

Zoltán Skoda

**THE FINAL COUNTDOWN
ELIMINATION OF
OUR VIRTUAL
CHRONOLOGY**

The new chronology of historical eclipses

THE HUNGARIAN CALENDAR

ARCHAEOASTRONOMY

BUDAPEST – WIEN – DUBLIN 2018 CE

200 YEARS, WHICH WILL SHAKE THE WORLD

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THE FINAL COUNTDOWN
ELIMINATION OF OUR VIRTUAL CHRONOLOGY

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To "Claudius Ptolemy"
To Regiomontanus,
To Sir Isaac Newton
To Professor Robert R. Newton
And for to all Academy of the World

PREFACE TO THE SECOND (ENLARGED) EDITION

In the first edition (2016) I have surveyed the historical solar and lunar eclipses from „the date of the Creation of the World up to the western campaign of Attila the Hun (CE 644/AD 453) adding to those eclipses a few of their chronological starting or corner points. In my recent study I reached the year of CE 1575. The attentive Reader could already discover also in my previous study that the number of those eclipses which were titled by the academical science as „magic, ghost, false date, usual (false) date, misdated, fictitious, no clear record, predicted, uncertain, possible, invisible, ambiguous, doubtful, alleged, unidentifiable, unlikely recorded” eclipses or „confused predictions” only, was drastically decreased by me.

In the first edition of my recent study using the Hungarian Calendar (the time-slip hypothesis of 190/192/194/196/198 years) I have already identified 80 historical solar and lunar eclipses. In my opinion the identification of those eclipses is 100 % sure. In the beginning period of my researches when I unreservedly believed in the correctness of the retro calculations related to the past 2800 years I was somehow limited in my field of research, although from the start I was a bit disturbed by the uncertainties of the delta-T. From the Canon of Theodor Oppolzer I have selected the pictures of the solar eclipses from the „era preceding the involvement of the delta-T” and I considered the explanations of Ginzel. In order to exclude successfully the uncertainties, in more details I have studied only the solar eclipses of west-east direction. Luckily for me the solar eclipse which took place at the location of Nola around the time of the death of Augustus Caesar (Aug 19 AD 14) was enough to prove the righteousness of the Hungarian Calendar (Aug 14 CE 212) in the chronological dispute with the traditional chronology which was determining its date mistakenly and is using its mistaken date up to now.

Originally the Hungarian Calendar hypothesis was born in order to eliminate the existing anomaly of the vernal equinoxes (MEQ).

When it became evident that 19 lunar eclipses of Ptolemy were placed on the time-axis mistakenly, and were misplaced by 196 years, I was freed from the necessity to consider the illustrations and the data of the retrocalculated solar and lunar eclipses as completely accurate.

It is well known that the year of the birth of Jesus Christ is the basis for our recent time-counting. However the year of our Lord”, or in Latin „Anno Domini”, is a bit problematic, since we do not know when was it, how many years ago counted back from our recent days! Some people (the humanists) found out that it was 2018 years ago, that is in the 0 year astronomically. They also decided that CE (Common Era) is not else than AD (Anno Domini), consequently AD 1=CE 1! At the same time regarding to the birth of Jesus can be proved an at least 5-9 yearly of date difference in the field of academics research.

As at now in academics circles they try to ply down the importance of BC and AD terms, saying that these are out of real use today.

But it is simply not true, CE 1=AD 1 and BCE=BC are in common use further on.

However it was scientifically explained that BC 1 is not else than the „0” year. Thus it does not matter that Jesus was born in BC 5/BC 3/BC 1 /AD 1/AD 3, etc.

The Hungarian Calendar, with certain preconditions, puts the birth of Jesus in the year CE 194, but relaxing these preconditions locates the year anywhere between CE 191-194.

Having such a big difference in years, the historical Christian chronology cannot be maintained any more.

Perhaps it is needless to say that when we search on the basis of the Hungarian Calendar for astronomical events, which happened in times closer to us by 200 years, and when we identify them properly, we at the same time invalidate all the earlier identified astronomical events up to a certain point. Moreover, it is not obligatory to search constantly for an event at an exact 200 year distance, since it is only a freak of fortune that the real event and the mistakenly identified one are separated from each other by exactly such a time-distance.

But why should my reader believe more in me than in scientific research of a 400-year period of time? My heaviest arguments, of course, will be those astronomical events, which resisted all of science’s efforts to be identified during the past 400 years. They tried the identification but with no success at all. As we mentioned earlier the academics science titled them as „magic, ghost, misdated, uncertain, fictitious, doubtful, alleged, etc.” eclipses. On the other hand, on the basis of the Hungarian Calendar the events happen to be there, at which place they must be situated according to the orthodox science as well.

Showing a couple of such decisive events on behalf of the Hungarian Calendar settles the case. There is no more need to continue the comparison of the earlier (by 200 years) mistaken event with the real one, and does not make sense to muse on which is the better of the two! It is more so in a case when we have a literary reference with day accuracy, since such a reference **can be only a product of later retro calculation.**

Surely nobody could hear in the first century about an erroneous idea (of starting year identification) created by Dionysius Exiguus of the 6th century...

Starting from the middle of the 15th century the interest of the scientists to find out more about our past was quickly growing and they also realized that an astronomical knowledge is also vital for that reason. Our foregoing’s were recording the events very diligently leaving for the posterity a lot of astronomical data recorded in a greatly varied chronological systems (Seleucid era, Arsacid era, Egyptian Calendar, Old Roman Calendar, Byzantine era, Old type Christian chronology, era Safar/Spanish era, etc.)

In 1538 J.J. Scaliger presented also the basic astronomical time-axis of our history selecting the starting point as the date of January 1st of the year -4712th, 12.00 hours. This is the so called Julian Day=0, or most commonly the beginning of the Creation of the World.

„Julian Day (JD) is the continuous count of days since the beginnings of the Julian Period used primarily by astronomers. The Julian Day Number (JDN) is the integer assigned to a whole solar day in the Julian day count starting from noon Greenwich Mean Time, with Julian day number 0 assigned to the day starting at noon on January 1, 4713 BC. The Julian day number is based on the Julian Period proposed by Joseph Scaliger in 1583 at the time of the Gregorian calendar reform.”

Following this calendar reform our honest scientists according to their best knowledge started to copy, convert and also „correct” those dates of the earlier chronicles which were not seemed properly placed on the time-axis. The historians even today do the same in order to save their readers from continuous calculations. The conversion, or retro calculation inevitably can be the source of mistakes, and in cases when we do not have the source from which they got and converted the date, we have not any chance to question their data which is given by day exactness. It was the situation up to now. In the 19th century the great scientists who worked on the sources were already less meticulous having their feeling self-confidence, self-importance and arrogance they filtered out a lot of „mistakes” from the sources and removed those old data forever. The most famous scientists themselves became basic sources (Mommsen, Ranke, Duby, Homan, Kristo, etc.)

Further on the self-importance feeling and the arrogance is ever growing, not only the historians but the astronomer-historians too are taking similar trend. In order to produce the solar and lunar eclipses’ maps of their like they are ready to modify the equations of the moon, using a mysterious Delta-T, they try to prove their correctness.

Today the situation is worse than in the time of Galilei. It is true that auto-da-fe is not yet introduced, but there is the conspiracy of silence, the complete censorship in the field of scientific literature. It is impossible to publish in a scientific journal since a time-slip hypothesis of 200 years is considered as nonsense, consequently it is unscientific. Visiting „the scientific forums and blogs” you can find not a better situation. The comments are screened and moderated; the moderator can rightfully exclude and shut out completely from the forum. Very scientifically they can qualify the different opinion as a category of topic’s disturbance. Never mind that we live in the era of internet, the universities and research institutes are protecting their employees and „good name” from uninvited letters (qualifying them as spams), so there is no space for electronical publication of any new approach (hypothesis) and to discuss it widely with the public.

During the past 15 years the only refreshing and nice exception was the Trinity College Dublin where the Trinity Centre for Medieval and Renaissance Studies gave me an opportunity on February 24th in 2016, and I could present briefly my hypothesis.

The only remaining field for me is the category of alternatives, where again the agents of the academical science are lecturing us, destroying the topic, and at the end, when they lack of any argument, they switch over to the mental state and the medication problems of the opponent, or they mention the conspiracy theory which can already involve legal consequences...

At the present time we are in this sad situation.

Dear English speaking Readers who is interested in my study never mind the above said. I wish you good reading and looking for your kind attention which can help you to understand my presented theory, or might generate your wish to read more about the same subject from my previous books.

Zoltán Skoda

PREFACE

Here in my recent study I present in brief all my astronomical results of all my previous books. In addition I also present the determination of the dates for several ancient astronomical events.

I had hoped for a while that someone else, with more extensive training in astronomy, would step forward to complete the task. Since nobody accepted this challenge, you must rest contented with my unprofessional studies. However, I hope you will find this content rewarding! Naturally, there will be those who find my work less than rewarding!

I gratefully acknowledge my debt to major scientists of the past, particularly T. von Oppolzer, F.K. Ginzel, and Robert R. Newton, whose works gave me a professional orientation, and opportunity to educate myself in astronomy, and good guidance regarding solar and lunar eclipses. It is a pity they have passed from us before the creation of the Hungarian Calendar.

The eclipse maps, figures, tables, and predictions appear here by courtesy of Fred Espenak, of NASA's Goddard Space Flight Center.

I wish all my readers a good read. Please take my analysis as food for thought and hazard a guess for the future consequences.

Zoltán Skoda

INTRODUCTION

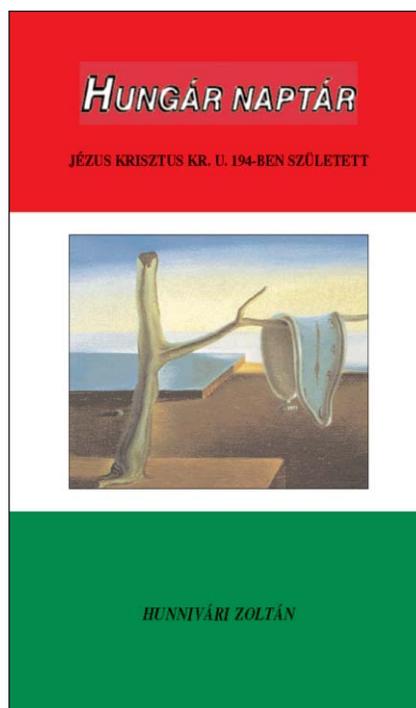
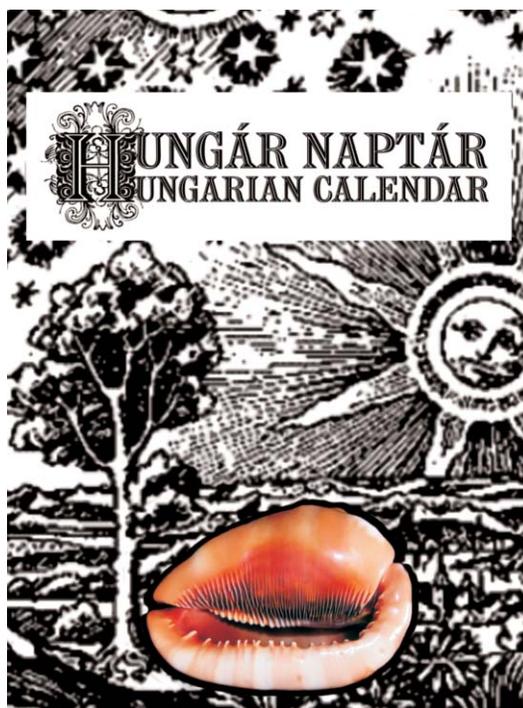
The aim of this study is to provide astronomical support for the *Hungarian calendar* hypothesis, through a critical analysis of solar and lunar eclipses which occurred during the 2000-year period following the introduction of the Nabonassar era, and which are recorded in literary works. I am well aware that not everyone is familiar with the Hungarian calendar hypothesis, so I shall repeat it here briefly.

The *Hungarian Calendar* hypothesis maintains that Julius Caesar introduced the Julian calendar in the year of CE 152 which is the result of astronomical backward counting from the present and means a period of time elapsed 1866 years ago. The officially accepted and universally propagated date for the introduction of the Julian calendar is the year of BC 45 which differs by 196 years from the proposed date, CE 152, of the *Hungarian Calendar*.

The *Hungarian Calendar* has determined the date of CE 152 as the starting date of the Julian calendar by astronomical backward counting of the time related to the vernal equinoxes (spring points). The “New chronology” was then verified and confirmed by the critical analysis of historical solar eclipses.

The conclusion of the *Hungarian Calendar* is that the dates of the vernal equinox (spring point) took place on March 21 of the Julian calendar (CE 152) and on the “Augustan correction” (about CE 190).

The *Hungarian Calendar* provides the answers for why Pop Gregory corrected (very rightfully by the way) the calendar by only 10 days in 1582. In addition, the *Hungarian Calendar* hypothesis maintains (on the basis of the same backward counting of the time) that Jesus Christ was born about CE 195 assuming that Jesus died when He was 33 years old.



CHRONOLOGY AS SCIENCE

Civilized nations have developed time-measurement and time reckoning into a science. This science is the chronology or science of eras and today both have become very independent and an important auxiliary science of historical science.

Almost everywhere and at all times, time-measurement and time-counting have been related to the motion and alteration of celestial bodies. In our Julian/Gregorian calendar, for example, we need only the concepts of the day and the year. A method of time-measurement which is based on the exact calculation of motion from celestial bodies is the subject of mathematical chronology.

Historical chronology gives us a picture showing the time-measuring and time-counting methods of different peoples in different eras.

The components of our recent time-reckoning come partly from the peoples of the ancient times and the results of amendments made in the Middle Ages.

As I have already mentioned in my Book – “Hungarian Calendar” (2004), uninitiated readers are generally convinced that chronology (time reckoning) is completely self-evident (being extremely simple), and there is no reason to doubt the accuracy of its presently accepted database.

I would like to mention that chronology started to become a science during the 17th-18th centuries when different European countries began to provide big source-edition serial publishing. In the 19th century, chronology became the most important auxiliary science of historical science and eventually became an accepted independent science.

The scientific chronology corresponding to our modern understanding was introduced by the great French humanist J.J. SCALIGER (1540-1609) and his opponent, the Jesuit monk D. PETAVIUS (1583-1652). Since the publication of the fundamental works of SCALIGER and PETAVIUS, “scientific chronology” has continued to develop.

Scientific chronology emerged in the 19th century, while relying on every aspect of the prescientific Christian time reckonings of medieval Europe (starting from the Creation of the World) which in many of their elements differed from each other. The highly complicated synchronization between the different calendar systems was done in a period of time which was lacking any scientific basis, and resulted with only minor corrections.

Thus from the point of view of chronology we have an absolutely unfailing system of measuring time (called chronology) since 1582 only, i.e. since the introduction of the Gregorian calendar, more precisely since the 4th/15th of October, 1582.

ASTRONOMY IN THE SERVICE OF HISTORICAL SCIENCE

It is a well known fact that the records of numerous astronomical observations reached to us in different chronicles and in old accounts of travels, and for ages there were more or less successful efforts to identify those astronomical observations. It is widely accepted by historians that history is usually written after an event and typically by the victors. Consequently, in every case, the veracity of each record must be examined very carefully.

We are equally aware that the dates of the historical chronology are verified by the historical solar and lunar eclipses and our recent academic science relies heavily on those dates without any hesitation.

Archaeo-astronomy is an interesting branch of science since it connects astronomy, an exact natural science, with historical science, which is an extremely subjective one. What principally connects them is time. Both parties must learn something additional, the astronomer by getting some historical knowledge, and the historians, for their part, by gaining some experience in recognizing astronomical phenomena.

Nobody can question the “historical” events which took place on 11th of August 1999 when, above Eurasia, a total solar eclipse was observed. But how far can we travel into the past and still have the same sense of security. Academic science is very optimistic in this regard since we explained to schools that we can journey safely back as far as the beginning of the first millennium BC. However, studying astronomical phenomena (mainly meaning solar and lunar eclipses) we can go back to the past and can examine about 2800 years.

Our chronology is determined by absolutely safe corner-points such as the beginning, 45 BC; the death of Caesar on the ides of March in 44 BC; and during the AD period – the “engraved in stone” date of the death of Augustus Caesar (at Nola near Naples), which was determined as 19th of August AD 14!

To prove the genuineness of the Roman chronology we have good support from the solar and lunar eclipses recorded in historical sources.

The academic science praises and prefers this method willingly although the scientists are getting more uncertain about the process of application when they analyze the results of this method.

One hundred years ago F.K. Ginzel performed a monumental task (*Spezielle Kanon der Sonnen- und Mondfinsternisse von 900 vor Chr. bis 600 nach Chr.*) of identifying 60 solar and lunar eclipses up until the fall of the Western Roman Empire.

As we approached 1970, the number (60) of identified eclipses became considerably reduced when Robert R. Newton, the professor of John Hopkins University, stated that four-fifths of the ancient “observations” were incorrect or unreliable. The latest research gives us another result which is more distressing than the version of Robert R. Newton.

F. Richard Stephenson’s book, “*Historical Eclipses and Earth’s Rotation*” indicates ***only two European solar eclipses***, for the first 300 years of the Julian calendar, are questionable.

Unfortunately the Chinese solar eclipses, which are presented by Stephenson to verify our Roman Catholic chronology, does not amount to much because there was not any contemporary synchronization between the Roman Caesars and Chinese Emperors. The Chinese chronology was established by Jesuits sent to China by the Roman popes after the year of 1582 and those Jesuits used the method of retro-counting of the time.

According to the Hungarian Calendar nothing is wrong with the veracity of the ancient solar eclipses. In fact, we start to find and locate those eclipses at their exact position we realize this is an area which is closer to us in time by 200 years!

In my book, “The final countdown – Chronology of eclipses from Julius Caesar to Diocletian (2005/2007)” – I have completed extensive research and put the eclipses at their correct places on the time axis. As a result, according to the traditional chronology Augustus Caesar died at Nola near Naples in AD 14 on 19th of August which also equals the year of CE 212 according to the Hungarian Calendar. We know this to be true because presently, the vernal equinox occurred on March 21 at 2 o’clock at dawn while the autumnal equinox occurred on Sept. 23 at around 12 o’clock.



Literary sources mention that a solar eclipse took place at the location of Nola a little earlier than the death of Augustus Caesar. 58 years after the introduction of the Julian calendar and on Aug. 14 in CE 212, a date that is earlier by five days than the death of Augustus, various astronomical programs indicate that a solar eclipse took place. This solar eclipse has a good companion, a lunar eclipse, which is connected to the first year of the reign of Tiberius and mentioned in connection with the revolt of the Pannonien legions. The date of the lunar eclipse is Jan. 24 in CE 213.

Looking back to the traditional year of CE 14 my Readers can already guess, without any hinting from me, that the academic science cannot show to us any solar eclipse connected to CE 14. After 400 years of intensive research the experts have agreed with the following opinion of D. Justin Schove:

“In ancient times the Sun was often credited with an eclipse around the time of the death of a famous person. Such a statement usually amounts to no more than a stock literary compliment. Augustus seems to be no exception.” (Schove, p. 5)

In general it might be the case, but in our case this “crediting with an eclipse” was not necessary! This single solar eclipse (CE 212) is enough to prove the righteousness of the Hungarian Calendar in the chronological dispute with the traditional chronology which was mistakenly established and used today. An event recorded in writing can bear any historical character when we safely say the exact time and the location of that event. When we cannot determine these exact dates we are lead into the world of legends and myths. Without mathematics and astronomy our entire history would be a mess and the geese of the Capitolium would be placed easily next to be the capitulation at Sedan.

THE SELEUCID CODE

The most ancient cradles of human civilization exist within the rivers of China's Yangtse and Huangho, India's Indus and Ganges, Egypt's Nile, and Mesopotamia's Tigris and Euphrates. Approximately 5000 years ago the first formations of humanity were established there. In the 19th century excavations performed at the Mesopotamian locations produced very rich findings. Archeologist found tens of thousands of small plates fully carved with the symbols of an ancient writing, and these are the plates that today are referred to as clay tablets.

Luckily for us we can safely state that any forgery of those tablets can be completely excluded from consideration. When those tablets reached the various museums, nobody could read them, or more precisely, nobody could interpret their meaning.

Towards the end of the 19th century, the cuneiform writing of the tablets came to be deciphered and their contents understood. For the purpose of my study, the clay tablets with astronomical content are the important ones, especially the records made by the Babylonian astronomers during the eras of the Seleucids and the Parthian Arsacides. Those records were elaborated by J. Epping and J. N. Strassmaier, both of whom determined correctly the names of the planets, the signs of the zodiac, thus opening the way to decode the astronomical texts.

Unfortunately the clay tablets are in bad shape. The necessary means have not yet been found to make a perfect interpretation of their records. Furthermore, in spite of the optimistic mood of mainstream scientists, an understanding of the ancient professional terminology is also far from perfection. Thanks must go to the Austrian Academy of Science and Mr. Hermann Hunger for translating the astronomical texts of the tablets into English and making them available for everyone to study.

At the start of the 20th century the Babylonian chronology was accepted by general agreement. Therefore, year 311/312 of the Seleucid era is equivalent to year CE 1 of our common era.

**The key to the date recalculation is
the following relationship: CE 1 = SE 311/312**

Perhaps that is enough to say about the clay tablets, at the outset, reflecting on the fact the "wonder weapon" nature of the content applies not just to adherents of traditional chronology but to my Hungarian Calendar as well. I would not like to bore you with the particulars of my examinations. It is the final result which is important.

After having evaluated and carefully examined the 40 dated tablets I am afraid I will have to cause distress to the representatives of the academic sciences and their faithful followers. Mainstream scientists made a mistake amounting to 196 years when they synchronized the era of the Seleucids. This 196 year slip, which is nothing other than a 2424 synodic moon-month cycle, was given the name "Seleucid code" by me. Its precise length is 71582.145 days, or in other terms 195.98545 tropical years.

The correct (right) key for the recalculation of the dates is

CE 1 = SE 115/116

or

SE 311/312 = CE 197

Everyone can continue to examine the dated clay tablets using my “Seleucid code” and the result will always be analogical. The academic standpoint is very clear in connection with the tablets.

If the lunar eclipse is definitely mentioned on the tablet, but the retro-calculation cannot show one in the traditional chronology, then they determine the case as “prediction”. In about 50 per cent of the examined cases they will, of course, find lunar eclipses retro-calculated in the traditional chronology and generously accept those as “observations” yet suffer greatly from the inaccurate measurements committed by the Babylonian astronomers.

Dear Reader, please understand the essence of what I say. Every recorded event was misplaced in time by 196 years. None of the identified solar or lunar eclipses are correct. They

were forcibly adjusted to fulfill their purpose, into a kind of scientific strait-jacket.

Today, this is known as modern science called Assyriology and astronomical chronology which essentially proves Assyriology using retro-calculation! From this mistaken basic data, the physicists happily calculate the value of delta-T.

The use of “The Seleucid code” reveals the fact that for the past 2600 years the value of delta-T with great certainty will converge to zero...

THE SELEUCID CODE

Zoltán Hunnivári

BACK TO THE BEGINNINGS

“The date of creation of the world”

The year of BC 6984 or BC 6484

Alfonso of Castile commissioned the Alfonsine tables, composed of astronomical data based on observation, from which the date of the creation has been calculated to be either 6984 BC or 6484 BC

The year of BC 5969

“The date of the creation of the world,” – according to Theophilus of Antioch.

The year of BC 5592

“The date of the creation of the world”, - according to Clement of Alexandria.

The year of BC 5529

“The date of the creation of the world”, - according to Theophilus of Antioch.

The year of BC 5509

“The date of the creation of the world”, - according to Byzantine era.

The year of BC 5500

“The date of the creation of the world”, - according to Hippolytus of Rome, Gregory of Tours.

The year of BC 5493

“The date of the creation of the world”, - according to Panodorus of Alexandria, Maximus the Confessor.

The year of BC 5228

“The date of the creation of the world”, - according to The Chronicon of Eusebius.

The year of BC 5199

“The date of the creation of the world”, - according to Jerome.

The year of BCE 4713 = -4712

Julian day (JD) is the continuous count of days since the beginning of the Julian Period used primarily by astronomers.

The **Julian Day Number (JDN)** is the integer assigned to a whole solar day in the Julian day count starting from noon Greenwich Mean Time, with Julian day number 0 assigned to the day starting at noon on January 1, 4713 BC.

The Julian day number is based on the Julian Period proposed by Joseph Scaliger in 1583 at the time of the Gregorian calendar reform.

The year of BC 4004

Among the Masoretic creation, estimates or calculations for the date of creation using Archbishop Ussher’s specific chronology dates the creation to 4004 BC. This became the most accepted and popular mainly because the date was attached to the King James Bible.

The year of BC 4000

“The date of the creation of the world”, - according Isaac Newton.

The year of BC 3961

“The date of the creation of the world”, - according Martin Luther.

The year of BC 3952

Bede in his work *De Temporibus* dated the creation to 18 March 3952 BC.

The year of BC 3761

The Hebrew Calendar has traditionally, since the 4th century AD by Hillel II, dated the creation to 3761 BC.

HUNGARIAN CALENDAR = ASTRONOMICAL DATING

**BCE does not correspond to BC and
AD does not correspond to CE!**

BRIEFLY TO SAY IN OTHER WORDS THE HUNGARIAN CALENDAR IS NOTHING ELSE THAN AN ASTRONOMICAL DATING OF THIS PART OF THE JULIAN CALENDAR WHICH COVERS THE TIME PERIOD THE DATA OF 4th OCTOBER, 1582.

SOLAR ECLIPSES OF HISTORICAL INTEREST

“Both the popular and technical literature contains many references to solar eclipses of the past. Some of these references are from ancient texts. In other cases, they are attempts to tie an eclipse with a historical event. [...]

Some events may be either apocryphal or fictional, or an eclipse may be incorrectly associated with a particular event. The eclipse maps and calculations are simply presented so that they may be compared with references in the literature. It is left to the reader to evaluate whether the eclipse association is valid or not.”

(Fred Espenak)

<http://eclipse.gsfc.nasa.gov/SEhistory/SEhistory.html>

After this brief introduction I am going to examine few historical eclipses using my Seleucid code and the Hungarian calendar hypothesis.

The year of BCE 560 (Traditional BC 763)

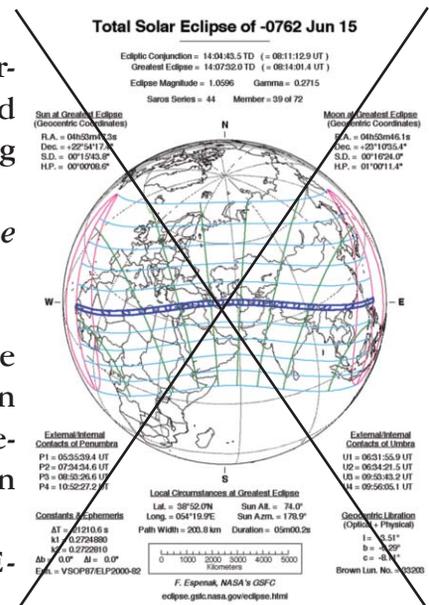
ASSYRIAN ECLIPSE

“The Assyrian eclipse is also known as the Bur-Sagale (Bur-Sagille, Pur-Sagale or Par-Sagale) eclipse. It was recorded in Assyrian eponym lists, most likely in the 9th year of king Ashur-dan III. The actual short entry reads as follows: *Bur-Sagale of Guzana, revolt in the city of Assur. In the month Simanu an eclipse of the sun took place.*”

http://en.wikipedia.org/wiki/Eclipse_of_Bur_Sagale

According to Fred Espenak the event had a considerable value of ΔT (recently maintained as 21220.6 sec, in 1997 believed to be 19840.3 sec, while in 2007 it was determined as 22343sec...) and the shadow of the Moon was casted on our globe as it follows.

<http://eclipse.gsfc.nasa.gov/SEhistory/SEplot/SE-0762Jun15T.gif>

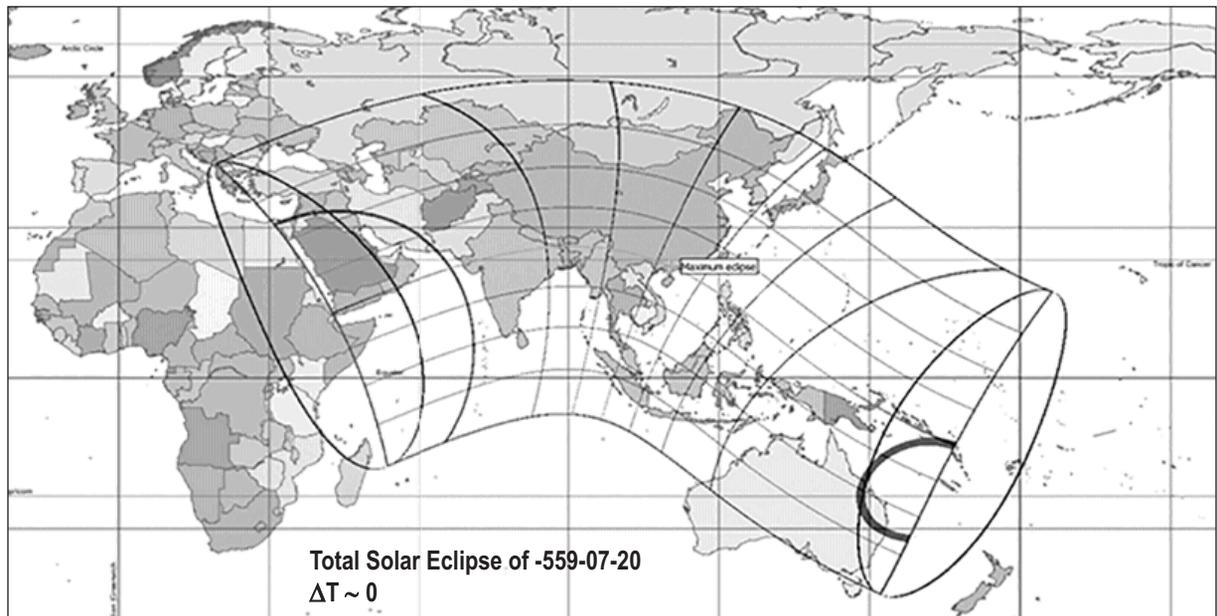


The date June 15, 763 BC is inconsistent with the Babylon calendar. Accepting June 15, 763 BC as the date of the eclipse means that the same year Nisan 1 must have begun on March 20, that is 8 or 9 days before the spring equinox falling that year on March 28/29. The Seleucid code helps us to find easily the date of the genuine solar eclipse.

BCE 560 Jul 20 (JD ~1517083.45)

<http://eclipse.gsfc.nasa.gov/5MCSEmap/-0599—0500/-559-07-20.gif>

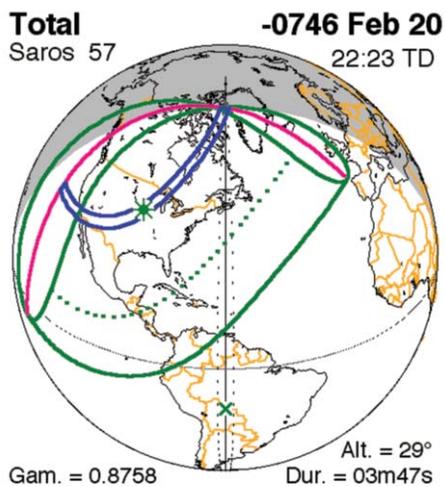
Of course the value of delta-T is zero instead of the proposed 16500 sec!



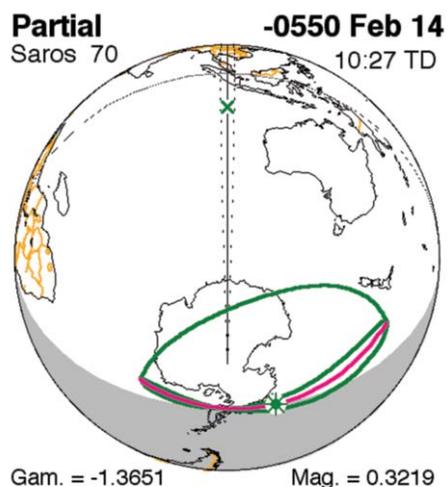
The year of BCE 551 (Traditional BC 747)

In a Hungarian calendar, the first day of the Nabonassar era – Toth 1 Nabonassar corresponds to February 20, 551 BCE. (JD ~1520221)

According of the Seleucid code the first Month begins February 14, 551 BCE. (JD ~ 1520215.5)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

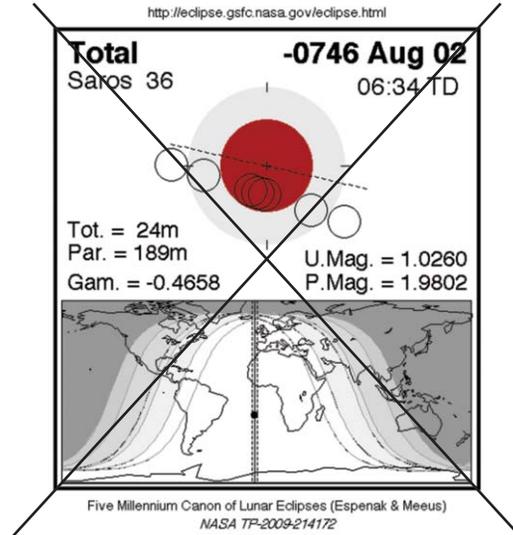
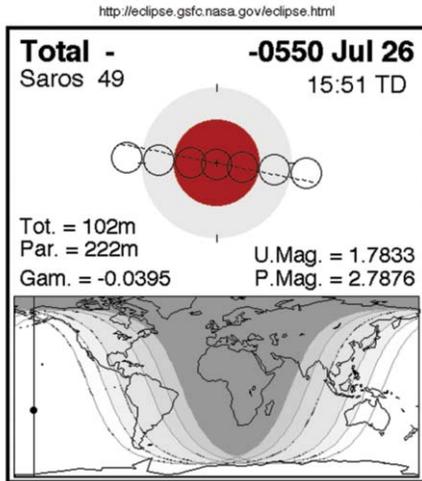
-550 February 14/Solar eclipse – New Moon.

(Traditional 26 February 747 BC)

-550 Julius 26/ Lunar eclipse - Observation/Clay tablet LBAT 1413

“Year 1/ Month VI”/ JD ~ 1520376,5 (Traditional -746 Augustus 2)

(Z. H.; La nueva cronologia de la historia de Espana, p. 31)



The year of BCE 550 (Traditional BC 746)

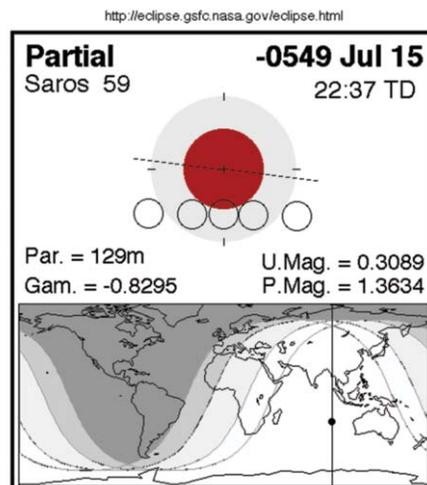
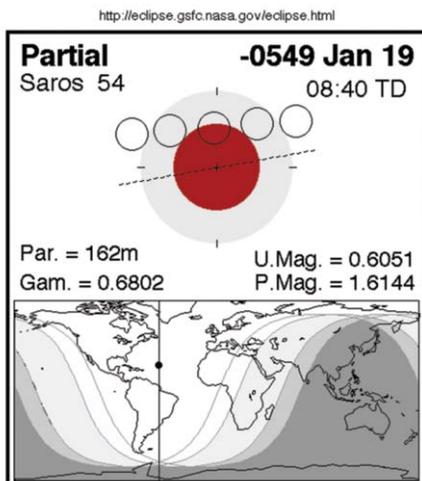
-549 January 19/ Lunar eclipse - Observation/Clay tablet LBAT 1413

“Year 1/Month XI”/ JD ~ 1520553,5 (Traditional -745 January 26)

-549 Julius 15/Lunar eclipse - Observation/Clay tablet LBAT 1413

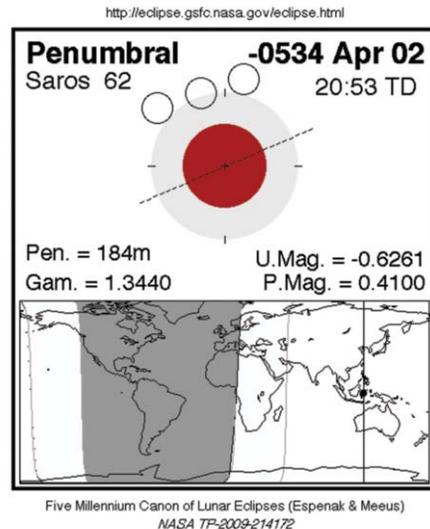
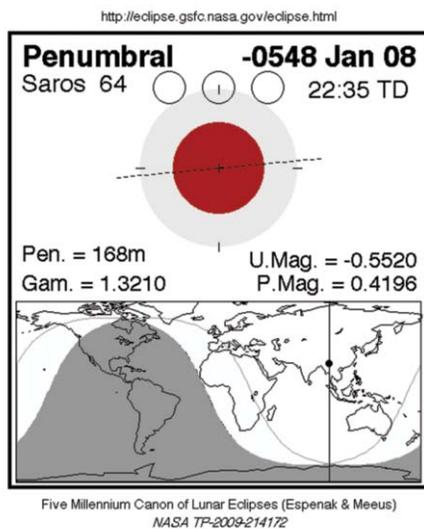
“Year 2/Mont V”/ JD ~ 1520731,5 (Traditional -745 Julius 22)

(Z.H.; La nueva cronologia, p.31)



The year of BCE 549 (Traditional BC 745)

-548 January 8/Lunar eclipse – Observation/Clay tablet LBAT 1413
“Year 2/Month XI”/JD ~ 1520908,5 (Traditional -744 January 15)



The year of BCE 535 (Traditional BC 731)

-534 April 2/Lunar eclipse /Clay tablet LBAT 1414
“1’ 1.50.Year 1 of Mukin-zeri (1,50 MU-1 KAM GIN-NUMUN.
2’ month I (eclipse) which was omitted (BAR sá DIB).
3’ At 1.0 after sunrise. (ina 1 ME NIM) ”
(Hermann Hunger; ASTRONOMICAL DIARIES, Volumen V; p. 2-3)
This lunar eclipse really happened on April 2 in BCE 535 after sunset.
JD ~ 1526106.5 (Traditional -730 April 9 – Prediction!)
(Z.H.; La nueva cronologia, p.32)

The year of BCE 525 (Traditional BC 721)

WAS IT THE CRIME OF CLAUDIUS PTOLEMY?

“This is the story of a scientific crime. By this, I do not mean a crime planned with the care and thoroughness that scientists like to think of as a characteristic of their profession, nor do I mean a crime carried out with the aid of technological gadgetry like hidden microphones and coded messages on microdots. I mean a crime committed by a scientist against his fellow scientists and scholars, a betrayal of the ethics and integrity of his profession that has forever deprived



The mathematician Claudius Ptolemy 'the Alexandrian' as imagined by a 16th-century artist

mankind of fundamental information about an important area of astronomy and history.”

[Robert R. Newton; THE CRIME OF CLAUDIUS PTOLEMY, Preface]

The above devastating criticism from Robert R. Newton's Preface is directed to Ptolemy's main astronomical work which is usually called the *Syntaxis*. In chapter XIII of his book R. Newton expresses his firm opinion in connection with the entire *Syntaxis* that all the "observations" of Ptolemy in relation with the Sun and the Moon are fabricated, they are the results of retro-calculations (thus we have a case of forgery).

R. Newton also accuses the astronomer Ptolemy that his data, taken by him from earlier authors, was also partly forged. The academic science did not pay too much attention to Newton's critical remarks since our scientists are very sure that the inaccuracy of Ptolemy's data is purely the result of measuring errors which show the limited measuring possibilities of Ptolemy's own life-time.

Recently when we have at hand my Hungarian calendar and Seleucid code there is a completely new perspective to investigate and explain the "inaccurate character" of data recorded in the *Syntaxis*.

In the earlier chapters of my book the Reader was informed about an astonishing fact that as a result of erroneous synchronization there was done a fatal mistake when the Seleucid dates were wrongly placed on the astronomical time axis, that is the mentioned dates were misplaced by 2424 synodical months (let me call this time length as Hunniviari's cycle). Accepting this revealed misplacement we have also a possibility to check the data of *Syntaxis*. For me it is not so difficult to perform the checking since we generally have the dates with day exactness.

But before we are going to deal with the dates of data in *Syntaxis* we must answer one basic question, "For Ptolemy who lived in emperor Hadrian's times, was there a real possibility to retro-calculate with day and hour exactness the occurrence of a lunar eclipse which had happened 850 years earlier than his own life-time and was he capable, at the same time, to properly calculate the duration of the same lunar eclipse?"

Without data of observations how could Ptolemy built up his monumental system which covers the time-interval from Nabonassar to the reign of king Antonius, the Roman emperor?

It is complete nonsense! It cannot be said in good faith and it is absurd to claim. By the way, is it a reality today for a physicist-astronomer who has the latest model of computers to retro-calculate properly and to determine correctly the data of a lunar eclipse which occurred 2800 years ago? No, he cannot do that at all as it will be convincingly proved in the later parts of this book!

At this point we can consider another aspect and we can ask a disturbing question, "What would be the standpoint of the modern physics and astronomy in case the works of Ptolemy, the *Almagest* or the *Syntaxis* (which are in publications since 1515) would have been lost forever, or if fatal mistakes would be done by the numerous transcribers (during the passed time of 1300 years)? Would the scientists of NASA estimate, with such self-assurance, the phases of the Moon which are at a distance of 2000 years from us in the past? When we know very well that the synodic month is a measuring unit of very uncertain length?"

„For the year 2000, the length of the mean synodic month (New Moon to New Moon) is 29.530588 days (=29d12h44m03s). However, the length of any one synodic month can vary from 29.26 to 29.80 days due to perturbing effects of the Sun on the Moon’s eccentric orbit.”

<http://eclipse.gsfc.nasa.gov/phase/phase2001gmt.html>

Nevertheless, our scientists mislead the general public maintaining that they can retro-calculate with the exactness of a second and they can determine the sky positions as far deep in the past as 2800 years.

I think it is just enough to remind my Readers about the uncertainty around the delta-T. As far back as 2800 years this uncertainty can cause a mistake of several hours when we try to guess the occurrence of a solar eclipse, especially when we try to determine its location.

The main factor which causes the impossibility of the exact retro-calculation is the irregular movement of the Moon. The phases of the Moon cannot be retro-calculated exactly, we can only guess them!

“The fact that the angular velocity of the moon goes through an oscillation, having a place where it is a minimum (apogee) and another where it is a maximum (perigee), has been known for a long time. The Babylonians knew of this oscillation in velocity and had well-developed methods of including it when they calculated ephemerides of the Moon. By following perigee and apogee over long periods of time, they also knew that the positions of the lunar perigee and apogee moved steadily through the heavens, and this knowledge passed to the Greek astronomers.” (Newton, p. 110)

However, at NASA, they pretend as if everything is in complete order. Dating back 4000 years (2000 BCE), they give us the values of the Moon’s phases with a minute exactness and those Moon phases determine the time and place of the historical lunar and solar eclipses. On page 191 of Ptolemy’s modern English edition the anomaly of Moon is demonstrated by the means of three Babylonian eclipses.

The main question for my investigation is, “Are we dealing with retro-calculated, that is with forged data, or do we have records of genuine contemporary observations?”

The first lunar eclipse of Ptolemy;

“First, the three ancient eclipses which are selected from those observed in Babylon. The first is recorded as occurring in the first year of Mardokempad, Thot [I] 29/30 in the Egyptian calendar [-720 Mar. 19/20]. The eclipse began, it says well over an hour after moonrise, and was total. Now since the sun was near the end of Pisces and [therefore] the night was about 12 equinoctial hours long, the beginning of the eclipse occurred, clearly 4 ½ equinoctial hours before midnight.”

[*Almagest*, IV, 6; trans. Toomer (1998, p.191).]

This lunar eclipse really happened on Martius 12 in BCE 525, not in BCE 721 Martius 19/20.

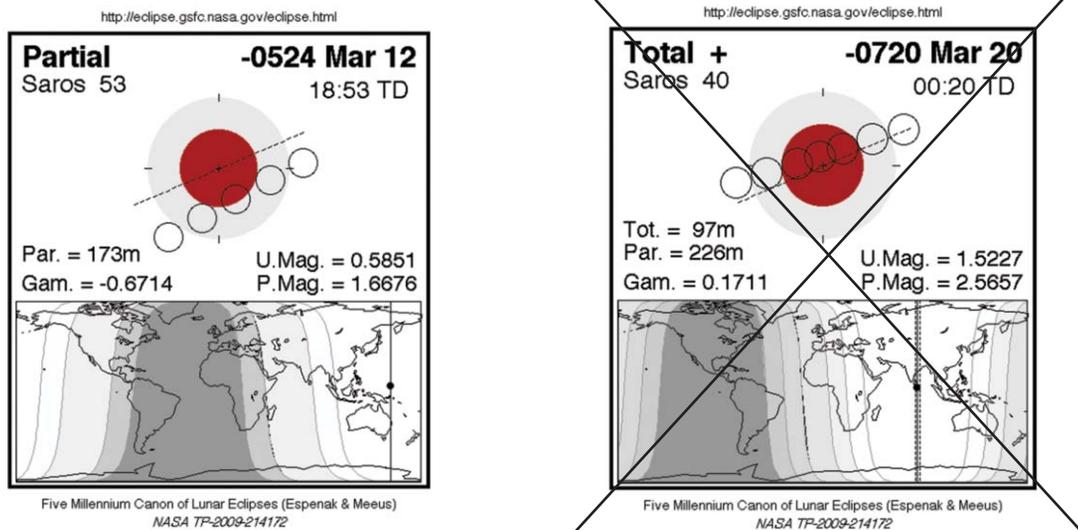
The result of my empirical calculations:

In Babylon -524 Martius 12 /Partial lunar eclipse begins at 19:05 Local Time (LT)/ Total lunar eclipse begins at 20:42 LT /Mid. of the eclipse 21:30 LT /Total eclipse ends at 22:18 LT/ Partial eclipse ends at 23:15 LC/ Delta T = zero sec! (JD ~ 1529738.27)

Summarizing the information above concerning the first examined lunar eclipse recorded by Ptolemy, we can firmly state that it was placed erroneously by official science on the astronomical time axis 196 years further into the past (-720 Mar. 20) while the correct date was definitely -524 Martius 12! Because of these facts, NASA illustrates the -524 Mar. 12 lunar eclipse incorrectly;

//eclipse.gsfc.../LE-524-03-12P.gif

(Z.H.; La nueva cronologia, p. 32-34)



The year of BCE 524 (Traditional BC 720)

“The second eclipse is recorded as occurring in the second year of the same Mardokempad, Toth [I] 18/19 in the Egyptian calendar [-719 Mar. 18/19]. The [maximum] obscuration, it says was 3 digits from the south exactly at midnight. So, since mid-eclipse was exactly at midnight at Babylon, it must have been 5/6 h before midnight at Alexandria...”

[Almagest, IV, 6; trans. Toomer (1998, p.191-2).]

This lunar eclipse really happened on Martius 1/2 in BCE 524 not in BCE 720 Martius 8/9.

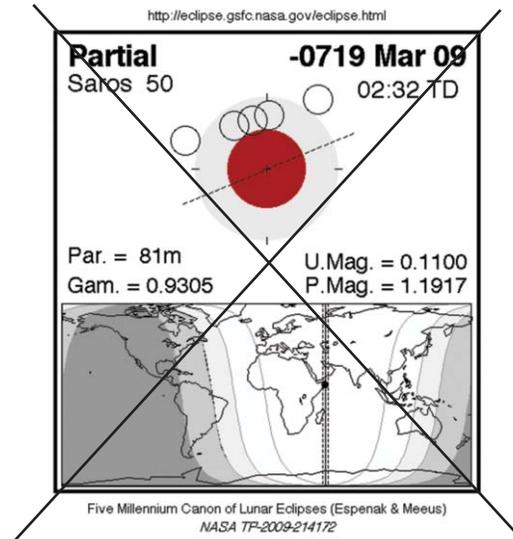
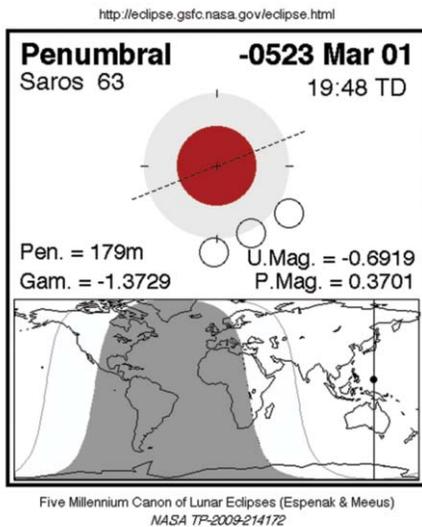
The result of my empirical calculations:

In Babylon -523 Martius 1 /2 /Partial lunar eclipse begins at 23:10 LT /Mid. of the eclipse 24:00 LT/ Partial eclipse end at 0:50 LT (Martius 2) /Delta T = zero sec! (JD ~ 1530092.37)

Summarizing the information above concerning the second examined lunar eclipse recorded by Ptolemy, we can firmly state that it was placed erroneously by official science on the astronomical time axis 196 years further into the past (-719 Mar 09) while the correct date was definitely – 523 Mar 01! Because of these facts, NASA illustrates the -523 Mar 01 lunar eclipse incorrectly.

//eclipse /LE-523-03-01N.gif

(Z.H.; La nueva cronologia, p. 34)



“The third eclipse is recorded as occurring in the (same) second year of Mardokempad, Phamenoth [Month VII] 15/16 in the Egyptian calendar [-719 Sept 1 /2]. The eclipse began, it says, after moonrise, and the [maximum] obscuration was more than half [the disc] from the north. So, since the sun was near the beginning of Virgo, the length of night at Babylon was about 11 equinoctial hours, and half the night was 5 1/2 [equinoctial] hours. Therefore the beginning of the eclipse was about 5 equinoctial hours before midnight (since it began after moonrise)...”

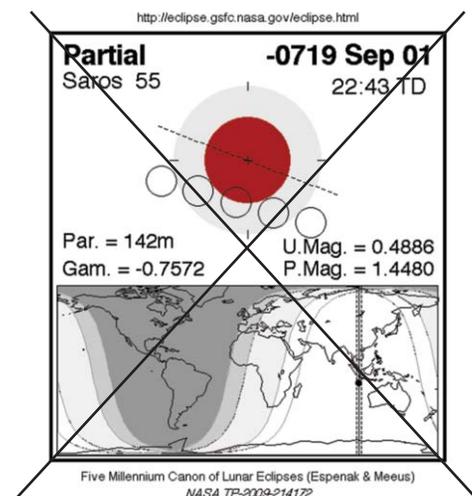
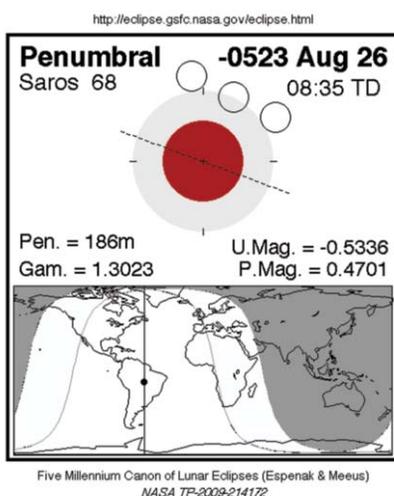
[Almagest, IV, 6; trans. Toomer (1998, p. 192).]

This lunar eclipse really happened on Augustus 26 in BCE 524, not in BCE 720 September 1. The result of my empirical calculations:

In Babylon -523 Augustus 26 /Partial lunar eclipse/ Mid. of the eclipse 20:02 LT /Delta T = zero sec! (JD ~ 1530269.21)

Summarizing the information above concerning the third examined lunar eclipse recorded by Ptolemy, we can firmly state that it was placed erroneously by official science on the astronomical time axis 196 years further into the past (-719 Sept. 1) while the correct date was definitely – 523 Augustus 25! Because of these facts, NASA illustrates the -523 Aug 26 lunar eclipse incorrectly;

//eclipse.gsfc.../LE-523-08-26.N.gif (Z.H.; La nueva cronologia, p. 34-35)



The year of BCE 517 (Traditional BC 713)

-516 April 13/ Lunar eclipse – Observation/Clay tablet LBAT 1414

“1’ (Year) 9, month II, the 15th. Its rose eclipsed.

2’ ½ of the disc was covered.

3’ At 20 before sunset. (ina 20 ana SÚ sámas)”

(H.H.; ASTRONOMICAL DIARIES, Volumen V; p. 4-5)

This lunar eclipse really happened on April 13 in BCE 517, not in BCE 713 April 19.

(Z.H.; La nueva cronologia, p. 35)

The year of BCE 506 (Traditional BC 702)

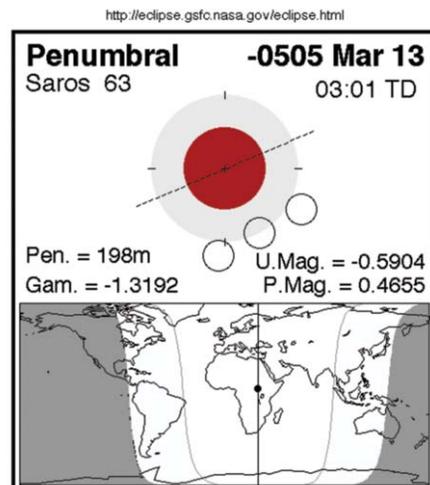
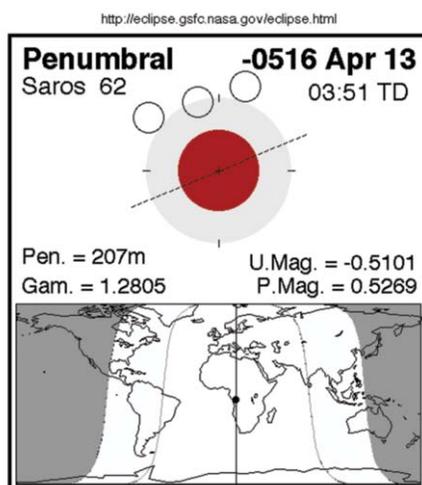
-505 Martius 13/ Lunar eclipse – Observation/Clay tablet 1415

“(Year) 1 of Bél-ibni, /to between south/ it set eclipsed.”

(H.H.; ASTRONOMICAL DIARIES, Volumen V; p. 8-9)

This lunar eclipse really happened on Martius 13 in BCE 506, not in BCE 702 Martius 20.

(Z.H.; La nueva cronologia, p. 36)



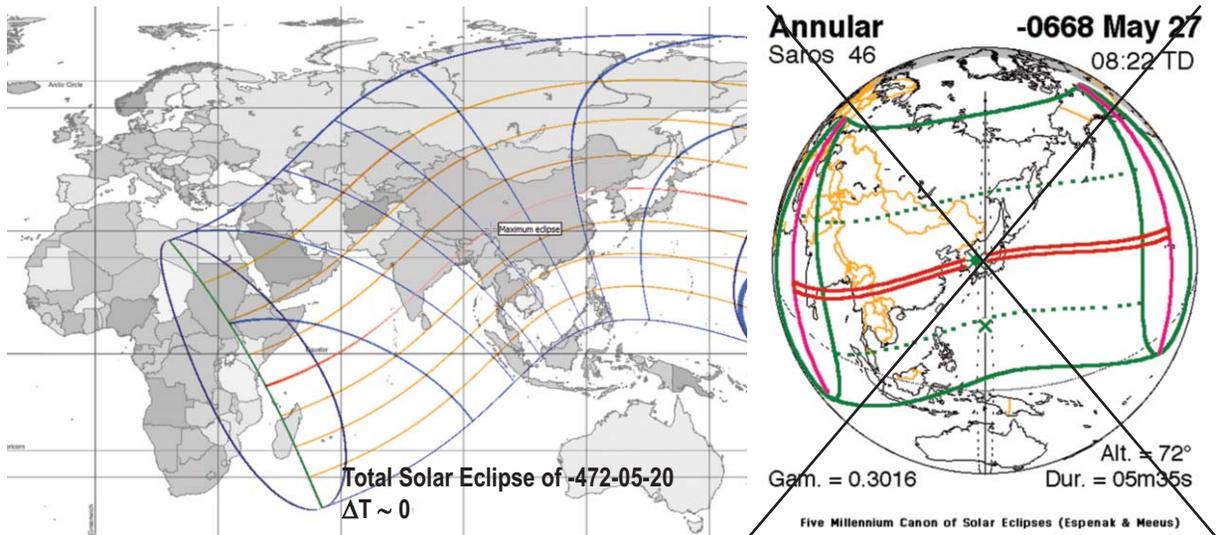
The year of BCE 473 (Traditional BC 669)

“If the Sun at its rising is like a crescent and wears a crown like the Moon: the king will capture his enemy’s land and (the land) will experience good...”

The above eclipse has been identified by Parpola (1983) as that of BC 669 May 27.

(Quoted in *Historical Eclipses and Earth’s Rotation*, by F Richard Stephenson, Cambridge University Press, 1997, page 125)

This solar eclipse really happened on May 20 in BCE 473, not in BCE 669 May 27. Delta T = zero sec! (JD ~ 1548799.5)



The year of BCE 425 (Traditional BC 621)

“In the fifth year of Nabopolassar, which is the 127th year from Nabonassar, which is the 127th year from Nabonassar, Athyr [III] 27/28 in the Egyptian calendar [-620 Apr 21/22], at the end of the eleventh hour in Babylon, the moon began to be eclipsed; the maximum obscuration was $\frac{1}{4}$ of the diameter from the south. Now since the beginning of the eclipse occurred 5 seasonal hours after midnight...”

[*Almagest*, V, 14; trans. Toomer (1998, p. 253).]

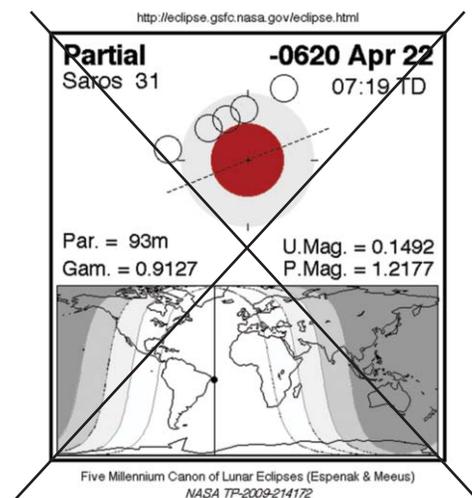
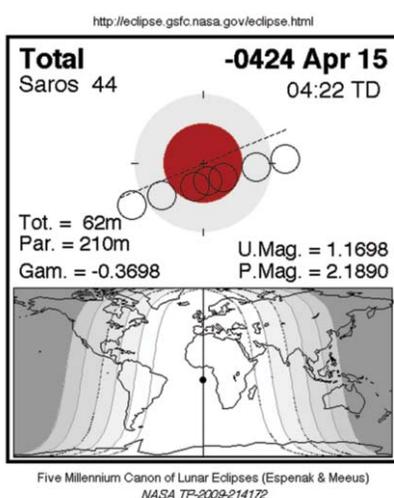
This lunar eclipse really happened on Apr 15 in BCE 425, not in BCE 621 Apr 22.

The result of my empirical calculations:

In Babylon -424 April 15/Partial lunar eclipse /Mid. of the eclipse 2:00 LT/Delta T = zero sec! (JD ~ 1566296.7)

Summarizing the information above concerning the fourth examined lunar eclipse recorded by Ptolemy, we can firmly state that it was placed erroneously by official science on the astronomical time axis 196 years further into the past (-620 Apr. 22) while the correct date was definitely – 424 Apr. 15! Because of these facts, NASA illustrates the -424 Apr 15 lunar eclipse incorrectly.

//eclipse.gsfc.../LE-424-04-15.T.gif (Z.H.; La nueva cronologia, p. 36)

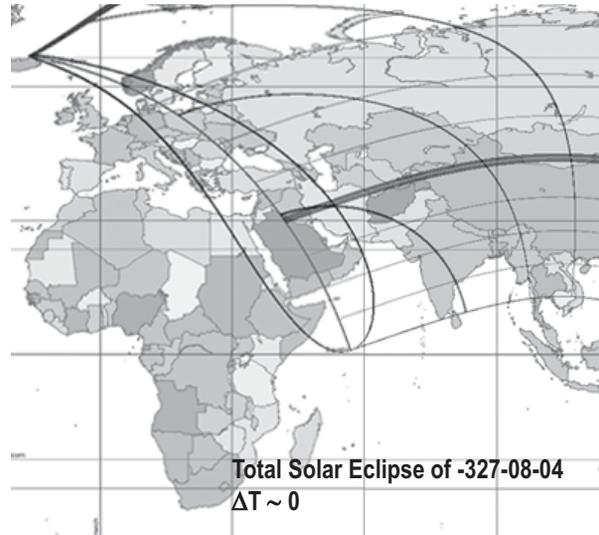
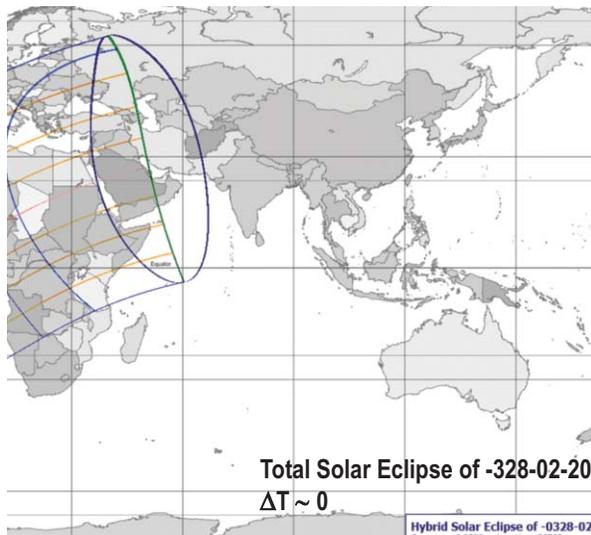


The year of BCE 329

The first solar eclipse in the fifth year of Kambyases. (Quoted in Chronicon Paschale; 2 of Kambyases)

This solar eclipse really happened on February 20 in BCE 329.

Delta T = zero sec! (JD ~ 1601306.25)



The year of BCE 328

The second solar eclipse in the sixth year of Kambyases. (Quoted in Chronicon Paschale; 2 of Kambyases)

This solar eclipse really happened on Augustus 4 in BCE 328.

Delta T = zero sec! (JD ~ 1601836.85)

The year of BCE 327 (Traditional BC 523)

“...Again in the seventh year of Kambyases, which is 225th year from Nabonassar, Phamenoth [month VII] 17/18 in the Egyptian calendar [-522 July 16/17], 1 hour before midnight at Babylon, the Moon was eclipsed half its diameter from the north. Thus the eclipse occurred about 1 5/6 equinoctial hours before midnight at Alexandria.”

[*Almagest*, V, 14; trans. Toomer (1998, p. 253).]

This lunar eclipse really happened on July 9 in BCE 327, not in BCE 523 July 17.

The result of my empirical calculations:

In Babylon -326 July 09/Partial lunar eclipse /Mid. of the eclipse 21:00 LT/Delta T = zero sec! (JD ~ 1602176.37)

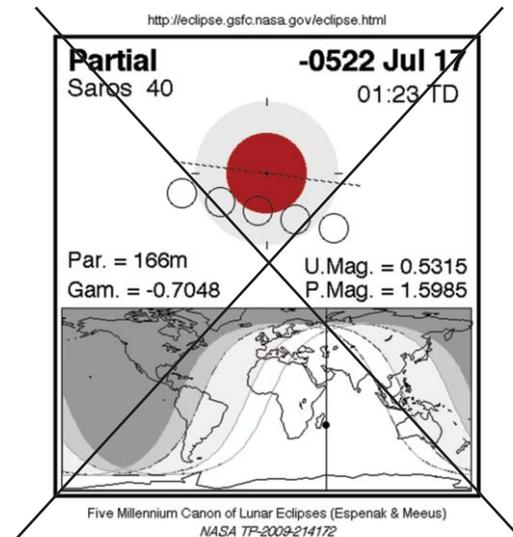
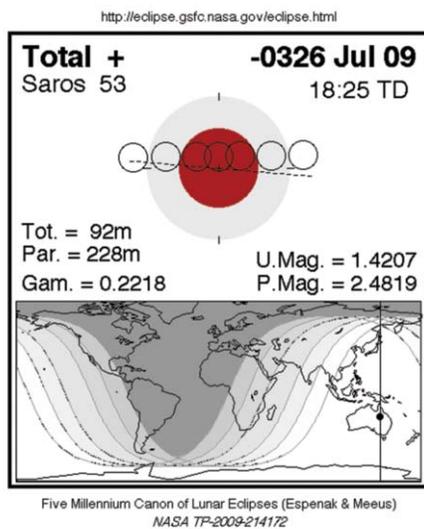
Summarizing the information above concerning the fifth examined lunar eclipse recorded by Ptolemy, we can firmly state that it was placed erroneously by official science on the astronomical time axis 196 years further into the past (-522 July 17) while the correct date was definitely – 326 July. 09! Because of these facts, NASA illustrates the -326 July 09 lunar eclipse incorrectly.

//eclipse.gsfc.../LE-326-07-09.T.gif

(Z.H.; La nueva cronologia, p. 37)

“Year 7 (Kambyses), month IV, night 14, 1 2/3 beru (=50 deg) after sunset the moon makes a total eclipse, (but) a little is left over; north (wind) went. [BM 33066 (=LBAT 1477), Rev. 19-20; trans. Huber, p. 25]”

(Quoted in *Historical Eclipses and Earth's Rotation*, by F Richard Stephenson, Cambridge University Press, 1997, page 166)



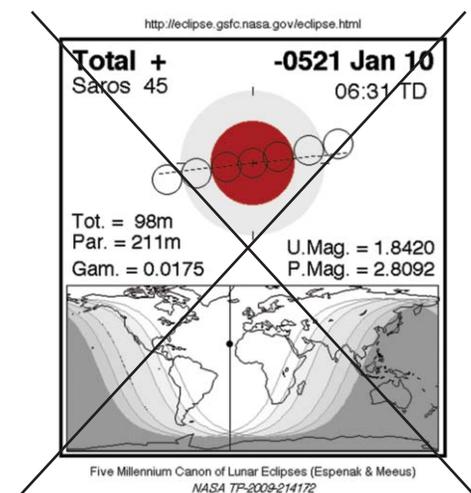
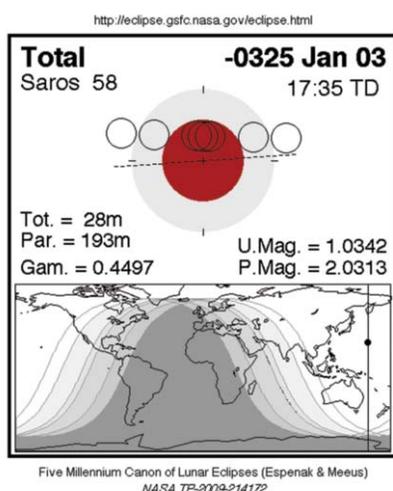
The year of BCE 326 (Traditional BC 522)

“Year 7 (Kambyses), month X, night 14, 2 1/2 beru (=75 deg) to sunrise are left over, the moon makes a total eclipse. South and north clouded, went.

. [BM 33066 (=LBAT 1477), Rev. 21-22; trans. Huber, pp. 25-26]”

(Quoted in *Historical Eclipses and Earth's Rotation*, by F Richard Stephenson, Cambridge University Press, 1997, page 167)

This lunar eclipse really happened on January 3 in BCE 326, not in BCE 522 January 10.



The year of BCE 295 (Traditional BC 491)

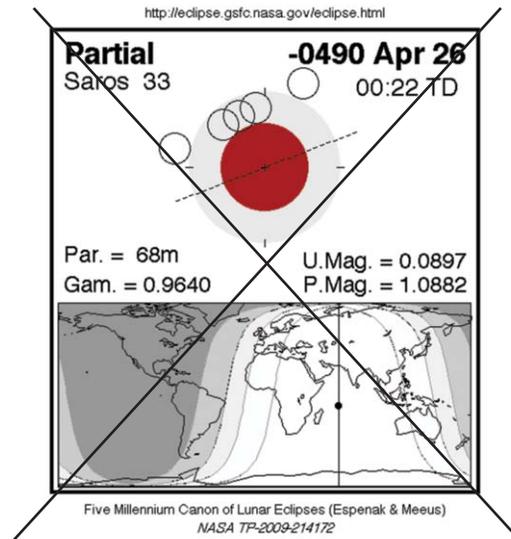
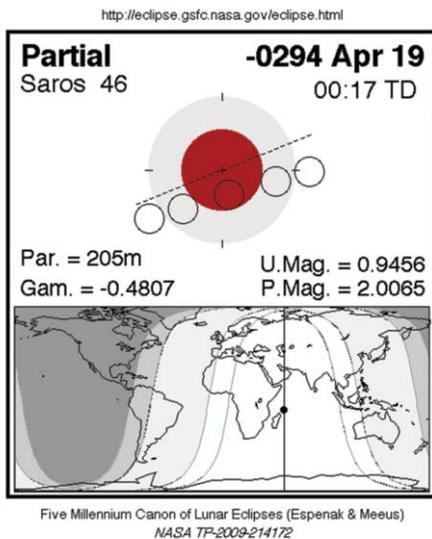
“The first eclipse we used is the one in Babylon in the thirty-first year of Darius I, Tybi [month V] ³/₄ in the Egyptian calendar [-490 Apr 25/26], at the middle of sixth hour [of the night]. It is reported that at this eclipse the Moon was obscured 2 digits from the south...”

[*Almagest*, IV, 9; trans. Toomer (1998, p.p. 206-7)

The lunar eclipse really happened on April 19 in BCE 295, not in BCE 491 April 26.

Delta T = zero sec! (JD ~ 1613782.3125)

(Z.H.; La nueva cronologia, p. 38-39)



The year of BCE 282 (Traditional BC 480)

“Such was the counsel which Chileus gave: and the Ephors...A prodigy had caused him to bring his army home; for while he was offering sacrifice to know if he should march out against the Persian, the sun was suddenly darkened in mid sky.”

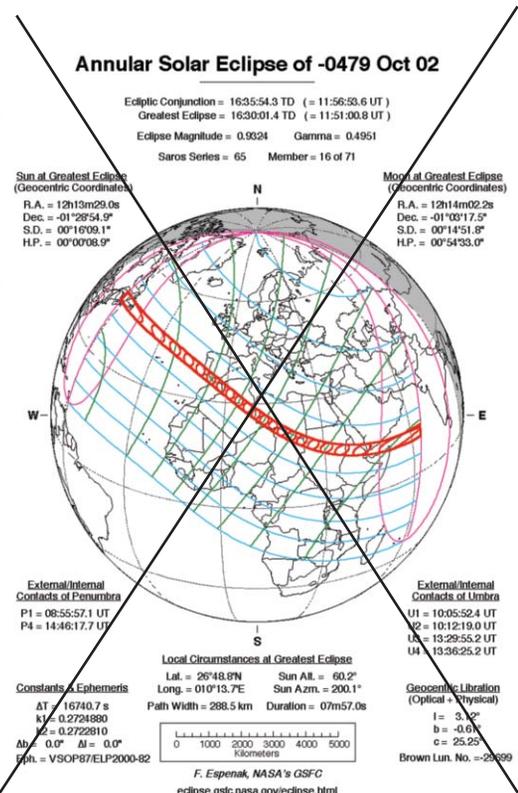
(Herodotus, History, IX 10)

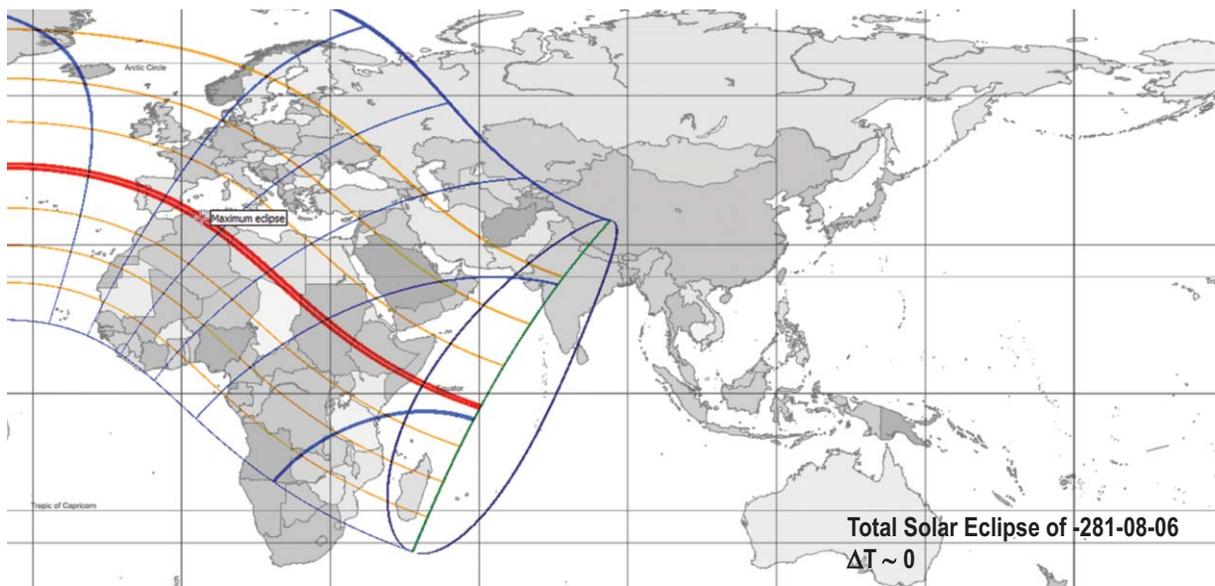
-479 Oct 02 Xerxes' Eclipse (Ginzel 4)

According to Fred Espenak the evolution of Delta T was from 17065.0 sec (2001) to 16375,4 sec (recent value), and considering the latest value the shadows of the Moon was casted on our Earth as it follows: //eclipse.gsfc...SE-0479Oct02A.gif

The location is Isthmus von Korinthos or Athens. Using my Seleucid code there is the genuine solar eclipse:

-281 Aug 06/Delta T = zero sec! (JD ~ 1618640.15)





The year of BCE 275 (Traditional BC 478)

“And now when all was prepared- the bridges, and the works at Athos, the breakwaters about the mouths of the cutting, which were made to hinder the surf from blocking up the entrances, and the cutting itself; and when the news came to Xerxes that this last was completely finished – then at length the host, having first wintered at Sardis, began its march towards Abydos, fully equipped, on the first approach of spring. At the moment of departure, the sun suddenly quitted his seat in the heavens, and disappeared, though there were no clouds in sight, but the sky was clear and serene. Day was thus turned into night; whereupon Xerxes, who saw and remarked the prodigy, was seized with alarm, and sending at for the Magians, inquired of them the meaning of the portent. They replied – ‘God is foreshowing to the Greeks the destruction of their cities; for the sun foretells for them, and the moon for us.’ So Xerxes, thus instructed, proceeded on his way with great gladness of heart.”

(Herodotus, History VII, 37)

-477 Feb 17 Xerxes’ Abydos eclipse (Ginzel 5)

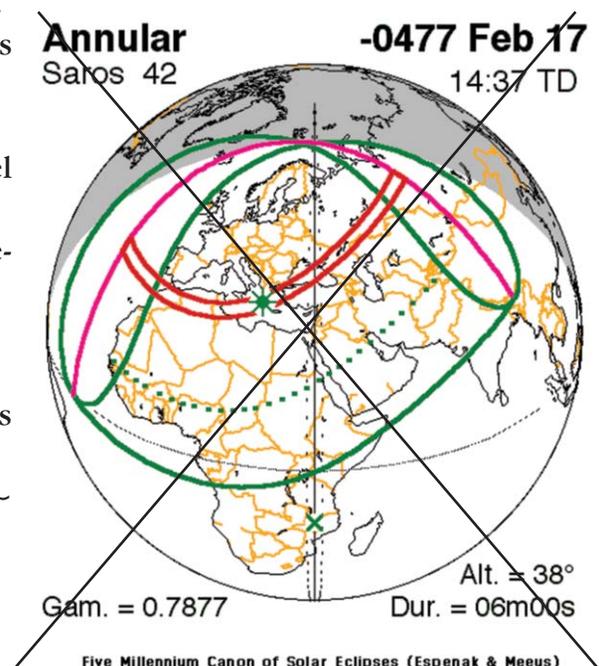
According of the illustration by Fred Espenak:

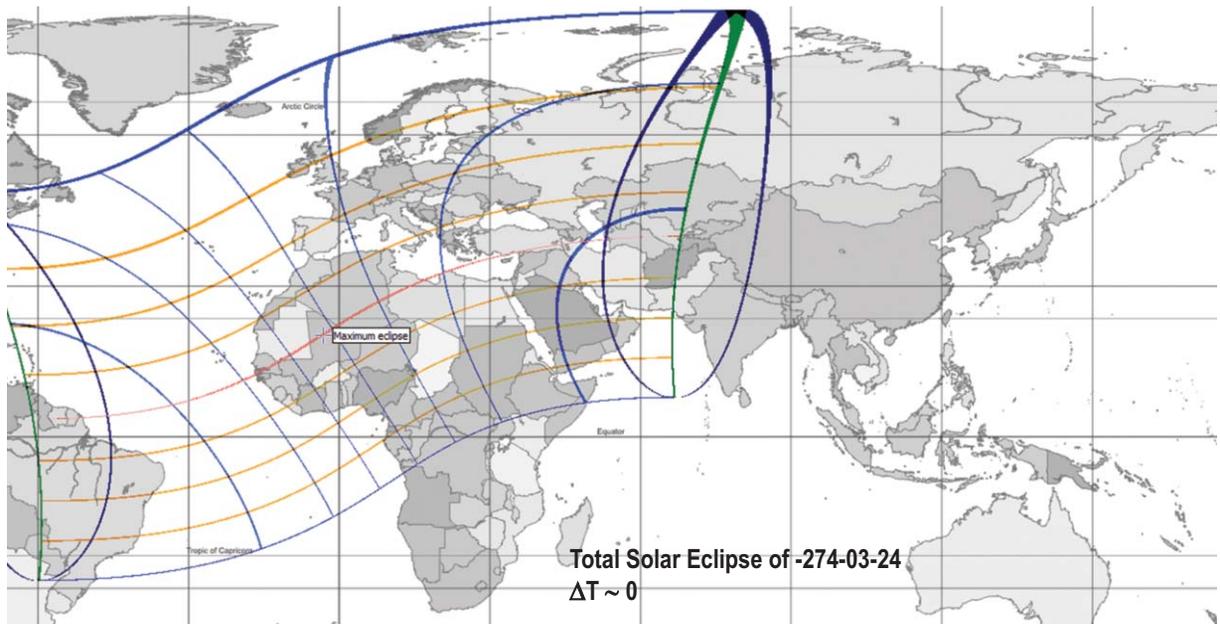
//eclipse.gsfc...-477-02-07.gif

The location is Sardis.

This solar eclipse really happened on Martius 24 in BCE 275.

-274 Mar 24/ Delta T = zero sec! (JD ~ 1621062.15)





The year of BCE 234 (Traditional BC 431)

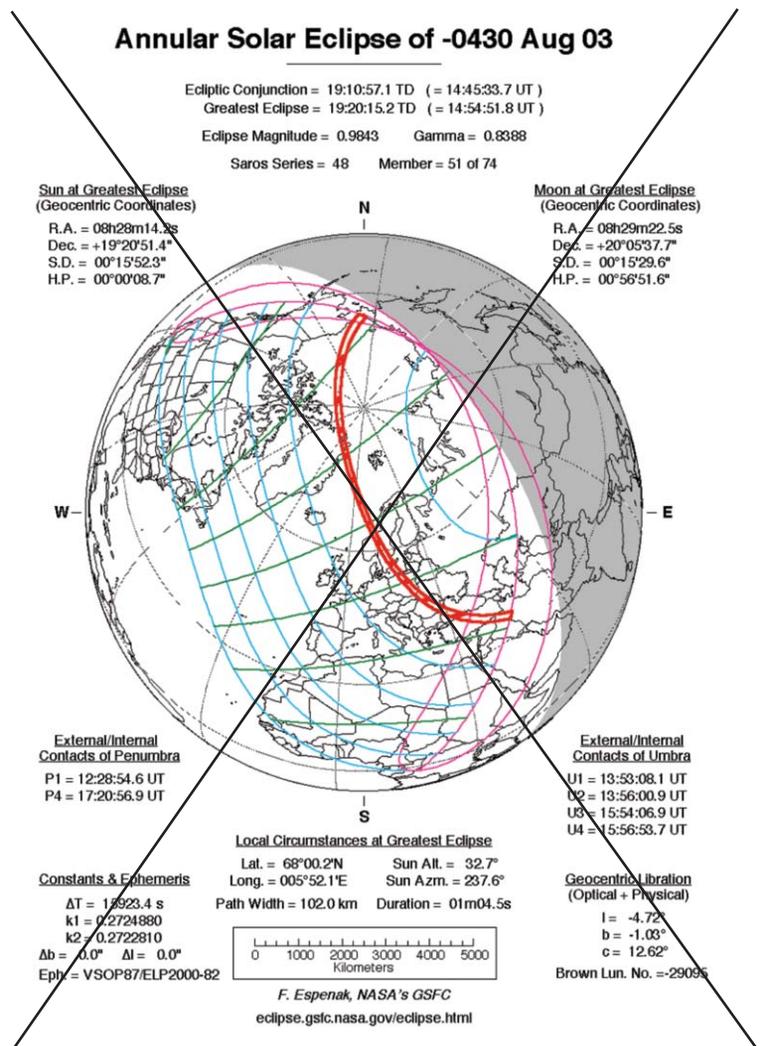
“The same summer, at the beginning of a new lunar month, the only time by the way at which it appears possible, the sun was eclipsed after noon. After it had assumed the form of a crescent and some of the stars had come out, it returned to its natural shape.”

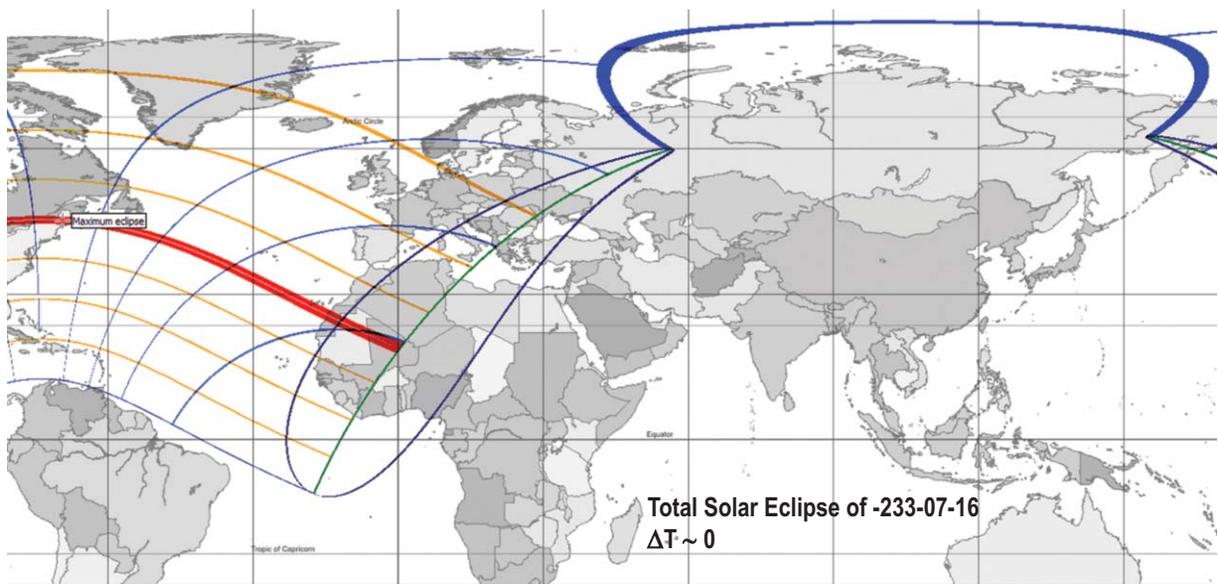
(Thucydides, the History of the Peloponnesian War, II, 28)

According to Fred Espenak the evolution of Delta T was from 16231 sec (2001) to 15638.2 sec (recent value), and considering the latest value the shadow of the Moon was casted on our Earth as it follows:

//eclipse.gsfc...-430-08-03.gif
The location is Athens. (Ginzell 6)

Using my Seleucid code there is the genuine solar eclipse:
-233 Jul 16/Delta T = zero sec!
(JD ~ 1636151.25)





The year of BCE 229 (Traditional BC 425)

“As the next year during Stratocles (archonship) in the month of Boedromion happened lunar eclipse.”

(Aristophanes, *The Clouds*, ed. Dübner)

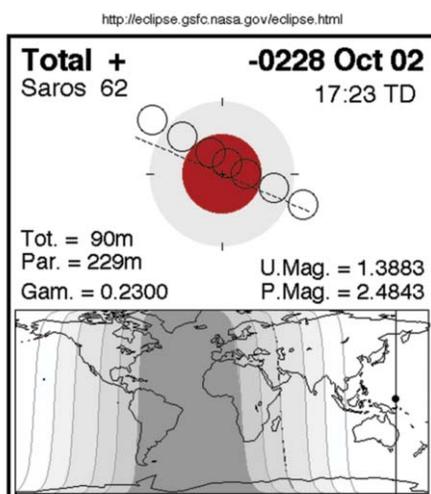
“Some Alleged Observations from the Year -424.

Kugler [1914, pp. 233-242] published and discussed a text that dates to the months IV through IX of the year 40 of Artaxerxes I... The text mentions a lunar eclipse beginning at 10 grad (40 minutes) after sunset on day VI 15, twelve days after the autumnal equinox....”

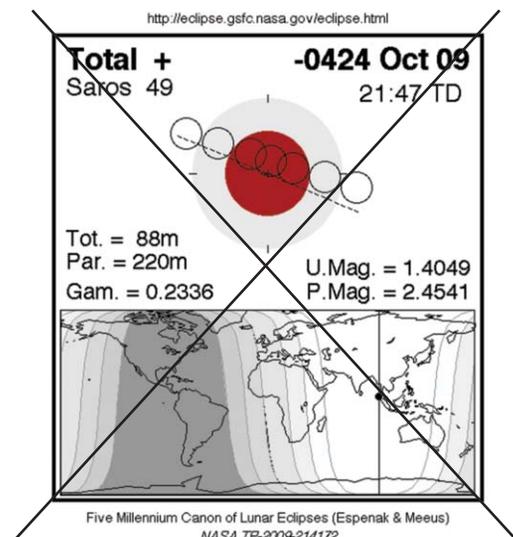
(Robert R. Newton,; *Ancient Planetary Observations and the Validity of Ephemeris Time*, Johns Hopkins Press, Baltimore, 1976, p. 127-8)

This lunar eclipse really happened on October 2 in BCE 229, not in BCE 424 October 9. (Ginzel 7)

Delta T = zero sec! (JD ~ 1638056.35)



Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172



Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172

The year of BCE 228 (Traditional BC 424)

“In first days of the next summer there was an eclipse of the sun at the time of new moon, and in the early part of the same month an earthquake.”

(Thucydides, the History of the Peloponnesian War, IV, 52)

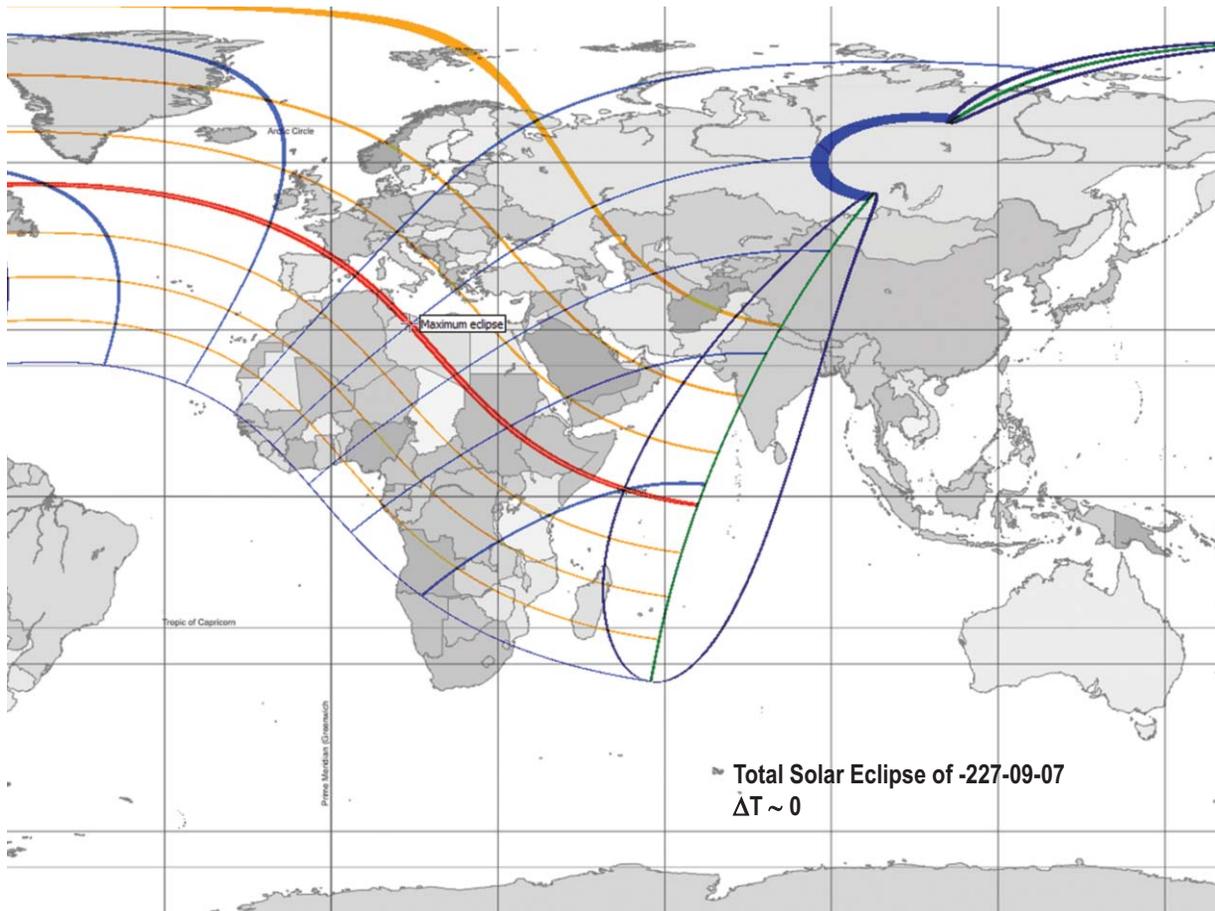
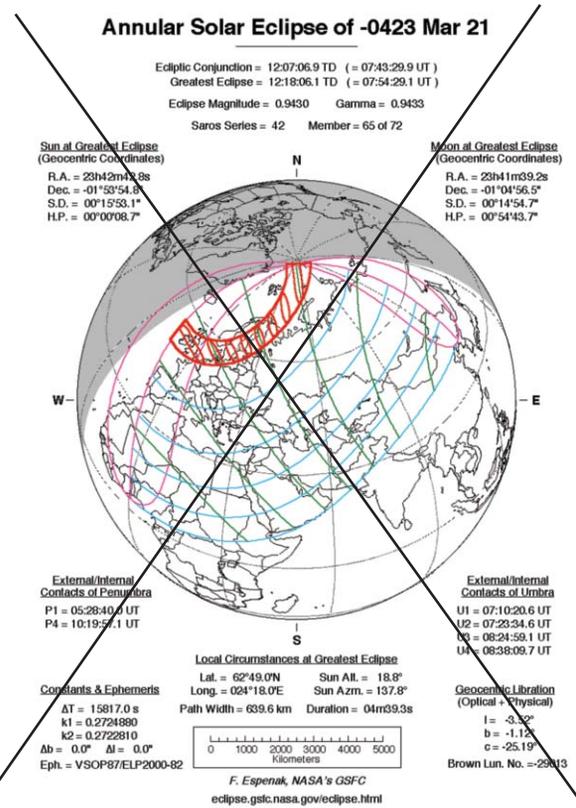
According to Fred Espenak the evolution of Delta T was from 16119 sec (2001) to 15545.8 sec (recent value), and considering the latest value the shadow of the Moon was casted on our Earth as it follows:

// eclipse423-03-21.gif

The location is Athens. (Ginzel 8)

Using my Seleucid code there is the genuine solar eclipse:

-227 Sep 07/Delta T = zero sec! (JD ~ 1638396.15



The year of BCE 218 (Traditional BC 413)

“All was at last ready, and they were on the point of sailing away, when an eclipse of the moon, which was then at the full, took place. Most of the Athenians, deeply impressed by this occurrence, now urged the generals to wait; an Nicias, who was somewhat over-addicted to divination and practices of that kind, refused from that moment even to take the question of departure into consideration, until they had waited the thrice nine days prescribed by the soothsayers,”

(Thucydides, the History of the Peloponnesian War, VII, 50)

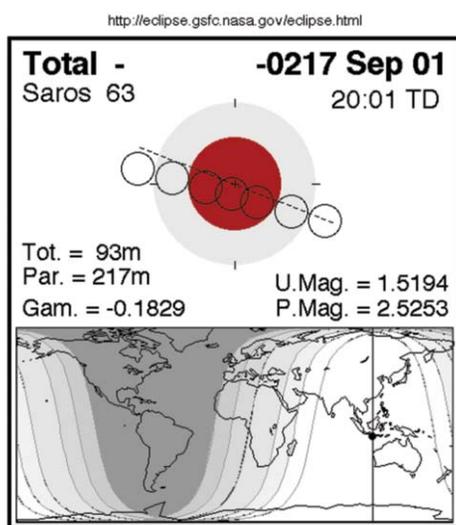
“It was the beginning of autumn, and many now lay sick, and all were out of heart. And when all were in readiness, and none of the enemy had observed them, not expecting such a thing, the moon was eclipsed in the night, to the great fright of Nicias and others, who, for want of experience, or out of superstition, felt alarm at such appearances.

...This was the twenty-sixth day of the month Carneus, the Athenian Metagitnion. ”

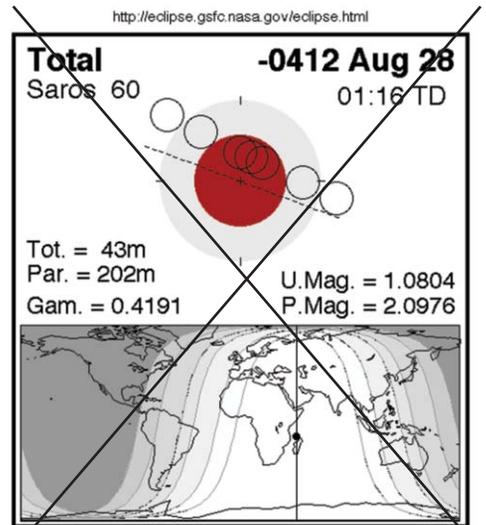
(Plutarch, Nicias, 22; 23; 28)

This lunar eclipse really happened on September 1 in BCE 218, not in BCE 413 Augustus 27. (Ginzel 9)

Delta T = zero sec! (JD ~ 1642042.41)



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The year of BCE 214 (Traditional BC 410)

“Babylonian Horoscope; Text 1 (AO 17649)

Darius (II) Year 13, X.24 = -409 Jan. 12/13

obv.

1' Tebetu the 24th, in the last part of night the 25th, year of

2' Darius the child was born.

