

Astronomy and ancient eclipse art—Is it a science?

Abstract

There are many books on archaeology with photographs showing crescents of strange shape. Experts interpreted such representations as religious art depicting the Moon's crescent with gods or goddesses. The author feels that most of those explanations are superficial and incorrect since they usually show royal courts, astronomical events, and solar crescents during annular eclipses. Further, two eccentric circles on the sky may indicate total-annular eclipses of the Sun on the stelae, thus may offer solid absolute dates for ancient Near Eastern kings.

The main purpose of this paper is to encourage the advancement of the sciences on a no-man's land between astronomy, archaeology, history, and chronology. For example, astronomers could utilize improved Delta-T figures related to Earth's palaeorotation, taken from ancient solar eclipse records. (The Delta-T is the clock-time error caused by the slowing rotation of our planet.) A large number of new and reliable astronomical absolute dates could improve the half-life figure in the radiocarbon dating method, and effect dendrochronology as well.

This paper is limited to a brief description of several unusual crescent-shaped forms on ancient stelae, tablets, and cylinder seal impressions. They are from ancient Mesopotamia and the Near East, but our last paragraphs refer to Roman coins with similar design as well.

Keywords: eclipse, records, ancient orient, sippa tablet, seven evil spirits

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Zoltan A Simon

Geologist and land surveyor with diplomas, Canada

Correspondence: Zoltan A Simon, Geologist and land surveyor with diplomas, Canadian Hungarian amateur scholar, 72 Best Crescent, Red Deer, Alberta, Canada T4P 6G9, Email zasimon@hotmail.com

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Ancient eclipse art in the near/middle east

This entire interdisciplinary concept and the related research began by seeing a photograph of King Esarhaddon's stele found at Zincirli (Sam'al), in Turkey. It shows two eccentric circles in the sky, a circle inside a larger one, touching each other above (Figure 1 M-N). This is a rare combination in real life and not really a decorative motif. The photo made an instant impression on the author that it had been a design commemorating an annular-total solar eclipse seen there. A long search in books and articles yielded many similar "records." The more interesting ones are tabulated in Figure 1. At some of them we inserted a similar real configuration, usually from the nearest such eclipse, computed by the *WinEclipse* software.

Generally speaking, there is an almost unbroken tradition regarding this specific "eclipse art" in Western Asia, since about 2000 BC in Ur. However, regarding about a hematite cylinder seal from the Old Babylonian Dynasty, experts wrote, "This is a return to prototypes of the mid-third millennium BC." In many of the cases, the motif already appears as a widespread symbol, just like a conventional sign on a modern map. Here we do not claim that every ancient eclipse art item would be a true and accurate representation of an actual solar eclipse. Each one may depend on specific circumstances. For instance, if the artist, painter or sculptor did not see the eclipse but resorted to the descriptions of other observers, his work would likely be inaccurate. If a king had a chance to observe the eclipse by the help of a court astronomer—maybe through dark glass—the artist was probably obliged to follow the ruler's sketch or description. The ruler and the priests may have had a primitive astronomical tool to watch eclipses: some of the cylinder seals depict a vertical bar standing on a base, with a semicircle on the top. It may have served to insert a circular dark glass or other semi-translucent optical aid, like a polished thin disk of alabaster. Sometimes an assisting minister seemed to hold such circular object on a rod, maybe in front of the king's eyes during the eclipse. Pictures *c* and *k* on Plate XXVII in Frankfort depict these

ritual tools or instruments that are often shown. The king may have dressed as Shamash, the sun god, during the ceremonies.

Porada et al.,¹⁻⁵ published many illustrations of Old Babylonian cylinder seal impressions. Figure 2 several of those depict the Sun and the Moon in conjunction. Erich Lessing's Photo Archive shows more amongst 2137 images by "Ancient Orient" search. Strangely, the majority of the designs depict the Sun covering most of the Moon's disk – or its own disk – that are astronomically impossible. One can see this more clearly on a stele in the Musée du Louvre, also in Figure 2R. It can be associated this schematic symbolism with a Mexican drawing in the *Codex Telleriano-Remensis* on Figure 2P: "eclipse del sol – tierra eclipsada" (solar eclipse – Earth eclipsed). It shows that the sun covered part of a huge stone (the Earth or Moon) about the death of Chimalpopoca, referring to the solar eclipse of 30 October 1426 CE. In Mesopotamia, the main issue was the conflict of the Sun with the Moon, depicted only by a general symbol for eclipses. Many kings, like Nabonidus, simply copied such nice symbols used by the previous rulers. In general, depicting the darkness of a total solar eclipse may pose utter difficulties for a modern painter as well.

