Thales' Great Discovery of Solar Eclipse Time Series Clusters

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In 1991, in his book ***How the Shaman Stole the Moon***, William H. Calvin described how observations of new moon time series clusters have been used to predict lunar and solar eclipses. He noticed: *While lunar eclipses occur at intervals of multiples of six lunar months (i.e. 6, 12, 18, 24, 30, etc.), many occur a month earlier (17, 23, 29, 35), so eclipse prediction is potentially quite easy, as long as you can sometimes be wrong.*

Over the years, I came across solar eclipses occurring at an interval of 6, 12 & 18 new moons:

At the age of 11, together with my dad on the roof of the building we lived in Geneva, there were two occasions when we observed solar eclipses. My dad had fixed a glass slide to the end of a cardboard tube and cautiously blackened it for a safe viewing. It turns out those eclipses were exactly **6 new moons apart.**

Recently, by looking at the dates of forthcoming partial solar eclipses in Nîmes, where I currently live, I noticed that the next two will be **12 new moons apart.**

And, in 2002, during a French CNRS mission in Angola, I had pointed out to the attending students that the forthcoming total solar eclipse and the preceding one were **18 new moons apart.**

Further investigations revealed that the most frequent solar eclipse interval turns out to be 18 new moons, which have repeatedly been observed to occur within clusters of **35 new moons**.

Twenty eight centuries ago, prior to his famous prediction of the -584 eclipse, Thales of Miletus had had the opportunity to observe and record ten solar eclipses. The eleventh in the list below is Thales' predicted eclipse:

Timelaps *Lunar months*		Date (*Local Time*) *sunset /sunrise*	Height	Masked
35	18 [	-610.04.17/17:58C1 *18:39*	7°	<20%
	17 [	-609.09.30 / 08:37	30°	58%
	18 [	-607.02.13 / 15:42	20°	76%
		-606.07.30 / 09:41	53°	62%
		-602.05.18 / 08:11 SAROS 57/-05	36°	49%
35	18 [	-596.07.09 / 05:09 *04:47*	3°	72%
	17 [	-595.12.23 / 16:55 *17:00*	-0.1°	61%
		-593.05.09 / 08:19	36°	46%
35	17[	-587.07.29 / 19:17 *19:26*	0.6°	93%
	18 [	-586.12.14 / 11:04	27°	74%
		-584.05.28 / 17:58 *19:14* SAROS 57/-04	13°	97%

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Among the solar eclipses over Miletus, the actual ones Thales did observe prior to winter solstice -586 enabled him to discover the pattern of solar eclipse time series' clusters. He used those clusters as the tool for his prediction.

Thales might have identified the three 17 & 18 new moon time series and even the *three 18 & 35* new moons time series, however, not yet the 223 lunar month Saros cycle!

To summarize Thales' discoveries**:**

1/ in time series, morning and afternoon eclipses occur alternately;

2/ such a time series beginning by a 17 new moon cluster will be followed by an 18 one or vice versa.

He may also have disentangle morning from afternoon eclipses, and discover the 35 new moon cluster time series.

Thales could not have imagined, that for sites relatively distant of Miletus, *a local statistical prediction* will not be automatically valid. Except for this hidden parameter, those time series were exactly what he needed to foretell over Miletus, a 1½ year in advance, a *partial* solar eclipse. Therefore, confident in late spring fine weather, after the solar eclipse of winter -586 *(or already after the -587 solar eclipse, assuming he had identified the 35 new moon cluster time series)* Thales made his qualified guess upon the occurrence of the -584 astronomical event.

It should be highlighted, that the eclipse predicted by Thales, as well as all the eclipses he previously observed over Miletus, were partial solar eclipses. The first historical *predicted* partial eclipse, *which turned out by chance to be total over the Babel Tower*, occurred 450 years after Thales, I mean the one on the 29th day of the 13th lunar month of year 175 Seleucid Era, i.e.: -135.04.15 Common Era. I therefore claim that the *totality phenomenon* could not have been known by Thales or by the people in his surroundings. Generations of historians, however, are either unaware of this, and have presumed Thales' prediction as being for a total solar eclipse, or else dismissed his scientific work as folklore.

Conclusion: Having discovered New Moon Time Series Cluster, Thales predicted, several months in advance, to the Lydian king Alyattes, an afternoon *partial* solar eclipse for May 28th, -584, i.e.: *The Eclipse That Ended a War and Shook the Gods Forever,* as phrased it W.J. Broad his NYT paper of April 7, 2024.

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