3' Kislimu, around the 15th, Mercury's first visibility in the east behind (east of) Gemini.”

Critical Apparatus: The closest approximation would be MÁŠ “Capricorn,” but Mercury was not east of (“behind”) Capricorn at his point.”

(Francesca Rochberg; Babylonian Horoscopes, American Philosophical Society, Philadelphia 1998, p. 51-55)

The correct date of the born according to the “Seleucid Code” was -213 Jan. 6/7!

obv.

1’ Tebetu the 24th, in the last part of night the 25th, year of 2’ Darius the child was born.” (-213 Jan. 6/7)

3’ Kislimu, around the 15th, Mercury’s first visibility in behind of Capricorn. (-214 Nov. 28/29)

4’ Tebetu: (Winter) solstice was on the 9th of Tebetu; (-214 Dec. 21)

...was on the 26th. (-213 Jan. 7/8)

5’ Sabatu: Sabatu, dense clouds, around the 2nd, Mercury’s first appearance in Capricorn. (-213 Jan. 13)

6’ The 14th of Sabbatu, Venus’s last visibility in east in front of Aquarius. (The year had an intercalary Addaru. (-213 Jan. 25)

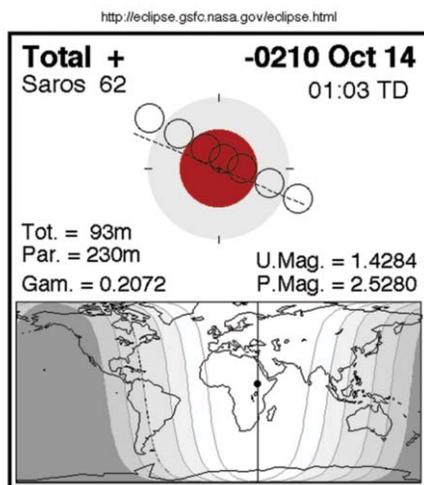


The year of BCE 211 (Traditional BC 406)

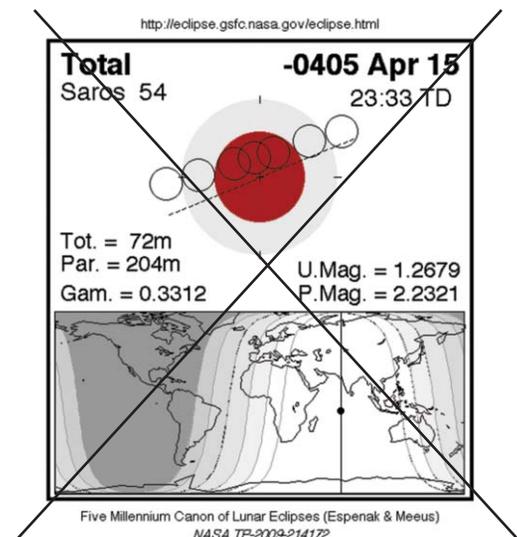
“In the ensuing year the year in which there was an eclipse of the moon one evening, and the old temple of Athena at Athens was burned, Pityas being now ephor at Sparta and Callias archon at Athens – the Lacedaemonians sent Callicratidas to take command of the fleet, since Lysander’s term of office had ended (and with it the twenty-fourth year of the war).”

(Xenophon, Hellenica, I, 6, 1)

This lunar eclipse really happened on October 14 in BCE 211, not in BCE 406 April 15. (Ginzel 10) Delta T = zero sec! (JD ~1644641.65)



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The year of BCE 209 (Traditional BC 404)

“In the following year - in which was celebrated an Olympiad, wherein Crocinas the Thessalian was victorious in the stadium, Endius being now ephor at Sparta and Pythodorus archon at Athens...

It was near this date, and at about the time of an eclipse of the sun, that Lycophrone of Pherae, who wanted to make himself ruler of all Thessaly, defeated in battle those among the Thessalians who opposed him, namely the Larisaeans and others, and slew many of them.”

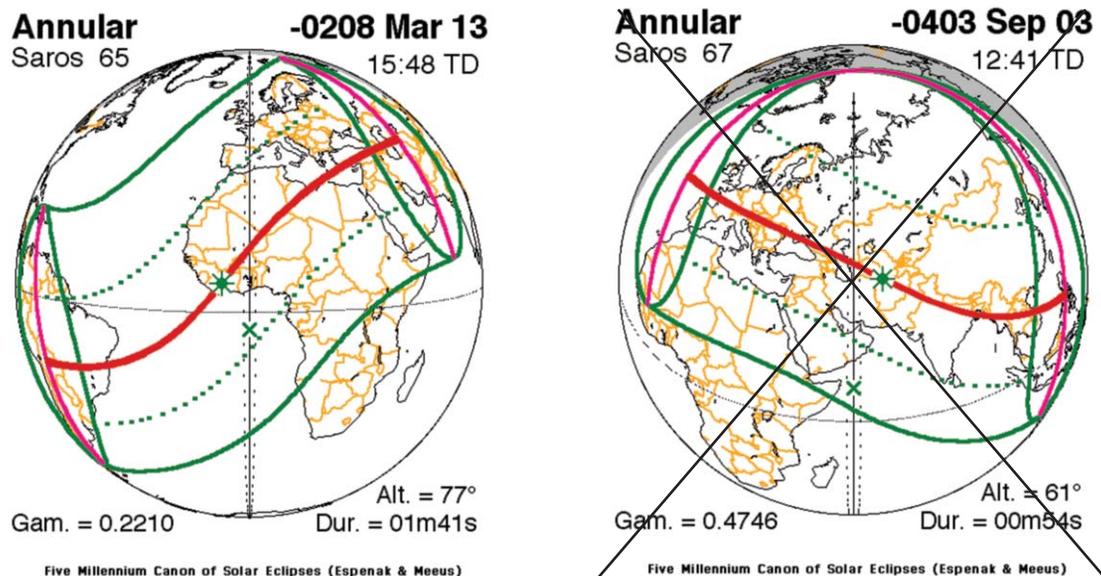
(Xenophon, Hellenica, II, 3, 2)

“ Archelaus rex....If he had admitted into the secrets of Nature one who even in broad daylight had lost his way – a king so ignorant of her ways that one day, when there was an eclipse of the sun, he shut up his palace, and, as is customary in times of grief and disaster, sheared his son’s hair?”

(Seneca, De Beneficiis V, VI, 2. Loeb Classical Library, 310.)

This solar eclipse really happened on September 7 in BCE 209, not in BCE 404 September 3. (Ginzel 11)

Delta T = zero sec! (JD ~ 1645335.9)



The year of BCE 198 (Traditional BC 394)

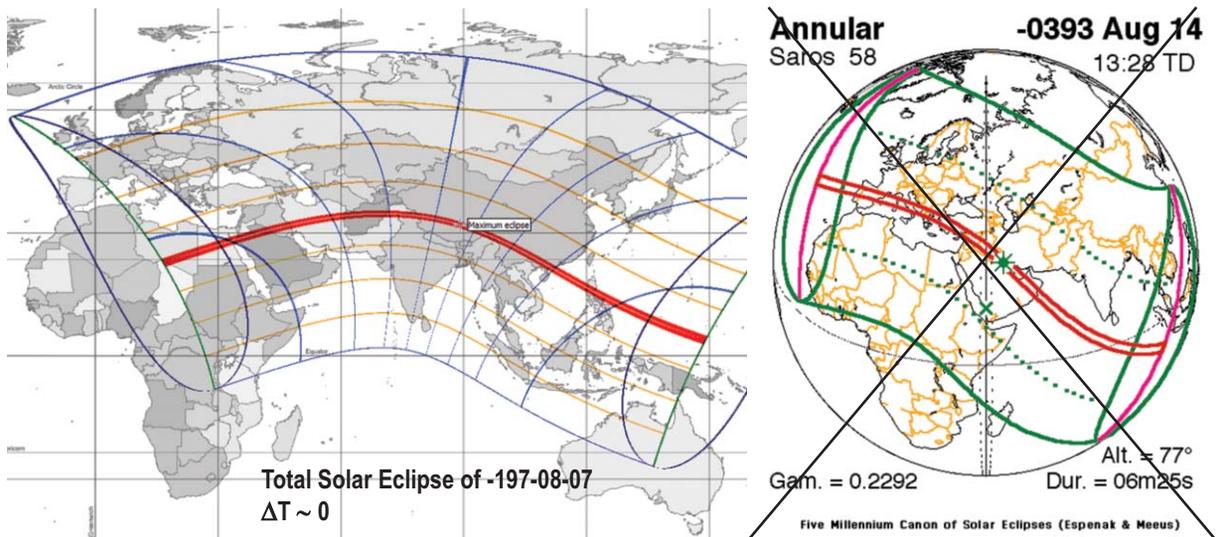
“When he was at the entrance to Boeotia, the sun seemed to appear crescent-shaped, and word was brought to him the Lacedaemonians had been defeated in the naval battle and the admiral, Peisander, had been killed.”

(Xenophon, Hellenica, IV, 3, 10 - Newton 1970, p. 102; Stephenson, p. 366)

The location near Chaeroneia, Greece. (Ginzel 13)

This solar eclipse really happened on Augustus 7 in BCE 198, not in BCE 394 Augustus 14.

Delta T = zero sec! (JD ~ 1649321.9)



The year of BCE 187 (Traditional BC 383)

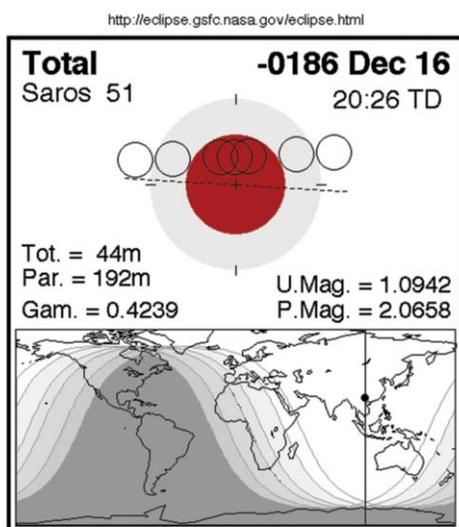
“He says that these three eclipses which he adduces are from the series brought over from Babylon, and where observed there; that the first occurred in the archonship of Phanostratos at Athens, in the month Poseidon; a small section of the moon’s disk was eclipsed from the summer rising-point [i.e. the north-east] when half an hour of night was remaining. He adds that it was still eclipsed when it set. Now this moment is in the 366th year from Nabonassar, in the Egyptian calendar (as Hipparchus himself says) Thoth 26/27 [-382 Dec. 22/23], 5 ½ seasonal hours after midnight (since half an hour of night was remaining).”

[Almagest, IV, 11; trans. Toomer (1998, p. 211-2).]

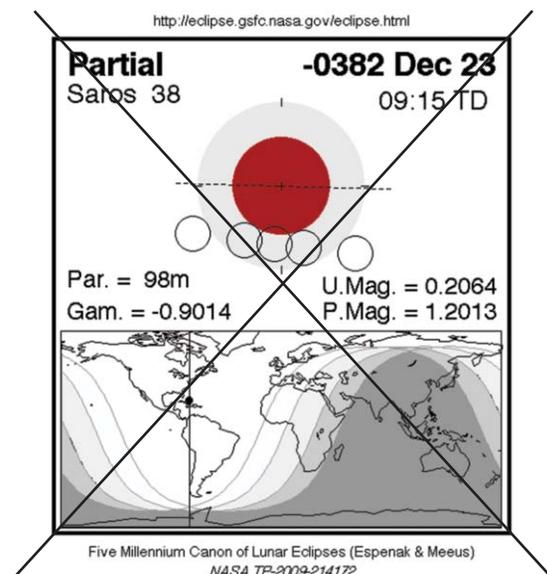
This lunar eclipse really happened on December 16 in BCE 187, not in BCE 383 December 23.

Delta T = zero sec! (JD ~ 1653471.6979)

(Z.H.; La nueva cronologia, p. 39)



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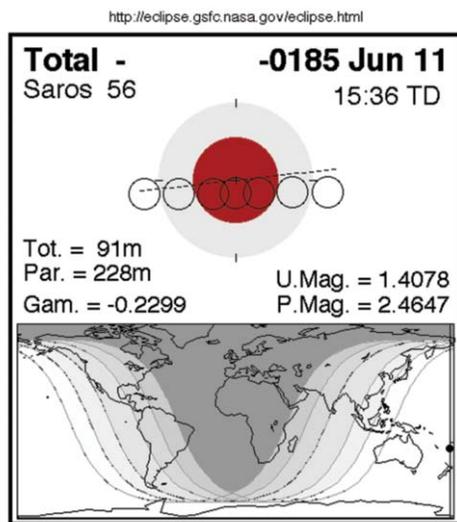
The year of BCE 186 (Traditional BC 382)

“He says that the next eclipse occurred in the archonship of Phanostratos at Athens, in the month Skirophorion, Phamenot 24/25 in the Egyptian calendar, and that the Moon was eclipsed from the summer rising-point [i.e. the north-east] when the first hour [of night] was well advanced. This moment is in the 366th year from Nabonassar, Phamenoth [VII] 24/25 [-381 June 18/19], about 5 ½ seasonal hours before midnight.”
 [Almagest, IV, 11; trans. Toomer (1998, p. 212).]

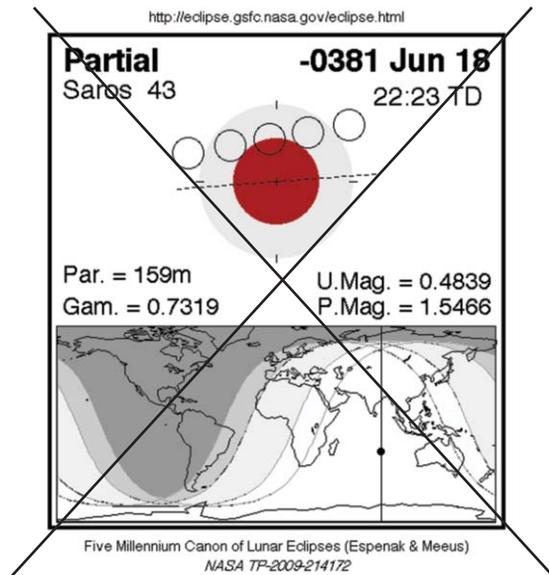
This lunar eclipse really happened on June 11 in BCE 186, not in BCE 386 June 18.

Delta T = zero sec! (JD ~ 1653648.25)

(Z.H.; La nueva cronologia, p. 40)



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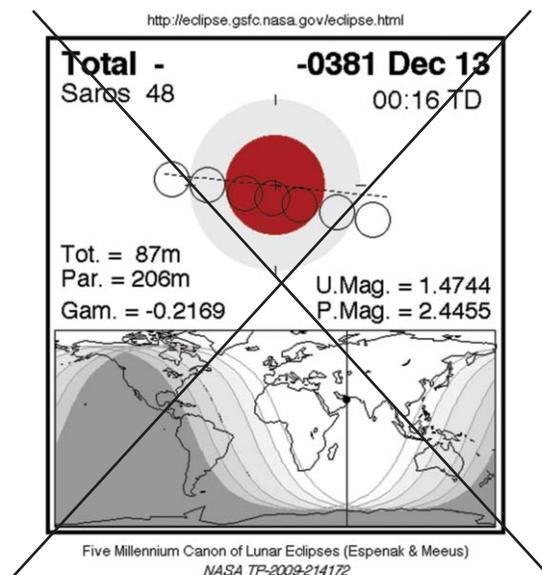
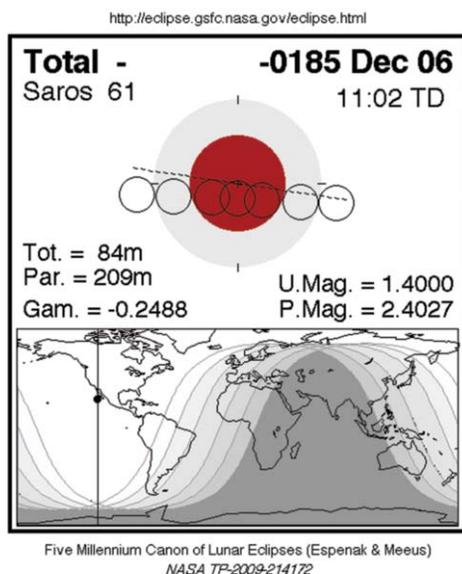
“He says that the third eclipse occurred in the archonship of Euandros at Athens, in the month Poseidon I, Thoth 16/17 in the Egyptian calendar and that (the moon) was totally eclipsed, beginning from the summer rising-point [i.e. the north-east], after four hours [of night] had passed. This moment is in the 367th year from Nabonassar, Thoth [I] 16/17 [-381 Dec 12/13], about 2 ½ hours before midnight. Now when the Sun is about two-thirds through Sagittarius, one hour of night at Babylon is about 18 time-degrees. So 2 ½ seasonal hours produce 3 equinoctial hours. Therefore the beginning of the eclipse was 9 equinoctial hours after moon on the 16th”. And since the eclipse was total, its duration was about 4 equinoctial hours.”

[Almagest, IV, 11; trans. Toomer (1998, p. 213).]

This lunar eclipse really happened on December 6 in 186, not in BCE 382 December 13.

Delta T = zero sec! (JD ~ 1653825.328)

(Z.H.; La nueva cronologia, p. 40-41)



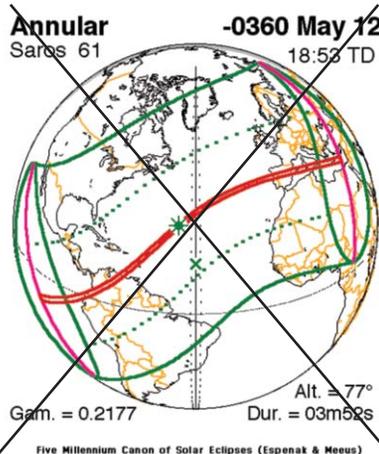
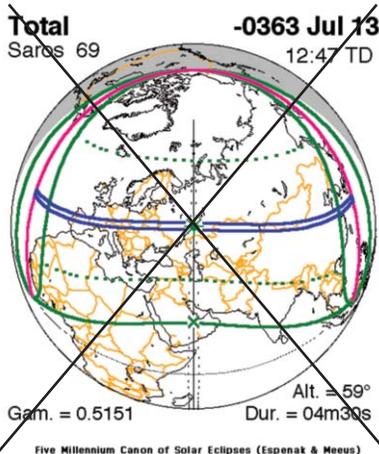
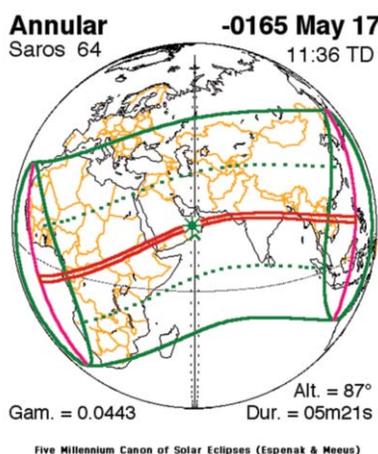
The year of BCE 166 (Traditional BC 364 and BC 361)

“When the common council of the Boeotians convened and the envoys had explained the matters on which they had been instructed, the Boeotians concurred with the Thesalians in every matter, gave Pelopidas seven thousand men and ordered him speedily assist as requested; but as Pelopidas was hastening to leave with his army, the sun, as it happened, was eclipsed.” (Diodorus, Library of History XV 80)

“At this time, Alexander the Pherarean falling back to his old nature, and having seized many of the Thessalian cities, and put garrisons upon the Achaeans of Phthiotis, and the Magnesians, the cities, hearing that Pelopidas was returned, sent an embassy to Thebes requesting succours, and him for their leader. The Thebans willingly granted their desire; and now when all things were prepared, and the general beginning to march, the sun was eclipsed, and darkness spread over the city at noonday.”

(Plutarch, Pelopidas, 31)

This solar eclipse really happened on May 17 in BCE 166, not in BCE 364 July 13. (Ginzel 14)



The calculation of the Saros Series 64 is not accurate because of Ptolemy's wrong phases of the Moon.

"While matters stood thus between them, and as they thought, they were unobserved and undiscovered, Helicon, the Cyzicenean, one of Plato's followers, foretold an eclipse of the sun, which happened according to his prediction; for which he was much admired by the tyrant, and rewarded with a talent of silver;"

(Plutarch, Dion 19)

This solar eclipse really happened on May 17 in BCE 166, not in BCE 361 May 12. (Ginzel 15)

Delta T = zero sec! (JD ~ 1660927.9)

The year of BCE 161 (Traditional BC 357)

"It was now the middle of summer, and the Etesian winds blowing steadily on the seas the moon was at the full..."

Just after the libations were made, and the accompanying prayers offered, the moon was eclipsed; which was no wonder to Dion, who understood the revolutions of eclipses, and the way in which the moon is overshadowed and the earth interposed between her and the sun."

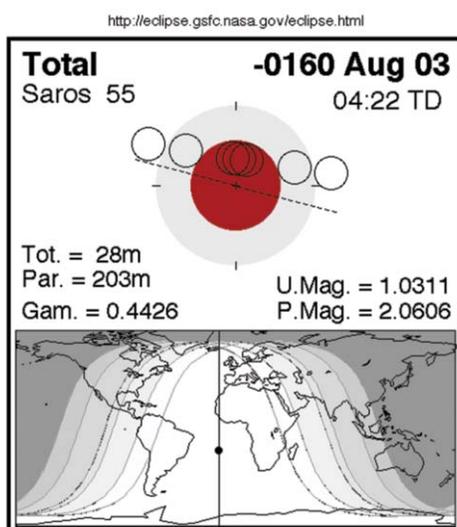
(Plutarch, Dion, 23; 24)

"So his friend Dion, when the moon, at the time he was to embark from Zacynthus to go against Dionysius, was eclipsed, was not in the least disturbed, but went on, and arriving at Syracuse, expelled the tyrant."

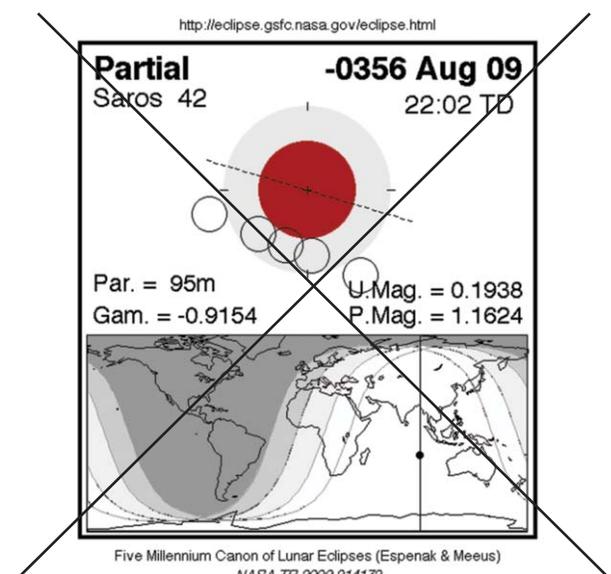
(Plutarch, Nicias, 23)

This lunar eclipse really happened on Augustus 3 in BCE 161, not in BCE 357 Augustus 9. (Ginzel 16)

The calculation of the Saros Series 55 (lunar) is not accurate because of Ptolemy's wrong phases of the Moon.



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The year of BCE 135 (Traditional BC 331)

Several Greek and Roman writers record that an eclipse of the Moon happened about the time of a battle between the army of Alexander the Great and the Persian forces at Arbela.

“It came to pass that in the month Boedromion, about the beginning of feast of Mysteries at Athens, there was an eclipse of the moon, the eleventh night after which, the two armies being now in view of another, Darius kept his men in arms, and by torch-light took a general review of them.”

(Plutarch, Alexander, 19)

“There he gave his army a rest. There was an almost total eclipse of the moon, and Alexander sacrificed to the Moon, Sun an Earth, who are all said to cause an eclipse. Aristander thought that the eclipse was favorable to the Macedonians and Alexander...”

...So ended this battle in the month Pyanepsion of the archonship at Athens of Aristophanes.”

(Arrian, Anabasis of Alexander, III, 7(6); 15(7),)

Clay Tablet; BM 36761 +BM 36390

2' The 13th, moonset to sunrise: 32 minutes

3' [...lunar] eclipse, in its totality covered. 40 minutes of the night...Jupiter, Saturn...

(w.livius org/ Astronomical diaries)

According to the “Seleucid Code” the correct date was;

-134 September 14

The Moon rise: 18:22,

Sun sets: 18:15,

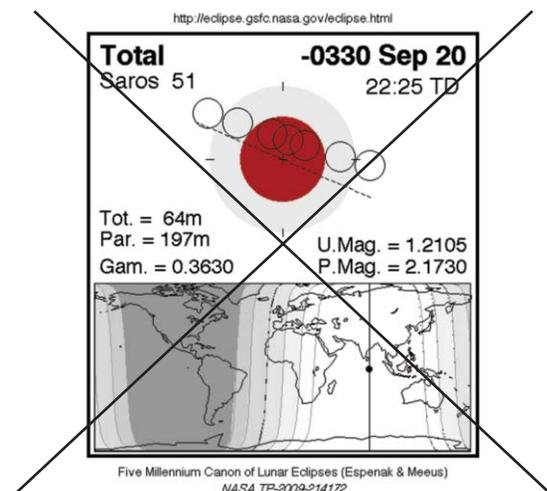
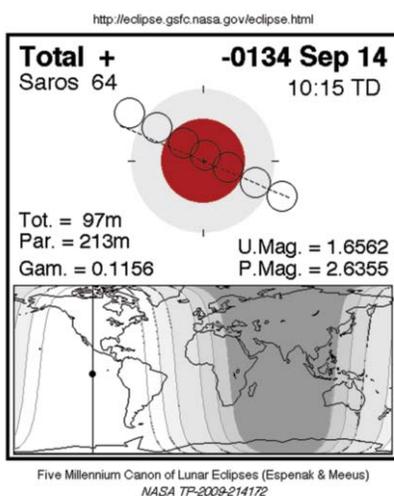
Jupiter rise: 22:47

Saturn sets: 20:57

(Starry Night Pro 4,5 for Al Hillah, Iraq)

This lunar eclipse really happened on September 14 in BCE 135, not in BCE 331 September 20. (Ginzel 18)

The calculation of the Saros Series 64 (lunar) is not accurate because of Ptolemy’s wrong phases of the Moon. (JD ~ 1672370.25)



The year of BCE 127 (Traditional BC 323)

The correct date of death of Alexander according to the “Seleucid code” was -126 June 5 not in BCE 323 June 11.

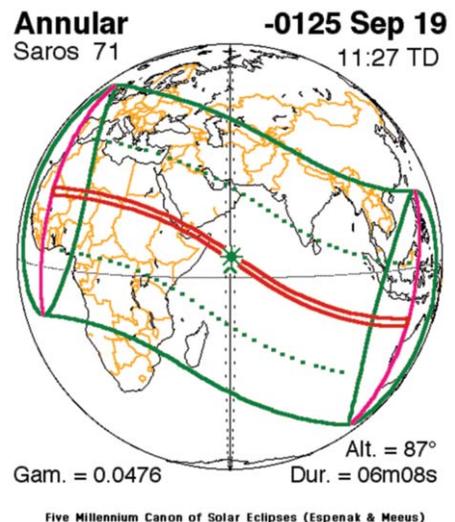
The year of BCE 126 (Traditional BC 322)

“In earlier times the biggest ace of presented evidences was the solar eclipse of Sippar. This solar eclipse was valued so greatly that equations of Moon also were adjusted to it. In the land of former Sippar was found a clay tablet of cunei form writing. (LBAT 212) On the tablet it was recorded that in the second year of King Philip’s reign a solar eclipse had started at 3 degrees that is at 12 minutes before sunset. The academicals science dates this event as September 26 of BCE 322 in the Julian calendar....”

This solar eclipse really happened on September 19 in BCE 126, not in BCE 322 September 26.

Delta T = zero sec! (JD ~ 1675663.25)

(Z.H.; The Seleucid Code, p. 58-63)



The year of BCE 116 (Traditional BC 312)

In a Hungarian Calendar, the first day of the Macedonian era - Dios 1 - equivalent to September 30 in 116 BCE.

(Traditional October 8 in 312 BC)

The year of BCE 115 (Traditional BC 311/SE 1)

SE 1 I/1 the first day of the first month of the first year of the Seleucid era. (In Babylon)

SE 1 I/1 = -114 Martius 27

(Traditional -310 April 3)

The year of BCE 112 (Traditional BC 310)

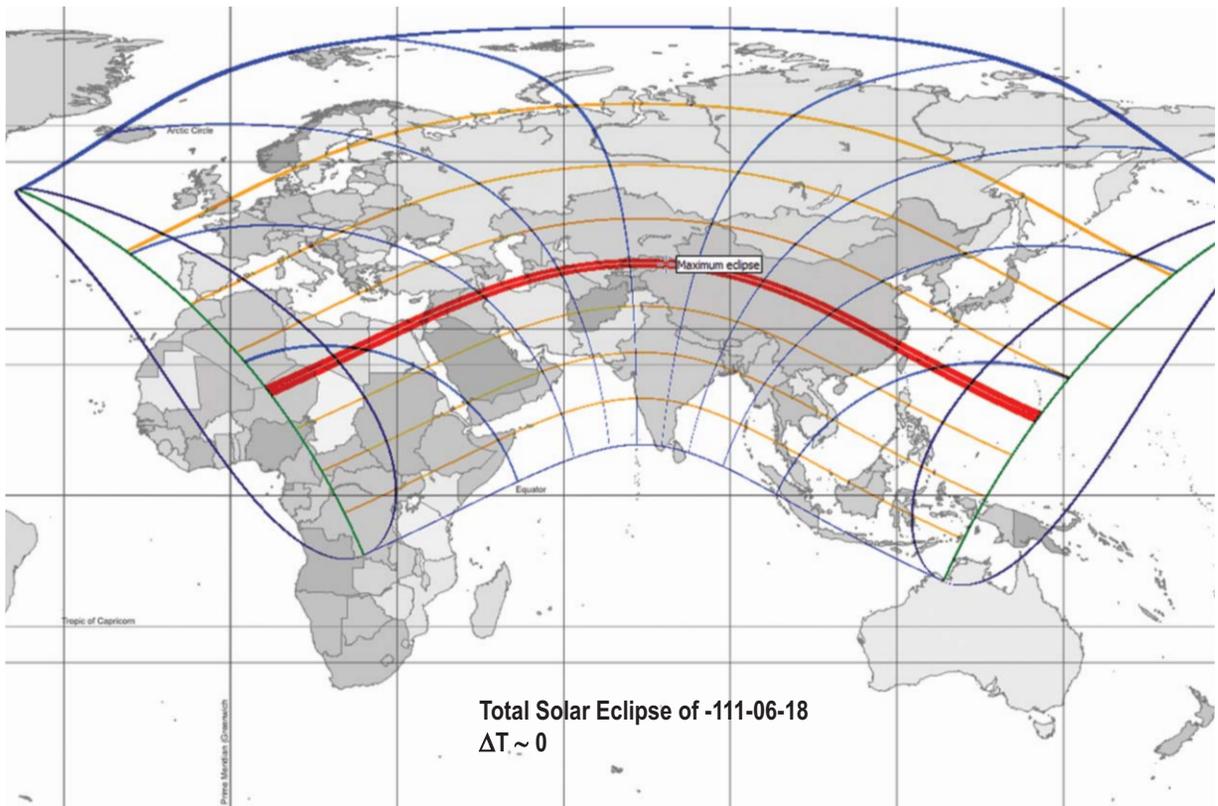
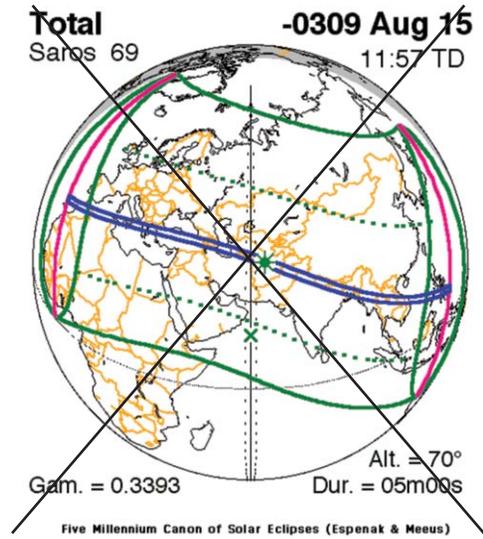
“Agathocles, who was already at the point of being overtaken and surrounded, gained un hoped for safety as night closed in. On the next day there occurred such an eclipse of the Sun that utter darkness set in and the stars were seen everywhere; wherefore Agathocles’ men, believing that the prodigy portended misfortune for them, fell into even greater anxiety about the future. After they had sailed for six days and the same number of night, just as day was breaking, the fleet of the Carthaginians was unexpectedly seen not far away.”

(Stephenson, p. 348-351)

This solar eclipse really happened on June 18 in BCE 112, not in BCE 310 Augustus 15. (Ginzel 19)

The calculation of the Saros Series 64 is not accurate because of Ptolemy’s wrong phases of the Moon.

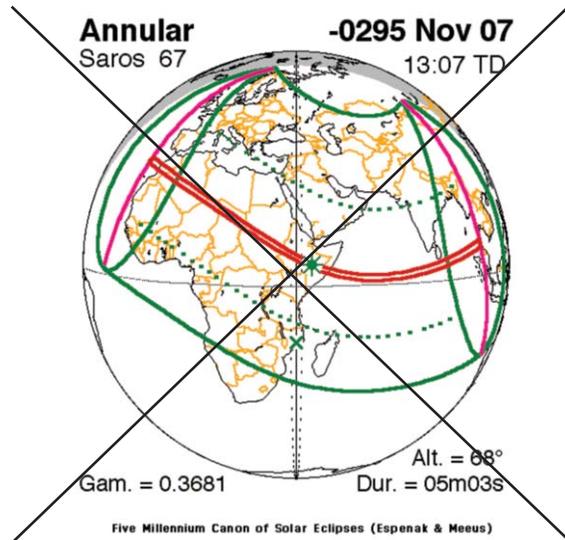
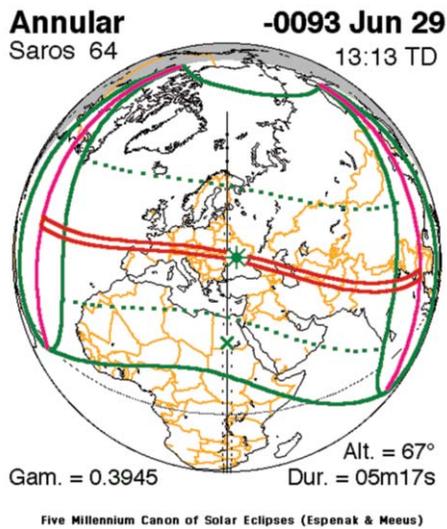
(JD ~ 1680683.85)



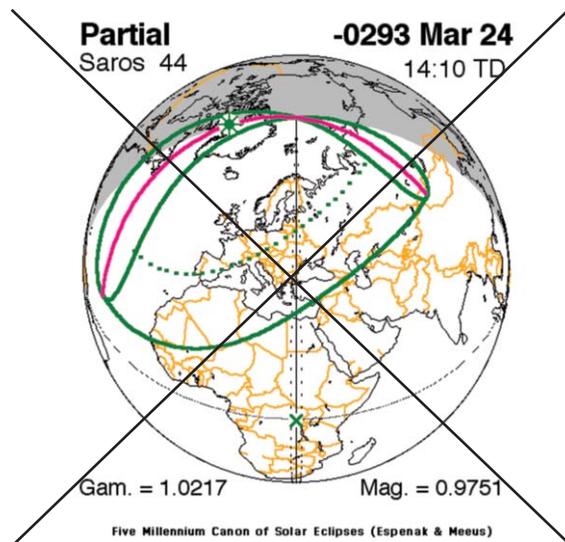
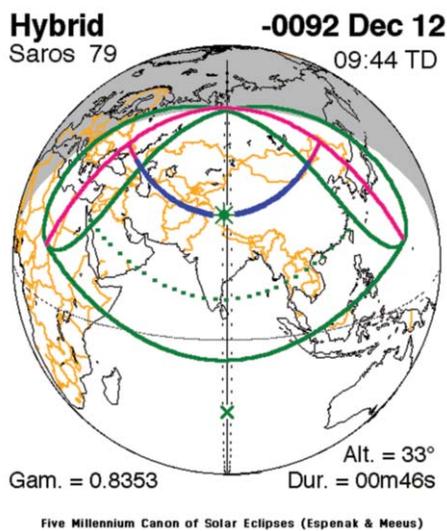
The year of BCE 94 (Traditional BC 296)

“Several portents occurred this year and, with the view of averting them, the senate passed a decree that special intercessions should be offered for two days...” (Titus Livius, The History of Rome, X, 23, 1)

The first solar eclipse really happened in BCE 94 Jun 29, not in BCE 296 Nov 07. (Ginzel 20) Delta T = zero sec! (JD ~ 1687269)



The second solar eclipse really happened in BCE 93 Dec 12, not in BCE 294 Mar 24. Delta T = zero sec! (JD ~ 1687800.8)



The year of BCE 61 (Traditional BC 257/ SE 54/55)

Clay Tablet; BM 41616+41636+41645+41797+42233

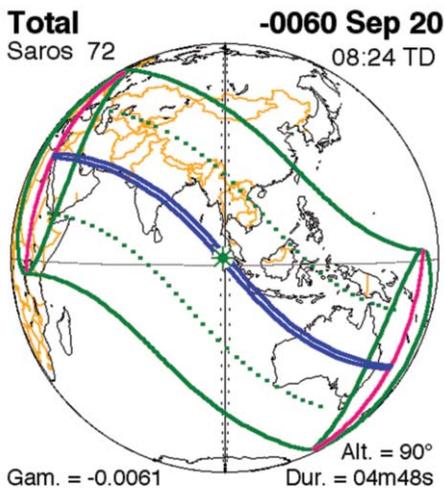
(Sachs-Hunger, Astronomical Diaries Volume II, p. 21)

*Rev. 1' ...32 grad onset and clearing; during its eclipse, the north wind which...
...2' fingers.*

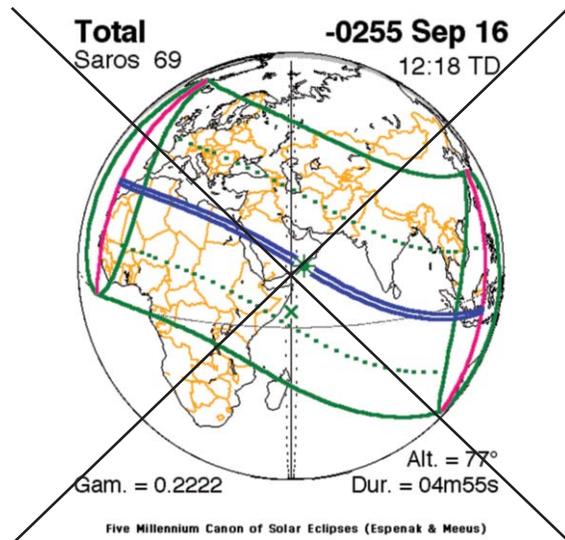
[Mercury's] last appearance in the west in Virgo; Saturn was in Libra; Mars was in Leo."

This solar eclipse really happened on September 20 in BCE 61 (SE 55), not in BCE 256 (SE 56!) September 16.

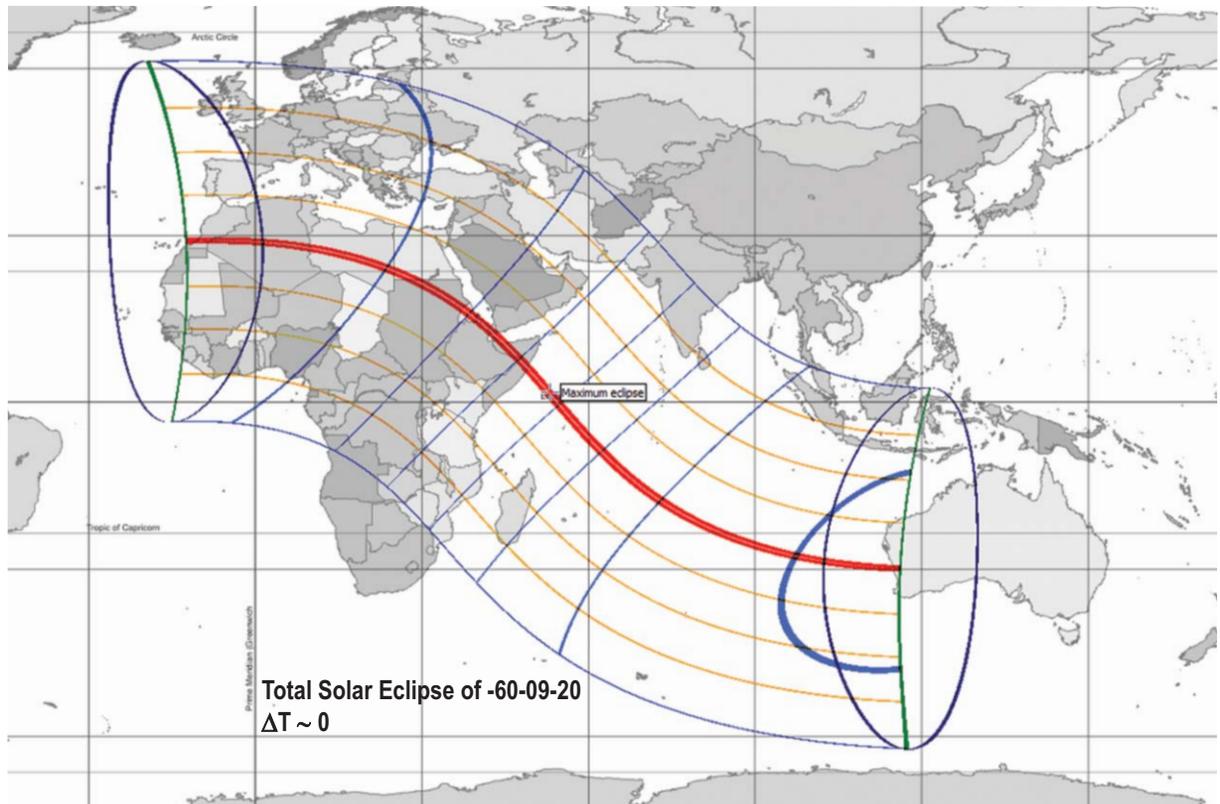
(JD ~ 1699406)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



The year of BCE 55 (Traditional BC 251/ SE 60/61)

"Babylonian Horoscope; Text 6 (BM 47721 =81-11.3,426)

(b) S.E.61 II.8 = -250 May 5/6

rev.

1' [Year] 61 (S.E.), Antiochus(II) was king

2'[Aj]aru, night of the 8th, beginning of night, moon

east of the Single star in the front of the Fur[row] (=gamma Virginis)

[...] cubits. The 8th day, at one-half béru before sunset, he was born...

(Francesca Rochberg; Babylonian Horoscopes, American Philosophical Society, Philadelphia 1998, p. 68-71)

The correct date of the born according to the "Seleucid Code"

was: -54 April 28/29

The year of BCE 51 (Traditional BC 247/ SE 64/65/ AR 1)

This is first year of Arsacid era. In Babylonian texts the Arsacid era is occasionally used.

The year of BCE 50 (Traditional BC 246/ SE 65/66) AR 1/2)

Clay Tablet; BM 132276 (SH2,71)

"Rev, 2' ...Night of the 29th, solar eclipse which passed; at 40..."

This solar eclipse really happened on Augustus 21 in BCE 50, not in BCE 246 Augustus 28.

(JD ~ 1703393)

According to the "Seleucid Code" the correct Calendar; SE 66

SE 66 /I 0 = -49 Mar 27/28

"Year 66, king Antiochus. Month I, (the 1st of which was identical with) the 30th: 14.30; clouds, I did not watch"

SE 66 /I 7 = -49 Apr 2/3

"Night of the 7th, beginning of the night, the moon was...above Beta Cancri."

SE 66 /I 10 = -49 Apr 5/6

"Night of the 10th, beginning of the night the moon was [nn] cubit below Theta Leonis."

SE 66 /I 14 = -49 Apr 9/10

"Night 14th, moonset to sunrise 1.30; clouds, I did not watch."

SE 66 /I 17 = -49 Apr 12/13

"[Night 17th] the moon was 2/3 cubit behind? Theta Ophiuchi."

SE 66 /I 19 = -49 Apr 15

"Night of the 19th, last part of the night, the moon was 4 1/2 cubits below Beta Capricorn."

SE 66 /II 1 = -49 Apr 26/27

"[The first Night.. the moon was] 4 cubit in front of Eta Geminorum."

SE 66 /II 6 = -49 May 1

"[Night] of the 6th, overcast; beginning of the night. The moon was 1 cubit 4 fingers above Alpha Leonis."

SE 66 /II 10 = -49 May 5/6

[Night of the 10th] beginning of the night, the moon was... behind Alpha Virginis..."

SE 66 / V 1 = -49 July 24

SE 66 / V 20 = -49 Aug 12

5' [...] happened in Esangil/"Esangila occurred" That month, on the 20th, it was heard in Babylon

6' [has died...] ... and fear were/was in the land.

SE 66 / V 29 = -49 Aug 21

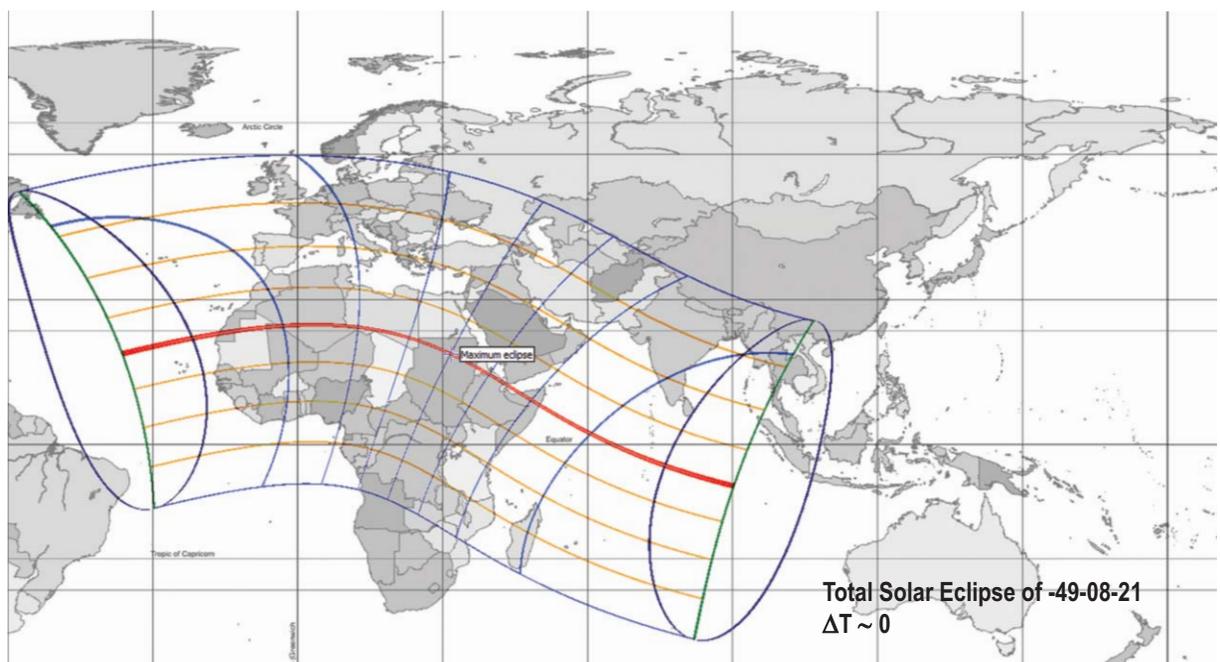
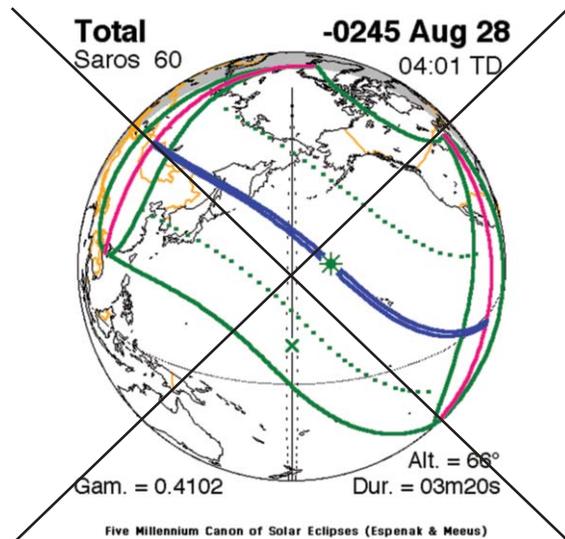
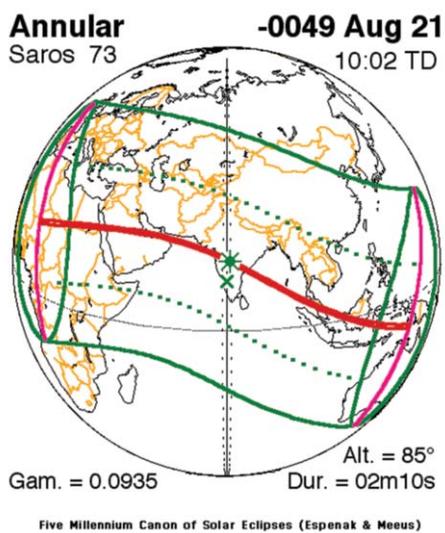
2' ...Night of the 29th, solar eclipse which was omitted; at 40+ [...]

4' [...] Mercury's in Leo; Saturn was in Libra; Mars was in Capricorn. That month the river level 16...

SE 66 / VI 1 = -49 Aug 22

SE 66 / VI 13 = -49 Sept 4

10' [...lu]nar eclipse, ...,omitted. Night of the 14th, last part of the night, the moon was 1 ½ cubits in front of eta Piscium"





The year of BCE 39 (Traditional BC 235/ SE 77)

“Babylonian Horoscope; Text 10 (MLC 2190)

S.E. 77 III.4 = -234 June 2/3 Translation

obv.

1' Year 77, Simanu the 4th, in the morning(?) of the 5th(?)

2' Aristocrates was born.

3' That day, the moon was in Leo, sun was in 12;30 Gemini”

.....

The correct date of the born according to the “Seleucid Code” was

-38 May 27/28!

6'Jupiter “ina” 18 Sagittarius (Sagittarius rise at 19:00, Jupiter set at 20:57)

....

8' ...Venus “ina” 4 Jupiter (MÚL. [BABBAR])

“9' The place of Venus: he will find favor wherever he goes;

10' he will have sons and daughters. Mercury in Gemini

rev.

1' with the sun. The place of Mercury: the brave one

2' will be first in rank;

3' he will be more important than his brothers; he will take over his father's house.”

4' Saturn (GENNA) 6 “al/ana(?)” Mars (AN) 24 “al/ana(?)...”

Mars set at 1:06 May 28, Saturn rise at 0:00 May 28.



The year of BCE 23 (Traditional BC 219)

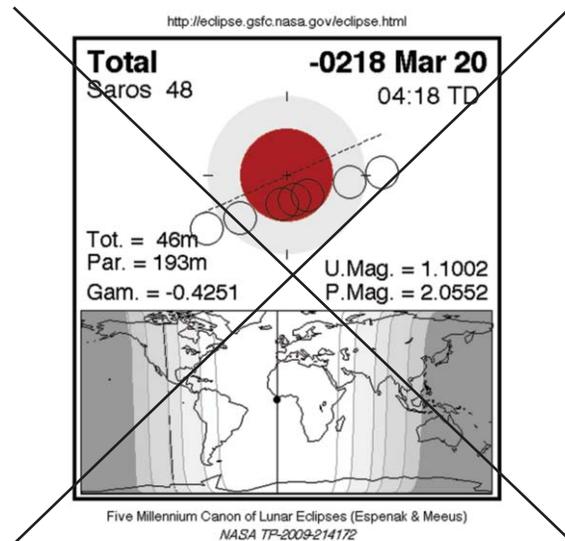
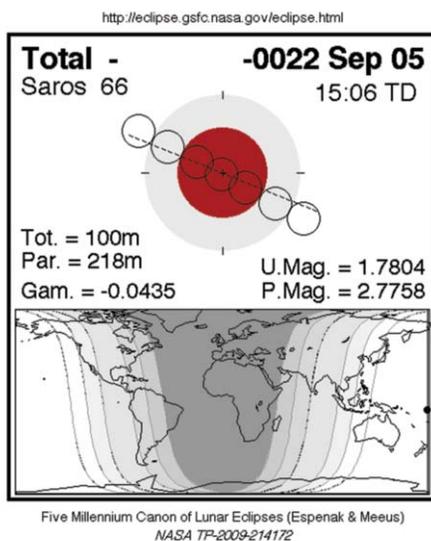
“While he was here [Attalus], an eclipse of the moon took place, and the Gauls, who had all along been aggrieved by the hardships of the march – since they made campaign accompanied by their wives and children, who followed them in wagons – considering this a bad omen, refused to advance further.”

(Polibius, The Histories, V, 78, 1. LCL, 1960, v.138 tr. W.R. Paton)

This lunar eclipse really happened on September 5 in BCE 23, not in BCE 219 March 20. (Ginzel 21)

The calculation of the Saros Series 66 is not accurate because of Ptolemy’s wrong phases of the Moon.

(JD ~ 1713270.3)



The year of BCE 22 (Traditional BC 217)

“About the same time Cn. Servilius entered upon his consulship at Roma, on the 15th of March.”

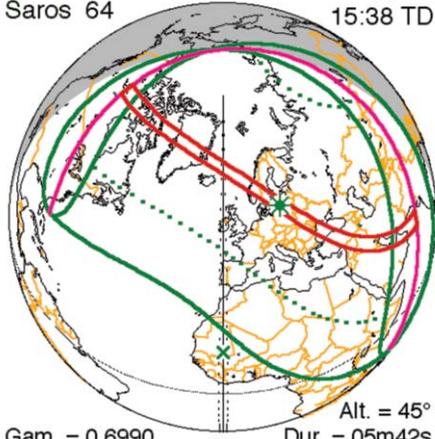
“To add to the general feeling of apprehension, information was received of portents having occurred simultaneously in several places. In Sicily several of the soldiers’ darts were covered with flames; in Sardinia the same thing happened to the staff in the hand of an officer who was going his rounds to inspect the sentinels on the wall; the shores had been lit up by numerous fires; a couple of shields had sweated blood; some soldiers had been struck by lightning; an eclipse of the sun had been observed; at Praeneste there had been a shower of red-hot stones; at Arpi shields had been seen in the sky and the sun had appeared to be fighting with the moon; at Capena two moons were visible in the daytime;...”

(Titus Livius, The History of Rome, XXII, 1, 4,8)

This solar eclipse really happened on Augustus 11 in BCE 22, not in BCE 217 February 11. (Ginzel 22)

Delta T = zero sec! (JD ~ 1713610.25)

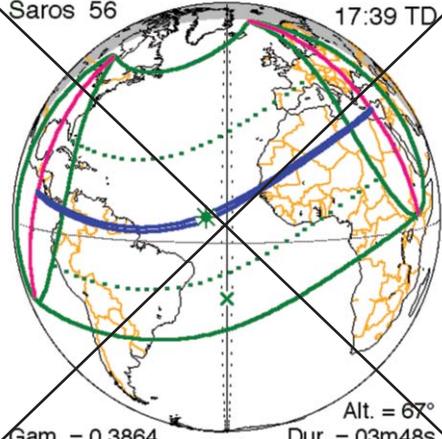
Annular -0021 Aug 11
Saros 64 15:38 TD



Gam. = 0.6990 Alt. = 45° Dur. = 05m42s

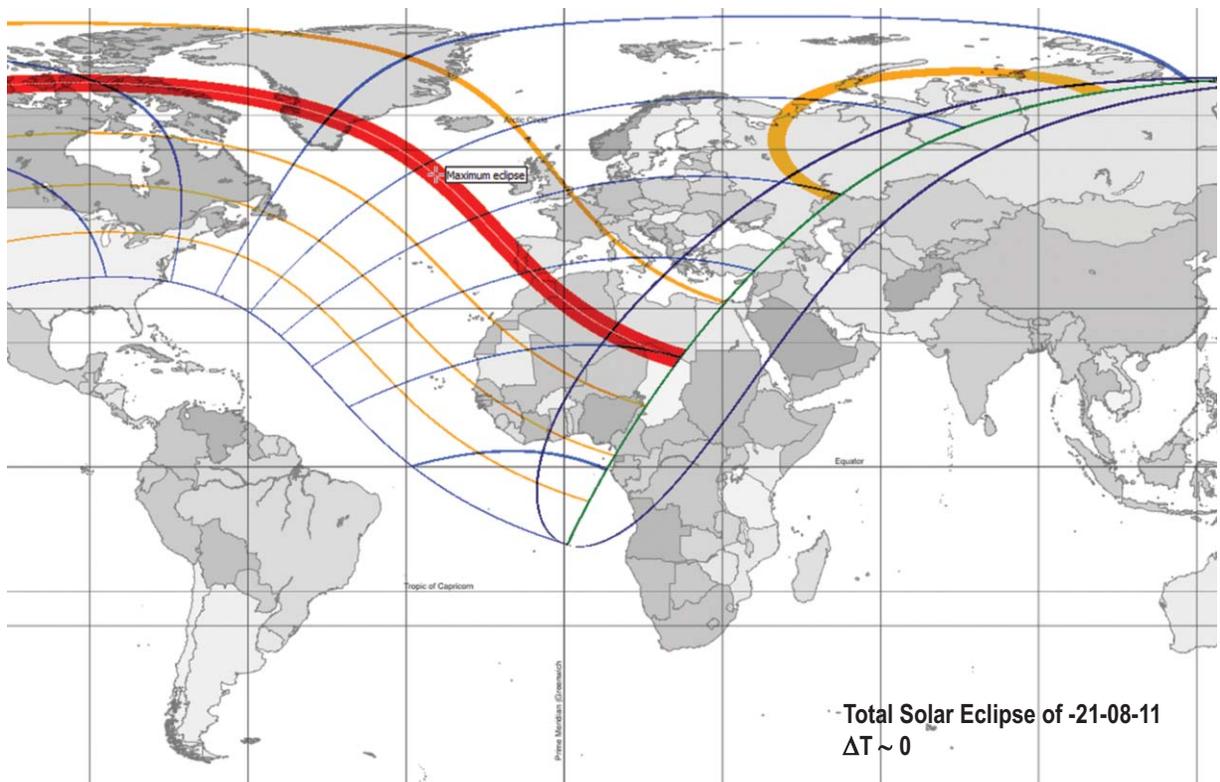
Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

Total -0216 Feb 11
Saros 56 17:39 TD



Gam. = 0.3864 Alt. = 67° Dur. = 03m48s

Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



The year of BCE 7 (Traditional BC 203 and BC 202)

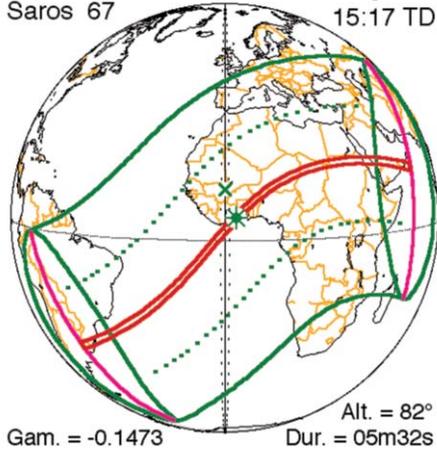
“The general alarm at the tidings from Africa was increased by rumours of various portents. At Cumae the sun’s disc was seen to diminish in size and there was a shower of stones; in the district of Veliternum the ground subsided and immense cavern were formed in which trees were swallowed up;...”

(Titus Livius, The History of Rome, XXX.38,8)

This solar eclipse really happened on April 29 in BCE 7, not in BCE 203 Max 6. (Ginzler 23)

Delta T = zero sec! (JD ~ 1718985.25)

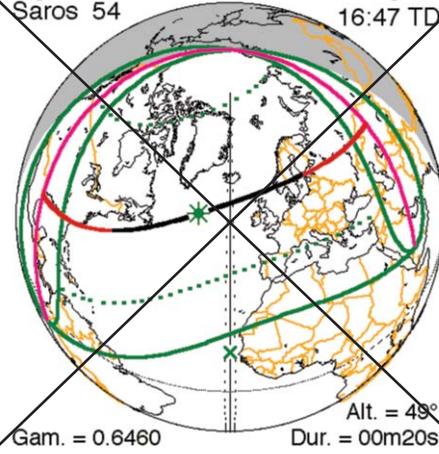
Annular -0006 Apr 29
Saros 67 15:17 TD



Alt. = 82°
Gam. = -0.1473 Dur. = 05m32s

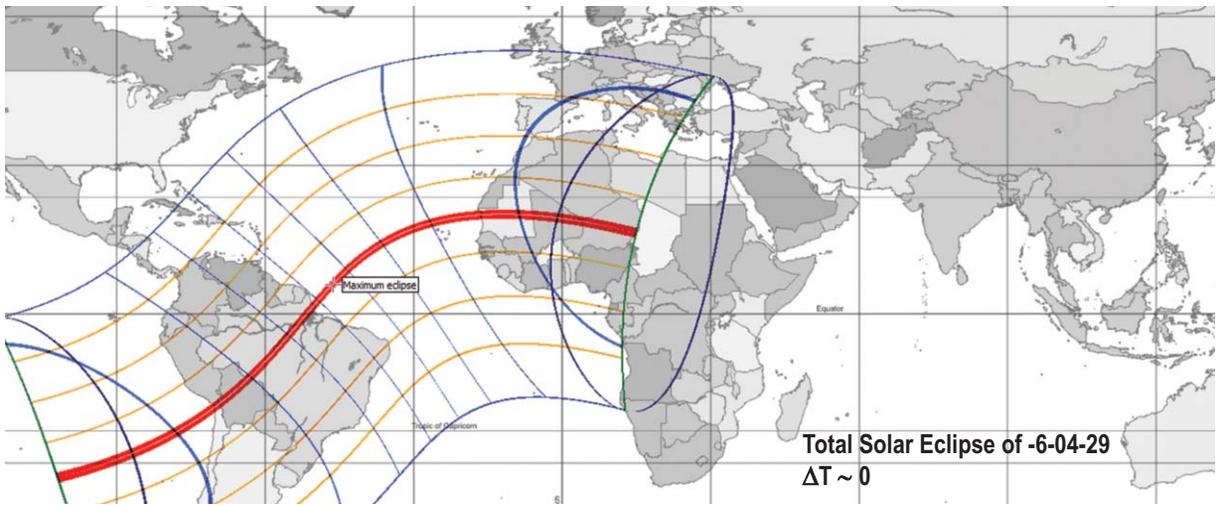
Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

Hybrid -0202 May 06
Saros 54 16:47 TD



Alt. = 49°
Gam. = 0.6460 Dur. = 00m20s

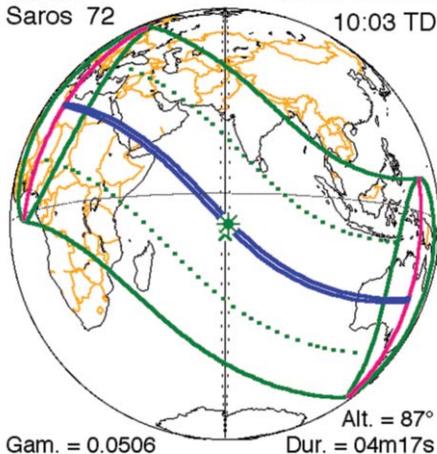
Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Total Solar Eclipse of -6-04-29
 $\Delta T \sim 0$

The solar eclipse of 19 October BC 202 may be identifiable as the eclipse which Dio as preserved by Zonaras, says took place shortly before the battle of Zama. This solar eclipse really happened on October 23 in BCE 7. (Ginzel 24)
Delta T = zero sec! (JD ~ 1719162)

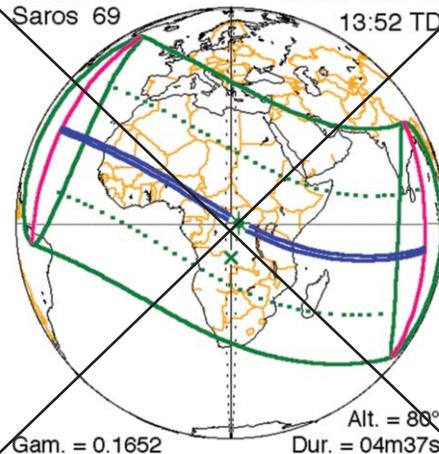
Total -0006 Oct 23
Saros 72 10:03 TD



Alt. = 87°
Gam. = 0.0506 Dur. = 04m17s

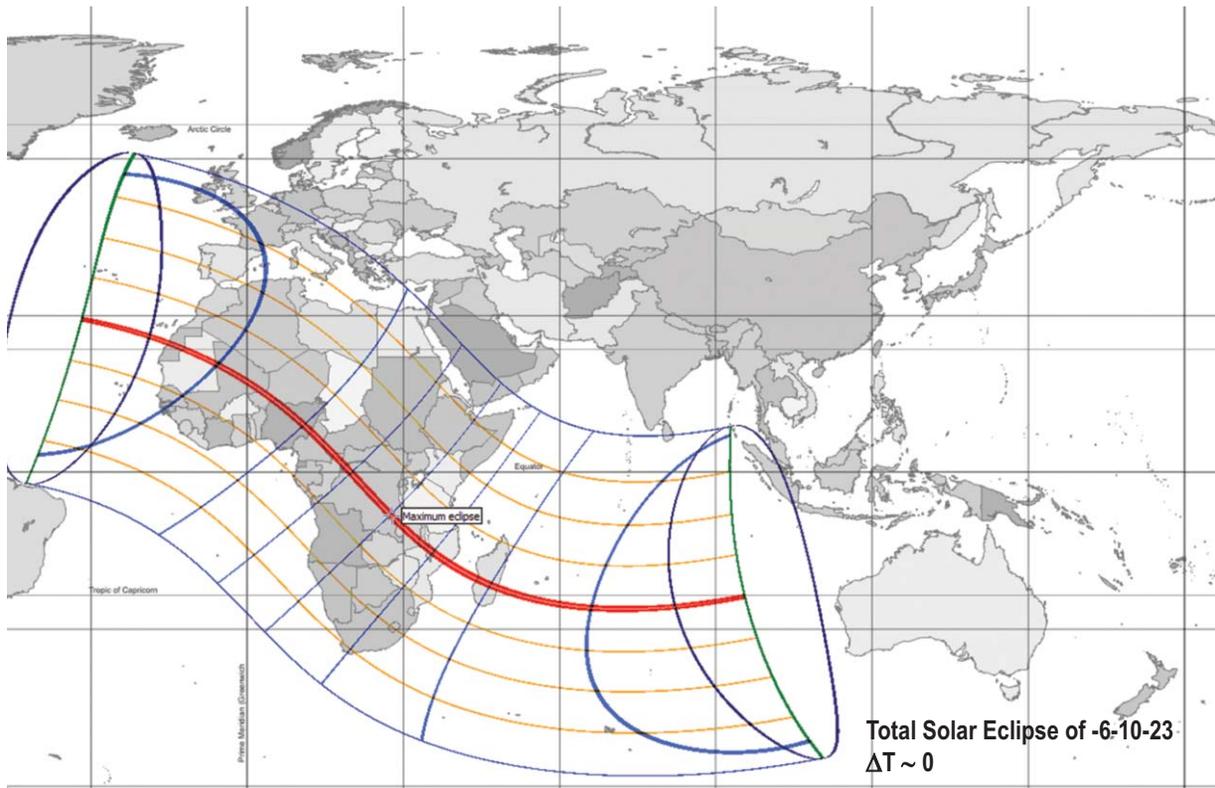
Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

Total -0201 Oct 19
Saros 69 13:52 TD



Alt. = 89°
Gam. = 0.1652 Dur. = 04m37s

Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



The year of BCE 5 (Traditional BC 201)

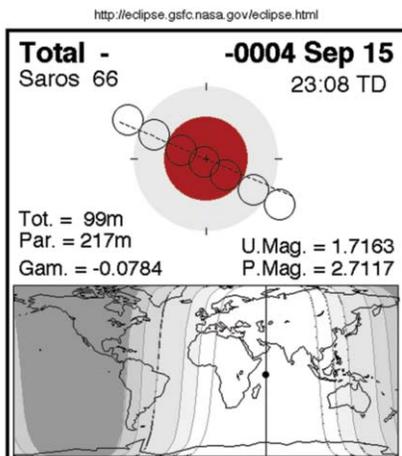
“...We will pass to the second set of three eclipses he set out, which he says were observed in Alexandria. He says that the first of these occurred in the 54th year of the Second Kallipic Cycle, Mesore [month XI] 16 in Egyptian calendar [200 Sept.22]. In this eclipse the moon began to be obscured half an hour before it rose, and its full light was restored in the middle of the third hour [of night].” ;”

[Almagest, IV, 11; trans. Toomer (1998, p. 214)

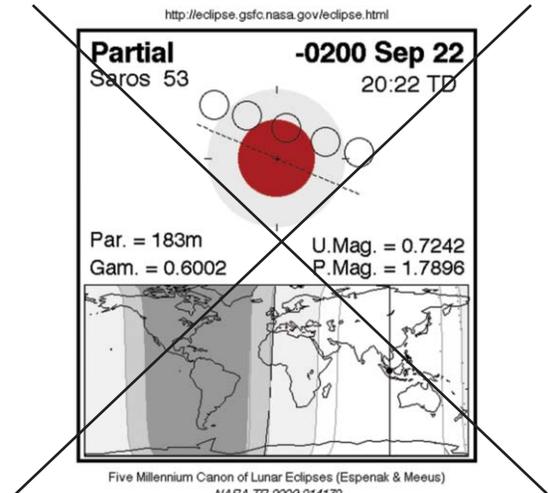
This lunar eclipse really happened on September 15 in BCE 5, not in BCE 201 September 22.

Delta T = zero sec! (JD ~ 1719855.1875)

(Z.H.; La nueva cronologia, p. 44-45)



Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172



Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172

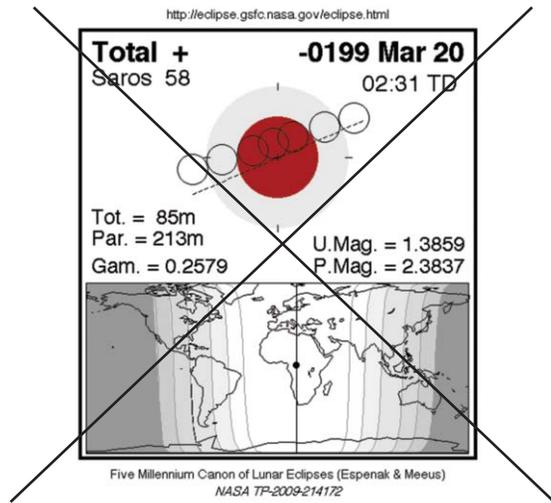
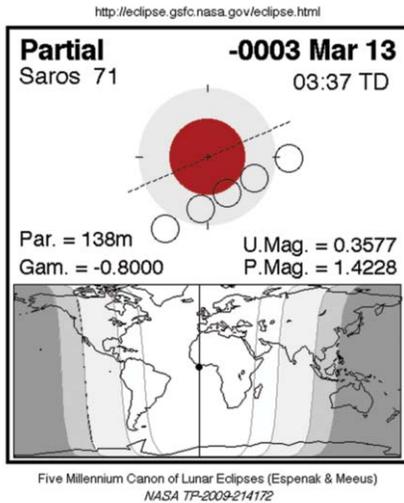
The year of BCE 4 (Traditional BC 200)

“He says that the next eclipse occurred in the 55th year of the same cycle. Mechir [VI]9 in Egyptian calendar [-199 Mar. 19], that it began when 5 1/3 hours of the night had passed, and was total.”

[*Almagest*, IV, 11; trans. Toomer (1998, p. 214)

This lunar eclipse really happened on Martius 13 in BCE 4, not in BCE 200 Martius 20. Delta T = zero sec! (JD ~ 1720033,448)

(Z.H.; La nueva cronologia, p. 45-46)



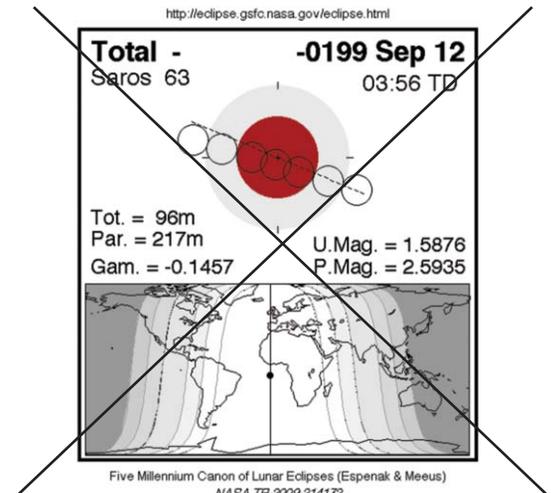
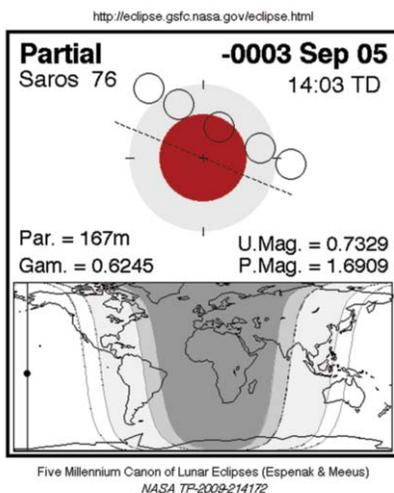
“...He says that the third eclipse occurred in the same (55th) year of the Second Cycle, on Mesore [month XII] 5 in Egyptian calendar [-199 Sept. 11] and that it began when 6 2/3 hours of the night had passed and was total. He also says that mid-eclipse occurred at about 8 1/3 hours of night, that is 2 1/3 seasonal hours after midnight.”

[*Almagest*, IV, 11; trans. Toomer (1998, p. 215)

This lunar eclipse really happened on September 5 in BCE 4, not in BCE 200 September 12.

Delta T = zero sec! (JD ~ 1720209.5)

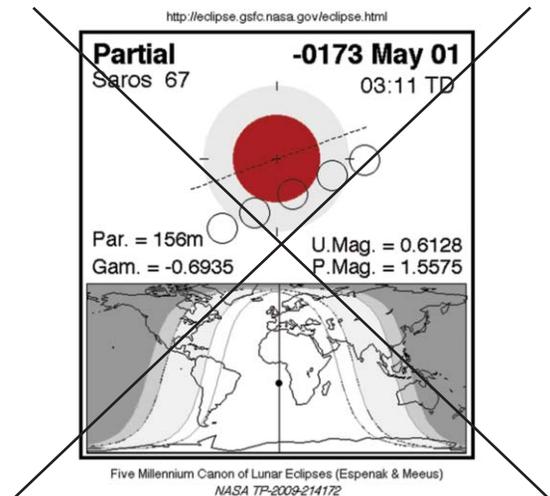
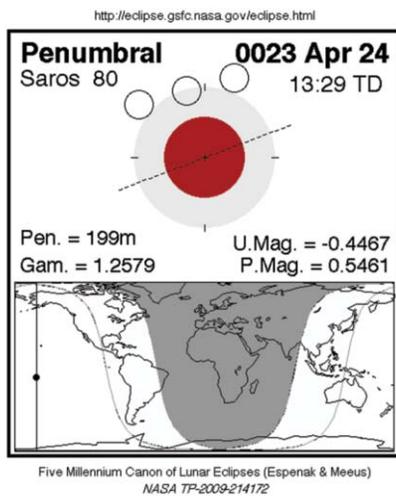
(Z.H.; La nueva cronologia, p. 46-47)



The year of CE 1 (Traditional BC 196/ SE 115/116)

Calendar

- SE 115 X 0 = CE 1 January 13
- SE 115 XI 0 = CE 1 February 12
- SE 115 XII 0 = CE 1 March 13
- SE 116 I 0 = CE 1 April 12
- SE 116 II 0 = CE 1 May 11
- SE 116 III 0 = CE 1 June 10 solar eclipse
- SE 116 III 14 = CE 1 June 24 lunar eclipse
- SE 116 IV 0 = CE 1 July 9
- SE 116 V 0 = CE 1 Aug 7
- SE 116 VI 0 = CE 1 September 6
- SE 116 VII 0 = CE 1 October 5
- SE 116 VIII 0 = CE 1 November 4
- SE 116 VIII 13 = CE 1 November 19 lunar eclipse
- SE 116 IX 0 = CE 1 December 3 solar eclipse
- SE 116 X 0 = CE 2 January 2



The year of CE 23 (Traditional BC 174)

“In the seventh year of Philometor, which is the 574th from Nabonassar, on Phamenoth [VII]27/28 in Egyptian calendar [-173 May 0/1], from the beginning of the eighth hour till the end of the eighth hour till the end of the tenth in Alexandria, there was an eclipse of the moon which reached a maximum obscuration of 7 digits from the north. So mid-eclipse occure 2 ½ seasonal hours after midnight, which corresponds to 2 1/3 equinoctial hours...”

[Almagest, VI, 5; trans. Toomer (1998, p. 283)]

This lunar eclipse really happened on April 24 in CE 23, not in BCE 174 May 01.

Delta T = zero sec! (JD ~ 1729571.48)

(Z.H.; La nueva cronologia, p. 49)

The year of CE 26 (Traditional BC 171/ SE 140/141)

Clay Tablet; BM 40574, Listed as LBAT 363

(Sachs-Hunger, Astronomical Diaries, Volume II, p. 444-447)

According to the "Seleucid Code" the correct Calendar for SE 140 XII 10-19

1' Year 140, kings Antiochus and Antiochus, his son.

"2' Night of the 10th, clouds were in the sky; the moon was 1 in front of Theta Leonis..."

SE 140 XII 10 = CE 26 March 18

"4' Night of the 11th...the moon was 1 ½ cubits in front of Beta Virginis..."

SE 140 XII 11 = CE 26 March 19

"6' Night of the 12th the moon was 3 cubits in front of Alfa Virginis."

SE 140 XII 12 = CE 26 March 20

"9' The 14th, equinox; I did not watch."

SE 140 XII 14 = CE 26 March 22!

(Traditional the equinox = BCE 171 March 28!!!)

"9-10' Night of the 15th ...the moon was 2 ½ cubits in front of Alpha Librae."

SE 140 XII 15 = CE 26 March 23.

"11'-12' Night of the 16th, clouds were in the sky; last part of the night, the moon was 2 cubits in front of the head of Scorpius."

SE 140 XII 16 = CE 26 March 24/25.

"13' Night of the 17th, last part of the night, the moon was ½ cubit below Alpha Scorpii, the moon having passed a little o the east."

SE 140 XII 17 = CE 26 March 26.

"14' ...Night of the 18th, the north wind blew; cold; last part the night, the moon was 2 cu[bits] below Theta Ophiuchi,"

SE 140 XII 18 = CE 26 March 27.

The year of CE 27 (Traditional BC 170/ SE 141/142)

Clay Tablet; BM 34603, Copy: LBAT 1263

(Hermann Hunger, Astronomical Diaries, Volume VI, p. 178-183)

"Rev. 3' Year 142, kings Antiochus and his son Antiochus.

4' Month IV, the 28th, solar eclipse:..."

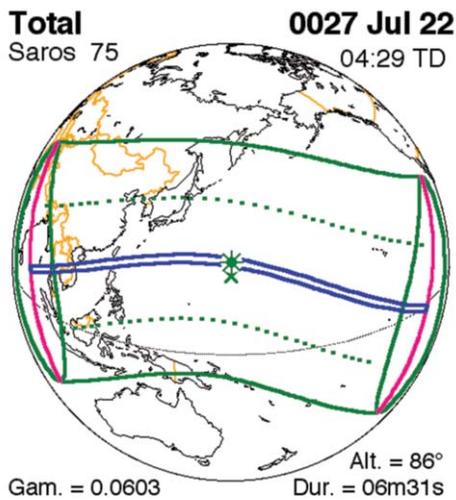
This solar eclipse really happened on July 22 in CE 27, not in BCE 170 July 28.

(According to F. Richard Stephenson the value of delta T for solar eclipse BC 170 Jul 28 = 35850 sec!!! In his book; p.140)

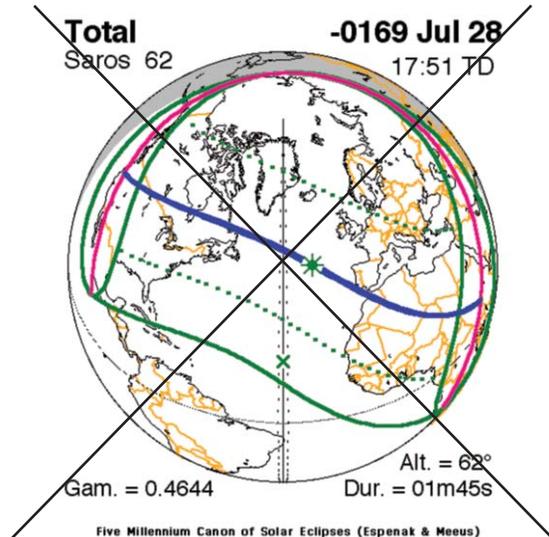
Delta T = zero sec! (JD ~ 1731121.75)

(Z.H.; The Seleucid Code, p. 98-104)

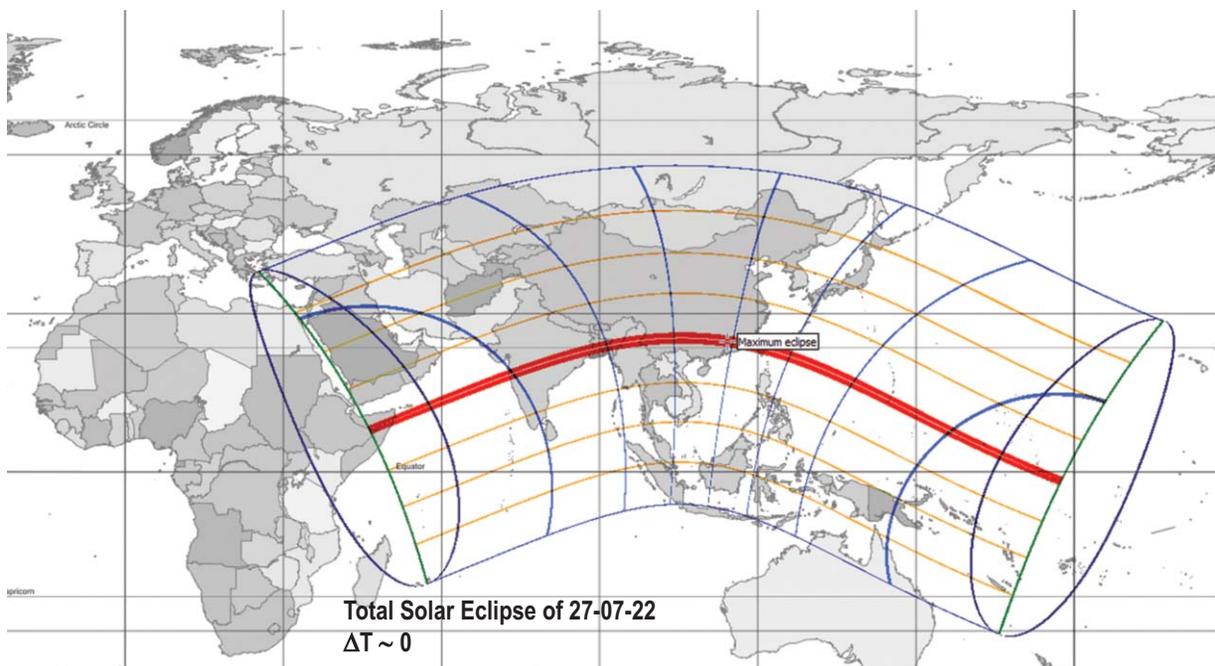




Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



The year of CE 31 (Traditional BC 166/ SE 145/146)

Clay tablet; BM 32844, Listed as LBAT 376

(Sachs-Hunger, *Astronomical Diaries*, Volume II, p. 486-487)

“1’ Year 146, [king] Antiochus”

(Month I, 28th...solar eclipse)

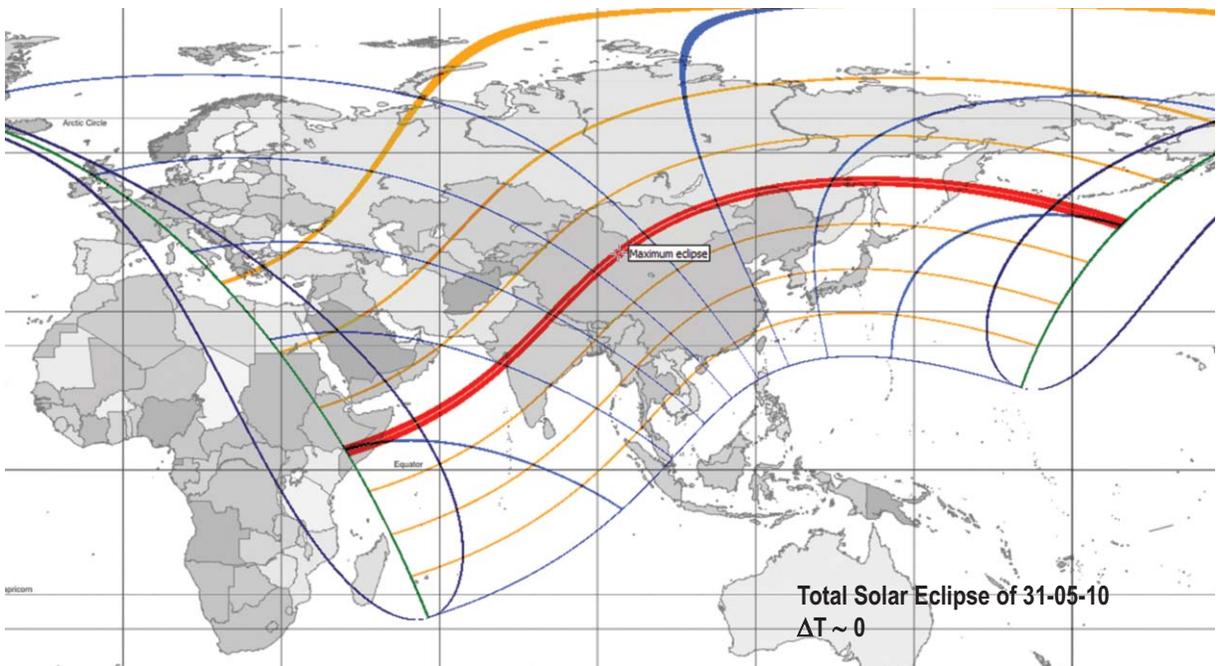
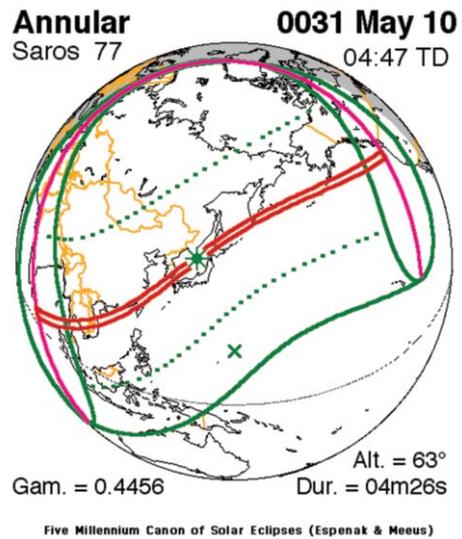
“14’ In 13 deg of day more than one-third of the disc [...].”

This solar eclipse really happened on the early morning of May 10 in CE 31, not in BCE 166 May 17.

(According to F. Richard Stephenson the value of delta T for solar eclipse BC 166 May 17 = 15250 or -6850 sec!!! In his book; p.140)

Delta T = zero sec! (JD ~ 1732509.8)

(Z.H.; *The Seleucid Code*, p. 105-106)



The year of CE 34 (Traditional BC 163/ SE 148/149)

Clay tablet BM 34037, Copy: LBA 1264 /SH VI, p. 184-187

“10’ Year 149, King Antiochus.

11’ Month V, night of the 29th, solar eclipse

12’ which was omitted. At 1 béru

13’ **before sunset**. (GE6 ana ZALÁG!!!) ”

Clay tablet BM 33850+...

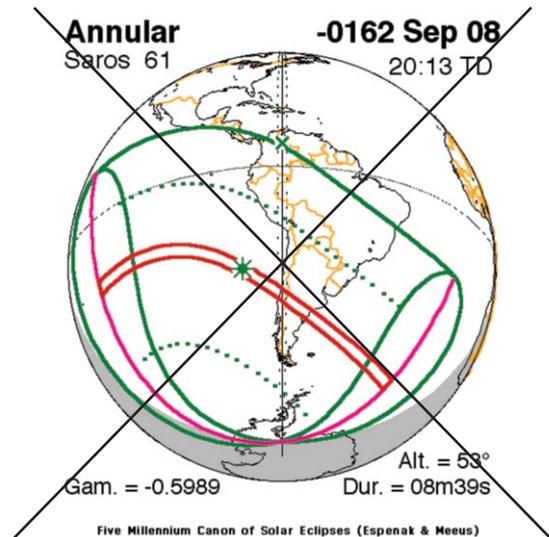
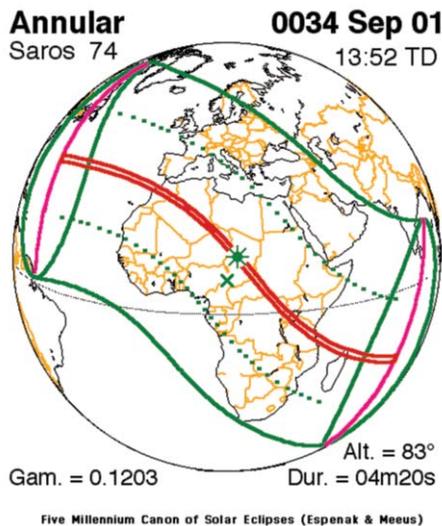
SH II, p. 24-29

3’ solar [eclipse] which was omitted; at 1 béru **before sunset**.

(GE6 ana ZALÁG!!!)

This solar eclipse really happened on September 1 in CE 34, not in BCE 163 September 8.





The year of CE 56 (Traditional BC 141/ SE 170/171)

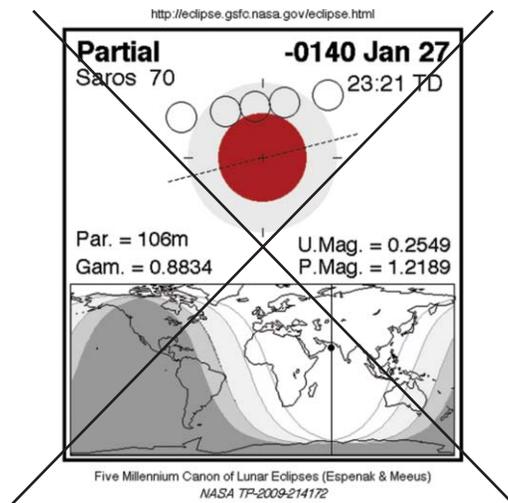
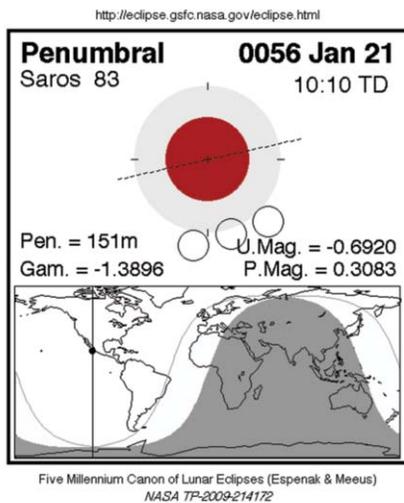
“Again in the thirty- seventh year of the Third Kalippic Cycle, which is the 607th from Nabonassar, Tybi [V]2/3 in Egyptian calendar [-140 Jan 27/28], at the beginning of the fifth hour [of night] in Rhodes the Moon began eclipsed; the maximum obscuration was 3 digits from the south. Here then, the beginning of the eclipse was 2 seasonal hours before midnight, which corresponds to 2 1/2 equinoctial hours.”

[*Almagest*, VI, 5; trans. Toomer (1998, p. 284)

This lunar eclipse really happened on January 21 in CE 56, not in BCE 141 January 27.

Delta T = zero sec! (JD ~ 1741531.325)

(Z.H.; La nueva cronologia, p. 52)



“Continuing our search for dated tablets, on the page 142 (SH III) we can find one with double dating (BM 34050) which is in relatively good condition and is extremely valuable for us. The double dating means that we have an exact date on it not only of the Seleucid era but also of the Arsacid era which differs from the Seleucid era by 64 years. The diary relates to the 107th year of the Arsacid era which is stated to be analogical to the 171st year of the Seleucid era, The months are also recorded as 9 and 10.

The inflated English translation (or rather distortion!) of the tablet's content leaves no doubt at the all about the sources used, which definitely were the retro-calculated astronomical celestial situations of BC 141 and BC 140. Based on these data the rendering to the calendar was performed.

I am sorry to disappoint the authors, but in my opinion the Babylonian astronomer was watching the sky in December of CE 56 and in January of CE 57, and he wrote what he saw with his "reed pen" on the mild clay for the information of future generations. Because of this fact, three very important sections of the tablet produce contradictions for the believers of the BC 141/BC 140 version of events. On the obverse side of the tablet, in line 12, a lunar eclipse is mentioned, which at that time was not visible, and in addition the tablet mentions that **were was a lunar eclipse 5 month earlier**. This earlier eclipse was visible in the evening of July 15th in CE 56 of the Julian calendar. For the lunar eclipse which was not visible in Babylon the correct date is December 11th, in CE 56. In line 23 of the tablet there is a note about the beginning of the winter solstice, which occurred on the 25th day of the 9th month. Recalculating this date we get December 21st, CE 56. Furthermore, it is unbelievably good luck for us that on the tablet we also have an intact piece telling us about a solar eclipse occurring 4 days later, although they could not see it. Retro-calculation helps us to see that the Sun was rising at the time of its eclipse, and the eclipse ended within not more than thirty minutes. The date of the eclipse after recalculation is December 25th, CE 56. These four dates following each other in such a sequence cannot be reproduced within a time period of 1000 astronomical years, including of course the turn of BC 141/BC 140. I can fully understand the non-committal attitude of the author of the analyzed book when he does not specify the calendar positions of these three very important events in the time-interval which was determined by him. His mistakenly identified solar eclipse was perfectly visible in the area of the Pacific Ocean."

(H.Z.; The Seleucid Code, p. 28-31)

Clay tablet BM 34050, Listed as LBAT 420 /SH III p. 142-153

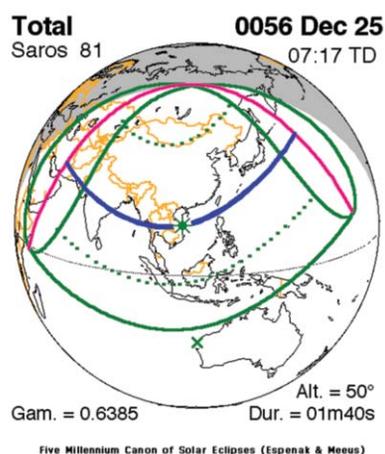
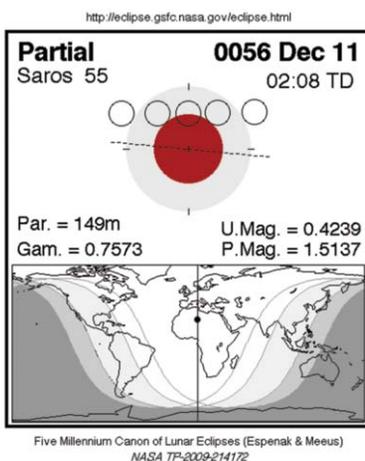
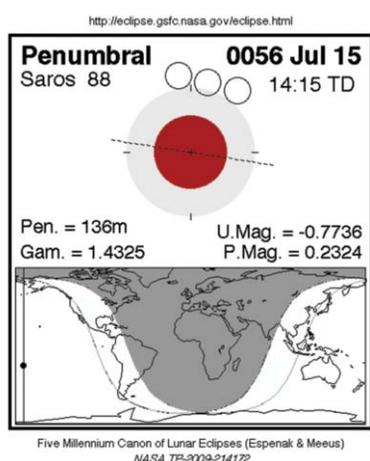
23' ...The 24th, solstice;

This was the winter solstice of CE 56 December 21.