An impression of the cylinder seal (WA 134757) of Sin-Ishmeanni – son of King Sin-Iddinam of Larsa – shows him standing before his enthroned master, Sumu-Yamutbal, who holds a cup. A dwarf stands between them and a praying priest or priestess behind. A cylinder seal in the Metropolitan Museum of Art depicts King Ibbi-Sin's official, Ilum-bani. The king is holding a cup under the eclipsed Sun.

It is hard to tell whether the following designs show stylized or true eclipses: a stele of Ur-Nammu of Ur, Ilishkautul's cylinder seal (named WA 130695) under Erra-imitti's rule, stele of Dadusha from the days of Shamshi-Adad I's death, etc. On Ur-Nammu's stele, the complete Sun with its own long crescent underneath could be a hint to the two shapes of the same celestial body. They may remind us to a modern series of astronomers' stop motion photographs taken of the different phases of an eclipse, displayed together.



Figure 1 Possible representations of solar eclipses from the ancient near East and Rome.

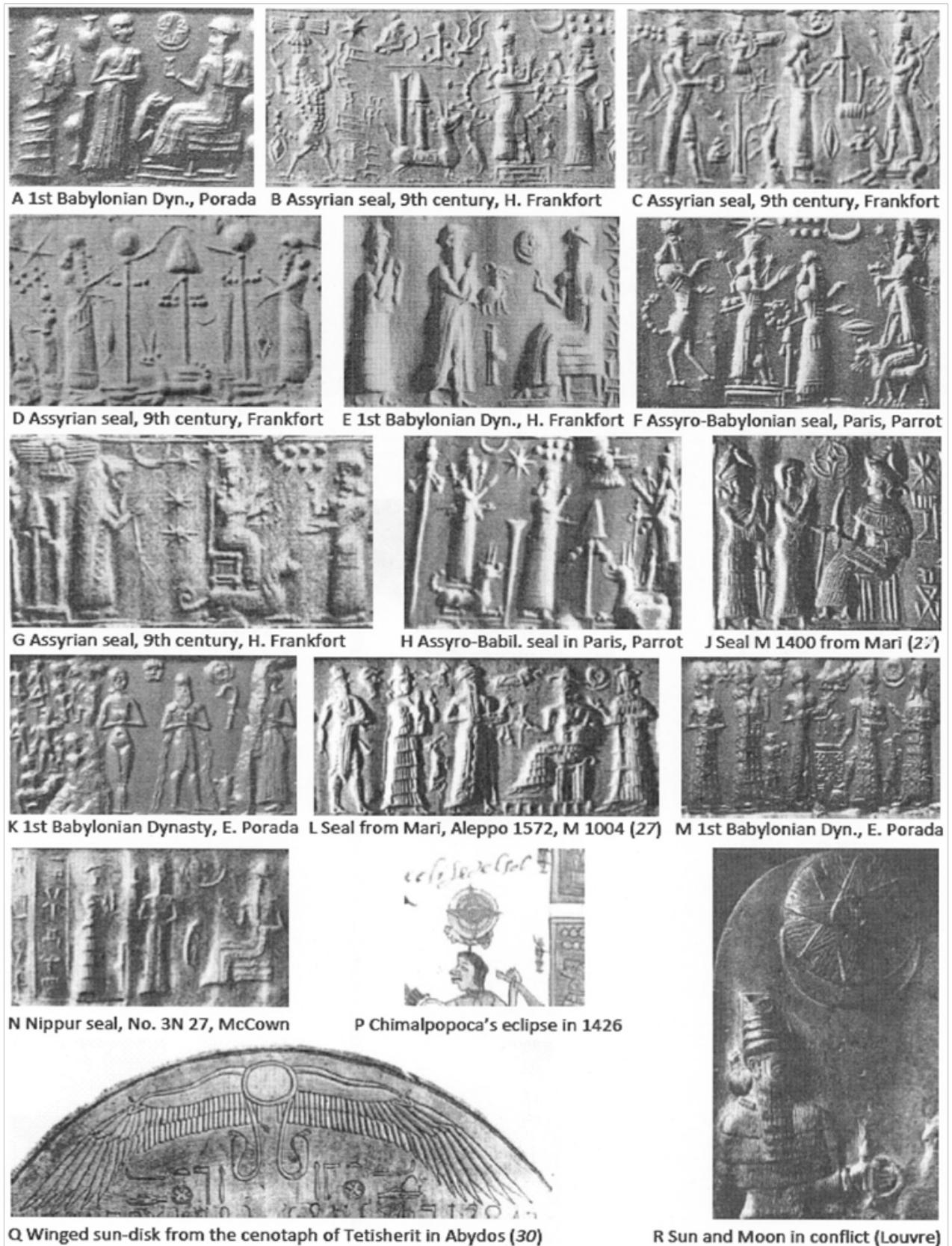


Figure 2 Possible solar eclipses depicted in ancient Mesopotamia, Mexico and Egypt.

A Canaanite stele of Hazor in Israel clearly shows an annular total eclipse and two hands raised in prayer towards the Sun. It may be dated to either 8 October 1764 or 28 April 1635 BC. The next similar phenomenon was visible from Hazor only in the twelfth century BC.

The *kudurrus* (boundary stones) of Melishipak and Nazimaruttash, Nabu-apla-iddina's "Sippar Tablet" named ME 91000–91004, and a stele (ME 90834) in the British Museum,⁶ erected by Marduk-balassu-iqbi, all depict Babylonian eclipses of the Sun. Annular–total eclipses are quite rare and excellent for absolute dating purposes.

King Melishipak's *kudurru* contains many of the mysterious cultic elements of the cylinder seals. Wikipedia shows its both sides under "Meli-Shipak II." The simpler side of the monument includes a standing ornate column, with a spearhead-shaped triangular thing at its top, in front of the sitting ruler. This cultic object is frequently recurring on the cylinder seals. The more crowded scene on the other side of the stone shows standing monsters and winged