29' [solar eclipse] which was omitted;

This solar eclipse really happened on December 25 in CE 56, not in BCE 140 January 1.

Delta T = zero sec! (JD ~ 1741870.9)



The year of CE 63 (Traditional BC 134/ SE 177/178)

Clay tablet BM 34669 + 3570, Listed as LBAT 432f.

(SH III p. 192-199)

“5’...Night of the 29th, solar eclipse [...]

This solar eclipse really happened on February 17 in CE 63, not in BCE 134 February 24.

The calculation of the Saros Series 70 is not accurate because of Ptolemy’s wrong phases of the Moon. (JD ~ 1744115.9)

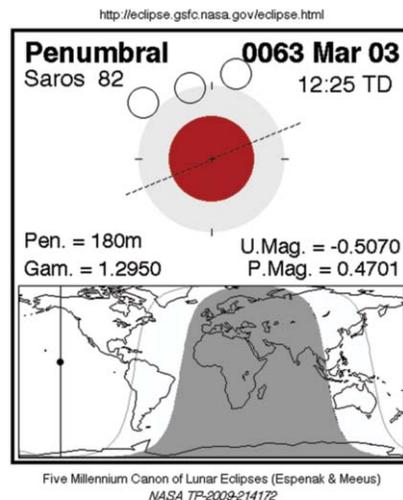
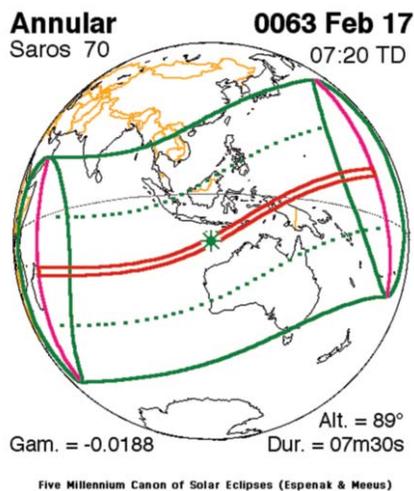
“16’ ...when alpha Lyrae culminated, lunar eclipse;”

This lunar eclipse really happened on March 3 in CE 63, not in BCE 134 March 10.

(Z.H.; The Seleucid Code, p. 129-133)



No. -134 B (BM 34669 +) Rev.



The year of CE 71 (Traditional BC 190/ SE 121/122)

Clay tablet BM 33643, Copy: LBAT 1437

(SH V p. 60-61)

“1’ Year 121” [Arsacid era!!!]

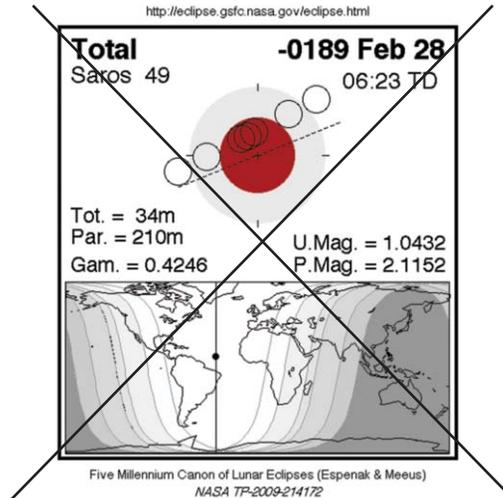
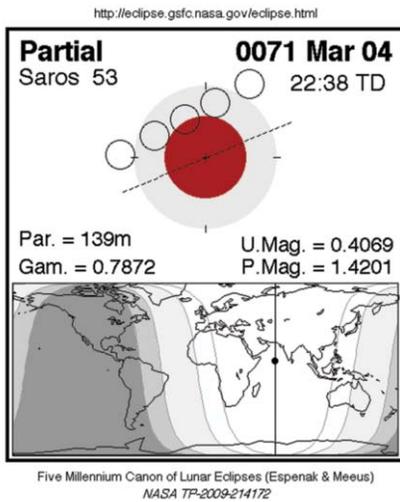
“2’ Month XII, night of the 15th

3’ when Beta Herculis culminated.

4’ lunar eclipse;”

This lunar eclipse really happened on **Mar 4 in CE 71**, not in BCE 190 February 28.

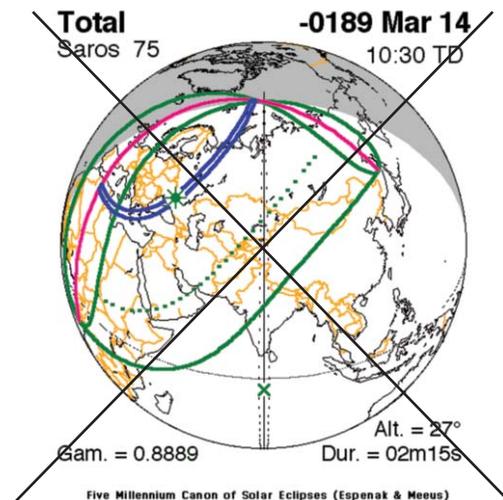
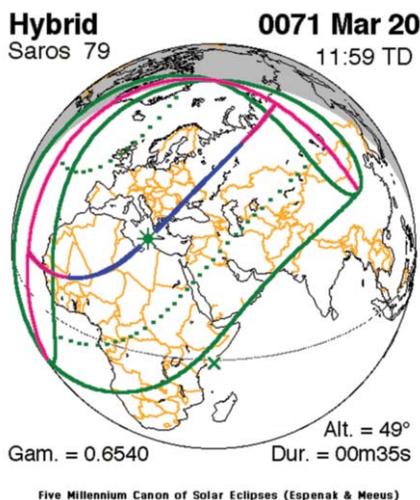
(JD ~ 1747053.43)



Clay tablet BM 33812, Copy: LBAT 1438

“Obv. 1’ Year 121, king Antiochus,
2’ month XII, the 29th, solar eclipse.”

This solar eclipse really happened on **Mar 20 in CE 71**, not in BCE 190 Mar 14. (JD ~ 17472069)



The year of CE 78 (Traditional BC 119/ SE 192/193)

Clay tablet BM 41693, LBAT 459

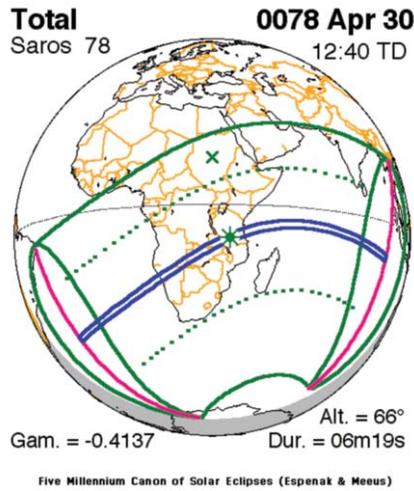
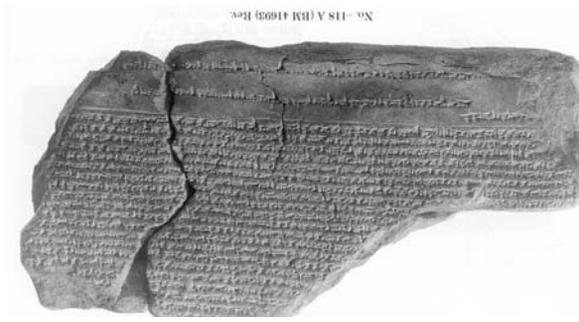
(SH III p. 321)

“A14’ the 28th, clouds were in the sky, the south wind blew; at noon and in the afternoon, very overcast, the north wind blew. Night of the 29th, clouds were in the sky, the north wind blew; solar eclipse which was omitted; at 13 deg **“after”** (not before) sunrise;”

This solar eclipse really happened on **April 30 in CE 78**, not in BCE 119 May 7.

(Z.H.; The Seleucid Code, p. 134-140)

The calculation of the Saros Series 78 is not accurate because of Ptolemy’s wrong phases of the Moon. (JD ~1749667.1)

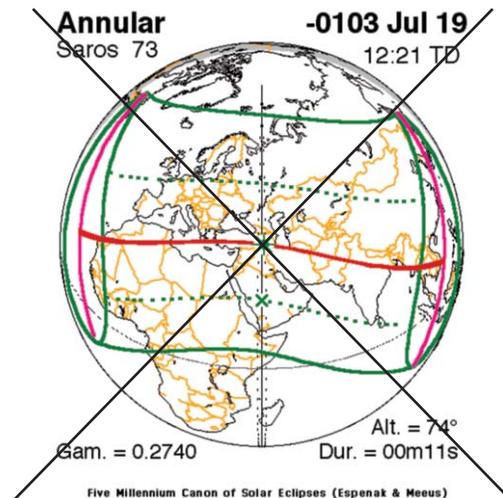
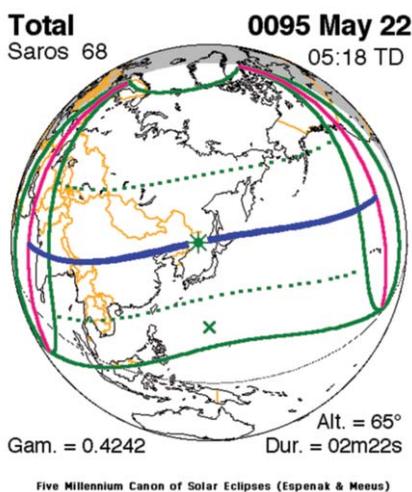


The year of CE 95 (Traditional BC 104, or a.u.c.650)

“C. Mario, C Flavio coss...Cimbri Alpes transgressi post Hispaniam vastatam iunxerunt se Teutonibus. Lupus urbem intravit. Fulminis ictu vultures super turrem exanimati. Hora diei tertia solis defectus lucem obscuravit.” (Julius Obsequens c. 43, Ginzel 28)
“Ginzel also lists what he calls ‘doubtful eclipses’ described by the writer Julius Obsequens. I pass by these in silence.”

(Robert R. Newton, AAO p.70)

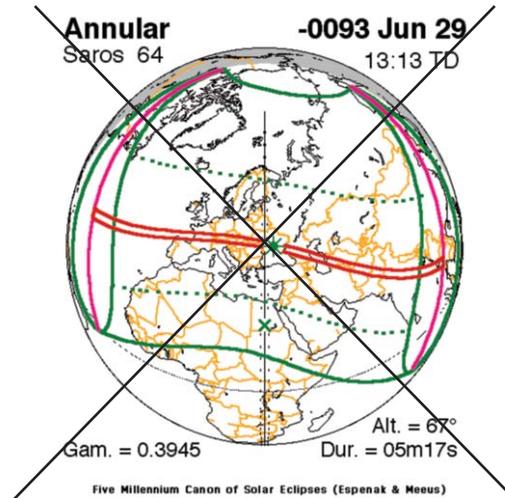
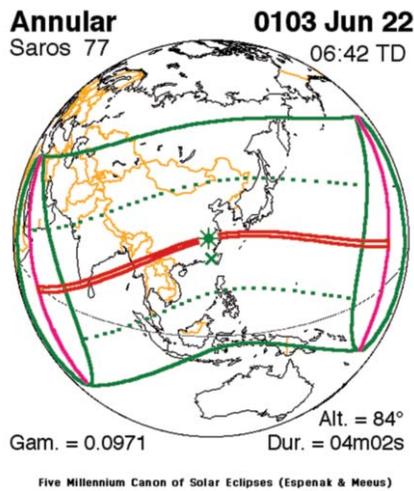
This solar eclipse really happened on **May 22 in CE 95**, not in BCE 104 Julius 19.
 Delta T = zero sec! (JD ~ 1755897.7)



The year of CE 103 (Traditional BC 94, or a.u.c.660)

“C. Caelo L. Domitio coss. Vulsinis luna nova deficit et non nisi postero die hora tertia comparuit.” (Julius Obsequens c.51., Ginzel 29/1)

This solar eclipse really happened on **Jun 22 in CE 103**, not in BCE 94 Jun 29.
Delta T = zero sec! (JD ~ 1758850.7)



The year of CE 125 (Traditional BC 136/ SE 175/176)

Clay tablet BM 45745, Listed as LBAT 429
(SH III p. 184-189)

“Left edge 3 [...year 1] 75, Arsaces”

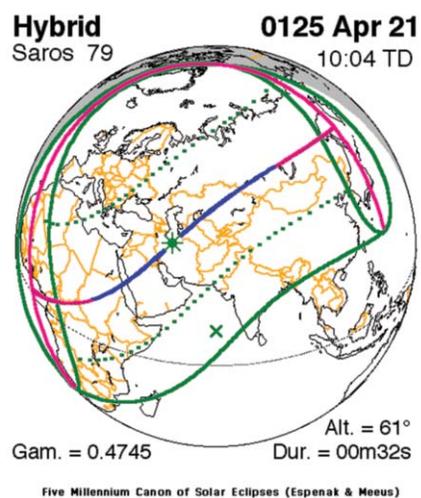
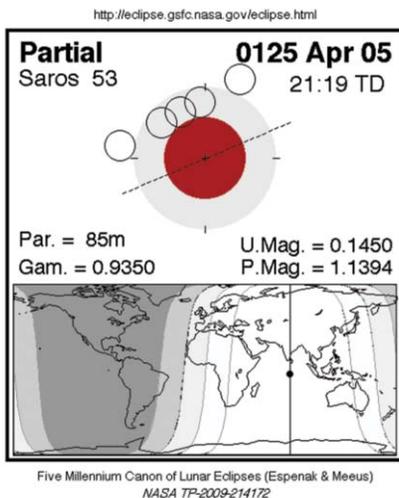
The dating is clearly Arsaces 175, which is equal to the SE 239 year.

AE 175 XII/2 0 = SE 239 XII 0 = CE 125 March 23

CE 125 April 5/6 – Lunar eclipse

CE 125 April 21 – Solar eclipse

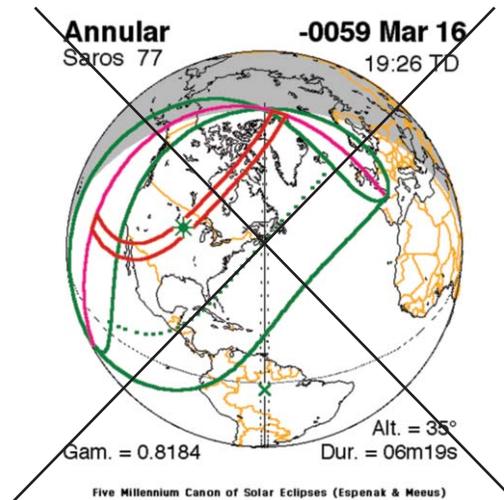
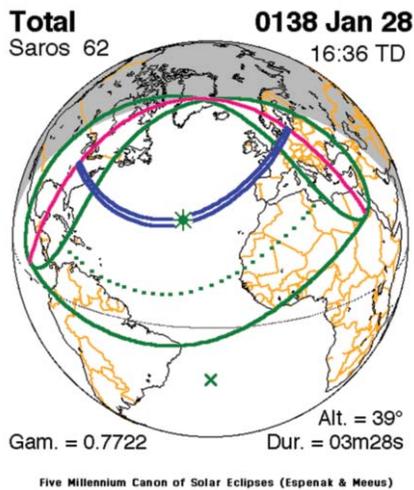
(Z.H.; Astronomical dating of Babylonian Texts describing the Total solar eclipse of AE 175/SE 239. ...w.seleucidcode.com/astronomical 2.pdf)



The year of CE 138 (Traditional BC 60, or a.u.c. 694)

“Q. Metello L. Afranio coss. Die toto ante sereno circa horam undecimam nox se intendit, deinde restitutus fulgor...” (Julius Obsequens c. 62, Ginzl 29/2)

This solar eclipse really happened on **Jan 28 in CE 138**, not in BCE 60 Mar 16. (JD ~ 1771490)



The year of CE 145 (Traditional BC 51, or a.u.c. 703)

“S.145 Sep 4 TOTAL SOLAR IN SPAIN (NO RECORD)” (Schöve, p. 28)

“Alleged eclipses from the time of Caesar” (Ginzl 31/1)

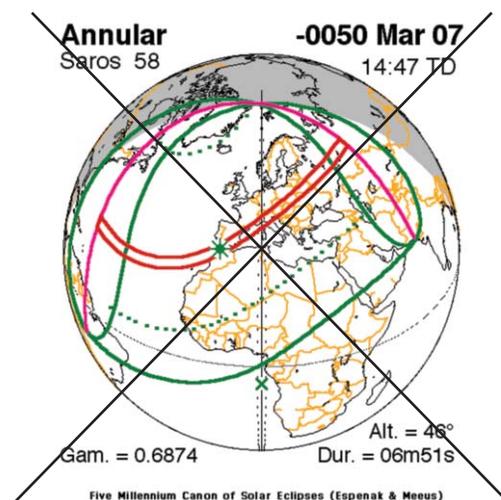
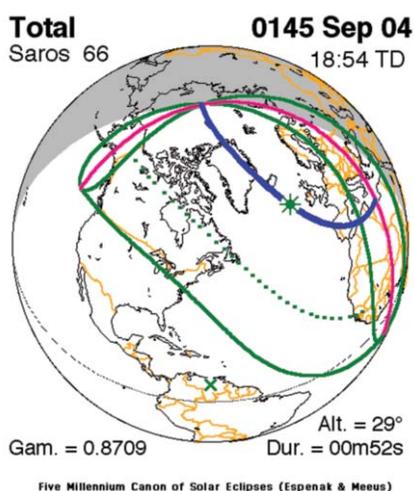
“Now at the very moment of coming to land at Dyrrachium he learned that he should not obtain a prosperous outcome...Hence many wolves and owls were seen in the city itself and continual earthquakes with bellowing's took place, fire darted across from the west to the east, and another fire consumed the temple of Quirinnus as well of the buildings. The sun, too, suffered a total eclipse, and thunderbolts damaged a scepter of Jupiter and a shield and a helmet of Mars that were votive offerings on the Capitol, and likewise the tables which contained the laws.” (Cassius Dio, Roman History, XLI, 14, Ginzl 31/1)

“-50 Mar 7 E (Caesar). Reference: Dio Cassius. There are both modern and ancient mysteries connected with this eclipse.

Book xli, Chapter 14 of Dio does mention an eclipse of the sun. It mentions it in connection with the flight of Pompey from Brindisi across the southern Adriatic to Dyrrachium. It is one of about a dozen portents that happened during his crossing or his landing or during that year. The passage does not seem worth quoting here, although it might interest a student of magic. There is a slight implication that the eclipse was placed at Rome. The eclipse is magical and has no reliability.”

(Robert R. Newton, AAO p.70)

This solar eclipse really happened on **Sep 04 in CE 145**, not in BCE 51 March 7. (JD ~ 1774266.274)



The year of CE 151 (Traditional BC 46, or a.u.c.708)

Julius Caesar who was in this year the “Pontifex maximus” (the pontiff), the consul and the dictator in one person, had reinstated the Roman calendar, inserting (or recovering) two intercalary of 27 days each, which were left out earlier in the period of the civil war. The numbers of the days in this year were $354 + 54 = 408$ (Hungarian Calendar, edition 2004, p. 91-177)

The year of CE 152 (Traditional BC 45, or a.u.c.709)

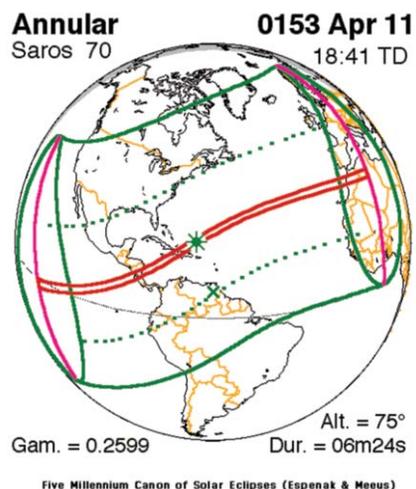
The starting year of the Julian calendar, Julius Caesar is the absolute ruler of the whole Roman Empire. In this year he adopted Octavius, the later Emperor Augustus, and appointed him as his heir of his wealth.

The year of CE 153 (Traditional BC 44, or a.u.c. 710)

The devotees of the Republic headed by Brutus and Cassius killed Julius Caesar.

“Alleged eclipses from the time of Caesar” (Ginzler 31/2)

“The most remarkable of mere human coincidences was that which befell Cassius, who when he was defeated at Philippi, killed himself with the same dagger which he had made use of against Caesar. The most signal preternatural appearances were the great comet, which shone very bright for seven nights after Caesar’s death, and then disappeared, and the dimness of the sun, whose orb continued pale and dull for the whole of that year, never showing its or-



dinary radiance at its rising, and giving but a weak and feeble heat. The air consequently was damp and gross for want of stronger rays to open and rarefy it. The fruits, for that reason, never properly ripened, and began to wither and fall of for want of heat before they were fully formed.” (Plutarch, Caesar)

This solar eclipse really happened on **Apr 11 in CE 153**.
(JD ~ 1777042.266)

The year of CE 154 (Traditional BC 43, or a.u.c.711)

Octavianus, Antonius and Lepidus, the proconsul of Gallia made the second triumvirate, which was legitimated by the meeting of the populace of Rome.

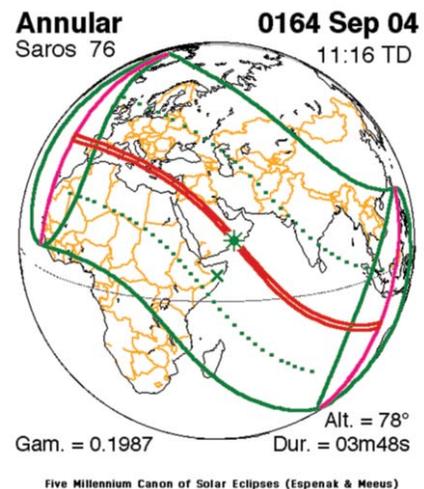
The year of CE 155/Era 1 (Traditional BC 42, or a.u.c.712)

The year of CE 164/Era 10

(Traditional BC 36, or a.u.c.717, Olympia 186/1)

In the year of Poplicola and Nerva consuls there was a solar eclipse according to the Chronicon Paschale. This solar eclipse was observable in the whole basin of the Mediterranean Sea on Sept. 4.

(Z.H.; The final countdown, p. 31-33)



The year of CE 166/Era 12

The History of the later Han (Hou Haushu) informs us that one Roman convoy reached the Chinese capital Luoyang in CE 166 (In the 9th year of Jen-hi period of Hau Huan-ti emperor). The convoy was sent by An-tun, the Roman emperor. The mainstream science is sure that An-tun was not else than Marcus Aurelius Antoninus.

Some scholars, who do not prefer him, are ready to modify by five years the Chinese chronology in order to find an Antonius Pius.

According to the Hungarian Calendar (HC) the “An-tun” of the History of the later Han is Mark Antony (Marcus Antonius).

The year of CE 191/Era 37/ SE 305-306th
(Traditional BC 8/BC 6/AD 1, or a.u.c.746/748/754)

This is the beginning of the Christian chronology, the traditionally accepted date of the birth of Jesus Christ. The academicians naturally also say that this statement about the birth date is completely false, although they used to determine an error of 5-7 years in connection with the birth of Jesus.

The Hungarian Calendar maintains that the actual „error” is as large as 194 years and this error brings us to this year.

The officially accepted error of 5-7 years is usually blamed on Dionysius Exiguus who lived 500 years later. However, as we will see later on in due course, the starting year which was determined by Dionysius using the retro-counting of time, is in correlation with the year of CE 191.

And hereby let us fix once again our basic concept: the 1st year of the New chronology is the year of the birth of Jesus Christ, the year of the Incarnation of our Lord, which year is astronomically the same as the 195th year of the ancient Olympiads (195/1), or the 754th year of Rome’s foundation and the 312th years of the Seleucid chronology.

The events preceding the birth of Jesus Christ are dated only from the 17th century by using the Before Christ (BC) indication.

Experiencing such an extent of uncertainty, my dear Reader please do not be surprised that the original alteration (an error of 198 years) of the Hungarian Calendar from the traditional chronology gradually is reducing, first going down to 196/194 years, and then „shrinking” to 190 years in the period of the 9th century.

The year of CE 194/Era 40/SE 308-309th
(Traditional BC 5/3 or a.u.c.749/751)

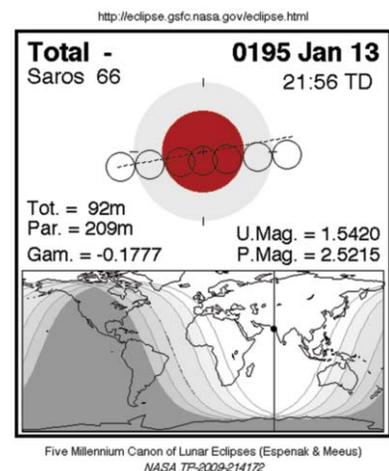
The hypothetical year of the birth of Jesus Christ, supposing that he lived up to 33 years of His age.

SE= AG 309 – birth of Jesus Christ, according to Chronicon Edessa.

The year of CE 195/Era 41/SE 309-310th
(Traditional BC 4/2 or a.u.c.750/752)

On January 13 there was a lunar eclipse. Herod the Great presumably died at the end of January. (Ginzel 32)

In this astronomical year the Jews, in the terms of the contemporary Julian calendar, observed the 32 hours old new moon crescent on March 29 at sunset, and this observation indicated for them the first day of the Nissan month. The celebration of Pascha which was to be held between Nissan 15 and Nissan 21 meant the celebration in the period of April 12-18. (Z. H.; The final countdown, p. 37-40)



The year of CE 196/Era 42, SE/B 310-311th
(Traditional BC 3/BC 1 or a.u.c.751/753)

The astronomers scientifically used to call this year as the „zero” year, but the existing error of 196 years happily will free the astronomers from the inconvenience of such labeling.

(Z. H.; La nueva cronologia, p. 61)

The year of CE 197/Era 43, SE/B 311-312th
(Traditional BC 2/AD 1 or a.u.c.752/754)

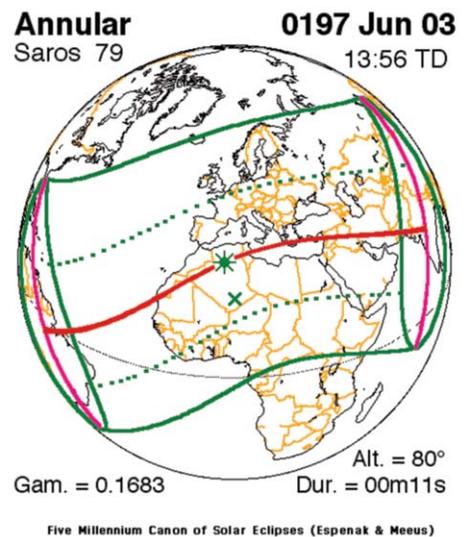
In relation to this year Dio Cassius in his LV book indicates a solar eclipse during the consulship of L. Cornelius Lentulus and M. Valerius Messala. (Ginzel 33)

The eclipse occurred on June 3 and the location can be the whole basin of the Mediterranean Sea.

Delta T = zero sec! (JD ~ 1793166.15)

A blatant error was made by the scientists when they analyzed this eclipse. Not finding any suitable solar eclipse around the Trad. BC 2, BC 3 years they slightly changed the names of the consuls in their original literary source, and made some additions to the source in brackets.

And doing so they created a phantom solar eclipse for CE 5, which eclipse also is in difference of 8 years from the related Roman chronology, but it was really well observable for the contemporary people living near the Amazonas River. (See more details in my book; The final countdown, p. 27-30)



The year of CE 198/Era 44
(Traditional BC 1/AD 2 or a.u.c.753/755)

The year of CE 199/Era 45
(Traditional AD 1/AD 3 or a.u.c.754/756)

The year of CE 212/Era 58
(Traditional AD 14/16 or a.u.c.767/769)

This year is an unmovable corner-stone of the traditional historical chronology, since in this year Emperor Augustus died in Nola.

“Let me start in an unorthodox way with my listing of an event from a traditionally

„false solar eclipse”, since in our chronology, as I have already mentioned, there is one absolutely safe corner-stone, which is the year of **AD 14**. For centuries the scientists tried to solve the problem: why is it that for that year which is determined with absolute certainty, suitable solar eclipse for Italy can not be found? . Up to the end of the 19th century there were heated debates caused by the fact that within the period starting from the beginning of the first century and ending at the death of Augustus Caesar on 19th of August, the scientists also could not find for Italy any solar eclipse which happened to be close to totality. The weakening of the preconditions for the search did not particularly help, since for the period of **AD 8-AD 16** there is no solar eclipse that could be connected to the Romans. The believers in historically recorded eclipse had, as their counter-argument, the eclipse of 15th February **AD 17**.

The track of this eclipse in Ginzler passes from Libya via Greece to the Danube delta, and the track thus crossed the Mediterranean.

Of course the three year long period is too great, it would upset the chronology in full, would disturb the list of the consuls, and in general it would question all the results of the careful scientific activities which were performed earlier.

Considering this danger the researcher reached a consensus, stating that 19th of August AD 14 (the day of the death) is indeed an unmovable chronological corner-stone, while, in relation to it, the solar eclipse of AD 17 is false.

Naturally, the sources can not be silenced, which is why for more than one hundred years the systematical invalidation, doubting and discrediting of these sources continues. Using scientific methods I need hardly add.

The result of 100 years in this vein prompts Schöve's reaction:

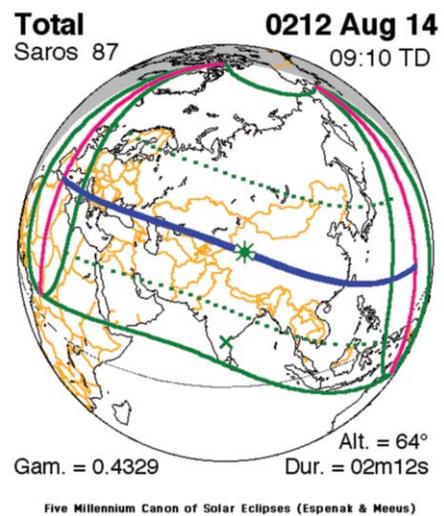
In ancient times the Sun was often credited with an eclipse around the time of the death of a famous person. Such a statement usually amounts to no more than a stock of literary compliment. Augustus seems to be no exception. (Schöve, p.5)

In such case the typical counter-argument is immediately at hand, stating that the author is not contemporary, he was collecting data considerably later from uncertain sources and compiled his report from them. Using this method, in our case Dio Cassius (who is usually very respectable) also becomes discredited. (LVI, 29)

Eusebius, who put his record in nice chronological order when saying „*Defectio solis facta et Augustus...moritur*” [*Obscuration of the Sun happened and Augustus...died.*], was accused that he „does not claim totality, or even that the eclipse occurred before the death of Augustus.” (Schöve, p. 6)

Naturally, Schöve does not deny the existence of these sources, but he thinks that the false „solar eclipse of AD 17 is the probable basis for the reports of Dio and Eusebius.”

And it is obvious in such cases, when the solar eclipse looked for (in the wrong place) can not be found, such an argument is formed that „there is possible confusion with the observed lunar eclipse of AD 14.” (Schöve, p. 6)



It is our good luck that the 196/198 year long time-difference of the Hungarian Calendar gives us a surprising result:

58 years after the introduction of the Julian calendar, that is on 14th August CE 212, which is earlier by five days than the time of the death of Augustus, the various astronomical programs indicate a solar eclipse which completely satisfies all my needs. According to the illustrations of Oppolzer, Ginzl and Espenak (sunearth.gsfc.nasa.gov/eclipse/eclipse.html) as well, the total solar eclipse can be observed at a nearly analogical area. The track of totality starts from the Spanish Carthago Nova at the moment of sunrise runs to the direction of Sardinia, while at Neapol, Nola and Arpi the darkness is total.

In Rome there was morning time, the darkening of the sun was probably 98%. Since it is approximately a solar eclipse of West-East direction, it does not mean anything either that the illustration of Espenak indicates 2h 23m Delta – T for the given time-period.

Let us specify the solar eclipse: HC/CE 212 Solar 212 Augustus 14
Total solar eclipse above Southern-Europe

Sources: Cassius Dio, Roman History, LVI, 29;

“During a horse-race at the Augustalia, which were celebrated in honors of his birthday, a madman seated himself in the chair which was dedicated to Julius Caesar, and taking his crown, put it on. This incident disturbed everybody, for it seemed to have some bearing upon Augustus, as, indeed, proved true. For in the following year, when Sextus Apuleius and Sextus Pompeius were consuls, Augustus set out for Campania, and after superintending the games at Neapolis, passed away shortly at Nola.

Indeed, not a few omens had appeared, and these by no means difficult of interpretation, all pointing to his fate for him. Thus, the sun suffered a total eclipse and most of the sky seemed to be on fire: glowing embers appeared to be falling from it and blood-red comets were seen. When a meeting of the senate had been appointed on account of the emperor’s illness, in order that they might offer prayers, the senate-house was found closed and an owl sitting on it hooted. A thunderbolt fell upon his statue that stood upon the Capitol and blotted out the first letter of the name “Caesar”. This led the seers to declare that on the hundredth day after that he should attain to some divine state. They deduced this from the fact that the letter “C” signifies “one hundred” among Latins, and the remainder of the word means “god” among the Etruscans. Now these signs appeared beforehand while he was still alive: but people of later days were struck also by coincidences in the case of the consuls and of Servius Sulpicius Galba.”

Eusebius/Jerome (ed/Schoenr, II 1866,147 or ed. Fotheringham, 1923,253)

“Defectio solis facta et Augustus...moritur.”

Eusebius/Jerome

“Obscuration of the Sun happened and Augustus...died.”

I could actually end my study with the analysis of this solar eclipse. Determining the calendar by retro-calculation produces the solar eclipse (which was looked for during the last 400 years by the science) exactly at the time and place originally recorded, too improbable to be mere coincidence.

Augustus Caesar did not live to see his 76th birthday (autumnal equinox, 23rd of September), and just a bit earlier that that date (19th of August) we have an observable total solar eclipse in the area of Rome, Neapolis and Nola.

By the way, my method of identification of this eclipse compliments the scientists who are studying the ancient world. They reconstructed carefully and very accurately the ancient relative chronology, and very rightly did not allow their well-established system to be disturbed by an indeed false solar eclipse which at a distance of 3 years from its rightful place.

Now the Hungarian Calendar simply has the only task of screening out the non-contemporary literary sources, while academical science must declare that Ptolemy, or more precisely that humanist who forged under his name, is a swindler. (But not an ancient swindler, as Robert R. Newton had already qualified him. “The Crime of Claudius Ptolemy” 1977, the Johns Hopkins University Press, Baltimore, Maryland 21218)



Emperor Augustus's mausoleum

The year of CE 228 (Traditional AD 29/ AD 32 or AD 33)

“S. 228 March 23 UNRECORDED SOLAR ECLIPSE” (Schove, p. 37)
“And Phlegon also who compiled the Olympiads writers about the same things in his 13th book in the following words: ‘In the fourth year of the 202nd Olympiad (AD 32-33), an eclipse of the Sun took place greater than any previously known, and night came on at the sixth hour of the day, so that stars actually appeared in the sky; and a great earthquake took place in Bithynia and overthrew the greater part of Nicaea.”

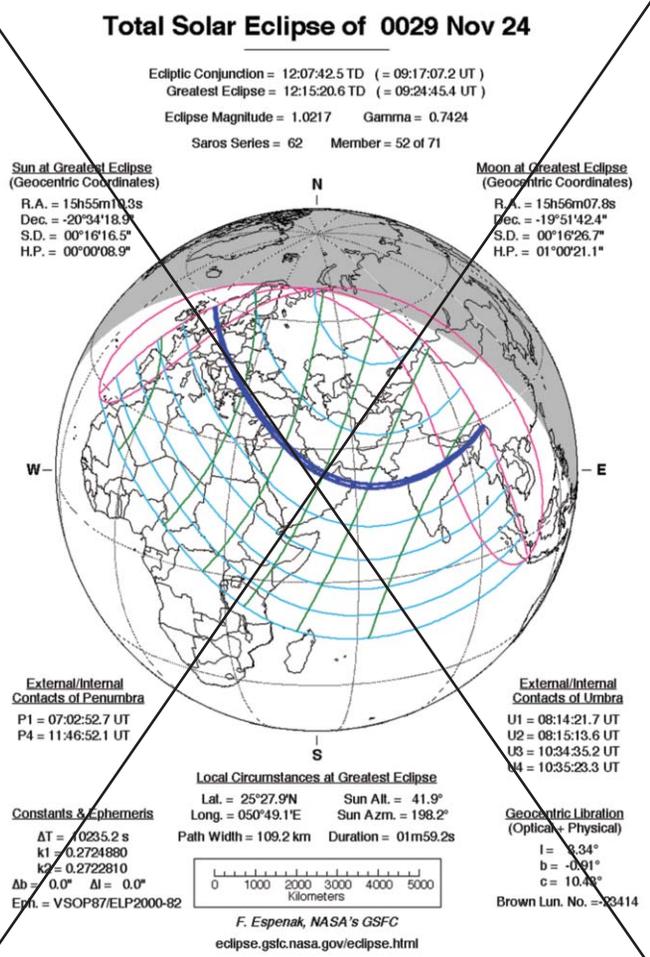
From: Phlegon, Olympiades, fragment 17 (Ginzel 35)

Quoted in Historical Eclipses and Earth’s Rotation, by F Richard Stephenson, Cambridge University Press, 1997, page 359-360

“+29 Nov 24 M (Plegon). Reference: Eusebius [ca325]. Eusebius was a famous church figure who took a leading part in the Council of Nicaea in 325.

One of his many writings was the Chronicon, a chronicle of events from the time of Abraham to his time. The original has been lost but there are several replacements. Fortunately, the versions agree closely in the part of immediate interest, and we can safely assume for present purposes that we have a text close to the one that Eusebius wrote. Portions of the Chronicon are preserved in a text by Syncellus written about 800 and in Syriac epitome made about 635, but these have less evidential value. The passage of interest says approximately” ‘Jesus Christ, the Son of God, in accordance with the prophecies made about Him, went to His Passion in the 19th year of Tiberius; for this time we find indeed in different Greek records the following related word for word: the sun was extinguished, in Bithynia an earthquake happened, which overturned, the greater part of Nicaea, — that agrees with what happened at the Passion of our Lord. Thus Phlegon, who wrote the Olympiads, report the following word for word in his thirteenth book: ‘In the fourth year of the 202nd Olympiad, there was an eclipse of the sun which was greater than any known before and in the sixth hour of the day it became night, so that stars appeared in the heaven; and a great earthquake that broke out in Bithynia destroyed the greatest part of Nicaea.

As it stands, this is a magical eclipse. It has to be magical if for no other reason than an unstated one: because of the way Passover is determined, the Crucifixion had to occur within a day or so of the full moon. Assimilation may underlie the magic... I see



no reason to attach any reliability to this record.” (Newton AAO 110-111)

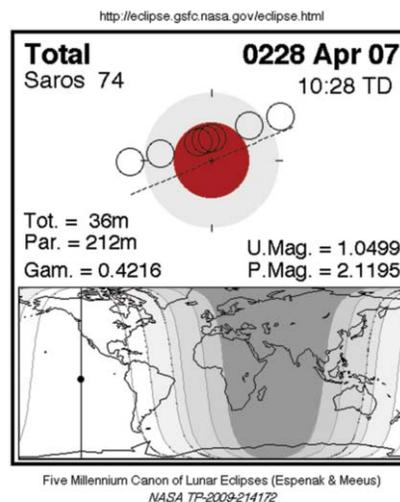
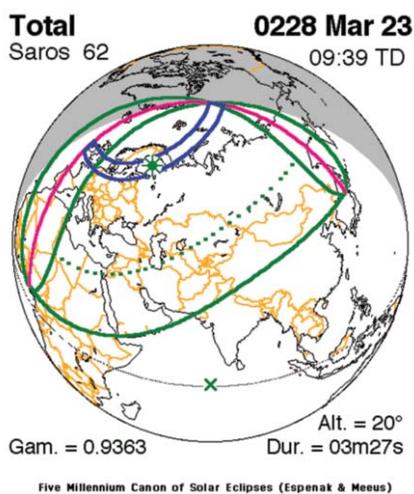
This solar eclipse really happened on March 23 in CE 228, not in CE 29 November 24. The calculation of the Saros Series 62 is not accurate because of Ptolemy’s wrong phases of the Moon. (JD ~ 1804417)

“CRUCIFIXION” LUNAR ECLIPSE IN JERUSALEM”

In my opinion the three hours of darkness mentioned by Luke the evangelist is related to the lunar eclipse, which must be looked for somewhere at AD 29 + 198 years on one day earlier than the day preceding the Jewish Passover.

My suggestion is **the total lunar eclipse [Luna XIV] of 7th of April in CE 228**. The calculation of the Saros Series 74 is not accurate because of Ptolemy’s wrong phases of the Moon.

$$(JD \sim 1804431.76 = [1804417 + 29.53/2])$$



The year of CE 240 (Traditional CE 45)

A new generation of 21st century philologist will learn a lot from the following solar eclipse, which occurred on the “birthday” of Emperor Claudius.

Ginzel (p.237) gives it under serial-number 37. His source is Dio Cassius LX 26, Loeb Classical Library Translation by Earnest Cary.

“25. The next year Marcus Vinicius and Statilius Corvinus became consuls, the former for a second time...

26. Since there was to be an eclipse of the sun on his birthday, he feared that there might be some disturbance in consequence, inasmuch as some other portents had already occurred; he therefore issued a proclamation in which he stated not only the fact that there was to be an eclipse, and when, and for how long, but also the reasons for which this was bound to happen. These reasons I will now give. The moon, which revolves in its orbit (or so it is believed), either directly below it or perhaps with Mercury an Venus intervening, has a longitudinal motion, just as the sun has and a vertical motion, as the other perhaps likewise has, but it has also a latitudinal motion such as the sun never shows under any conditions. When therefore, the moon gets in a direct line with the sun over our heads and passes under its blazing orb, it obscures the rays from

that body that extend toward the earth. To some of the earth's inhabitants this obscuration lasts for a longer and to others for a shorter time, whereas to still others it does not occur for even the briefest moment. For since the sun always has a light of its own, it is never deprived of it, and consequently to all those between whom and the sun the moon does not pass, so as to throw a shadow over it, it always appears entire. This, then is what happens to the sun, and it was made public by Claudius at that time. But now that I have once touched upon this subject, it will not be out of place to give the explanation of a lunar eclipse also. Whenever, then the moon gets directly opposite the sun (for it is eclipsed only at full moon, just as the sun is eclipsed at the time of new moon) and runs into the cone-shaped shadow of the earth, a thing that happens whenever it passes through the mean point in its latitudinal motion, it is then deprived of the sun's light and appears by itself as it really is. Such is the explanation of these phenomena.

27. At the close of that year Valerius Asiaticus and Marcus Silanus became consuls, the former for a second time."

[Suetonius says that the birthday of Claudius was August 1]

In this case Ginzel does not let me down, since he doubts that anyone could see the eclipse in Rome with the naked eye. (AD 45, August 1). Of course, on the basis of the source-text, he points out that here we have a case with an event calculated in advance. Leaving Ginzel aside, the biggest problem with this solar eclipse remains the same, that it really could not be observed, but it is on this eclipse that the identification of the age and birthday of Claudius is based.

After all, how could Cassius Dio, or more precisely John Xiphilinus "The Epitomizer" [what a nice name] know about this solar eclipse which can only be observed very well in the Dakar-Khartoum-Indian ocean area? Naturally, he tells us that the solar eclipse is result of calculation! The question arises: since when could people calculate solar eclipse? During the time of the emperors Claudius and Caracalla it is certain that they lacked the ability!

My opinion in connection with this solar eclipse and birthday-date is that, in the days of Xiphilinus, [the precise dating of this time I leave to more professional researchers] efforts had already been made to retro-calculate solar eclipse with an accuracy of one day, for the whole of the Earth, but the determination of the track of their totality was still in its infancy.

Anyhow, after that another historian, Suetonius, also connected the birthday of Claudius to this solar eclipse. Consequently he must be located into the times after Xiphilinus, since Suetonius mentioned 1st of august. This is the only message of this "predicted" solar eclipse for the source-critics dealing with Suetonius.

Such a non-visible but calculated solar eclipse can shake the complete structural system of the science to its foundations, including the creditability of C-14 tests and the "science" of paleography!

Naturally the dismissal of the wrongly identified (at AD 45) and retro calculated solar eclipse leads to a very serious consequence!

Up to now it was the definite proof for the correct use and the leap year distribution of the Julian calendar, at a time 30 years after the death of Augustus Caesar. From this moment on, this proof can be forgotten forever. Moreover,

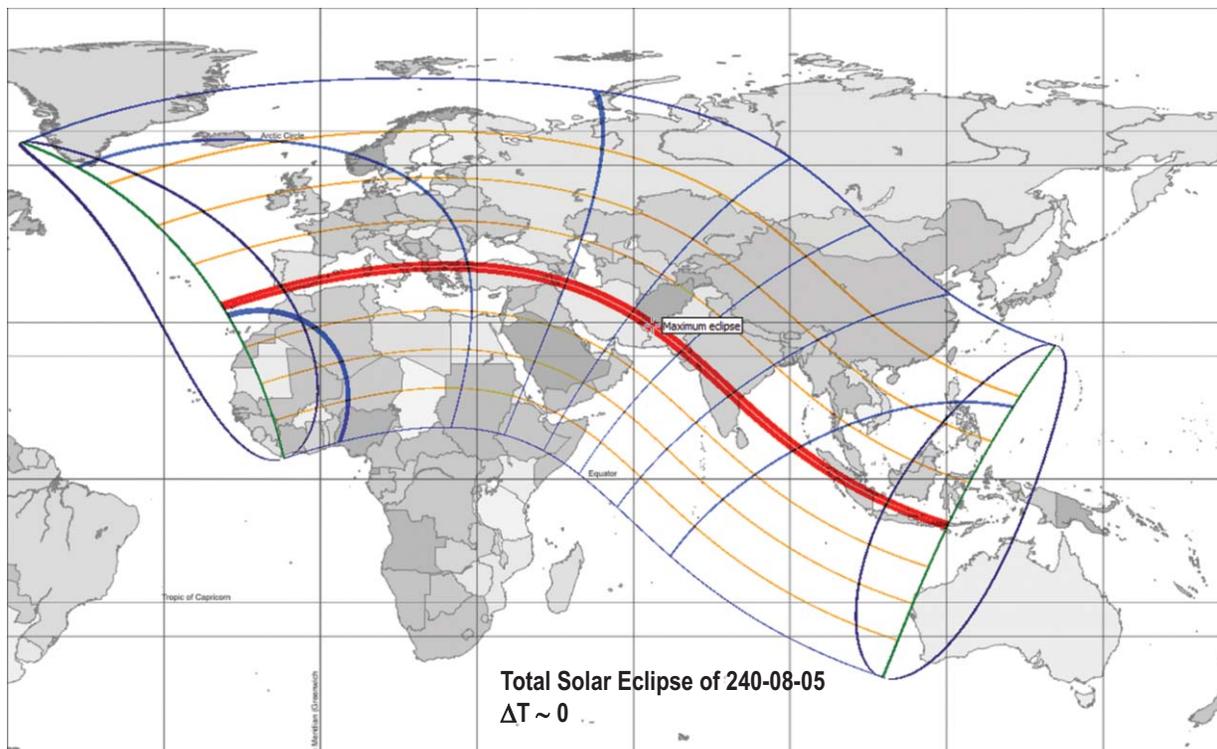
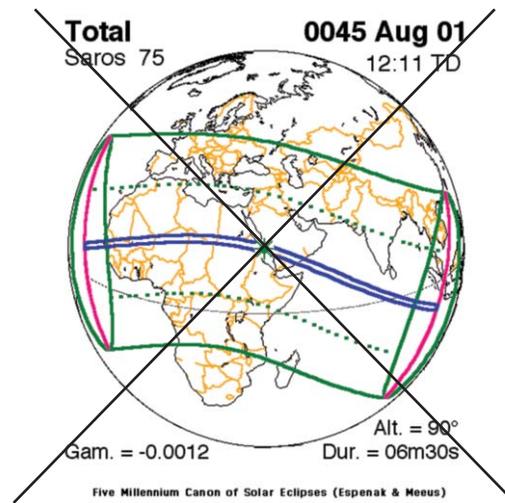
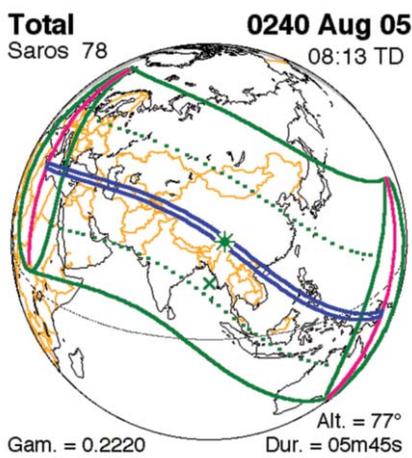
This solar eclipse was the one that was also used to prove the correctness of the AD year counting method arising only 500 years later.

This solar eclipse had proved in a wonderful way that during the time of Caracalla the chronological concepts of the later Dionysius Exiguus and the Venerable Bede were already known to Dio Cassius...

And in a final addition the author of the source could ascertain when the emperor Claudius was born according the Julian Calendar, which is mathematically regular and retro-calculated to earlier time, and which is in use by astronomy in the 20th century (AD 1 = CE 1).

This solar eclipse really happened on August 5 in CE 240, not in CE 45 Augustus 1. Delta T = Zero sec! (JD ~ 1808934.95)

(Z.H.; The final countdown, Budapest, 2007. p. 49-55)



The year of CE 252 (Traditional AD = CE 59)

Our next solar eclipse will be one retro-calculated for a period 200 years earlier. The line of events presented up to now show us clearly that the reign of Nero Caesar occurred somewhere between the period of CE 252 and 266. Consequently, Agrippa could not be killed on 30th April in CE 59, when there was a total solar eclipse visible to the south from Sicily.

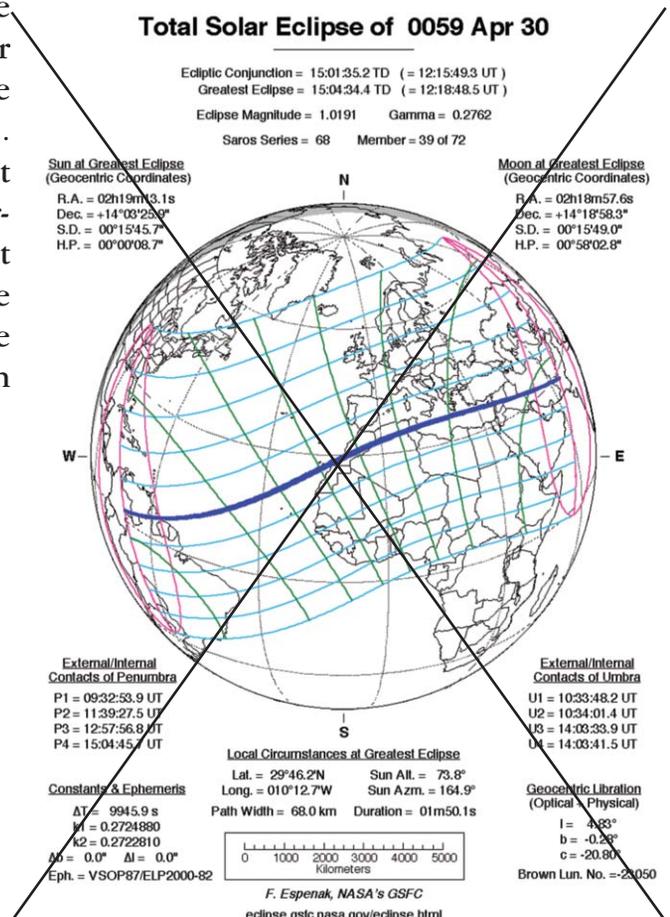
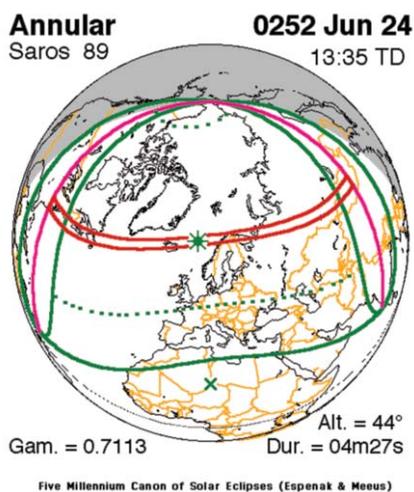
Pliny errs when he gives us the date with day-exactness, merely showing he can count. And he is sufficiently daring to give us the data about the hour for Armenia! (It happened in Campania between the 7th and 8th hour of the day, and in Armenia between the 10th and 11th hour.)

It is very remarkable precision from the “ancient world”, from such an author, who at the same time has a very confused opinion about the names of the consuls supporting the appearance of the islet and in connection with the dates of the main corner-stones of the year.

(Z.H.; The final countdown, Budapest 2007. p. 58-59)

“ 59 Apr 30E. Reference: Ginzel (1899). Ginzel gives references to this eclipse from several ancient writers. Pliny the Elder (Natural History, Bk. II, 180) gives the most detail. The eclipse was observed in Campania between the 7th and 8th hours of the day, and in Armenia between the 10th and 11th hours. The Armenia observation is treated as the separate observation 59 Apr 30M.

Pliny was a serious student of natural history among other things, and was killed on 79 Aug 25 while trying first to observe the great eruption of Vesuvius and later to rescue some friends (Pliny the Younger, ca 100, Letter LXV to Tacitus). He is often regarded as somewhat gullible and willing to accept the marvelous. This does not seem to warrant questioning the eclipse report, which he probably wrote close in time to the event, and which he seems to have been



interested in the difference in times between Armenia and Campania. I give this record a reliability of unity. The standard deviation of magnitude will receive the value 0.1 because eclipse predictions were rather reliable by now and may have been known to a number of people.” (Newton AAO 73-74)

This solar eclipse rally happened on **June 24 in CE 252**, not in CE 59 Apr 30. (Ginzel 39)
Delta T = Zero sec! (JD ~ 1813276)

The year of CE 266 (Traditional AD = CE 66 or 67)

“S. 266 Sept. 16 TOTAL IN SYRIA (NO RECORDED)” (Schove, p. 40)

Studying the scientific literature on historical solar eclipses, I pay special attention to those events, which can be placed very firmly in time in the system of the traditional chronology, but for which, at the same time, you can find neither solar nor lunar eclipses near or far, for those same events. Two such events, that is, two solar eclipses, were recorded for us by Philostratus, and based on him the two eclipses used to be mentioned as “the solar eclipses of Apollonius”.

I start with the first one, the identification of which is very problematical. The work of Philostratus, describing the life of Apollonius of Tyana, has for a long time been labeled as an historical novel. Probably this opinion was strengthened by the fact that his solar eclipses could not be identified. However, we can also learn from this work that shortly before the solar eclipse Apollonius met a flesh and blood, real consul, who held his office in AD 66. Based on this, in 1878 Seyffart identified our event as an event of AD 67 May 31, while the critical edition of the source refers to AD 64 Augustus 1. Of course neither is correct, in spite of the fact that Ginzel, although reluctantly, accepted Seyffart’s idea.

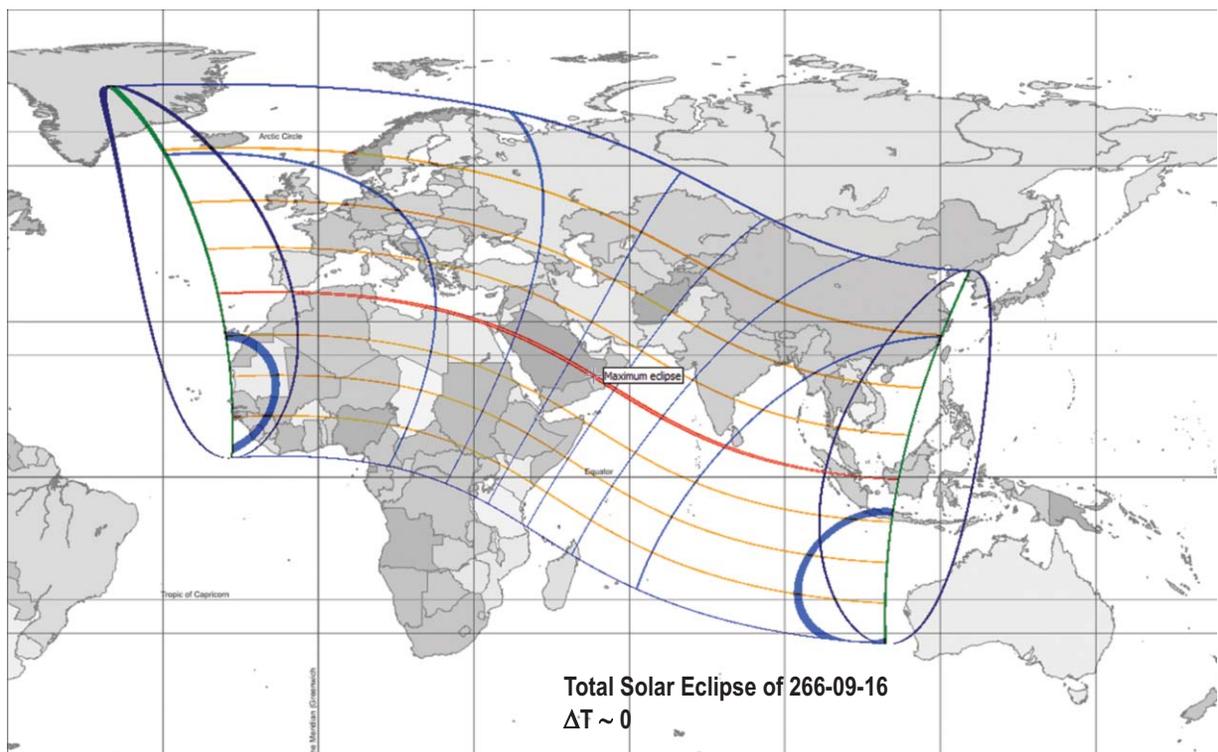
Let us quote the source:

Flavius Philostratus, “The life of Apollonius of Tyana, LCL, tr. F.C. Conybeare, 1960
“Just at the time when he was holding these conversations with the people of Hellas, the following remarkable portent overspread the heavens. The orb of the sun was surrounded by a wreath, which resembled a rainbow, but dimmed the sunlight. That the heavenly sign portended a revolution was of course clear to all.” (Ginzel 39/1)

Considering the offered location of Rome, and considering the 198 year shift of the Hungarian Calendar we can state that the Romans could observe a very spectacular solar eclipse on September 16 in CE 266 a little after sunrise. I think there is no need out that solar eclipse of CE 266 (identified by me) is not to be compared with the erroneous AD/CE 67 one, and there is no need to calculate the year-difference, which just results in 197 years. After all the above said, it remains only for the historians to consider that the consulship of Telesinus must be attached to this year!

(Z.H.; The final countdown, Budapest 2007, p. 60-63)

This solar eclipse rally happened on **Sept 16 in CE 266** (Ginzel 39)
Delta T = Zero sec! (JD ~ 1818472.855)



The year of CE 267 (Traditional AD = CE 69)

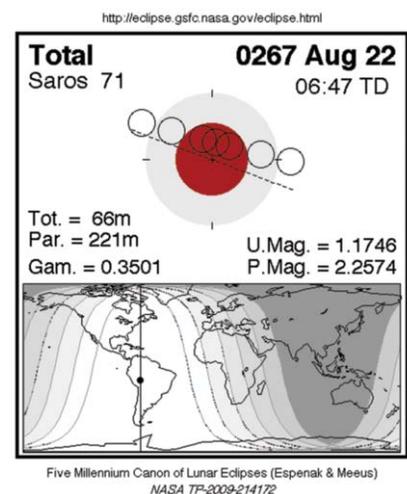
“DIO’S ECLIPSES OF VITELLIUS

Lunar eclipses about AD 68-69. Various eclipses, some difficult to identify satisfactorily, are mentioned in Cassius Dio LXIV/LXV, 8 and 11, now extant only in the epitomes of Xiphilinus (11th century) and Zonaras (11th.12th century);

The great confusion which under these conditions prevailed in the camp of Vitellius was increased that night by an eclipse of the moon. It was not so much its being obscured (though even such phenomena cause fear to men who are excited) as the fact that it appeared both blood-colored and black and gave out still other terrifying colors. Not even for this, however, would the men change their mind or yield; but when they came to blows each other, they fought most eagerly, although, as I said, the Vitellians were leaderless; for Alienus had been imprisoned at Cremona.” (Schöve, p. 14-15)

This lunar eclipse really happened on **Aug 22 in CE 267**.

Death of Vitellius Dec 20 in CE 267! (AD 69)



The year of CE 270-272 (Traditional AD = CE 71 and 74/5)

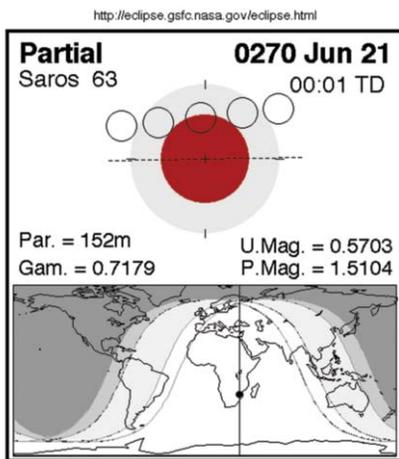
“S. 272 Nov. 8 ANNULAR IN N. EGYPT (NO RECORD)” (Schove, p. 41)

“M.71 march 4 and S.71 March 20 PLINY’S ECLIPSE PAIR

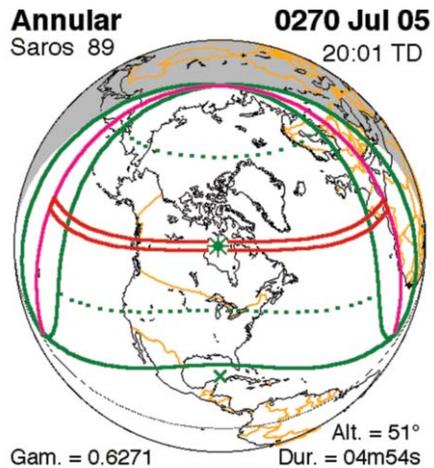
For a year which is unclear, but certainly during the reign of Vespasian, the elder Pliny says, speaking of eclipses of the Sun and Moon, ‘For it has happened even in our time that both stars were missing within 15 days’.

(Schove, p. 16-17)

The first eclipse pair really happened on June 21 and July 5 in CE 270, not in CE 71. (In the year of the third consulship of the elder Emperor Vespasian ~ AD 72)



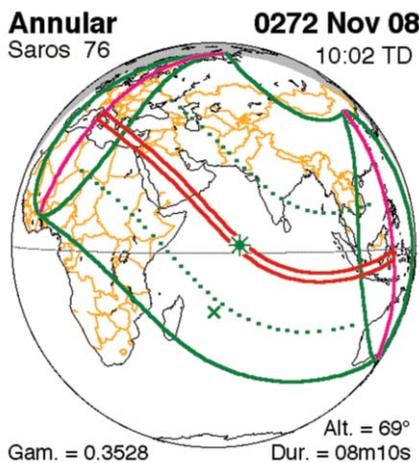
Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172



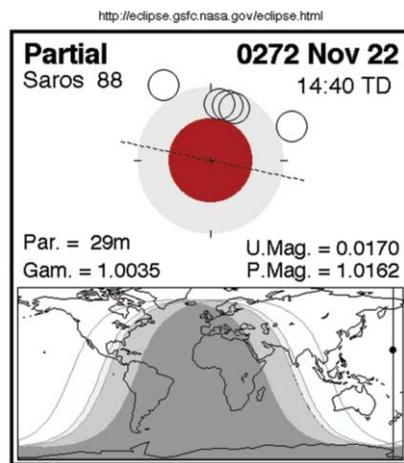
Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

The second eclipse pair really happened on Nov 8 and Nov 22 in CE 272, not in CE 74. (The second consulship of the younger ~ AD 74)

So, the back calculation of the Lunar Saros series –88 is not accurate!



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Five Millennium Canon of Lunar Eclipses (Espenak & Meeus)
NASA TP-2009-214172

The year of CE 272 (Traditional AD = CE 71/75/83)

“S. 272 Nov 8 ANNULAR IN N. EGYPT (NO RECORD)” (Schove, p. 41)

“POSSIBLE SOLAR ECLIPSE OF PLUTARCH”

Eclipse of Plutarch (probably AD 75 or 83). This eclipse, much discussed over the centuries, still lacks definitive identification. Plutarch wrote in Greek, but his works are usually known by their Latinized title. (Schove, p. 17-19)

For centuries there have been attempts to identify a solar eclipse for the same period time, an eclipse connected to the name of Plutarch:

“Now grant me that nothing that happens to the Sun is so like its setting as a solar eclipse. You will if you call to mind this conjunction recently which, beginning just after noonday, made many stars shine out from many parts of the sky and tempered the air the manner of twilight. If you have forgotten it...”

(Fotheringham; Newton, 1970, p-114-117; Stephenson, p.360-364)

“In summary, a date for the ‘eclipse of Plutarch’ of AD 71 Mar 20 seems very likely. However, since the historical details are somewhat tenuous and the above date has been derived only as the result of extensive astronomical computations, it would seem scarcely justifiable to use the eclipse to make any deductions on the value of Delta T. (Stephenson, p. 364)

Since the scientists were looking for this eclipse in the wrong time-interval, it is not surprising that Robert R. Newton in 1970 wrote the following about it:

“I do not take the passage from Plutarch to be a description of a specific eclipse. If it be one, it is unidentifiable both in time and place.”

It is my pleasure to declare that the place is Greece, and **the time is CE 272 Nov 8!** (Z.H.; The final countdown, Budapest, 2007. p. 74)

The year of CE 277 (Traditional AD = CE 79)

Both Suetonius and Dio describe a comet that appeared before the death of Vespasian. The comet had a long, conspicuous tail and so was described as having long hair. The Roman people interpreted this as an omen that Vespasian would soon die. But Dio tells us: To those who said anything to him about the comet he said: This is an omen, not for me, but for the Parthian King; for he has long hair, whereas I am bald. Dio adds that the comet was visible for a long time.

In CE 277, a comet was observed and recorded by the ancient Chinese astronomers.

“In the 3rd year of same epoch (Han Ning), the 1st moon (February), there was a comet in the west. In the 3rd moon (April) it was in S. D. Wei. In the 4th moon the comet was in Neu Yu. In the 5th moon (June) it was in the east.

Death of Vespasian (June 14) Accession of Titus.

The year of CE 292 (Traditional AD = CE 95)

“For those of my readers who still suspect that we only have an unlucky coincidence in connection with the 197/198 years, let us examine the “INVISIBLE ‘SECOND’ APOLLONIAN ‘ECLIPSE’” of Philostratus:

Based on the source this event is placed in the vicinity of AD 95, which is later by 28 years than the first eclipse. The academical standpoint in connection with this case is its complete rejection.

The author also gives the location. Apollonius was in Greece.

Here is the source:

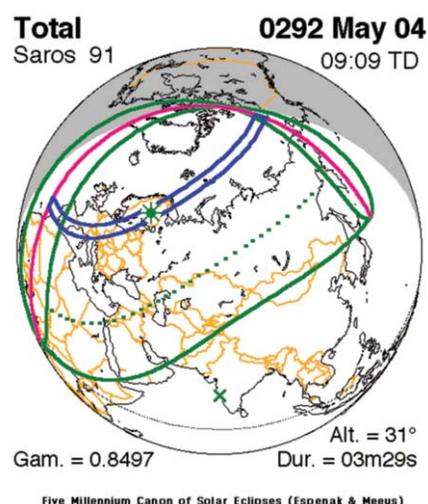
Flavius Philostaratus, ‘Life of Apollonius of Tyana’, VIII,23

‘...about this time while he was pursuing his studies in Greece, such an omen was observable in the heavens. A crown resembling Iris surrounded the disc of the Sun and darkened its rays.’ (Ginzel 41/1)

The source also indicates that the author speaks about an annular solar eclipse, and from Chapter 25 we can also learn that the event took place around the time of the assassination of Domitian, which happened on AD 96 September 18 in the usual chronology. Ginzel, in 1899, found no suitable eclipse around this time and location, so he regarded the description as referring to something other than an eclipse. Apart from this, other researchers have sometimes taken the passage, if hesitantly, as referring to the solar eclipse of AD 95 May 22, the track of totality of which start in the Indian Ocean and ends in the Pacific...

I do not intend to follow them, since the annular solar eclipse of CE 292 May 4 was visible also at the required location that is in Greece!

So, the back calculation of the Solar Saros Series -91 is not accurate!



The year of CE 295 (Traditional AD = CE 97/8)

“295 ANNULAR IN MEDITERRANEAN (NO RECORD)” (Schöve, p. 42)

GHOST ‘ECLIPSE’ OF NERVA’S DEATH

Speaking of the emperor Nerva, Sextus Aurelius Victor, in the section of his Roman History entitled ‘De vita et moribus imperatorum Romanum’ often called the epitome, Chap XII (Nerva) par 13, says:

‘On the day on which he [Nerva] died, the eclipse of the sun took place.’ (Schöve, p. 20)

The date of Nerva’s death, like the date of the death of Augustus, is an unmovable corner-stone with a day-exactness (which is AD 98 January 25) and for this date the usual chronology cannot offer anything, there was no solar eclipse in January, within the range of AD 97 and AD 99. “

Taking into consideration that here we have a less than two-year time-gap in comparison with the previous source of Philostratus, and supposing that our literary source from Victor recorded (copied?) for us the date of Nerva's death with erroneous indication of the month and the day, it might be that the different sources relate to the same solar eclipse when mentioning Apollonius in Greece and Nerva in Rome. In this case we have real solar eclipse contrary to the traditionally "Ghost eclipse".

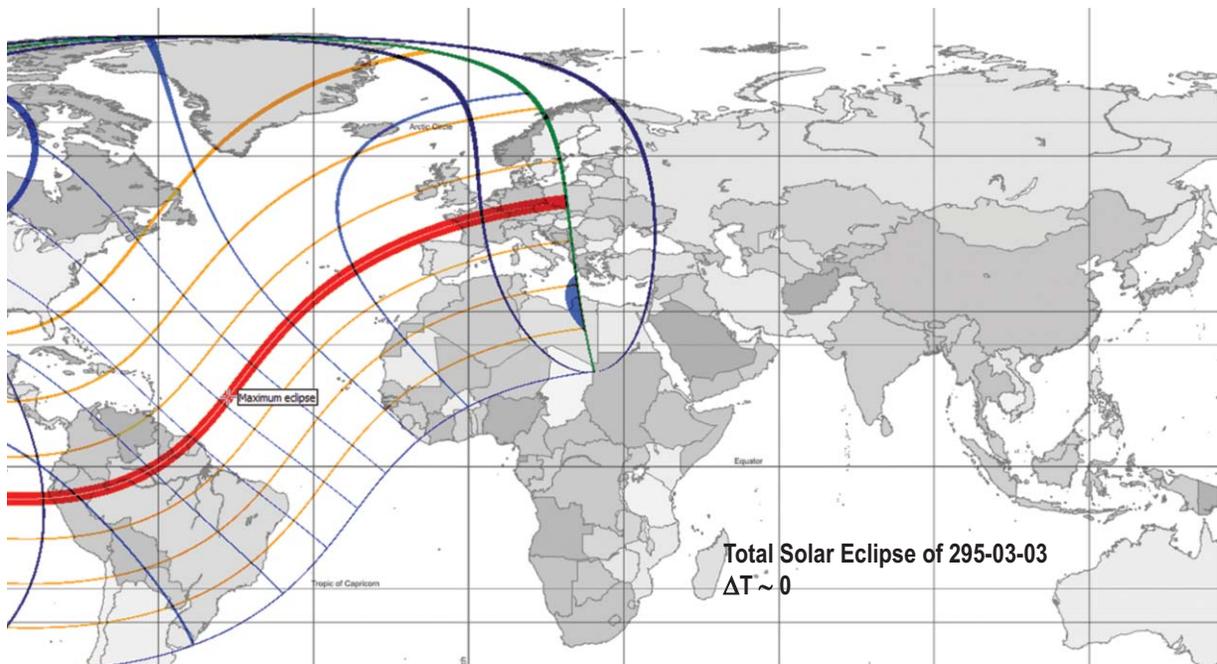
I am very confident in drawing the attention of the interested researchers to the date of 295 March 3, as the DATE OF THE NEW UNMOVABLE CORNER-STONE OF THE ROMAN HISTORY!

Consequently the date of Nerva's death is 295 March 3rd following the record of Sextus Aurelius Victor!

(Z.H.; The final countdown, Budapest 2007, p. 67)

This solar eclipse rally happened on **Mar 03 in CE 295**. (Ginzel 39)

Delta T = Zero sec! (JD ~ 1828868)



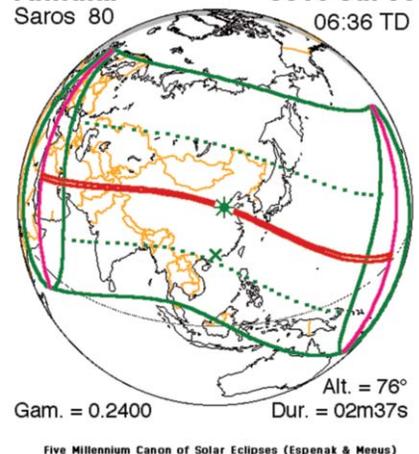
The year of CE 316 (Traditional AD = CE 118)

"S. 118 Sept. 3 TOTAL SOLAR RECORDED IN LATIN ANNALS

'Hadrian and Salinator. Under these consuls an eclipse of the Sun took place.' This appears in the Fasti Vindobonenses priores (also known by other titles, e. g. Annals of Ravenna).

The second consulate of Hadrian, who had Salinator as colleague, occurred in AD 118 (on the usual chronology). Newton 1972 (448, 451, 604) and 1979 (419) manages to allow the record a little weight, de-

Annular 0316 Jul 06
Saros 80 06:36 TD



spite its vagueness about place and silence about time of day.” (Schove, p. 24)

This solar eclipse really happened on **July 6 in CE 316**, not in CE 118 Sept 3.

Delta T = Zero sec! (JD ~ 1836663.76)

The year of CE 321 (Traditional AD = CE 125)

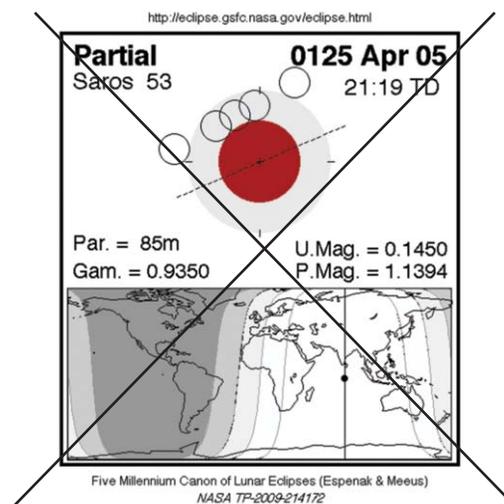
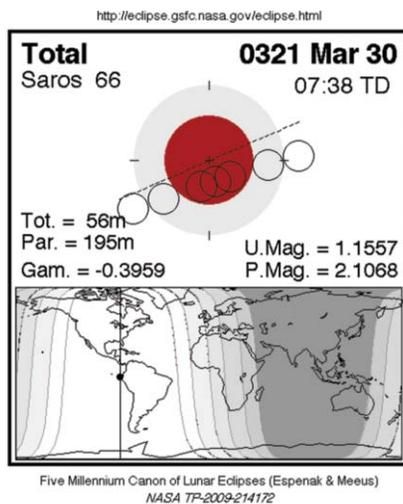
“The second eclipse we used in the one observed in Alexandria in the ninth year of Hadrian, Pachon [IX] 17/18 in the Egyptian Calendar [125 Apr 5/6], $3 \frac{3}{5}$ equinoctial hours before midnight. At this eclipse too the Moon was obscured $\frac{1}{6}$ of this diameter from the south.

[*Almagest*, IV, 9; trans. Toomer (1998, p. 206)

This lunar eclipse really happened on March 30 in CE 321, not in CE 125 April 15.

Delta T = Zero sec! (JD ~ 1838391.27)

(Z.H.; La nueva cronologia, p. 63-64)



The year of CE 329 (Traditional AD = CE 133)

“Let us now turn to the three eclipses which we have selected from those very carefully observed by us in Alexandria.

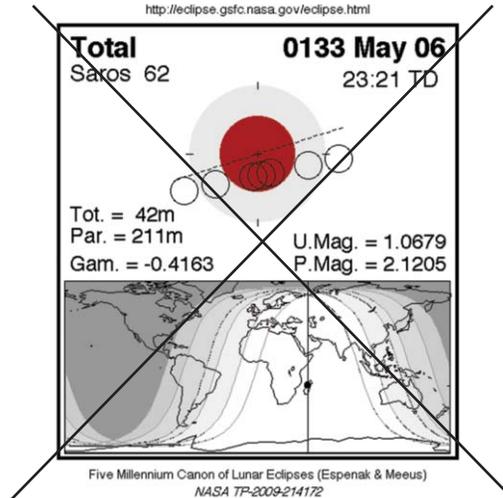
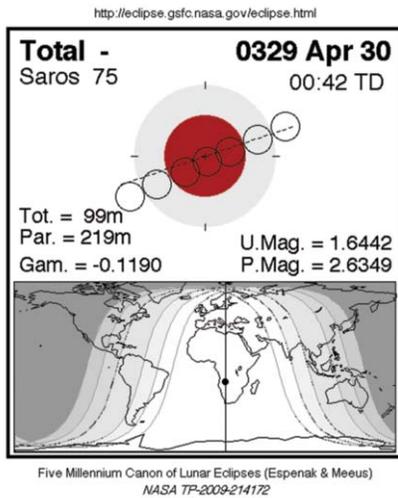
The first occurred in the seventeenth year of Hadrian, Pauni [X] 20/21 in the Egyptian calendar [133 May 6/7]. We computed exact time of mid-eclipse as $\frac{3}{4}$ of an equinoctial hour before midnight. It was total.”

[*Almagest*, IV, 9; trans. Toomer (1998, p. 198)

This lunar eclipse really happened on April 30 in CE 329, not in CE 133 May 6.

Delta T = Zero sec! (JD ~ 1841344.3645)

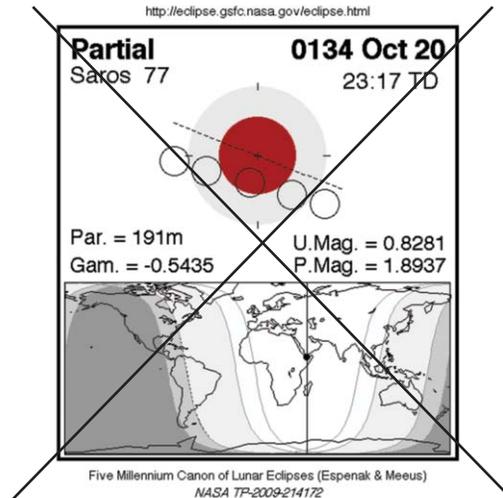
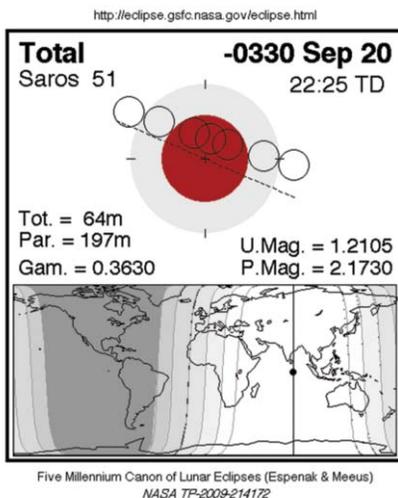
(Z.H.; La nueva cronologia, p. 64-65)



The year of CE 330 (Traditional AD = CE 134)

“The second occurred in the nineteenth year of Hadrian, Choiak [IV] 2/3 in the Egyptian calendar [134 October 20/21]. We computed that mid-eclipse occurred 1 equinoctial hour before midnight. [The Moon] was eclipsed 5/6 of its diameter from the north. (Almagest, IV. 6; trans. Toomer. p. 198)

This lunar eclipse really happened on October 13 in CE 330, not in CE 134 October 20. Delta T = Zero sec! (JD ~ 1841876.37)
(Z.H.; La nueva cronologia, p. 65)

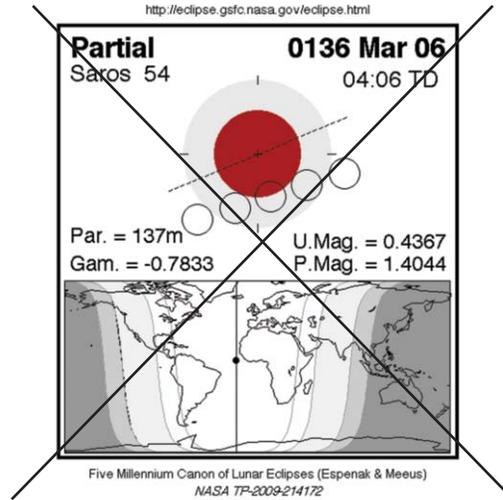
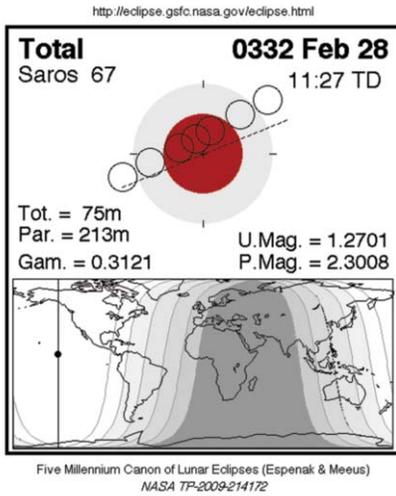


The year of CE 332 (Traditional AD = CE 136)

“The third eclipse occurred in the twentieth year of Hadrian, Pharmouthi [VIII] 19/20 in the Egyptian calendar [136 March 5/6]. We computed that mid-eclipse occurred 4 equinoctial hours after midnight. [The Moon] was eclipsed half of its diameter from the north.”

(Almagest, IV. 6; trans. Toomer. p. 198)

This lunar eclipse really happened on February 28 in CE 332, not in CE 136 March 6.
 Delta T = Zero sec! (JD ~ 1842378.56)
 (Z.H.; La nueva cronologia, p. 66)



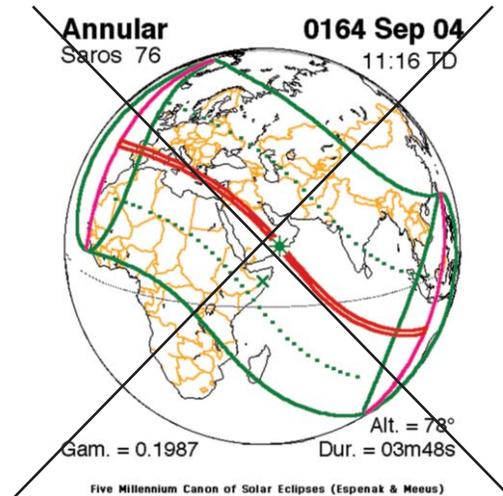
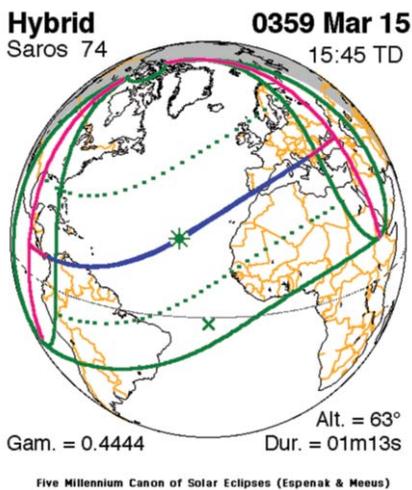
The year of CE 359 (Traditional AD = CE 164)

“S. 359 Mar 15 ANNULAR TOTAL (NOT RECORDED)” (Schove, p. 56)

“ANNULAR ECLIPSE OF SOSIGENES

Neugebauer 1975 (1, 104) takes this to be the annular eclipse said by Proclus to have been observed (in Greece) by Sosigenes the Peripatetic (2nd century AD);” (Schove, p. 28)

This solar eclipse really happened on March 15 in CE 359, not in CE 164 Sept 4.
 (JD ~ 1852256.14)



The year of CE 386 (Traditional AD = CE 186)

“Two sources have been claimed as evidence for a sizeable solar eclipse visible at Rome in the reign of Commodus: Aelius Lampridius and Herodiani.

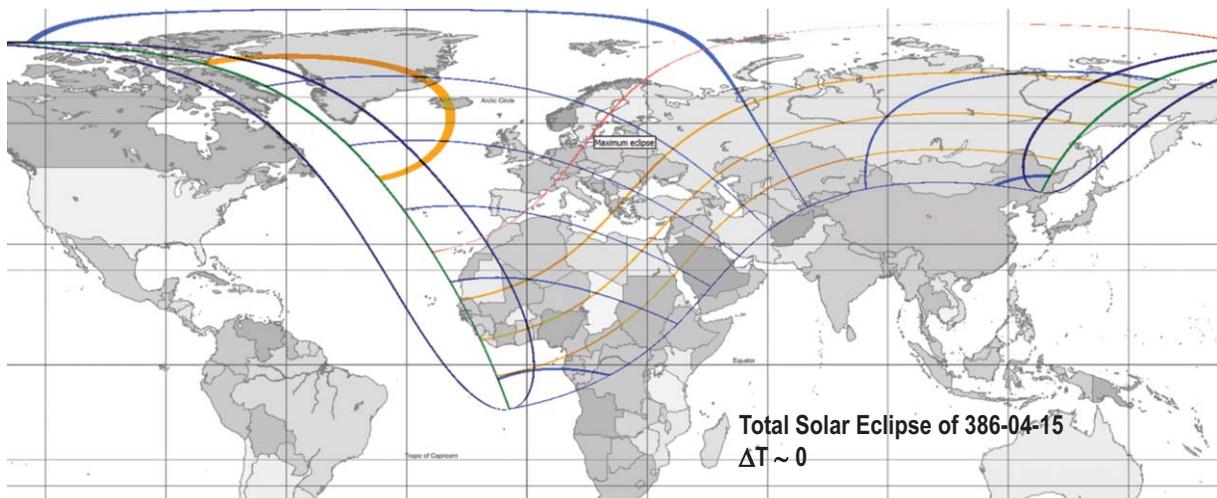
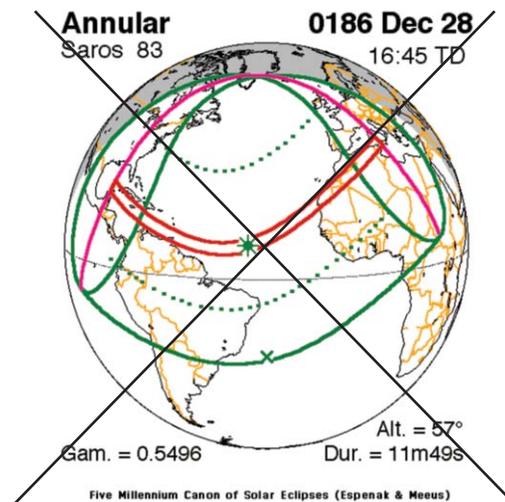
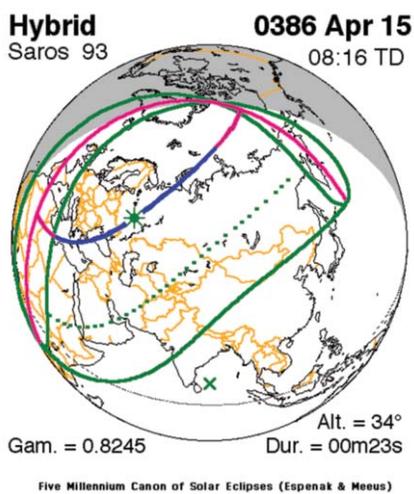
The prodigies that occurred in his reign, both those which concerned the state and those which affected Commodus personally, were as follows. A comet appeared.”

“ 186 Dec 28E. Reference: Ginzel (1899). Ginzel quotes a passage from the 4th century historian Lampridius who says that an eclipse was seen in Rome about Jan 1 during the reign of Commodus (180-192). There was only one eclipse that can meet these conditions. Unfortunately, the sun must have set at Rome while still eclipsed. Under these circumstances, even a small eclipse would be easily seen, and there is no clue to the magnitude. This eclipse will not be calculated.” (Newton AAO p.74)

This solar eclipse really happened on April 15 in 386, not in CE 186 December 28. (Ginzel 42) $\Delta T = \text{zero sec!}$ (JD ~ 1862148.95)

In April of CE 386 a comet was observed and recorded by the ancient Chinese astronomers.

“In the 11th year of the epoch Tae Yuen, the 3rd moon, there was a comet in Nan Tow. It was visible until the 6th moon, when it disappeared. Epoch Tae Yuen, CE 376-396: 3rd moon April: 6th moon July.” (Z.H.; The final countdown, Budapest 2007, p. 80-82)



The year of CE 418 (Traditional AD = CE 218)

The only ancient writer to describe this eclipse for us, through his later epitomizer, is Cassius Dio. Speaking of the end of the 14-month reign of the usurper Macrinus (usual chronology AD 217 April – 218 June), he says:

“It seems to me that this also had been indicated in advance as clearly as any event that ever happened. For a very distinct eclipse of the sun occurred just that time and the comet was seen for a considerable period;”

Since it is a solar eclipse that passes over whole of the basin of the Mediterranean Sea in a West-East direction, there is no need to search eagerly for a specific location. As a place of observation I can accept Rome, Smyrna, Pergamun, whichever one the author could visit.

This solar eclipse really happened on July 19 in CE 418, not in CE 218 October 7. (Delta T = zero sec! (JD ~ 1873932.1) (Ginzel 44)

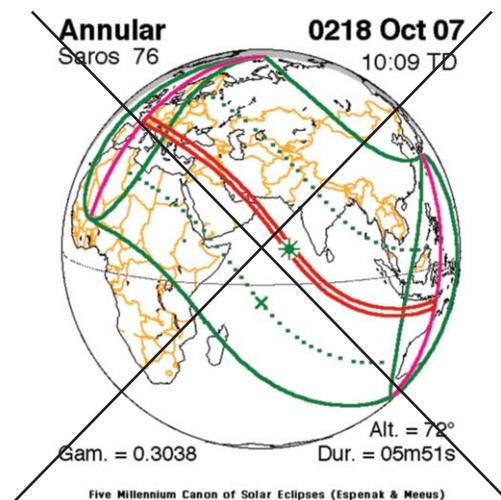
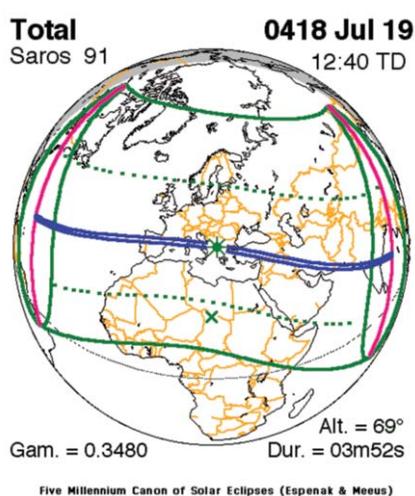
Needless to say, this solar eclipse once again is a VERY FIRM chronological cornerstone, and the ancient Roman history can be fixed to it very safety.

Elagabalus proclaimed emperor at Raphanea (16 May), after his supports defeat Macrinus, who is put to death. Elagabalus winters at Nicomedia.

In CE 418, a comet was observed and recorded by the ancient Chinese astronomers.

“In the 14th year of the same epoch, 5th moon, day Kang Tsze, there was a comet in Pih Tow Kwei, towards the middle. In the 7th moon, day Kwei Hae (September 15) the comet appeared in the western part of Tae Wei, above Juy Ke, and below the star Leang.”

(Z.H.; The final countdown, Budapest 2007, p. 84-87)

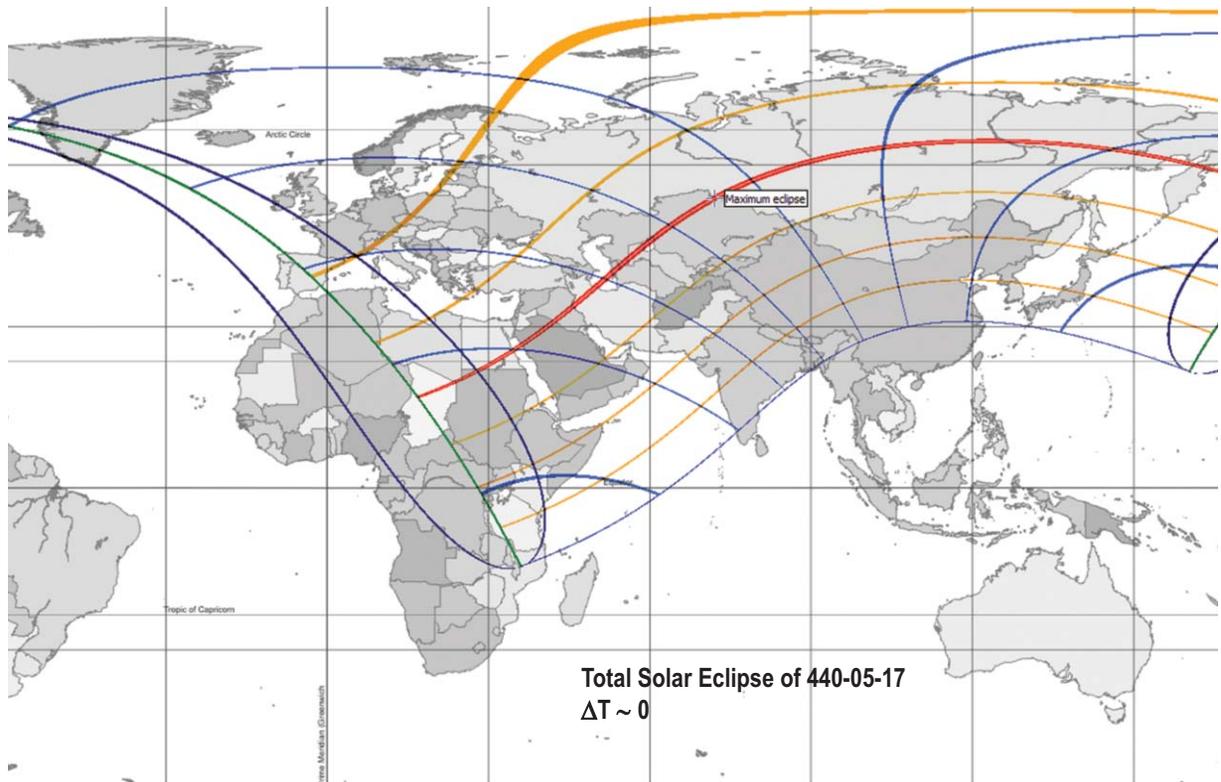


The year of CE 440 (Traditional AD = CE 237/238/240/241)

Historia Augusta: *“And an end of the civil war strife was made when the boy Gordian was given consulship. There was an omen, however that Gordian was not to rule for long, which was this: there occurred an eclipse of the sun, so black that men thought it was night and business could not be transacted without the aid of lanterns.”* (Ginzel 45)

This solar eclipse really happened on May 17 in CE 440, not in CE 240 August 5. (Ginzel 45)

Delta T = zero sec! (JD ~ 1881904.8)



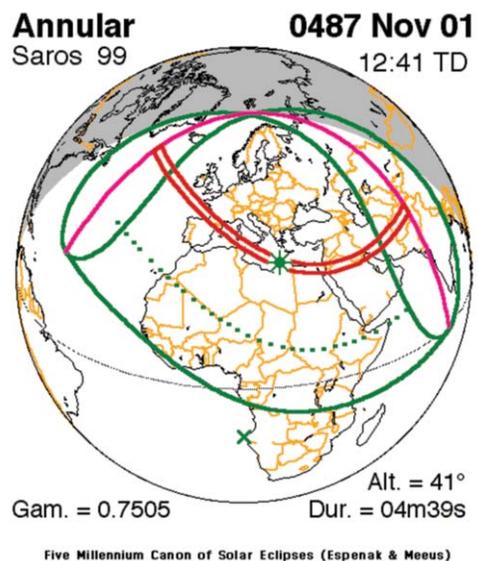
The year of CE 487 (Traditional AD = CE 291/292)

The solar eclipse which was observed in Nov 1 in CE 487, and which is connected to the consulship of Tiberianus and Dione according to the source, the “Consularia Constantinopola”, points to the traditional AD 291 year. (Ginzel 46)

“Tiberianus and Dione consuls. Under these consuls there was a darkness in the middle of the day, and in this year Constantius and Maximinus were elevated to Caesars on the calends of March.”

(Z.H.; The final countdown, Budapest 2007, p. 88-90)

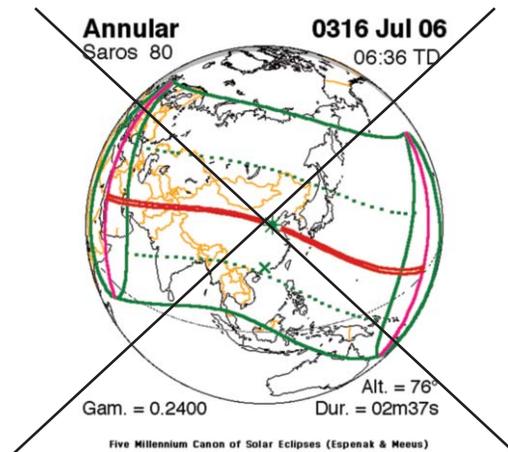
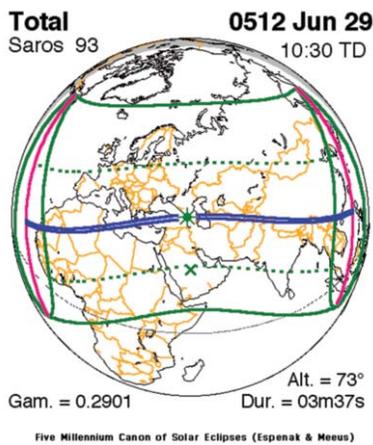
(Z.H.; La nueva cronologia, p. 68)



The year of CE 512 (Traditional AD = CE 315/316)

“The ‘three Caesars’ eclipse of Aurelius Victor In his *De Caesaribus* Sextus Aurelius Victor mentions the simultaneous elevation of Crispus and Constantine (sons of the emperor Constantine the Great) and Licinianus or Licinius (son of the emperor Licinius), ‘which was shown by an eclipse of the Sun perpetrated on a day in the same months to be destined to be hardly long-lived nor happy for those who were elevated’. Dates between 315 and 317 have been mentioned for the elevation.” (Schöve, p. 47)

This solar eclipse really happened on **June 29 in CE 512**, not in CE 316 July 6. (Ginzler 48) Delta T = zero sec! (JD ~ 1908245.93)

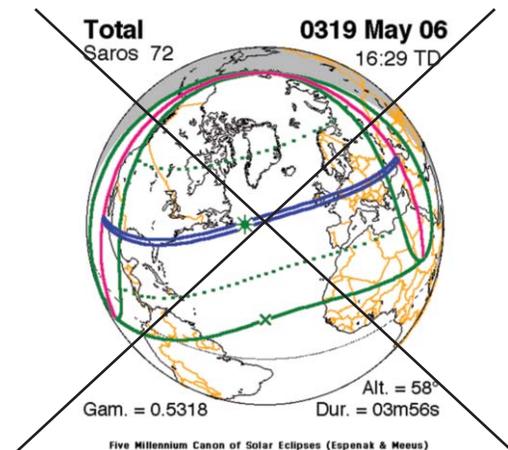
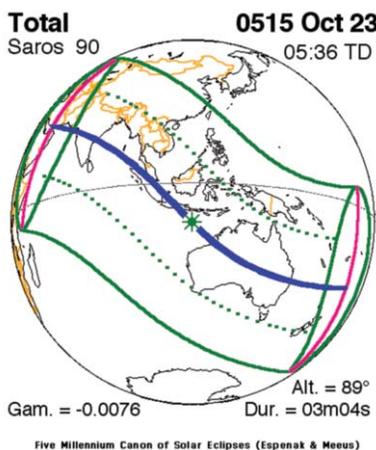


The year of CE 515 (Traditional AD = CE 318/319)

“319 May 6. Reference: *Consularia Constantinopolitana*. ‘Licinio V and Crispo Caes. Under these consuls there was a darkness at the 9th hour of the day.’ The editor (Mommson) identified the year as 318, but there is no serious question about the identification of the eclipse. Again there is no way to tell the place.”

(Newton; 1972, p. 534)

This solar eclipse really happened on **Oct 23 in CE 515**, not in CE 319 May 6. (Ginzler 49) Delta T = zero sec! (JD ~ 1909456.73)



The year of CE 534 (Traditional AD = CE 334 and 337)

“S. 334 July 17 ANNULAR IN SICILY

This is one of the most certainly dated of eclipses. It is mentioned in the *Mathesis* (an astrological work) of Julius Firmicus Maternus.

Firmicus Maternus was a Sicilian, and Ginzel quotes authority for his work being already completed before the death of Constantine. Firmicus, describing the fear caused by eclipses ‘in the middle of the day’, says, ‘speaking of the more recent’, that such a was predicted by astrologers (mathematici) in the consulate of Optatus and Paulinus.” (Schöve, p. 50)

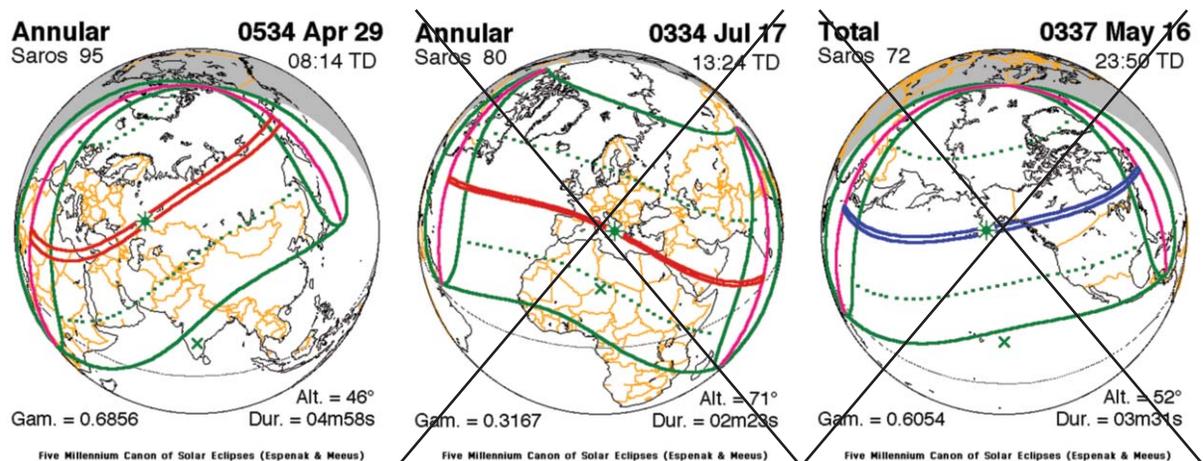
This solar eclipse really happened on **April 29 in CE 534**, not in CE 334 July 17. (Ginzel 51)

“S. 337 May 16? PREDICTED (UNOBSERVABLE) SOLAR ECLIPSE

Solar eclipse before the death of Constantine the Great (AD337)? Ricc. 1653, 293 quotes the *Life of Constantine* for a solar eclipse a little before the death of Constantine, which he says occurred on 337 May 22, the feast of Pentecost.” (Schöve, p. 51)

This solar eclipse really happened on **April 29 in CE 534**, not in CE 337 May 16.

Delta T = zero sec! (JD ~ 1916219.85)



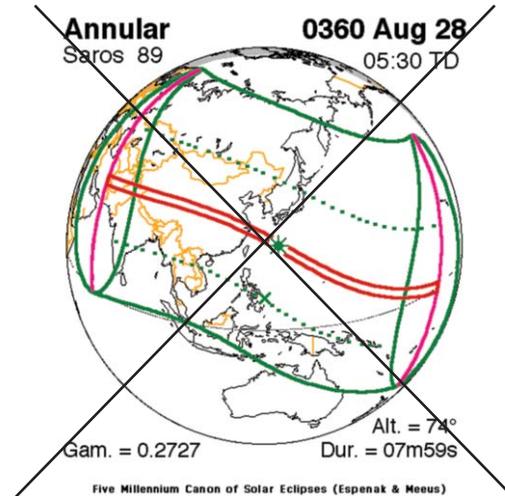
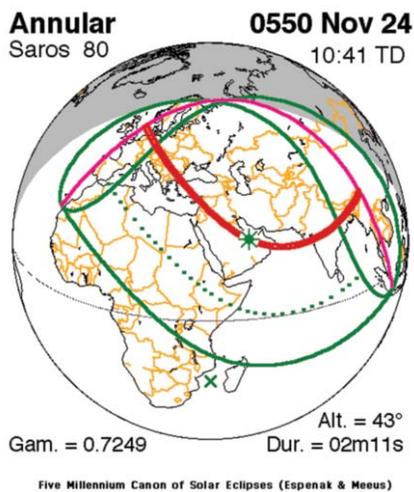
The year of CE 550 (Traditional AD = CE 360)

“360 Aug. 28 M, B. Reference: Ammianus Marcellinus [ca. 391, Chapter XX.2]. (In my view Poggio Bracciolini CE 1380 - 1459)

The following happened during a year that is clearly 360: ‘That year throughout the East a darkness was seen, and stars shone out together from morning until midday.’ I used this eclipse in AAO (Section IV. 5), where I wrote that it happened during a battle.. I do not know what caused me to make this blunder; I can only suppose that I mixed up some notes while I was writing the text. Although the duration is clearly exaggerated, it seems safe to accept this as a genuine record, but I shall lower the reliability to 0.5 because of the exaggeration. Because of the stars, I shall use 0.01 for the standard deviation of the magnitude.” (Newton 1972, p. 537)

This solar eclipse really happened on **Nov 24 in CE 550**, not in CE 360 Aug. 28. (Ginzel 54)

Delta T = zero sec! (JD ~ 1922272.94)



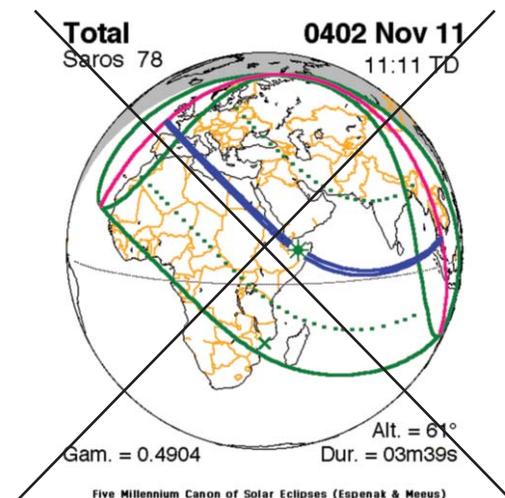
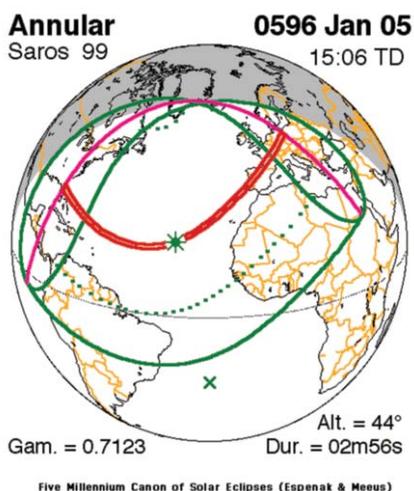
The year of CE 596/Era 442 (Traditional AD = CE 400/402/404)

“402 Nov 11 E. This report is from the annals of Bishop **Hydatius**, who had his bishopric in northern Portugal but who used Spanish as well as local records: Ol. 295,2. The sun was eclipsed on the third of the ides of November on the second week-day” The date translates into 402 Nov 11, which was a Tuesday, Reliability = 1; standard deviation in magnitude = 0.06. The place is the Iberian peninsula,…” (Robert R. Newton, AAO p. 75)

“Ginzel must have used a different edition; according to him the words ‘on the 2nd feria’ follow the statement of the date. 402 Nov 11 was actually the 3rd feria. This record is also in **Hydatius**’ continuation of the Byzantine source **Consularia Constantinopolitana**.

(Robert R. Newton, Medieval Chronicles and the rotation of the Earth, 1972, p. 508)

This solar eclipse really happened on **Jan 05 in CE 596**, not in CE 402 Nov 11. (Ginzel 59) Delta T = zero sec! (JD ~ 1938751.12) (Z.H.; La nueva cronologia, p. 69)



The year of CE 603/Era 449 (Traditional AD 410 = CE 410)

“FICTITIOUS SOLAR ECLIPSE OF ALARIK

Solar eclipse around the time of the sack of Rome by Alaric (410, late August)? References to such an eclipse appear not in Zosimus but in the secondary literature, and they do not have any basis in fact, since all we have encountered mention stars seen in the daytime, but there was no suitable eclipse between 402 and 418.” (Schöve, p. 71)

Using the Hungarian Calendar we can determine with the exactness of the year and the month, the time when Rome was raided by Alaric, the king of Sarmatas/Getas.

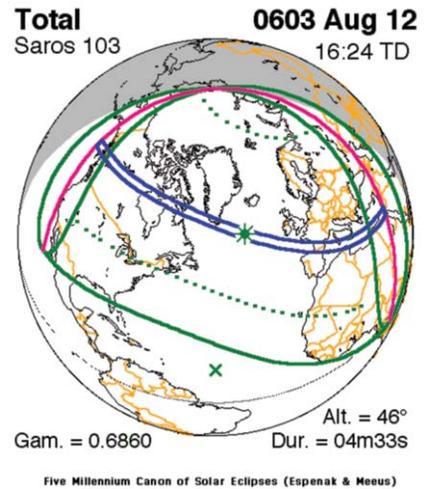
The date of CE 410, June 18, could not be the right one, firstly because of the visibility which was limited to Morocco, and secondly because it was not in August...

To create a clear picture for everybody, it would be desirable as soon as possible to teach in our schools the correct astronomical time, what is the year of CE 603 and the date of the solar eclipse is August 12!

Delta T = zero sec! (JD ~ 1941527.176)

The fictive solar eclipse of Alaric in 410 was definitely a fictive one!

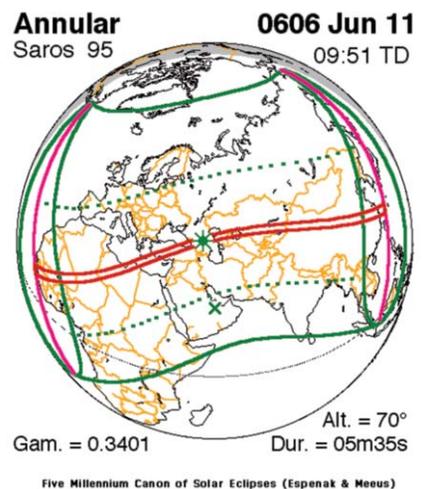
(Z.H.; La nueva cronologia, p. 71 and H.Z.; MAGYAR ATOM, p. 39)



The year of CE 606 (Traditional AD = CE 410/412)

In the 10th year of Theodosius there was a solar eclipse according to the Chronicon Paschale. This solar eclipse was observable in the Mediterranean Sea on Jun 11. (JD ~ 1942560.9)

(Z.H.; La nueva cronologia, p. 70)



The year of CE 612/Era 458 (Traditional AD = CE 418)

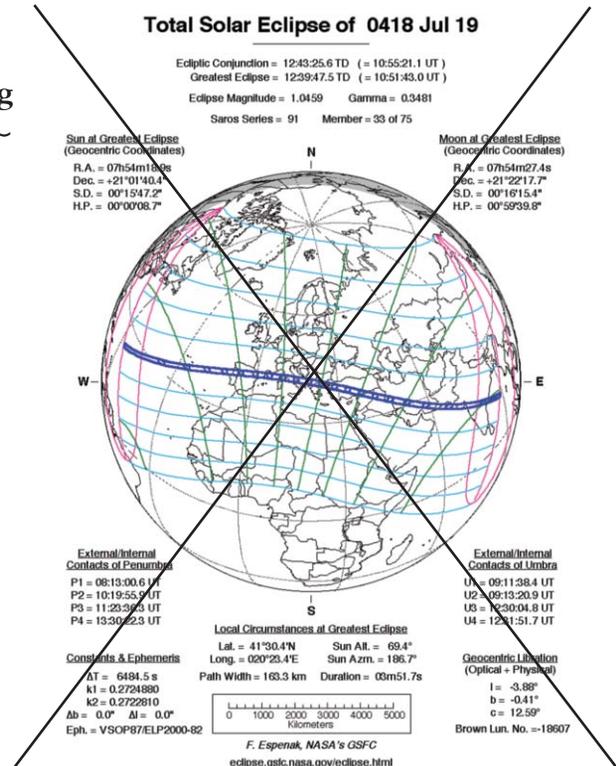
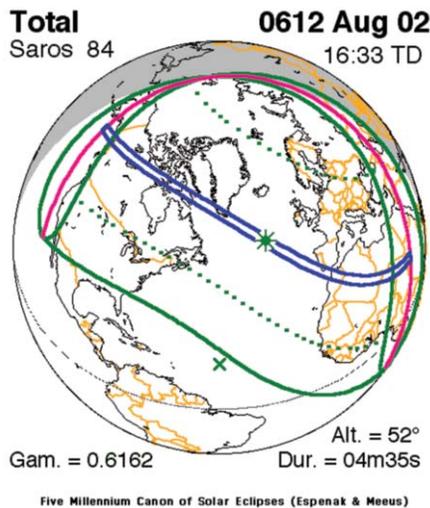
“418 Jul 19 E. Hydatius also reports this eclipse which was reported independently from the other end of Empire: ‘Ol. 299,2. The sun was eclipsed on the 14 Kalends of August, which was the fifth week-day.’ The date translates into 418 Jul 19, which was a Friday. This report has the same characteristics as the report 402 Nov 11 E.”

(Robert R. Newton, AAO p.75)

“An eclipse of the sun occurred on the 14th calends August (= Jul 19) which was the 5th feria.” 418 Jul 19 was actually the 6th feria. I suspect that Hydatius calculated the weekday using the date 419 Jul 19 by accident... Since Hydatius had earlier records that apparently come from Galicia, I shall assume that this is also a local record, but I shall lower the reliability to 0.2. Place: Galicia

(Robert R. Newton, 1972 p. 508-509)

This solar eclipse really happened on Aug 02 in CE 612, not in CE 418 Jul 19. (JD ~ 1944805.183)



The year of CE 616 (Traditional AD = CE 421)

“MISDATED ECLIPSE OF PROSPER

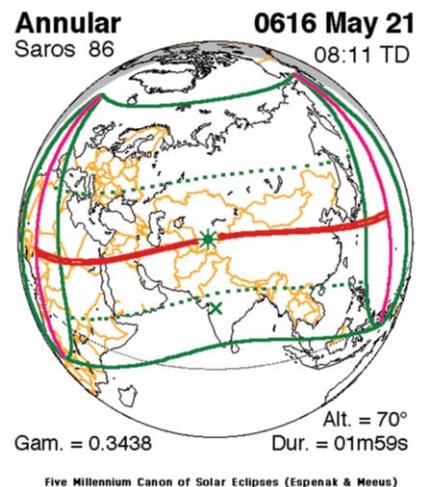
Possible records formerly ascribed to S.421 May 17. Scal.1598, 573; 1629, 611, discusses records from South Gaul which we may call (i) Prosper, (ii) Pseudo-Prosper.

Prosper is based on consular fasti (arranged by pairs of consuls); a standards edition is now Mommsen’s, under the title ‘Prosper Tiro, Epitoma Chronicon’.

Pseudo-Prosper is a chronicle (arranged by regnal years), sometimes called Chronicon Pithoeanum.

In Mommsen’s edition, (ii) does give, under the 26th year of Honorius (about 421) ‘This year an eclipse of the Sun occurred’. Scaliger noted this, and, calling on both (i) and another manuscript of (ii) for ancillary chronology, identified the eclipse as S. 421 May 17. Oppolzer shows this as approximately annular in West Africa (near Dakar) the South Sahara, and the southern part of the Red Sea – suspiciously far from Gaul.” (Schöve p. 73-74)

This solar eclipse really happened on May 21 in CE 616.



“GHOST ECLIPSE (AURORA?) OF JEROME (c. 398)

Solar obscuration in a treatise of Jerome (about AD 398). Jerome, in a treatise addressed to Pammachius against John, bishop of Jerusalem, appears *prima facie* to speak of an eclipse: ‘a few months ago, about the days of Pentecost, when, the Sun being obscured, everyone feared that the day of judgement was already at hand.’ (Schove p.64)

This solar eclipse really happened on May 21 in CE 616.

(JD ~ 1946192.83)

(Z.H.; La nueva cronologia, p. 70)

The year of CE 632 (Traditional AD = CE 632)

The first year of Yazdijerd Era. (YZ)

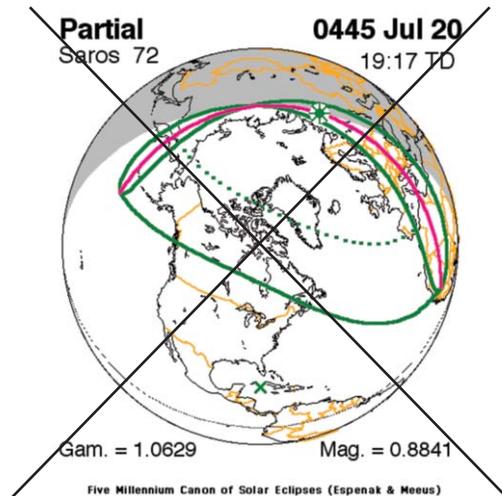
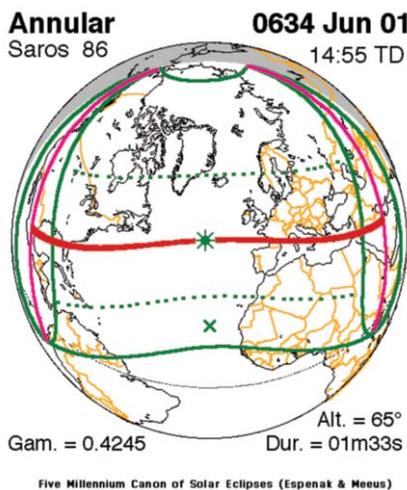
June 16 – The first day of Yazdegerdi Calendar

The year of CE 634 (Traditional AD = CE 444)

AD 444 “An eclipse of the sun at the ninth hour.” (The Annals of Inisfallen, Ireland)

“ Of these, the chief one is in the Annals of Inisfallen, where under 444 we read ‘An eclipse of the Sun in the ninth hour’. MacAirt viewed as emendable to 445, and followed C.O’Connor (in his 1825 edition) and Anscombe in identifying the eclipse as S.445 July 20, an identification we have suggested is impossible, see L.Bieler, Irish Historian. Studies, 6. 1949, 252, citing a lecture in Dublin by D.J. Schove. Schove, JBAA, 65, 1954, 38-9, rejected the earlier eclipse as too late in the day, and too small in Ireland. The revised identification, S.447 Dec. 23, fits better.” (Schove p.76)

This solar eclipse really happened on **June 1 in CE 634!**



(JD ~ 1952778.11)

The year of CE 639/Era 485 (Traditional AD = CE 447)

“447 Dec 23 E. By Hydatius ‘Ol. 306, 3 Yr 23 Valentinian III. The sun was eclipsed on the 10 Kalends (Some copies have 9 Kalends) of January, which was the third weekday. If ‘10 Kalends’ is right, the date equals 447 Dec 23, a Tuesday. This report receives the same characteristics as the last two. Valentinian III was Emperor of the West from 425 to 455.”

(Robert R. Newton, AAO p.75)

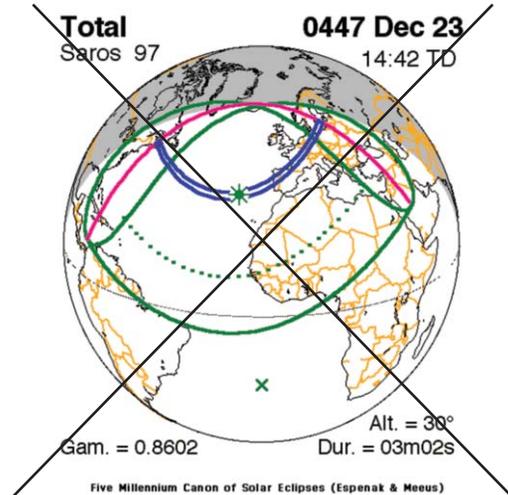
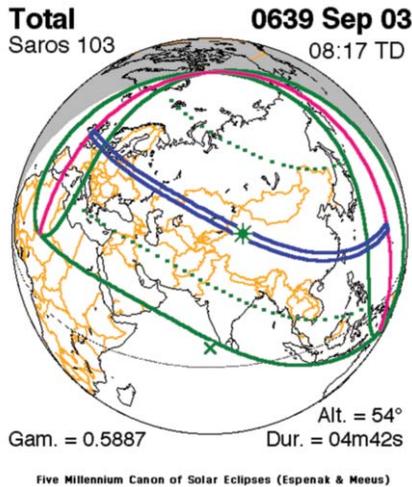
“447 Dec. 23 BW(?). Reference: Cambriae [ca 1288]. The first entry in *Annales Cambriae*, for the year 4 of the Welsh era, is : ‘A day as dark as night.’ This corresponds to 448 if I am correct that the year 1 corresponds to 445. The next entry is for the year 9 (453); it records that Leo, bishop of Rome, changed the date of Easter. The Easter of 455 was one of the dates for which the rules of the Roman church and of the other churches gave different results. Easter would have been on April 24 according to usual rules, but the Roman church (see Section II. 2) wanted April 17. Pope Leo began arguing for April 17 as early as 452. Thus the chronology of *Cambriae* is fairly close even in the earliest entries. The entry does not necessarily refer to an eclipse. If it doesn’t refer to an eclipse, the only reasonable identification is 447 Dec 23. This date does not necessarily mean that the year 448 was an error according to the annalists’ customs; there were many conventions that put the date we call 447 Dec 23 into what we call the following year. We cannot have high confidence that the observation was made in Wales although it is plausible that such record could have been made there. There was probably church activity in Wales before this time, both as a result of Christian efforts under Roman Empire and missionary efforts from Ireland. Some Welsh monasteries may have been founded already. However, the entry is the kind of brief notice that could easily be taken from one place to another, and the observation may have been made on the continent. I shall calculate this eclipse on the assumption that it was observed at S. David’s, but with the low reliability of 0.05. I shall use a standard deviation of the magnitude of 0.1. Schove [1954], in his interesting study of early British references to eclipses, quotes what is probably a reference to the same eclipse in some Irish annals that I have not found. The eclipse was also reported from Spain by Hydatius [ca. 468]. There is little resemblance between the records, and it is unlikely that Hydatius is the source for the Welsh record.” (Newton 1972 MCRE p.208-209)

“There is also a probable reference in MS. B of the so-called *Annales Cambriae*; e.g. in the edition by J. Williams ab Ithel we find under editorial 447 ‘Dies tenebrosa sicut nox’, ‘A day as dark as night’. The identification is fairly certain, but there is a difficulty, for the statement implies totality (or almost so), which is impossible in either Wales or Ireland. Thus the Welsh record, if literally true, comes from S.W. Europe, perhaps via Ireland. Newt. 1972, 208, rightly deals leniently with the editorial 447. The eclipse is placed in the fourth year of the Welsh Era of the *Annales Cambriae*, and normally AD – WE = 444, so that WE 4 would normally mean AD 448; but the year beginning is uncertain, and about Christmas was common. Newt. appears to accept totality at face value (place St. David’s) but with low weight.

The late *Annales of Lund* (or *Esrom*) have a milder statement on similar lines, under 447 or 448. They simply say ‘Hic dies tenebrosa fuit’, ‘In this year a dark occurred’; this

falls a little short of implying totality. Ginz 1899, 219 mentioned that eclipse must have been very striking in Denmark, but regarded the ultimate source as not yet determined, which seems to be still the case.” (Schove p.76)

This solar eclipse really happened on **Sep 03 in CE 639**, not in CE 447 Dec 23.
Delta T = zero sec! (JD ~ 1954697.84)

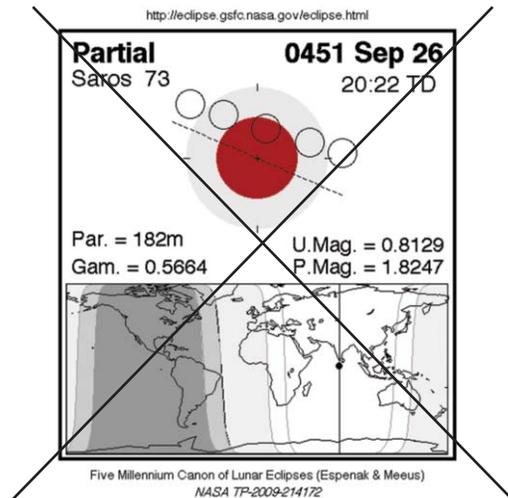
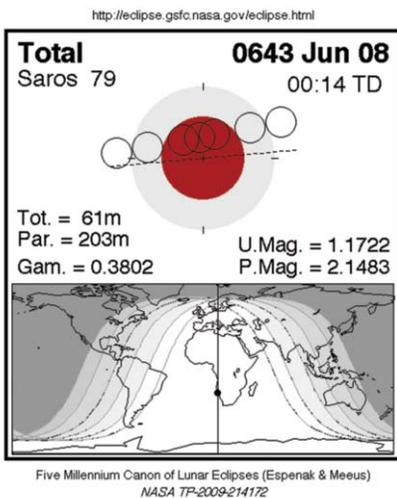


The year of CE 643/Era 490 (Traditional AD = CE 451/452)

“M. 451 Sept.26 (p.m.) LARGE LUNAR IN N. E. Portugal

This eclipse is clearly mentioned in Hydatius 1984, 26: ‘In the 28th year of Valentinian in the 307th Olympiad, the Moon is darkened from the East (a parte Orientis) 5. Kal. Oct. (= Sept.27) The 28th year of Valentinian III normally means 452.” (Schove, p. 77)

This lunar eclipse really happened on **June 7 in CE 643**, not in CE 451 September 26. (Ginzl 62) (JD ~ 1956071.5)



The year of CE 644 (Traditional AD = CE 450-453)

The starting year of the reign of Marcian, the emperors of the Romans.

To this year can be connected the Gallia campaign of our King Etele (Attila)

“FICTITIOUS ECLIPSE OF ATTILA, Discredited solar eclipse in the time of Attila. [450-453]” (Schove p. 77)

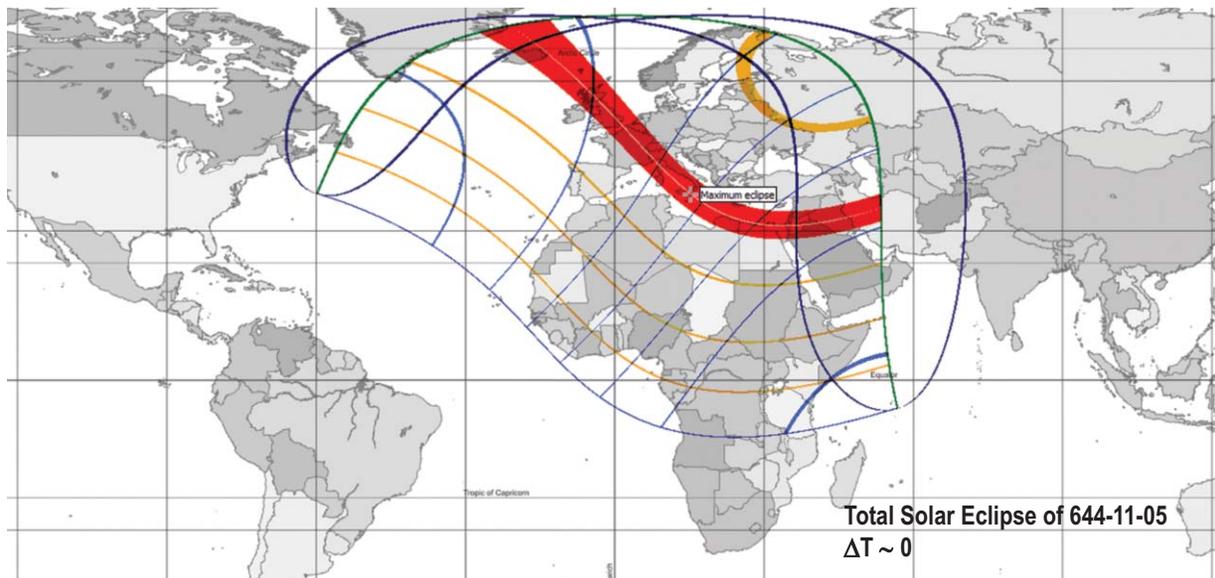
“Even the Sun appeared hideous, so that scarcely a third part of it gave light, I believe on account of such deeds of wickedness and the shedding of innocent blood.” (Gregorius Turonensis, refers to solar eclipse of 24 February AD 453, when Attila the Hun was raiding Italy.”

“In any case, the identification S.450 April 27, proposed in Scaliger 1598, 575 ... is impossible if an observed eclipse is meant.” (Schove p. 77

This solar eclipse really happened on **November 5 in CE 644!!!**

Delta T = zero sec! (JD ~ 1956588)

(Z.H.; La nueva cronologia, p. 71 and H.Z.; MAGYAR ATOM p. 41)



*Mór Than:
The Feast of Attila,
based on a fragment of
Priscus*

The year of CE 646 (Traditional AD = CE 453/454)

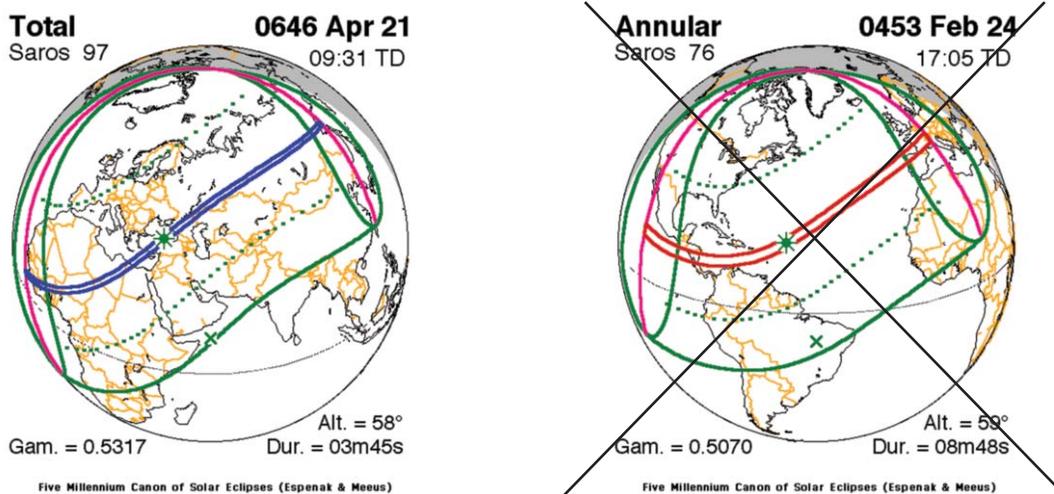
The solar eclipse of Hydatius;

“**SUNSPOT IN PORTUGAL ?** It may be added that Hydatius has, under editorial AD 453 or 454 (29th or 30th year of Valentinian), a curious ‘a sign in the Sun at rising.’ (Shove p.78)

“Hydatius says that there was a sign in the sun in the year that equals 454. There was a solar eclipse that should have been large in Galicia on 453 Feb 24. A sign put in the year 454 could be an eclipse in 453, but it could also be many other things. **It is safest to ignore this report.**” (Robert R. Newton; **MEDIEVAL CHRONICLES AND THE ROTATION OF THE EARTH**, p. 509)

This solar eclipse really happened on Apr. 21 in CE 646, not in CE 453 February 24. (JD ~ 1957119.890)

(Z.H.; La nueva cronologia, p. 72)



The year of CE 650 (Traditional AD = CE 458)

The solar eclipse of Hydatius; (458 May 28.)

Ol. 310.1 (Ginzel 63)

2nd regnal year of Majorian in Italy and Leo in Constantinopolis

“On Wednesday, 28 May, from the forth hour to the sixth, the sun appeared to be diminished in the light of its orb to the appearance a crescent moon on the fifth or sixth day.” (Richard W. Burgess, *The chronicle of Hydatius and the Consularia Constantinopolitana. Two contemporary Accounts of the Final Years of the Roman Empire*, Oxford Univ. Press, 1997)

“For 458 May 28, Hydatius lists a partial solar eclipse with an estimate of the magnitude; the sun was diminished until it appeared like a moon on its fifth or sixth day. While a partial eclipse with a measured magnitude is as good as a total eclipse, this measurement does not seem accurate enough to be valuable, especially since the place of the observation is uncertain.” (Newton AAO p. 76)

“458 May 28 E, Sp. Reference: Hydatius.

'01. 309.3 (= 459). On the day 5th calends June (=May 28), the 4th feria, the sun appeared diminished in the brightness of its orb in the form of a moon of the 5th or 6th from the 4th hour to the 6th. The weekday is correct for the eclipse date 458 May 28 rather than for the day stated, thus the feria was not calculated at a later time. A moon 5.5 days old has about ¼ of its surface illuminated. This corresponds to a magnitude of about 0.8. Reliability: 1. Place: Galicia.

Magnitude: 0.8 with a standard deviation of 0.1; path north of Spain. I noted the existence of this record in AAO but did not use it.” (Newton, 1972 MCRE p. 509-510)

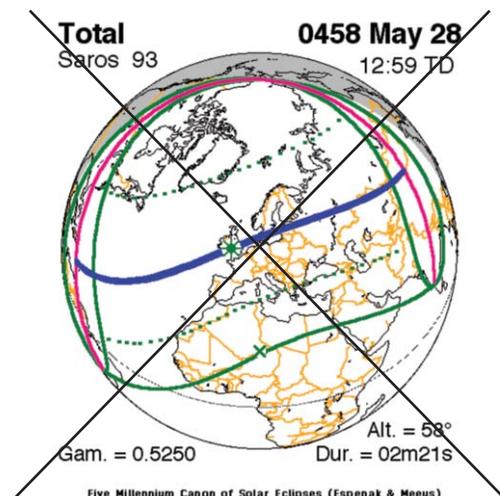
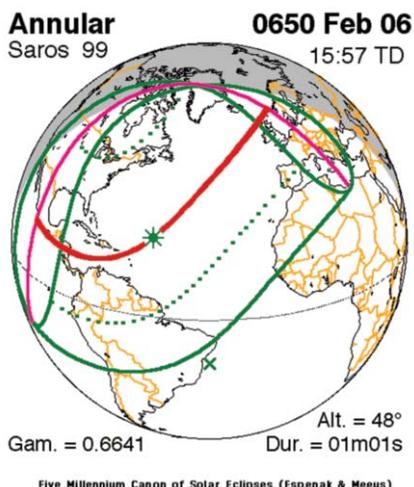
“S. 458 May 28 (Wed.) PARTIAL SOLAR ECLIPSE IN PORTUGAL

This eclipse is clearly referred to in the Chronicle of Hydatius: ‘In the first year of Majorian in Italy and Leo in Constantinople, in the 309th Olympiad, on 5.Kal.Jun. (=May 28), the fourth day of the week (Wednesday), from the fourth to the sixth hour, the Sun appeared reduced in the light of his orb to the figure of the Moon five or six days old’. The description implies a magnitude of 0.8 (Newt.1979, 459). Leo reigned from 457 Feb.7, Majorian from 457 April 1, and some editors give second (not first) year. Muralt misdated the eclipse 457.

The track of totality goes across the Atlantic via the British Isles to Asia; the noon point is in the North Sea. Ginz.1886, 972 tabulated the part of the Oppolzer track which runs between Ireland and the North Sea, and found magnitude 0.775 at Chaves at 10.43 a.m.

Ginz.1899, 221 found magnitude 0.78 at Chaves about 10.45 a.m., and pointed out that the magnitude corresponds to a six-day-old Moon (he referred to Isidore of Seville, Origines 3, 54, for terms describing sickle shapes of the Moon). The magnitude at Chaves was modest, but agrees tolerably with the statement of Hydatius, who, being interested in eclipse, may have been expecting this one. The eclipse is considered in Newt.1970, 76; 1972, 509. Identification goes back at least to Petav.1627, 847. The eclipse having been total in Britain, Schove, JBAA 65(1), 1954, 39, comments on its non-recording in the British Isles.” (Schove p. 79)

This solar eclipse really happened on February 6 in CE 650, not in CE 458 May 28. Delta T = zero sec! (JD ~ 1958507.158)



The year of CE 654/Era 500 (Traditional AD = CE 462/463)

Hydatius, Ol. 310.3, (AD 463) 1-st regnal year of Severus.

“In the province of Gallaecia various portentous manifestations were seen. VI non. Mar. (March 2), the cocks crowed at sunset and the full moon turned to blood. This day was a Friday” (Ginzel 64)

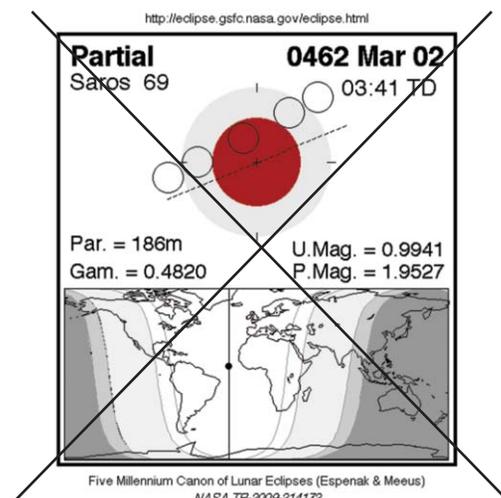
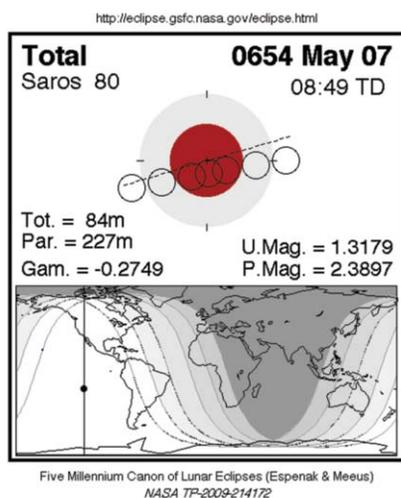
“M.462 March 1-2 BLOOD-RED ECLIPSE IN PORTUGAL

This eclipse also is clearly referred to in Hydatius: ‘In the first year of Severus, in the 310th Olympiad. in the province of Gallaecia various signs of portents are seen. [Aera D] 6.non.Mar. (March 2), from sunset (to) cock-crow the full Moon is turned to blood; it was the sixth day of the week (Friday)’. Severus began to reign on 461 Nov.19. ‘Aera D’ means Spanish Era 500, hence AD 462 (the difference in the reckonings being 38 years). Oppolzer gives magnitude 1.02 with mid-eclipse at 2.05 a.m., mean time at Greenwich, and a total duration of 3h20m (the duration of the eclipse is, of course, exaggerated in the record). Ginz. 1899, 221 finds magnitude 1.01 at 1.41 a.m., meantime at Chaves. Identification goes back at least to Petav.1627, 846.

A probable brief reference in Fredegar, Book 2, Ch.7 would have been difficult to date if its wording had not suggested an abbreviated borrowing from Hydatius.” (Schove p. 79-80)

This lunar eclipse really happened on May 7 in CE 654, not in CE 462 March 2.

The calculation of the Lunar Saros Series – 80 is not accurate because of Ptolemy’s wrong phases of the Moon. (JD ~ 1960058)



The year of CE 655 (Traditional AD = CE 464)

Ol. 311.1 (Ginzel 65)

2nd regnal year of Severus

“On Monday, 20 July, from the third hour to the sixth, the sun was perceived to be diminished in its light to the appearance of the moon on the fifth day.”

“464 Jul 20 E, Sp. Reference: Hydatius. ’01.311.1 (=465). On the 13th calends August (= Jul 20), the 2nd feria, the sun was decreased in its light in the form of a 5th moon

from the 3rd hour to the 6th.’ 464 Jul 20, rather than 465 Jul 20, was on the 2nd feria. A moon 5 days has about 1/5 of its surface illuminated, so it will be sufficiently accurate to use 0.85 for the magnitude. Reliability: 1. Place: Galacia. Magnitude: 0.85 with a standard deviation of 0.07; path north of Spain.

For the last two reports [458, 464], I have taken the standard deviation of the magnitude to be about half the difference between totality and the estimated magnitude.” (Newton 1972 MCRE, p.510)

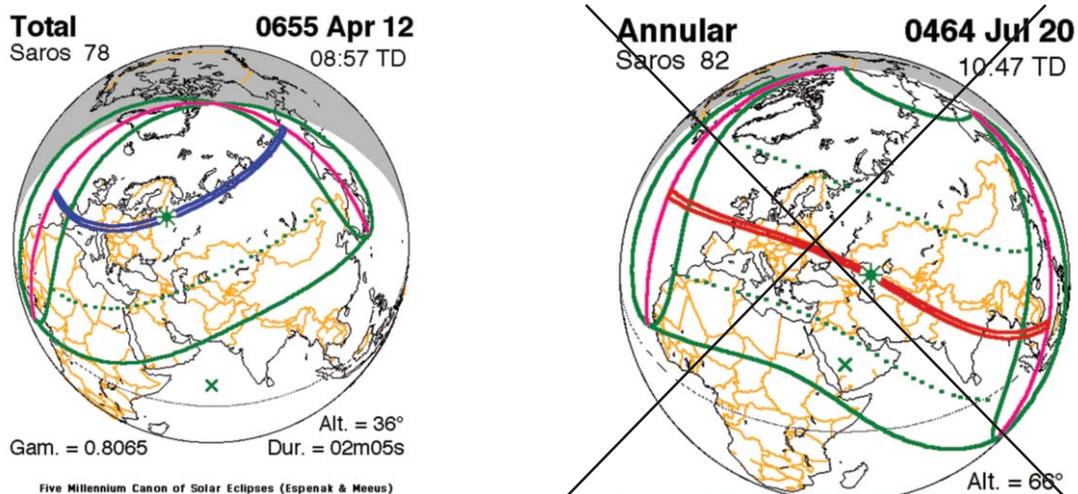
“S.464 July 20 (Mon.) SOLAR ECLIPSES PARTIAL IN PORTUGAL AND LARGE IN SYRIA

This is the last eclipse unmistakably in Hydatius: ‘In the second year of Severus, in the 311th Olympiad (should be 310th), on 13.Kal.Aug. (=July 20), the second day of the week (Monday), from the third to the sixth hour, the Sun is observed to be diminished in its light to the figure of a 5-day-old Moon’. Severus began to reign 461 Nov.19, and some editors put the eclipse in his third (not second) year. This description enables Newt.1979 (354, 372, 459) to estimate its magnitude as 0.85+/- 0.075.

The track of annularity runs from the Atlantic to approximately Brittany, Northern France, Central Europe, South Russia to the Himalayas. The Western European part of the Oppolzer track is tabulated in Ginz.1886, 972, which gives the greatest magnitude at Chaves as 0.82 about 7.07 a.m.

Ginz.1899, 222 finds the greatest magnitude at Chaves to be 0.91 at 7.01. a.m. The times are perhaps a little earlier than one would expect from the record. Identification goes back at least to Petav.1627, 848. See also Louis du Four de Longuerue, Disquisitio de annis Childerici I Francorum regis. The eclipse is mentioned vaguely in Fredegar. It has recently been dealt with in Newton 1972, 510.” (Schöve p.80)

This solar eclipse really happened on April 12 in CE 655, not in CE 464 July 20. (JD ~ 1960397.9)



The year of CE 658 (Traditional AD = CE 467)

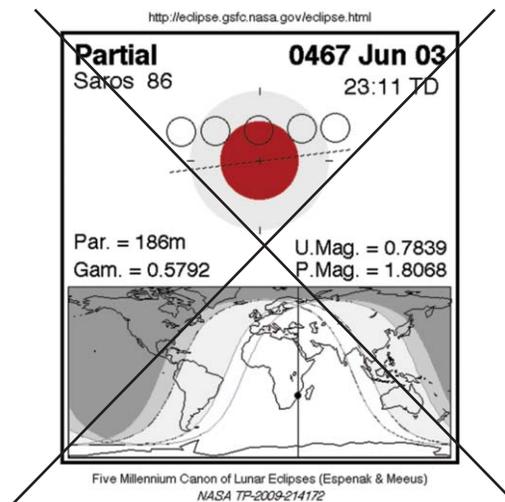
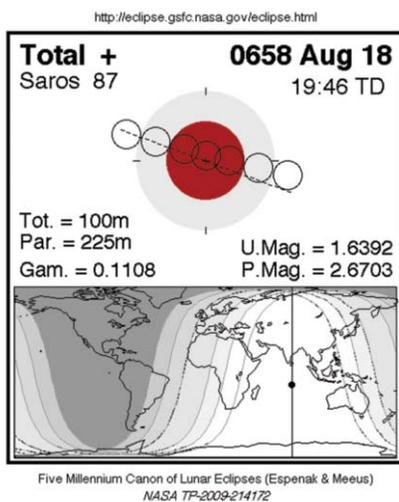
“M. 467 June 3 COMET (OR ECLIPSE GHOST) IN GAUL

“The last certain eclipse in the Chronicle of Hydatius is S.464 July 20. But a damaged section has something meteorological or astronomical, apparently among portents seen

in Gaul and reported by an embassy which returned in the second year of Anthemius (whose reign began on 467 April 12). We read of 'another sun seen after sunset'. Newt. 1972, 510 thinks that the passage may refer to the partial lunar eclipse of 467 June 3. No other lunar eclipse was visible in Western Europe until autumn of 469, although the comet of 467 seems to account for the remark. The sunspot maximum was uncertain, so that an auroral corona is possible." (Schove p. 80-81)

"Hydatius record for '01. 311.4' (=468) exists only in a fragmentary form. The isolated words 'setting of the sun' occur in it. There were no lunar eclipses in 468. The solar eclipses of 468 May 8 and 468 Nov 1 should not have been visible in Spain. Since Hydatius' dates are often 1 year too late, we should also try 467. The solar eclipse of 467 Mar 19 would have been a small eclipse visible only in the morning if at all. The lunar eclipse of 467 Jun 3 would have begun at about 19h 30m local time in Galicia and this is also about sunset there on Jun 3. Thus there is a reasonable chance that Hydatius recorded the lunar eclipse of 467 Jun 3, but there is not enough certainty to let us use the record." (Newton 1972 MCRE, p.510)

This lunar eclipse really happened on August 18 in CE 658, not in CE 467 June 3. (JD ~ 1961622.32)



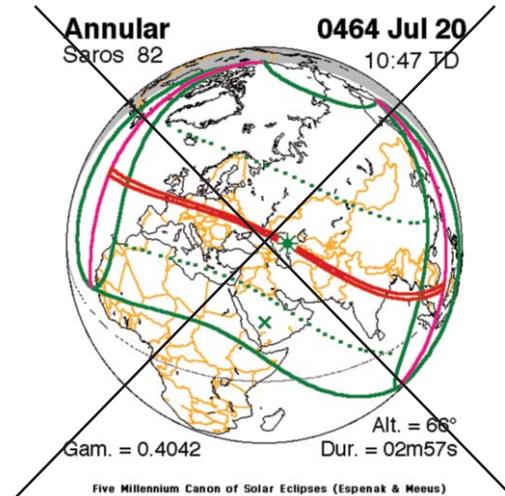
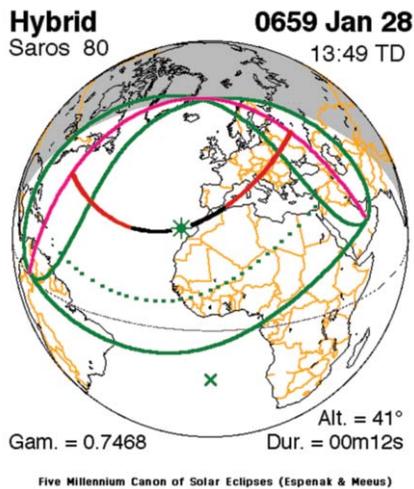
The year of CE 659 (Traditional AD = CE 464/465)

"S. 659 Jan. 28. **NO RECORD, EVEN AT CONSTANTINOPLE**"
(Schove, p. 127)

"The Syrian writer, Agapius says 'In the ninth year of the reign of Leo, there was an eclipse of the Sun and the stars appeared (in daytime)'. As Leo ascended the throne in 457 Jan., this is a reference to S.464 July 20, with an error of one year. Ginz. 1899 shows a brief stretch of the band of annularity running north of the Sea of Azov and through the North-Central part of the Caspian Sea. The source of Agapius may thus have been from Armenia." (Schove p. 80)

This solar eclipse really happened on January 28 in CE 659, not in CE 464 July 20. (JD ~ 1961785.1)

(Z.H.; La nueva cronologia, p. 72)



The year of CE 678 (Traditional AD = CE 485)

“485...This year on July, 1 an eclipse of the sun happened.” (Paschale Campanum)

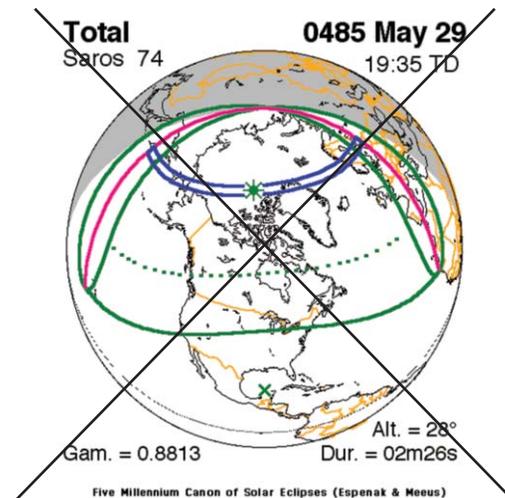
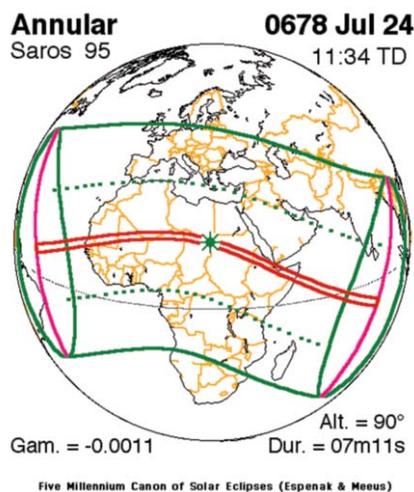
“The sun appeared hideous in a way that there was visible as if its third part shining; I believe that it was as a result of such a crime and bloodshed of innocent people.”

(Gregory of Tours, The history of Francs, IV, 31.)

(Ginzel 67)

“S. 485 May 29 USUAL (FALSE) DATE FOR GREGORY’S ECLIPSE See 497...” (Schove p. 82)

This solar eclipse really happened on July 24 in CE 678, not in CE 485 May 29. (JD ~ 1968902)



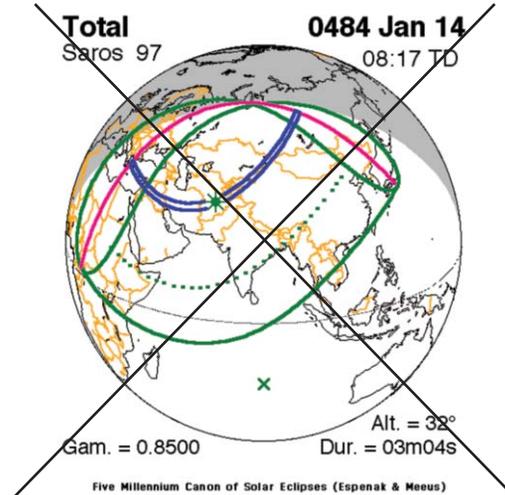
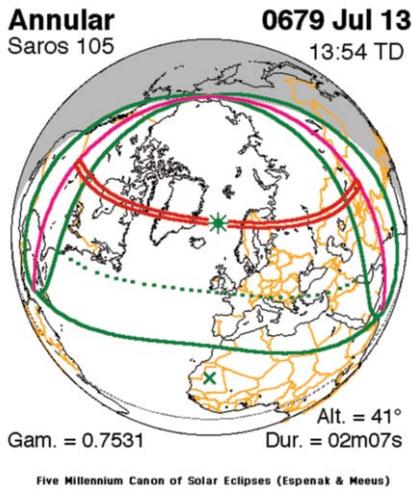
The year of CE 679/SE 795 (Traditional AD = CE 483-84)

“An 795....The extant source is Elias 1910, 74 Seleucid 795 is AD 483-4, second Kanun is January. According to Bury, Hist. Later Rom. Emp., Piruz fell in battle in 484 January. ‘At three hours of the day’ sounds late for an eclipse which probably occurred an hour

or so after sunrise, but no great accuracy was intended; the third, sixth and ninth hours may be regarded as a canonical division of the day into four parts.” (Schöve p. 82)

This solar eclipse really happened on July 13 in CE 679, not in CE 484 January 14. The back calculation of the Solar Saros Series – 105 is not accurate. (JD ~ 1969256)

(Z.H.; La nueva cronologia, p. 72)



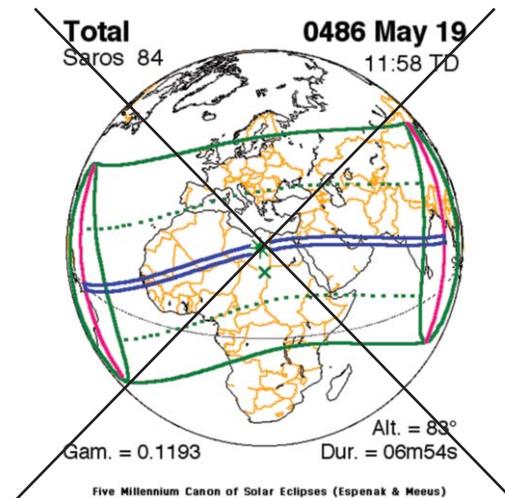
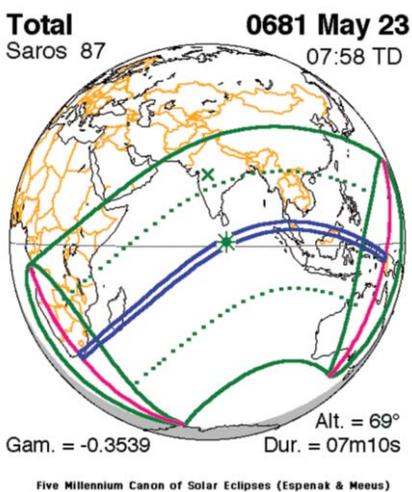
The year of CE 681/SE 797 (Traditional AD = CE 485-86)

“Elias 1910, 74 says: ‘An 797. En lequel le soleils’eclipsa le lundi 19’Ijar, á neuf heures de la journée, et les étioles appurent.’

Seleucid 797 is AD 485-6 (autumn to autumn in Elias), and ‘Ijar is May, so that the date is correct. ‘At the nine hours of the day’ in Elias implies little more than that eclipse occurred in the afternoon;”

The back calculation of the solar Saros Series – 87 is not accurate.

This solar eclipse really happened on May 23 in CE 681, not in CE 486 May 19. The back calculation of the Solar Saros Series – 87 is not accurate. (JD ~ 1969935.82)



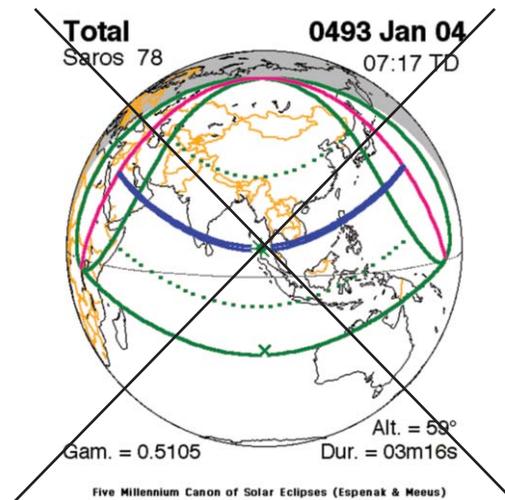
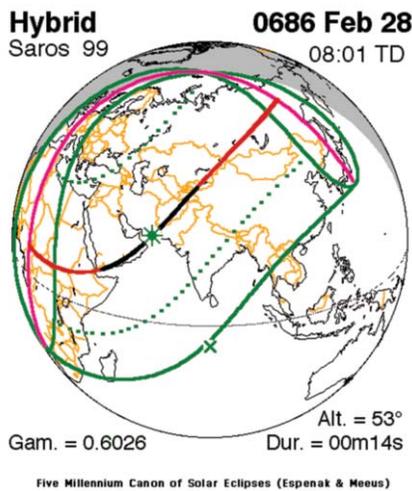
The year of CE 686 (Traditional AD = CE 493)

“S.493 Jan. 4 SUNRISE ECLIPSE IN SYRIA (UNLIKELY RECORD)

The 12th century Michael mentions an eclipse of the Sun early in the reign of Anastasius I (491-518). This might refer to S. 493 Jan. 4;”

This solar eclipse really happened on February 28 in CE 686, not in CE 493 January 4. Delta T = zero sec! (JD ~ 19671677.83)

(Z.H.; La nueva cronologia, p. 73)

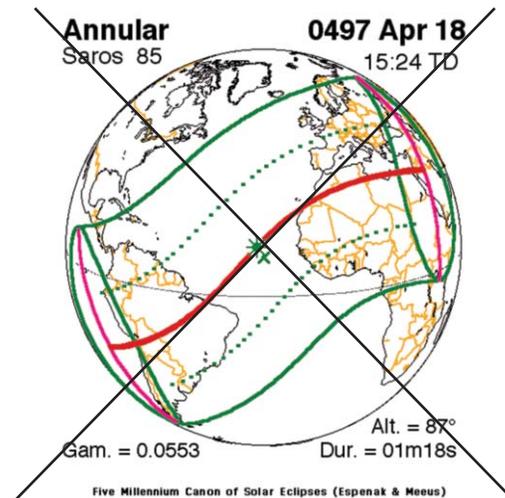
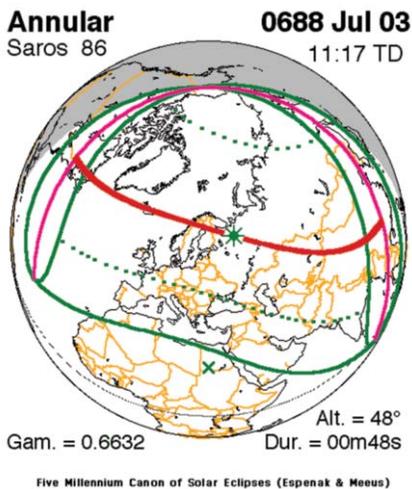


The year of CE 688 (Traditional AD = CE 493)

“Under the year 493 Scotorum has: Defectus solis apparuit.”

(Newton, 1972 MCRE p. 187)

This solar eclipse really happened on July 3 in CE 688, not in CE 497 April 18. (JD ~ 1972534)

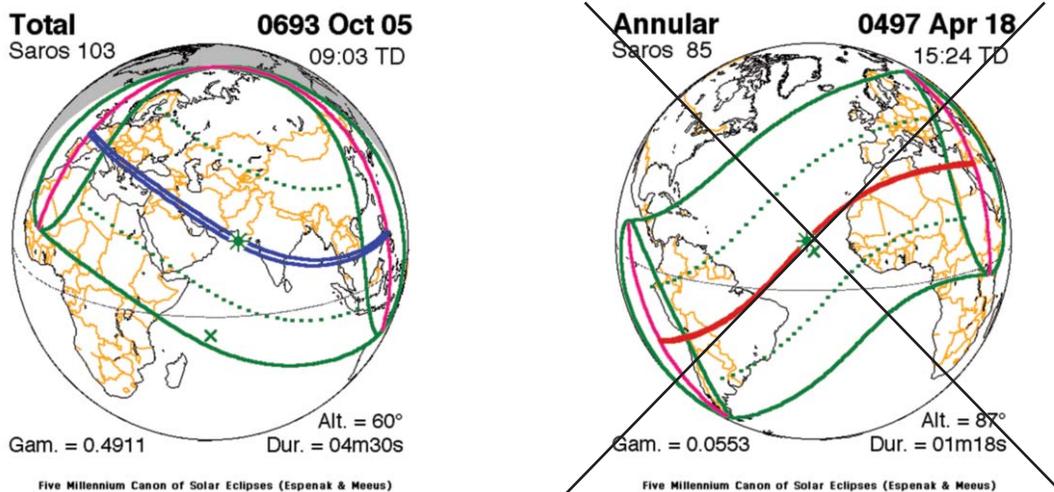


The year of CE 693 (Traditional AD = CE 496/497)

“497 Apr 18. Reference: Marcellinus. The entry for the year that can be identified as 497 contains: ‘An eclipse of the sun appeared.’ Unfortunately this brief record cannot be identified safely because there were two significant eclipses in both Constantinople and Illyrica within six months of each other. The eclipse of 496 Oct 22, we estimate roughly from the chart in Oppolzer, had a magnitude of about 0.7 in Constantinople or Illyrica. The eclipse of 497 Apr 18 had a magnitude of perhaps 0.8 in Constantinople and somewhat less in Illyrica. Hence there is a good chance that either eclipse would be recorded. The chronology in Marcellinus is usually fairly good, but we cannot rely upon it to resolve an interval as short as six months. Since 497 is apparently the year intended, and since the eclipse of 497 Apr 18 was somewhat larger in Constantinople than the other one, that identification is more probable. However the probability is not high enough to let us use this record.” (Ginzel 68, Newton, 1972 MCRE p. 541-2)

“497 Apr 18. References: Ulster. Under the year 496 Ulster has: Solis defectus apparuit.” (Ginzel 68, Newton 1972 MCRE p. 187)

This solar eclipse really happened on October 5 in CE 693, not in CE 497 April 18. Delta T = zero sec! (JD ~ 1974453.871)



The year of CE 706 (Traditional AD = CE 510/512)

“S. 706 July 14 ANNULAR IN S.W. EUROPE BUT NOT RECORDED” (Schöve, p. 147)

“512 Jun 29. Reference: Marcellinus. ‘Near these times an eclipse of the sun happened.’ This eclipse is probably the eclipse of 512 Jun 29. However, the eclipse of 511 Jan 15 may have been visible in Constantinople at sunset. I shall calculate both eclipses in section XVII.2, and if it turns out that the eclipse of 511 Jan 15 was significant I shall ignore this record. If I use it, I shall give it reliability of 1, since it is contemporaneous. Place: Constantinople. Standard deviation of the magnitude: 0.1” (Ginzel 69, Newton 1972 MCRE p. 542)

“512 Jun 29 Reference: Paschale Campanum. The source first gives Easter as the 10th calends May (=Apr 22), which confirms that the year is 512. It then goes on to say: ‘This

year on the calend of July (=Jul 1) the sun suffered an eclipse, and when Vesuvius erupted on the 8th ides July (=Jul 8), there was darkness in the vicinity of the mountain.’ The printed text gives the date of the eclipse by writing ‘in k. Iul.’ It is unusual to write in this usage, and I imagine that someone has mistaken ‘iii’ for in. If so, the date intended by the annalist is the 3rd calends July, which equals Jun 29 and is correct.

Reliability: 0.5 Place: Naples. Standard deviation of the magnitude: 0.1.” (Ginzel 69, Newton 1972 MCRE p. 455)

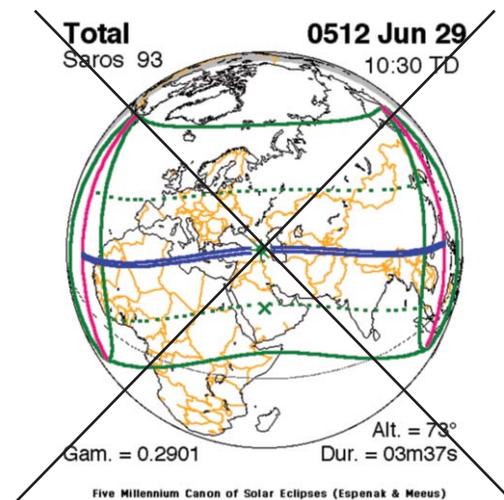
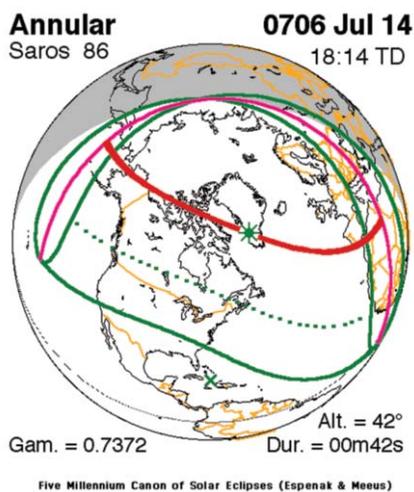
“512 Jun 29. Reference: Ulster and Scotorum. Ulster has ‘Defectus solis contigit’ (An eclipse of the sun happened) under the year 512. Scotorum has the identical entry under 510, continuing the pattern of being earlier than Ulster.” (Newton 1972 MCRE p. 187)

“Agapius says: ‘In the 22nd year of Anastasius, in the month of Haziran (June) at midday, there was an eclipse of the Sun’. As Anastasius was proclaimed Emperor in 491 April, the year is correct.”

(Schove p. 93)

This solar eclipse really happened on July 14 in CE 706, not in CE 512 June 29. (JD ~ 1979119.254)

(Z.H.; La nueva cronologia, p. 74)



The year of CE 718 (Traditional AD = CE 528)

“The literary eclipse. ‘ The rim of black spread slowly into the sun’s disk,... the multitude groaned with horror to feel the cold uncanny night breezes... and see the stars come out... (and later)... the silver rim of the sun pushed itself out...’ This is one of the few eclipse reports (Clemens gave the date 528 Jun 21 for the eclipse.) in which the recovery from the eclipse is specifically mentioned. The omitted parts of the text are not relevant to present purposes.

Clemens, though a classical author, is not an ancient author, but he can be studied by the methods used for one: The quotations clearly show that Clemens saw a total solar eclipse some time before he wrote this work, say between 1850 and 1900 if we pretend that we do not know the exact date of publication. For an ancient work, we

usually know the date of writing only within a few decades. We know where Clemens lived and we make a preliminary identification of possible eclipses from the charts in Oppolzer [1887].

The eclipses of 1854 May 26, 1869 Aug 7, and 1900 May 28 are good possibilities; other could be admitted with lower probability. We carefully calculate the local circumstances of each eclipse for Clemens' current home, ignoring the possibility that he might have been traveling. We identify the eclipse as the one with greatest calculated magnitude. We then use this possibility alone using the eclipse to improve the astronomical constants or the accelerations.

It is doubtful that anyone would analyze Clemens' text in this way, but the pretended analysis illustrates three main points that are relevant to the treatment of some ancient 'eclipse records' in the current literature.

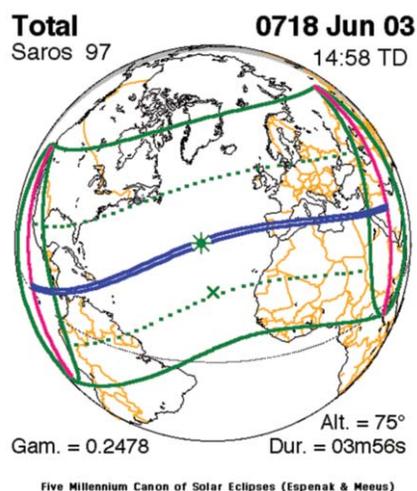
First we can almost surely disprove an eclipse sighting by Clemens on the basis of independent evidence. We cannot usually do this with ancient writer. Thus ignorance, the inability to disprove, has often been equated with an assessment of high reliability.

Second, if the reader will study carefully the rules of the peculiar game that has been played, which I shall call the 'identification game', he will see that they lead to a successful 'identification' for almost any set of times and places chosen at random. It is only necessary for there to be a modest uncertainty in either the time or place. Further, the calculated path of the 'identified' eclipse, by the rules of the game, passes close to some chosen point. Thus, if the 'eclipse' report is used to improve the constants that went into the eclipse computation, by making the calculated path go through the chosen point, it is almost guaranteed that the changes in the constants will be acceptably small.

Finally Clemens did not need to see an eclipse at all in order to write the passages quoted. He was a skillful and imaginative writer and could have written the passages on the basis of his reading alone. Alternately, his use of an eclipse could have been suggested by seeing a small one or by seeing an eclipse prediction in a newspaper or almanac.

By a 'literary eclipse', I shall mean one that has been inserted into a work of conscious literary invention. A literary eclipse should be assigned a reliability of zero; it usually comes from imagination and not observation. An exception should be made only if there are strong grounds for believing that the writer did not have access to written or oral descriptions of eclipses (If independent evidence should be found that a writer had in fact witnessed an eclipse, that evidence should be used, but not the literary description)." (Newton AAO p. 45-47)

This solar eclipse really happened on June 3 in CE 718 (JD ~ 1983461.12)



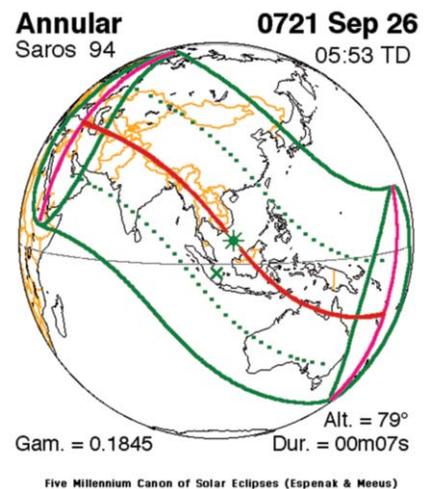
The year of CE 721/SE 837 (Traditional AD = CE 525/526)

“An 837. En lequel le soleil s’ eclipsa au milieu du jour. With Elias, Seleucid 837 means AD 526-6, and the year begins on Oct.1; thus this year is correct. It would be a surprise to find Syriac writer able to mention an eclipse, some five centuries earlier, with its noon point two thousand miles south of Syria. He frequently indicates its source, but unfortunately not here. His sources in general include both Christian and Islamic writers.” (Schove p. 94)

This solar eclipse really happened on September 26 in CE 721

Delta T = zero sec! (JD ~ 1984671.74)

(Z.H.; La nueva cronologia, p. 75)



The year of CE 732/SE 848 (Traditional AD = CE 534/536/537)

“S. 732 Mar 1 TOTAL IN S.E. ISLAM BUT NO RECORD” (Schove, p. 150)

“S. 534 April 29 ANNULAR ECLIPSE”.

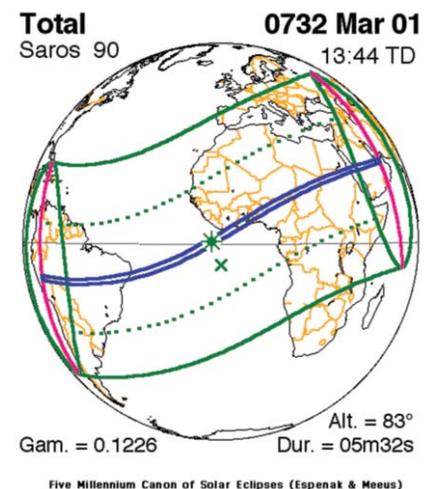
“Agapius speaking of Justinian, says: ‘In the **eighth year of his reign**, there was an eclipse of the Sun, on the 29th of Nisan (April), at two hours in the afternoon.’ Justinian was emperor from 527 April 1, sole emperor from 527 Aug.1, so that the year is reasonable. But in the afternoon is quite wrong; no doubt the second hour of the day is meant.” (Schove p. 95)

“536 Mar. /537 June VOLCANIC DARKNESS”

“Most contemporary reports are no longer extant, but they were summarized later by Michael, probably after John of Ephesus, whose work is partly lost. ‘... in the year of the Greeks 848 (i.e. AD 536) there was a sign in the Sun.’ (Schove p. 95-96)

This solar eclipse really happened on March 1 in CE 732

Delta T = zero sec! (JD ~ 1988481)



The year of CE 733 (Traditional AD = CE 536/538)

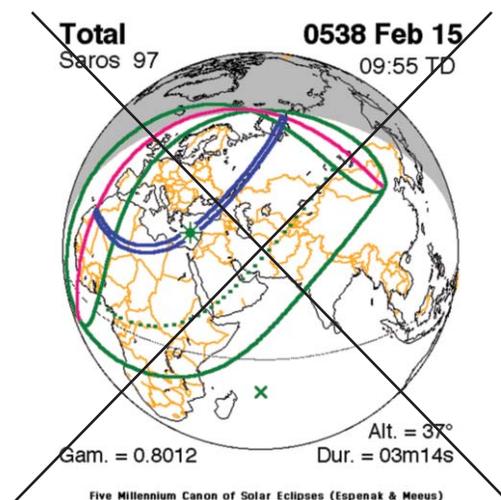
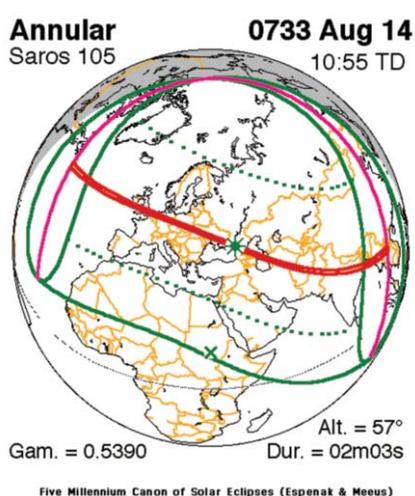
“In the year 538, there happened an eclipse of the sun, on the 16th of February, from the first to the third hour”. (Bede: Ecclesiastical History of England, V, 24)

“A.D. 538. This year the sun was eclipsed, fourteen days before the calends of March, from before morning until nine o’clock in the morning.” (Anglo-Saxon Chronicle I 28 II 14) (Ginzler 70)

“538 Feb 15 E. This record is best discussed along with the record for 540 Jun 20 E.” (Newton AAO p.76)

“536 Sep 1 (?). Reference: Procopius, De Bello Vandalico, Book II Chapter 14, p.469. Procopius was a Byzantine writer, but this observation, if that is what it is, was made in Italy. Procopius writes: ‘There was a grave portent that year. Indeed for the entire year the sun sent forth his rays without his usual brilliance, like the moon . . . From this it happened that neither war nor famine nor any manner of deadly evil ceased to beleaguer mankind. That was **the tenth year** of Justinian’s reign.’ (Newton 1972, p. 458)

This solar eclipse really happened on Augustus 14 in CE 733, not in CE 538 February 15. The back calculation of the Solar Saros Series – 105 is not accurate. (JD ~ 1989012)



The year of CE 735 (Traditional AD = CE 540)

“In the year 540, an eclipse of the sun happened on the 20th of June, and the stars appeared during almost half an hour after the third hour of the day” (Bede: Ecclesiastical History of England, V, 24)

“A.D. 540. This year the sun was eclipsed on the twelfth day before the calends of July; and the stars showed themselves full night half an hour after nine a.m.” (Anglo-Saxon Chronicle I 28 II 15)

“540 Jun 20 E. References: Ginzel [1899]; Bede. Ginzel quotes a passage from a document found in Ravenna that I have not seen directly: ‘Fourth year of Belisarius and fourth year of Straticus, there was darkness from the third till the fourth hour of the day on Saturday.’ Bede writes: ‘In the year 538, there happened an eclipse of the sun, on the 16th of February, from the first to the third hour’. ‘In the year 540, an eclipse of the sun happened on the 20th of June, and the stars appeared during almost half an hour about the third hour of the day.’ The quotations are from the translation mentioned in the citation. These are two of three solar eclipses recorded by Bede.

The statements are taken from annals and may be given a reliability of unity. Neither document states anything specific about the magnitude of the eclipse of 538, so I give it a standard deviation of 0.06 in magnitude. ‘Almost half an hour’ sounds a little long

for stars to remain visible, except possibly for Venus, but time-keeping was rather informal then and this duration can be ignored. On the basis of the stars, I give the eclipse of 540 a standard deviation of 0.01 in magnitude. The main problem concerns the place of these observations.

Bede was writing an ecclesiastical history of England and drew mostly upon local sources for the history before his own time. However, he includes some general history and for this he used Continental sources. It is quite possible that he did not realize how narrow the zone of a total solar eclipse is and hence did not realize that a Continental eclipse observation does not necessarily apply to England.

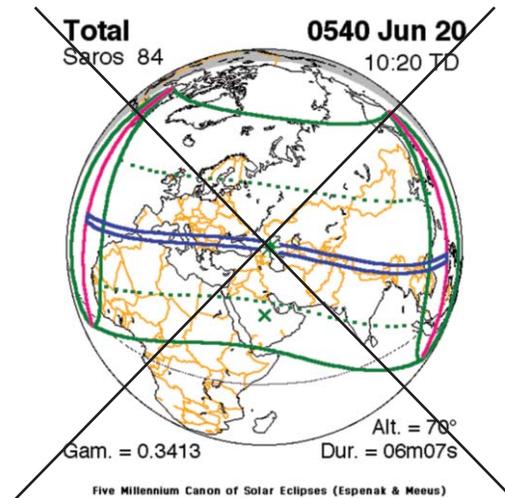
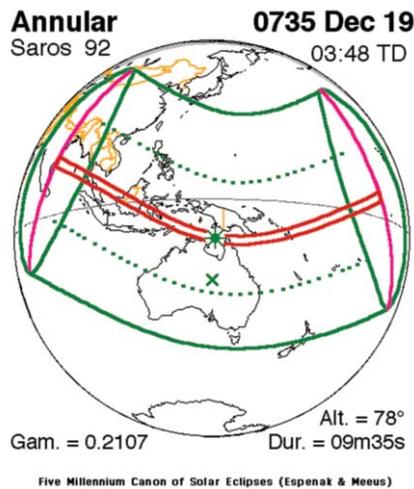
The charts in both Oppolzer's and Ginzl's canons of eclipses show that the eclipse of 538 Feb 15 passed through the eastern Mediterranean and that the eclipse of 540 Jun 20 passed along the Mediterranean and the southern part of Europe. It is unlikely that either eclipse, and particularly the one in 538, would have been reported from England, and it is most unlikely that stars would have been visible in England during the 540 eclipse. Further, the conditions of life in England at the time were unfavorable to making and recording such observations; the first official church presence in England dates from 597. In spite of this, I would have assigned the places of observation to be somewhere in England if I had not found the Ravenna document.

The Ravenna document gives the only cue we have about a place of observation, and it is not satisfactory. There is one report but there were two eclipses. According to Ginzl, the listing of Belisarius and Straticus as consuls identifies the year as 539. This does not agree with either eclipse. 'Saturday' does not help because it too does not agree with either eclipse. Since there is no way to choose, Ginzl labels the Ravenna record as '538 or 540'. It seems possible that the compiler of the Ravenna record accidentally ran two records together and that the single record does in fact refer to both eclipses, but there is no evidence that this actually happened.

The Ravenna record does nothing more than establish the fact of a Continental record for at least one of the eclipses of 538 and 540, and hence it gives credibility to a non-English source for Bede's reports. The Ravenna record is certainly not the record used by Bede. If it refers to both eclipses, it is almost surely not an original record. However, it is most unlikely that eclipse reports originated from England, and Ravenna is the only place we have, so I shall use it. I shall indicate lack of faith in the choice and keep it from having much importance by assigning a standard deviation of 10° to the longitude.

Attribution of a Continental source for these records does not imply that Bede traveled there; that is a separate question." (Newton AAO p.76-78)

This solar eclipse really happened on December 19 in CE 735, not in CE 540 June 20. The back calculation of the Solar Saros Series – 92 is not accurate. (JD ~ 1989868.7)



The year of CE 743 (Traditional AD = CE 547)

“S. 547 Feb. 6 ECLIPSES OF COSMAS (IN EGYPT?)

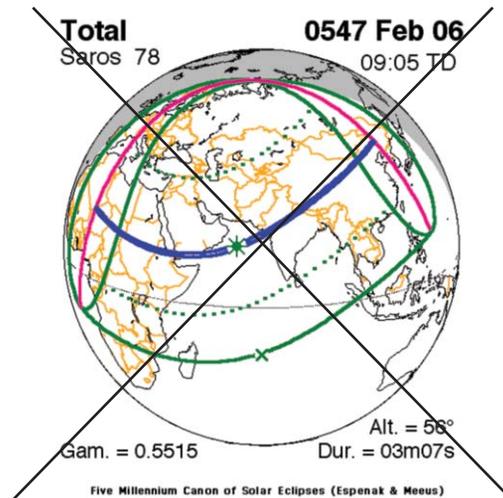
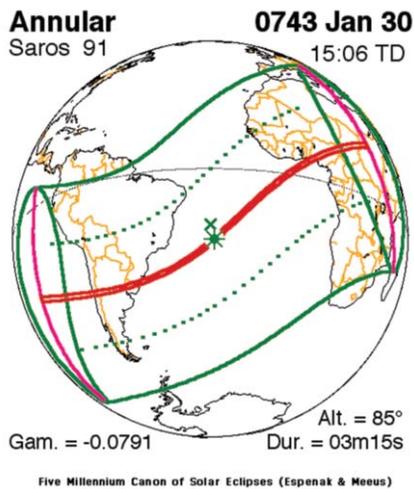
M. 547 Aug. 17

These two eclipses are easily identified as those mentioned in Book vi of the *Topographia Christiana* of Cosmas (‘Indicopleustes’) of Alexandria, apparently written close to the time of the eclipses. Cosmas refers to both eclipses as predicted to Alexandria by one Stephan of Antioch; he mentions that the solar eclipse actually occurred, but is silent on whether the lunar eclipse was seen. Ginz. 1899, 225 gives both Greek and a German translation. Greek text and French translation appear in the edition by Wanda Wolska-Conus, Tome III.

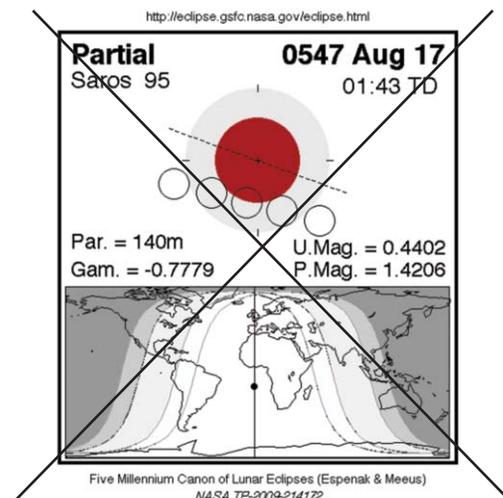
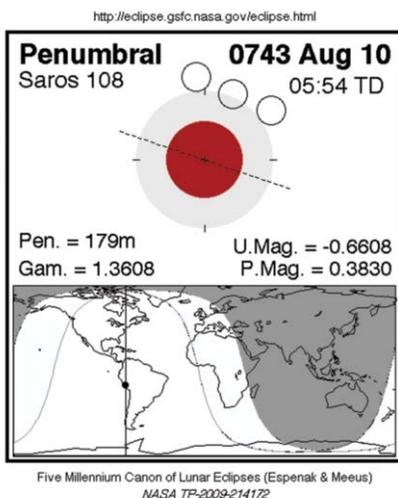
As Cosmas gives no specific time of day, the interest is primarily calendrical. The dates provide a good example of the working of the Egyptian calendar in its Julian form, with fixed year-beginning Thoth 1 = Aug.29, twelve months each of 30 days, and 5 or 6 supplementary days. Cosmas gives the dates as Mechir 12 and Messori 24; on the scheme just stated, the 12th of Mechir (sixth month) is Feb.6, and the 24th of Messori (the twelfth month) is, when no leap year is involved, Aug.17. Since there were eclipses on those dates in AD 547, Ginz. has no hesitation in confirming the identifications made by J. Krall in 1890. In treating of this matter, J.B. Bury has Messori 14 by misprint for Messori 24.

The solar eclipse was total in or near Nubia, India and China; Ginz. finds magnitude 0.50 at Alexandria about 8.35 a.m. The lunar eclipse was partial, and took place there entirely after Alexandria midnight. The solar eclipse is accepted by Newt.1979, 387, but he points out that Cosmas was famous for his travels and we should not necessarily assume that the observation was made in Alexandria. A solar eclipse of 0.5 is not likely to have been noticed.” (Schove p. 98-99/ Ginz. 72)

This solar eclipse really happened on January 30 in CE 743, not in CE 547 Feb. 6. (JD ~ 1992468.1)



This lunar eclipse really happened on Augustus 10 in CE 743, not in CE 547 Aug. 17. The back calculation of the Lunar Saros Series – 108 is not accurate. (JD ~ 1992659.74)



The year of CE 753 (Traditional AD = CE 563)

“Once on the first day of October, the sun was in eclipse, so that less than a quarter of it continued to shine, and the rest was so dark and discoloured that you would have said that it was made of sackcloth. Then a star, which some call a comet, appeared over the region for a whole year, with a tail like a sword, and the whole sky seemed to burn and many other portents were seen”(Gregory of Tours, The history of Francs, IV, 31. Penguin classics, London) (Ginzel 73)

“563 Oct 3 E,F. Reference: Gregory of Tours, which says in Chapter 4.31: ‘... on the calends of October the sun was so obscured that not a fourth part of it remained shining, but it appeared hideous and discolored like some sort of bag.’ This appears in the chapter that Gregory devoted to signs near this time, and the year is not given exactly. However there does not seem to be any question about the identification of the eclipse, even though the day of the year is wrong by 2. The eclipse was in Gregory’s time, but this does not sound like a strictly contemporaneous account and I shall give it reliability of

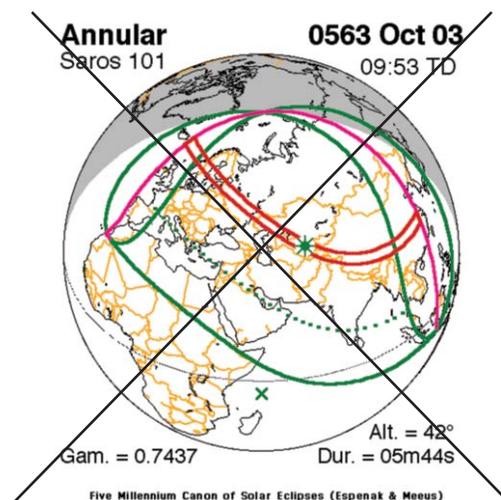
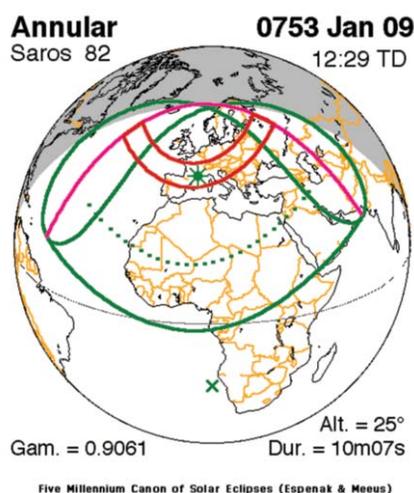
only 0.5. Since he says ‘not a fourth part’, I shall take the magnitude to be 0.8 (leaving 1/5 uneclipsed), with a standard deviation of 0.1 Place: Tours, path assumed north of Tours.” (Newton 1972 MCRE p.322)

“S.563 Oct.3 PARTIAL SOLAR IN FRANCE

Gregory of Tours: ‘But once on the kalends of October the Sun appeared so obscured that not even a quarter remained shining; it seemed hideous and discoloured, and looked like a sack. And a star, which some call a comet [AD 565 DJS], having a ray like a sword, appeared over that region for a whole year, and the sky was seen to burn, and many other signs appeared.’

Following Struyck 1740, 113, the passage is generally accepted as referring to the annular eclipse of 563 Oct.3, not quite on the kalends of October. The comet is that of 565. The track of annularity runs from near Iceland to Russia and China, so that the eclipse was not very large in France. Thin cloud or haze must have made the observation possible.” (Schöve p.100)

This solar eclipse really happened on January 9 in CE 753, not in CE 563 October 3. Delta T = zero sec! (JD ~ 1996100)



The year of CE 763 (Traditional AD = CE 567)

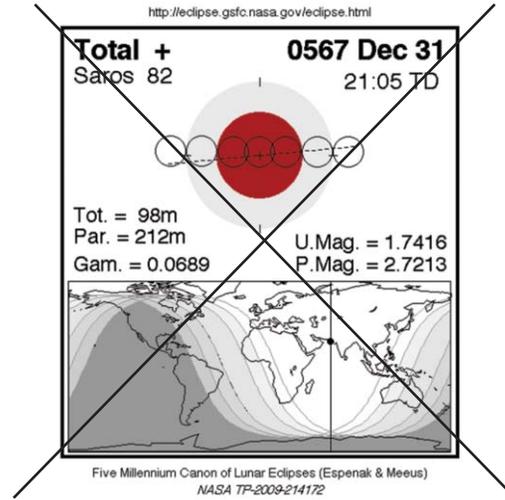
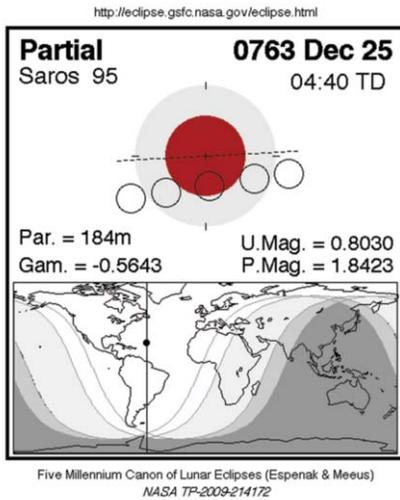
“ad 567 p.c. (Justini anno). In caelo luna XVI non comparuit II Kal. Januari” (Excerptum Sangallense, Ginzl 74)

“M. 567 Dec. 31 (p.m.) DEEP TOTAL LUNAR ECLIPSE IN S.E. EUROPE

Excerpta Sangallensia has in the reign of Justin II, about the year 567: ‘in caelo luna XVI non comparuit II kl. Ian’

Ginzl.1899, 226 takes ‘non comparuit’ as meaning ‘disparuit’; II kal. Ian.is Dec.31. There was a deep total eclipse of the Moon in mid-evening on 567 Dec.31. Oppolzer gives magnitude 1.74 and mid-eclipse at UT 19.44. Thus record is clearly correct. St. Gall was not founded until 614 and the source may have been the lost chronicle of Theophanes of Byzantium.” (Schöve, p. 101)

This lunar eclipse really happened on December 25 in CE 763, not in CE 567 Dec. 31 (JD ~ 2000101.7)



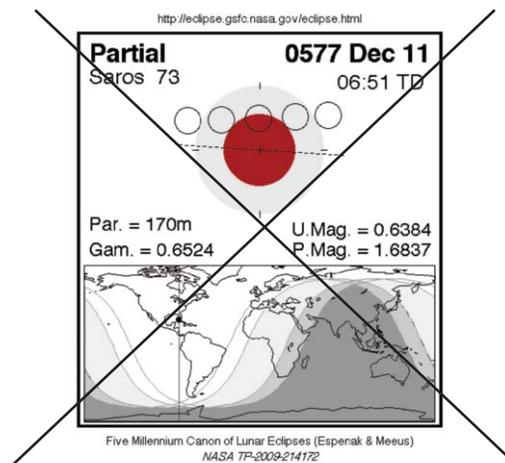
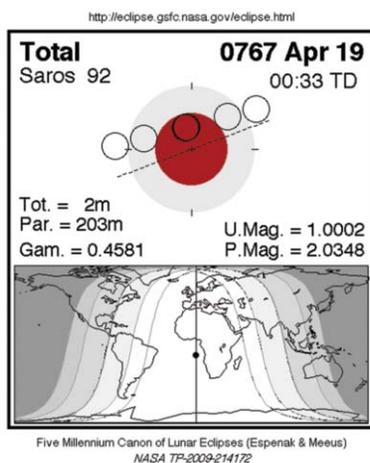
The year of CE 767 (Traditional AD = CE 577)

“When I was celebrating Mass on Saint Martin’s Eve, which is 11 November, a remarkable portent was seen in the middle of the night. A bright star was seen shining in the very center of the moon, and other stars appeared close to the moon, above it and below. Round the moon stretched the circle which is usually a sign of rain. I have no idea what all of this meant. This same year the moon often appeared in eclipse and there were loud claps of thunder just before Christmas.” (Ginzel 75, Gregory of Tours, The history of Franks, V, 23.)