lions, a laying animal (a statue?) with straight long horns like those of a gazelle. These are common motifs on the seals as well. The fork-like symbol with a U-shape recurs on Ashur-nasirpal II's stele, perhaps referring to lightning. Another recurring motif, maybe an astronomical tool or cult item, is a wedge- or crutch-shaped standing object, usually with a semi-circular hump about its middle. The ruler often holds a chaplet with prayer beads – of Oriental origin – to count the number of prayers. A round wine-jar, a small naked girl, a rhombus- or vulva-shaped item, bull-men, or purification of a man by water appears in several pictures.

Governor Bel-Harran-bel(i)-usur was a palace herald during the reign of Shalmaneser IV. He occupied that office from the reign of Adad-nirari III onwards. He erected a stele for his new city – near the modern Tel Abta – built in the desert. Later, probably after the governor's death, Tiglath-pileser III made revisions or additions in the text of the stele. (An eponym under the late reign of Tiglath-pileser III may have been a later namesake of the governor in question.) This artistic monument named AM 1326 apparently depicts an annular–total eclipse seen at Tel Abta. Gaston Maspero and J. Pritchard also published drawings of this stele in their books.

King Adad-nirari III's Tell al-Rimah stele named IM 70543 commemorates a large partial eclipse of the Sun. The large dots represent the "Seven Evil Spirits," "Seven Judges" or "Seven Stars" (the Pleiades) above the Sun. They refer to an "eclipse", originally of the Moon, in the Assyrian vernacular: "against its face the Seven advanced." Therefore, it is not necessary to search for a major solar eclipse during which the Pleiades would have stood near the Moon. According to the stele, a bright star was apparently visible during the eclipse.

The partial annular eclipse of King Tiglath-pileser III, on 9 December 744 BC, is depicted at Nimrud. This drawing, originally from Layard, is not widely known. The Kurkh stele of King Shalmaneser III, related to his battle at Qarqar, depicts a partial eclipse of the Sun. The partial solar eclipse on Ashur-nasirpal II's stele is similar.