“M. 577 Dec. 11 LUNAR IN FRANCE

There is a lunar entry in Gregory. The entry is for a year usually taken to be 577 (or rather the second year of Childebert II, running from 576 Dec. 25 to 577 Dec.24). After mentioning a lunar phenomenon (near-by stars, etc.) on 3.Id.Nov. (= Nov.11), which is not said to be an eclipse date, Gregory continues his signs and portents with: ‘In that year we frequently saw the Moon turned black.’ In fact M.577 Dec.11 is the only lunar eclipse listed by Oppolzer for 577.” (Schöve p. 101)

This lunar eclipse really happened on April 18/19 in CE 767, not in CE 577 Dec. 11 (JD ~ 2001312.52)



The year of CE 770 (Traditional AD = CE 580/581)

“The moon was darkened and a comet appeared in the sky. A serious epidemic followed among the common people.” (Ginzel 76, Gregory of Tours, The history of Franks, V, 41.)

“M. 581 Apr. 5 LUNAR ECLIPSE AND COMET IN FRANCE

There is a second lunar eclipse recorded in Gregory. The passage appears to relate to the year 580 (or rather the fifth year of Childebert II, running from 579 Dec.25 to 580 Dec.24). It says ‘the Moon was darkened and a comet appeared.’ There was no lunar eclipse in 580, and the passage is usually taken to refer to the partial lunar eclipse of 581 April 5.” (Schove p. 102)

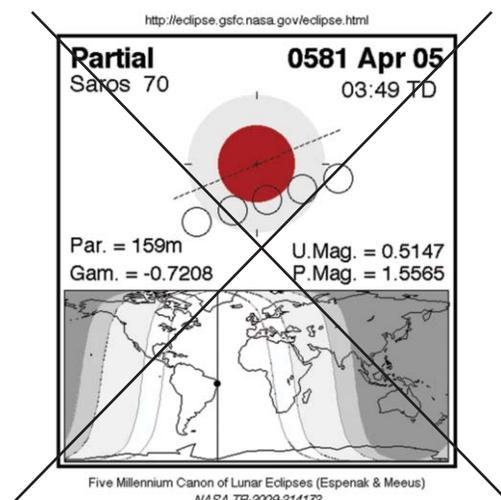
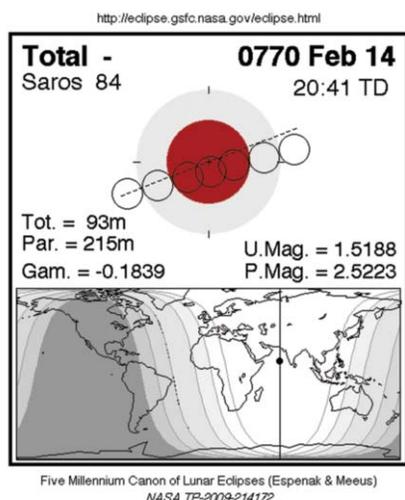
“In the 5th year of the same epoch, the 4th moon, day Ke Wei, there was a comet in Whoo Chay. Its luminous envelope appeared much disordered. It was about 30 cubits in length. In the 5th moon, day Ke Maou, the comet was seen in the north. Its colour was white. On the day Kwei Wei it went to the east, and approached the middle star of Pa Kuh. In the 6th moon, day Kwei Maou, it came near San Kung. On the day Ke Wei it disappeared.

Epoch Ta Leih, 5th year, 770: 5th moon, day Ke Maou, June 15th: days, Kwei Wei, June 19th; Kwei Maou, July 9th; Ke Wei, July 25th.

San Kung, three stars near head of Asterion.”

(Observations of Comets, by John Williams, F.S.A. 1871, p.45)

This lunar eclipse really happened on February 14 in CE 770, not in CE 581 April 5. (JD ~ 2002345.36)



The year of CE 772 (Traditional AD = CE 582)

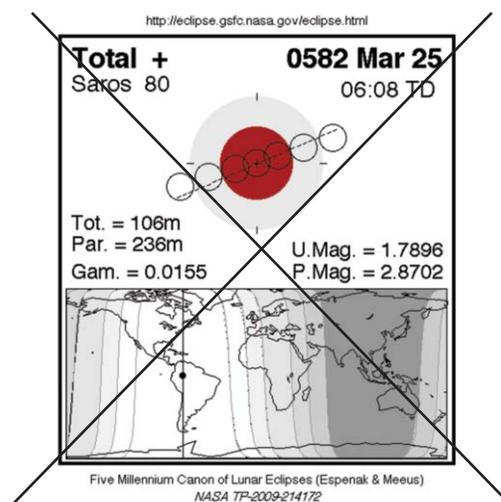
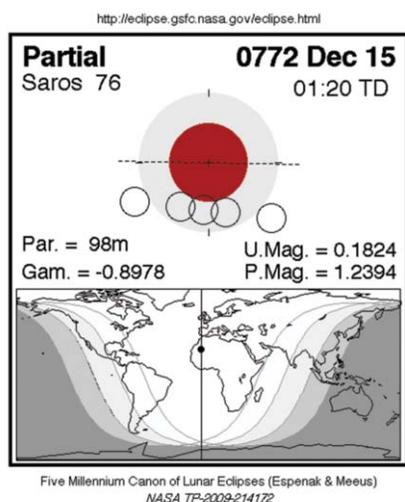
“The portents appeared again this year. The moon was in eclipse.”

(Ginzel 77, Gregory of Tours, The history of Franks, VI, 21.)

“M. 582 mar. 25 or M.582 Sept 17-18 LUNAR ECLIPSE OF GREGORY

A third lunar eclipse appears in Gregory. Among the prodigies for apparently, the seventh year of Childebert II, he says ‘the Moon suffered an eclipse’.” (Schove p.102-103)

This lunar eclipse really happened on December 15 in CE 772, not in CE 582 March 25, or CE 582 September 17-18 (JD ~ 2002345.36)



The year of CE 779 (Traditional AD = CE 590)

“A dispute arose about the date of the Easter, because Victorius, in his cycle, had written that Easter should be celebrated on the fifteenth day after the full moon. To prevent this Christian holding the feast on the same day after the full moon as the Jews, Victorius added: ‘The Church of Rome celebrates on the twenty second day.’ As a result many people in Gaul hold Easter on the fifteenth day, but I myself kept the feast on the twenty-second day. I made careful inquiries and discovered that the Spanish Springs, which flow by divine agency, began to run on the day which I had chosen for Easter. There was a great Earthquake very early in the morning on Wednesday 14 June, just as the day began to dawn. There was an eclipse of the sun in the middle of October. The sun’s rays were so diminished that it gave no more light than the honored moon when five days old.” (Gregory of Tours, The history of Francs, X, 23. Penguin classics, London) (Ginzel 78)

“590 Oct 4 E,F. Reference: Gregory of Tours, who writes in Chapter 10.23: ‘Then the sun suffered an eclipse during the 8th month and its light diminished until the part remaining in light had horns like a 5th moon.’ I believe that ‘8th month’ means October in its original literal meaning and that ‘like a 5th moon’ means like the moon when it is 5 days old. A moon that is 5 days old has about 0.25 of its surface illuminated, so I shall take the magnitude of the eclipse to be 0.75 of the area. This is equivalent to a magnitude of about 0.8 as defined in Section IV.5. I shall use this as the magnitude, with a standard deviation of 0.1. Place: Tours. There is no question about the identification of the eclipse, and the account was written within a short time of the eclipse. Hence I shall use a reliability of 1. The path is assumed northeast of Tours.” (Newton, 1972 MCRE p. 322-323)

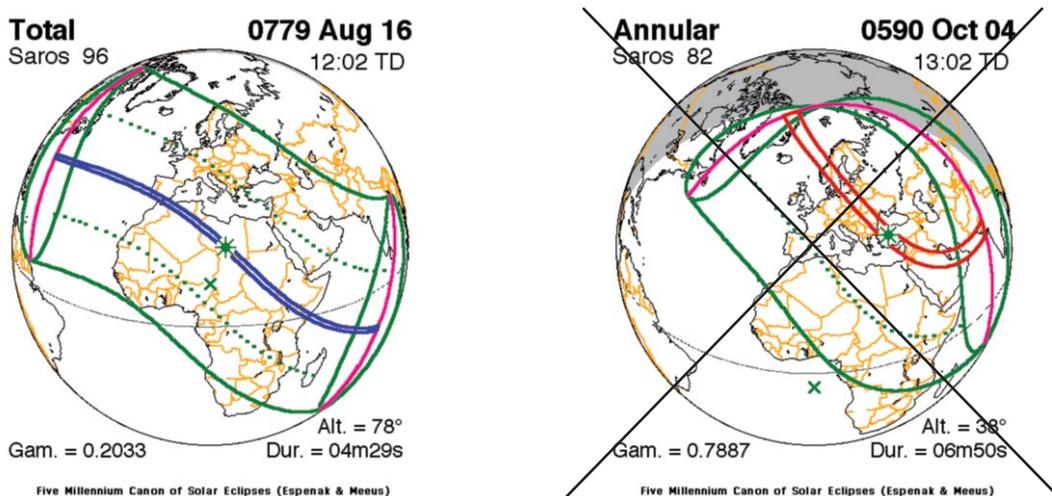
“S.590 Oct.4 PARTIAL SOLAR IN FRANCE

Gregory of Tours has apparently in the fifteenth year of Childebert and the twenty-ninth year of Guntram: ‘The Sun suffered an eclipse in the middle of the eighth month:

and its light diminished, that what it has available was scarcely as much as the horns of a five-day-old Moon have.'

In Gregory 'the eighth month' normally means October. In spite of 'the middle of the eighth month', the eclipse occurred on 590 Oct.4. There is no doubt about the year, because it was one of the occasional years in which the Easter cycle of Victorius of Aquitaine mentions rival dates on the fifteenth and twenty-second days of the Moon, and Gregory alludes to the fact in the same chapter. The eclipse was nothing like total in France. Correct identification goes back at least to Petavius 1627, 852." (Schöve p.103)

This solar eclipse really happened on August 16 in CE 779, not in CE 590 October 4. (JD ~ 2005638.79)



The year of CE 781 (Traditional AD = CE 590)

"In the thirtieth year of the reign of the aforesaid prince [Guntram], our Lord's garment..."

In this year there was an eclipse of the moon; and in the same year war broke out between the Franks and the Bretons on the banks of the river Vilaine." (Ginzel 79/The Fourth Book of the Chronicle of Fredegar and Continuations. IV. 12)

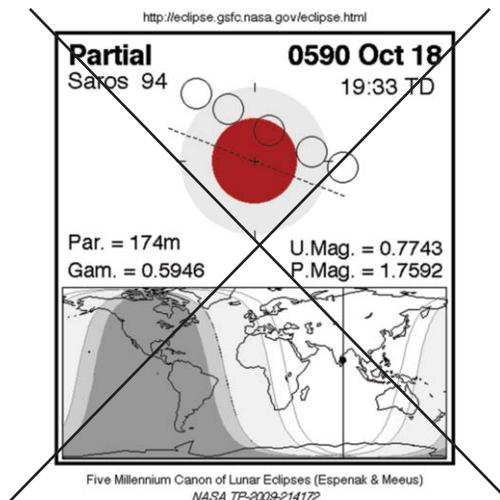
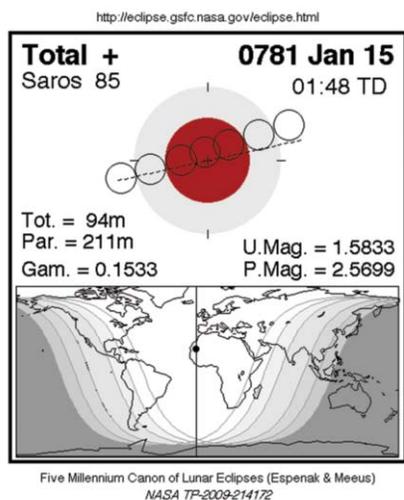
"M. 590 Oct. 18 PARTIAL LUNAR IN FRANCE

Fredegar has, in the 30th year of the reign of Guntram, usually taken to coincide mainly with AD 590, 'In this year the Moon was eclipsed'. There was a partial eclipse of the Moon on 590 Oct. 18.

It may puzzle readers that the solar eclipse which Gregory of Tours puts in the 29th year of Guntram is usually identified as S.590 Oct.4, while the lunar eclipse which Fredegar puts in the 30th year of Guntram is usually identified as M.590 Oct.18. But Fredegar is known to number the years of Guntram's reign differently from Gregory. Common matter is slight, and there is not complete consistency, but, in general, Fredegar's year number in Guntram's reign is one more than Gregory's. Thus, Gregory's 29th year of Guntram and Fredegar's 30th year of Guntram contain common matter, namely a campaign of the Franks against the Bretons (Beppolen killed, Ebrachar disgraced). This year of Guntram's reign coincides largely with what we now call AD 590 (Gregory of

Tours rightly mentions the election of Gregory I as pope), and it is in this year that Gregory puts an unusually roughly dated solar eclipse, and Fredegar an undated lunar eclipse.” (Schove p.104-105)

This lunar eclipse really happened on January 15 in CE 781, not in CE 590 October 18. (JD ~ 2006332.57)

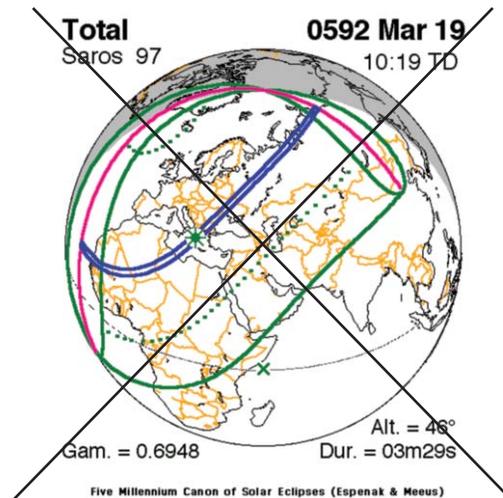
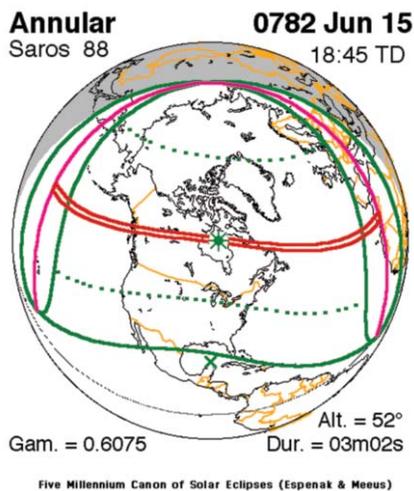


The year of CE 782 (Traditional AD = CE 592)

“592 Mar 19. Reference: Fredegarius Scholasticus: ‘In the 32nd year of the reign of Guntram, the sun was eclipsed from morning to midday, so that hardly a third of it was seen.’ Guntram or Gontram was king of Burgundy from 561 to 593, and 592 was thus the 32nd year of his reign. Further, Oppolzer shows that the eclipse of 592 Mar 19 should have been in the morning in Burgundy. In spite of this agreement we cannot regard the identification as secure. The eclipse of 594 Jul 23 was also in the morning and it should have had about the same magnitude in Burgundy as the eclipse of 592 Mar 19. The chronology definitely excludes the eclipse of 594 Jul 23 if we can accept it as accurate, but mistakes of 2 years in the date of an event are unfortunately rather common. Therefore I shall assume that the probability is 0.5 that the identification of 592 Mar 19 is correct. Since the account is not quite contemporaneous, I shall further lower the reliability to 0.25. Place: 7th century Burgundy, as defined in the preceding section. Magnitude: 2/3 with a standard deviation of 0.1; path south of Burgundy.” (Ginzel 80, Newton 1972, p. 323)

“Fredegar, Book 4, Ch 13 has: ‘In the 32nd year of Guntram’s reign the Sun was eclipsed from dawn to midday to the extent that the third part of it was scarcely visible.’ As we have explained, the 32nd year of Guntram is usually taken to coincide mainly with AD 592.” (Schove p. 106)

This solar eclipse really happened on June 15 in CE 782, not in CE 592 March 19. (JD ~ 2006849.276)



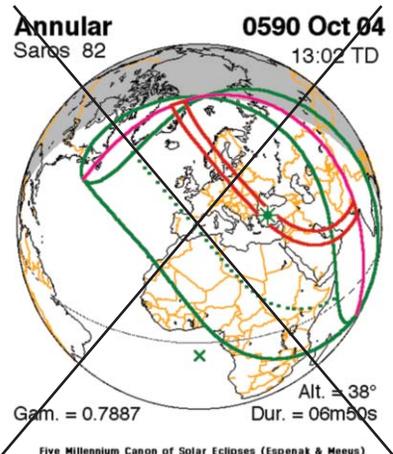
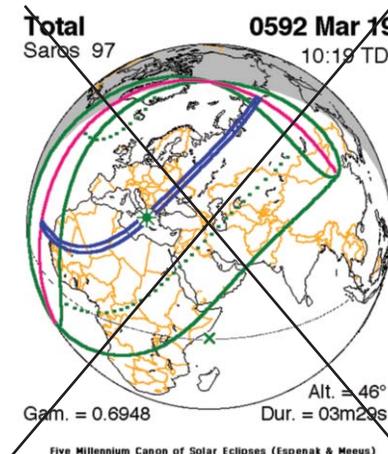
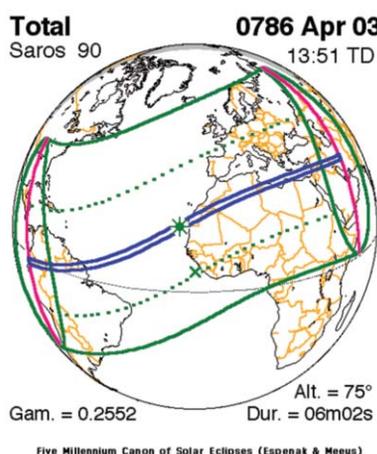
The year of CE 786/SE 903 (Traditional AD = CE 590/592)

“S. 786 Apr 3 TOTAL SOLAR IN MIDDLE EAST BUT NOT RECORD” (Shove, p. 162)

“The 10th century Syriac writer Agapius, 8(3), 1912, 447, says, under Maurice: ‘Next year, which was the 903rd year of Alexander, in the month of Adar (March), in the middle of the day, there was an eclipse of the Sun.’ The 903rd year of Alexander was AD 591-2 (autumn to autumn in Syria), and the passage clearly refers to S.592 March 19. Michael, X, 23, 1963, 373, states ‘there was an eclipse of the Sun, and darkness there, on March 10 from the third to the sixth hour. Everyone said that the Sun obscured itself because of the massacre of the monks, servants of Christ.’ This is evidently a Greek, not a Syrian, record.” (Schove p.105-106)

“590 Oct 4. Reference: Simocatta. ‘Not moved by their entreaties, the emperor Mauricius went out of the palace and proceed one and one-half parasangs to the Hebdomon, as it is called in Byzantium. That day there happened a very great eclipse of the sun. Then there arose a violent roaring south wind, that almost tore the pebbles from the depths of the sea.” (Stephenson, p. 542)

This solar eclipse really happened on April 3 in CE 786, not in CE 592 March 19, or CE 590 October 4. Delta T = zero sec! (JD ~ 2008237.1)



The year of CE 787 (Traditional AD = CE 591/592/594)

“591 Sep 23. References: Ulster and Scotorum. This report is best discussed along with the following one.”

“592 Mar 19. References: Ulster and Scotorum. Ulster has: ‘Defectio solis .i. mane tenebrorum’ for an unspecified day in the year 591. Ulster also has: ‘Matutina tenebrosa’ for an unspecified day in 592.

MacCarthy unquestioningly accepted these records of the two eclipses stated. Both records really say the same thing, namely that there was darkness or a failure of the sun in the morning. This statement does not reasonably apply either eclipse in Ireland.

The fact that both records say essentially the same thing raises the possibility that one and not two eclipses are meant (That is, the same eclipse may have been recorded in two ancient sources, but under different years because of dating error. The compilers of Ulster could then have interpreted the records as reports of different eclipses.). The suspicion is reinforced by the fact that Scotorum has but one entry, which is for the year 590: ‘Defectus solis, tenbrarum.’

An embarrassing number of eclipses occurred near the years 591 and 592. The eclipse of 590 Oct 4 passed through southern Norway and was largest in Ireland at perhaps 11h. The eclipse of 591 Mar 30 passed through northern Africa at about sunset. The eclipse of 591 Sep 23 passed almost through Dakar and was largest in Ireland sometime in the morning. The eclipse of 592 Mar 19 passed through southern Italy and was largest in Ireland at about 11h. The eclipse of 594 Jul 23 was probably total in Ireland shortly after sunrise. Finally, the eclipse of 596 Jan 5 crossed the Alps near sunset.

The only two of these to which ‘early morning’ could properly be applied in Ireland seem to be those of 591 Sep 23 and 594 Jul 23. It is questionable whether the first of these would have been seen in Ireland. I think that the most likely explanation of the entries is that all entries refer to the eclipse of 594 Jul 23. I shall assign zero reliability to this identification. However, I shall calculate the circumstances of the eclipses of 590 Oct 4, 591 Sep 23, 592 Mar 19, and 594 Jul 23 for the center of Ireland, in order to get better estimates of the times and thus to see whether a stronger identification can be made. The results will be presented in Section XVII.2.

Schöve said of the two entries in Ulster: ‘...it seems probable that the first reference is a further continental import, particularly as a word for eclipse was not likely to have been known to the original annalists.’ However, the Irish church was well established by 590, and the annalists, who were apparently church people since they worked with Easter tables, should have been well acquainted with Latin. Hence they would probably know a word for eclipse, whether there was a special term for one in the native language or not. It should be noticed that the early part of the annals, at least in their present form, is in Latin. Schöve concluded that the second entry in Ulster was perhaps a record of the eclipse of 594 Jul 23. He did not consider Scotorum.

The early French source ‘Fredegarius Scholasticus’ does indeed report an eclipse ‘a mane usque ad mediam diem’ (from early morning to midday); he states the explicitly that the eclipse was partial. It does not seem likely to me that ‘Fredegarius Scholasticus’ is the source used by the Irish annalists, but the possibility cannot be definitely denied. My feeling arises from the great disparity in wording; neither Irish record is merely an

abbreviated form of the French. In Section X.3 I conclude, somewhat uncertainly, that the French record refers to the eclipse of 592 Mar 19.” (Newton 1972, p.189-91)

“S. 594 July 23 TOTAL SOLAR IN BRITISH ISLES

The track of totality starts at sunrise in the Atlantic, passes via Ireland and Britain to a noon point in Russia, then on to China where it would have been very striking. The eclipse is recorded in Irish annals.

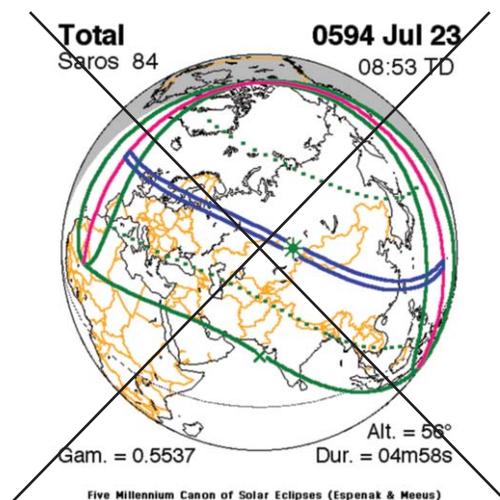
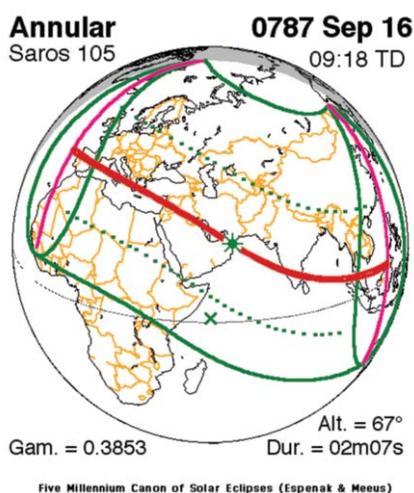
There are certainly one or two solar eclipses mentioned in Irish annals around AD 590-4; all records refer to a morning eclipse, though in the case of *Chronicum Scotorum* the word is supplied by the editor...

We agree with Newton 1972, 593 that at least three possible identifications must be kept in mind.

(The Irish sources *Scotorum* and *Ulster* contain references to an eclipse in the morning sometime around the year 592. We cannot even be sure whether the records refer to one or to two eclipses. I discussed these records under the designation 592 Mar 19 B,I in Section VII.1. The eclipse of 594 Jul 23 was the greatest eclipse in Ireland near 592, and it came about 1h after sunrise there. However, we cannot exclude 590 Oct 4, 591 Sep 23, and 592 Mar 19 without careful calculation, and the eclipse cannot be identified safely. The magnitude of each of the eclipses depends upon accelerations used, and the values about to be given are the greatest found for some combination specified in Equation XVI.9. We find 0.75 for 590 Oct 4, 0.34 for 591 Sep 23, and 0.63 for 592 Mar 19. It is not too likely that the eclipse of 591 Sep 23 was observed in Ireland, but there is reasonable probability that the others were. Thus we must continue to allow at least three possible dates for the eclipse or eclipses recorded in *Scotorum* and *Ulster*.)

But it seems nowadays that the great Irish total eclipse of the decade, namely S.594 July 23, is not merely present in Irish annals, but also occurs in some cases with a correct year-indicator. It would lead us too far to consider how the dating of Irish annals relates to non-astronomical events (e.g., the pontificate of Gregory the Great, the mission of St. Augustine, and the death of St. Columba). We accept the records as relating to 594 and suspect that two records (one in Latin) were available, one perhaps from Bangor, N.E. Ireland, and one from Iona in what is now Scotland.” (Schöve p.106-107)

This solar eclipse really happened on September 16 in CE 787, not in CE 594 July 23. The back calculation of the Solar Saros Series – 105 is not accurate. (JD ~ 2008767.9)



The year of CE 791 (Traditional AD = CE 601/602/603)

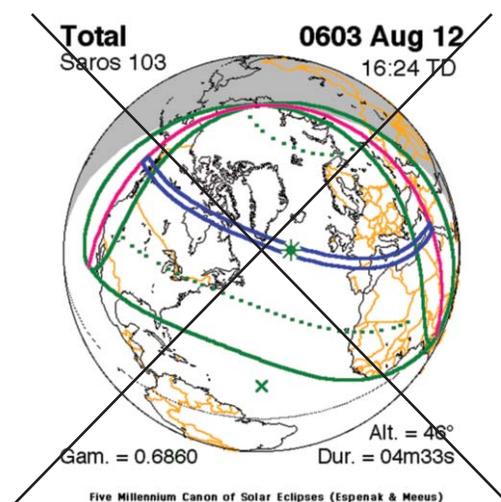
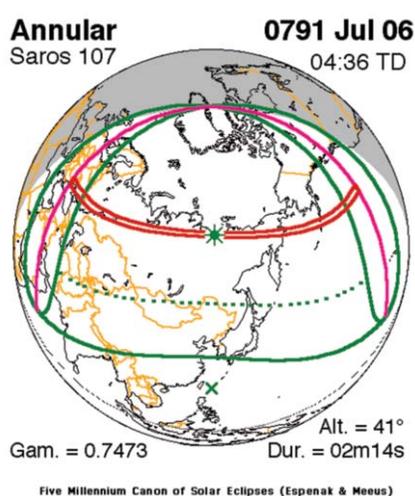
“S. 791 July 6 SUNRISE AT CONSTANTINOPOLE BUT NOT RECORDED” (Shove p.164)
“603 Aug 12. Reference: ‘Fredegarius Scholasticus’. Fredegarius puts this eclipse in the year after Phocas killed Mauricius and assumed the Byzantine throne, which happened in 602. The record says: ‘In that year the sun was eclipsed.’ I have found no earlier record of this eclipse and the eclipse was within less than 40 years of the compilation of the chronicle. Thus there is a good chance that the record is independent and local. Reliability: 0.5. Place: 7th century Burgundy. Standard deviation of the magnitude: 0.1.” (Newton, 1972 MCRE, p. 323)

“S.603 Aug 12 (Monday) IN EASTERN FRANCE, ETC.

Writing of the eighth year of the reign of Theodoric in Orleans and Burgundy, usually taken to be AD 603, the Burgundian annals for 584-603 included by the anonymous author commonly dubbed ‘Fredegar’ say ‘Eo anno sol obscuratus est’. Although month and day are not given, this solar eclipse can hardly be other than that of 603 Aug.12, which was total in North-East Spain and large throughout France. The identification goes back at least to Petavius 1627 (854).

As a warning against false identifications, we mention two out of a number of much later writers who used Fredegar as a source, directly or indirectly.” (Schove p. 112-113)

This solar eclipse really happened on July 6 in CE 791, not in CE 603 Augustus 12. Delta T = zero sec! (JD ~ 2010156.68)



The year of CE 797 (Traditional AD = CE 601)

“S. 601 March 10 NEAR TOTAL IN EGYPT AND SYRIA

An ostrakon now in Turin Museum, but found in the village of Djeme (modern Medinet Habu) near ancient Thebes in Egypt, carries a Coptic inscription first published by L. Stern in 1878 and pointed out to Ginzel by J. Krall. The eclipse it mentions was identified in Ginzel 1883 (655) as S.601 March 10; the identification has been confirmed by E.B. Allen, J. Am. Oriental Soc., 67 (4), 1947, 267-9, and Newton 1979, 388 where further references will be found.

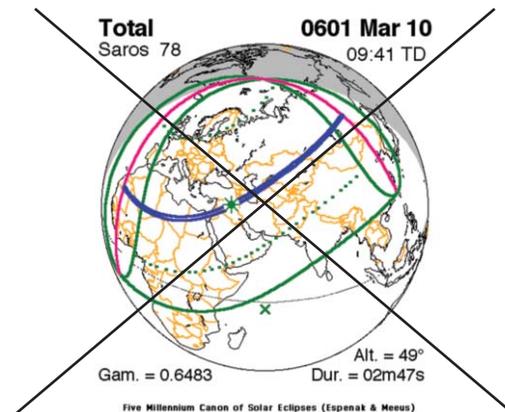
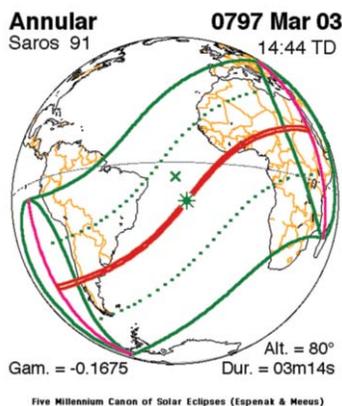
The inscription reads, in Allen’s translation: ‘On the fourteenth of Phamenoth of the fourth indiction, the sun was eclipsed in the fourth hour of the day and in the year in which Peter, son of Palu, was made village official in Djeme”.

As the stone was believed to be of the sixth or seventh century AD., and the Egyptian calendar (with Thoth 1 = Aug. 29) makes Pham.14 = March 10, and the indiction is correct, and moreover Ginzel found S.601 March 10 to reach a maximum magnitude of 0.92 and 9.54 a.m. at Thebes, Ginzel’s identification appears reliable...”

This eclipse is clearly mentioned in the Chronography of Elias, metropolitan of Nisibis, who wrote early in the eleventh century...

‘Year 912. The sun was eclipsed on Friday 10 Adar [March], in the middle of the day; the stars appeared, and there was a violent wind’. The year 912 is Seleucid, or ‘of the Greeks’. “ (Schove p.111-12)

This solar eclipse really happened on March 3 in CE 797, not in CE 601 March 10. (JD ~ 2012224.1)

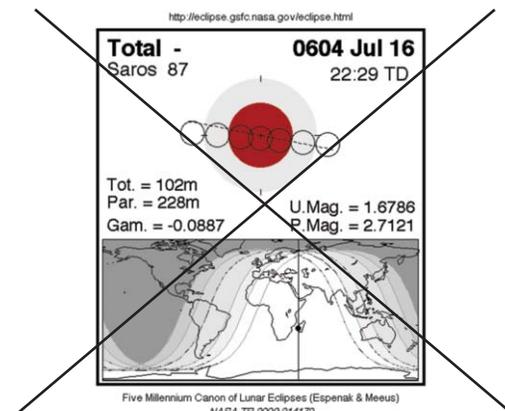
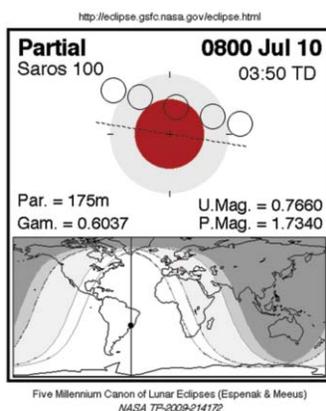


The year of CE 800/SE 915 (Traditional AD = CE 604/605)

“M. 604 July 16-17 IN MESOPOTAMIA

This deep total lunar eclipse around midnight in the Near East is mentioned by Elias: ‘Year 915. The Moon was eclipsed on the night of Thursday 16 Tammuz (July)’ : Elias gives as source the Chronicle of James of Edessa, whose report is identical.” (Schove p. 113)

This lunar eclipse really happened on July 10 in CE 800, not in CE 604 July 16-17. (JD ~ 2013448.65)



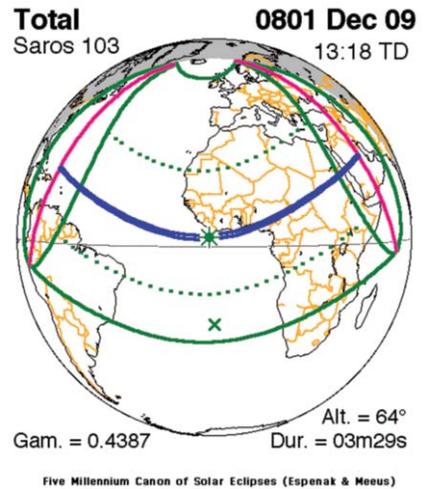
The year of CE 801 (Traditional AD = CE 610/611)

“610-2 *MISDATED SOLAR ECLIPSE* NEAR START OF THE REIGN OF HERACLIUS

The twelfth-century writer, Michael the Syrian, ascribes a solar eclipse to the ‘year in which Heraclius commenced to reign over the Roman.’ As Phocas was executed on 610 Oct 5, this eclipse has been ascribed to the years 610-612. However, as we explain below, the correct date is 617.” (Schove p.114)

This solar eclipse really happened on December 9 in CE 801.

Delta T = zero sec! (JD ~ 2013966)
(Z.H.: La nueva cronologia, p.78)



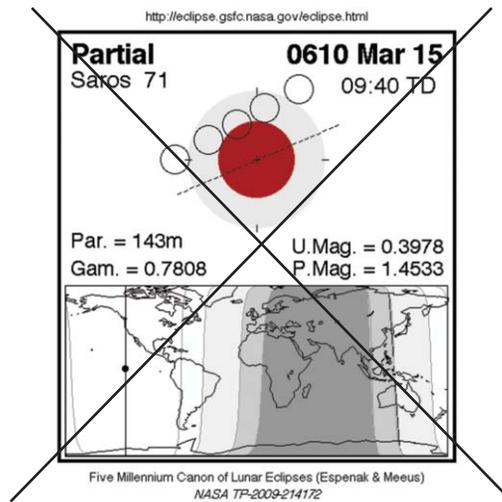
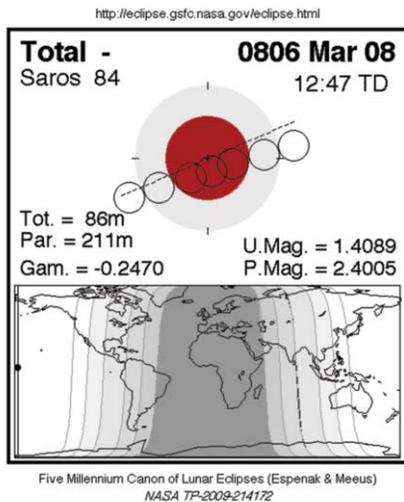
The year of CE 806 (Traditional AD = CE 610)

“M.610 March 15 (Sunday) ISLAMIC *CALCULATION*

This was not, strictly speaking, a Western eclipse, as it was invisible in Europa and the Middle East...

But the list of late seventh-century Islamic horoscopes given in Pingree includes this, as ‘the third conjunction, in which was made clear the mission of the Prophet of God, and which a lunar eclipse occurred’.” (Schove p.114)

This lunar eclipse really happened on March 8 in CE 806, not in CE 610 March 15. (JD ~ 2015516)



The year of CE 807 (Traditional AD = CE 612/617)

“612 Aug 2. Reference: Scotorum. The entry for the year 614 says: ‘A star was seen at the seventh hour of the day.’ The entry says nothing about an eclipse, but it is conceivable that the original had ‘An eclipse of the sun and a star was seen...’, and that the first part of the record was lost in copying. The nearest plausible eclipse to 614 is the eclipse of 612 Aug 2, which would have been large in Ireland around the 7th or 8th hour. However, the pattern of dating errors in this portion of Scotorum suggests that the correct year is 617 rather than 612 or 614. I consider it doubtful that this record refers to an eclipse, and I consider the eclipse to be *unidentifiable* if it does.” (Newton MCRE, p.191-192)

“S. 612 Aug. 2 (Wed.). IRISH ‘*GHOST*’ (FROM S. SPAIN?)

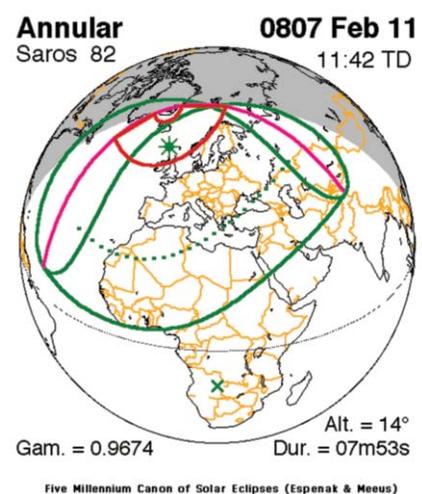
We know of no certain Western record. Schroeter shows totality in Morocco. The magnitude reached about 0.9 at Seville, where Isidore was flourishing, but he does not seem to record it.

There are, however, possible Irish references. Various Irish annals mention a star seen at the seventh (or eighth) hour of the day. E.g. 7th hour in CS (s.a. 617), AC (s.a.617), and AT (under implied 613?); 8th hour in AU (s.a. 613, probably true 614), and similarly in J. O’Donovan’s Introduction to the Annals of the Four Masters (1, 1851, xlvi), where ‘comata’ is editorially supplied to ‘stella’, indicating a comet. No comet is recorded in China.

One may estimate from Schroeter a magnitude of about 0.77 in midafternoon in Central Ireland, for which O’Connor calculates 0.77 about 3.04 p.m. Newton 1972 (191) notes the reasonably fitting hour, but considers doubtful that record refers to an eclipse, and considers the eclipse to be unidentifiable if it does. It should be noted, however, that eclipse identifications S.615 Jan.5, S.615 June 2, S.616 May 21 and S.617 Nov 4 may be eliminated, as all were distinctly morning eclipses in Ireland, if they were visible there (S.616 looks doubtful from Oppolzer).

Because of the extreme vagueness of the record, we have not thought it worth while to give fuller references to the Irish Annals, which might have derived the information from Spain.” (Schove p. 114-5)

This solar eclipse really happened on February 11 in CE 807. (JD ~ 2015856)



The year of CE 812 (Traditional AD = CE 615-9)

“617 Nov 4. Reference: Georgios Hamartolos. ‘There happened moreover a severe famine and great mortality; the sun also was darkened and ashes rained.’ This is during the reign of Heraclius (emperor 610-641). It occurs in the early part of the text that deals with his reign, but it is not safe to infer the date from this. There were eclipses on

616 May 21, 617 Nov 4, and 634 Jun 1 during Heraclius' reign. 617 Nov 4 probably had the largest magnitude in Constantinople, according to the charts in Oppolzer [1887], but it is not legitimate to infer the date from this. I have found no other reference to a famine nor to a rain of ashes near this time. There is no way to date this record and I shall not attempt to use it." (Newton 1972, MCRE p. 543)

"S. 617 Nov. 4, E. MEDITERRANEAN

A solar eclipse in the earlier part of the reign of Heraclius is mentioned by the ninth-century writer George the Monk ('Hamartolos'): 'There was hard famine and great mortality, and the Sun was darkened, and it rained ashes.' The entry occurs in a historical context differently dated by various authorities, but not, as far as we can see, outside the range AD 615-9. We do not know George's authority for the eclipsed record, which is not mentioned by Theophanes. The same source evidently used Michael the Syrian, who misdated it as follows: 'In the year in which Heraclius commenced to reign over Romans (i.e. 610/611) there was an eclipse of the Sun during four hours.' Both writers mention famine and this must relate to the large solar eclipse of 617 (See Proudfoot 1975, 390). Meeus (personal communication 1982 Aug 23) calculates that 92% of the sun's diameter was eclipsed at Constantinople, sufficient to explain the phrase 'the sun was darkened.'

The annular eclipse of 617 Nov 4 was very large at Constantinople.

The track of annularity in Schroeter runs from North-West to South-East from Amsterdam via Vienna, Bucharest, just north of Constantinople, and North-East Asia Minor, to around Babylon. This makes the maximum magnitude at Constantinople about 0.98 around 9.15 a.m.

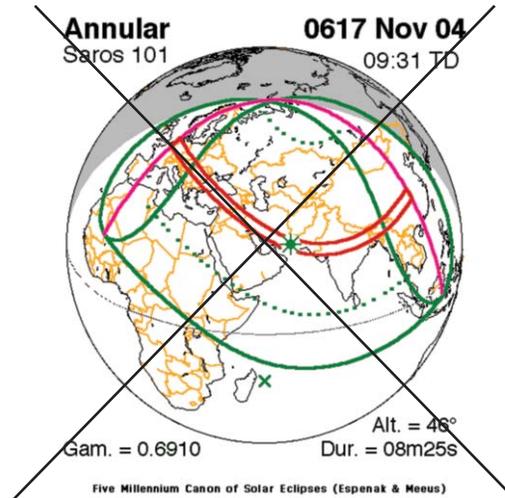
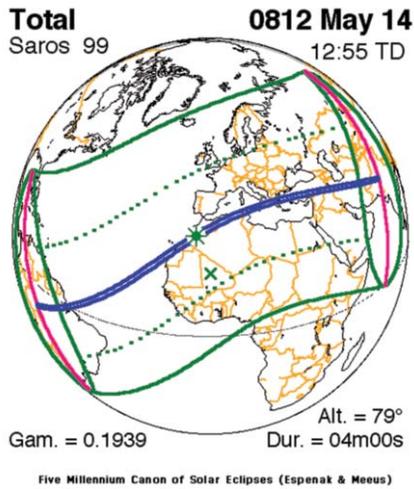
Newton 1972 (530, 543) says '617 Nov.4?. Valid observation; cannot date', and mentions also S.616 May 21 and S.634 June 1 as other Byzantine eclipses during the reign of Heraclius.

Perhaps, as Newton suggests, the rain of ashes may have been due to a volcanic eruption. This may have darkened the Sun; consequently the record cannot be treated as referring indubitably to a solar eclipse.

This eclipse is clearly mentioned by, ostensibly, Stephanus of Alexandria, who worked at Constantinople under the emperor Heraclius. The year of composition, indicated in several places in the work itself, is equivalent to the Byzantine year AD 618-9 (indication 7). The examples all relate to AD 617 and 618, and include syzygy calculations associated with S.617 Nov.4 and M.618 Oct.9. We owe the reference to Neugebauer 1975 (2, 1045-51), where much detail may be found.

Information about S.617 Nov.4 occurs in Usener (pp.293-4, 329). 'November fourth' is spelled out, the Egyptian month Athyr is correctly given, and also is indication 6 (AD 617-8). Any reader who wishes to distinguish text, fragmentary extracts and scholia from one another is referred to Usener and Neugebauer. The identification S.617 Nov.4 is secure, but according to Neugebauer (2, 1049) the solar and lunar eclipse computations (as distinct from mere syzygy computations) are unpublished." (Schöve p. 115-6)

This solar eclipse really happened on May 14 in CE 812, not in CE 617 November 4. Delta T = zero sec! (JD ~ 2017775.033)

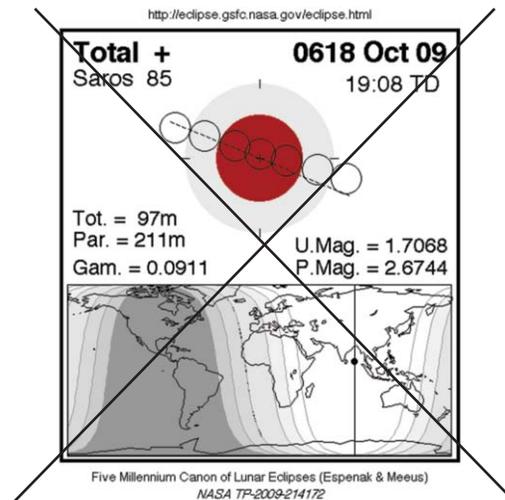
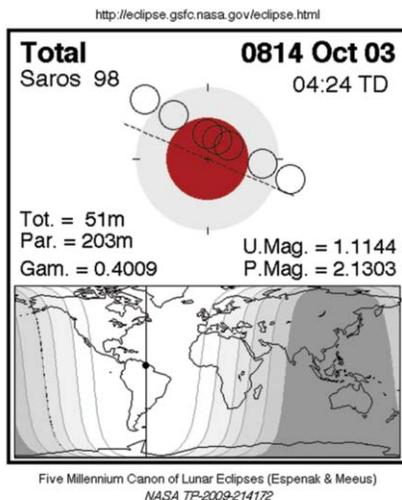


The year of CE 814 (Traditional AD = CE 618)

“M. 618 Oct. 9 E. MEDITERRANEAN LUNAR ECLIPSE

Almost as certain is the mention by Stephanus of this lunar eclipse, see Usener (pp. 328-9). Totality appears to be mentioned in the text, October (and Phaophi) and seventh indiction (AD 618-9) in a scholium. Thus at the very least there is written tradition of a total lunar eclipse on 618 Oct.9. This is not surprising, since the eclipse was a deep total one (Oppolzer magnitude 1.72), with mid-eclipse about 18h UT, or say 8 p.m. in the Eastern Mediterranean, an evening time very favourable for observation.” (Schove p. 116)

This lunar eclipse really happened on October 3 in CE 814, not in CE 618 October 9. (JD ~ 2018646.68)



**The year of CE 816 /Yazdijerd (YZ) 184-185 /AH 1
(Traditional AD = CE 622)**

Beginning of Islamic calendar; marked by Hegira of Mohammed.

The year of CE 818 (Traditional AD = CE 624)

“624 Jun 21. Reference: Cambriae. The notice: ‘The sun was obscured’ (or ‘darkened’) occurs under the year 180, which is presumably 624. I saw no event within 20 years of this that could be dated independently, so there is no way to check the accuracy of the chronology.

It is unlikely that the magnitude of the eclipse of 624 Jun 21 exceeded about 0.5 or 0.6 in Wales. The large eclipses nearest in time are those of 619 Mar 21 and 634 Jun 1. The penumbral eclipse of 625 Jun 10 cannot be ruled out, at least not without detailed computation. This eclipse seems to be *unidentifiable*.” (Newton 1972, MCRE p. 209-210)

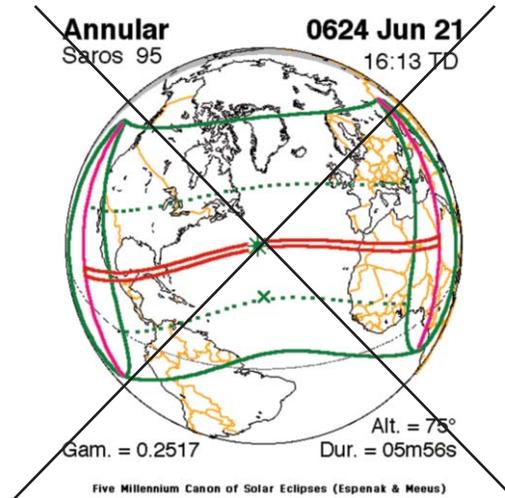
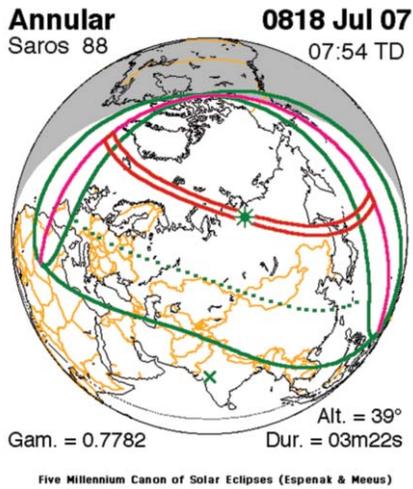
“S.624 June 21. ANOTHER IRISH ‘*GHOST*’

The annular eclipse of 624 June 21 and the penumbral eclipse of 625 June 10 have both been invoked to explain Irish and ‘Welsh’ references to an eclipse in 624 or 625. O’Connor gives magnitudes in mid-Ireland only 47% and 25% respectively, and we do not consider that either eclipse was noticed there. The 624 eclipse may have been considerable (perhaps more than 80%) in Seville, and consequently noticeable there, but it is not mentioned even in Isidore.

The reference in the original ‘Chronicle of Ireland’, assembled perhaps at a Bangor or Iona in the later seventh century, was presumably what we now find in the Annals of Ulster, namely ‘annus teneborus’ (very dark year), under AU year 624 presumed as usual to have referred to AD 625 (which must be the case if the statement at the beginning of the annal, that the first day of January was a Tuesday, is true).

In the AI, (pp.86-7) an eclipse is specified, but this seems to be the rationalization of a later copyist. ‘The Annals of the Britons’ omit the darkness and state badly that in 624 ‘the sun eclipsed’. This is the so called eclipse of Edwin, but the eclipses of 624 and 625 were not likely to have been noticed anywhere in Ireland or Britain; we therefore consider that the darkness of the year does not refer to an eclipse, unless (as we suspect for 612) the information came originally from Spain. The darkening of the sun in the 620’s is mentioned under c.626-8, and possibly there were volcanic eruptions in this decade which weakened the effective solar heat and light.” (Schove p. 119)

This solar eclipse really happened on July 7 in CE 818, not in CE 624 June 21. (JD ~ 2020019.824)

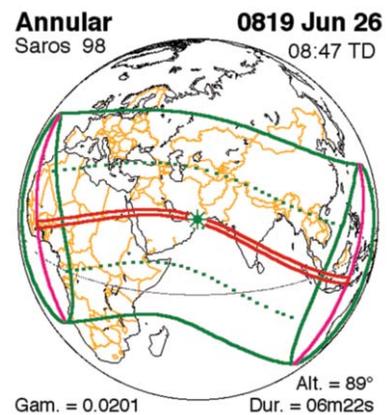


**The year of CE 819/YZ 187-188
(Traditional AD = CE 626-9)**

“626-9 ‘GHOST’ ECLIPSES (VOLCANIC DUST ?)

There are various Syrian records of an ‘eclipse’ of the Sun for nine months, from October to June, in the 17th year of Heraclius, which ought to mean some period within AD 626-8. The earliest full record we have encountered is in Agapius (1912, 452).” (Schove p. 120)

This solar eclipse really happened on June 26 in CE 819. (JD ~ 2020373.861)

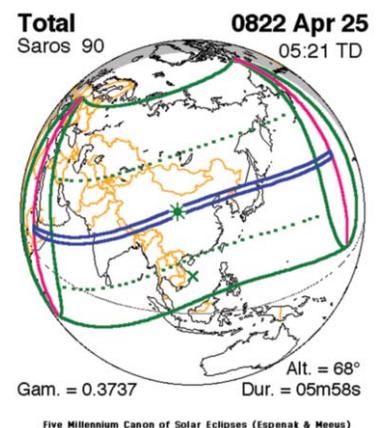


The year of CE 822/AH 6-7 (Traditional AD = CE 628/631)

“Agapius also has (1912, 461) a solar eclipse, with stars appearing, in the seventh year of Mohammed (presumably AH 7, which ran from AD 628 May 11 to 629 April 30). However, there was no considerable solar eclipse visible in Arabia or Syria around this time (only several astrologically calculable ones).

We also mention here an Islamic eclipse reference which we owe in the first instance to Richard Bell, in his Sahih, or collection of Traditions, says: ‘The Sun was eclipsed on the day that Ibrahim died, and the people said: ‘It is eclipsed for the death of Ibrahim’. But the messenger of Allah said: The Sun and the Moon are two of the sign of Allah: they are not eclipsed for the life or death of anyone. When you see it, call upon God and pray until it clears’.

‘The messenger of Allah’ is one of the titles of Mohammed. Ibrahim was Mohammed’s infant son by Mary



the Copt, and is supposed by some to have died in June or July of AD 631.” (Schove p. 121-2)

This solar eclipse really happened on April 25 in CE 822.

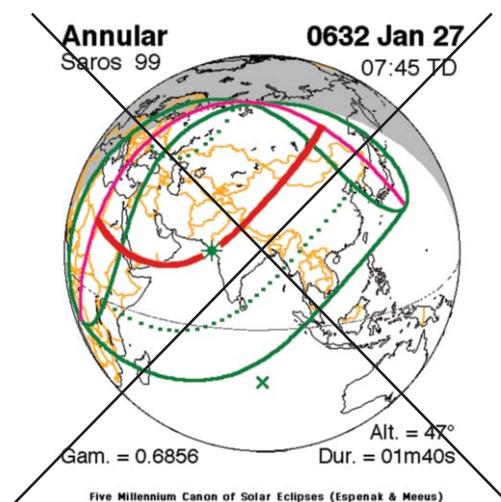
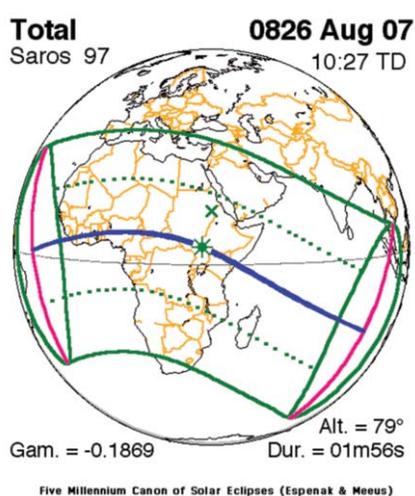
Delta T = zero sec! (JD ~ 2021407.72)

The year of CE 826 (Traditional AD = CE 632)

Death of Muhammad; succession of Abu Bakr (-634)

“Agapius (1912, 468) says, in a partly illegible passage, ‘the Sun was obscured’ apparently about the time when Mohammed died (632 June 8) and Abu Bakr succeeded. This seems refer to S. 632 Jan. 27 rather than S. 634 June 1. The seventh century Islamic horoscopes printed in Pingree 1968 (118) also include one dated 632 January 26 and headed ‘The solar eclipse indicating the death of the Prophet and accession of Abu Bakr.’ (Schove, p.121)

This solar eclipse really happened on Augustus 7 in CE 826, not in CE 632 January 27. (JD ~ 2022973)

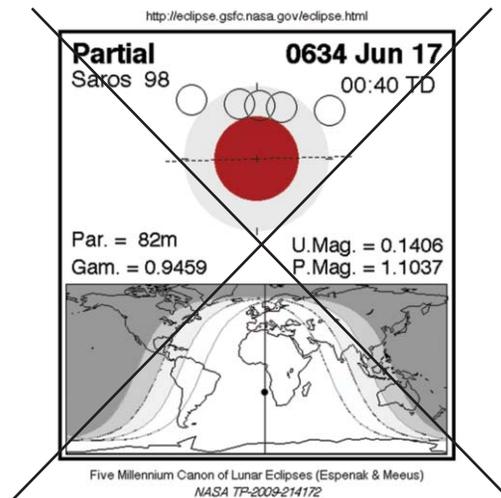
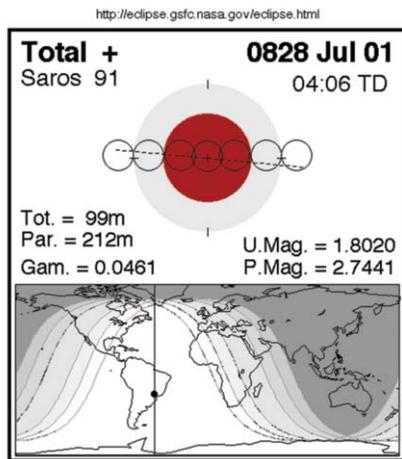


The year of CE 828 (Traditional AD = CE 634)

“M. 634 June 16-17 in Arabia. LATER CALCULATION

One of the seventh century Islamic horoscopes printed in Pingree 1968 (119) is dated 634 June 16 and is headed ‘The lunar eclipse indicating the death of Abu Bakr and accession of ‘Umar’. The eclipse was small; Oppolzer gives maximum magnitude 0.15 only, at 11.30 p.m. Greenwich (hence about 2 a.m. in the Near East). Abu Bakr is usually taken to have died in 634, about August, but this eclipse was evidently calculated at a larger date.” (Schove p.122)

This lunar eclipse really happened on July 1 in CE 828, not in CE 634 June 16-17. (JD ~ 2023666.67)



The year of CE 829/YZ 197-198/AH 13-14

“Il y eut, dit Habash, une eclipse de luna l’an 198 d’Izdjerd. (Cette année commence an 28 avril 829, ère vulgaire, et finit au 27 avril 830)”

(Caussin 1804, p.84)

This lunar eclipse really happened on June 20 in CE 829. [Saros 101]
(JD ~ 2024021.33)

“S. 829 Nov. 30 PARTIAL SOLAR IN BAGDAD

This eclipse is the first of some thirty Islamic eclipses between AD 829 and AD 1004 which were observed by astronomers (as distinct from mentioned by historians) and constitute an important part of our medieval eclipse information. There are 29 Arabian eclipses, observed in Bagdad or Cairo, to be found mentioned in Newcomb 1878 or Newton 1970 or (in 24 cases) both, taken from Caussin 1804 (a French translation, *Le Livre de la grande Table Hakemite*, of a work by Ibn Yunus, who died about 1008-9). Caussin 1799 had previously abstracted information about 28 of these eclipses. The records are excellent in general, but weak in a few instances. Newton 1970 (but not Newcomb 1878) also used information about four eclipses between AD 883 and AD 901 reported by Al- Battani (Albategnius) from Syria (in two cases, Antioch as well as ar-Raqqa), which have been known to European astronomers for many centuries. We shall normally mention only a few salient points about each eclipse, referring the reader to Caussin, Newcomb and Newton for full numerical details.

In the case of S.829 Nov.30, the central line of annularity in Oppolz. starts at sunrise in Egypt, and proceeds via approximately Aden to a noon point in the Indian Ocean. At Bagdad the eclipse was only partial; the astronomical report mentions the beginning (though Newcomb doubts whether it was observed) and the end, the latter at about three seasonal hours after sunrise (half-time between sunrise and local apparent noon).”
(Schove p.184)

“AD 829 Nov 30 [Saros 94]

Ahmad b. 'Abd Allah known as Habash said: 'There was a lunar eclipse... in the year 198 of Yazdijerd... As of the solar eclipse, which (occurred) in this year at the end of the month of Ramadan, all calculations were in error. The altitude of the Sun at the beginning of the eclipse was 7deg as they (the astronomers) claim. The eclipse ended when the altitude of the Sun was about 24 deg, as though it was 3 hours of day (after sunrise)'

Here we have a combination of a Persian year and a Muslim month. The year 198 of Yazdijerd (= 214/215 AH) covered the period from AD 829 Apr 28 to 830 Apr 27. A date at the very end of Ramadan in that year closely corresponds (within a day or so) to AD 829 Nov 30 – the calculated day of a solar eclipse visible in Baghdad. No observational details are recorded for the lunar eclipse; for the present purpose, the allusion to this event merely serves to establish the year. The remark that the astronomers claimed that the altitude of the Sun at first contact was 7 deg suggests that the measurement was regarded as only approximate.” (Stephenson; HISTORICAL ECLIPSES AND EARTH’S ROTATION, p. 470)

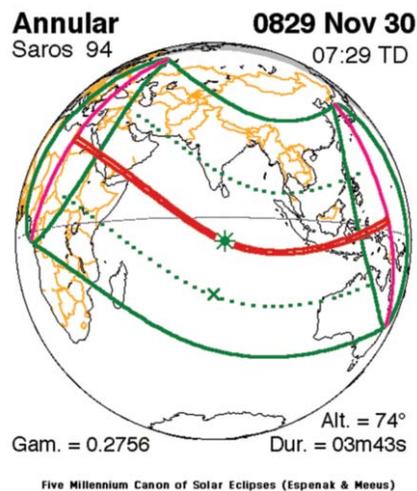
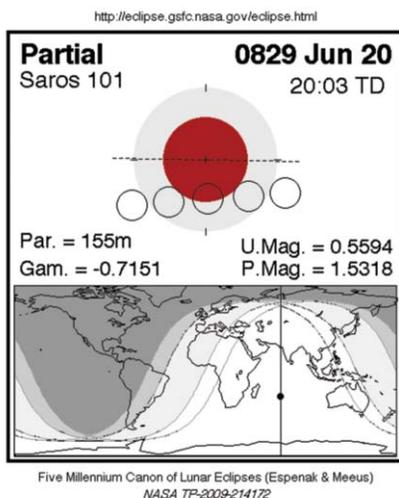
It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 94 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series - 94 is not accurate!

This solar eclipse really happened on November 30 in CE 829.

Delta T ~ Zero sec! (JD ~ 2024183.8)

(Z.H.: La nueva cronologia, p.79)



The year of CE 837/AH 22-23 (Traditional AD = CE 643/644)

“Agapius places the eclipse in the eleventh year of Omar (Umar) usually considered to have reigned from 634 August until his assassination on 644 Nov. 3, two days before the eclipse. He reigned from AH 13 until nearly the end of AH 23.” (Schove p. 124)

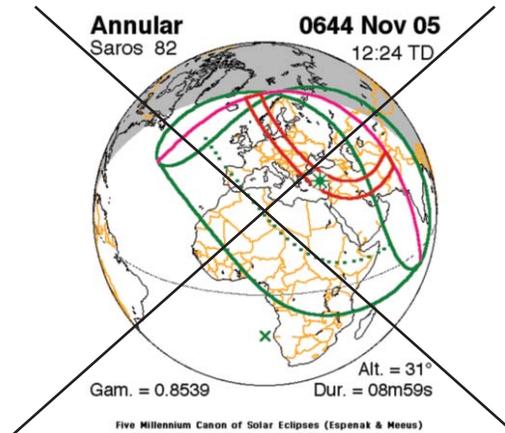
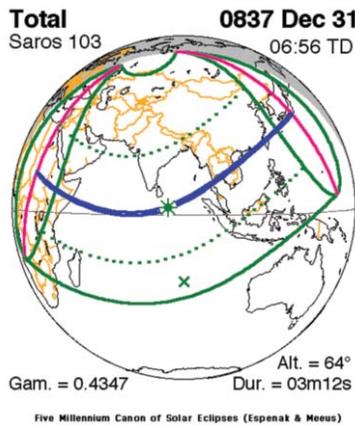
“644 Nov 5 Reference: Theophanes. ‘And an eclipse of the sun occurred, month Dios fifth, day sixth, hour ninth.’ This is listed under the 3rd year of Constans II, emperor 642-668. Dios is the Greek name for the month equivalent to the Roman November. Hence the date given is 644 Nov 5, which was the 6th feria. The 9th hour of the day looks

reasonable for maximum eclipse at Constantinople. Reliability: 0.5. Place: Constantinople. Standard deviation of the magnitude: 0.1.

Cedrenus has the following: ‘Third year (of Constans) was an eclipse of the sun.’ There is not enough information to let us decide whether this is an independent record or not, so I shall ignore it.” (Newton 1972, MCRE p. 453)

This solar eclipse really happened on December 31 in CE 837, not in CE 644 November 5. Delta T = zero sec! (JD ~ 2027136.8)

(Z.H.: La nueva cronologia, p. 80)

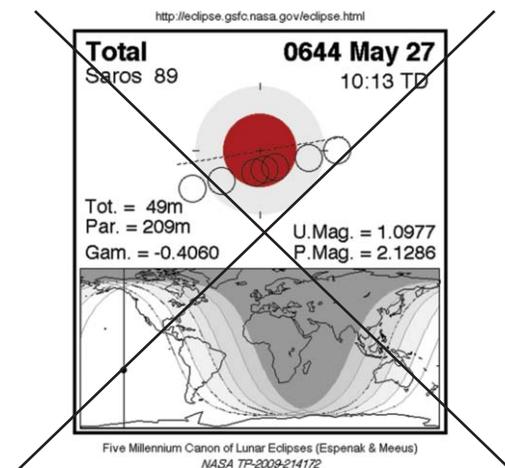
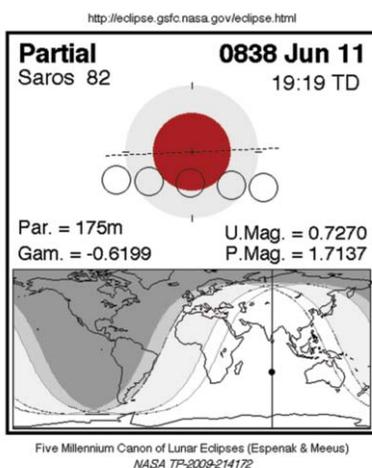


The year of CE 838 (Traditional AD = CE 644)

“M. 644 May 27. LATER CALCULATION

One of the seventh-century Islamic horoscopes printed in Pingree 1968 (119) is dated 644 May 27 and headed ‘The lunar eclipse indicating the death of Umar and the accession of Uthman.’ Oppolzer gives a total eclipse, magnitude 1.08, at 9.07 UT (thus about noon in the Near East). Consequently the eclipse was not visible in the Near East, the eclipse being, for that region, a purely calculated one. According to Camb.Med.Hist. 2, 1926, 354, Umar was killed on 644 Nov.3. Our next eclipse notice relates to S.644 Nov.5, just two days after the reputed date of Umar’s death.” (Schove p. 123)

This lunar eclipse really happened on June 11 in CE 838, not in CE 644 May 27. (JD ~ 2027299.3)



The year of CE 840 (Traditional AD = CE 646/650)

“S.646 April 21. IN THE MIDDLE EAST

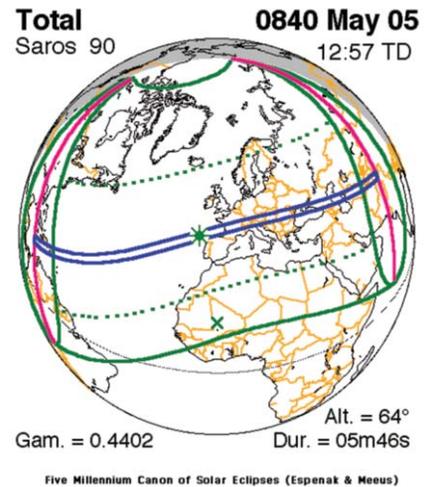
We have encountered no certain Western record (a Chinese mention exists). But the Syrian writer Severus Sebokht, of Ken-neshre near Edessa, is known to have lived until at least AD 665 and to have written a short work on eclipses. We do not know the date of this work, but wonder whether the author’s interest in eclipses may have been aroused by the pair of solar eclipses on 644 Nov.5 and 646 April 21, both large in Syria.” (Schove, p.124)

“S. 650 Feb. 6 **FALSELY ATTRIBUTED TO BEDE**

Bede mentions S. 664 May 1 (though wrongly as May 3) unmistakably in his Hist. Eccl. of 731 and reasonably clearly in both his small De Temporibus of 703 and his larger De Temporum Ratione of 725. ... Between them they attribute to Bede ‘tomo secundo’ two solar eclipses, S.650 Feb. 6 and S. 661 July 2, which did occur but appear not to be genuinely mentioned by Bede. As both false identifications were copied in Tycho-Curtius 1666...” (Schove p. 125)

This solar eclipse really happened on May 5 in CE 840

Delta T = zero sec! (JD ~ 2027993.035)



The year of CE 849

“S.849 May 25 LARGE SOLAR ECLIPSE IN SCOTLAND **NOT** RECORDED” (Schove, p. 191)

“S.655 April 12. **PROBABLY RECORDED IN SPAIN**

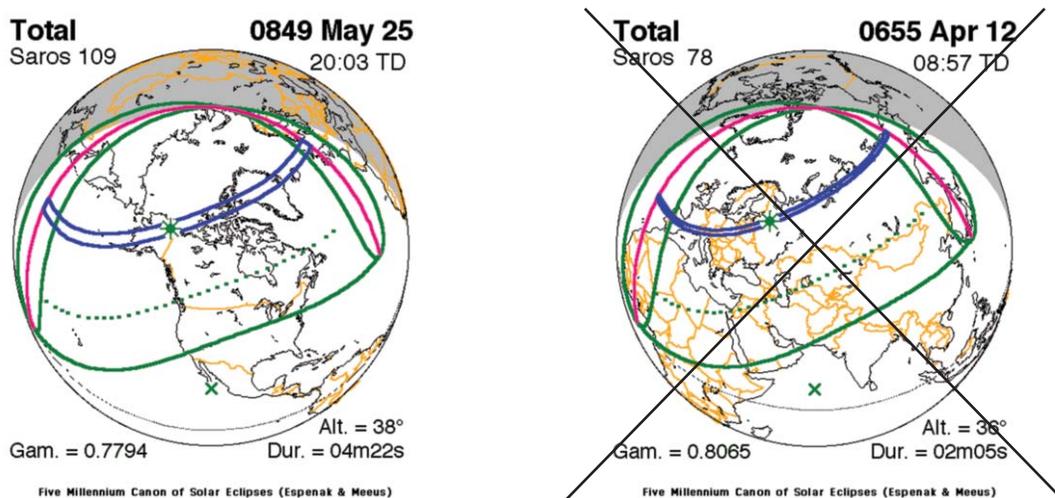
Among continuations of Isidore’s History of the Goths, Vandals and Sueves is a Continuatio of about AD 754, edited by Mommsen. On page 343 are two eclipse references. The first (34) is in the reign of the Byzantine emperor Constans II (641-688): ‘huius imperio sole medio die obscurato celum stellas prodit.’ (Schove, p. 125)

“655 Apr 12. Reference: Isidorus. It should be pointed out again that the solar eclipses are actually in a continuation of the history and not in the part written by Isidorus himself. At one point the continuation says: ‘In this reign, the sun being obscured in the middle of the day, stars came out in the sky.’ The reign is that of the Byzantine emperor Constans II, emperor 641-668. There are only three possibilities for a reasonably large eclipse during this time, unless the errors in Oppolzer [1887] are larger than we expect. The eclipses of 644 Nov 5 and 646 Apr 21 are possible, but only if the observation was made in the eastern empire. There are two Byzantine records of the eclipse of 644 Nov 5; neither makes it a large eclipse, but that might be a simple failure to record the indications of one. I have found no Byzantine record of the eclipse of 646 Apr 21. The eclipse of 655 Apr 12 is the only other possible eclipse during the reign of Constans II, and it is the only possibility for an observation in Spain.

A few lines farther on we find the following: ‘In his times an eclipse of the sun, such that stars appeared in the middle of the day, terrified all Spain and foreshadowed a Gascon invasion with a not-small army.’ ‘His’ could still refer to Constans II, but I do not believe that one can safely infer this from the text alone. However, the text definitely puts this eclipse a few years after 647 (685 of the Spanish Era), and the only reasonable possibility is the eclipse of 655 Apr 12.

The words used in the two references to an eclipse are quite different but the basic facts are the same. Thus it seems likely that the writer has copied two records of the same eclipse without realizing that fact, although we cannot conclude with surety that the first record refers to 655 Apr 12. I shall assume that we have a record of 655 Apr 12. Because of the likelihood that the record is copied, I shall lower the reliability to 0.5. The writer says ‘all Spain’ and it is safer to use all Spain as the place than to use Seville. Standard deviation of the magnitude: 0.01.” (Newton, p. 510-11)

This solar eclipse really happened on May 25 in CE 849, not in CE 655 April 12. (JD ~ 2031300.33)



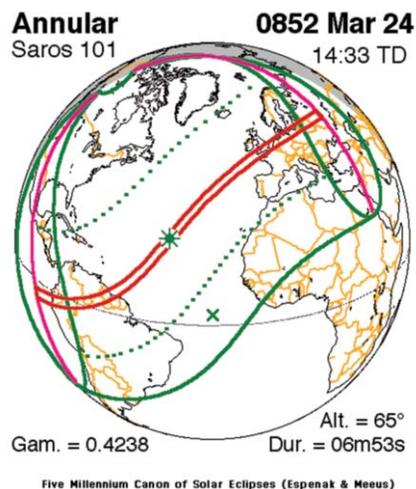
The year of CE 852 (Traditional AD = CE 661)

“S. 852 Mar. 24 LARGE SOLAR ECLIPSE IN N. EUROPE **NOT** RECORDED” (Schove, p. 191)

“S. 661 July 2: **NO GENUINE** WESTERN RECORD

This is the second (S. 650 Feb. 6 being the first) almost certainly false identification from Bede ‘tomo secundo’ in Calvinus.” (Schove, p. 127)

This solar eclipse really happened on March 24 in CE 852 (JD ~ 2032334.102)



**The year of CE 854, AH 39/40, YZ 222/223, Seljuk AH 239/240
(Traditional AD = CE 660)**

“M. 854 Feb. 16-17 LARGE PARTIAL IN BAGDAD

This large partial lunar eclipse, given by Ibn Yunus (tr. Caussin) as observed in the late evening of 854 Feb.16 at Bagdad, is omitted, apparently because considered weak, but Newcomb 1878, 45, but is discussed in Newton 1970; the details seem sufficiently clear to guarantee at least the identification.” (Schove p.191)

(When Ibn Yunus is mentioning the AH 239 he shows his true character confirming the fact that he is really not an astronomer and writer of the 11th century since he is using the Seljuk Hijra which is the result of the 1079 Jalali calendar reform.)

“854 Feb 16. This report contains the only Islamic measurement of magnitude that is not given in terms of the digit. The record says that the ‘uneclipsed part of the disc exceeded one-tenth.” (Newton, AAO p. 148)

“AD 854 Feb 16/17 [Saros 95]

This lunar eclipse was mentioned by al-Mahani. ‘There was an eclipse of the Moon in the month of Ramadan in the year 239 of al-Hijrah on the night of Saturday, the middle of the month. It was found by observation that the beginning of this eclipse was at 10 hours and something like half of one-tenth of an hour after midday of Friday. We did not determine its times apart from the beginning. It was found that the uneclipsed part of its body was more than 1/10... (calculated details)...’.

The fact that only the time of first contact is reported is surprising; as an evening eclipse, the entire course of events should have been visible unless unfavourable weather intervened. Although the text does not specify whether equal or unequal hours were used, since part of the measured interval of 10;03 hours after midday was in daylight and part in darkness, only equal hours would be meaningful.

RESULT... Delta T ~ 3150 sec.” (Stephenson, p. 477-8)

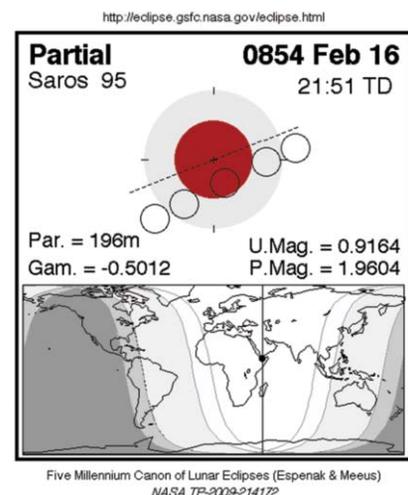
So, the back calculation of the Lunar Saros Series - 95 is not accurate!

This lunar eclipse really happened on February 16 in CE 854.

Delta T ~ Zero sec! (JD ~ 2033028.41)

“AD 854 Aug 11/12 [Saros 100]

This lunar eclipse was mentioned by al-Mahani. ‘The Moon was eclipsed on the night of Sunday 13th of the month of Rabi’ al Awwal in the year 240 of al-Hijrah. It was found by observation that the time of beginning of the eclipse was when the altitude of (the star) al-dabaran was 45;30 deg in the east. We did not find its times (accurately) except this time, which was exact and precise. We measured the time of the completion of (the first phase of) the eclipse, which is the time of the beginning of staying (al-makth) (in totality) and found it (to be) when the altitude of al-shamiyyah was between 22 and 23 deg in the east. This (latter) measurement is not exact but approximate. We determined the time of



the beginning from the altitude of *al-dabaran* by the astrolabe and found it to be 44 deg (of celestial sphere) after midnight... (calculated details) ... We (also) determined the time (of the beginning of) the stay by the astrolabe, taking the altitude of *al-shamiyyah* as 23 deg and found it to be 23.5 parts (i.e. degrees) of the celestial sphere after the beginning (of the eclipse). RESULT... Delta T ~ 2500 sec.” (Stephenson, p. 478-9)

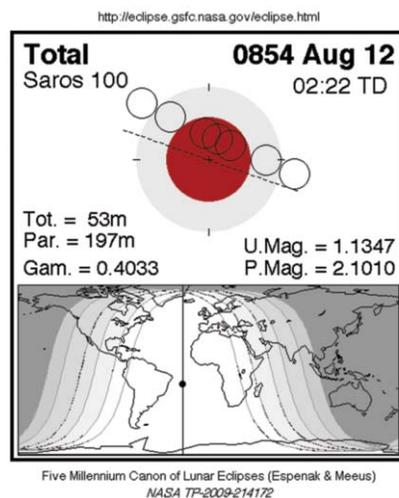
“M. 660 Dec. 22. **LATER CALCULATION ONLY**

The Islamic horoscopes in Pingree 1968 (120) include one (IV 13) headed ‘The lunar eclipse indicating the death of Ali and accession of Muawiya.’ (Schove, p. 127)

So, the back calculation of the Lunar Saros Series - 100 is not accurate!

This lunar eclipse really happened on Augustus 11-12 in CE 854

Delta T ~ Zero sec! (JD ~ 2033204.6)



**The year of CE 856, AH 41/42, YZ 224/225, Seljuk AH 241/242
(Traditional AD = CE 664/666)**

“S.856 Jan. 11 MEDIUM SOLAR ECLIPSE IN SPAIN NOT RECORDED (Schove, p. 191)

“S.655 April 12. PROBABLY RECORDED IN SPAIN

Among continuations of Isidore’s History of the Goths, Vandals and Sueves is a Continuatio of about AD 754, edited by Mommsen. On page 343 are two eclipse references.

...

The second (36) is in the reign of Reccaswinth, Visigothic king of Spain (sole ruler c. 653-672), and is mentioned immediately after a Council of Toledo usually assigned, as by Mommsen, to 653: ‘Huius temporibus eclipsim solis stellis meridie visentibus omnis Spania territat atque incursionem Vasconum non cum modico exercitus damno prospectat’.

Ginzel 1886 (972-4) had already discussed a passage from Roderic of Toledo (died 1248) which is clearly related to the second (36) passage above. Probably correctly, he had ruled out, as insufficiently striking in Spain, the eclipses S.659 Jan.28 and S. 671 Dec.7 (qq.v).

He considered more seriously the two eclipses **S.655 April 12** and **S.666 Sept.4** (called Nov.4 by oversight). Both were total over much of Spain and large over all Spain, the former more than 4 hours before noon and the latter about 3 hours after noon, so that the reference to ‘the middle of the day’ is apparently to be understood broadly. Ginzel preferred S.666, for reasons which seem weak even in relation to the limited passage from Roderic which he quoted. In relation to the passages from the Continuatio Hispana, and the mention of the 653 Council of Toledo, fresh consideration is needed. It will be noted that both eclipses, S.655 and S.666, fall within both the reigns mentioned; also that it is not clear whether the two passages (34 and 36) relate to the same eclipse or to two different eclipses. If the eclipse of 34 is derived from some Byzantine

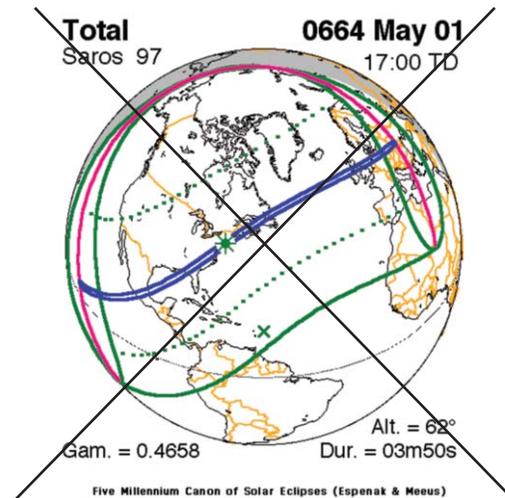
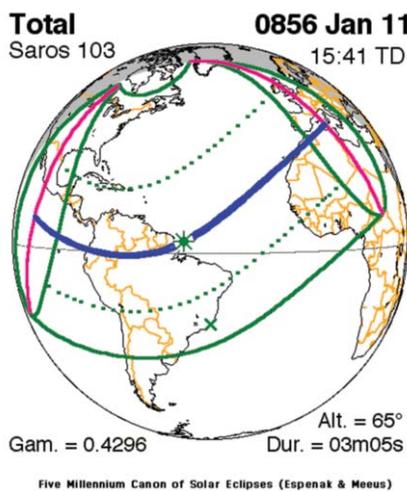
source, and ‘medio die’ may be discounted, it could in fact refer to S.644 Nov.5 (q.v). But the eclipse of 36 seems definitely Spanish, and is probably either S.655 or S.666. Newton 1972 (507, 510-1) discusses both passages under S.655 April 12. We adopt the same course, as perhaps the best that can be done with these weak records.” (Schöve, p. 125-6)

“664 May 1. Reference: Bede.

The translation mentioned in the citation reads: ‘In the same year of our Lord’s incarnation, 664, there happened an eclipse of the sun, on the third of May, about ten o’clock in the morning.’...This is the last of three solar eclipse reports by Bede....

The mistake of the two days in the date does not interfere with the identification. The reliability is unity. The standard deviation of magnitude will be taken as 0.06. The place needs discussion.” (Newton, AAO p.49-50)

This solar eclipse really happened on January 11 in CE 856, not in CE 664 May 1, and not in CE 666 Sep 4. (JD ~ 2033722.15)



“M. 856 June 21-22 PARTIAL LUNAR IN BAGDAD”

“This partial lunar eclipse was observed at Bagdad, according to Ibn Yunus.” (Schöve p. 192)

“856 Jun 22. The record does not indicate whether the magnitude refers to the area or to the diameter. The observer of this eclipse and the observer of the eclipse of 854 Feb 16 were the same. It was tentatively concluded that the magnitude of the latter eclipse was originally referred to the diameter before editing. For this reason I will assume that this measurement is of the diameter. Luckily, for a lunar eclipse near 8 digits, it makes almost no difference whether the magnitude refers to the area or the diameter (Figure V.2).”

(Newton, AAO p. 148)

“AD 856 Jun 21/22: Baghdad [Saros 82]

(This is) the third lunar eclipse mentioned by al-Mahani. ‘There was an eclipse of the Moon on the night of Monday the middle of (the month of) Safar in the year 242 of al-Hijrah...(date on the Persian Calendar)... It was found by observation that the beginning

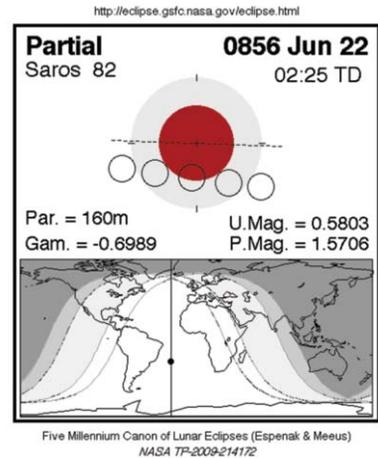
of the eclipse was when the altitude of (the star) al-dabaran was 9;30 deg in the east; the amount of the revolution of the (celestial) sphere from midnight to this time, as we determined (from this measurement) with the astrolabe was 50 deg. We did not determine its times except for the beginning. It was found (by observation) that the un-eclipsed part of its body (i.e. disk) was more than one quarter and less than one third... (calculated details)...’.

RESULTS ...thus Delta T = 2350 sec. Once again, the astrolabe reduction (3.33h) is fairly precise.” (Stephenson, p. 479)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 82 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 82 is not accurate!

This lunar eclipse really happened on June 22 in CE 856.
Delta T ~ Zero sec! (JD ~ 2033884.6)

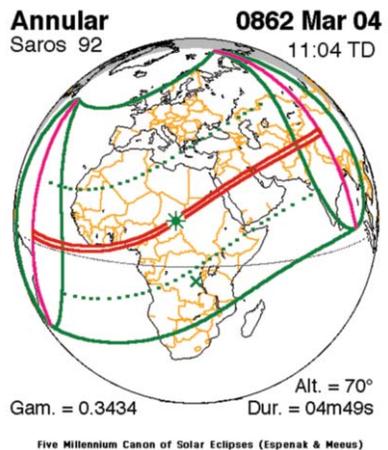


The year of CE 862 (Traditional AD = CE 665/666)

“Year 976 of the Greeks, a Seleucid year which, for Syria, ought to indicate AD 664-5, autumn to autumn.” (Schöve, p. 131)

The back calculation of the Solar Saros Series - 92 is not accurate!

This solar eclipse really happened on March 4 in CE 862 (JD ~ 2035966)

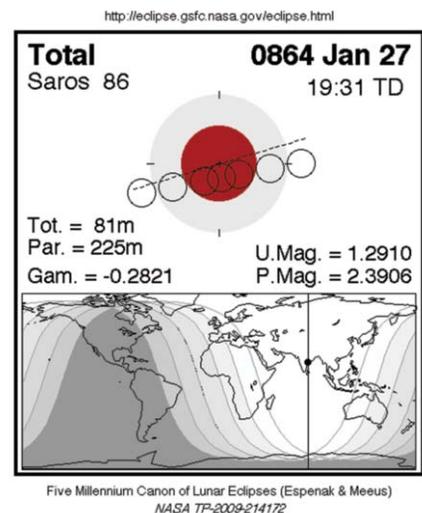


The year of CE 864 (Traditional AD = CE 670)

“M. 670 Jan. 11-12. A LATER ISLAMIC CALCULATION

The Islamic horoscopes in Pingree 1968 (120) contain one (IV 14) headed ‘A lunar eclipse in the sixth conjunction’. Oppolzer gives the magnitude as 0.59 at 12.50 a.m. at Greenwich, say between 3 a.m. and 4 a.m. in the Near East, and this eclipse was presumably a calculated one.” (Schöve, p. 132)

This lunar eclipse really happened on January 27 in CE 864 (JD ~ 2036660.31)



The year of CE 866, AH 52, YZ 235, Seljuk AH 252

“AD 866 Jun 16 [Saros 99]

‘This solar eclipse was mentioned by al-Mahani. He said: ‘The Sun is to be eclipsed on Sunday the 28th of (the month of) Jumada al-Ula in the year 252 of *al-Hijrah*... (date on Persian calendar)... It was found (by the observation) that this eclipse began (a little) more than a third of an hour after *Zawal*; the middle of the eclipse, as we estimated, was at 7 hours and 1/3 and 1/10; then the eclipse cleared at 8 hours 1/2 ... (calculated details) ... The eclipsed part of the Sun’s diameter, as we estimated, was more than 7 digits and less than 8 digits.’

The month should be Jumada al-Ukhra, rather than the previous month Jumada al-Ula; otherwise the recorded Islamic date is correct – as is the date on the Persian calendar. Elsewhere in the above text, it is stated that times are expressed in seasonal hours. No altitude measurements are preserved, only the reduced times. *Zawal* means the moment when the shadows of a gnomon begins to noticeably increase after the Sun transits the meridian and is thus a few minutes after noon. It will be assumed that the estimated time of first contact means roughly half an hour after midday.

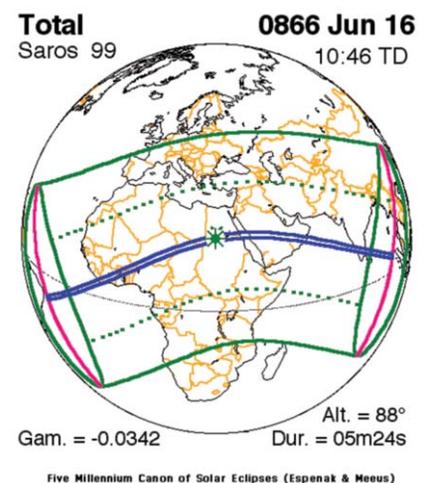
RESULT ... thus Delta T ~ 2200 sec, ... thus Delta T ~ 2500 sec, ...

thus Delta T ~ 2450 sec. These three Delta T results are fairly self-consistent.” (Stephenson, p. 471)

So, the back calculation of the Solar Saros Series - 99 is not accurate!

This solar eclipse really happened on June 16 in CE 866

Delta T ~ Zero sec! (JD ~ 2037531)



“M.866 Nov. 26 CALCULATED BY A BAGDAD ASTRONOMER

A lunar eclipse of small magnitude (0.125 Ibn Yunus, 0.06 Oppolzer).

Newton, 149 tends to think, probably rightly, that Newcomb did not use this Islamic record because of doubt whether the data were observed or calculated.” (Schöve, p, 194)

“866 Nov 26. The preceding report for 866 Jun 16 gave details of calculations relating to the eclipse first followed by details of the observations and notes about the discrepancies. This report says that the ‘opposition should have been’ at 9h 31m and so on. The part of the text giving the numbers in Table V. 4 is followed by remarks that make no sense to me and that give no additional numbers. The presumption is that the numbers listed in Table V. 4 are the calculated ones and that the observed values have been omitted in the available text by some accident.

Newcomb did not use either eclipse of 866, apparently because of suspicion about which values were observed and which were calculated.” (Newton, AAO p. 149)

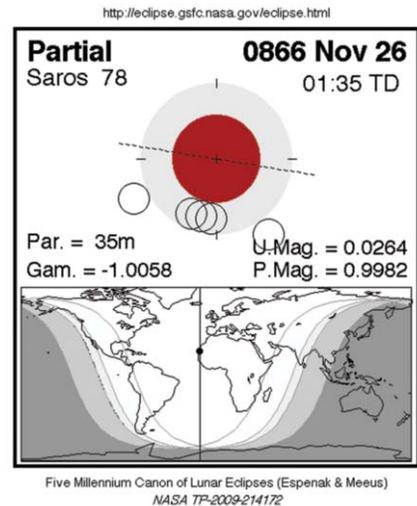
“The Islamic date of this event (252 AH, Dhu al-Qa’dah 15) correspond to AD 866 Nov 25/26, on which day the computed magnitude was only 0.03.” (Stephenson, p. 476)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 78 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series – 78 is not accurate!

This lunar eclipse really happened on November 26 in CE 866.

Delta T ~ Zero sec! (JD ~ 2037693.56)

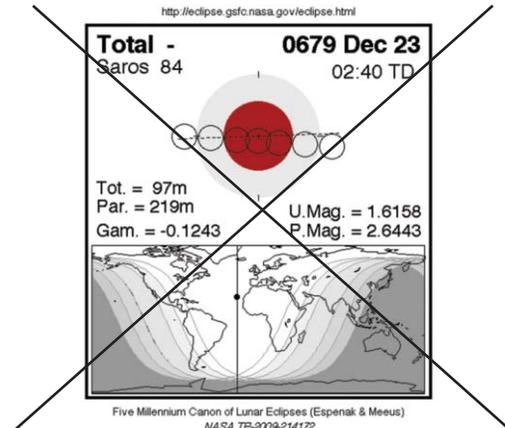
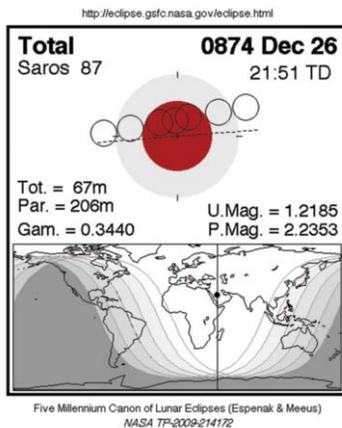


The year of CE 874 (Traditional AD = CE 679)

“M. 679 Dec.22-23 POSSIBLY OBSERVED IN MIDDLE EAST

The last (IV 15) of the seventh-century Islamic horoscopes in Pingree 1968 (121) is headed ‘The lunar eclipse indicating the death of Muawija and accession of Yazid’. (Schove, p. 134)

This lunar eclipse really happened on December 26 in CE 874, not in CE 679 December 22-23. (JD ~ 2040646.41)

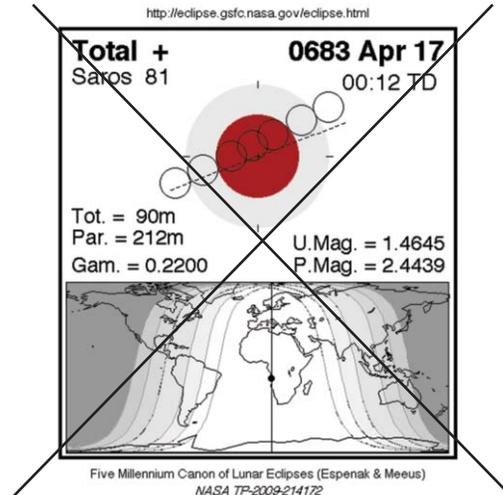
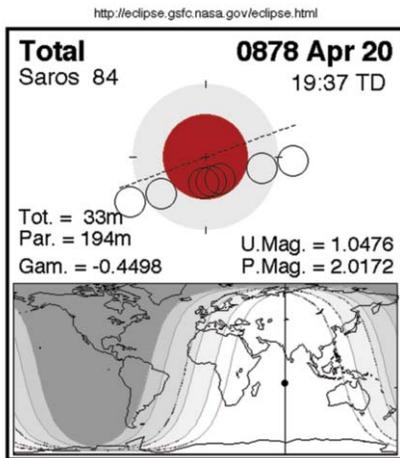


The year of CE 878 (Traditional AD = CE 683/685/688)

“M. 683 April 16-17. LUNAR ECLIPSE

As with M.680 June 17-18, there is what is essentially a contemporary Italian record. ‘At this time, April 16, indiction 11, the moon was eclipsed after Lord’s Supper; it laboured with blood-red face almost all night and only after cock-crow did it gradually begin to clear up and return to its normal condition.’ (Schove p. 135)

This lunar eclipse really happened on April 20 in CE 878, not in CE 683 April 16-17. (JD ~ 2041857.31)



“688 July 3. Reference: Ulster an Scotorum. Ulster for the year 688 and Scotorum for the year 685 contain an identical entry that can be translated as follows: ‘A part of the sun was obscured.’”

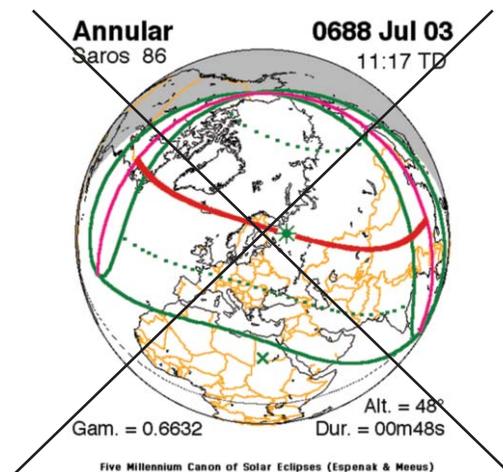
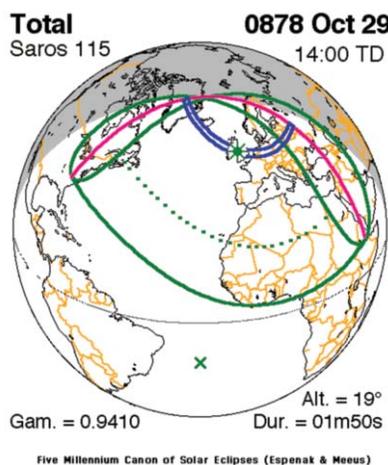
(Newton, 1972 p. 193)

“S.688 July 3 IN IONA OR IRELAND

An eclipse is mentioned in identical words in three accounts having ‘The Chronicle of Ireland’ as ultimate source. ‘Part of the Sun was darkened’ occurs in Annals of Ulster under AD 688, in Chronicum Scotorum under 685. ...

Newton 1972 (193-4) says rightly that there is no other possible identification within 5 years, and, again rightly, that the years in AU contain random errors as well as the systematic error needing correction +1....” (Schove, p. 135)

This solar eclipse really happened on October 29 in CE 878, not in CE 685 or 688! (JD ~ 2042049.08)



The year of AD = CE 882....

“AD 882 Aug 2/3: Baghdad

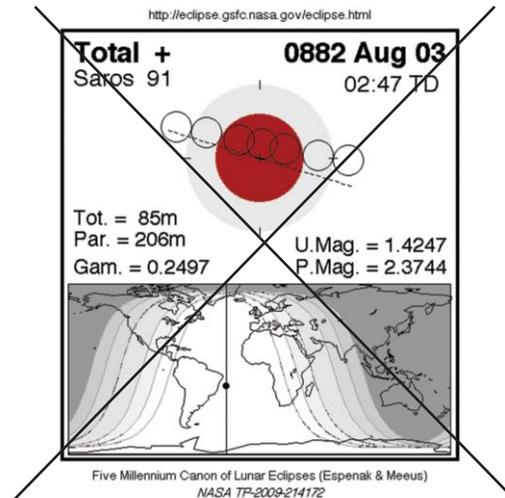
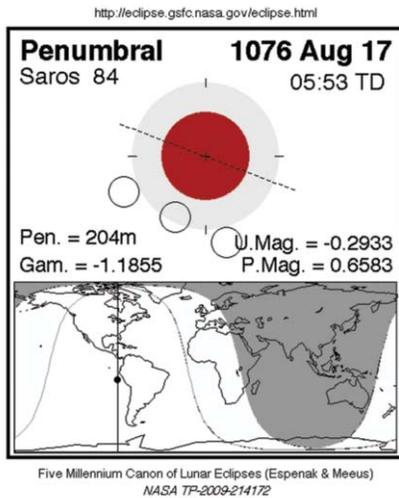
(269 AH.) In (the month of) Mubarram this year... the Moon was eclipsed on the night of the 14th (day) and set eclipsed.

[Al-Tabari: *Tarikh al-Tabari: Tarikh al-Rusul wa'l Muluk*, vol. IX, p.613]

RESULTS...Combining these limits yields $-4200 < \Delta T < 7550 \text{ sec.}$ " (Stephenson, p. 451)

This lunar eclipse really happened on August 17 in CE 1076, not in CE 882 Aug 2/3! (JD ~ 2114295.74)

The calculation of the Lunar Saros Series – 84 is not accurate because of Ptolemy's wrong phases of the Moon!!!



"AD 882 Aug 17: Baghdad

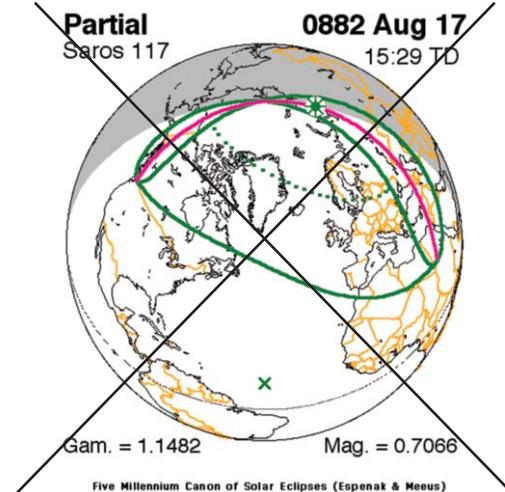
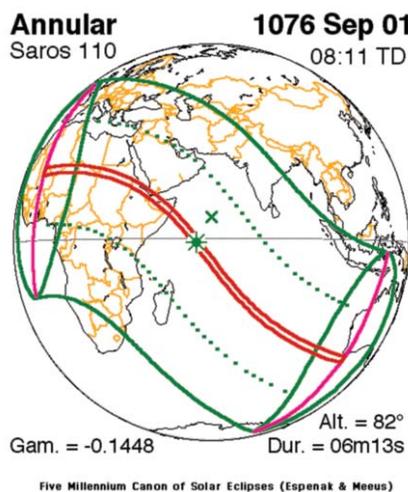
(269 AH.) In (the month of) Mubarram in this year...the Sun was eclipsed at the time of sunset on Friday, when nights remained to the completion of Mubarram and set eclipsed...

[Al-Tabari: *Tarikh al-Tabari: Tarikh al-Rusul wa'l Muluk*, vol. IX, p.613]

RESULTS...Combining these limits yields $1250 < \Delta T < 7000 \text{ sec.}$ " (Stephenson, p. 449-50)

The back calculation of the Solar Saros Series - 110 is not accurate!

This solar eclipse (sunrise) really happened on September 1 in CE 1076, not in CE 882! (JD ~ 2114310.838)



The year of AD = CE 883...

“AD 883 Jul 23/24: al-Raqqab

This lunar eclipse was observed by us at city of al-Raqqab on the 23rd of (the month of) Tammuz in the year 1194 of Dhu al-Qarnayn,.. which is the year 1206 of al-Iskander. The middle of the eclipse was at a little more than 8 equal hours after midday. A little more than 1/2 plus 1/3 of the Moon’s diameter was eclipsed... (calculated details)... [Al Battani]

RESULT...Delta T ~ 900 sec... (Stephenson, p. 488-9)

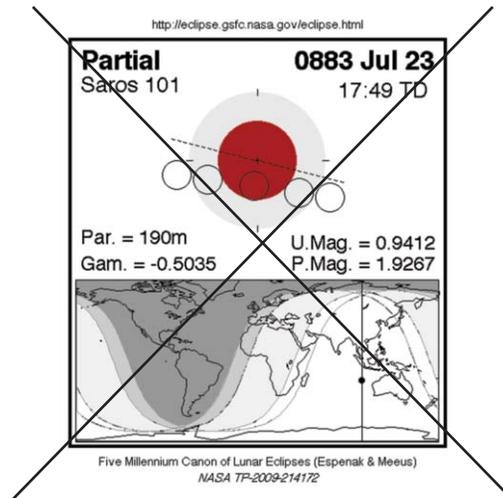
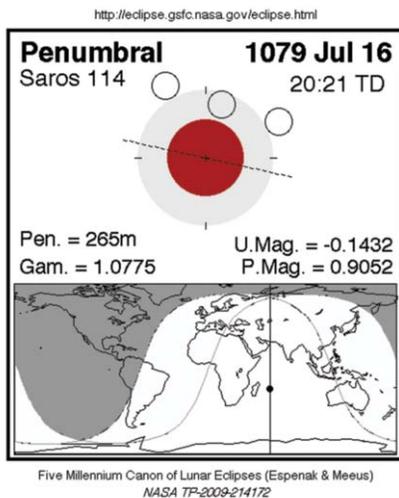
“M.883 July 23 LARGE IN SYRIA

It is the first in time of four eclipses (two solar and two lunar) between 883 and 901 mentioned in Ch.30 of his Astronomy and used by European astronomers since at least Regiomontanus.” (Schove. p. 203)

This lunar eclipse really happened on July 16 in CE 1079, not in CE 883 July 23! (JD ~ 2115359.34)

In this case the first examined lunar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (883 July 23) while the correct date was definitely 1079 July 16! Because of these facts, NASA illustrates the 1079 July 16 lunar eclipse incorrectly...

The back calculation of the Lunar Saros Series 101 and 114 are not accurate...



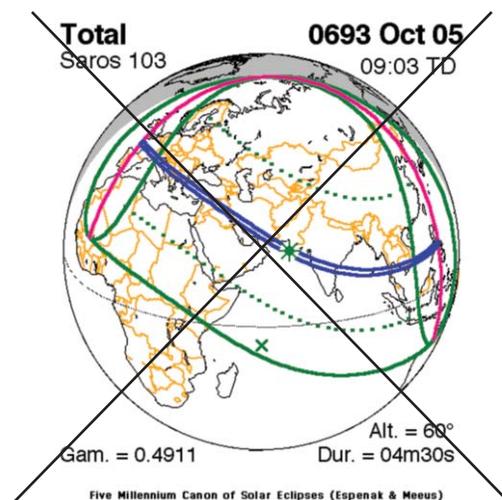
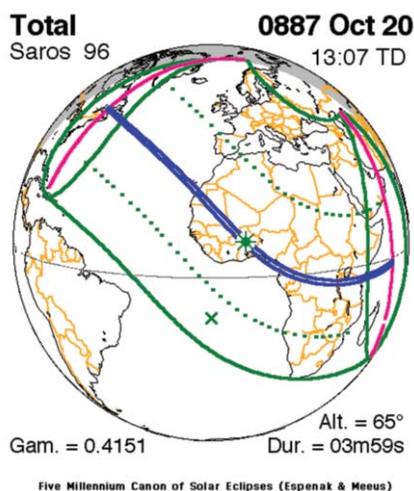
The year of CE 887 (Traditional AD = CE 693)

“Elias of Nisibis evidently had at least two sources for this eclipse since he gives it twice over, once correctly under AH 74, and again under AH 75, incorrectly as regards year but otherwise more fully:

Year 74. – Commenced Tuesday 13 Iljar [May] of year 1004 of the Greeks [Seleucid era]. In which there was an eclipse of the Sun on 29 Jamada I, 5 Teshrin I; the stars were visible.

First Teshrin regularly means October, and there is no doubt that both passages refer to S.693 Oct. 5, which fell in AH 74 is fairly correct on the date.” (Schove p. 140-1)

This solar eclipse really happened on October 20 in CE 887, not in CE 693 October 5. Delta T = zero sec! (JD ~ 2045327.1)



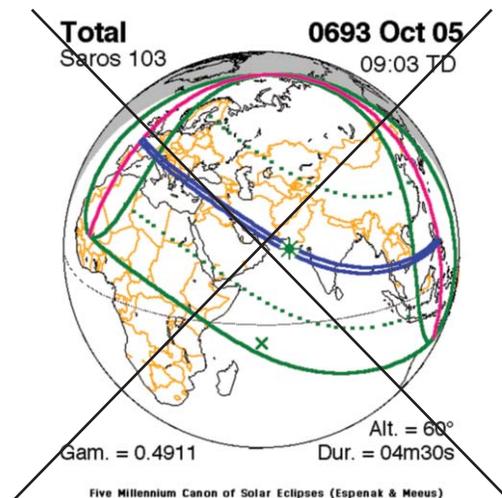
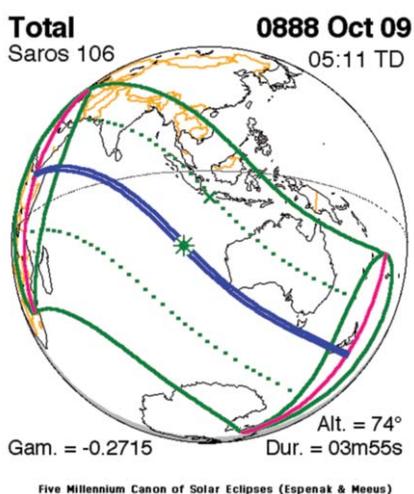
The year of CE 888 (Traditional AD = CE 693)

“Year 75. – Commenced Saturday 2 Ijar [May] of year 1005 of the Greeks. In which there was a total eclipse of the Sun on Sunday 5 Teshrin, at the fifth hour of the day.

The eclipse is also mentioned in the Chronicle of Michael the Syrian, Jacobite patriarch of Antioch. ‘In the year 1005 of the Greeks, 75 of the Arabs, the Sun was darkened on a Sunday in the month of Teshrin I, at the third and the fourth hour: and there was a profound darkness; the stars appeared.’ (Schove p.141)

“693 Oct 5. Reference: Theophanes. ‘That year an eclipse of the sun happened, month Hyperberetaeus fifth, day first, hour third, such that some stars shone out.’ This was put under the 8th or 9th year of Justinian II, emperor 685-695, and Hyperberetaeus is the same as October. Hence the eclipse was surely the one on 693 Oct 5, which was on the first feria; the hour of the day is reasonable. Reliability: 0.5. Place: Constantinople. Standard deviation of the magnitude: 0.01.” (Newton 1972, p. 543-4)

This solar eclipse really happened on October 9 in CE 888, not in CE 693 October 5. Delta T = zero sec! (JD ~ 2045681.71)



The year of AD = CE 891...

“AD 891 Aug 8: al-Raqqab

This solar eclipse was observed by us at city of al-Raqqab on the 8th of (the month of) Ab in the year 1202 of Dhu al-Qarnayn, which is the year 1214 after the death of al-Iskandar. The middle of the eclipse was at one seasonal hour after midday. (A little) more than 2/3 of the Sun was eclipsed in view...(calculated details)...[Al-Battani]

Ab (corresponding to August) was the 11th month of the year.

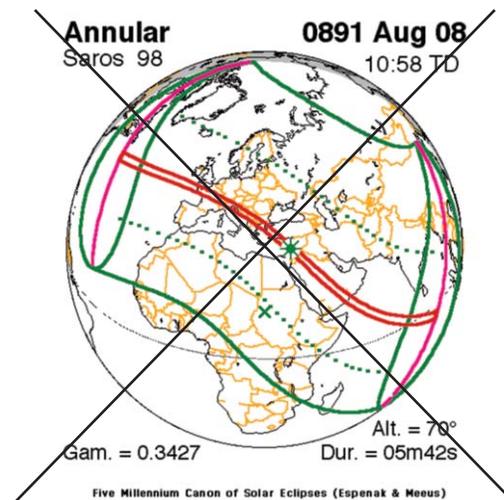
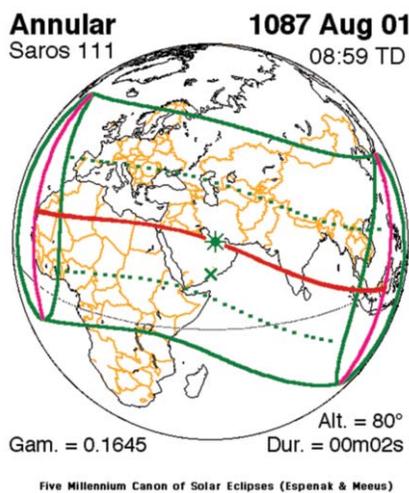
RESULTS...Delta T = 1700 sec” (Stephenson, p. 489)

„S. 891 Aug. 8 ANNULAR SOLAR ECLIPSE IN EUROPA AND ASIA

An annular eclipse...This observation is discussed in Newton with reference to modern Latin translation in Nallino 1903. Discussion goes back at least to Regiomontanus. (Schöve, p. 205)

This solar eclipse really happened on August 1 in CE 1087!

(JD ~ 2118296.871)



In this case the first examined solar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (891 Augustus 8) while the correct date was definitely 1087 Augustus 1! Because of these facts, NASA illustrates the 1087 Augustus 1 solar eclipse incorrectly...

The back calculation of the Solar Saros Series 98 and 111 are not accurate...

The year of AD = CE 901...

“AD 901 Jan 23: Antakyah

This solar eclipse was observed by us at city of Antakyah on the 23rd of (the month of) Kanun al-thani in the year 1212 of Dhu al-Qarnayn, which is the year 1224 after the death of al-Iskander. The middle of the eclipse was about 3 2/3 equal hours before midday. (A little) more than 1/2 of the Sun in sight was eclipsed...(calculated details)...

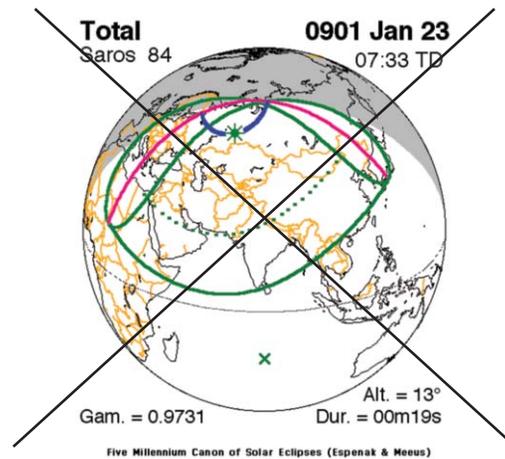
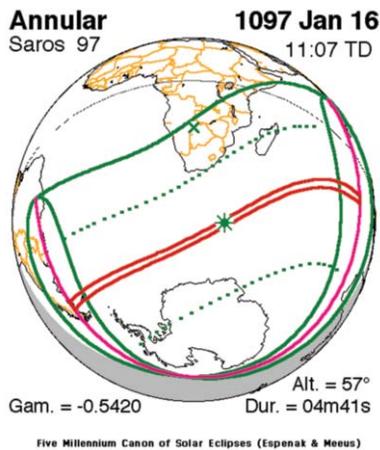
[Al-Battani]

Kanun al-thani (corresponding to January) was the fourth month of the year.

RESULTS... Delta T ~ 1650 sec (Stephenson, p. 489)

This solar eclipse really happened on January 16 in CE 1097!

(JD ~ 2121752.96)



In this case the second examined solar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (901 Jan. 23) while the correct date was definitely 1097 January 16! Because of these facts, NASA illustrates the 1097 January 16-i solar eclipse incorrectly...

The back calculation of the Solar Saros Series 84 and 97 are not accurate...

“AD 901 Aug 2/3: Antakyah

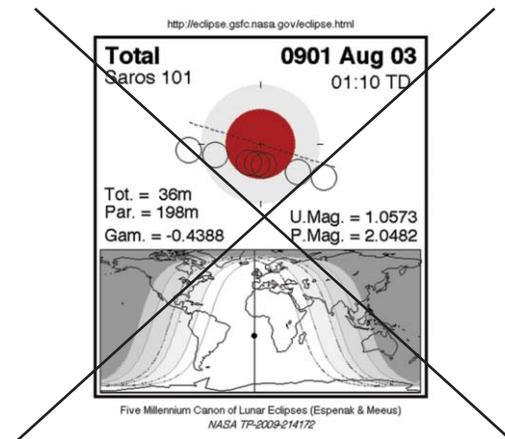
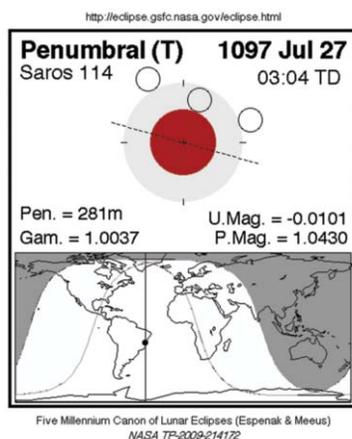
This lunar eclipse was observed by us at city of Antakyah on the 2nd of (the month of) Ab in the year 1212 of Dhu al-Qarnayn, which is the year 1224 from the death of al-Iskander. The middle of the eclipse was at approximately 15 plus 1/3 equal hours before midday. The Moon was eclipsed by less than its diameter by a small amount... (calculated details)... [Al-Battani]

Although this eclipse was recorded as marginally partial, it was actually total according to computation.

RESULTS... Delta T ~ 650 sec... (Stephenson, p. 490)

This lunar eclipse really happened on July 27 in CE 1097!

(JD ~ 2121944.63)



In this case the second examined lunar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (901 Aug. 3) while the correct date was definitely 1097 July 27! Because of these facts, NASA illustrates the 1097 July 16-i solar eclipse incorrectly... The back calculation of the Lunar Saros Series 101 and 114 are not accurate...

**The year of CE 912/Era 758 AH 99-100
(Traditional AD = CE 718/720)**

“718 Jun 3. Reference: Isidorus. Here the continuation says: ‘At the same time, at the beginning of era 758, the 100th year of the Arabs, the sun is recognized by many to be eclipsed from the 7th hour of the day to the 9th, with stars being seen.’ This is also put in the reign of Anastasius II.

The chronology is highly confused. Anastasius came to the Byzantine throne in 713 and was deposed in 716, although he was not killed until 721. The year 758 of the Spanish Era is our 720, so the ‘beginning’ is near 720 Jan 1; the Spanish year began on Jan 1. Possibly the writer was still counting Anastasius as the legitimate ruler.

If we assume that the time is around 720, the only plausible eclipses are those of 718 Jun 3 and 720 Oct 6. The latter eclipse is possible only if the errors in Oppolzer are rather large. His chart shows that the path missed Spain entirely and that the eclipse would probably have been seen later in the day than record says. Further, it does not seem reasonable to describe either eclipse as being near the beginning of the year.

The reference to the year of the Arabs furnishes a resolution of the problem. If the writer thought that 758 of the Spanish era and the ‘100th year of the Arabs’ were equivalent, we can read this as saying that the eclipse was near the beginning of the 100th year of the Hegira. The epoch of the era of the Hegira is taken as either 622 Jul 15 or 622 Jul 16, depending upon the chronologist. The Moslem year is a lunar calendar with 12 lunar months always; no attempt is made to keep it approximately adjusted to the solar year. The rules governing the lengths of the months make the year equal to 354 11/30 days exactly. An elementary calculation that should be accurate within a few days puts the beginning of the year 100 near 718 Aug2. If the writer did not know that the Moslem year was lunar, he would have thought that their year 100 was equal to our year 721 or, rather, its equivalent 759 of the Spanish era; an accident could have put him 1 year in error in his attempted conversion.

Thus the eclipse of 718 Jun 3, which should have been large or total in Spain in the first part of the afternoon, fits the conditions of the record as well as we can reconstruct them. No other eclipse fits the conditions well, unless Oppolzer’s approximations happened to cause appreciable error. I shall calculate the circumstances for 720 Oct 6 as a test. If its path crosses any part of Spain, I shall ignore this record. If it does not, I shall take the record as applying to 718 Jun 3, with a reliability of 0.5 Place: Seville. Standard deviation of the magnitude: 0.01.” (Newton, 1972 p. 512-513)

“We had a similar problem in connection with the record 718 Jun 3 E, in Chapter XIV. Isidorus [ca. 624] said that there was an eclipse from the 7th to the 9th hour of the day, and that stars could be seen, in a year that is near 720.

In Oppolzer, the only eclipse path that crossed any part of Spain near this time was on 718 Jun 3, although the path of the eclipse of 720 Oct 6 came fairly close to the southern tip. Thus, the identification of the eclipse was made contingent upon careful calculation of the circumstances of 720 Oct 6.

For three of the four combinations of accelerations used, the path of totality of the eclipse of 720 Oct 6 crossed some part of Spain. The hour of maximum eclipse was slightly outside the hours stated Isidorus, but not enough so to let us exclude the alternate date. Thus we cannot identify the eclipse in Isidorus.

These are the only records in the preceding chapters that I accepted on a contingent basis. In three other cases, I decided to calculate the circumstances even though the records clearly do not contain enough information to permit their use. The purpose of the calculations was to see if we could reach any further conclusions, with the understanding that the records would not be used even if we did.” (Newton, p. 592-593)

“S. 718 June 3 TOTAL SOLAR IN SPAIN

S. 718 June 3 probable (S.720 Oct. 6 less probable)

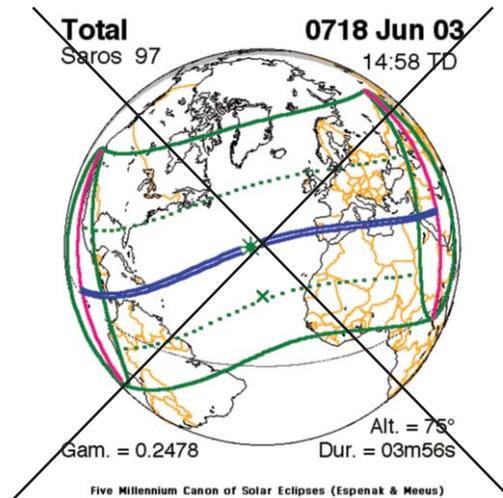
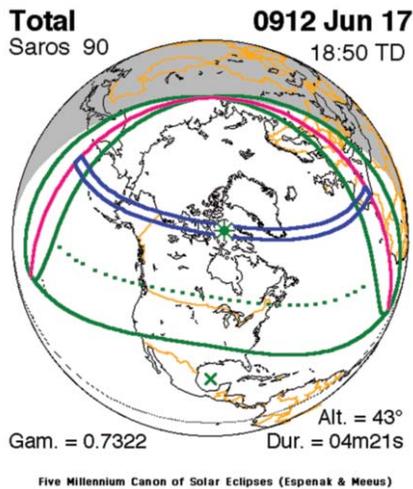
Isidore Pacenses, in his *Continuatio Hispana* (about 754) of the Gothic, etc. history by the more famous Isidorus Hispalensis (Isidore of Seville, died 636), has a passage given with slight variations by various editors and commentators. The gist of the passage is that as Spanish Era SpE 757 (or 758) was beginning, in the 100th year of the Arabs, an eclipse of the Sun occurred in Spain, from the 7th (or 6th) to the 9th hour of the day; some place this eclipse in the time of Hurr, but most in the time of his successor Samh.

SpE 757 and 758 are AD 719 and 720. The years of the Hijra, AH 99 to 102, began about 717 Aug.14, 718 Aug.3, 719 July 24 and 720 July 12 respectively. Although all the year numbers are a unit or so too large, one must nevertheless agree with the result of the discussion in Ginzel 1886 (974-6): the great Spanish total eclipse of 718 June 3 (Schroeter’s band of totality passes north of Lisbon, south of Madrid, and then to Northern Tunisia) fits better than S.720 Oct.6 (total in North Africa) as regards both totality and hour in Spain. If only one eclipse is involved, S.718 must have the preference.

But it is not impossible that the account may have been influenced by both eclipses, e.g., the indication of year may be a compromise by a writer faced with apparently conflicting records and unaware that two different eclipses occurred in the years round 719. The historical chronology about this time seems a little uncertain, but it is probable that 718 June 3 fell in the time of Hurr and 720 Oct. 6 in the time of Samh. If this is true, and one is informed of a division of opinion as to whether ‘this’ eclipse occurred in the time of Hurr or in the time of Samh, one may legitimately suspect conflation.” (Schove. p. 147-8)

This solar eclipse really happened on June 17 in CE 912. (JD ~ 2054334.281)

(Z.H.: *La nueva cronologia*, p.84)



**The year of CE 923, AH 110/111, YZ 291/292, Seljuk AH 310/311
(Traditional AD = CE 729/733)**

“M. 923 June 1 PARTIAL IN BAGHDAD

This is one of the Ibn Yunus eclipses. The middle and end were observed at Bagdad by several astronomers in collaboration. It is reported that at mid-eclipse (greatest obscuration) the Sun was 8° high and the magnitude was 9 digits (i.e. 0.75); also that at the end the Sun was 20° high and the time was 2 1/5 seasonal hours after sunrise.” (Schove, p. 221-222)

“AD 923 June 1/2: Baghdad [Saros 103]

This lunar eclipse was calculated by Ali ibn Amajur al-Turki from the al-Zij al-'Arabi of Habash and observed by him and his son Abu al-Hasan and his freedman Muflih. (He said:) ‘There was an eclipse of the Moon in (the month of) Safar in the year 311 of al-Hijrah... (calculated details)... The Moon rose at sunset (already) eclipsed by ¼ or a (a little) more of the digits of the diameter (i.e. 3 digits or a little more). The Moon was eclipsed by (a little) more than 9 digits of diameter. The middle of the eclipse was at 1 and 2/3 of equal hours of night (i.e. after sunset). The clearance of the eclipse was at 3 equal hours (after sunset) and (that was) when the altitude of (the star) al-ridf was 29;30 deg in the east... (calculated details)...

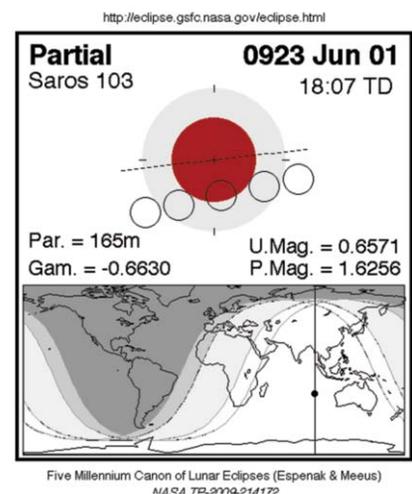
The alternative Arabic name for al-ridf is Dhanab, from which the modern name Deneb is derived.

RESULTS...Delta T = 2000 sec.” (Stephenson, p. 479-80)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 103 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 103 is not accurate. Delta T ~ Zero sec!

This lunar eclipse really happened on June 1 in CE 923. (JD ~ 2058335)



“AD 923 Nov 11: Baghdad [Saros 96]

This solar eclipse was calculated and observed by Abu al-Hasan Ali ibn Amajur, who used the al-Zij al-Arabi of Habash. ‘This eclipse was at the conjunction (i.e. new Moon) of (the month of) Sha’ban in the year 311 (AH). We as a group observed (this eclipse) and clearly distinguished it. The estimate of all (observers) for the middle of the eclipse was that it occurred when the altitude of the Sun was 8 deg in the east; its clearance was at 2 1/5 seasonal hours (after sunrise), when the altitude of the Sun was 20 deg. We observed this eclipse at several sites on the Tarmah (an elevated platform on the outside of the building). The estimate of Abu al-Hasan for the middle of the eclipse at his house was when the altitude of the Sun was 8 deg, as I estimated myself at my house before he arrived. The magnitude of the eclipse was 1/2 and 1/4 (i.e. 3/4) of the Sun’s diameter; the middle of the eclipse, which we estimated when the Sun’s altitude was 8 deg, would be when the elapsed time (after sunrise) was 0;50 seasonal hours, and the (celestial) sphere had revolved (through) 10;40 deg. (The interval) between the middle of the eclipse and its clearance in this observation was 1;22 seasonal hours... (alternative times in equal hours)...’.

The statement that the eclipse ‘was at the conjunction of (the month of) Sha’ban’ implies that it occurred at the new Moon of Sha’ban – i.e. the very end of the previous lunar month Rajab.

RESULTS...Delta T = 1600 sec.” (Stephenson p. 471-2)

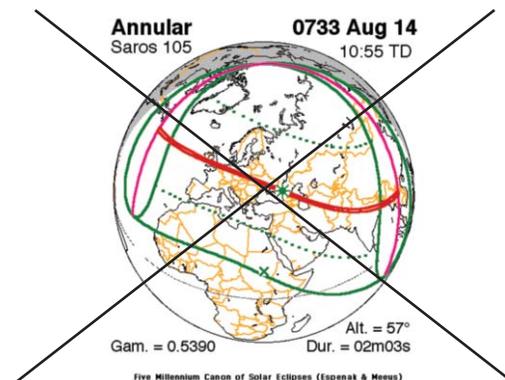
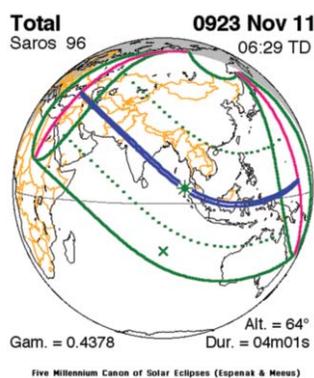
“S. 733 Aug 14 TOTAL SOLAR IN ... CAUCASUS

“A fragmentary primary source of the 730s has been incorporated into the ‘History of the Caucasian Albanians’ by Movses Dasxuranci (tr. C.J.F. Dowsett, 1961, Oxford University Press). This refers to Cattle Plague, Taxes and Famine in the 720s and is followed by what seems to be description of a total eclipse at a specific place: ‘the borders of Mozu, in the bishopric of Siwnik’. A hermit saw a vision (possibly auroral in origin) and ‘announcing the coming of the wrath (of the Lord) throughout the canton, he besought all to pray, and an impenetrable darkness descended over the borders of Mozu, and the earth shook for forty days, and nigh on 10,000 souls were swallowed up; and because of this (the place) was called Vayoc Jor (Valley of Woe)’.” (Schove, p. 151)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 96 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series - 96 is not accurate.

This solar eclipse really happened on November 11 in CE 923 not in CE 733 Augustus 14. Delta T ~ Zero sec! (JD ~ 2058497.8)



The year of CE 924 (Traditional AD = CE 733)

“733 Aug 14 a. Reference: Anglo-Saxon Chronicle. Most texts read something like: ‘In this year Aethelbald occupied Somerton, and there was an eclipse of the sun.’ I discussed this record in Section IV.1 of AAO under the designation 733 Aug 14 B. In AAO, I put the observation in Canterbury for reasons that will be discussed under the next record. On the basis of additional study, I realize that the earlier conclusions are not justified. I shall take the place of this observation to be England. Reliability: 0.5. Standard deviation of the magnitude: 0.1” (Newton, 1972, p. 151-152)

733 Aug 14 b. Reference: Bede. (This is in the ‘Continuation’.)

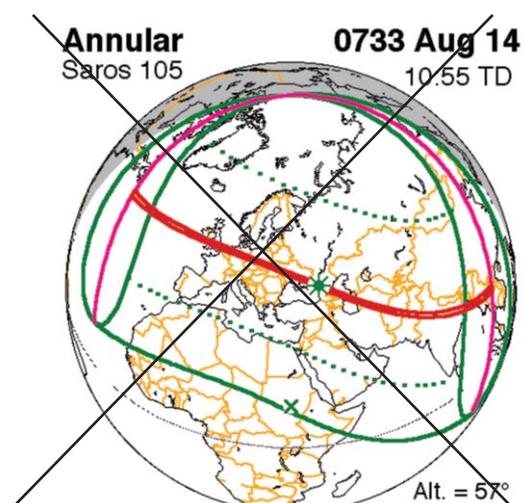
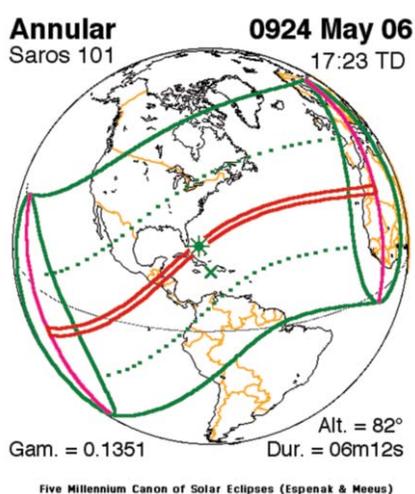
‘Year 733, there was an eclipse of the sun on the 19th calends September (= Aug 14) about the 3rd hour of the day, such that almost the entire disk of the sun appeared to be covered by a horrible black shield.’ (Newton, 1972, p. 152)

“S. 733 Aug 14 TOTAL SOLAR IN CENTRAL ENGLAND AND CAUCASUS

There is one contemporary account, namely that in the construction of Bede’s Ecclesiastical History (1969, 572-3): ‘In 733 an eclipse of the Sun occurred on xviii (variant, xviii) Kal. Sept. about the third hour of the day so that its whole orb seemed to be covered by a black and terrifying shield’. The dates are Aug.14 (variant, 15), the former being correct, and sometimes degenerating into Aug.19 in later-writers.

The most correct of the early copyists from the continuation of Bede (or from another set of Northumbrian annals) date from Norman times; they are Simeon of Durham and Roger of Hoveden; the hour is also correctly inserted in the latin version of MS.F of the Anglo-Saxon Chronicle, which otherwise gives year only. Newton 1972 (143-7) lists the English sources up to Roger of Hoveden. The hour, when given, is always ‘about the third’.” (Schöve, p. 150)

This solar eclipse really happened on May 6 in CE 924, not in CE 733 Augustus 14. (JD ~ 205867522)



The year of CE 925

“M. 925 Apr. 11 TOTAL IN BAGDAD

A total eclipse, maximum magnitude about 1.09. This is one of the Ibn Yunus eclipses; the beginning and end were observed at Bagdad in the early evening, see Caussin 1799, 7; 1804, 116, Newcomb 1878, Newton 1970. A wildly erroneous stellar altitude at the beginning has to be discarded, see Newcomb, 46, Newton, 150, but enough sound information remains to provide good observed times of both beginning and end of the eclipse.” (Schove, p. 222)

“925 Apr 11. A star elevation and its conversion into time were both here. There is good agreement for the end phase. According to Newcomb the elevation given for Arcturus yields a time almost an hour before sunset and quite different from the hour given. The hour given is reasonable, so the presumption is that star identity was recorded wrong.” (Newton, AAO p. 150)

“AD 925 Apr 11/12: Baghdad [Saros 85]

This lunar eclipse was calculated and observed by Abu al-Hasan ibn Amajur. This eclipse was on the night of Tuesday, the 15th of (the month of) Muharram, year 313 of al Hijrah. He mentioned that the Moon was totally eclipsed and reported its five times (as found by calculation but not given in the text). Then he said: ‘I observed this eclipse. The beginning was when altitude of (the star) (al-simak) al-ramih was 11deg in the east. The end of clearance was when the altitude of (the star) al-nasr al-waqi’ was 24 deg’. He then said: ‘The beginning of the eclipse would be when the time elapsed from the start of night (i.e. from sunset) was 0;55 seasonal hours; the observation was later by 0;23 seasonal hours than that calculated from the al-Zij al-Mumtahan of Habash. The end of clearance by observation would be at 4;36 seasonal hours; observation was (again) later than calculation by 0;17 seasonal hours’.

There must be an error in the preserved altitude of alpha Boo at first contact. This star would be 11 deg above the eastern horizon at about 55 minutes before sunset rather than after it but the text clearly implies an observation. Presumably a scribe made an error in reporting the elevation of the star, but there is no obvious alternative reading here. The reported time of 55 minutes after sunset will be adopted instead. When Ibn Amajur compared this time with the result based on the tables of Habash, it showed much the same discrepancy as for the reported time of last contact.

It is not stated whether the azimuth of alpha Lyr was east or west of the meridian at last contact. However, it is clear from the reported time of 4 h 36 m after sunset (LT = 22.72 h) that the star was to the east of the meridian; an elevation of 24 deg would correspond to a rather similar LT of 22.77 h.

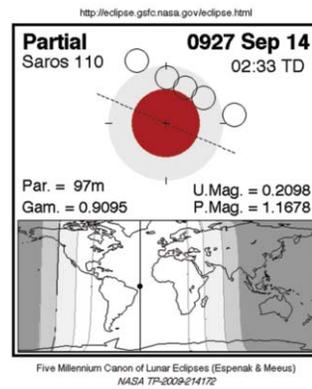
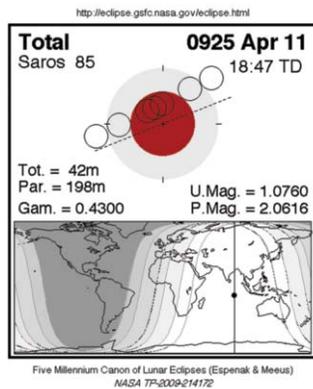
RESULTS ...Delta T = 2400 sec.” (Stephenson, p. 480)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 85 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 85 is not accurate.

This lunar eclipse really happened on April 11 in CE 925.

Delta T ~ Zero sec! (JD ~ 2059015)



The year of CE 927

“M. 927 Sept. 13-14 SMALL BUT OBSERVED IN BAGDAD

A small partial eclipse, observed during the later part of ‘Friday night’ at Bagdad, according to the Ibn Yunus list. Maximum magnitude about 0.3 was observed, compared with calculated 0.21 (Oppolzer), 0.22 (Newton). Times of beginning, middle and end were given in Caussin 1804, but only that of the beginning was confirmed by a stellar altitude. Newcomb attributes the slight earliness to the keen eye of the young observer (‘mon fils Aboulhassan’) detecting the penumbra before the arrival of the umbra.” (Schove, p. 223)

“927 Sep 14. The magnitude is described as greater than $\frac{1}{4}$ of the diameter and less than $\frac{1}{3}$: this is entered in the table as $3\frac{1}{2}$ digits. Similar phraseology was used in almost all cases where the tabular magnitude in Table V.4 is reported to half a digit.” (Newton, AAO p.150)

“AD 927 Sep 13/14: Baghdad [Saros 110]

This lunar eclipse was calculated and observed by Ali ibn Amajur, who used the al-Zij al-Arabi of Habash. This eclipse was on the night of Friday, in the year 315 of al- Hijrah.. (calculated details)...’ He said: ‘This eclipse was observed by my son Abu al-Hasan. The beginning of the eclipse was when the altitude of (the star) al-shi’ra al-yamaniyyah was 31 deg in the east; the part of the celestial sphere which has revolved between sunset and the beginning of the eclipse is 148 deg plus a third of a degree and this is (equivalent to) 9;52 equal hours, which is 10;0 seasonal hours. The estimated digits of the eclipse was more than $\frac{1}{4}$ but less than $\frac{1}{3}$, as though it was 3.5 digits...(calculated details...)’.

Although the month (and day of the month) is not cited, no other lunar eclipse apart from that identified above occurred in 315 AH (AD 927 Mar – 928 Feb). Confirmation of the calculated date is provided by the recorded weekday (Friday). In addition, the estimate of magnitude is in tolerable accord with calculation for this eclipse.

RESULTSDelta T = 2950 sec.“ (Stephenson, p. 481)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 110 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 110 is not accurate. Delta T ~ Zero sec!

This lunar eclipse really happened on September 14 in CE 927. (JD ~ 2059900.6)

The year of CE 928

“S. 928 Aug.18 SMALL SOLAR OBSERVED IN BAGDAD

An annular eclipse, whose path starts at sunrise in East Africa and has noon point near Indonesia. According to the Ibn Yunus account, at Bagdad the Sun rose with a little less than a quarter of its surface eclipsed, and its altitude at the end of the eclipse was $11^{\circ}53'20''$. The Sun was observed distinctly by reflection from a water surface.” (Schöve, p. 223)

“928 Aug 18. The times in the original record were given to a precision of seconds or even of ‘thirds’: hence they were probably calculations from tables made to compare with the observed circumstances. The height of the sun at the end of the eclipse seems to record a genuine observation. The record says that the eclipse was followed by watching it in a reflecting pool.” (Newton, AAO p.150)

“AD 928 Aug 18: Baghdad [Saros 108]

This solar eclipse was calculated and observed by Ali ibn Amajur. (According to calculation), the beginning was to be at... (calculated details)... on Monday. He said: ‘I observed this eclipse with my son Abu al- Hasan and Muflih and (found) that the Sun rose (already) eclipsed by less than one $\frac{1}{4}$ of its surface. The eclipse continued to increase by an amount that we could perceive until $\frac{1}{4}$ (of its surface) was eclipsed. We observed the Sun distinctly (by reflection) in water. We (found) that it cleared and nothing of the eclipse remained and we distinguished the (full) circle of the Sun’s body in water; (that was) when the altitude was 12 deg in the east, less $\frac{1}{3}$ of a division of the al-halaqa (i.e. the ring), which is graduated in thirds (of a degree), that is (less by) $\frac{1}{9}$ degree.... (comparison with calculation)...’.

Although the full date is not stated, it can fairly readily be established. The observation is cited between the records of two lunar eclipses: those of AD 927 Sep 13/14 and 929 Jan 27/28 (entries 6 and 7 of section 13.8 below). Only one solar obscuration would be visible at Baghdad during this interval- that of AD 928 Aug 18, which indeed occurred on a Monday. Hence the date is firmly established.

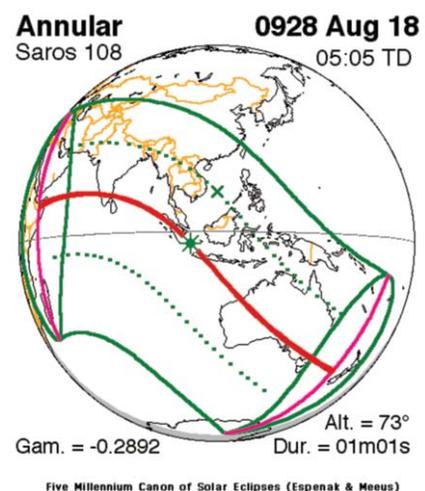
RESULTS... Delta T = 1800 sec” (Stephenson, p. 472)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 108 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series - 108 is not accurate.

This solar eclipse really happened on Augustus 18 in CE 928.

Delta T ~ Zero sec! (JD ~ 2060239.707)



The year of CE 929

“M. 929 Jan.27-28 TOTAL IN BAGDAD

A total lunar eclipse, magnitude 1.20 (Oppolz., Schroe.). The beginning was observed at Bagdad, but the time as it has reached us via Ibn Yunus and Caussin is defective. The time of the beginning is given in two ways...

Unfortunately, the other way in which the time is specified supports the ‘wrong’ time. The beginning is said to have been observed about ‘5 unequal hours after sunset’. Newton 1970, 232 rightly finds agreement ‘almost to the minute’ with ‘altitude of Arcturus 18°’. Our rough calculations give about UT 20h 9m.

Thus unless the observed time of the beginning was at some stage wrongly given in one mode of statement and then correctly converted to the other mode (see Newton 1970, 232), the Bagdad time has to be discarded for astronomical purposes, as it was by Newcomb and Newton. But the identification of the eclipse seems certain.” (Schove. p. 223-4)

“AD 929 Jan 27/28: Baghdad [Saros 87]

This lunar eclipse was calculated and observed by Abu al-Hasan Ali ibn Amajur. This eclipse was at the opposition (i.e. full Moon) of (the month of) Dhu al-Hijjah, year 316 of al Hijrah... (calculated details)... He said: ‘I observed this eclipse at its beginning when the altitude of (the star) (al-simak) al-ramih was 18 deg in the east; the time elapsed from the start of the night (i.e after sunset) (to the beginning) was 5 hours seasonal, as required by calculation from the (al-Zij) al-Mumtahan’.

RESULTS.... Delta T= 6000 sec

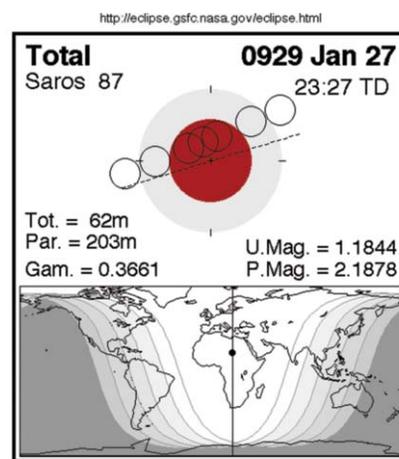
Although the LT derived from the altitude measurement is in fair accord with the stated time of 5 unequal hours after sunset (equivalent to a LT of 22.88 h), and was said to confirm calculation from tables, the resulting Delta T value is very discordant compared with roughly contemporaneous results. Hence the observation will be rejected.” (Stephenson, p. 481)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 87 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 87 is not accurate.

This lunar eclipse really happened on January 27/28 in CE 929.

Delta T ~ Zero sec! (JD ~ 2060402.5)



The year of CE 933

“AD 933 Nov4/5: Baghdad [Saros 99]

This lunar eclipse was calculated and observed by Ali ibn Amajur al-Turki. He said: ‘(According to calculation) from the al-Zij al-Mumtahan al-‘Arabi of Habash, the eclipse opposition was on the night of Tuesday the 13th of (the month of) Dhu al-Qa’dah, year 321 of al-Hijrah... (calculated details)...’ He said ‘I observed this eclipse when (the Moon) entered (the shadow) and (that was) when altitude of (the star) (al-simak) al-ramih was 15 deg in the east and when the time elapsed from the start of the night was 9;56 seasonal hours... (calculated details) ...’.

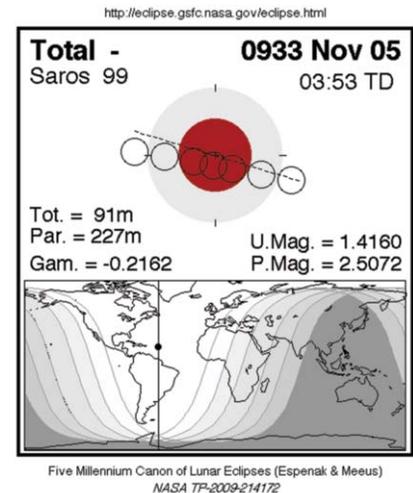
RESULTS thus Delta T = 2250 sec. “ (Stephenson. p. 482)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 99 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 99 is not accurate.

This lunar eclipse really happened on November 4/5 in CE 933.

Delta T ~ Zero sec! (JD ~ 2062144.66)



The year of AD = CE 939...

“AD 939 Jul 19: Olmos/Cueva del la Mora (Spain)

(327 AH.)The Caliph al-Nasir li Din Allah advanced (northwards from Cordoba) heading for his holy battle (jihad) until he reached Toledo on Thursday, when seven nights (sic) remained to the completion of (the month of) Ramadan. He stayed there for six days and left on Thursday, when two nights remained to the completion of Ramadan, for Welmish fortress and on Friday to Khalifah Castle. During the forenoon (Duba) of that day (Friday) the Sun was eclipsed totalyy and its disk became dark except for a slight portion as seen by eye.

[Ibn Hayyan, al-Muqtabis fi Tarikh al-Andalus, vol V, p.434]

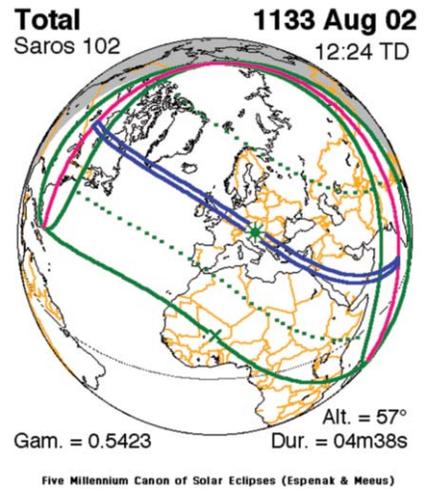
Ibn Hayyan is here quoting from the contemporary writer al-Razi, who probably resided at Cordoba. It would appear that the eclipse was witnessed while the Caliph and his army were travelling between Welmish and Khalifah. I learn from Dr Edward Cooper of London Guildhall University that the present-day names for Welmish and Khalifah are respectively Olmos and Cueva de la Mora. Olmos is situated approximately 30 km north of Toledo, while Cueva de la Mora is some 20km further north than Olmos.

It is difficult to reconcile the two descriptions (i) ‘the Sun was eclipsed totally’ and (ii) ‘its disk became dark except for a slight portion as seen by eye’. Possibly the Sun was reduced to a small point of light or a bright prominence appeared at the solar

limb. However, the true phase must remain in doubt. The value of the observation is further weakened by the uncertainty in the precise place of observation.” (Stephenson p. 443-444)

The back calculation of the Solar Saros Series – 102 is not accurate.

This solar eclipse really happened on Augustus 2, in CE 1133! (JD ~ 2135100)



The year of CE 945 (Traditional AD = CE 752/753/756)

“753 Jan 9. Reference: Ulster. The first entry for 753 notes that the sun was darkened, but gives no other details. The fact that this is the first entry for the year creates a mild presumption that the eclipse happened early in the year. I did not see any other events near this one that could be a dated independently, so there is no way to test the accuracy of the year. There were rather large eclipses in Ireland on 753 Jan 9 and 758 Apr 12. Since there was a large eclipse during the year stated, and since it came early in the year as the position of the entry suggests, I shall accept the identification of 753 Jan 9. Since there was another possibility with a dating error of 5 years, I shall use the small reliability of 0.2. Place: Ireland. Standard deviation of the magnitude: 0.1.” (Newton, p.194)

“753 Jan 9. Reference: Bede

(This is in the ‘Continuation’.) ‘In the year 753, the 5th year of Eadberht’s reign, there was an eclipse of the sun on the 5th ides January (= Jan 9). Later that same year and month, which is the 9th calends February (= Jan 24), the moon endured an eclipse, covered with horrible black shield, like the sun a little before.’ (The Latin text is as rough as my translation.)

There are two disturbing features of this report, besides the need to supply ‘5th’ as described in the footnote. The editor (Plummer) says that the original has the year as 756, but that he changed it to 753 because 753 was the only year for a long time in which both a solar and a lunar eclipse were visible in January in England. Since the day of the month is correct for both eclipses, provided that the year is really 753, this action of the editor seems justified.

It is more disturbing that the record uses language clearly taken from the record 733 Aug 14b B, E above. This makes one wonder how reliable the copying of the original text was in even the oldest manuscripts that we now have. Since the days of the month are correct, I shall assume that the copyist merely let his eye wander to an earlier annal, and that the record as we now have it is basically correct.

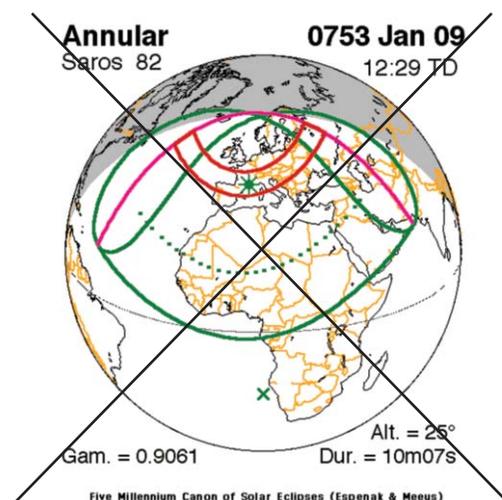
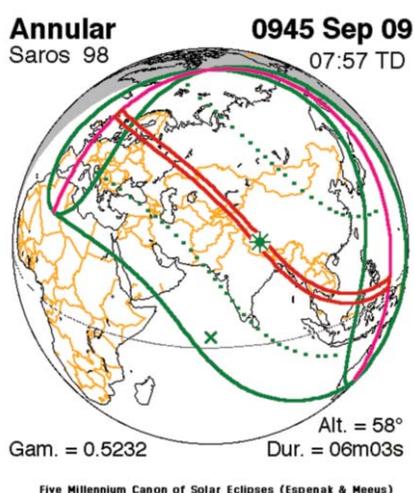
I shall lower the reliability to 0.3 because of all the problems with the record. Standard deviation of the magnitude: 0.1. Place: Jarrow.” (Newton, p. 153-4)

“S. 753 Jan 9 ANNULAR (SOLAR) ECLIPSE IN ENGLAND AND IRELAND

‘753, 15th year of king Eadbert of Northumbria, 5.id. Jan. (Jan.9), a solar eclipse occurred; shortly afterwards, in the same year and month, namely 9. Kal.Feb. (Jan.24), the Moon suffered eclipse, being covered, like the Sun a little earlier, by a fearful black shield’. Continuation of Bede’s Hist. Eccles.

The solar eclipse is also mentioned (dark Sun; no month of day) in th AU under 752 (meaning our 753) and in AT O’Connor 1952 makes the greatest magnitude for mid-Ireland be 0.87 at 10.35 a.m. We have encountered no record except from Britain and Ireland.” (Schove p.153-4)

This solar eclipse really happened on September 9 in CE 945, not in CE 753 January 9. Delta T = zero sec! (JD ~ 2066470.82)



The year of CE 956 (Traditional AD = CE 762/763/764)

“764 Jun 4. Reference: Ulster. The entry for 763 (after correcting for the systematic error) notes that the sun was darkened at the third hour of the day, but does not give the day of the year. I did not notice any historical events that would allow testing the accuracy of the year. Ulster notes a lunar eclipse for 773 Dec 4. There was a total eclipse of the moon visible in Ireland on that date, but this is too far away to give good confirmation. However, the entry for 762 records ‘a great snow and an eclipse of the moon’. The reference to the great snow and the fact that this is the first entry of the year both suggest an eclipse occurring early in the year. There was an eclipse of magnitude 0.4 on 762 Jan 15 visible in Ireland, a total eclipse on 763 Jan 4, and an eclipse of magnitude 0.8 on 763 Dec 25. There were no other winter eclipses visible in Ireland for several years on either side of these dates.

Hence there is a strong presumption that the year 763 is close to being right for the solar eclipse. The only possible eclipse that occurred during the morning was that of 764 Jun 4; it would have been maximum in Ireland at about the 4th hour. Hence this is almost surely the right identification, and the lunar eclipse was thus probably that of 763 Jan 4. This identification is strengthened by the consideration that the lunar eclipse of 763 Jan 4 is the only one of the various possible eclipses that was total.

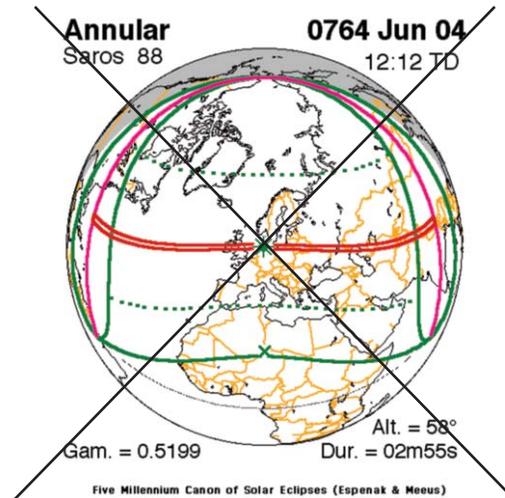
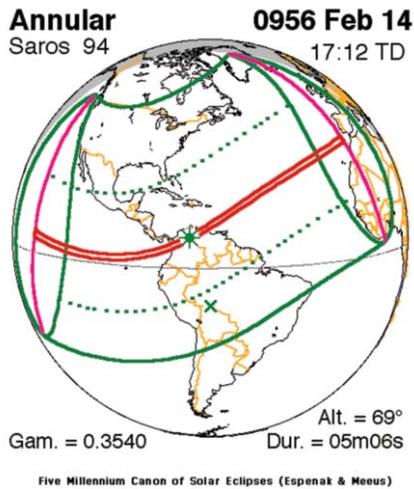
I shall accept the identification of 764 Jun 4 for the solar eclipse, with a reliability of 0.5. Place: Ireland. Standard deviation of the magnitude: 0.1.” (Newton p. 194)

“S. 764 June 4 ANNULAR (SOLAR) RECORDED IN IRELAND AND FRANCIA

The eclipse is also mentioned in Irish annals. The Annals of Ulster have under 762 ‘Sol tenebrosis in hora tertia diei, ‘A dark Sun in the third hour of the day. 762 in AU would normally mean AD 763, but here the reference is to S.764 June 4...” (Schove, p. 158-9)

The back calculation of the Solar Saros Series – 94 is not accurate.

This solar eclipse really happened on February 14 in CE 956, not in CE 764 June 4. (JD ~ 2070281.213)



The year of CE 970/Era 816 (Traditional AD = CE 777-779)

“779 Aug 16? Classic example of a magical eclipse.” (Newton, p. 320)

“779 Aug 16. Reference: Turolodus. Turolodus 12th - century version of the Roland legends makes a magical eclipse occur at the death of Roland. I discussed this account at some length in AAO.

I did not advance it seriously as a record of an eclipse; instead I used it *pedagogically*. ...” (Newton, 1972 p. 324)

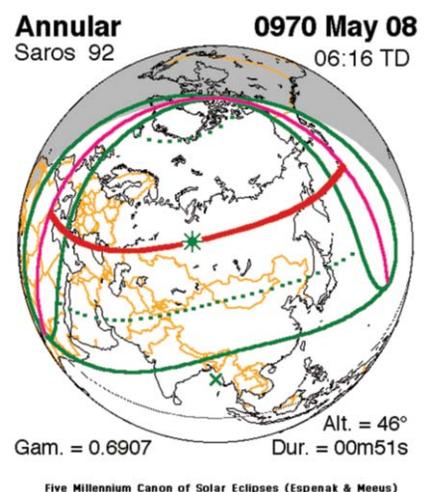
“777-9 GHOST ECLIPSE OF ROLAND

Roncevaux eclipse: fact or fiction?

The Chanson de Roland, a poetic account of the death of Roland and others in an ambush in the Pyrenean pass of Roncevaux mentions an eclipse of the Sun which has all the appearance of being fictional.” (Schove, p. 160)

The back calculation of the Solar Saros Series – 92 is not accurate.

This solar eclipse really happened on May 8 in CE 970, not fiction... (JD ~ 2075477.7)

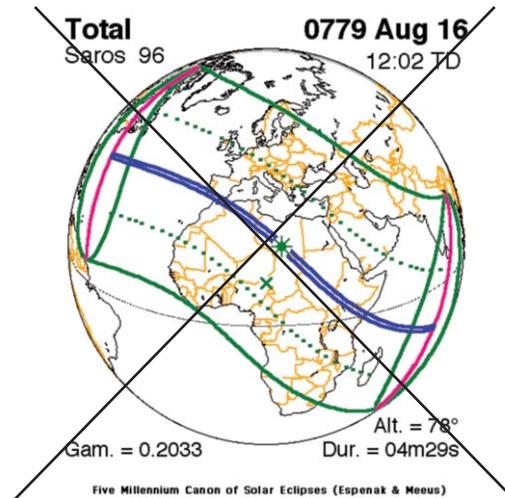
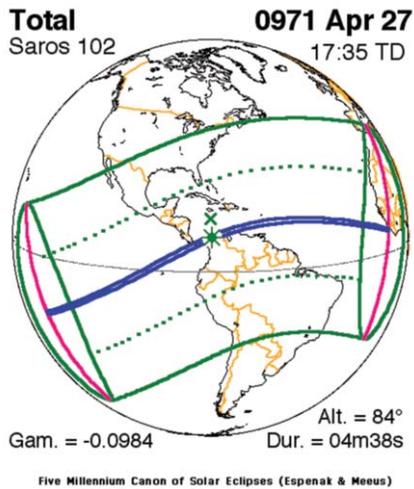


The year of CE 971/Era 817 (Traditional AD = CE 779)

“Ginzel 1886 (980-1) discussed a record of this eclipse contained in a North Spanish manuscript (probably from Oviedo) at the Escorial near Madrid. The Escorial record gives correctly (Spanish) Era 817 (=AD 779) and xvii Kal. Sept. (= Aug. 16)...” (Schove, p. 162)

The back calculation of the Solar Saros Series – 102 is not accurate.

This solar eclipse really happened on April 17 in CE 971, not in CE 779 Augustus 16. (JD ~ 2075832.2)



The year of CE 977, AH 167, YZ 346, Seljuk AH 367

“One of the Ibn Yunus eclipses, it was observed by astronomers at Cairo between 8.20 and 10.40 a.m., Cairo mean time, with a maximum magnitude about 0.67.” (Schove, p. 237)

“AD 977 Dec 13: Cairo [Saros 96]

This solar eclipse was in the early morning of Thursday the 28th of the month of Rabi ‘al-Akhir, in the year 367 of al-Hijrah (date on Persian calendar)...

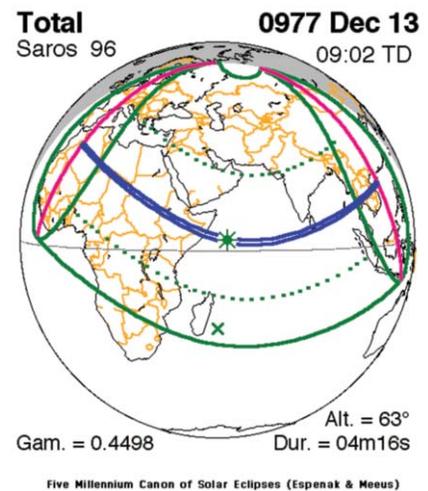
RESULTS thus Delta T = 2000 sec.” (Stephenson, p. 473)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 96 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series - 96 is not accurate.

This solar eclipse really happened on December 13 in CE 977.

Delta T ~ Zero sec! (JD ~ 2078253.873)



The year of CE 978, AH 167, YZ 347, Seljuk AH 367

“This Ibn Yunus eclipse was observed at Cairo between about 2.30 and 4.50 p.m., Cairo mean time.” (Schöve, p. 238)

“AD 978 Jun 8: Cairo [Saros 101]

This solar eclipse was on Saturday the 29th of (the month of) Shawwal in the year 367 of *al-Hijrah*... (date on Persian, Syrian and Coptic calendars)...

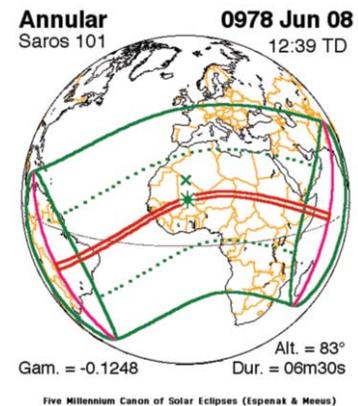
RESULTS ...thus Delta T ~ 1300 sec.” (Stephenson, p. 473)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 101 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series - 101 is not accurate.

This solar eclipse really happened on June 8 in CE 978.

Delta T ~ Zero sec! (JD ~ 2078431.024)



The year of CE 979, AH 168/169, YZ 348, Seljuk AH 368/369 (Traditional AD = CE 787)

“M. 979 May 14-15 ANNULAR IN EGYPT

This partial lunar eclipse, of Oppolzer magnitude 0.73, occurred entirely before mid-night throughout the Western world, during the evening of Wednesday or Thursday. It is one of the Ibn Yunus eclipses. At Cairo it was observed that the Moon rose eclipsed, and that the eclipse ended 1h 12m after sunset. (Schöve, p. 238)

“AD 979 May 14/15: Cairo [Saros 85]

This lunar eclipse was in (the month of) Shawwal in the year 368 of *al-Hijrah*...

RESULT thus Delta T ~ 1650 sec. (Stephenson, p. 482)

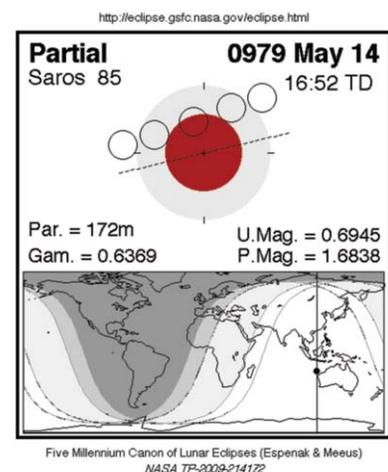
“As the horizon at Cairo is somewhat hilly towards the south-east accurate limits to Delta T cannot be derived without considering the horizon profile in detail. However, making no allowance for this effect leads to such wide limits for Delta T ($-4100 < \Delta T < 550$) that attempts to refine this solution would not be worthwhile. The observation will thus not be considered further.” (Stephenson, p. 497)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 85 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 85 is not accurate.

This lunar eclipse really happened on May 14-15 in CE 979.

Delta T ~ Zero sec! (JD ~ 2078771.2)



“M. 979 May 28 ANNULAR IN EGYPT

This is another Ibn Yunus eclipse. At Cairo the Sun was seen less than half eclipsed; Schroeter’s table suggests a maximum magnitude about 0.40 there.” (Schove, p. 238)

“979 May 28. The time given was not stated to be the beginning of the eclipse but rather the time when it became ‘sensible to view’. This time will be ignored. It is not clear whether the magnitude given was the maximum of the eclipse or the magnitude at sunset; it will be necessary to test both possibilities in Part II.” (Newton, AAO p.150)

“AD 979 May 28: Cairo [Saros 111]

This solar eclipse was in the late afternoon of Wednesday the 23rd of (the month of) Shawwal in the year 368 of al-Hijrah...(date on Persian, Syrian and Coptic calendars)...

RESULTthus Delta T = 1450 sec. (Stephenson, p. 484)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 111 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series – 111 is not accurate.

“787 Sep 16. Reference: Theophanes. ‘Ninth of September month, Indiction 11, day of the Lord, a very great eclipse of the sun happened at the 5th hour of the day, during mass.’ This was during the 7th year of Constantine VI, emperor 780-797. Calculation from the Indiction according to the rules given in Section XV.1 yields the year 787. The eclipse date 787 Sep 16 was on the first feria, so it looks as if this is a reliable account of that eclipse, with an accidental error of exactly one week in reading the date from the calendar. I would guess that the eclipse was maximum at about the 3rd hour from Oppolzer, but the difference is not enough to affect the identification.

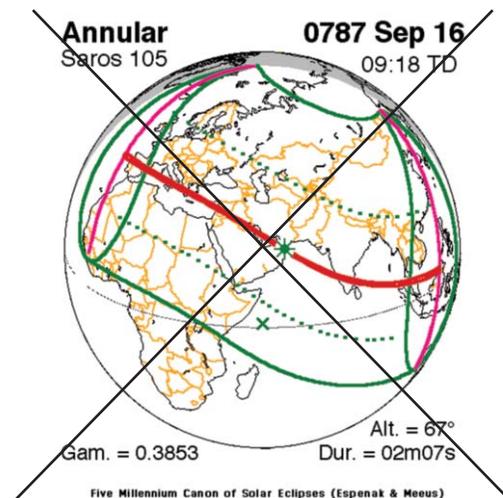
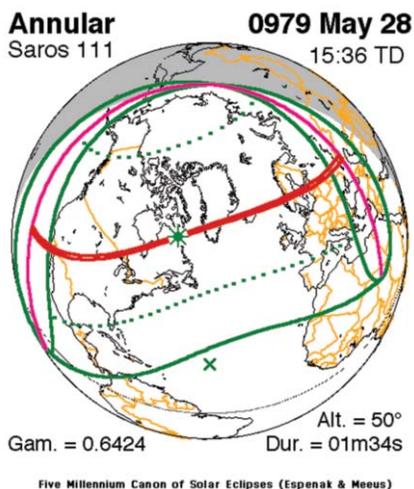
It is notable that Theophanes changed his style of reporting eclipses at this point. Since we are now well into his adult life, it is plausible that he has begun to use his own notes. Reliability: 1. Place: Constantinople. Standard deviation of the magnitude: 0.02, since this was a ‘very great’ eclipse.

Cedrenus has obviously copied from Theophanes (or from Theophanes’ source if Theophanes is not original). He has the same mistake of giving Sep 9 rather than Sep 16.”

(Newton, 1972 p. 544-5)

This solar eclipse really happened on May 28 in CE 979, not in CE 787 Sep 16.

Delta T ~ Zero sec! (JD ~ 2078785.15)



“M. 979 Nov. 6-7 PARTIAL IN EGYPT

This partial eclipse, of Oppolzer magnitude about 0.86, occurred around Cairo mid-night. (Schove, p. 238)

“AD 979 Nov 6/7: Cairo [Saros 90]

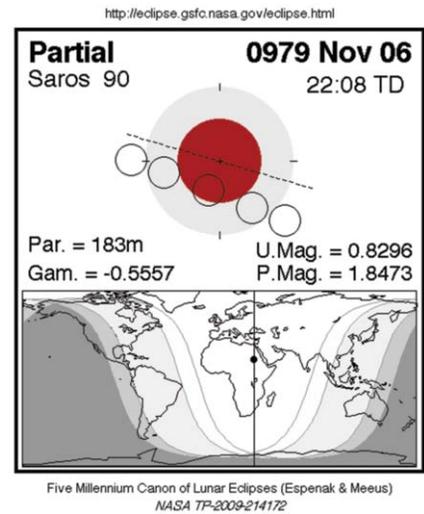
This lunar eclipse was in the month of Rabi ‘al-Akhir in the year 369 (of *al-Hijrah*) on the night whose morning was Friday the 13th of the month...(date on Persian, Syrian and Coptic calendars)...A group of scholars gathered to observe this eclipse...

RESULTS ...thus Delta T = 1900 sec, ...thus Delta T = 1300 sec.” (Stephenson, p. 483)

The back calculation of the Lunar Saros Series - 90 is not accurate, because of Ptolemy’s wrong phases of the Moon!

This lunar eclipse really happened on November 6/7 in CE 979.

Delta T ~ Zero sec! (JD ~ 2078947.42)



The year of CE 980

“M. 980 May 2-3 DEEP TOTAL IN EGYPT

Ibn Yunus gives information about both beginning and end, but the lunar altitude at the beginning needs emendation.” (Schove, p. 239)

“980 May 3. The record does not say whether the moon was to the east or the west at the beginning, but it should not be hard to distinguish these two options if the measurement is otherwise valid. Newcomb says that the altitude given was not attained at any time during this night and hence that there is a transmission error in the record.” (Newton, AAO p. 150)

“AD 980 May 2/3: Cairo [Saros 95]

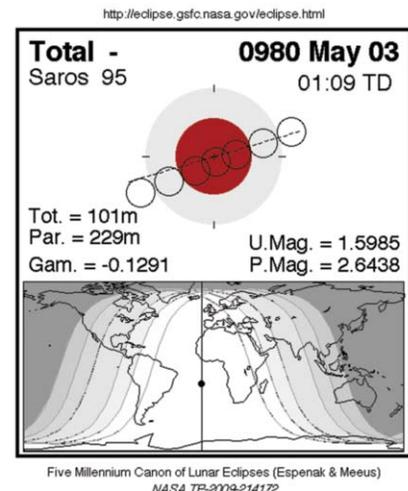
The Moon was totally eclipsed in (the month of) Shawwal in the year 369 of al-Hijrah on the night whose morning was Tuesday...(date on Persian calendar)...A group of scholars gathered to observe this eclipse.

RESULT thus Delta T ~ 2100 sec. (Stephenson, p. 483)

So, the back calculation of the Lunar Saros Series - 95 is not accurate.

This lunar eclipse really happened on May 2/3 in CE 980.

Delta T ~ Zero sec! (JD ~ 2079125.54)



The year of CE 981

“M. 981 Apr. 21-22 SMALL PARTIAL IN EGYPT

This small partial eclipse, of Oppolzer magnitude 0.18 at UT 2h 20m, occurred entirely after midnight at Greenwich and therefore at Cairo, where Ibn Yunus says it was observed. He gives maximum magnitude about 0.25, and his information about beginning and end leads to times around 3.30 and 5.08 a.m., Cairo mean time.” (Schöve, p. 239)

“AD 981 Apr 21/22: Cairo [Saros 105]

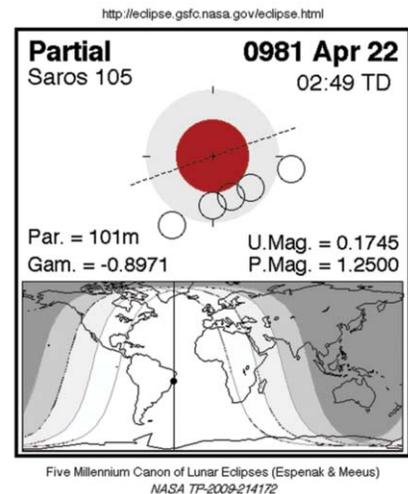
This lunar eclipse was in the month of Shawwal in the year 370 of *al-Hijrah* on the night whose morning was Friday....(date on Persian, Syrian and Coptic calendars)...We gathered to observe this eclipse at al-Qarafa in the Mosque of Ibn Nasr al-Maghribi. ...

RESULTS ...thus Delta T ~ 2000 sec, ...thus Delta T ~ 2350 sec.” (Stephenson, p. 483-4)

So, the back calculation of the Lunar Saros Series - 105 is not accurate.

This lunar eclipse really happened on April 21/22 in CE 981.

Delta T ~ Zero sec! (JD ~ 2079479.61)



“M. 981 Oct. 15-16 SMALL PARTIAL IN EGYPT

This small partial eclipse, of Oppolzer magnitude 0.36 at UT 2h 54m, also occurred entirely after midnight at Greenwich and therefore at Cairo, where Ibn Yunus says it was observed. He gives maximum magnitude about 0.42. His lunar altitude at ‘l’attouchement par dehors’ is agreed to give about 4.18 a.m., Cairo mean time; Newt.1970, 150 ignores this time because of the phraseology, but Newc.1878, 52 found it less than a quarter of an hour later than this calculated beginning.” (Schöve, p. 239)

“981 Oct 15. Since the phase given was ‘attouchement’ the time in this record will be ignored.” (Newton, AAO p. 150)

“AD 981 October 15/16: Cairo [Saros 95]

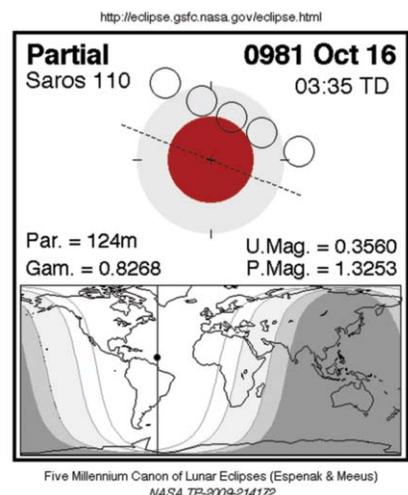
The Moon was eclipsed in the month of Rabi’ al-Akhir in the year 371 of al-Hijrah on the night whose morning was Sunday. About 5 digits of diameter were eclipsed...

RESULT thus Delta T ~ 1500 sec. (Stephenson, p. 484)

So, the back calculation of the Lunar Saros Series - 110 is not accurate.

This lunar eclipse really happened on October 15/16 in CE 981.

Delta T ~ Zero sec! (JD ~ 2079656.64)



The year of CE 983

“M. 983 Mar. 1-2 TOTAL IN EGYPT

According to Oppolzer and Schroe., this total eclipse had maximum magnitude about 1.09 some 20 minutes before Greenwich midnight. Ibn Yunus says it was observed at Cairo. The stated lunar altitude at the beginning, namely 66° , is necessarily wrong, being more than the Moon’s meridian altitude.” (Schove, p. 240)

“983 Mar 1. The first phase is called ‘sensible to view’, so the time of this phase will be ignored. According to Newcomb, the altitude of the moon given for this phase is physically impossible, so that the time is not usable anyway.” (Newton, AAO p. 150-1)

“AD 983 Mar 1/2: Cairo [Saros 87]

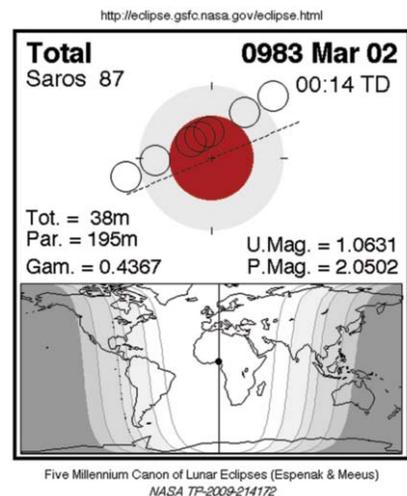
This lunar eclipse was in the month of Ramadan in the year 372 of *al-Hijrab* on the night whose morning was Friday, the 15th of the month... (Date on Persian, Syrian and Coptic calendars)...The Moon was totally eclipsed ...

RESULTS ...thus Delta T = 1200 sec.” (Stephenson, p. 484)

So, the back calculation of the Lunar Saros Series - 87 is not accurate.

This lunar eclipse really happened on March 1/2 in CE 983.

Delta T ~ Zero sec! (JD ~ 2080158.5)



The year of CE 985

“S. 985 July 20 PARTIAL PHASE IN EGYPT

The central line of totality runs from New Mexico via the Atlantic and North Africa to an end in Equatorial East Africa. Ibn Yunus says magnitude 0.25 was observed at Cairo.” (Schove, p. 240)

“AD 985 Jul 20: Cairo [Saros 100]

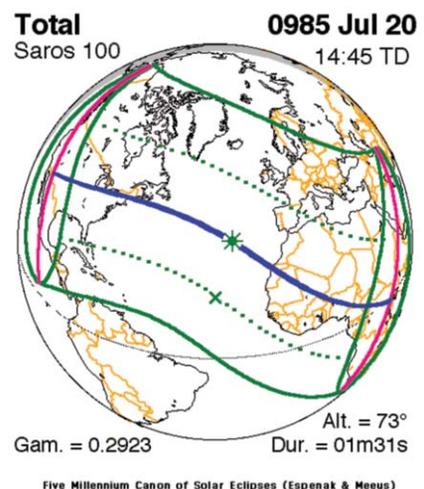
This solar eclipse was in the late afternoon on Monday at the end of (the month of) Safar in the year 375 of *al-Hijrab*...

RESULTS ...thus Delta T ~ 1500 sec, ...thus Delta T ~ 750 sec.” (Stephenson, p. 474)

So, the back calculation of the Solar Saros Series - 100 is not accurate.

This solar eclipse really happened on July 20 in CE 985.

Delta T ~ Zero sec! (JD ~ 2081030.11)



The year of CE 986

“M. 986 Dec. 19 LARGE PARTIAL IN EGYPT

A large partial eclipse, of Oppolzer magnitude 0.925 at UT 4h 11m. Ibn Yunus gives magnitude about 0.83 at Cairo, and an initial lunar altitude from which Newcomb finds a beginning at 4.56 a.m., Cairo mean time, about 22m later than Newcomb’s tabular value. At Cairo the Moon set eclipsed.

There is also some problematical information, on which Caus.1799, 9 and Caus.1804, 172 differ, and E.B. Knobel may be consulted. See Newcomb 1878 and Newton 1970; the latter author decides to ignore the record.” (Schove, p. 240-1)

“986 Dec 19. The heights of the moon at the beginning and at ‘attouchement’ differ by 26 grad. This seems impossible, whatever attouchement may have meant. Further, attouchement would have had to occur before the beginning. It seems likely that parts of different records have been copied by accident. Since the moon set still eclipsed, the altitude listed for the beginning may be correct, and Newcomb used it. *I consider it safer to ignore this record altogether.*”

(Newton, AAO p. 151)

“AD 986 Dec 18/19: Cairo [Saros 89]

This lunar eclipse was on the night whose morning was Sunday, the 15th of (the month of) Sha’ban in the year 376 of *al-Hijrab*. The eclipse became noticeable when the altitude of the Moon was 24 deg in the west...

RESULTS ...thus Delta T ~ 800 sec.

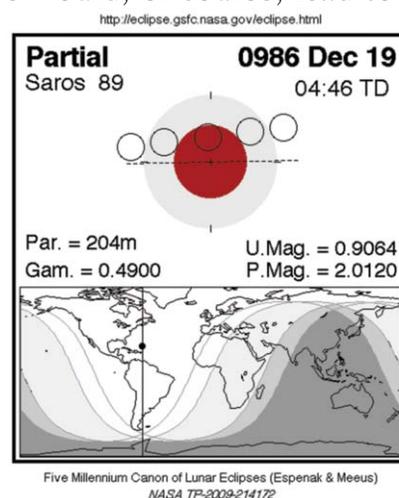
NB an earlier moment for the detection of the eclipse would, of course, lead to a higher result for Delta T.” (Stephenson, p. 485)

So, the back calculation of the Lunar Saros Series - 89 is not accurate because of Ptolemy’s wrong phases of the Moon!

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 89 Lunar Saros Series perhaps is not perfect.

This lunar eclipse really happened on December 18/19 in CE 986.

Delta T ~ Zero sec! (JD ~ 2081546.7)



The year of CE 990 (Traditional AD = CE 797/798)

“M. 990 Apr. 12-13 PARTIAL IN ISLAM

A partial eclipse, for which Oppolzer gives the magnitude about 0.76 with mid-eclipse at UT 21h 43m and semi-duration of 1h 30m. Goldstine 1973 gives opposition (not quite the same thing as mid-eclipse) at UT 21h 39m. The eclipse was observed at Cairo with magnitude 0.625, according to Ibn Yunus, but the record has been mistrusted.” (Schove, p. 241)

“990 Apr 12. Because ‘attouchement’ is used, the first time given will be ignored. Newcomb also ignored the time of the end phase, but I did not note his reason.” (Newton, AAO p. 151)

“AD 990 April 12/13: Cairo [Saros 86]

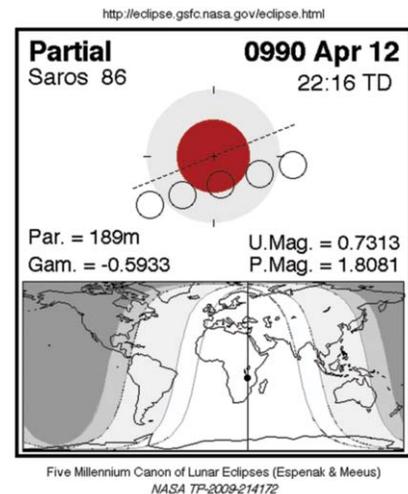
This lunar eclipse was on the night whose morning was Sunday, the 16th of (the month of) Muharram in the year 380 of *al-Hijrah*. 7 ½ digits of the Moon’s diameter were eclipsed, as I guessed....

RESULTS ...thus Delta T = 3500 sec.” (Stephenson, p. 486)

So, the back calculation of the Lunar Saros Series - 86 is not accurate.

This lunar eclipse really happened on April 12/13 in CE 990.

Delta T ~ Zero sec! (JD ~ 2082757.42)



„S. 797-8 March 3? VOLCANIC DARKNESS

We have encountered no true record of either of these eclipses, but they need examination to see whether one of them may have any connection with mention (first at Constantinople) of a darkening of the Sun for 17 days. The answer is certainly No.

It is known that in 797 (probably mid-August) Irene blinded her son, Constantine VI, and assumed sole imperial power. Under AM 6289 (AD 786-7) Theophanes, a contemporary, says: ‘The Sun was darkened for 17 days and did not give off its rays, so that ships went off course, and everyone said that the Sun stopped shining because of the blinding of the emperor; and thus his mother Irene came to power’. No eclipse fits....

S.797 March 3 was annular and ended at sunset in the Northern Sudan;

S.798 Feb. 20 was also annular, but ended at sunset between Scotland and Iceland;

Consequently, it is not worth while to give detailed references to later writers who tell the same tale. Among Byzantines, these include George the Monk (Hamartolos), Leo Grammaticus, and Cedrenus. Among other oriental writers, Hamza al-Isfahani.” (Schove, p. 167)

“798 Feb 20. Reference: Theophanes. ‘...the sun for 17 days gave off no rays,...’

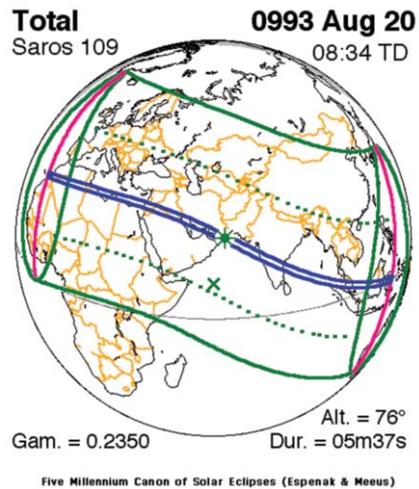
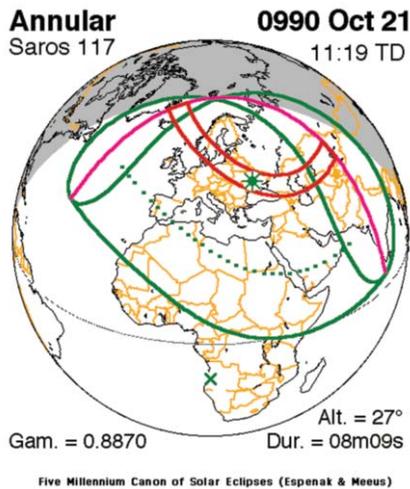
One may not totally dismiss a story such as this without study. One must consider the possibility that the account has been garbled, or that an actual event has been exaggerated. It is doubtful that this is an exaggerated account of an eclipse. The eclipse of 798 Feb 20 may have been a partial eclipse visible just at sunset in Western Europe, but it should not have been visible at all in Constantinople within seven years of this date. It is possible that a volcanic eruption or some other event put a large amount of dust into the air, and the account seems to suggest this kind of darkening more than an eclipse...

I shall not take this to be a record of an eclipse.” (Newton, 1972 p. 545-6)

This solar eclipse really happened on October 21 in CE 990.

The back calculation of the Solar Saros Series - 117 is not accurate.

Delta T ~ Zero sec! (JD ~ 2082948.97)



**The year of CE 993, AH 183, YZ 362, Seljuk AH 383
(Traditional AD = CE 796/97/98)**

“S. 993 Aug. 20 TOTAL SOLAR S. MEDITERRANEAN (LARGE IN EGYPT)

Oppolzer’s central line of totality begins in Morocco, and proceeds to a noon point near the coast of Pakistan and an end in Indonesia. Schroeter’s band of totality passes just north of Alexandria and almost centrally over Jerusalem.

Ibn Yunus says the eclipse was seen at Cairo, with magnitude two thirds of the surface (implying about 0.73 of the diameter). From solar altitudes at beginning and end, Newcomb and Newton find the equivalent of Cairo mean times about 7.43 and 10.25 a.m.” (Schove, p. 243-4)

“AD 993 Aug 20: Cairo [Saros 109]

This solar eclipse was in the forenoon of Sunday the 29th of (the month of) Jumada al-Ukhra in the year 383 of al-Hijrah... (date on Persian, Syrian and Coptic calendars)... The eclipse began when the altitude of the Sun was 27 deg in the east and was complete (i.e. reached its maximum) when the altitude was 45 deg in the east. The Sun cleared when its altitude was 60 deg in the east. About 2/3 of it (i.e. the surface) was eclipsed.

Use of the provisional Delta T result obtained from equation (8.1) (1750 sec) leads to a calculated magnitude of 0.96. The observed magnitude (equivalent to 0.59 in terms of the solar diameter) would thus appear to represent a considerable underestimate (see also section 13.10). This eclipse was independently reported to be total by the Cairo chronicler, al- Maqrizi (see chapter 12). However, al-Maqrizi lived more than four centuries after the event and his source is unknown.

RESULT ...thus Delta T = 2000 sec.

NB for this eclipse to be partial at Cairo, in accordance with the observation recorded by Ibn Yunus, either Delta T < -2800 or Delta T > -750 sec. Neither of these limits are at all critical and will be disregarded in further investigation.” (Stephenson, p. 474-5)

So, the back calculation of the Solar Saros Series - 109 is not accurate.

This solar eclipse really happened on Augustus 20 in CE 993.

Delta T ~ Zero sec! (JD ~ 2083982.8)

The year of AD 993

“AD 993 Aug 20: Cairo?

(383 AH.) *In this year the Sun was eclipsed totally at the end of (the month of) Jumada al-Ukbra. It was so dark that the stars appeared and people could not see the palms of their hands. The eclipse cleared at the end of the day. [Al-Maqrizi: Itti'az al-Hunafa bi Akhbar al-A'amma al-Fatimiyyin al-Khulafa, vol. I, p.280]*

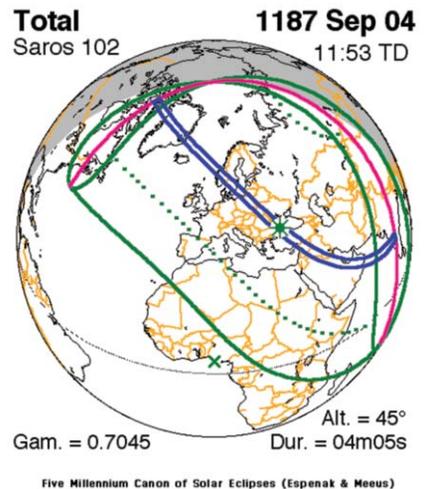
Although al-Maqrizi spent most of his life in Cairo, he wrote more than four centuries after the eclipse. Hence the place of observation must be regarded as very doubtful; there is nothing in the text itself to indicate a Cairo source. Although al-Maqrizi appears to quote from an eye-witness description of totality, careful observations made in Cairo and recorded by the contemporary astronomer ibn Yunus indicate that the eclipse was only partial there and ended in mid-morning (see chapter 13). Al-Maqrizi may have obtained his information from a source much to the east of Cairo.

Calculation using equation ($\Delta T = 1750 \text{ sec}$) indicate that at Cairo the magnitude would be 0.96 at 8.9 b.”... (Stephenson, p. 444)

So, the back calculation of the Solar Saros Series - 102 is not accurate.

This solar eclipse really happened on September 4 in CE 1187!!!

(JD ~ 2154856)



The year of CE 999 (Traditional AD = CE 809/810)

“S.809 July 16 PARTIAL SOLAR IN N. W. EUROPA

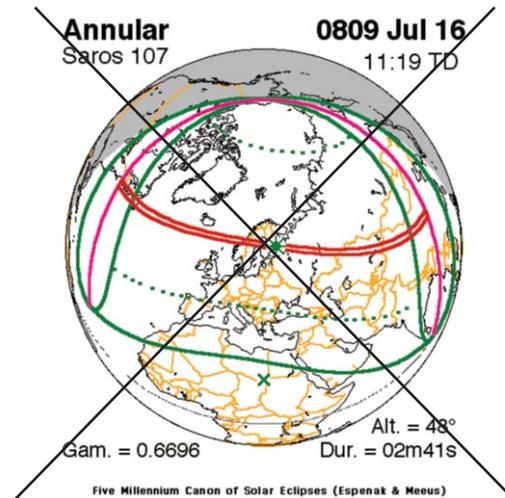
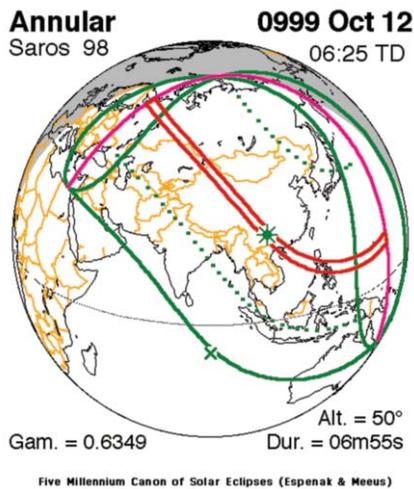
This was essentially a northern eclipse, and the original record probably English. The ASC has ‘809’. In this year there was an eclipse of the Sun at the beginning of the fifth hour of the day on xvii. Kal. Aug. [July 16], the second day of the week [Monday], the 29th day of the Moon.” (Schöve, p.176)

“809 Jul 16. Reference: [Whitelock et al.](#) Most texts read something like: ‘In this year was an eclipse of the sun at the beginning of the fifth hour of the day on 16 July, the second day of the week, the 29th day of the moon.’ ...

For the solar eclipse I take the following: Place, England; standard deviation of magnitude, 0.06, reliability, 1. Since neither the hour nor the magnitude of the lunar eclipse [July 1] was recorded, the lunar eclipse report does us no good.