A few eclipse art items may depict either solar or lunar crescents. For instance, a stele of King Nabonidus of Babylon is clearly related to a Sin (Moon) temple. In this case, the crescent obviously means the Moon.

Based on the names and catalogue numbers in museums, mentioned above and shown here, it is relatively easy to find some

related photographs on the Internet by *Google* search. (Please refer to our Figures 1–2 below for the illustrations.)

A cylinder seal from Nippur and another one from the First Babylonian Dynasty (Frankfort's Plate XXVIIg) show extremely thin lines remaining from the eclipsed Sun. In addition, both of them depict a small creature in front of the king holding a cup. We find three Old Babylonian seals in Table G of Moortgat depicting a sitting king holding a cup. Two of them are associated with the eclipse symbol. (The ruler may have needed a cup of wine to strengthen his heart during a fearful eclipse.) On the other hand, at another scene – Plate 111.10 of McCown – the crescent is very thick, possibly showing an eclipsed Sun with a magnitude of only 70% or so. Thus, the thickness of the Sun's remaining crescent varies on the cylinder seals.

A paper entitled "*Rituals for an eclipse possibility in the 8th year of Cyrus*" mentions the playing on a copper kettledrum during a lunar eclipse. Our stelae and cylinder seals do not seem to depict any drum at solar eclipses. However, before a predicted total lunar eclipse, often a substitute king was appointed. Thus, the fury of heaven and the death of the real Assyrian king were averted by the enthronement of that substitute king who was sacrificed, perhaps during the eclipse. The head of a man shown near the eclipsed Sun may refer to the head of the decapitated substitute king, here due to an ancient solar eclipse.

The Mesopotamian-style symbol – the solar disk above its own crescent – was quite unknown in other regions, except Ugarit and Syria where the Egyptian and Mesopotamian influences met and their elements formed a combination. The "*ankh*" (*life*) sign meant Egyptian influence. Plates to *The Cambridge Ancient History* show the "dynastic seal" of Ugarit: a replica of the seal of Yakuru, son of Niqmaddu, king of Ugarit from the early second millennium BC. Ben-Tor⁷ shows a Syrian-style cylinder seal from Canaan: the common scene with an "ankh" cross, two sphinx-like winged lions, and a – possibly domesticated – lion clawing a gazelle-like animal.

Two cylinder seals from Mari are dated before Hammurabi's reign. The older one, described as Aleppo 6296 (M 1400), depicts a sitting ruler holding a long knife or saw-sword but no sacrificial animal is visible. The second seal, named Aleppo 1571 (M 1004) shows a sitting king with a dagger (?) in his hand. A minister or priest in front of him brings a small animal for sacrifice. The ruler sometimes holds a double-axe in his hand. Plate XXXVI/3 of Jastrow⁸ is a seal impression showing an almost complete solar crescent, similar to Esarhaddon's Zincirli stele. André Parrot⁹ (1958, figures 8–9 on page 96ff) has similar crescents of the Sun where the Pleiades and a star were visible—supposedly during an eclipse.

Some researchers believe that the drawings of winged solar disks refer to total eclipses where the solar prominences appeared like wings. If the winged sun disk was associated with major solar eclipses in Mesopotamia, as on pictures I and J of Figure 1 or B–G–H of Figure 2, this rule would apply for Egypt, too. In Egypt, the corresponding eclipse art was present mainly in the form of winged sun disks surrounded by one or two serpents, sometimes with the "*ankh*" symbol. In most of the paintings, the Sun was red, defined by a single line. In a few cases, its border was a double line that may represent annular–total eclipses. Alternatively, maybe the outer circle represented the limits of the Sun's halo, the corona. In many traditions, huge serpents (Egyptians, Mayans) or dragons (Chinese) caused the eclipses by eating up the Sun. This was practically an international motif.

Ahmose I, first king of the 18th Dynasty, depicted such concentric circles on the (CM CG34002) funeral stela from the cenotaph of his grandmother Tetisherit(t) at Abydos. See Figure 2Q. Archaeologists date it to the second half of his rule. In the Middle Chronology, this event may correspond to an annular–total eclipse of the Sun in 1562 BC. Other candidates between 1750 and 1350 BC are 1710, 1689, 1646, 1635, 1601, 1508, 1410, and 1389 BC. These were annular eclipses, while total eclipses occurred in 1741, 1533, 1523, 1478, and 1352 BC.