Newcomb does not include the eclipse of 809 in his list of eclipses visible in England.” (Newton, AAO p. 51-52)

This solar eclipse really happened on October 12 in CE 999 not in CE 809 July 16. $\Delta T \sim \text{Zero sec!}$ (JD ~ 2086226.76)



The year of CE 1001, AH 191, YZ 370, Seljuk AH 391

“AD 1001 Sep 5/6: Cairo [Saros 92]

This lunar eclipse was in (the month of) Shawwal in the year 391 of al-Hijrah at the start of the night of Saturday, the 14th of the month... (Date on Persian calendar)... The Moon cleared when about 2 seasonal hours of night had elapsed (i.e. after sunset). I saw the Moon before its clear-ance and it was like a crescent.

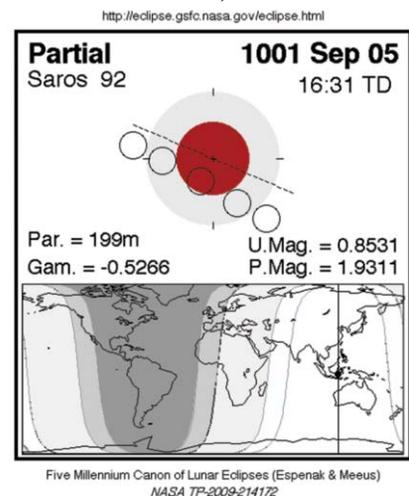
It is not clear whether the estimate of 2 hours is only approximate, but this will be assumed.

RESULTS ... thus Delta T ~ 600 sec.” (Stephenson, p. 486)

So, the back calculation of the Lunar Saros Series - 92 is not accurate.

This lunar eclipse really happened on September 5/6 in CE 1001.

Delta T ~ Zero sec! (JD ~ 2086921.2)



The year of CE 1002, AH 192, YZ 370, Seljuk AH 392

“1002 Mar 1. The translation of Ebn Iounis cited in the references list a total eclipse of the moon for this date. A translator’s note also says that the record is partly garbled and that the *translator has restored* one of the numbers by calculation. I have omitted this eclipse from Table V. 4.” (Newton, AAO p. 151)

“AD 1002 Mar 1/2: Cairo [Saros 97]

This lunar eclipse was on the night whose morning was Monday the 15th of the month of Rabi’ al-Akhir in the year 392 of al-Hijrah... (date on Persian calendar)... The Moon was totally eclipsed and had a staying (al-makhth: i.e. in totality or in darkness). The eclipse began when the altitude of (the star) (al-simak) al-ramih was 12 (or 52) deg east

and when the altitude of (the star) al-hadi was 14 deg in the west. The altitude of (the star) (al-simak) al-ramih at the complete clearance was 35 deg.

There is evidence of scribal errors in recording both altitudes of alpha Boo. The elevation if this star at first contact (implying an LT of 20.25 h) is incompatible with that of alpha Aur at the same moment (LT= 23.55 h). However, the symbols for the numbers 12 and 52 are so similar that confusion is not uncommon- as noted by Caussin (1804). Reading 52 deg for altitude of alpha Boo leads to a LT of 23.48 h, which is in fairly good accord with that derived from the alpha Aur measurement. This altitude will thus be adopted.

Assumption of an altitude for alpha Boo of 35 deg in the west at the end of the eclipse implies an LT of 6.41 h. This is about 40 minutes after sunrise, so that the star would be invisible; further, an excessive duration for the eclipse of nearly 7 h would be implied. In this case, it is not possible to satisfactorily restore the altitude measurement at last contact.

RESULT thus Delta T = 1750 and 1950 sec.

The Delta T results obtained in this section are listed in table 13.3, and are plotted in figure 13.7.

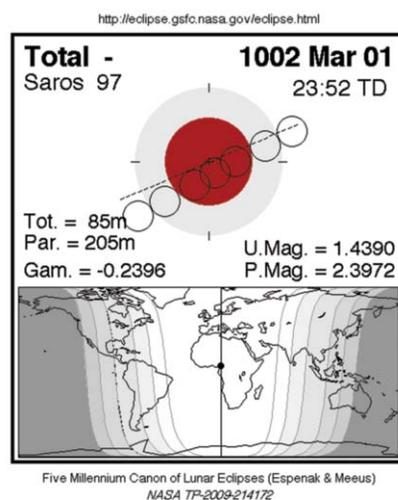
Comparison between figure 13.7 and figure 13.6 shows that the scatter is considerably greater for the lunar data. A partial explanation is poorer resolution of the contacts, perhaps combined with the greater difficulty of reading an instrument at night.” (Stephenson, p. 486-8)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 97 Lunar Saros Series perhaps is not perfect.

So, the back calculation of the Lunar Saros Series - 97 is not accurate.

This lunar eclipse really happened on March 1/2 in CE 1002.

Delta T ~ Zero sec! (JD ~ 2087098.5)



The year of AD 1003

“AD 1003 Feb 19/20: Jurjan

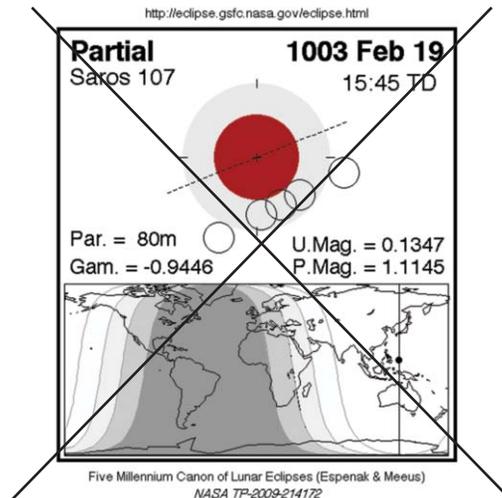
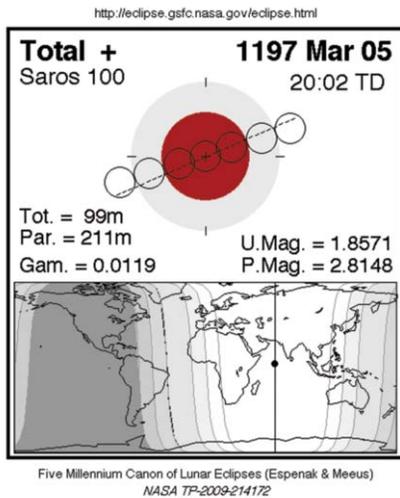
This lunar eclipse was on the night of Saturday the 14th of the month al Rabi’ al Akbir in the year 393 (of al-Hijrah). I observed the beginning and clearance at Jurjan... [Al-Biruni]:al-Qanun]....

RESULT... Delta T = 1450 sec.... (Stephenson, p. 491)

This lunar eclipse really happened on March 5 in CE 1197!!!

The back calculation of the Lunar Saros Series 100 and 107 are not accurate.

Delta T = Zero sec! (JD ~ 2158326.33)



“AD 1003 Aug 14/15: Jurjan

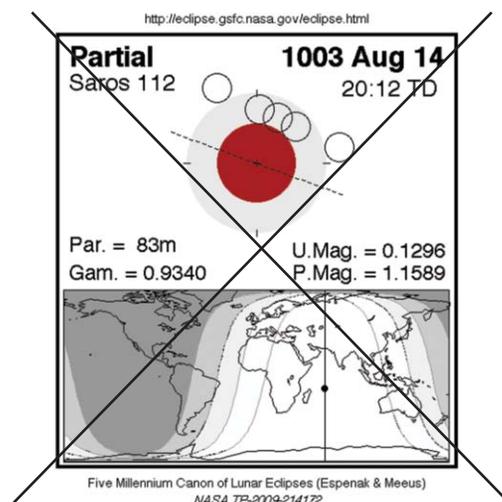
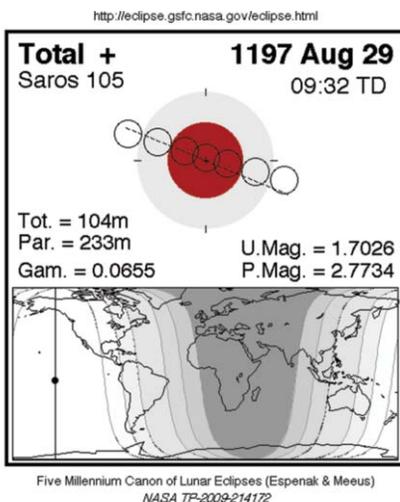
This lunar eclipse was on the night of Sanday the 13th of (the month of) Shawwal in the year 393 (of al-Hijrah). I observed it at Jurjan... [Al-Biruni]:al-Qanun]....

RESULT...thus Delta T = 700 sec.... (Stephenson, p. 491)

This lunar eclipse really happened on Augustus 29 in CE 1197!!!

The back calculation of the Lunar Saros Series 105 and 112 are not accurate.

Delta T ~ Zero sec! (JD ~ 2158502.9)



**The year of CE 1004, AH 194, YZ 372, Seljuk AH 394
(Traditional AD = CE 812/814)**

“1004 Jan 24. This record gives times for both the beginning and being sensible to view. These times will be ignored, as will the time of greatest phase of this record and elsewhere. The record does not say whether the magnitude is of the diameter or the area. Luckily, the difference is ignorable for a solar eclipse this large. It will be necessary in Part II to test for the point of observation lying on both sides of the zone of totality, and to hope that one possibility can be excluded on a ‘reasonableness’ basis.” (Newton, AAO p. 151)

“AD 1004 Jan 24: Cairo. [Saros 105]

This solar eclipse was in the sign of Aquarius and was in the late afternoon of Monday the 29th of the month of Rabi’ al-Awwal in the year 394 of al Hijrah... (date on Persian, Syrian and Coptic calendars)... The Sun was eclipsed until what remained of it resembled the crescent Moon on the first night of the month. I estimated the eclipsed portion of the Sun to be 11 digits (i.e. of surface). The altitude of the Sun when the eclipse became noticeable in it (i.e. on its disk) was 16.5 deg in the west; thus I estimated (the altitude) at the beginning to be 18.5 deg. About quarter of the diameter was eclipsed when altitude was 15 deg, and half of the diameter was eclipsed when altitude was 10 deg. The eclipse was complete (i.e. maximum phase) when altitude was 5 deg.

Although the eclipse was generally annular, it is clear from the text that the observed phase at Cairo was only partial. The progress of the eclipse was carefully followed, and it thus seems very unlikely that the observers overlooked the annular phase.

RESULTS

For a partial eclipse at Cairo, either $\Delta T < 1770$ or $\Delta T > 1940$ sec.

Since the belt of annularity was rather narrow, only a restricted range of ΔT is ruled out by the observation of a partial eclipse. It is unfortunate that Ibn Yunus does not state whether the upper or lower part of the Sun remained visible. If he had done so, one of the above ΔT ranges would have been excluded. His remark that what remained of the eclipsed Sun ‘resembled the crescent Moon on the first night of the month’ may simply be an indication of the narrowness of the solar crescent, not necessarily the direction in which it was facing.

(NB computed LT of maximum phase = 16.7 h; solar altitude = 7deg.)” (Stephenson, p, 468)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 105 Solar Saros Series perhaps is not perfect.

“812 May 14. Reference: Theophanes. ’14 of May month, day sixth, a great solar eclipse happened for about three and half hours, from the eighth hour until the eleventh hour.’ (Newton, 1972 p. 546)

“S. 812 May 14. The hours in Theophanes and Michael are reasonable for Western Asia Minor and Syria respectively.” (Schöve, p. 180)

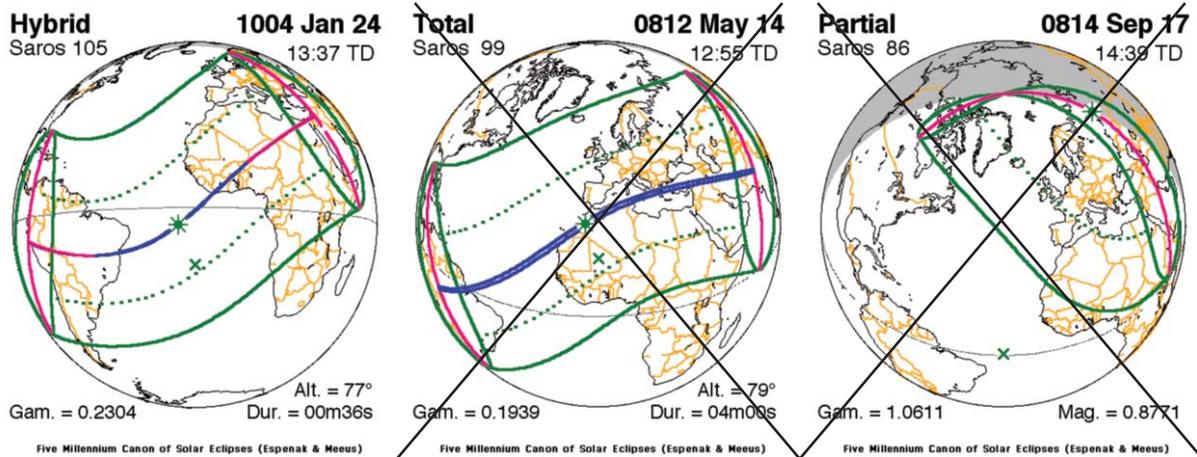
“S. 814 Sept. 17 CALCULATED SOLAR ECLIPSE

The later *Genealogia ducum Brabantiae ampliata* says, with reference to Charlemagne, ‘quo oriente sol obscuratus est’. Other references may exist, as in our reading we have not always noted vague statements of this kind, which frequently accompany accounts of the deaths of famous persons, and smack of superstition. There was no suitable solar eclipse near or after Charlemagne’s death (814 Jan. 28)... The report is most likely to have arisen either from a mere computational result, or as an abridgement of the usual allusions to eclipses before Charlemagne’s death...” (Schöve, p. 182)

So, the back calculation of the Solar Saros Series - 105 is not accurate.

This solar eclipse really happened on January 24 in CE 1004.

$\Delta T \sim$ Zero sec! (JD \sim 2087792)



The year of AD 1004

“AD 1004 Jul 4/5:Jurjaniyyah

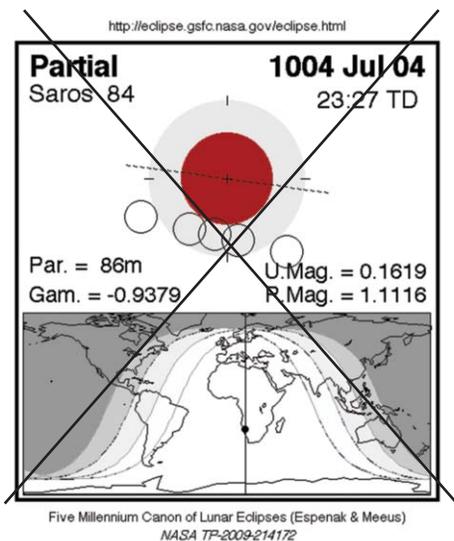
This lunar eclipse was on the night of Wednesday the 14th of the month of Ramadan in the year 394 (of al-Hibrah). I observed its middle at Jurjaniyyah of Khwarizm and found it to be 36;32 (minutes of day) after midday of Tuesday...in the year 1752 (of Nabonassar), Ghaznak is east of Jurjaniyyah by 1;42,12 (minutes of day)

[Al-Biruni].al-Qanun]....

RESULT...thus Delta T = 2600 sec.... (Stephenson, p. 492)

This lunar eclipse really happened on July 20 in CE 1198!!!

The back calculation of the Lunar Saros Series 77 and 84 are not accurate.



The year of CE 1005 (Traditional AD = CE 813)

“S. 813 May 4 TOTAL SOLAR IN SOUTH-EASTERN EUROPE...”

The primary account is that of Theophanes in the original Greek (Latin versions wrong). Western accounts are almost worthless, being mainly garbled versions of the Byzantine record. Correctly under AM 6305, Theophanes, Chronographia.

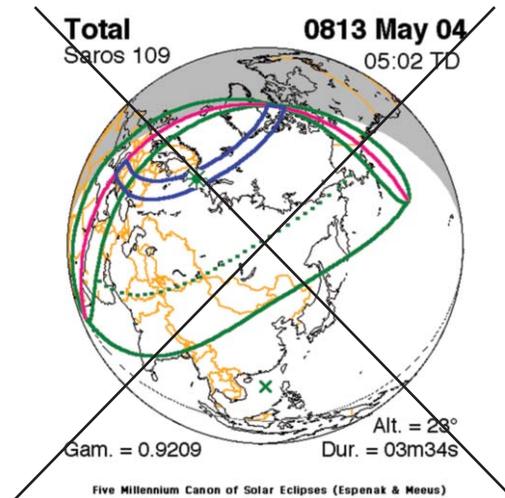
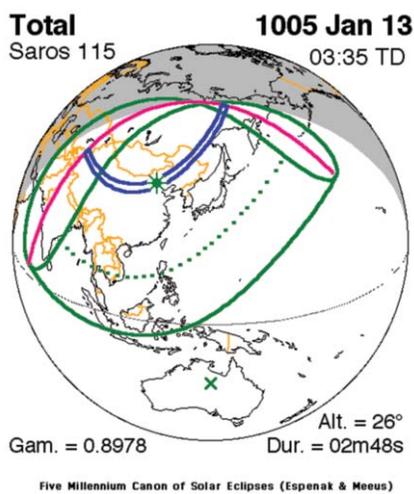
On the 4th of May an eclipse of the Sun occurred in the 12th degree of Taurus, **according to astronomical calculation**, as the Sun was rising; and great fear fell on the multitudes’. (Schöve, p.180)

“813 May 4. Reference: Theophanes. In the year following the preceding account we find: ‘On the 4th of May month an eclipse of the sun happened near the 12th degree of Taurus.’ The position given for the sun was probably **taken from tables a calendar rather than from observation**. Reliability: 1. Place: Constantinople. Standard deviation of the magnitude: 0.1.” (Stephenson, 1972 p. 547)

The back calculation of the Solar Saros Series - 115 is not accurate.

This solar eclipse really happened on January 13 in CE 1005, not in CE 813 May 4.

Delta T ~ Zero sec! (JD ~ 2088146.64)



“Complete obscuration of the Sun, on dates corresponding to **1005 Jan 13** and 1122 Mar 10 are briefly noted in the Annals (chaps. 14 and 29) of the Liao-shih, the official history of the Liao dynasty – also compiled under the direction of T’o T’o.” (Stephenson, p. 251)

The year of CE 1007 (Traditional AD = CE 811/12, SE 1123)

“S. 812 May 14. TOTAL IN SYRIA AND WESTERN ASIA MINOR PARTIAL PHASE IN FRANCIA

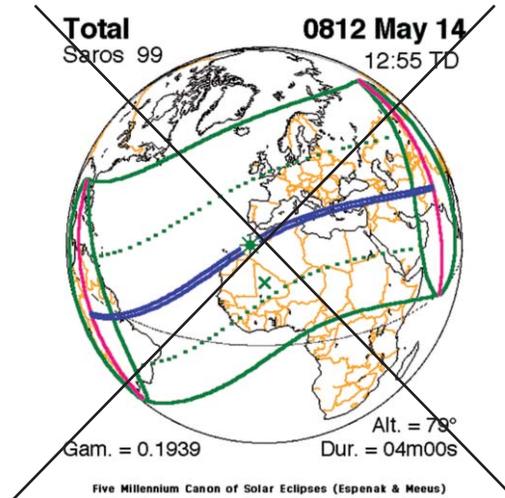
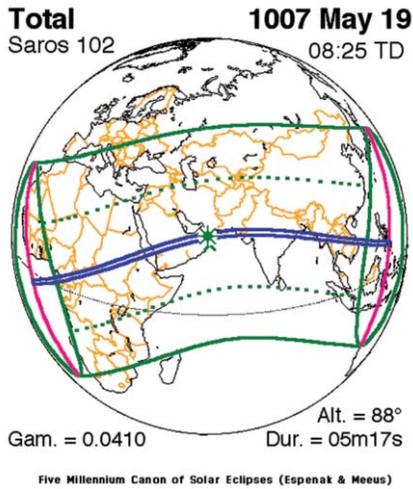
...But a correctly dated record of totality was given in the late 12th century by Michael, xii, 7 and Muller accepts the Edessa/Harran region as the place. ‘In the [Seleucid] year 1123 [AD 811-2], the 14th of “Iyar [May], there was a total eclipse of the Sun, from the ninth hour to the eleventh hour, and the darkness was as profound as night; the stars were seen, and people lit torches...” (Schöve, p. 179-180)

“AD 812 May 14: Syria?

...This is one of the earliest *detailed* accounts of a total solar eclipse from any part of the world. The event occurred more than centuries before the chronicler’s own era. Although the date is accurately recorded (1123 Seleucid = AD 811/2), the place of observation is unfortunately not specified.” (Stephenson, p. 423)

The back calculation of the Solar Saros Series – 102 is not accurate!

This solar eclipse really happened on May 19 in CE 1007, not in CE 812 May 14. Delta T ~ Zero sec! (JD ~ 2089002.84)



The year of CE 1010 (Traditional AD = CE 818)

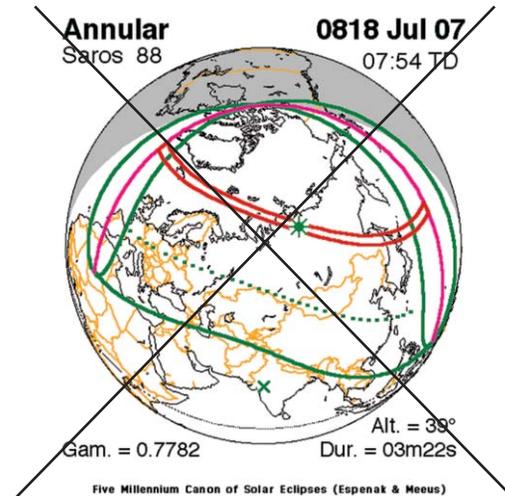
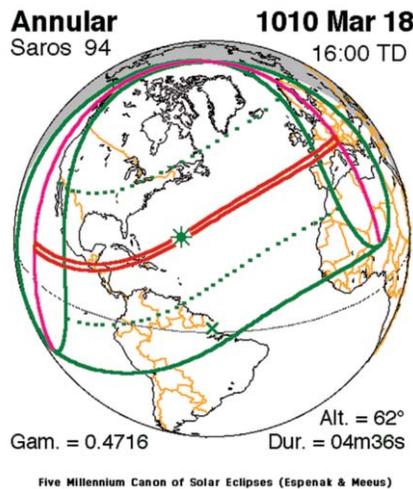
“S.818 July 7 PARTIAL SOLAR (CALCULATED?)

RFA: ‘818...An eclipse of the Sun occurred on 8.Id, Jul. (= July 8)’.

Similarly, with no hour, in the least ten other Frankish sources. In spite of unanimity about July 8, the true date was July 7, in the early morning.” (Schove, p. 182)

“818 Jul 7. References: Laurissenses, and Fuldenses. Both say the same thing under 818: ‘An eclipse of the sun occurred on the 8th ides July.’ The correct day is the nones of July.” (Newton, p. 397)

This solar eclipse really happened on March 18 in CE 1010, not in CE 818 July 7. Delta T ~ Zero sec! (JD ~ 2090037.16)



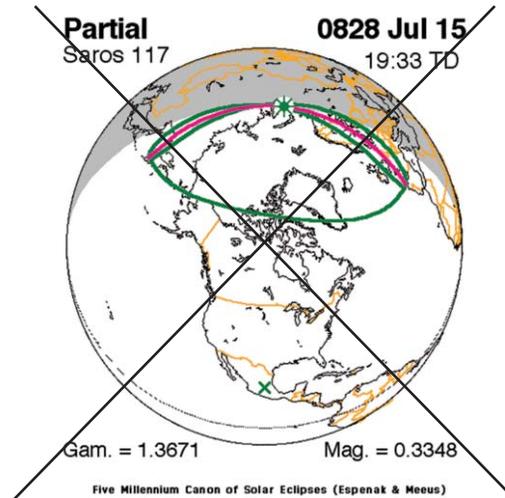
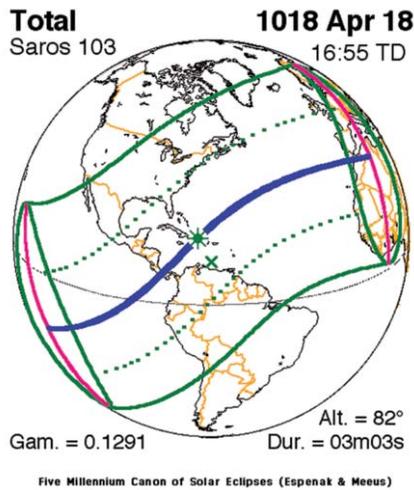
The year of CE 1018 (Traditional AD = CE 828)

“S. 828 July 15 FALSE DATE

We have encountered no Western record of this penumbral eclipse. In Europa it was practically invisible, and can have amounted at most to a sunset eclipse of trifling mag-

nitude. It is true that Newton 1972, p. 226, in a summary table, gives ‘828 July 15?’ in relation to a passage, ‘833... Sol et luna per eclypsim deficiunt’ in the (later) Chronicles of Sigebert of Gembloux in Belgium.” (Schove, p. 183)

This solar eclipse really happened on April 18 in CE 1018, not in CE 828 July 15.
Delta T ~ Zero sec! (JD ~ 2092990.2)



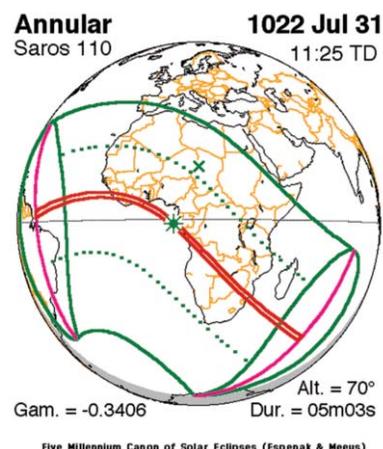
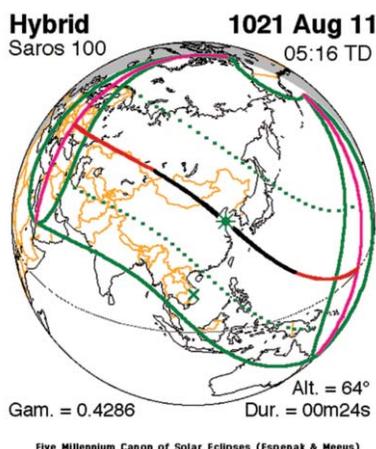
The year of CE 1021

“In the *Sung-shih*, as in the official histories of earlier dynasties, a number of spurious sightings of eclipses are recorded along with genuine observations. The Sung astronomers are known to have attained a fair degree of success in predicting eclipses. Thus according to the *Sung-hui-yao chi-kaio* (History of Sung Administration), the Sung Bureau of Astronomy predicted a total eclipse in AD 1021, but this was seen to be only partial (magnitude 4/10) at the capital.” (Stephenson, p. 252)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 100 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series – 100 is not perfect. This total solar eclipse really happened on Aug 11 in CE 1021.

Delta T ~ Zero sec! (JD ~ 2094200.7)



The year of CE 1022

“An ‘almost complete’ obscuration of the Sun on a date which is equivalent to AD 1022 Aug 1 is reported in the Astrological Treatise of the same history. Calculation shows that this eclipse, which is not mentioned in the Annals, would be visible mainly in the southern hemisphere and could not have been seen in China.” (Stephenson, p. 251-252)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 110 Solar Saros Series perhaps is not perfect.

So, the back calculation of the Solar Saros Series – 110 is not perfect (wrong)! This total solar eclipse really happened on July 31 in CE 1022.

Delta T ~ Zero sec! (JD ~ 2094555)

The year of CE 1023 (Traditional AD = CE 833)

“833. CONFUSED PREDICTION

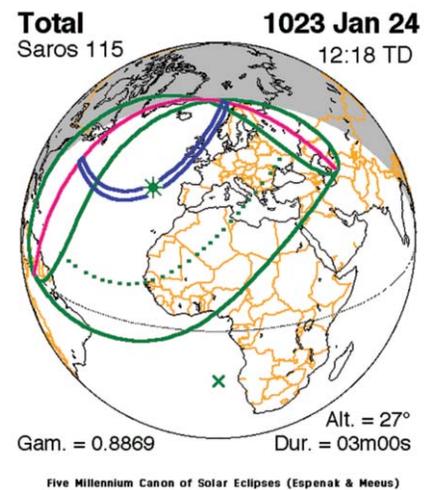
Sol et luna defecerunt per eclipsin’, Annals of Xanten, Appendix. Similar in at least three other sources: a Rheim chronicle, Sigebert or Bouquet, and Alberic” (Schöve, p. 186)

“Under 832 Fuldenses has: ‘The sun was eclipsed on the 5th nones May (= May 3) and the moon the 2nd nones June (= Jun 4).’ It is clear that the record is in error because a solar and a lunar eclipse could not have this interval. I have not been able to find any combination of two errors that would account for this record. Xantenses says that the sun and moon were eclipsed in 833. This is almost surely an erroneous borrowing the already serious error in Fuldenses.” (Newton, p. 397-8)

The back calculation of the Solar Saros Series – 115 is not accurate!

This solar eclipse really happened on January 24 in CE 1023,

Delta T ~ Zero sec! (JD ~ 2094732)



The year of CE 1033 (Traditional AD = CE 840/841/843)

Death of Carolingian emperor, Louis the Pious; after died solar eclipse;

“S. 840 May 5 TOTAL SOLAR IN W. GERMANY AND ITALY

The documentation of the total eclipse of the Sun in 840 and 878 is *more copious* than of any other eclipse of the century. Moreover, the report of the eclipse on 840 May 5 (the day before Ascension Day) is so frequently followed by that of the death of Louis the Pious on June 20 that 840 June 20 as the date of his death is one of the most certain pieces of chronological information. The eclipse is known astronomically to have occurred on 840 May 5, and the small number of 839’s and 841’s found in the sources are to be written off as wrong.”

“840 May 5. References: Augienses and Weingartenses.

Augienses has, under 840: ‘An eclipse of the sun on te 3rd nones May (= May 5), between the 8th and the 9th hour, on the eve of the Ascension of Our Lord. Louis died.’ Weingartenses has the same, except that it inverts the order of the sentence and adds Louis’ title of emperor after his name. These records make it seem that Louis died on the day of the eclipse, but that is not correct. Louis (the subject of *Vita Hludowici Imperatoris*) died on 840 Jun 20. ...

The record of this eclipse in Marianus Scotus is a copy of this one.

Fuldenses has under 840: ‘Moreover in this year on the eve of the Ascension of the Lord, that is the 4th ides May (= Maj 12), there was an eclipse of the sun about the 7th or 8th hour of the day so great that the stars near the darkness of the sun could be seen, and the color of things in the earth was changed.’

Here I think that the error in date strongly suggest originality. The correct date is ‘3rd nones May’ and it is unlikely that a copier would change this into ‘4th ides May’. The error is exactly 1 week. I image that the annalist was refreshing his memory by consulting a calendar, that he had a calendar arranged by weeks, and that he simply read off the wrong Wednesday.

Xantenses, which has under 840: ‘And the 3rd of May, that is, the 3rd of the Rogation days, there was an eclipse of the sun at 9th hour, and stars were seen clear in the sky just as at night.’

The annalist has ‘3rd of May’ which is wrong as well as being an usual way of writing a date; he probably omitted ‘nones’ from ‘3rd nones May’ by accident.

Vita Hludowici Imperatoris. This says: ‘In that time an usual eclipse of the sun occurred on the 3rd day of the Major Litany; as much as its light receded darkness prevailed until it differed in no way from true night. For indeed the regular collection of stars was seen, and no star was dimmed by the light of the sun; ... The passage continues at some length describing the phases of the sun as its light was restored. This sounds like the original description of an eye witness. I shall take the standard deviation of the magnitude to be 0. There is a problem about the place.” (Newton, p. 398-9)

“AD 840 May 5: Bergamo [Saros 90]

In the third year of the Indiction, the Sun was hidden from this world and stars appeared in the sky as if were midnight, on the third day before the Nones of May (May 5) during the Litanies of Our Lord. There was great distress, and while the people beheld it, many thought that this age would last no longer. But while they were contemplating these simple things, the Sun shone again and trembling as it were began to escape from its former shade.

(Stephenson, 387-90)

“S. 841 Oct. 18 PREDICTED AND WATCHED FOR FRANCE

This annular eclipse, partial in France, is clearly referred to in Nithard’s History, Book II, Ch.10: ...

‘While I was writing this at the Loire near St. Cloud, an eclipse of the Sun occurred in Scorpio in the first hour of October 18, a Tuesday.’...

Probably this had been predicted and was watched for by Nithard. The Sun’s longitude was about 209.3 so that strictly the Sun was in the last degree of Libra rather in Scorpio.” (Schove, p. 188)

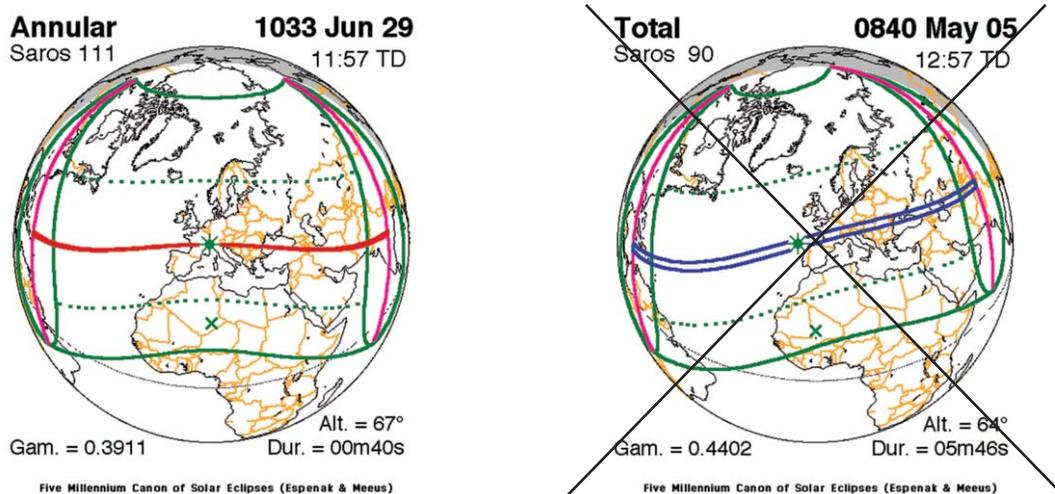
“841 Oct 18. Reference: Nithardus. Nithardus wrote in Chapter II.10: ‘As I was writing this, being halted upon the Loire near sanctum Fludualdum, an eclipse of the sun happened in Scorpio at the first hour, on the third feria, on the 15th calends November (= Oct 18).’

The information in this account is correct. Unfortunately no one seems to know where sanctum Fludualdum was. The editor suggest ‘S. Claude above Blois’. Since the Loire runs almost straight from Orleans to Tours, since Blois is halfway between the two, and since the stretch between them is a reasonable large fraction of the Loire, I shall take Orleans and Tours as two possible places, thus automatically including places between an nearby. Reliability: 1. Standard deviation of the magnitude: 0.1” (Newton, p. 328)

This solar eclipse really happened on June 29 in CE 1033, not in CE 840 May 5, or 841 October 18.

The back calculation of the Solar Saros Series – 111 is not accurate!

Delta T ~ Zero sec! (JD ~ 2098541)



Treaty of Verdun divides Carolingian empire into three. Eastern and western parts roughly correspond to Germany and France.

The year of CE 1039 (Traditional AD = CE 848)

“848 NON-ECLIPSE

Under the year AD 848, in which he places the slaying of Ethelred [the second], king of the Northumbrians, and the beginning of the 18-year reign of Osbert, Roger of Wendover (d. 1237), Flores Historiarum says:

‘In the same year there was an eclipse of the Sun, at the sixth hour of the day [noon], on the Kalends of October [October 1].’

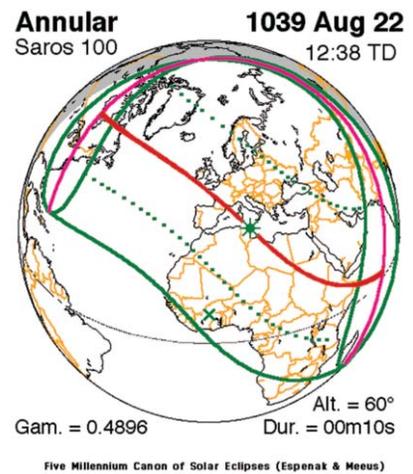
However, Roger’s *eclipse information is completely spurious*; there was no eclipse anywhere on the day mentioned. Neither of the genuine solar eclipses of 848 (June 5 and Nov. 29) was visible in England, and changing only the year gives no help. While gross misplacement of some eclipse may be considered, the explanation may be

simpler. New Moon occurred on 848 Oct 1, about 4 a.m. at Greenwich. It is easy to image that sometime between the ninth century and the thirteenth. probably later rather than earlier, some astrologer-astronomer, computing this conjunction, found the right day and the wrong hour, and misguidedly inferred a solar eclipse.” (Schove, p. 190-191)

This solar eclipse really happened on Aug 22 in CE 1039.

The back calculation of the Solar Saros Series – 100 is not accurate!

Delta T ~ Zero sec! (JD ~ 2100786)



The year of CE 1040

“AD 1040 Feb 15 (mag. = 0.69): Pien

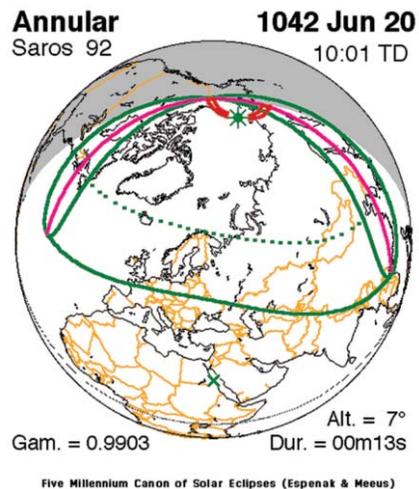
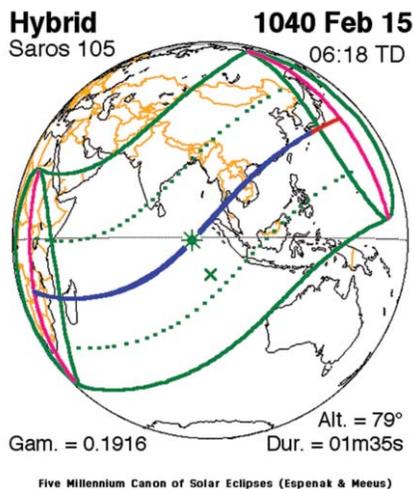
Pao-yuan reign period, first year, first month, day *ping-ch'en*, the first day of the month. The Sun was eclipsed by 6 divisions (*fen*) and it was restored at 1 mark in the hour of *shen*.

[Wen-hsien T'ung-k'ao]

RESULT ...thus Delta T = 2850 sec.” (Stephenson, p. 288-9)

The back calculation of the Solar Saros Series – 105 is not accurate!

Delta T ~ Zero sec! (JD ~ 2100962.76)



The year of CE 1042

“AD 1042 Jun 20 (mag. = 0.41): Pien

Ch'ng-li reign period, 2nd year, 6th month, day *jen-shen*, the first day of the month. The Sun was eclipsed by 5 divisions (*fen*). At 6 marks in the hour of *yu* (18.56 h) the eclipse was 2 divisions and then the Sun set beneath the Earth and was invisible.

[Wen-hsien T'ung-k'ao]

RESULT ...Combining these limit yields $-850 < \Delta T < 2550$ sec.” (Stephenson, p. 318)

The back calculation of the Solar Saros Series – 92 is not accurate (wrong)!
 $\Delta T \sim$ Zero sec! (JD \sim 2101818.914)

The year of CE 1046

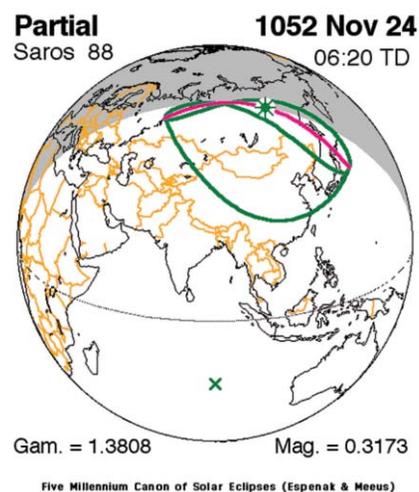
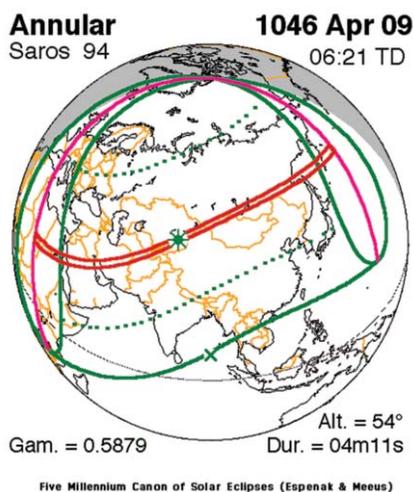
“AD 1046 Apr 9 (*mag.* = 0.46): *Pien*

Ch’ingli reign period, 6th year, 3rd month, day *hsin-szu*, the first day of the month. The Sun was eclipsed by 4 ½ divisions (*fen*). At 3 marks in the hour of *shen* it was restored.

[*Wen-hsien T’ung-k’ao*]

The LT of end correspond to 15.84 h. In chapter 53 of the *Yuan-shih*, the time is given as ‘3 marks in the central half of the hour of *shen*’ – i.e. 1684 h. Because of this disagreement, the observation will not be considered further. (Stephenson, p. 289)

The back calculation of the Solar Saros Series – 94 is not accurate!
 $\Delta T \sim$ Zero sec! (JD \sim 2103207.762)



The year of CE 1052

“AD 1052 Nov 24 (*mag.* = 0.11): *Pien*

Huang-yu reign period, 4th year, 11th month, day *jen-yin*, the first day of the month. The Sun was eclipsed by more than 2 divisions (*fen*). At 1 mark in the central half of the hour of *wei* it was restored.

[*Sung-shih*, chap.81]

The LT of end corresponds to 14.36 h.

RESULTS

LT of last contact = 14.36 h, UT = 6.58 h. Computed TT = 7.39 h, thus $\Delta T = 2900$ sec.” (Stephenson p. 289)

The back calculation of the Solar Saros Series – 88 is not accurate!
 $\Delta T \sim$ Zero sec! (JD \sim 2105628.76)

The year of CE 1053

“AD 1053 Nov 13 (*mag.* = 0.66): *Pien*

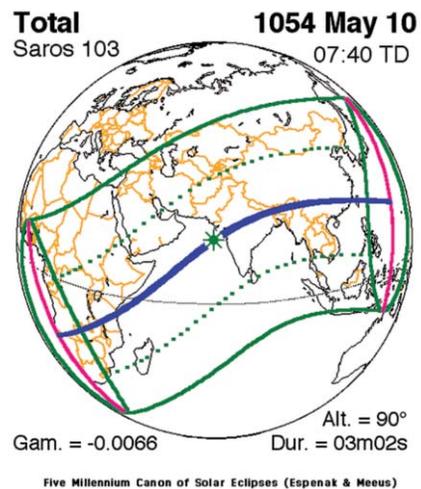
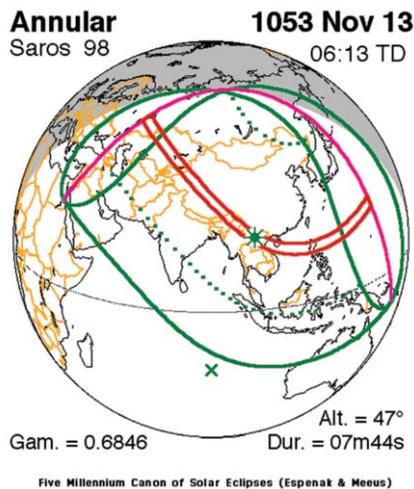
Huang-yu reign period, 5th year, 10th month, day *ping-shen*, the first day of the month. At 1 mark in the central half the hour of *wu*, the Sun was eclipsed by 4 ½ divisions (*fen*).

[*Wen-shien T'ung-k'ao*, chap.283]

The LT of maximum corresponds to 12.36 h. In chapter 53 of the *Yuan-shih*, the time is given as ‘1 mark in the hour of *wei*’ – i.e. 13.36 h. Because of this discrepancy between the two sources, the observation will be rejected.” (Stephenson, p. 289)

The back calculation of the Solar Saros Series – 98 is not accurate!

Delta T ~ Zero sec! (JD ~ 2105982.75)



The year of CE 1054

“AD 1054 May 10 (*mag.* = 0.71): *Pien*

Chih-ho reign period, 1st year, 4th month, day *chia-wu*, the first day of the month. The Sun was eclipsed by more than 9 divisions (*fen*) and the loss began on the south-west side. It reached its maximum at 1 mark in the central half of the hour of *shen*. On this day it was cloudy and rain fell...

[*Wen-shien T'ung-k'ao*, chap.283]

The LT of maximum, which corresponds to 16.36 h, is confirmed by the record in chapter 52 of the *Yuan-shih*.

RESULTS

LT of last contact = 16.36 h, UT = 8.65 h. Computed TT = 9.17 h, thus Delta T = 1900 sec.” (Stephenson, p. 290)

The back calculation of the Solar Saros Series – 103 is not accurate!

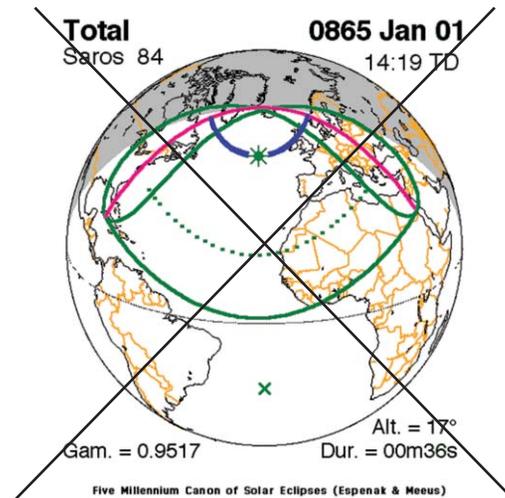
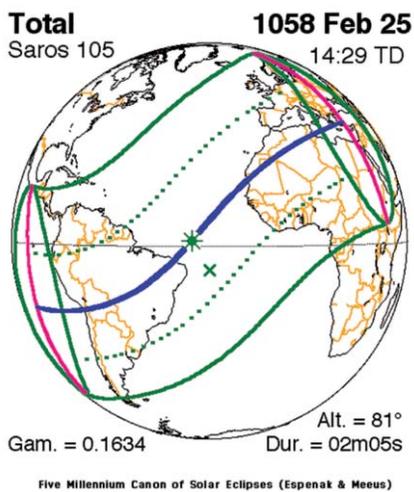
Delta T ~ Zero sec! (JD ~ 2106160.817)

The year of CE 1058 (Traditional AD = CE 864/5)

“S.865 Jan. 1 TOTAL SOLAR IN IRELAND

This total eclipse of the Sun is clearly mentioned in Irish records. Under manuscript year 864 (true 865) the Annals of Ulster, have ‘An eclipse of the Sun on the Kalends of January, and an eclipse of the Moon in the same month.’ The solar eclipse is correctly indexed as S.865 Jan. 1. by B. MacCarthy. No Irish annals give more detail, and some give less. The manuscript year is always wrong, but long since rectified editorially (together with one or two slips).” (Schove, p.192)

This solar eclipse really happened on Feb 25 in CE 1058, not in CE 865 Jan 1. The back calculation of the Solar Saros Series – 105 is not accurate! Delta T ~ Zero sec! (JD ~ 2107548.1)



The year of CE 1059

“AD 1059 February 15 (mag. = 0.36): Pien

Chia-yu reign period, 4th year, first month, day *ping-shen*, the first day of the month. The Sun was eclipsed by more than 3 divisions (fen). At 3 marks in the initial half of the hour of *weit* it was restored.

[Wen-shien T'ung-k'ao, chap.283]

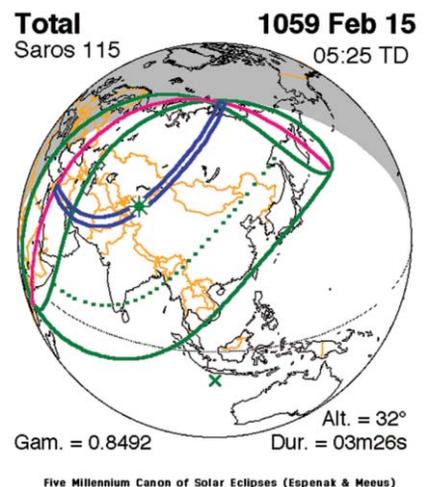
The LT of last contact, which corresponds to 13.84 h, is endorsed by the record in chapter 53 of the Yuan-shih.

RESULTS

LT of last contact = 13.84 h, UT = 6.47 h. Computed TT = 7.13 h, thus Delta T = 2400 sec.” (Stephenson, p. 290)

The back calculation of the Solar Saros Series – 115 is not accurate!

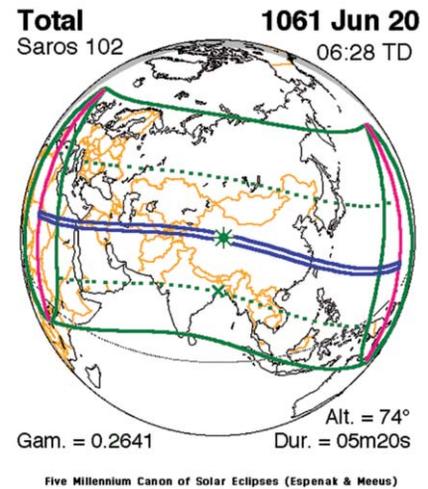
Delta T ~ Zero sec! (JD ~ 2107902.723)



The year of CE 1061, AH 253, Seljuk AH 453 (Traditional AD = CE 867)

“(2) AD 1061 Jun 20: Baghdad

(453 AH.) On Wednesday, when two nights remained to the completion of (the month of) Jumada al-Ula, two hours after daybreak, the Sun was eclipsed totally. There was darkness and the birds fell whilst flying. The astrologers claimed that one-sixth of the Sun should have remained (uneclipsed) but nothing of it did so. The Sun reappeared after four hours and a fraction (of an hour). The eclipse was not in the whole of the Sun in places other than Baghdad and the provinces.’ [Ibn al-Jawzi] ...



RESULTS

For totality at Baghdad, $800 < \Delta T < 2140$ sec.

(Stephenson, p. 439)

So, the back calculation of the Solar Saros Series – 102 is not accurate! This solar eclipse really happened on June 20 in CE 1061.

$\Delta T \sim \text{Zero sec! (JD} \sim 2108758.76)$

(Z.H.: La nueva cronologia, p. 94)

“M. 867 Nov. 15 (p.m.) TOTAL IN BAGHDAD

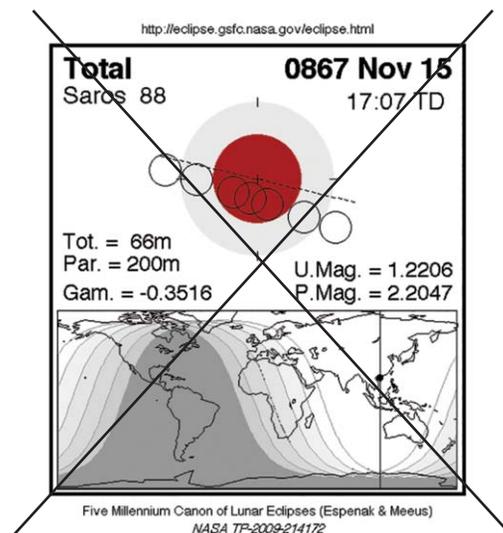
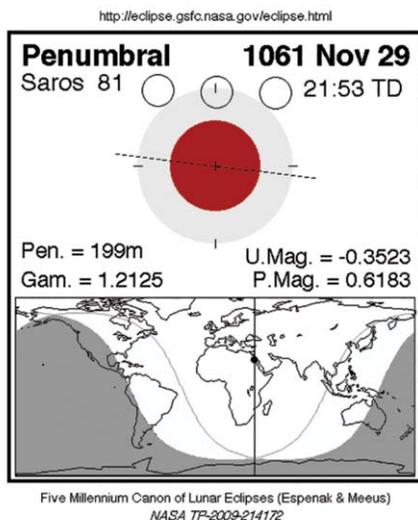
This is the first in time of several Persian an Arabian eclipses pointed out to Ginzel...

Ginzel quotes at-Tabari as stating that ‘the Moon was eclipsed and was completely invisible or [at any rate] disappeared for the most part’ on the night of AH 253 Dhu ‘l-Qa’da [XI] 14, equivalent to AD 867 Nov.15. This date is correct.” (Schove, p. 194)

The back calculation of the Lunar Saros Series 81 and 88 are not accurate!

This lunar eclipse really happened on Nov 29 in CE 1061, not in CE 867 Nov 15.

$\Delta T \sim \text{Zero sec! (JD} \sim 2108921.41)$



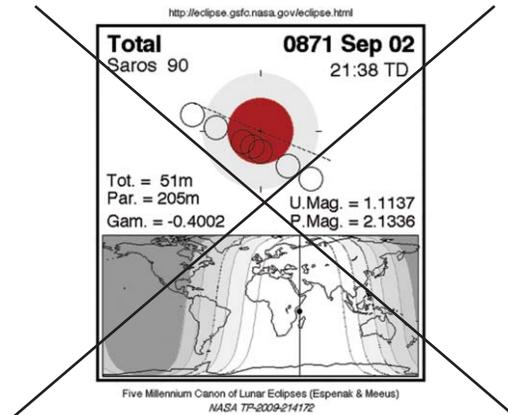
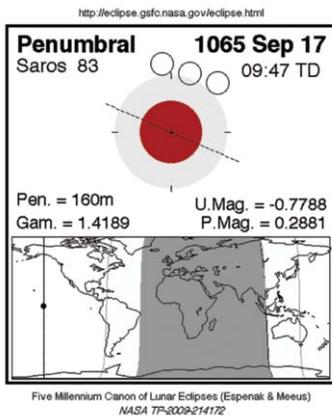
The year of CE 1065, AH 257 (Traditional AD = CE 871)

“M. 871 Sep. 2-3 POSSIBLY OBSERVED IN IRAQ

This is another Tabari record; the eclipse appears from Ginzel to have been imperfectly predicted, but it would be fully visible in Mesopotamia in good weather, and anyway is chronologically significant, marking a disastrous month for the inhabitants of city of Basra. Ginzel quotes at-Tabari to the effect that in AH 257, in month of Shawwal 14; this date converts to AD 871 Sept. 4” (Schove, p. 195)

The back calculation of the Lunar Saros Series 83 is not accurate!

This lunar eclipse really happened on Sep 17 in CE 1065, not in CE 871 Sep 2. (JD ~ 2110308.9)



The year of CE 1067

“AD 1067 Mar 3/ 4 (mag. = 1.43): Pien

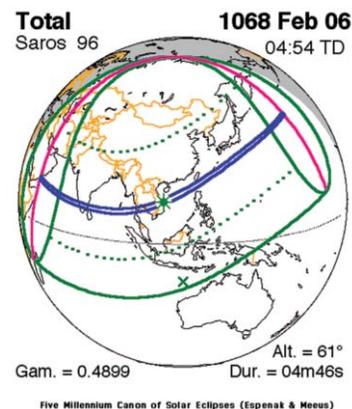
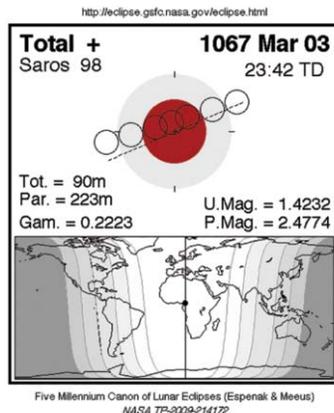
Chic-ping reign period, 4th year, 2nd month, day *chia-wu*. The Moon was eclipsed. It began to be seen at 4 mark in the hour of ch’ou in the west. It was was 15 deg in I (lunar lodge). At 6 marks in the hour of *ch’ou* the eclipse reached its maximum. It was more than 8 divisions. It set eclipsed in the direction *yu* and was not seen.”

[Wen-shien T’ung-k’ao, chap.285]

(Stephenson, p. 321)

The back calculation of the Lunar Saros Series 98 is not accurate!

Delta T ~ Zero sec! (JD ~ 2110841.5)



The year of CE 1068

“AD 1068 Feb 6 (*mag.* = 0.55): *Pien*

His-ning reign period, 1st year, 1st month, day *chia-bsu*, the first day of the month. The Sun was eclipsed. according to the astronomers, on this day at 8 marks in the hour of *szu* the Sun was seen to diminish; the loss began on the south-west side. After (hou) 5 marks in the hour of *wu* the eclipse reached six divisions (*fen*). Not until 3 marks in the hour of *wei* was it restored to roundness.

[*Sung-hui-yao Chi-kao*]”
(Stephenson, p. 290)

The back calculation of the Solar Saros Series 96 is not accurate!

Delta T ~ Zero sec! (JD ~ 2111180.701)

1068 Aug 15/16; Lunar eclipse observations in China;

The back calculation of the Lunar Saros Series – 113 is not accurate!

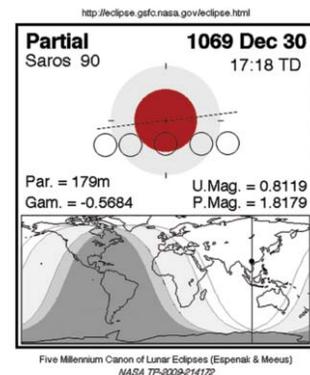
Delta T ~ Zero sec! (JD ~ 2111372.44)

The year of CE 1069

1069 Dec 30/31; Lunar eclipse observations in China;

The back calculation of the Lunar Saros Series – 90 is not accurate, because of Ptolemy’s wrong phases of the Moon!

Delta T ~ Zero sec! (JD ~ 2111874.22)



The year of CE 1071 (Traditional AD = CE 878/881)

“878 Oct 29. Reference: Whitelock et al. [1961].

Most Chronicles texts read something like: ‘And the same year there was an eclipse of the sun for one hour of the day.’ If the entry for this year were the only reference to this eclipse in the Chronicles, one should assign the value 0.06 to the standard deviation of its magnitude.” (Newton, AAO p. 52)

“S.878 Oct. 29 (Wed.) TOTAL SOLAR IN IRELAND, ENGLAND AND GERMANY

All solar eclipses recorded in the British Isles and Europe under years 874 to 880 really refer to the solar eclipse of 878 Oct. 29...

Discussion of S.878.29 goes back at least to Gemma Frisius, Kepler, Calvisius, Riccioli and others. Ginzel 1883 and Newton 1972 both list over 30 medieval sources, containing various amounts of detail; ...

The Annals of Ulster give under annal 877 (normal 878) the correct month and day, and are also correct on the hour, since “about the **seventh hour of the day**’ here means somewhat before 1 p.m....

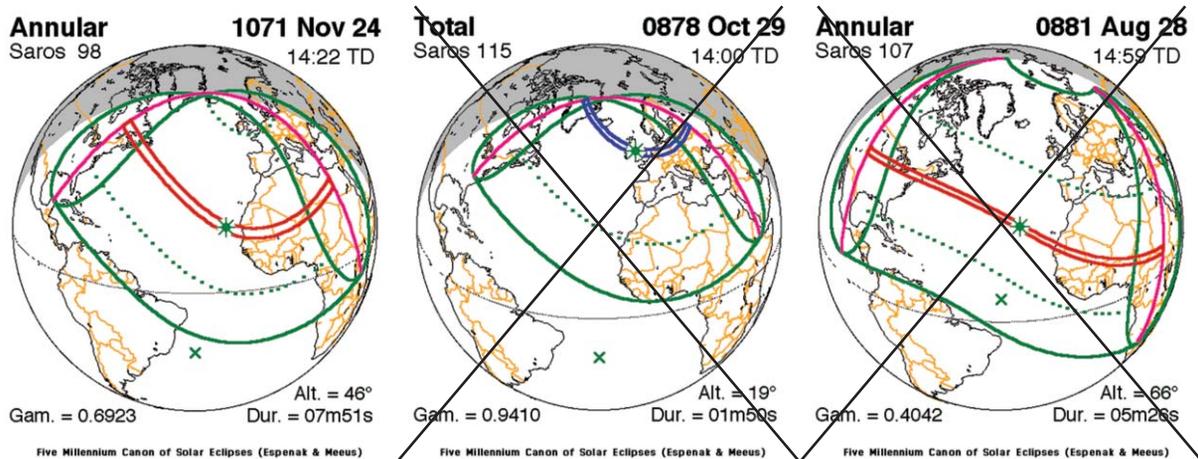
Other English sources more or less contemporary with the eclipse are the Anglo-Saxon Chronicle and Asser’s Life of Alfred the Great, neither of which gives month or day. The Chronicle gives, usually under 879 (but MS. C under 880) a solar eclipse... (Schöve, p.196-200)

“S.881 Aug. 28 FALSE IDENTIFICATION

Posthumous edition of Calvisius, and hence Tycho-Curtius 1666, mention an eclipse of the Sun on 881 Aug.28 as noted in Frankish annals. We have found a solar eclipse of 881 mentioned only in the second continuation of the Annales Juvavenses maximi, of Salzburg, and the description does not fit:

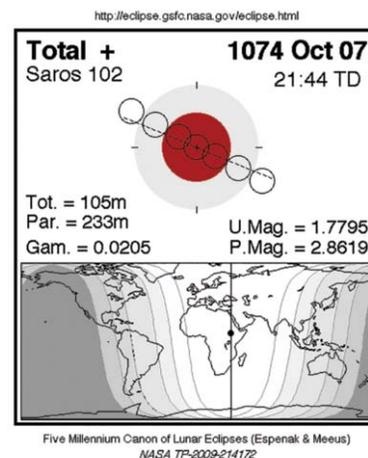
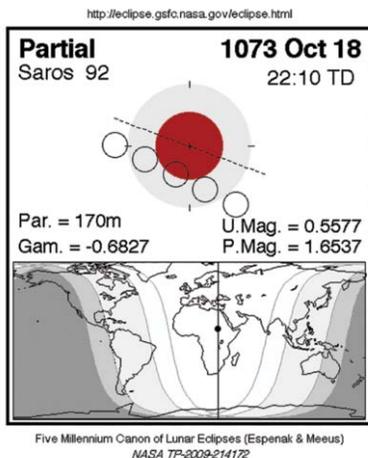
‘DCCCLXXXI. The Sun was obscured from the third to the sixth hour.’ (Schove p. 201)

This solar eclipse really happened on Nov 24 in CE 1071, not in CE 878 Oct 29, or 881 Aug 28. (JD ~ 2112568.095)



The year of CE 1073

1073 Oct 18/19; Lunar eclipse observations in China;
 The back calculation of the Lunar Saros Series – 92 is not accurate!
 Delta T ~ Zero sec! (JD ~ 2113262.42)



The year of CE 1074

1074 Oct 7/8; Lunar eclipse observations in China;
 The back calculation of the Lunar Saros Series – 102 is not accurate!
 Delta T ~ Zero sec! (JD ~ 2113616.4)

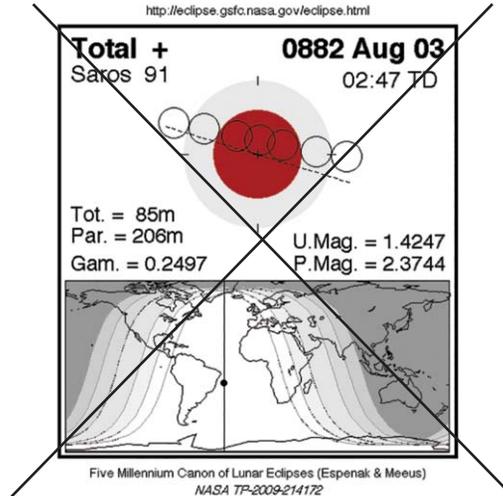
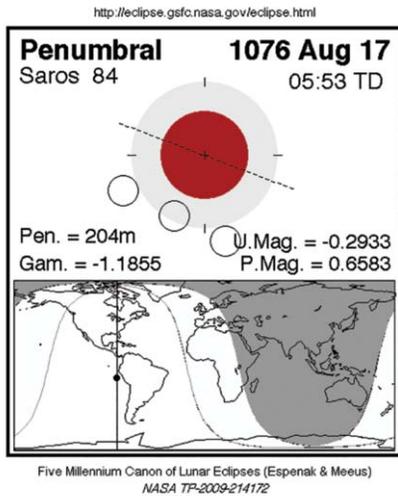
The year of CE 1076 (Traditional AD = CE 882)

“AD 882 Aug 2/3: Baghdad

(269 AH.) In (the month of) Mubarram this year... the Moon was eclipsed on the night of the 14th (day) and set eclipsed.

[Al-Tabari: Tarikh al-Tabari: Tarikh al-Rusul wa'l Muluk, vol. IX, p.613] (Stephenson, p. 451)

This lunar eclipse really happened on Augustus 17 in CE 1076, not in CE 882 Aug. 2/3! (JD ~ 2114295.74)

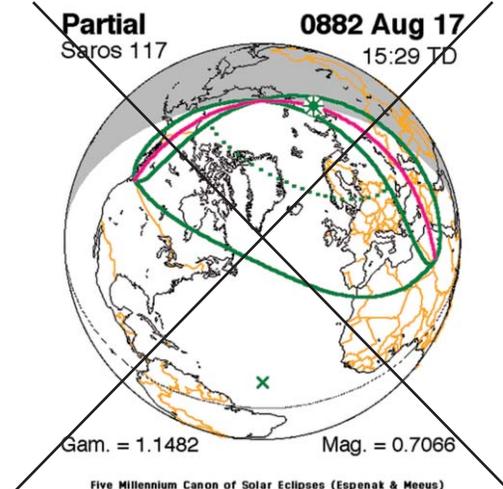
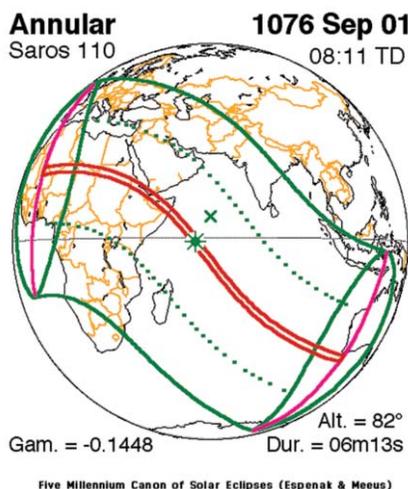


”AD 882 Aug 17: Baghdad

(269 AH.) In (the month of) Mubarram in this year...the Sun was eclipsed at the time of sunset on Friday, when nights remained to the completion of Mubarram and set eclipsed...

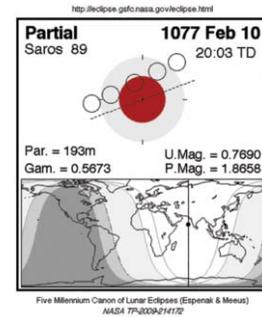
[Al-Tabari: Tarikh al-Tabari: Tarikh al-Rusul wa'l Muluk, vol. IX, p.613] (Stephenson, p. 449-50)

This solar eclipse (sunrise) really happened on September 1 in CE 1076, not in CE 882! The back calculation of the Solar Saros Series 110 is not accurate (wrong)! (JD ~ 2114310.838)



The year of CE 1077

1077 Feb 10/11; Lunar eclipse observations in China;
 The back calculation of the Lunar Saros Series – 89 is not accurate, because of Ptolemy’s wrong phases of the Moon!
 Delta T ~ Zero sec! (JD ~ 2114473.33)



The year of CE 1077 (Traditional AD = CE 885)

“S. 885 June 16 NEAR TOTAL SOLAR IN SCOTLAND AND N-IRELAND

The only records know to us come from Scotland and Ireland. This is not surprising. ...

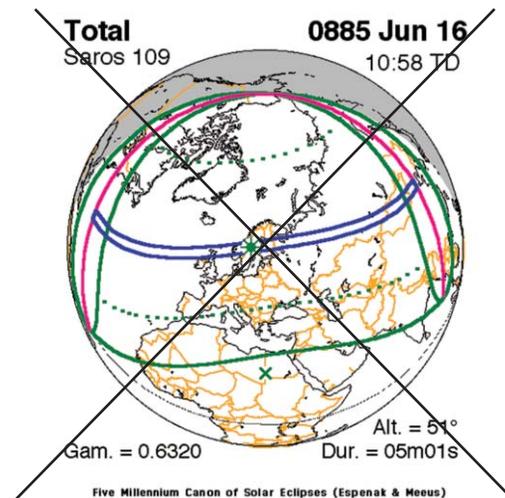
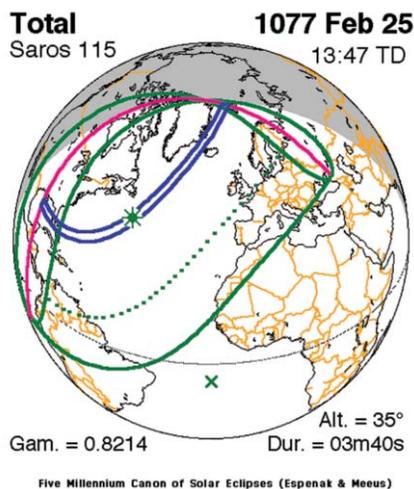
The only record which mentions the day comes from Scotland. The Chronicle of the King of Scotland, version A says that in the ninth year of Eochaid [Eocha], king of the Britons, ‘on the very day of Cyricus, an eclipse of the Sun occurred’. The day mentioned is June 16, and it fixes the year (885) which might otherwise be uncertain; see Anderson 1922, 363-4.

The eclipse is also mentioned, without month or day, in the Annals of Ulster (under AU 884 = AD885): ‘An eclipse of the Sun and stars were seen in the sky.’ (Schöve, p. 203-204)

This solar eclipse really happened on Feb 25 in CE 1077, not in CE 885 Jun 16.

The back calculation of the Solar Saros Series – 115 is not accurate!

Delta T ~ Zero sec! (JD ~ 2114488.07)



The year of CE 1079, AH 271, Seljuk AH 471, YZ 447/448 (Traditional AD = CE 883/85)

Calendar reform. Malih-Shah commissioned a group of eight mathematicians and astronomers, to reform the calendar, and they worked out the Jalali Calendar connected forever with the tropical year.

The Jalali Calendar began on Friday 1 Far 458/ 1/9 Ram 471 AH/ 15 March 1079 CE.

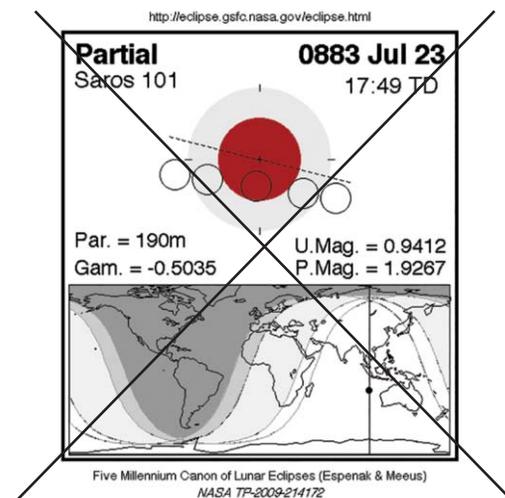
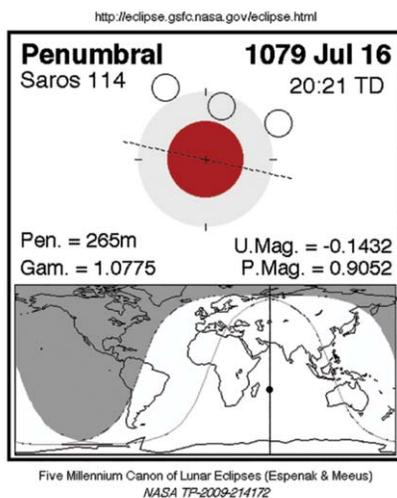
“AD 883 Jul 23/24: al-Raqqab

This lunar eclipse was observed by us at city of al-Raqqab on the 23rd of (the month of) Tammuz in the year 1194 of Dhu al-Qarnayn,.. which is the year 1206 of al-Iskander. The middle of the eclipse was at a little more than 8 equal hours after midday. A little more than 1/2 plus 1/3 of the Moon’s diameter was eclipsed... (calculated details)... [Al Battani]” (Stephenson, p. 488-9)

“M.883 July 23 LARGE IN SYRIA

It is the first in time of four eclipses (two solar and two lunar) between 883 and 901 mentioned in Ch.30 of his Astronomy and used by European astronomers since at least Regiomontanus.” (Schöve. p. 203)

This lunar eclipse really happened on July 16 in CE 1079, not in CE 883 July 23! (JD ~ 2115359.34)



In this case the first examined lunar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (883 July 23) while the correct date was definitely 1079 July 16! Because of these facts, NASA illustrates the 1079 July 16 lunar eclipse incorrectly...

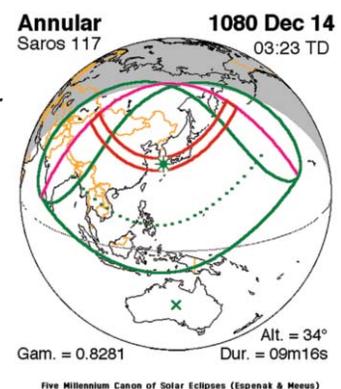
The back calculation of the Lunar Saros Series 101 and 114 are not accurate (wrong)!

The year of CE 1080

1080 Dec 14; Solar eclipse observations in China;

The back calculation of the Solar Saros Series – 117 is not accurate!

Delta T ~ Zero sec! (JD ~ 2115875.64)



The year of CE 1084 (Traditional AD = CE 888/893/894)

“893-4 AMBIGUOUS ECLIPSE OF ST. GALL

Lunar eclipses of 893 and 894. Let us consider the following four eclipses of the Moon; M.893 Jan. 6, M.893 July 2-3, M.893 Dec. 26, M.894 June 21-22. ...

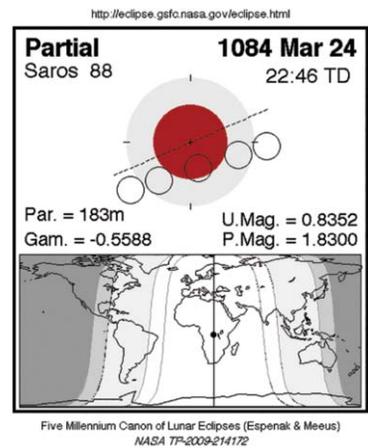
Some manuscript of the third St Gall continuation of Almannic Annals have, as two consecutive annals:

‘893. Eclipse of the Moon. Arnulf in Moravia. William killed. Engilschalch blinded. Robert killed. Alemanni into Italy.’ (Schöve, p. 209)

This lunar eclipse really happened on Mar 24 in CE 1084.

The back calculation of the Lunar Saros Series 88 is not accurate!

(JD ~ 2117072.44)

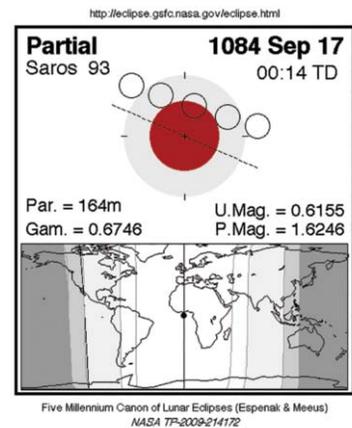


“894. Eclipse of the Moon. Arnulf into Italy with army.’ The year-numbers at this point appear reasonable (maximum error one unit....”

This lunar eclipse really happened on Sep 17 in CE 1084.

The back calculation of the Lunar Saros Series 93 is not accurate!

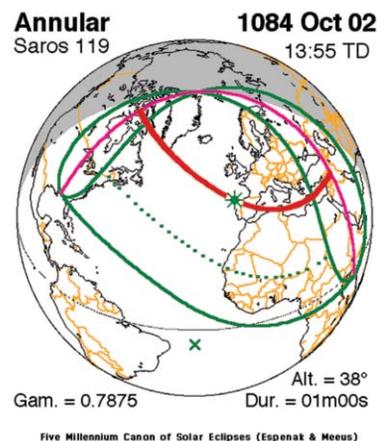
(JD ~ 2117248.5)



“A further Syrian observation is probably the source for Michael the Syrian’s report discussed by Newton 1979, 390. Michael says: ...there was an eclipse of the sun at mid-day, so that the stars could be seen in all the sphere of the heavens’. Newton points out that Michael specified the year incorrectly as 888/889...”

This solar eclipse really happened on Oct 2 in CE 1084.

(JD ~ 2117264.077)



The year of CE 1087 (Traditional AD = CE 891)

“AD 891 Aug 8: *al-Raqqab*

This solar eclipse was observed by us at city of al-Raqqab on the 8th of (the month of) Ab in the year 1202 of Dhu al-Qarnayn, which is the year 1214 after the death of al-Iskandar. The middle of the eclipse was at one seasonal hour after midday. (A little more than 2/3 of the Sun was eclipsed in view... (calculated details)... [Al-Battani]

Ab (corresponding to August) was the 11th month of the year.” (Stephenson, p. 489)

„S. 891 Aug. 8 ANNULAR SOLAR ECLIPSE IN EUROPA AND ASIA

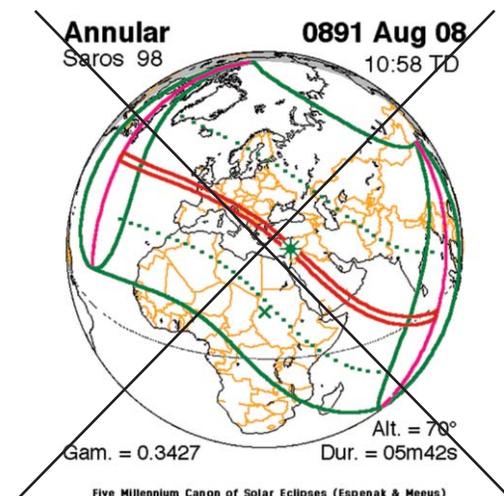
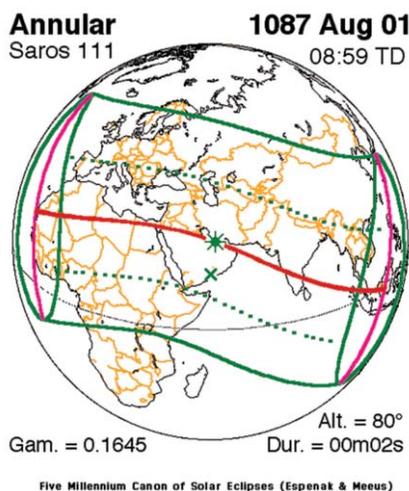
An annular eclipse... This observation is discussed in Newton with reference to modern Latin translation in Nallino 1903. Discussion goes back at least to Regiomontanus. (Schöve, p. 205)

This solar eclipse really happened on August 1 in CE 1087!

(JD ~ 2118296.871)

In this case the first examined solar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (891 Augustus 8) while the correct date was definitely 1087 Augustus 1! Because of these facts, NASA illustrates the 1087 Augustus 1 solar eclipse incorrectly...

The back calculation of the Solar Saros Series 98 and 111 are not accurate (wrong)!

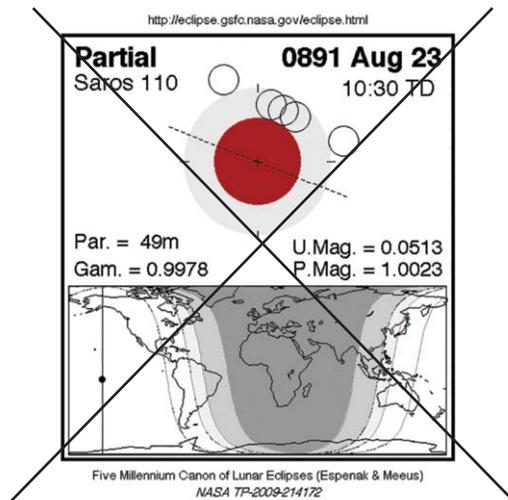
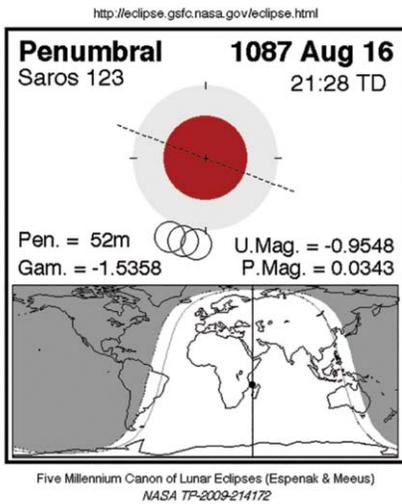


“M.891 Aug. 23 SPURIOUS RECORD

Calvisius 1605, 745 mentioned a lunar eclipse as observed by Albategnius at the first morning hour of AD 891 Aug 23. This allusion was rightly omitted in the posthumous editions of Calvisius. The small eclipse occurred around 10h UT, thus in full daylight in Syria where it was consequently invisible (Sun well above the horizon, Moon well below the horizon). If Albategnius really did mention the eclipse, it can only have been calculated, not observed.” (Schöve, p. 208)

This lunar eclipse really happened on Augustus 16 in CE 1087, not in CE 891 Augustus 23!

The back calculation of the Lunar Saros Series 110 and 123 are not accurate! (JD ~ 2118312.4)

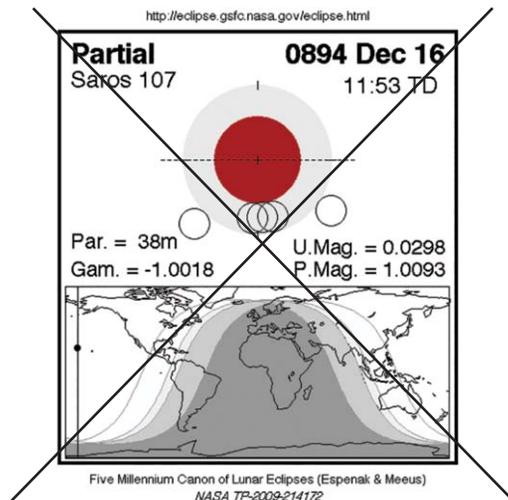
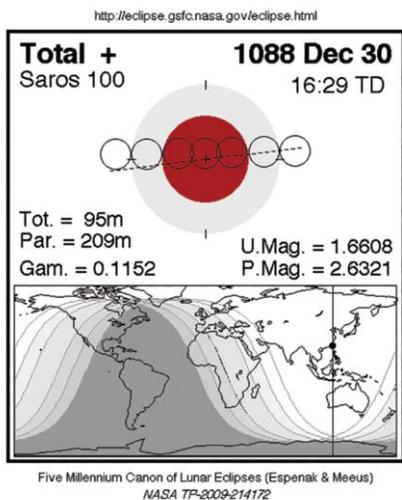


The year of CE 1088 (Traditional AD = CE 893/894)

“M. 893 Dec. 26 TOTAL RECORD IN ARMENIA

The Islamic-dated records of M.893 Dec. 26 are discussed in Ginzel 1887. 713-4. There is a contemporary source, namely at-Tabari. According to Ginzel Tabari (iii/4, 2129) mentions the observation as made at Dabil, and gives the date as AH 281 Shawwal 14 which transforms to AD 894 Dec. 17; but on 894 Dec. 16 (q. v.) there was only a very small lunar eclipse, invisible in Iran.” (Schove, p. 208)

This lunar eclipse really happened on December 30 in CE 1088, not in CE 894 Dec 17! The back calculation of the Lunar Saros Series 100 is not accurate! (JD ~ 2118814.2)

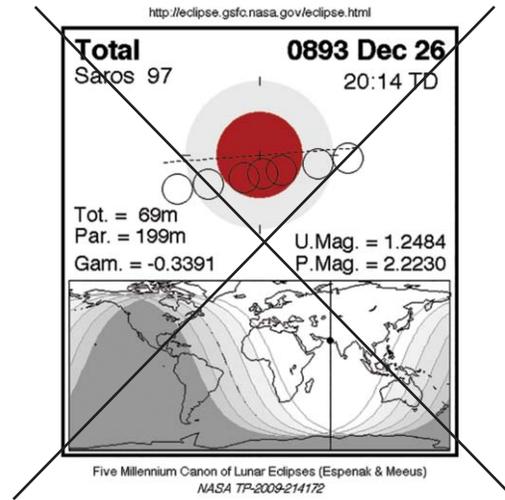
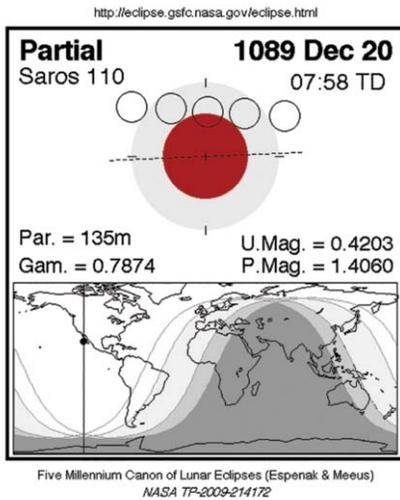


The year of CE 1089 (Traditional AD = CE 893)

“M. 893 Dec. 26 TOTAL RECORD IN ARMENIA

...Elias 1910, 117 gives AH 280 Shawwal 14, which transforms to AD 893 Dec. 27, the day starting at sunset on 893 Dec. 26.” (Schove, p. 208)

This lunar eclipse really happened on December 20 in CE 1089, not in CE 893 Dec 26!
 The back calculation of the Lunar Saros Series 110 is not accurate!
 (JD ~ 2119168.83)



The year of CE 1094

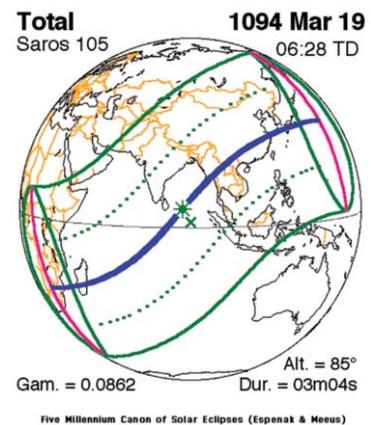
“AD 1094 Mar 19 (mag. = 0.81): Pien

Yuan-yu reign period, 9th year, 3rd month, day jen-shen, the first day of the month. The Astronomer-Royal reported that the Sun should have been eclipsed, but on account of cloud cover it was not (fully) seen. It began (to visible) at 3 marks in the hour of *wei*. It was seen through clouds that the Sun was eclipsed by more than one division (fen) on the south-west side. At 6 marks in the hour of (*wei*) it reached its maximum of 7 divisions. Then it became invisible on account of the covering of clouds.

[Wen-shien T'ung-k'ao,
 chap.283]”
 (Stephenson, p. 291)

The back calculation of the Solar Saros Series – 105 is not accurate!

Delta T ~ Zero sec! (JD ~ 2120718.767)



The year of CE 1097 (Traditional AD = CE 901)

“AD 901 Jan 23: Antakyah

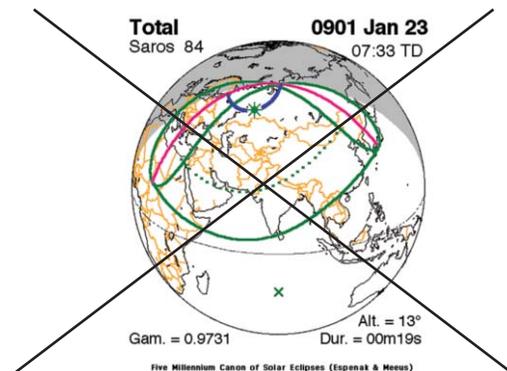
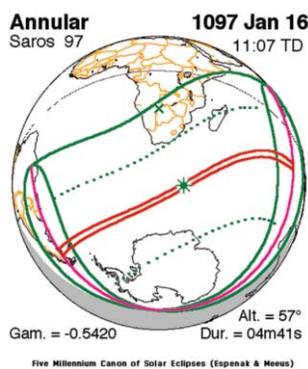
This solar eclipse was observed by us at city of Antakyah on the 23rd of (the month of) Kanun al-thani in the year 1212 of Dbu al-Qarnayn, which is the year 1224 after the death of al-Iskander. The middle of the eclipse was about 3 2/3 equal hours before midday. (A little) more than 1/2 of the Sun in sight was eclipsed... (calculated details)... [Al-Battani]

Kanun al-thani (corresponding to January) was the fourth month of the year. (Stephenson, p. 489)

This solar eclipse really happened on January 16 in CE 1097! (JD ~ 2121752.96)

In this case the second examined solar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (901 Jan. 23) while the correct date was definitely 1097 January 16! Because of these facts, NASA illustrates the 1097 January 16-i solar eclipse incorrectly...

The back calculation of the Solar Saros Series 84 and 97 are not accurate (wrong)!



“AD 901 Aug 2/3: Antakyah

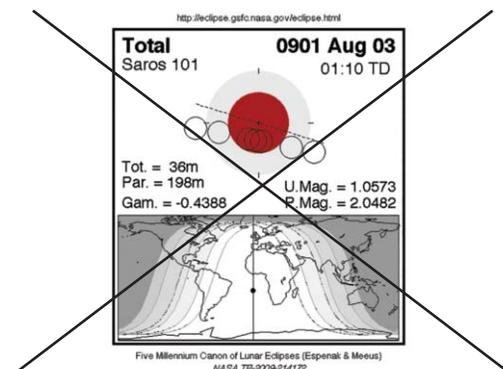
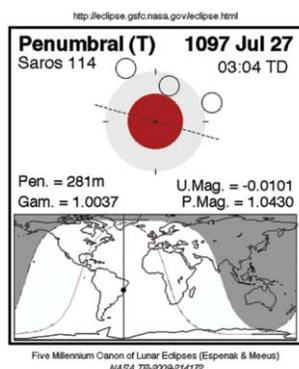
This lunar eclipse was observed by us at city of Antakyah on the 2nd of (the month of) Ab in the year 1212 of Dhu al-Qarnayn, which is the year 1224 from the death of al-Iskander. The middle of the eclipse was at approximately 15 plus 1/3 equal hours before midday. The Moon was eclipsed by less than its diameter by a small amount... (calculated details)... [Al-Battani]

Although this eclipse was recorded as marginally partial, it was actually total according to computation.” (Stephenson, p. 490)

This lunar eclipse really happened on July 27 in CE 1097! (JD ~ 2121944.63)

In this case the second examined lunar eclipse recorded by Al Battani, we can firmly state that was placed erroneously by official science on the astronomical time axis 196 years further into the past (901 Aug. 3) while the correct date was definitely 1097 July 27! Because of these facts, NASA illustrates the 1097 July 27 lunar eclipse incorrectly...

The back calculation of the Lunar Saros Series 101 and 114 are not accurate...



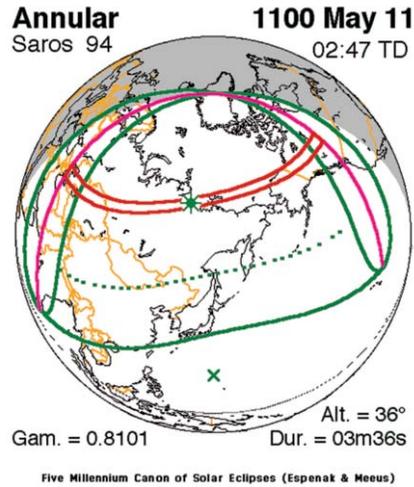
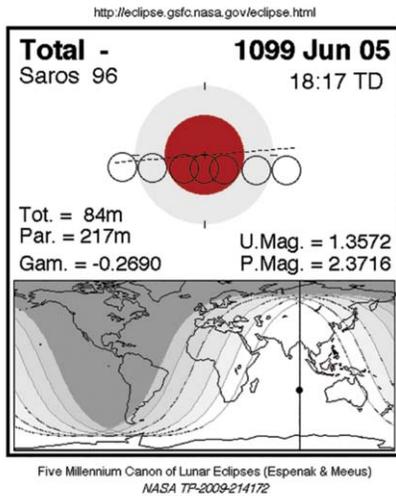
The year of CE 1099

1099 Jun 5/6. Lunar eclipse observations in China;

“Figure 9.6 is a plot the Delta T values listed in table 9.7. All results are included apart from the two highly discordant data in AD 1099 (Delta T = 5100 and 3850 sec.) It seems very likely that scribal errors are responsible for these anomalous values.” (Stephenson, p. 305-307)

The back calculation of the Lunar Saros Series – 96 is not accurate!

Delta T ~ Zero sec! (JD ~ 2122623.26)



The year of CE 1100

“AD 1100 May 11 (mag. = 0.34): Pien

Yuan-fu reign period, 3rd year, 4th month, day *ting-mao*, the first day of the month. The Astronomer-Royal said, ‘In the initial half hour of ch’en, the Sun was eclipsed at the north-west by 4 divisions (*fen*). At 3 marks in the central half of the hour of *szu* it was restored to fullness...

[*Sung-hui-yao Chi-kao*]”
 (Stephenson, p. 291)

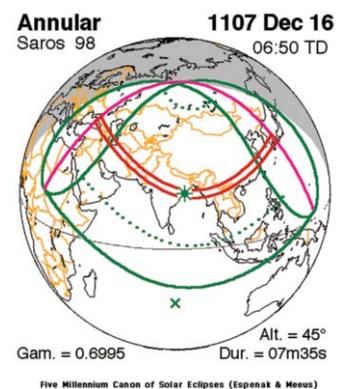
Delta T ~ Zero sec! (JD ~ 2122963.613)

The year of CE 1107

1107 Dec 16; Solar eclipse observations in China;

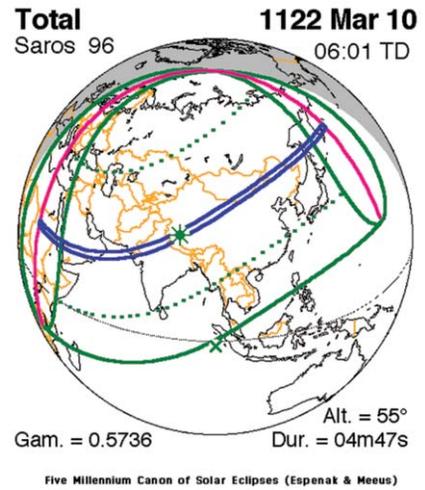
The back calculation of the Solar Saros Series – 98 is not accurate!