The “Sphinx Stela” of Pharaoh Thutmose IV is dated to ca. 1390 BC, using the Middle Chronology. A huge winged sun disk with concentric circles, surrounded by two cobras, dominates the scene. It seems to depict an annular–total eclipse. More interestingly, one can find a corresponding annular–total eclipse of the Sun on 9 February 1389 BC in Egypt. Therefore, it is quite possible that the painting depicts a real eclipse of the Sun.

Otherwise, in ancient Egypt, the notions “horizon” and the “eclipse” had a close relationship, perhaps because many solar eclipses near the horizon were visible by the naked eye. One of the two hieroglyphs is the solar disc touching the horizon between two rounded mountains. Seth was the god of darkness, chaos and confusion – that probably included major solar eclipses. An Egyptian researcher is claiming that the *Sed*–festivals (or *Heb*–*sed*) were associated with eclipses and rejuvenation of the Sun’s and Pharaoh’s power. We are of the opinion that he is correct, so studies of those festivals may eventually lead to a reliable Egyptian absolute chronology.

As a by–product, such identifications of several eclipses in ancient times could help astronomers to get more accurate Delta–T figures. Those values, in turn, would reveal us the parameters that define the palaeorotation of our planet, contributing to the research of the long–term variation of the rotation rate of Earth. One of my manuscripts contain almost 200 eclipse maps from the total solar eclipse of Sargon of Akkad on June 14, 2353 BCE, till the nineteenth century, taken from many ancient nations of the world. No publisher of the world seems to have any interest in publishing such an important handbook.

Solar eclipses on ancient coins

Some coins on the Internet (Nebel)¹⁰ at are interesting. The obverse of an L. Lucretius Trio denarius from c. 76 BC (cat. #274) apparently depicts the solar eclipse of 6 March 78 BC in Rome. Its magnitude was 85.79% so perhaps seven “stars” (Vega, Arcturus, Capella and four planets) became visible.

Two other catalogues (Sear and Tkalec) contain a coin showing a crescent of about 270 degrees in extent: if we draw two lines to each cusp from the origin of the larger circle – the Sun – the two lines would form a right angle. Therefore, these coins do not depict the Moon but definitely the Sun. (In case of the Moon’s crescent, the circle’s origin would lay on the connecting line.) The coin’s description is: “P. Clodius Turrinus, AR denarius, (3.41g) 42 BC, Radiate head of Sol right, quiver behind. / Crescent moon and five stars, P CLODIVS M F below...” This is a Roman coin minted by Clodius Turrinus, allegedly in c. 42 or 43 BC. Its catalogue no. is 274 in Tkalec. For us the most interesting is a great similarity between the coin’s solar crescent and the identical shape of the Sun’s eclipsed disk on 7 March 51 BC. Perhaps the gap of 8–9 years is explicable because that unique sight had a deep effect on Clodius and he always remembered the pattern. That eclipse had a maximum magnitude of 82.93% there, so Jupiter, Venus, Mars, Vega, and Capella may have been visible. Many authorities claim that “stars” could be visible only over (a magnitude of) $m=90\%$.

The excellent Sky View Café astronomy software on the Internet shows you almost everything you may wish to see on the ancient skies. (We used the same program for the previous two paragraphs.) Saslaw and Murdin refer to a possible solar eclipse shown on an ancient coin of Istros on the western shore of the Black Sea. We are of the opinion that it depicts the eclipse of 14 July 337 BC.

You can do your own research

The most scholarly way for readers less familiar with astronomy and eclipses is to study the books of Professor Stephenson¹¹ and others. In addition, the *WinEclipse* astronomy software copyrighted by Scsibrany¹² is extremely useful in viewing ancient eclipses. In the present article, we have used his program. Sometimes we printed out the shape of the darkened Sun from a similar eclipse in the decades in question, seen at the same geographical location. (You may type in the – positive or negative – year or an interval, the latitude and longitude of the observation point, and the speed of the animation. You may even modify the recommended value of the Delta–T, the correction for the clock–time error usually expressed in seconds. Both *WinEclipse* and the user–friendly *Sky View Café* are very simple and straightforward, a lots of fun to learn astronomy. Finally, the readers can always refer to the extremely useful academic publication of Kelley & Milone¹³ as a handbook on archaeoastronomy.

It remains to be seen whether any of these suggested eclipse representations would ever become useful for scholars. Many of them may claim that eclipse art items should be regarded as curious freaks of (human) nature, mere coincidences. Similar opinion ruled about fossils two centuries ago, as devil’s creations in order to mislead the believers. Then, it was claimed that fossilized seashells found in the Himalayas proved that Noah’s flood once had covered those mountains. Mainstream scholars held both conclusions to be hasty and superficial. However, those “freaks” laid the foundations of a new science in those days: palaeontology, the study of prehistoric life.

A few centuries ago a few astronomers claimed that the Earth was orbiting around the Sun and not the other way around. Some of them were burned or executed for their doctrines. About 120 years ago certain scholars warned the world that the speed of the first automobiles may kill the passengers. When our older generation was born, every scholar believed that the Universe has no life except on planet Earth. Today they know of thousands, if not million planets where life is possible. If you told someone that one day man would walk on the Moon, everybody would have declared you a crackpot. Schliemann was ridiculed for believing in the Trojan War and the existence of Troy’s ruins. Wegener became a laughing stock of others for pointing out the resemblance of the eastern coastline of South America and the western coastline of Africa. Today we admit that Schliemann has found Troy and Wegener gave birth to a new science of plate tectonics studying continental plates and their drifts.

The present author understands that there are at least four competing chronologies from “High” to “Super–short” for the ancient world. He is reluctant to take sides in this article in order to keep the peace between the rivals. Thus, authorities could pick eclipse candidates that would fit their theories or chronological systems the most harmoniously.

On the other hand, writers must be honest to their readership. Having said that, the instant author needs to confess that he does not believe in the chronologies of mainstream archaeologists. The old “dead reckoning” still dominates for most of them. Old habits, like the absolute confidence in the correctness of the regnal dates of Egyptian and Assyrian rulers, die hard. Generally, those scholars

accept a possible error of one or two years but no more. Such rigid approach has been challenged by dozens of physicists using the “modern” radioactive dating method that has improved a lot since the days of Libby. We may read about an alleged war sometimes called “archaeology v. science”.

Lidén K & Eriksson G¹⁴ published a good paper entitled “*Archaeology vs. Archaeological Science. Do we have a case?*” They referred to the publication series *Natural Science in Archaeology*, specialized in archaeometry, with the aim “to bridge this information gap at the interface between archaeology and science”, as expressed by its editors Bernd Herrmann, a physical anthropologist, and Günther Wagner, a geophysicist. The authors call for genuine collaboration between scholars since “it takes two to tango”.¹⁴

During the last decade, such dispute and skirmishes between two interdisciplinary sciences – radiocarbon dating combined with dendrochronology vs. archaeology – seem to have escalated between the two camps. Some of the scholars call it a rivalry between radiometry as a real science and archaeology as only a subjective science. Both camps are silent about astronomy which is a true science. Of course, archaeology is a real science and one should accept, for example, Professor Bietak’s suggested date for the explosion of the Greek island of Thera. However, such super-explosion happened in two steps and no one can give an exact interval between the two catastrophes. Also, the radiometry camp appears to be correct by stating that the traditional reigns of the king of Egypt in the 17th and 18th dynasties are too low, perhaps by centuries. That appears to be true. Part of such error came from the fact that mainstream scholars many decades ago accepted the Middle Chronology (where Hammurabi ruled from 1792–1749 BCE), instead of the High Chronology pioneered by Professor Peter J. Huber. His system, in which Hammurabi reigned from 1848 BCE, is much stronger scientifically than any other chronology.

The instant author’s humble prediction is that neither of the two camps will obtain a lasting victory without the consideration of astronomy. Our “eclipse art” may only be a small peripheral field but the complete ignorance of dozens of Egyptian eclipse records will take its toll one day. The Egyptian kings or pharaohs often celebrated visible eclipses of the sun, probably a few days after the astronomical event. As the rule of the Sun was confirmed by the “rebirth” of the sun, the rule of the king was confirmed and celebrated as well. The pharaoh was the mirror image of the sun. Their celebrations of the “sed-festivals” or “*heb sed*” form a great contrast with the reaction of the ancient Greeks before the Peloponnesian War. King Agamemnon cried in the last year of the Trojan War because even the Sun and the Moon were not safe: a hint to a pair of lunar and solar eclipses in Homer. Or, the Argonauts, the sailors of the ship name Argo, cried at the sight of a major eclipse of the sun when the islet of Anaphi appeared at the end of the darkness.

It shall be reiterated that the author prefers not to mention key dates in this paper, in order to reduce the number of possible attacks from every direction.

Perhaps a hint about two or three suggested fix chronological points may be included though. First, the Roman historian Julius Solinus have saved us an ancient record regarding the length of the independent Carthaginian state. Solinus wrote that Carthago existed for 737 years after its foundation, until Scipio razed it to the ground in 146 BCE. Citizens of that city may have kept in their memory for generations the length of such important interval. Reckoning back from 146 BCE, we get 883 BCE for the foundation of that city in or after the seventh regnal year of their King Pygmalion. The predecessor of

Pygmalion was Matgenus or Mutgo, the biblical Mattan. Traditional Israelite chronology works out with this Carthaginian date just like a Swiss watch.

Wikipedia¹⁵ is often a battlefield of extremist views. I learnt that an “editor” with the pseudonym “Infrogmaton” simply deleted my whole text of 2003 from under “Phoenician Chronology” in 2004. [Similar was the fate of my Wikipedia¹⁶ page entitled “*Ab Urbe Condita*” about the foundation of Rome from the astronomer’s point of view.] One can still find those texts in Wikipedia^{17,18}’s junk yard or back yard after a search.

Returning to Mattan, king of Tyre and high priest of Baal, he could have been “King Matinu Baal of Arwad” who sent 200 soldiers to the Battle of Qarqar (see Wikipedia). Arwad’s seamen and soldiers were in the service of Tyre, according to Ezekiel (27: 8,11). The corrected date of the reign of this King Mattan or Matinu would and should modify every date for the Assyrian kings, at least before the widely accepted solar eclipse of the eponym Bur-Sagale on 15 June 763 BC.^{19–25} Unfortunately, we do not have an “eclipse art” record depicting that eclipse and the identification is not beyond doubt if the Assyrian eponym lists only recorded years connected with important events. Perhaps some of those lists skipped the uneventful years altogether. In any case, if King Shalmaneser III of the Assyrians arrived in the Battle of Qarqar in 853 BC but the troops of one of his adversaries, sent by Matinu or Mattan, arrived in or around 907 BC no battle could have taken place.^{26–29} The difference between the two suggested dates for the battle is close to fifty–six years that is the shift between the middle and high chronologies: the former places Hammurabi’s accession in 1792 while the latter in 1848 BCE.

Second, no mainstream scholars seem to care much about recorded eclipse pairs when a solar and a lunar eclipse took place a fortnight apart from each other. My mentor, Professor Peter J. Huber is one of the exceptions. When I called his attention to such eclipse pair in the hymns of King Shulgi in Jacob Klein’s book, he was glad to examine such rare occurrences. He found two possible candidates in Shulgi’s reign in the High Chronology but no meaningful match exists in the other chronologies. A similar pair of eclipses is mentioned in the Book of Joshua, during his battles at Gibeon, the modern El Jib. The Sun “stopped” in the middle of the sky and the Moon above the Valley of Ayalon, almost for one day: perhaps “almost on the selfsame day.” Many astronomers in Eastern Europe in the middle Ages used the wording, “the Sun stopped on the sky”, when they referred to a solar eclipse. They meant that the Sun stopped shining, even during partial eclipses. The Bible does not claim that “the Earth stopped rotating for a full day”, only a few dozens of disoriented bible interpreters do in our days.

Third and last, if you feel sick and tired of the increasing number of chronological schemes of the ancient world, it is a kind of joy and satisfaction to read ancient Irish or Scottish chronicles. One may get the impression that their ancestors kept recording the passing years with high accuracy, just like the ancient Jews, Greeks, Romans, Chinese and Mexicans. Those Gaelic records of the middle Ages, independently from each other, remembered the exact date of their departure from Egypt. (The *Annals of Inisfallen* and the chronicles of John of Fordun agree on the year.) Other traditions remember that their ancestor Gaythelus was swimming when a serpent bit his arm but Moses cured his snakebite. This must have happened in Nubia in their young age. Decades later the Egyptians expelled the tribe of Gaythelus because they refused to participate in the persecution of the Israelites in the days of the Exodus.^{30–34}

Human history is much more than comparing broken pots and examine the stratigraphy where they were found, or adding a combination of radiocarbon dates and “wobble-matched” tree-ring counts under the name of dendrochronology as icing on a cake. (After all, the readers have no idea whether such dates or results have been uncalibrated, undercalibrated, or overcalibrated because so many calibration curves exist. The public cannot see those crucial wobble-matched tree ring sequences and no one can improve them. No wonder that most archaeologists are not too enthusiastic about such a mess right now.) And we have not yet mentioned the “chronological fault line” produced by the calibration of radiocarbon dates, supposedly going through ancient Greece, based on the year rings of bristlecone pine.^{35–39}

Traditions of every nation make this dull scientific picture much more vivid and realistic. The real history of many nations may be called “surreal.” Real history is more exciting than many science fiction books.

A serious difficulty about the subject of this paper is that it belongs to a “no man’s land” in the sciences. An astronomy editor may shift it to an archaeology publisher because it contains a lot of archaeology. An archaeology editor would likely push it to an astronomy publisher because it has nothing to do with archaeological digging and it contains a lot of astronomy. Chronology does not have tenured scholars and officially does not exist. Thus, one may be concerned that there would be no quick advancement in this scientific vacuum for many years, until professors and faculties of chronology would be appointed in the universities.^{40,41}

Turning to a more interesting area, the present author has seen the northern lights in the city of Red Deer (Alberta, Canada) three times between April 2010 and the first days of November 2011. Therefore, he was familiar with the appearance of that phenomenon. Also, in 1982 he observed red (pinkish or purple) northern lights on the sky to the north of Seattle. Apart from his three sightings of such northern lights, once he has also seen a new and very different celestial phenomenon as follows.⁴²

On a night, probably on April 4, 2010, near the eastern city limits of Red Deer, horizontal waves or strips of northern light appeared on the entire sky. They were totally different from the regular northern lights. (Perhaps we may call them “northern belts” as well.) Between 22:00 and 23:00 in local time, the author observed this fantastic phenomenon for about fifteen minutes. It was seen on the clear sky and must have been visible for many persons in town. Shiny, brilliant stripes like belts were moving at regular intervals and distances on the night sky, coming from north. (They seemed like waves that arrive at the seashore, parallel to the coastline.) Of course, the colour of the belts was silvery like starlight. The central zone of each belt seemed more brilliant, or having higher density and total uniformity. In this sense, their steadiness was not comparable to the capricious forms and always changing shapes of the common northern lights. The “waves” run in an east–west direction like parallel lines. They rose above the northern horizon, and followed each other with a frequency of about four or five seconds. Thus, a wave of shiny belt passed over my head once in every four or five seconds. Each seemed like a very narrow and sharp but straight “Milky Way” and the width of each belt was uniform, each with a constant width. The sight was so majestic and amazing that there is hardly any word to describe them. It was a feeling like traveling by a spacecraft, and crossing new galaxies at regular intervals. It seemed like touching the pulse of the universe, a vibrating and pulsating feeling through immense power. It gave the

impression that the universe was alive. Unfortunately, I did not have a camera on me and cannot provide photographs. Due to the rapid movement of the belts, a photograph may have shown a blurry image anyway.

The air was cold and I went to sleep, assuming that a picture of the beautiful celestial phenomenon would be in the local newspapers on the next day. However, nothing has been published. Maybe most of Red Deer’s population was sleeping, watching the TV or simply did not have a camera to record this wonderful thing. Many unique things may have happened during the last five millennia that have not been recorded or did not come down to us.

For practical considerations, it is better to conclude this study, with a separate bibliography below. Another similar paper will follow below about the astronomy and art of the ancient Mexicans, with an independent bibliography.

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None.

Conflict of interest

Author declares there is no conflict of interest.

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