Delta T ~ Zero sec! (JD ~ 2125738.78)



The year of CE 1122 (Traditional AD = CE 926)

“Complete obscuration of the Sun, on dates corresponding to 1005 Jan 13 and **1122 Mar 10** are briefly noted in the Annals (chaps. 14 and 29) of the Liaoshih, the official history of the Liao dynasty – also compiled under the direction of T’o T’o. A semi-nomadic kingdom, the Liao was established in the early tenth century in the extreme north of China. It was brought to an end by the Juchen in AD 1125. The *Liao-shih* does not contain an astronomical treatise. Even if the reports of totality were reliable, the place of the observation cannot be established with any confidence; the Liao rulers had five separate residences scattered throughout Manchuria.” (Stephenson, p. 251)

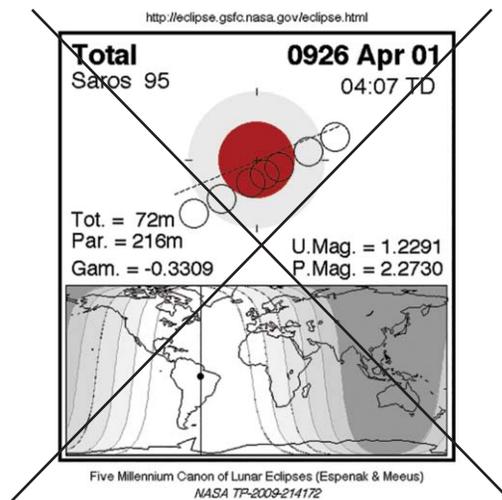
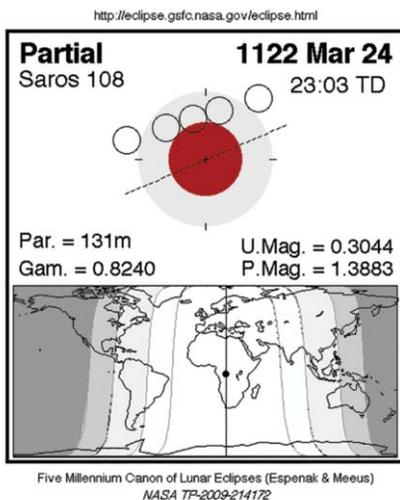


The back calculation of the Solar Saros Series – 96 is not accurate!
Delta T ~ Zero sec! (JD ~ 2130936.75)

“M. 926 Apr. 1 (Sat. a.m.) TOTAL IN FRANCE

This eclipse of the Moon early on the kalends of April is clearly referred to in the Annals of Flodoard (Frodoard) of Rheims. On MS. also says that the eclipse occurred on Easter Saturday (sabbato sancto paschale), which is correct, as Easter Sunday in 926 fell on April 2. One might think from Flodoard’s description that *the eclipse was only partial*, but it was in fact total.” (Schove, p. 222)

This lunar eclipse really happened on March 24 in CE 1122, not in CE 926 April 1!
Delta T ~ Zero sec! (JD ~ 2130951.46)



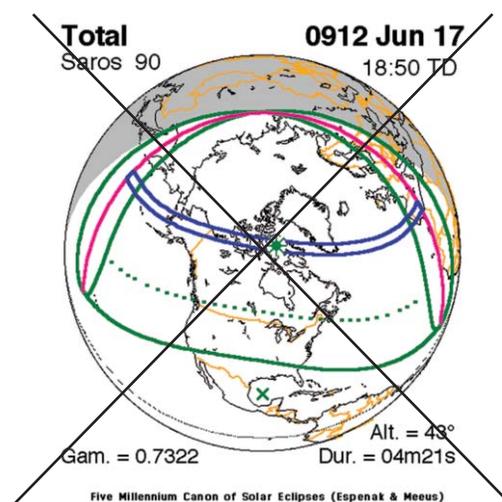
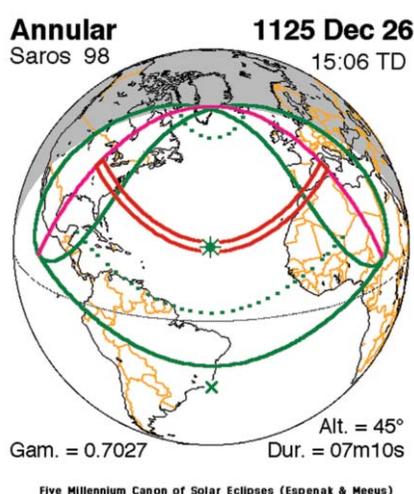
The year of CE 1125, AH 319 (Traditional AD = CE 912)

Solar eclipse in Cordoba;

“In this year, on Wednesday 28 Shawwal the Sun was totally eclipsed before sunset; the stars appeared, and most of the criers attached to the mosques hastened to call the Sunset Prayer, which was in fact said. But the Sun reappeared and brought back light, then really set.” (Ibn Hayyan: al-Muqtabis fi Tarikh al-Andalus)

This solar eclipse really happened on December 26 in CE 1125, not in CE 912 June 17! The back calculation of the Solar Saros Series – 98 is not accurate! Delta T ~ Zero sec! (JD ~ 2132324.12)

(Z.H.: La nueva cronologia, p. 101)



The year of CE 1133, AH 327 (Traditional AD = CE 939/944)

“S.939 July 19 TOTAL SOLAR IN THE MEDITERRANEAN

This eclipse is correctly dated in several sources, and often mentioned as happening about the time of a great victory of Ramiro II, the Christian king of León, etc., over Abd-ar-Rahman III, the famous Saracen leader in Spain in AD 939, probably between Monday July 22 and Monday, Aug.5 inclusive (**Aug. 1** is the date given by E. Levi-Provencal in Historia de Espana). Several later sources are more than a unit out in the year. Sigebert and Annalista Saxo have 944.

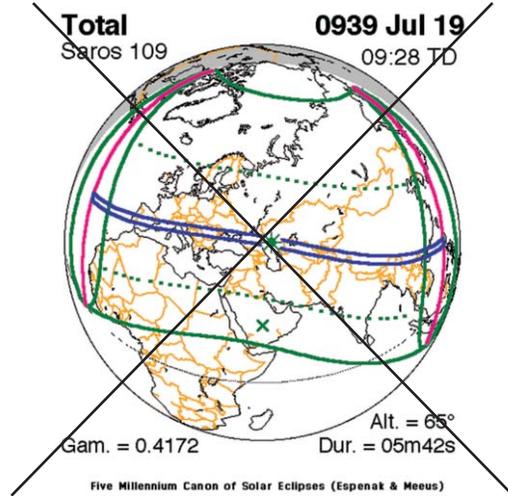
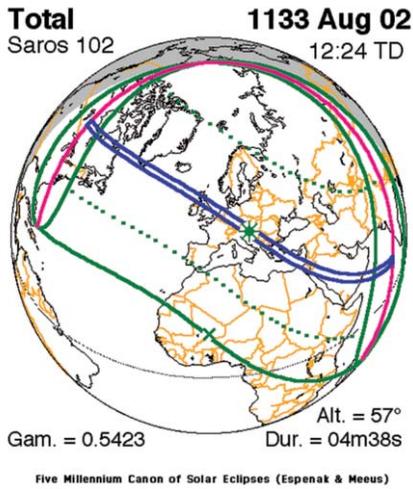
It is a known irony that the contemporary Arabic record of the Spanish eclipse and Christian victory occurs in the ‘Golden Meadows’ of Ma’sudi (c.900-956), a much-travelled native of Baghdad who never saw Spain.” (Schove, p. 226-228)

“939 Jul 19. Reference: Sigebertus. Sigebertus has under 944: ‘The sun suffered a horrible eclipse on the 6th feria in the 3rd hour of the day.’...Sigebertus makes other errors of 5 years in his chronology. The report reads as if it is independent of other reports of the eclipse of 939 Jul 19. However it is certainly not original. Since Sigebertus used many sources from all parts of Europe we have no good way to know the point of origin. Thus I shall give this report a reliability of 0.” (Newton 1972, p. 235)

This solar eclipse really happened on August 2, in CE 1133!

The back calculation of the Solar Saros Series – 102 is not accurate! . Delta T ~ Zero sec! (JD ~ 2135100)

(Z.H.: La nueva cronologia, p. 102)

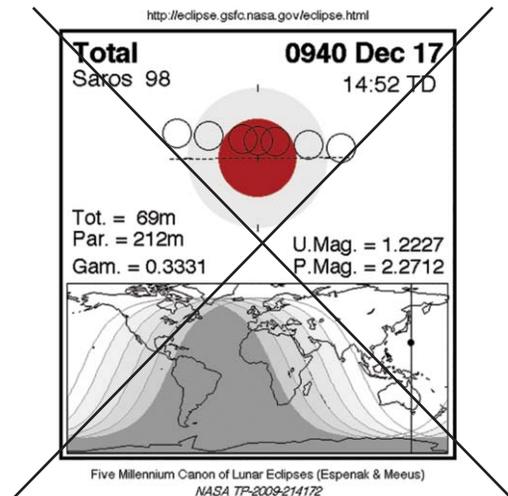
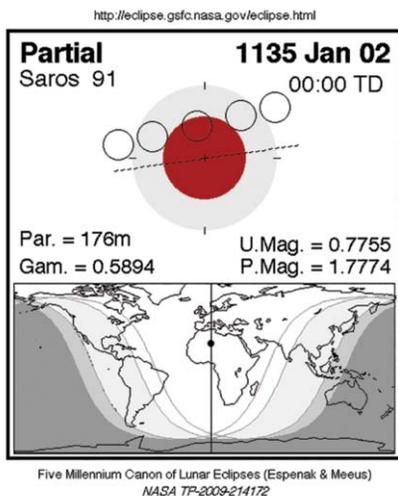


The year of CE 1135, AH 329 (Traditional AD = CE 940/941)

“M.940 Dec, 17-18 TOTAL IN SYRIA

This total eclipse is clearly mentioned by Elias 1910, 129 under the year AH 329: ‘The Moon was eclipsed on the night of Friday, the 15th of Rabia I [940 Dec.18], and during Saturday night the caliph Ar-Radi died’. Elias gives as general reference for his 329 annal Tabit, son of Sinan. Ar-Radi reigned c. 934-940.” (Schove, p. 229)

This lunar eclipse really happened on January 2 in CE 1135, not in CE 940 Dec 17!
Delta T ~ Zero sec! (JD ~ 2135617.5)



The year of CE 1135

“1135 Jan 16 (annular, mag. = 0.93): Lin-an [class A]

Shao-hsing reign period, 5th year, 1st month, the first day of the month. A man named Ch'en Te-I predicted that the Sun should be 8 ½ tenths eclipsed with the beginning of loss in the initial half of the hour of szu. (These predictions) were verified by observation.

[*Sung-shih*. chap.81.]”

This account is to be found in the calendar treatise of the *Sung-shih*.

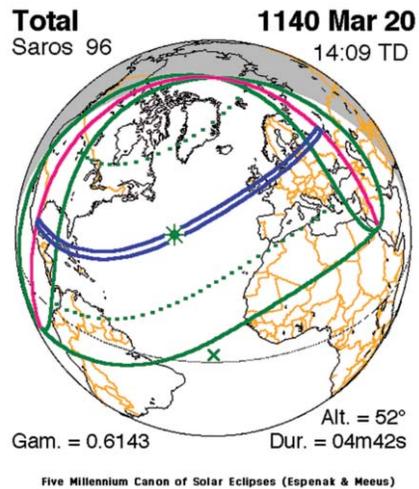
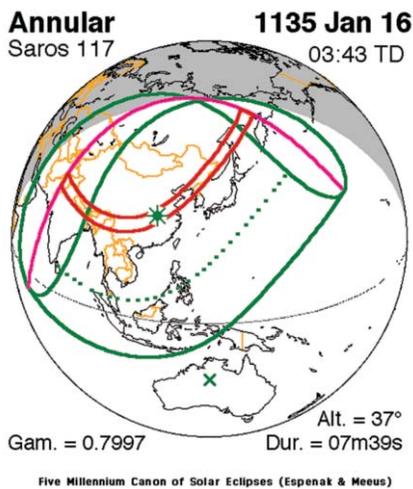
Although the observational record is brief, it would seem that a large partial eclipse was witnessed at Lin-an; there is no mention of annularity. The local time of beginning corresponds to some time between 9 and 10 h.

RESULTS

For a large partial eclipse at Lin-an, Delta T < 1840 sec or > 3810 sec” (Stephenson, p. 253)

The back calculation of the Solar Saros Series – 117 is not accurate!

Delta T ~ Zero sec! (JD ~ 2135631.65)



The year of CE 1140 (Traditional AD = CE 949/951)

“c.949 NON-ECLIPSE IN ITALY

Solar non-eclipse about 949?

We have four (late?) references to the Sun's becoming like blood or ruddy and blood-red, during the reign of Lothar II (948-50) in Italy. We have concluded that this was not an eclipse. See *Annales Polonorum*; *Martin of Oppau*; *Chron. Univ. Mettens*; *Instituta regalia...Longobardorum...*

(951) See under S.418 July 19 and S.939 July 19 for 951 July 19 error in *Annals of Blandigny* (Ghent).

The late *Annales Blandinienses* (of Blandigny near Ghent); have a solar eclipse at the third hour under 951 July 19 (an impossible eclipse date).” (Schöve, p. 229, 227)

This Solar eclipse really happened on March 20 in CE 1140!

Delta T ~ Zero sec! (JD ~ 2137522.09)

**The year of CE 1147
(Traditional AD = CE 957/958)**

“c. 957 CONFUSED SOLAR RECORD

Misdating of solar eclipse (really 961)

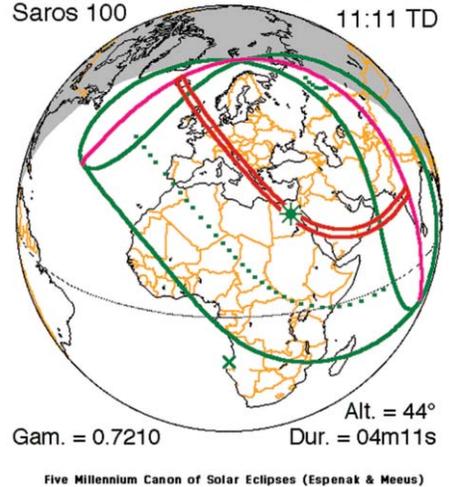
The Fleury fragment quoted above under M.955 Sept.4-5 mentions, apparently for the third year of Lothaire, a solar eclipse on XV. Kal..Jan. (Dec. 18), with stars visible from the first to the third hour (a manifest exaggeration)...The date carries its own refutation. There was no solar eclipse in France during the third year of Lothaire (which cannot possibly fall outside 955-8), nor any solar eclipse anywhere on or close to Dec. 18 in any of the years round about.” (Schöve, p. 230)

This Solar eclipse really happened on October 26 in CE 1147!

The back calculation of the Solar Saros Series – 100 is not accurate!

Delta T ~ Zero sec! (JD ~ 2140297.964)

Annular **1147 Oct 26**
Saros 100 11:11 TD



The year of CE 1153 (Traditional AD = CE 961/962/963)

“S. 963 Sept. 20 CONFUSED RECORD IN ITALY

This annular eclipse had noon point in the Atlantic, and proceeded via North-West Africa to an end in Central Africa. There is a reference in the Annals of the Bari region traditionally dubbed those of ‘Lupus protospatharius’. Having already (p. 54) mentioned S. 961 May 17 in a different context under its correct year, the Annals have ‘963’. The emperor Romanus died, and Nicephorus succeeded, and reigned for 7 years; and king Otto entered Rome, and the Sun was obscured’. A modest partial eclipse, of magnitude perhaps no more than 0.5 may have occurred in Southern Italy in the late afternoon. The words ‘in this 6th year’ may have been omitted and the eclipse of 968 may be meant.” (Schöve, p. 231-232)

“Lambacensis says ‘There was an eclipse of the sun’ under 1153. Such a brief notice is not safe to use in a source that could still be secondary.” (Newton, p. 269)

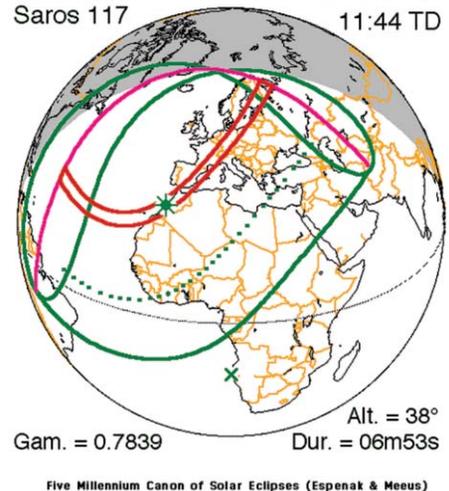
This Solar eclipse really happened on January 26 in CE 1153!

The back calculation of the Solar Saros Series – 117 is not accurate!

Delta T ~ Zero sec! (JD ~ 2142217)

(Z.H.: La nueva cronologia, p. 105)

Annular **1153 Jan 26**
Saros 117 11:44 TD



The year of CE 1160 (Traditional AD = CE 967/968)

“S. 967 July 10 NO CERTAIN RECORD EVEN IN S.E. MEDITERRANEAN

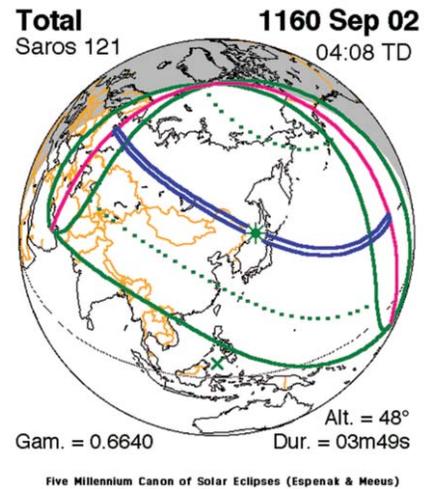
There is probably some reference in the Annals of Farfa: ‘968. Otto II imperator. Sol deficit hora tertia, 14. Kal. Aug.’ It is difficult to know what to make of this. The year numbers in these annals are mostly about one unit too large, though Otto II was crowned in Rome on 967 Dec. 25, which would count as the beginning of 968.” (Schove, p. 233)

“Casinates, ‘Lupus Barensis’ and Farfenses all have brief notes under 969 that probably refer to this eclipse. I cannot identify the specific sources, but it is not safe to use these records.” (Newton, p. 467)

This Solar eclipse really happened on September 2 in CE 1160!

The back calculation of the Solar Saros Series – 121 is not accurate!

Delta T ~ Zero sec! (JD ~ 2144992.67)



The year of CE 1162, AH 357 (Traditional AD = CE 966/968)

“There is a probable reference, too erroneous to be of much value, by the Spanish historian J. A. Conde, who in his History of the Arabs in Spain used primarily Moslem dating. To quote the editions we have seen... apparently of AH 355 Rajab, ‘During the same month there were eclipses of the Sun and Moon. The eclipse of the Moon was on the night of the fourteenth, and that of the Sun on the twenty-eighth day commencing at the hour of sunrise’. The dates mentioned are 966 July 6 and 20, and quite unsuitable. No lunar eclipse, umbral or penumbral, occurred at the full moon of 966 July 5, while S.966 July 20 was an afternoon, not a sunrise, eclipse in Spain.” (Schove, p. 233-234) En el página 182 del ‘UNA DESCRIPTION ANONIMA DE AL-ANDALUS’, entre los anos 355 y 358 su puede leer la siguiente anotación: [68]...El sol y la luna se eclipsaron ese mes.

[70] Tambien ese ano el sol amaneci6 eclipsado.’

(Z.H.: La nueva cronologia, p. 106)

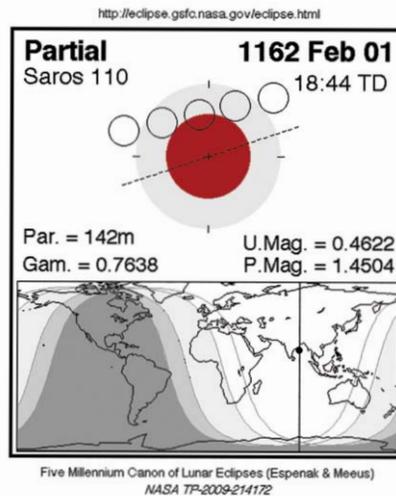
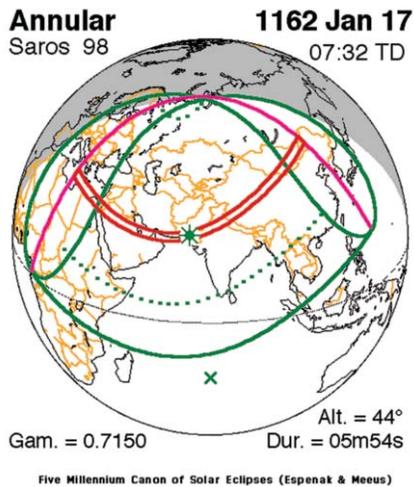
This Solar eclipse really happened on January 17 in CE 1162!

The back calculation of the Solar Saros Series – 98 is not accurate!

Delta T ~ Zero sec! (JD ~ 2145494.8)

This Lunar eclipse really happened on February 1 in CE 1162!

Delta T ~ Zero sec! (JD ~ 2145510.3)



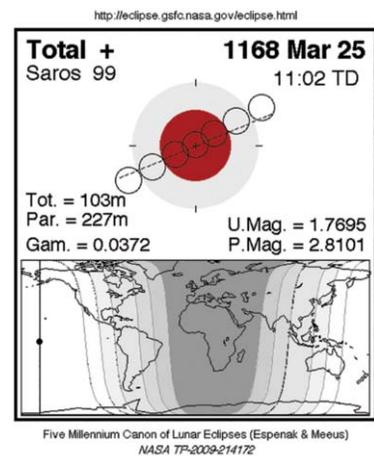
The year of CE 1168

1168 Mar 25/26; Lunar eclipse observations in China;

“Most of the extant observations in this category...an isolated report dating from AD 1168 Mar 25/26, which is preserved in chapter 82 of the Sung-shih....Presumably a scribal error has occurred here; the equivalent value of Delta T is – 2300 sec.” (Stephenson, p. 300-2)

The back calculation of the Lunar Saros Series – 99 is not accurate!

Delta T ~ Zero sec! (JD ~ 2147754)



The year of CE 1173 (Traditional AD = CE 979/983)

1173 Jun 12; Solar eclipse observations in China;

“AD 1173 Jun 12 (mag. = 0.58): Lin-an....

RESULTS

(i) Delta T = 900 sec.; (ii) Delta T = 2000 sec.; (iii) Delta T = 1400 sec.

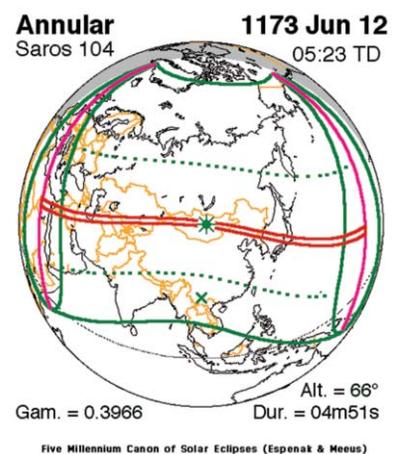
The back calculation of the Solar Saros Series – 104 is not accurate!

Delta T ~ Zero sec! (JD ~ 2149658.72)

“S. 983 Mar. 17 FALSE IDENTIFICATION

This identification of the solar eclipse mentioned by Cedrenus (cf. 979 May 28) at about AD 979 was given by Murrart. We find S.983 Mar. 17 invisible at Constantinople and was only penumbral in any case. (Schöve, p. 240)

This Solar eclipse really happened on June 12 in CE 1173!



The year of CE 1176, AH 371, Seljuk AH 571

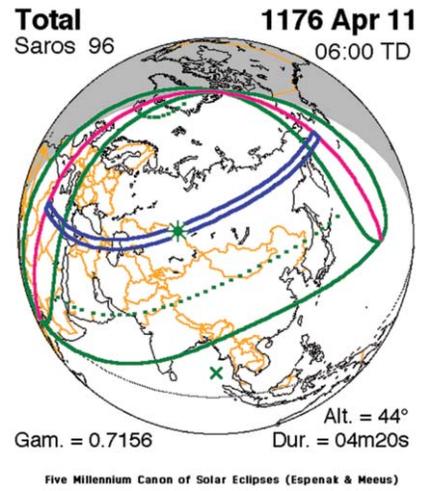
“AD 1176 Apr 11 [Sunday] (total, mag. = 1.06): Cizre (571 AH) In this year the Sun was eclipsed totally and the Earth was in darkness... [Ibn al-Athir: al-Kamil fi al-Tarikh]

RESULTS

For totality at Cizre, $600 < \Delta T < 2350$ sec.” (Stephenson, p. 439-442)

The back calculation of the Solar Saros Series – 96 is not accurate!

$\Delta T \sim \text{Zero sec! (JD} \sim 2150692.75)$



**The year of CE 1178, AH 374, Seljuk AH 574
(Traditional AD = CE 984/987/988)**

“AD 1178 Aug 29/30 [Wednesday] (mag. = 0.46): Baghdad (574 AH) The Moon was eclipsed after the last third of the night in the middle of (the month of) Rabi’ al-Awwal, and stayed in that state until it set after sunrise...

[Ibn al-Jawzi: Al-Muntazam fi Tarikh al-Muluk wa’l-Umam,]

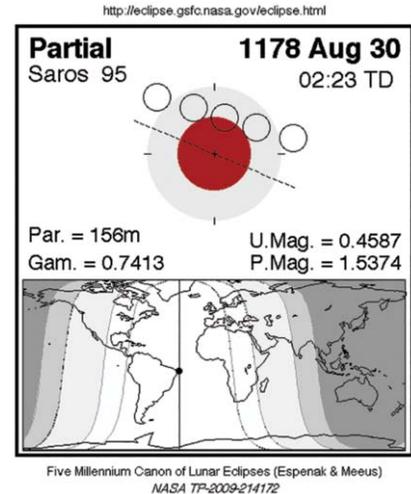
An observation of a solar eclipse recorded in this same passage has already been discussed in the previous section. Ibn al-Jawzi was living in Baghdad at the time. His remark that the Moon set after sunrise suggests unusually careful observation....

RESULTS

Combining these limits yields $-5650 < \Delta T < 3450$ sec.” (Stephenson, p. 452)

It is quite interesting that up to now never entered somebody’s mind such idea that the retro calculation of the 95 Lunar Saros Series perhaps is not perfect...

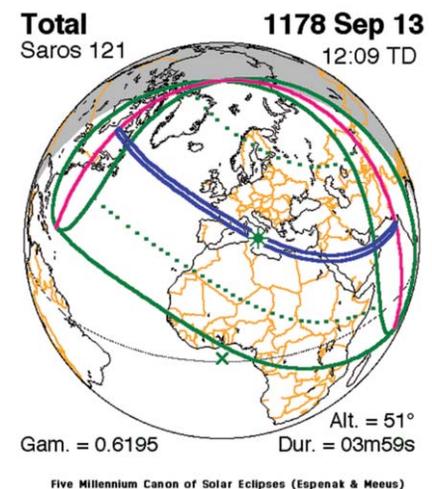
The back calculation of the Lunar Saros Series – 95 is not perfect (wrong)! $\Delta T \sim \text{Zero sec! (JD} \sim 2151563.6)$



“AD 1178 Sep 13 [Wednesday]: Baghdad

(574 AH) The Moon was eclipsed after the last third of the night in the middle of (the month of) Rabi’ al-Awwal, and stayed in that state until it set after sunrise. Also the Sun was eclipsed on Wednesday the 29th of Rabi’ al-Awwal in the afternoon and stayed like that until near sunset.

[Ibn al-Jawzi: Al-Muntazam fi Tarikh al-Muluk wa’l-Umam,]



RESULTS ...thus Delta T > - 3250 sec.” (Stephenson, p. 450)

The back calculation of the Solar Saros Series – 121 is not perfect (wrong)! Delta T ~ Zero sec! (JD ~ 2151578)

“S.988 May 18 CONFUSED RECORDS OF SOLAR ECLIPSE

The South Italian annals of ‘Lupus protospatharius’ mention a solar obscuration under AD 987. As noted under 985, no solar eclipse was visible in South Italy in that year;...” (Schöve, p. 241)

“Lupus Barenis says that the sun was obscured in 987. This probably a reference to the eclipse of 990 Oct 21, but it is a late reference and is not usable.” (Newton, p. 467)

“990 Oct 21. References: Quedlinburgenses and Thietmarus. In Book I, Chapter 10, Thietmarus writes: ‘In the year 989 of the Incarnation of the Lord the sun was eclipsed on the 12th calends November (= Oct 21) at the 5th hour of the day. Quedlinburgenses gives the same information about the eclipse, but under the correct year. If one copied the other, it is Thietmarus that is the copy.’ (Newton, p.403)

This solar eclipse really happened on September 13 in CE 1178!

The year of CE 1178-1180, AH 374-376 (Traditional AD = CE 986/988)

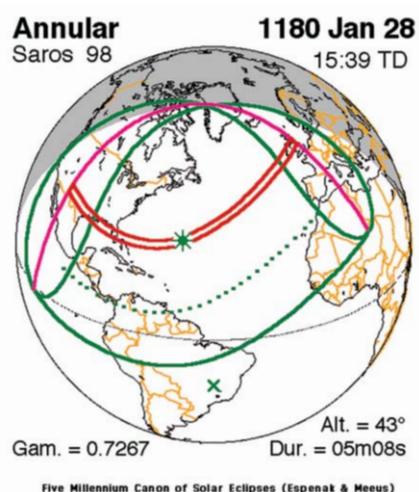
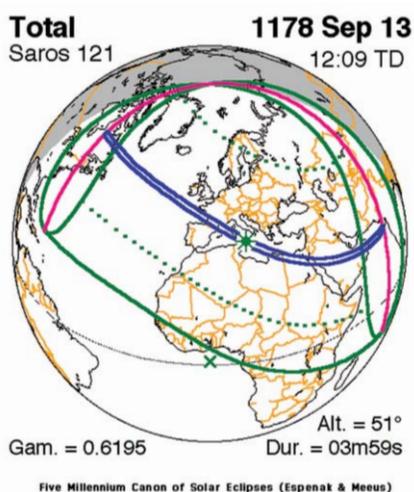
En el página 192 de la crónica [UNA DESCRIPCIÓN ANONIMA DE AL-ANDALUS], en el ano 376 se puede leer la siguiente anotación:

[110]...también el sol se eclipse dos veces y la tierra tembló en Córdoba.” El primer eclipse solar se vio en Córdoba, el día 13 de septiembre de 1178, mientras el Segundo el día 28 de enero 1180.”

(Z.H.: La nueva cronologia, p. 109)

The first solar eclipse really happened on September 13 in CE 1178!

The second solar eclipse really happened on January 28 in CE 1180!



The year of AD 1178 [about 1368 CE]

“1178 Sep 13e E, F. Reference: Gaufredus. This eyewitness account reads” ‘Year of the Incarnation of our Lord MCLXXVIII. 4th feria, ides of September, 28th of the moon, on a

clear day about the 5th hour the sun suffered an eclipse; its sphere began to be covered from the east until it was like a moon on its 2nd or 3rd. The star Venus was seen to the north. After the 6th [hour?] in the order that it was darkened its brightness returned until the sun shown full again. Then we could see each other's faces,... I have supplied '[Hour?]. Reliability: 1. Place: Vigeois. A moon on 'its 2nd or 3rd' night would have about 0.04 of its area exposed on the average. I believe that this conflicts with the statement that Venus could be seen. Hence I shall ignore the indication of partiality, and I shall use this as an ordinary report with a standard deviation of 0.02." (Newton, p. 349)

This one is a typical solar eclipse of the 15-16. Century's retro calculated with day exactness, and using this eclipse the humanists wished to verify historical events which were taking place 190 years later. Since we have the case of retro calculation the mistaking in the determination of the year, the month or the day is inevitable.

"AD 1178 Sep 13 (total, 1.05):Vigeois (France)

In the year from the Incarnation of Our Lord 1178, on the 4th day of the week (Wednesday), the Ides of September (Sep 13), the 28th day of the Moon, on a clear day, about the 5th hour the Sun suffered an eclipse; and its disc began to be covered from the east (sic) until it was like a two- or three-day-old Moon. The star Venus was seen to the north. After 6 the brightness returned from the east (sic), in the order in which it was blackened, until the Sun was fully illuminated. Then we saw each other's' faces as they appear beside a glowing furnace.

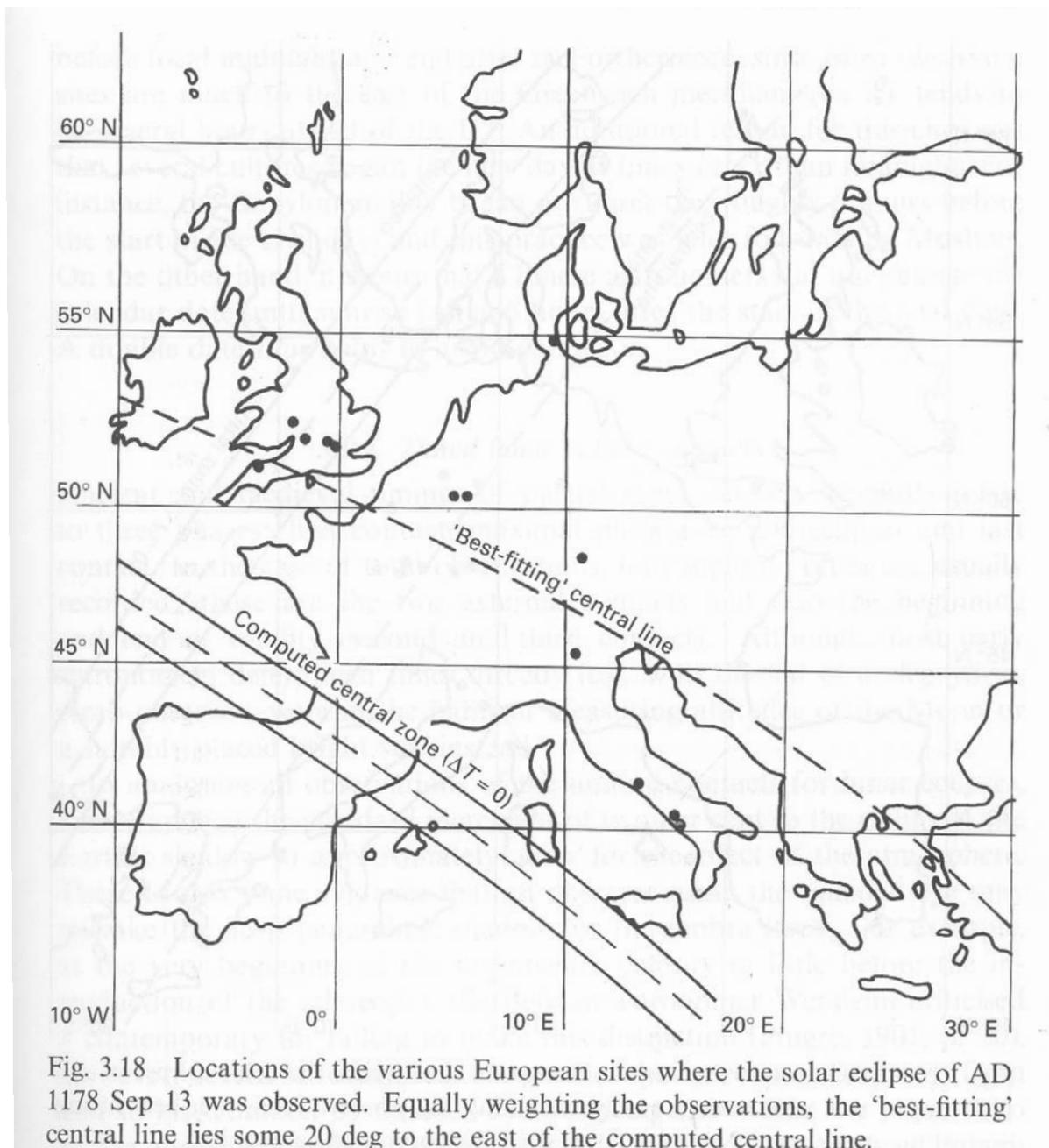
[Ex Cronico Gaufredi Vosiensis; Bouquet 1781]

Gaufredus, the author of this eyewitness description, was prior of the monastery of Vosium (now Vigeois) at the time of the eclipse. Although he gives a careful description of a partial eclipse, he has mistaken the limb of the Sun at which it began to be covered and uncovered; in each case this would be the western edge, The reference to the apparent reddening of the observers' faces perhaps suggest that Gaufredus and his colleagues had been looking at the Sun for too long! (Stephenson, p. 419)

"The difficulties associated with the analysis of laconic records of solar eclipses are perhaps best illustrated by consideration of the almost contemporaneous total solar eclipses of AD 1178 Sep 13 and 1187 Sep 4. In the interval of only nine years between them, Delta T unlikely to have varied by more than a few tens of seconds. As a result of an extensive search through published compilations of European chronicles, Ginzl (1884a) was able to assemble 14 separate records of the first event and as many as 27 for the second. No progress in uncovering further records of these two eclipses has since been made. Most of the accounts which Ginzl compiled were from local annals (e.g. of monasteries) and hence the place of observation may be confidently established. However, a few other reports were contained in chronicles which drew on information from a wide area. In almost every case, it is merely reported that an eclipse of the Sun occurred on a specified day without giving any descriptive details. For instance, the following brief report is from Italy in AD 1178:

1178...On the Ides of September (Sep 13), the Sun was obscured. [sol obscuratus est] [Chronicon Fossae Nuovae.]

Figure 3.18 marks the locations of each observing site for the eclipse of AD 1178 and figure 3.19 for the eclipse of 1187. Both charts are drawn on a rectangular grid in order to best demonstrate the effect of altering Delta T. The computed tracks of totality on each date, based on the assumption of a constant length of day of 86400 SI second (Delta T = 0), are shown. On the seemingly plausible assumption that the individual observations should be equally weighted, it is possible by displacing the calculated central lines (i) in 1178 towards the east by about 20 deg and (ii) in 1187 towards the west by some 10 deg to derive what appear to be their most likely true positions. The implied values for Delta T are roughly +5000 sec in 1178 and -2500 sec in 1187. These results are at considerable variance with one another – and also with those obtained from roughly contemporaneous Chinese and Arab timed measurements, which indicate a value for Delta T at this date of around +1000 sec.” (Stephenson, p. 80-82)



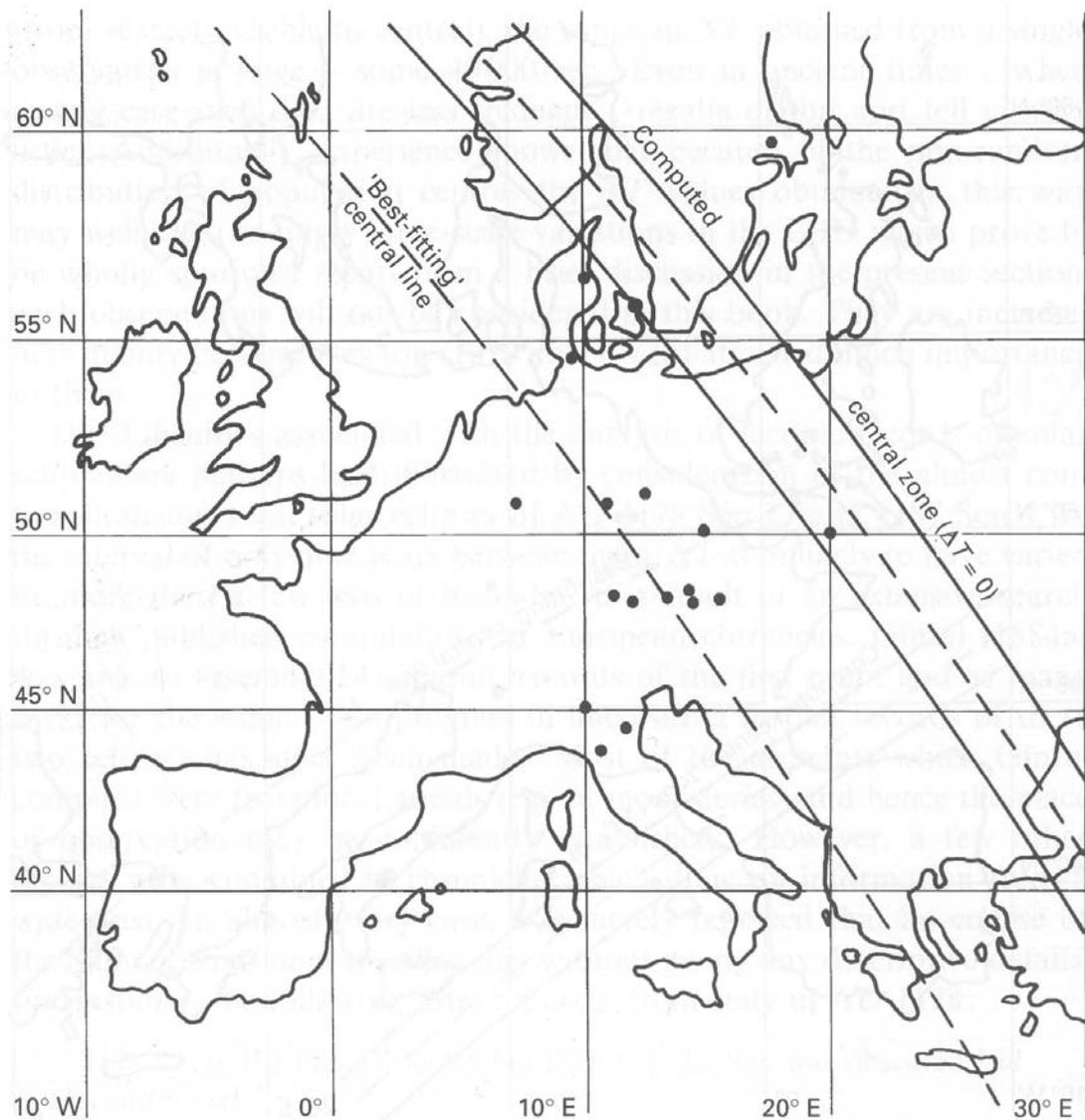


Fig. 3.19 Locations of the various European sites where the solar eclipse of AD 1187 Sep 4 was observed. Equally weighting the observations, the 'best-fitting' central line lies some 10 deg to the west of the computed central line.

The year of AD 1187 [about 1377 CE]

“1187 Sep 4b E, Sc. Reference: Hamsfort [ca. 1585]. Hamsfort has under 1187: ‘With the moon passing under its disk, the sun on the day before the nones of September was so much eclipsed that the stars in the sky shone in the daytime just as at night.’ Hamsfort adds that the annals giving this eclipse were supplied by Langius, and that they had been mentioned by Gerardus Mercator and Vincentius. Langius is Joannis Langius, a friend to whom Hamsfort dedicated his work. I do not know who Vincentius is. Mercator is the latin form of the name of Gerhard Kremer, who is best known for his map projection. He also published a ‘Chronicle from the beginning of the world to the year 1568’, in which he made considerable use of eclipses for chronological purposes, judging from the subtitle.

Since we have no idea whether this report came from Denmark or Germany or elsewhere, I give it a reliability of 0. (Newton, p. 488)

“1187 Sep 4 M, HL. Reference: De Expugnatione. The source says: ‘In the year 1187, in the month of September, on the 4th day of the month, the 6th feria, at the 9th hour, the sun was darkened, and in that darkness the greater number of those native to Ascalon came to the camp of the Egyptians.’ (Newton, p. 562)

“1187 Sep 4 B, E. Reference: Gervase. Under 1187 is: ‘The day before the nones of September, the 6th feria and the 6th hour, on the 28th day of the moon, appeared a partial eclipse of the sun in England.’ It is interesting that this eclipse was recorded from as far away as Jerusalem. The feria is correct, the hour looks reasonable, and the day of the moon is correct for the ecclesiastical moon.” (Newton, p. 171-2)

““1187 Sep 4 E, BN. Reference: Blandinienses. Under 1187 appears: ‘An eclipse of the sun on the 2nd nones September (= Sep 4). Reliability: 1. Place: Blandain. Standard deviation of the magnitude: 0.1.” (Newton, p. 246-7)

“1187 Sep 4a E, CE. Reference: Mellicenses [ca 1564]. The first sentence under **1188** reads: ‘There was an eclipse of the sun on the 2nd nones September (= Sep 4) at about the 9th hour; and the Sepulchre of the Lord, besieged by pagans, is destroyed.’ (Newton, p. 270)

“1187 Sep 4b E, G. Reference: Monacensis. This continuation of some annals from Salzburg has: ‘1187. There was an eclipse of the sun on the day before the nones of September (that is, on Sep 4) on the *day of Venus* for about 4 hours.’ ... (The Roman equivalent of our Freya’s day, or Friday. ***It is unusual for a clerical writer to use the pagan names of the days.***)” (Newton, p. 423)

“1187 Sep 4d E, G. Reference: Pegavienses. This has, under 1187: ‘An eclipse of the sun at the middle of the day on the 3rd nones September (= Sep 3).’ (Newton, p. 423)

The year of CE 1187, AH 382/383 (Traditional AD = CE 991/993)

“M. 991 Apr. 1-2 DEEP TOTAL IN IRAQ

A deep total eclipse, with Oppolzer and Schroeter magnitude 1.54 and mid-eclipse shortly before Greenwich mean midnight. The eclipse is mentioned by Elias (p.289). He fully dates it in several systems, and says it occurred at the ninth hour of the night on which the Thursday began.” (Schove, p.243)

This lunar eclipse really happened on Mar 26 in CE 1187, not in CE 991 Apr 2.

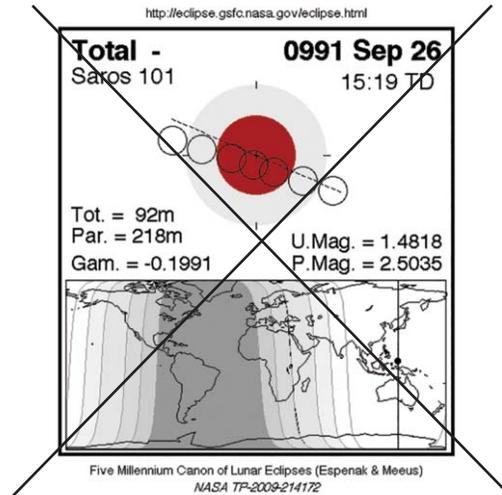
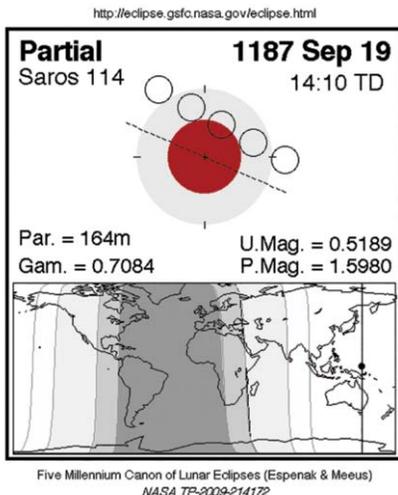
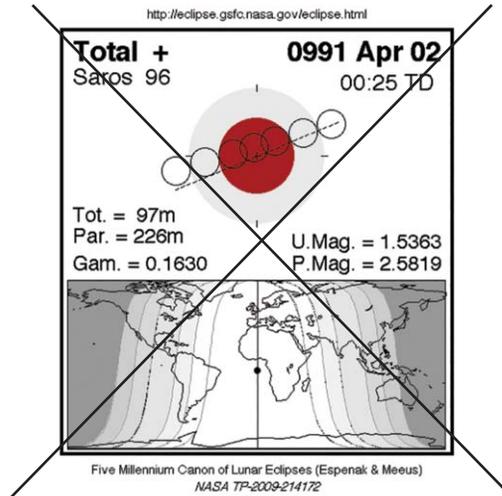
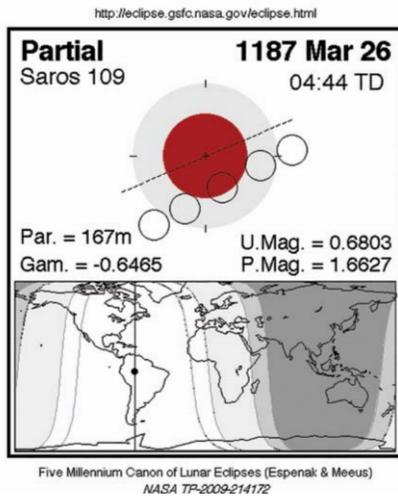
The back calculation of the Lunar Saros Series 96 and 109 are not accurate (wrong)!
Delta T ~ Zero sec! (JD ~ 2154693.7)

“M. 991 Sept. 26-27 DEEP TOTAL IN IRAQ

A deep total eclipse, with Oppolzer and Schroeter magnitude 1.48, mid-eclipse around UT 14h 45m and semi-duration of umbral eclipse 1h 50m. The eclipse is mentioned by Elias, who says the Moon was eclipsed at the beginning of Sunday night; in civil terms this means the beginning of Saturday evening. In Mesopotamia the Moon would rise eclipsed.” (Schove, p. 243)

This lunar eclipse really happened on Sep 19 in CE 1187, not in CE 991 Sept. 26.

The back calculation of the Lunar Saros Series 91 and 104 are not accurate (wrong)!
Delta T ~ Zero sec! (JD ~ 2154871.1)



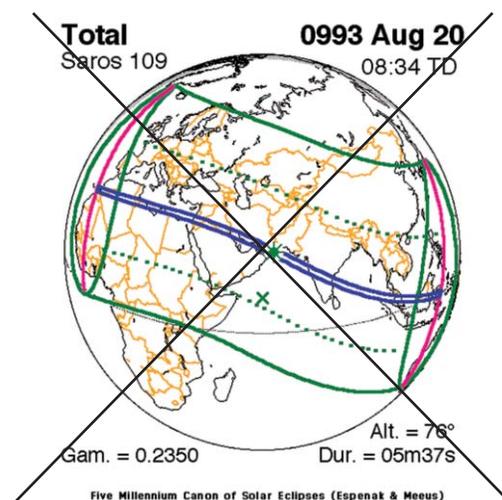
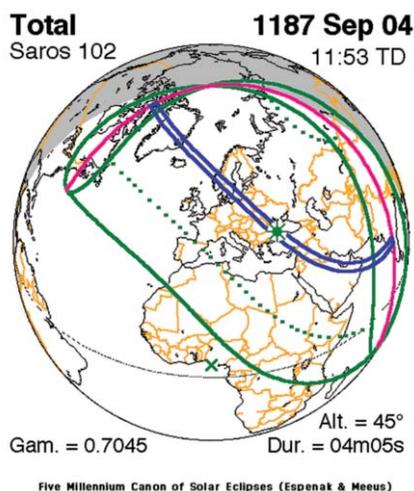
“AD 993 Aug 20: Cairo?”

(383 AH.) In this year the Sun was eclipsed totally at the end of (the month of) Jumada al-Ukhra. It was so dark that the stars appeared and people could not see the palms of their hands. The eclipse cleared at the end of the day. [Al-Maqrizi: Itti’az al-Hunafa bi Akhbar al-A’imma al-Fatimiyyin al-Khulafa, vol. I, p.280]

Although al-Maqrizi spent most of his life in Cairo, he wrote more than four centuries after the eclipse. Hence the place of observation must be regarded as very doubtful; there is nothing in the text itself to indicate a Cairo source. Although al-Maqrizi appears to quote from an eye-witness description of totality, careful observations made in Cairo and recorded by the contemporary astronomer ibn Yunus indicate that the eclipse was only partial there and ended in mid-morning (see chapter 13). Al-Maqrizi may have obtained his information from a source much to the east of Cairo.” (Stephenson, p. 444)

This solar eclipse really happened on Sep 4 in CE 1187, not in CE 993 Aug 20.

So, the back calculation of the Solar Saros Series 102 and 109 are not accurate. Delta T ~ Zero sec! (JD ~ 2154856)



The year of AD 1191 [about 1381 CE]

“1191 Jun 23 B. E. References: Wendover and Ralf of Coggeshall. Under the year 1191, Wendover has: ‘This year, in June on the eve of S. John the Baptist, the 1st feria, an eclipse of the sun appeared about the 6th hour of the day and lasted until the 8th hour, on the 27th of the moon, the sun being in Cancer.’ Ralph of Coggeshall has an entry that is identical except that he does not have ‘1st feria’ but does have that the eclipse was partial. The date and the weekday are correct, but the hours of the day look late, judging from the map in Oppolzer.” (Newton, p. 172)

“1191 Jun 23c B. E. Reference: Waverly. Waverly has, under the year 1191: ‘There was an eclipse of the sun on the Lord’s day about the 6th hour.’ (Newton, p. 173)

“1191 Jun 23d B. E. Reference: Florence of Worchester. The continuation made at Bury S. Edmunds has: ‘The sun had an eclipse on the 9th calends July, such that stars appeared for 3 hours.’ (Newton, p. 173)

“1191 Jun 23a E, BN. Reference: Fossenses, which has under 1191: ‘This year occurred an eclipse of the sun on the eve of S. John the Baptist.’ (Newton, p. 247)

“1191 Jun 23a E, CE. Reference: Melicenses [ca. 1564]. Under **1193**, this source notes the death of Pope Clement III, the accession of Celestine III, and the coronation of Henry VI as Holy Roman emperor by the latter. It then says: ‘There was an eclipse of the sun on the 9th calends July (= Jun 23) at about the 7th hour.’ I believe that the year given is simply an accident, because all of the information is correct for 1191. Reliability: 1. Place: Melk. Standard deviation of the magnitude: 0.1.” (Newton, p. 271)

“1191 Jun 23b E, CE. Reference: S. Rudberti [ca. AD 1286]. This source has the information about the coronation under the correct year, and then has under the same year: ‘An eclipse of the sun occurred on the 9th calends June about the middle of the day.’ The text has ‘June’ where it should have had ‘July’, but this mistake is encouraged by the nature of the Roman calendar, and it is in fact surprising that it did not happen more often...Place: Salzburg. (Newton, p. 271)

“1191 Jun 23b E, BN. Reference: Lambertus Parvus. Lambertus writes under 1191: ‘An eclipse of the sun and a flood of waters in Liege outside the castle took place.’ In the same year, Lambertus says that Richard and Henry prepared an expedition to the

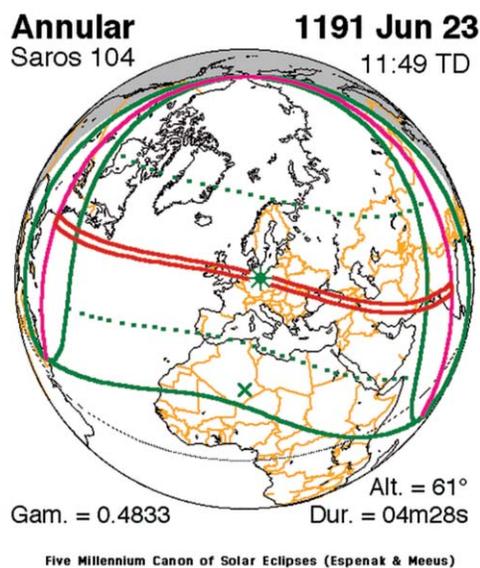
Holy Land. Actually Richard (Coeur-de-Lion) and Philip started in 1190 and arrived with their expedition in 1191, but this does not help much either to confirm or impeach the chronology. For the next year, Lambertus writes that the Paschal moon was seen on the 17 calends April (=Mar 16) instead of the 14th (= Mar 19). 1192 Mar 19 was the ecclesiastical new moon where-as the new moon would have been visible in Belgium on 1192 Mar 16, so the chronology is confirmed.” (Newton, p. 247)

“1191 Jun 23a E, G. Reference: Zwifaltenses. In the middle of a rhyming section dealing with other matters there is the following: ‘1190. On the 9th calends July (= Jun 23) there was an eclipse of the sun near the 6th hour of the day” (Newton, p. 424-5)

“1191 Jun 23b E, G. Reference: Monacensis. This source says under 1191: ‘There was an eclipse of the sun on the 7th calends of July (= Jun 25) near midday, and all the air was made purple.” (Newton, p. 425)

“1191 Jun 23c E, G. Reference: S. Stephani. These annals have: ‘1191. There was an eclipse of the sun on the 9th calends July, the Lord’s day, about the hour nones. On the same day as the eclipse a great battle of the Christians with the pagans began near Acre, and with many from both sides being killed, victory fell to the Christians.” (Newton, p. 425)

This one is a typical solar eclipse of the 15-16. Century’s retro calculated with day exactness, and using this eclipse the humanists wished to verify historical events which were taking place 190 years later. Since we have the case of retro calculation the mistaking in the determination of the year, the month or the day is inevitable.



The year of CE 1201 (Traditional AD = CE 1009)

“1009 Mar 29a E, BN. Reference: Leodienses. This source has under 1009: ‘An eclipse of the sun took place about the 2nd hour of the day.”

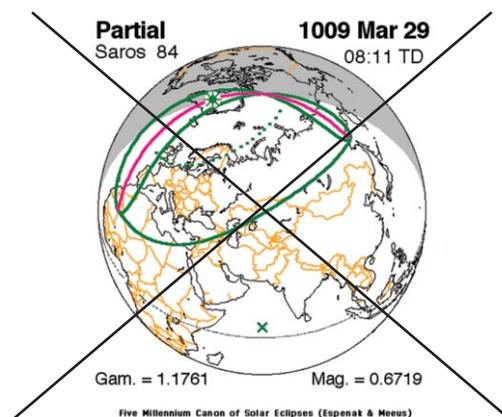
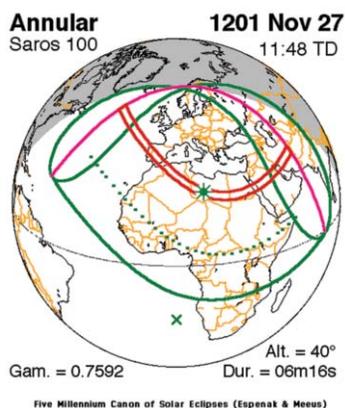
“1009 Mar 29b E, BN. Reference: Blandiniensis. This source has the eclipse under 1008, where it says...” (Newton p. 238)

“1009 Mar 29 (?). Quedlinburgenses says that, in 1009, on the 3rd calends May (= Apr 29), on the 6th feria, the 1st of the moon the sun was covered by a terrible colored cloud and that it stayed covered for 2 days, regaining its proper light only on the 3rd day...” (Newton, p. 403-4)

This solar eclipse really happened on Nov 4 in CE 1201, not in CE 1009 Mar 29.

The back calculation of the Solar Saros Series – 100 is not accurate!

Delta T ~ Zero sec! (JD ~ 2160043.99)



The year of CE 1202

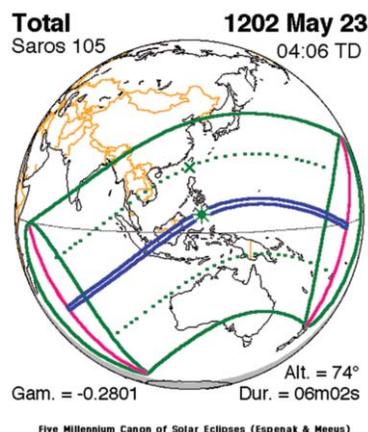
“AD 1202 May 23 (*mag.* = 0.58): *Lin-an*

Chia-t'ai reign period, 2nd year 5th month, day chia-ch'en, the first day of the month, The Sun was eclipsed. The loss began at 1 mark in the initial half of the hour of *wu*. It was restored to roundness in the initial half of the hour of *wei*...

” (Stephenson, p. 292)

The back calculation of the Solar Saros Series – 105 is not accurate!

Delta T ~ Zero sec! (JD ~ 2160230.7)



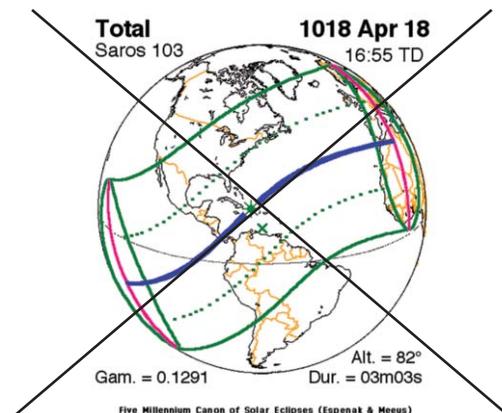
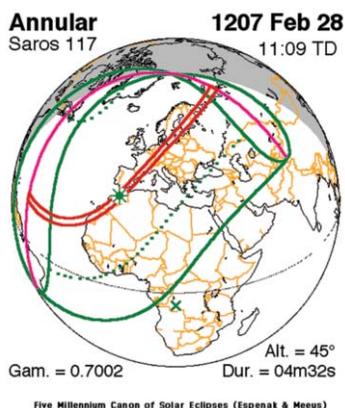
The year of CE 1207 (Traditional AD = CE 1018)

“1018 Apr 18 E, G. Reference: Thietmarus. In Book VIII, Chapter 5, at a time that is in the spring of 1018: ‘In those days the sun before its setting appeared to several to be halved in wondrous fashion.’ The eclipse of 1018 Apr 18 should have been about half total at sunset in Saxony.” (Newton, p. 404)

This solar eclipse really happened on Feb 28 in CE 1207, not in CE 1018 Apr 18.

The back calculation of the Solar Saros Series – 107 is not accurate!

Delta T ~ Zero sec! (JD ~ 2161972.963)



The year of AD 1207 [about 1399 CE]

“1207 Feb 28a B, E. Reference: Matthew Paris, which has under 1207: ‘This year the sun suffered an eclipse from the 6th to the 8th hour. And also the moon underwent an eclipse within the year, in sad foreboding of things in the near future.’...The ‘foreboding’ suggests that the record was written after some of the unpleasant events of John’s reign, such as the Interdict which was imposed in 1208, but probably a short time after and from contemporary notes.” (Newton, p. 174)

The year of CE 1216 (Traditional AD = CE 1023)

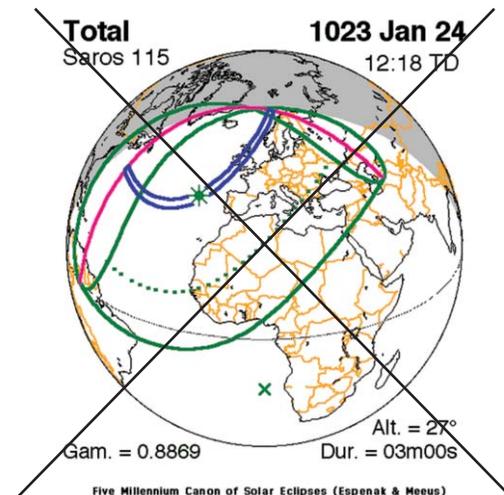
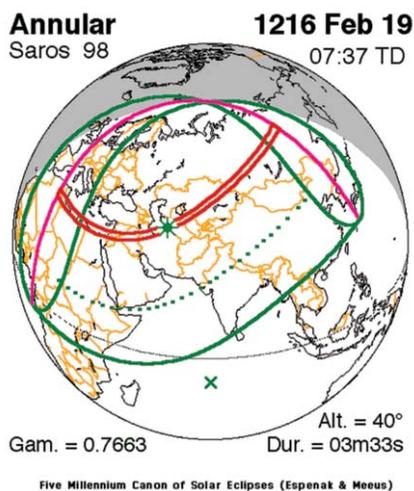
“1023 Jan 24 E, F. Reference: Ademarus. Ademarus wrote in Chapter LXII: ‘In those days, in the month of January, about the 6th hour of the day an eclipse of the sun took place for an hour...’ (Newton. p. 333)

“1023 Jan 24 B, E. Reference: Burton. Under the year 1023 Burton has: ‘The sun was darkened on the 9th calends February.’ (Newton, p. 157)

This solar eclipse really happened on Feb 19 in CE 1216, not in CE 1023 Jan 24.

The back calculation of the Solar Saros Series – 98 is not accurate!

Delta T ~ Zero sec! (JD ~ 2165250.82)



The year of CE 1218 (Traditional AD = CE 1030)

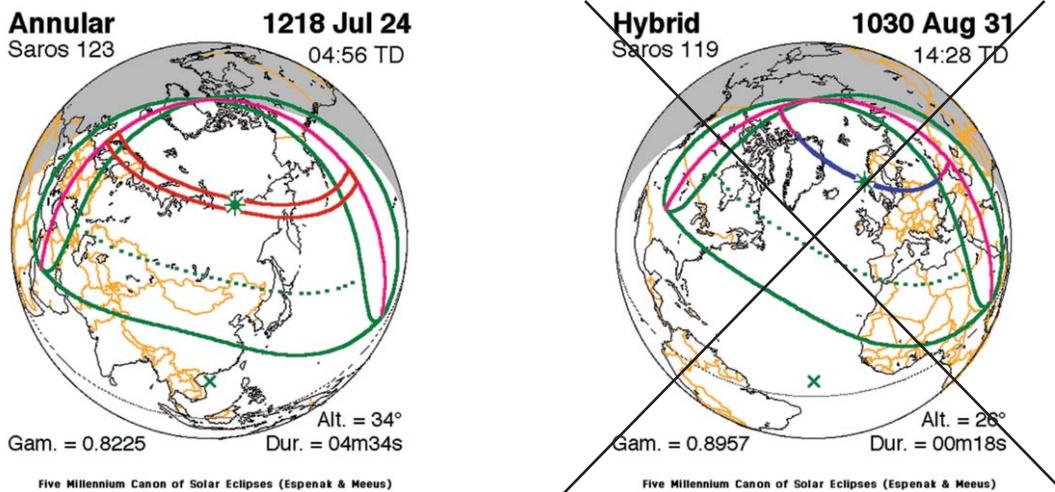
“1030 Aug 31 E, Sc. Reference: Snorri. This is the famous alleged ‘eclipse of Stiklestad’ that I discussed at length in AAO Section IV.4.

At the time of Olaf’s death, Norway and large areas of England formed a common kingdom. All the Icelandic/Norse annals that I have seen which cover the year 1030 record the battle of Stiklestad, the death of S. Olaf or both and many of English and Danish annals do the same. None of these annals notes the eclipse of 1030 Aug 31.

In order to appreciate the significance of this evidence, we must realize that S. Olaf played an important role in the Christianization of Norway and that many miracles be-

came connected with him. Although he was not canonized until 1164, his cult was well established within a few years of his death, and **July 29** was observed as the anniversary of his death, in at least one church calendar drawn up about 1050. The Swedish source Lundense, in which the entries may be contemporaneous, also gives **July 29**. If a total eclipse of the sun had occurred at the time and place of his death, this fact would have made a deep and irrevocable impression upon the minds of his followers.” (Newton, p. 499-501)

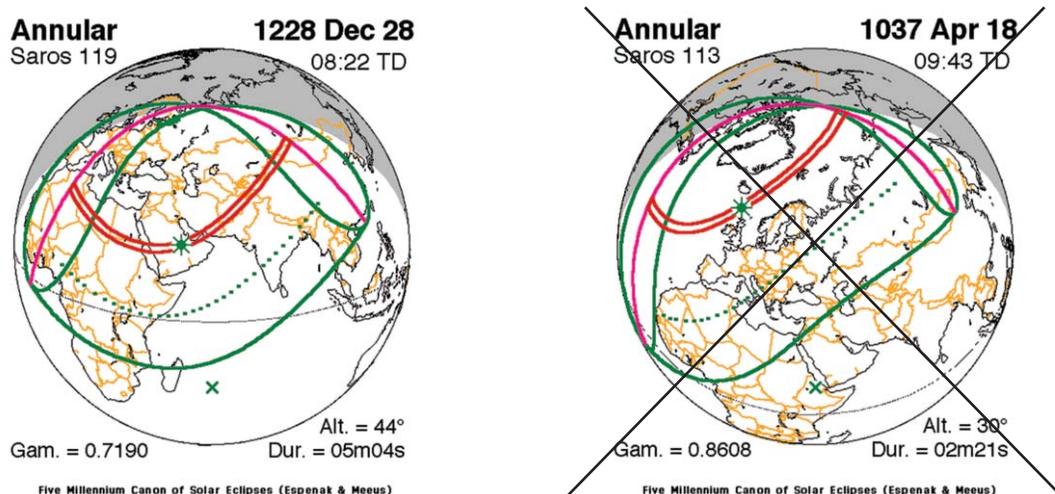
This solar eclipse really happened on **July 24** in CE 1218, not in CE 1030 Aug 31! Delta T ~ Zero sec! (JD ~ 2166136.7)



The year of CE 1228 (Traditional AD = CE 1037)

“1037 Apr 18 E, BN. Reference: Blandinienses. The reference has, under 1037: ‘This year occurred an eclipse of the sun on the 14th calends May (= Apr 18), on the 28th day from the new moon, at the **first hour of the day**.’ (Newton, p. 240)

This solar eclipse really happened on Dec 28 in CE 1228, not in CE 1037 Apr 18. The back calculation of the Solar Saros Series – 119 is not accurate! Delta T ~ Zero sec! (JD ~ 2169946.85)



The year of AD 1230 [about 1421 CE]

“AD 1230 May 14 [Tuesday] (total, 1.05): Belvoir? (England)

In the same year (1230) an extraordinary eclipse of the Sun occurred, in the very early morning immediately after sunrise, on the day before the Ides of May (May 14) in Rogationtide, namely the third day of the week (i.e. Tuesday). As result, the workers in the fields and many others, leaving their morning’s work on account of the excessive darkness, decided to return to bed and go back to sleep...” (Stephenson, p. 425)

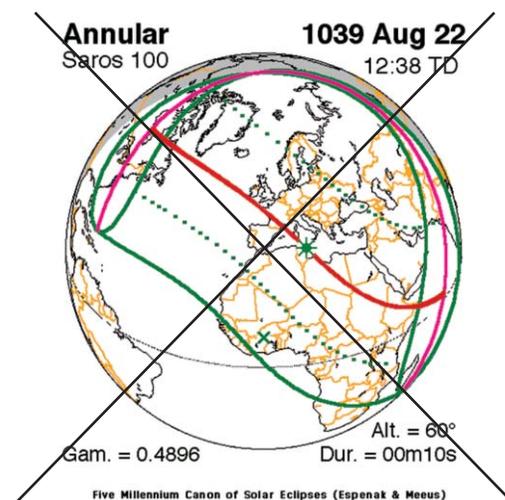
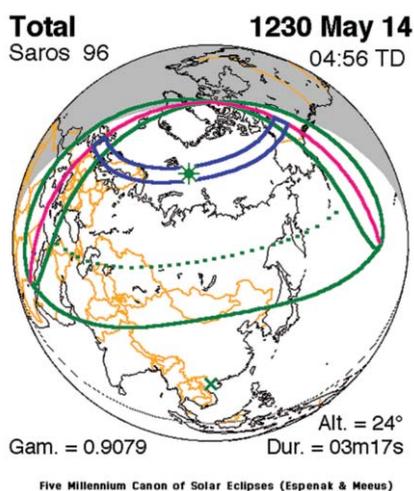
This one is a typical solar eclipse of the 15-16. Century’s retro calculated with day exactness, and using this eclipse the humanists wished to verify historical events which were taking place 190 years later. Since we have the case of retro calculation the mistaking in the determination of the year, the month or the day is inevitable.

The year of CE 1230/Traditional AD = CE 1039

“1039 Aug 22a E, F. Reference: Mosomagenses. The entry for 1039 reads in part: ‘11 Kal. Septembris sol contenebratus est. [The underlining indicates a word that the editor has ‘restored’. It is most likely that the manuscript has ‘XI’ rather than ‘11’ for the numeral; it is possible that the numeral is written out.] The words are almost identical with some entered under 1005, as I mentioned above.” (Newton, p. 339)

“1039 Aug 22c E, F(?) Reference: Cameracensium. In Chsapter III.55 this has: ‘... there was an eclipse of the sun on the day before the ides of May (= May 14); and the 2nd nones June (= Jun 4), so it is said, he [the Holy Roman emperor Conrad II, who died on 1039 Jun 4] died...” (Newton, p. 340)

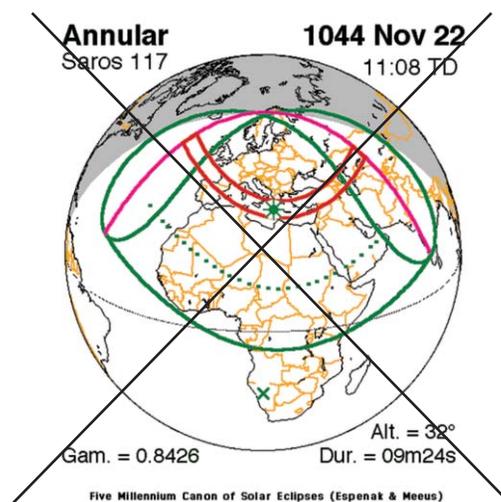
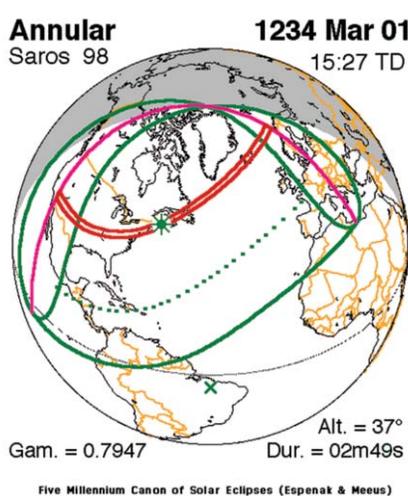
This solar eclipse really happened on May 14 in CE 1230, not in CE 1039 Aug 22. The back calculation of the Solar Saros Series – 96 is not accurate! Delta T ~ Zero sec! (JD ~ 2170448.7)



The year of CE 1234/Traditional AD = CE 1044

“1044 Nov 22 E, I. Reference: Romani. The second entry under the year **1046** reads: ‘And then in the same year on the feast of S. Cecilia the sun was obscured for the space of about 3 hours.’(Newton, p. 469)

This solar eclipse really happened on Mar 1 in CE 1234, not in CE 1044 Nov 22. The back calculation of the Solar Saros Series – 98 is not accurate! Delta T ~ Zero sec! (JD ~ 2171836.14)



The year of CE 1239/Era 1085

“1239 Jun 3b E, CE. Reference: Lambacensis, which has: ‘1239. There was an eclipse of the sun on the 3rd nones June at about the 9th hour.’ This contemporaneous report receives a reliability of 1. Place: Lambach. Standard deviation of the magnitude: 0.1.” (Newton, p.273)

“AD 1239 Jun 3 [Friday] (total, 1.08) Split (Croatia)

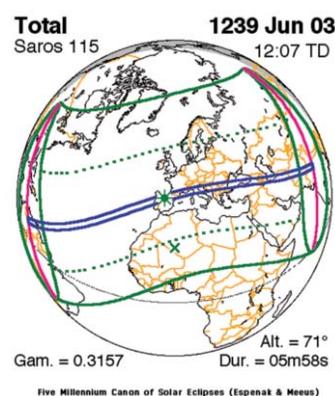
At the same time, AD 1239 on the third day from the beginning of the month of June, a wonderful and terrible eclipse of the Sun occurred, for the entire Sun was obscured, and the whole of the clear sky was in darkness. Also stars appeared in the sky as if during the night, and a certain greater star shone beside the Sun on the western side. And such great fear overtook everyone, that just like madmen they ran about to and fro shrieking, thinking that the end of the world had come. However, it was a Friday, the 30th day of the (lunar) month. And although the same defection of the Sun appeared throughout the whole of Europe, it was not however spoken of in Asia and Africa.

[Ex Thomae Historia Pontificum Salonitanorum et Spalatinorum]

(Stephenson, 401)

The back calculation of the Solar Saros Series – 115 is not accurate!

Delta T ~ Zero sec! (JD ~ 2173756)



The year of AD 1239 [about 1431 CE]

“AD 1239 Jun 3 [Friday] (total, 1.08): Coimbra (Portugal)

On the 3rd day before the Nones of June (Jun 3), on the same day that Christ suffered, namely the 6th day of the week (Friday), and the same time that darkness occurred over the whole Earth at the Passion of our Lord, namely from the 6th to the 9th hours of the era 1237, there occurred a sign such has never happened since the Passion of the Lord until the present day. There was indeed night between the 6th and 9th hours and the Sun became as black as pitch and the Moon (sic) and many stars appeared in the sky. Then the receding of the darkness of night was followed by the receding and recovering of the Sun’s original clarity. Many men and women assembled in the Church of the Holy Cross in Coimbra...”

[Chronicon Conimbricense, III; Florenz (1747, vol II, p. 336] “ (Stephenson, p. 399)

“...In view of the above remarks, I have not assumed totality unless the complete disappearance of the Sun is clearly described. This means rejecting a number of unusually vivid records, such as the following from Toledo which relates to the eclipse of AD 1239

Jun 3:

The Sun was obscured on Friday at the 6th hour of the day, and it lasted for a while between the 6th and 9th hours and it lost all its strength and there was as though night. There appeared many stars, and then the Sun grew bright again of its own accord, but for a long time it did not regain the strength that it usually has. Era 1277 (Julian = AD 1239). [Anales Toledanos Segundos; in Spanish; Florenz 1747] (Stephenson, p. 385)

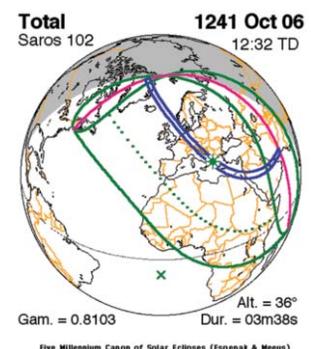
“AD 1239 Jun 3: Arezzo (Italy)

While I was in the city of Arezzo, where I was born, and in which I am writing this book, in our monastery, a building which is situated towards the end of the fifth latitude zone (clima), whose latitude from the equator is 42 and a quarter degrees and whose westerly longitude is 32 and a third, on Friday, at the 6th hour of the day, when the Sun was 20 deg in Gemini and the weather was calm and clear, the sky began to turn yellow and I saw the whole body of the Sun covered step by step and it became night. I saw Mercury close the Sun ...”

(Stephenson, p. 397-8)

The year of CE 1241

“1241 Oct 6c E,CE. Reference: Lambacensis. This has: 1241. There was darkness over all the earth, and stars appeared, on the day before the nones of October, about the 9th hour.’ Later, under the same year, the entry for 1241 refers to the Mongol invasion of Hungary and says that 80,000 people were killed. I think the annalist is trying to describe a total eclipse. Reliability: 1. Place: Lambach. Standard deviation of the magnitude: 0.” (Newton, p. 273-4)



“AD 1241 Oct 6 (total, mag, = 1.05): Nile Delta

On the 9th of the month of Babah of the year 958... in the reign of al-Malik al-Salih Najm al-Din Ayyub (King Ayyub the Good) and under the presidency of Patriarch Cyril, something strange and wonderful occurred in the world such that everyone who saw it or heard about it was astonished. Namely, the Sun was gradually darkened until it became completely dark. Also the day became dark like night. Some people saw the stars and people lit lamps and people were very frightened and prayed...The darkness cleared instantly and then the Sun appeared as usual and lit up the world, and lamps were extinguished. The duration of the solar eclipse was about one hour –from the middle of the 8th to the middle of the 9th hour...

[Synaxarium Alexandrinum.] (Stephenson p. 445)

The back calculation of the Solar Saros Series – 102 is not accurate!

Delta T ~ Zero sec! (JD ~ 2174612)

The year of CE 1245

“AD 1245 Jul 25 (mag. = 0.74): Lin-an

Shun-yu reign period, 5th year. According to the calculation of an astronomical official named Cheng, the Sun should have been eclipsed at 3 marks in the initial half of the hour of *wei*. It was observed at 4 marks in the central half of the hour of *wei*. The magnitude should have been 8 divisions (fen) but it was actually 6 divisions.

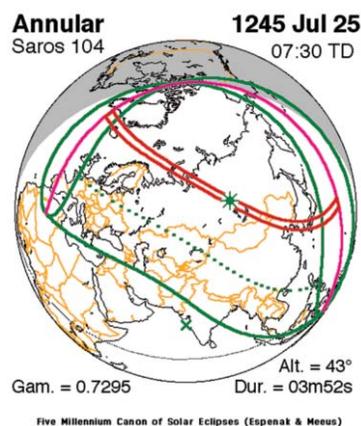
[Sung-shih, chap. 82.]” (Stephenson, p. 293)

“...Since the pattern of the Korean accounts of totality is very repetitive, a single example will suffice. The following observation was recorded on a date corresponding to AD 1245 Jul 25:

King Kojong, 32nd year, 7 month, day kuei-szu [30], the first day of the month. The Sun was eclipsed and it was total. [Koryo-sa, chap. 47] (Stephenson, p. 263)

The back calculation of the Solar Saros Series – 104 is not accurate!

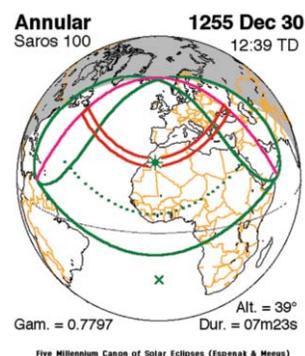
Delta T ~ Zero sec! (JD ~ 2175999.81)



The year of CE 1255

“1255 Dec 30 E, CE. Reference: Pragensium, which has under 1255: ‘On the 3rd calends January (= Dec 30) the sun suffered an eclipse,’ Reliability: 1 Place: Prague. Standard deviation of the magnitude: 0.1.” (Newton, p. 282)

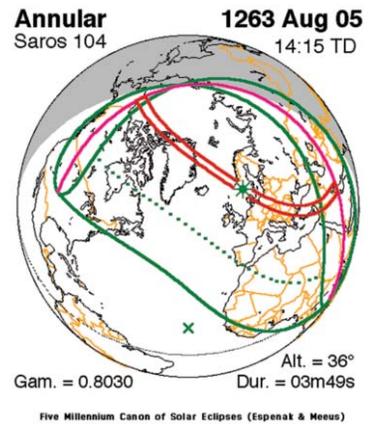
The back calculation of the Solar Saros Series – 100 is not accurate! Delta T ~ Zero sec! (JD ~ 2179810.02)



The year of CE 1263

“1263 Aug 5 E, CE. Reference: S. Rudperti. Under 1263 this has: “There was a partial eclipse of the sun and two of the moon.” (Newton, p. 274-5)

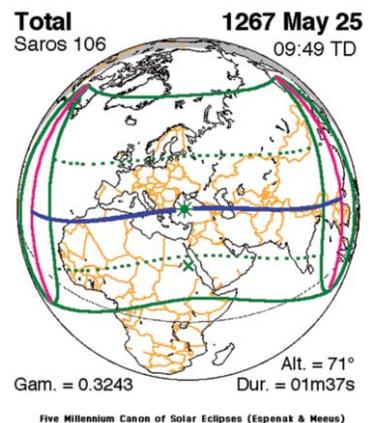
The back calculation of the Solar Saros Series – 104 is not accurate! Delta T ~ Zero sec! (JD ~ 2182585.1)



The year of CE 1267

“1267 May 25 E, CE. Reference: S. Rudperti. ‘1267. An earthquake occurred about the 3rd hour of the day, and an eclipse of the sun followed thereafter.’ (Newton, p. 275)

The back calculation of the Solar Saros Series – 106 is not accurate! Delta T ~ Zero sec! (JD ~ 2183973.9)



The year of CE 1283 (Traditional AD = CE 1093)

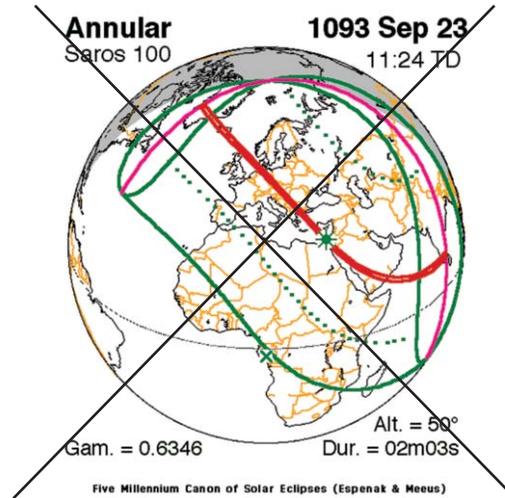
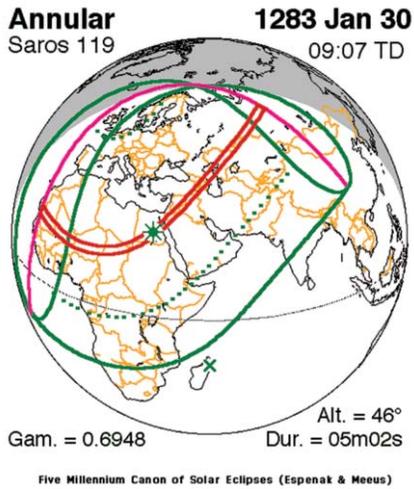
“1093 Sep 23a B, E References: Florence of Worcester and Simeon of Durham. Both sources have identical entries under 1093: ‘A very wonderful sign appeared in the sun.’ It is odd to see identical entries in these two sources, which are presumably independent and contemporaneous at this point in time. It is not odd to see an eclipse referred to as a sign in medieval records, but it is unusual to see an eclipse that is not described as an eclipse or at least as a darkening. It is almost certain that some words have been omitted by accident.

Since the year is given, since other events in the same year are dated accurately in both sources, and since there was a large eclipse in that year, I shall assume that this is an eclipse record, but with low reliability. If there were a single record, a reliability of 0.2 would be reasonable for a record that has probably been copied. Since there are two identical records, with no way to choose between them, I shall treat them as independent, with a reliability of 1.1 each, and with a standard deviation of the magnitude of 0.1” (Newton, p. 157-8)

This solar eclipse really happened on Jan 30 in CE 1283, not in CE 1093 Sep 23.

The back calculation of the Solar Saros Series – 119 is not accurate!

Delta T ~ Zero sec! (JD ~ 2189702.88)



The year of CE 1315 (Traditional AD = CE 1124)

“1124 Aug 11a. Reference: Bermondssey. “This year, on the 8th ides April (= Apr 6) the sun appeared like a new moon.

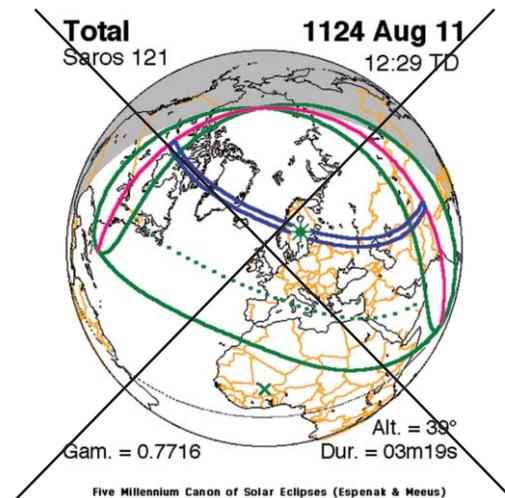
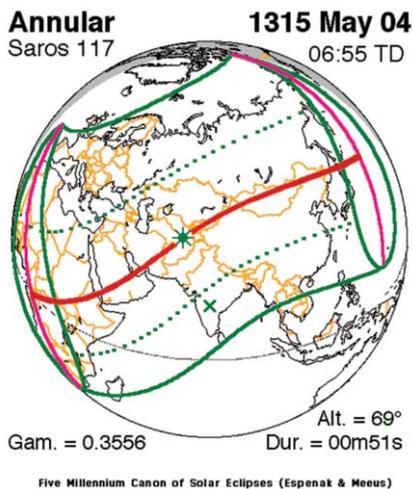
“1124 Aug 11b. Reference: Matthew Paris, who has under the year 1124: “The sun became like a new moon.” (Newton, p.158)

“1124 Aug 11 M, HL. Reference: Fulcher. The relevant passage says: “Thereupon the sun appeared to us for almost an hour with a colorful light, changed into a new hyacinth form or into a kind of horned eclipsed moon. This was on the 3rd ides August (= Aug 11), as the 9th hour was passing.” (Newton p. 562).

This solar eclipse really happened on May 4 in CE 1315, not in CE 1124 Aug 11.

The back calculation of the Solar Saros Series – 117 is not accurate!

Delta T ~ Zero sec! (JD ~ 2201484.79)



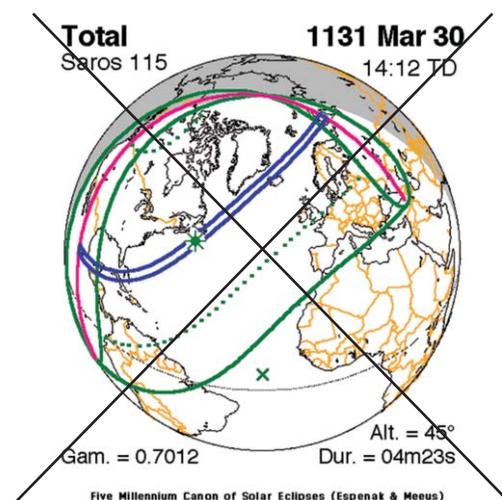
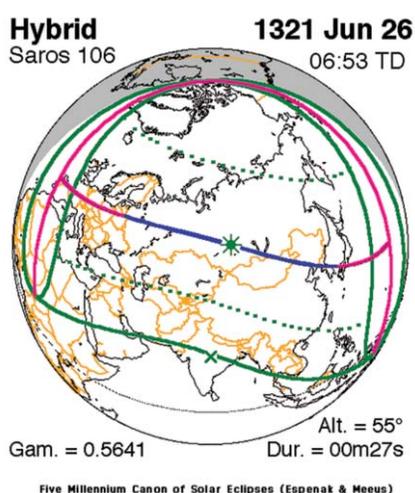
The year of CE 1321 (Traditional AD = CE 1131/1133)

“1133 Aug 2 E, Sc(?). Reference: Eskinbek. The reference has, under 1131: ‘There was an eclipse of the sun in the autumn,’ The chronology of the source is generally good. For examples it has the death of Henry (Henry V, Holy Roman emperor 1106-1125) in 1125 and the election of Pope Innocent II in 1130; both dates are correct.

However the only eclipse in 1131 visible in Scandinavia was that of 1131 Mar 30... Since there is no satisfactory identification of this eclipse, I give this report a reliability of 0.” (Newton, p. 484)

“1131 Mar 30 E, Sc. References: Reseniani, Hoyers, and Gottskalks state that there was an eclipse of the sun on 1131 Mar 30, while Lögmanns states that there was an eclipse in 1132....” (Newton, p. 502)

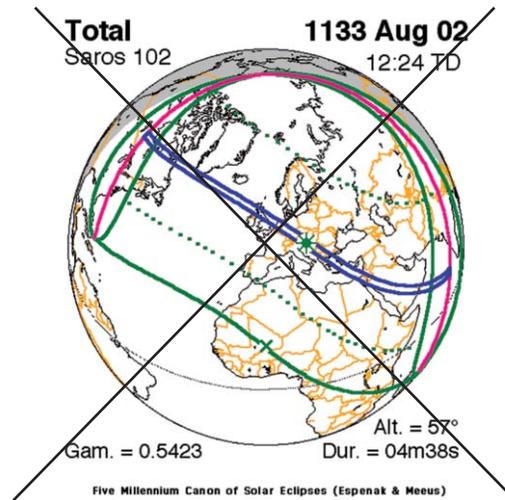
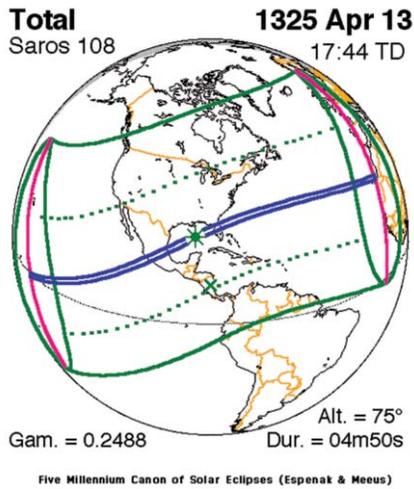
This solar eclipse really happened on Jun 26 in CE 1321, not in CE 1131 Mar 30. Delta T ~ Zero sec! (JD ~ 2203729.785)



The year of CE 1325 (Traditional AD = CE 1133/1135)

“1133 Aug 2. Reference: Anglo-Saxon Chronicle. On 1133 Aug 1, King Henry I boarded ship and the next day he started what proved to be his last channel crossing. He died in France on 1135 Dec 1. The translation of the Chronicle cited in the reference has, under the year 1135: ‘In this year King Henry went overseas at Lammas, and the next day, when he was lying asleep on board ship, the day grew dark over all lands, and the sun became as if it were a three-nights’-old moon, with stars about it at midday. People were very much astonished and terrified, and said that something important would be bound to come after this – so it did, for that same year the king died...’ (Newton, p. 160)

This solar eclipse really happened on Apr 13 in CE 1325, not in CE 1133 Aug 2. The back calculation of the Solar Saros Series – 108 is not accurate (wrong)! Delta T ~ Zero sec! (JD ~ 2205117.24)

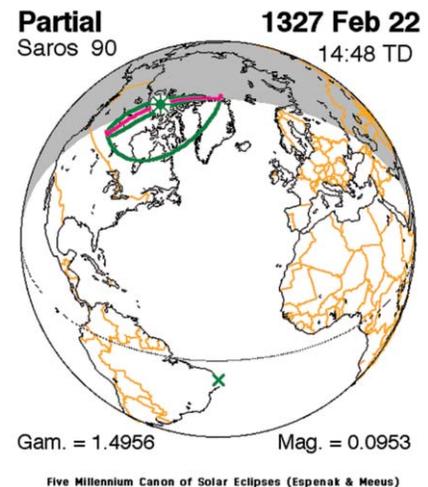


The year of CE 1327 (Traditional AD = CE 1137)

“Under the year 1137 Ryenses has another entry: ‘During Lent there was darkness in all the earth.’ Lent is denoted in medieval Latin by ‘Quadragesima’, with reference to the 40 days of Lent, not counting Sundays. ...I can find no identification for this record other than 1140 Mar 20. There was no possible eclipse in 1137, whether during the Lent or not. Further, in 1140, Easter was on Apr 7 and Ash Wednesday was on Feb 21.” (Newton, p. 485-6)

This solar eclipse really happened on Feb 22 in CE 1327!!!

The back calculation of the Solar Saros Series – 90 is not accurate (wrong)! Delta T ~ Zero sec! (JD ~ 2205797.11)



The year of CE 1330 (Traditional AD = CE 1140)

“AD 1330 Jul 16 (total, 1.02): Zbraslav (Czech Republic)

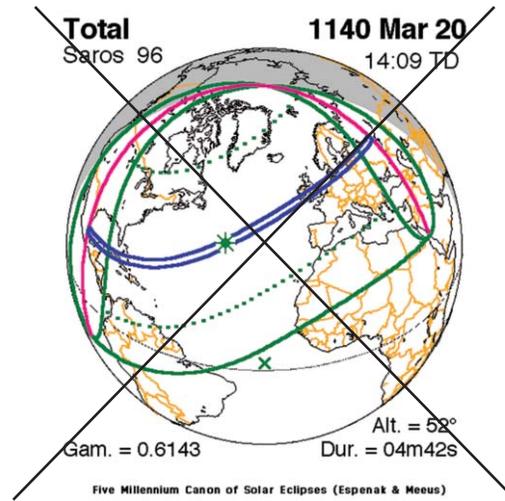
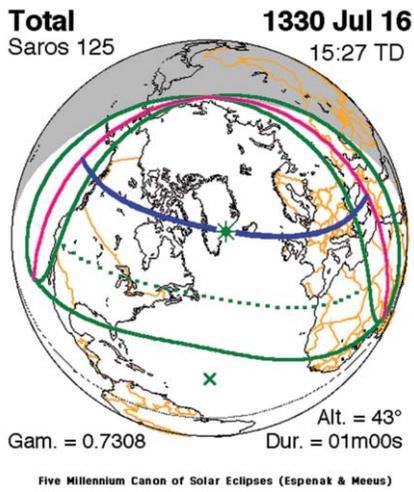
1330. In this same year on the Ides of July (Jul 15) at the 8th hour of the day, the Sun was so greatly obscured that of its great body only a small extremity like a three-night-old Moon was seen.” (Stephenson, p. 420)

“1140 Mar 20b E, Sc and 1140 Mar 20c E, Sc. Reference: Ryenses. There are clearly two independent Danish reports of this eclipse that occur in several places. I have chosen Ryenses for citation because it is the oldest source that contains either one, and in fact it contains both.

Under the year 1140 Ryenses has: ‘And on the 4th calends April (=Mar 29) there was darkness over the whole earth.’

Stralius has a similar entry, but with 'III. Kal.' in place of 'IIII. Kal.' This suggests that he used Ryenses.

This solar eclipse really happened on July 16 in CE 1330, not in CE 1140 Mar 20. Delta T ~ Zero sec! (JD ~ 2207037.142)



The year of CE 1333

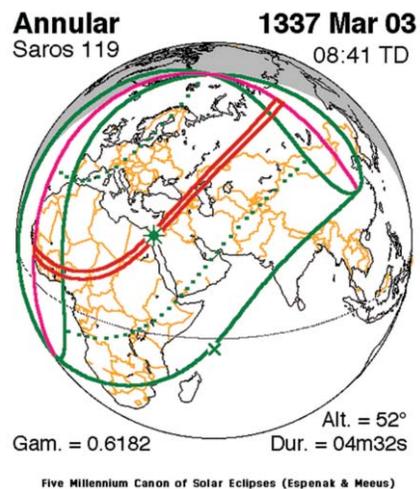
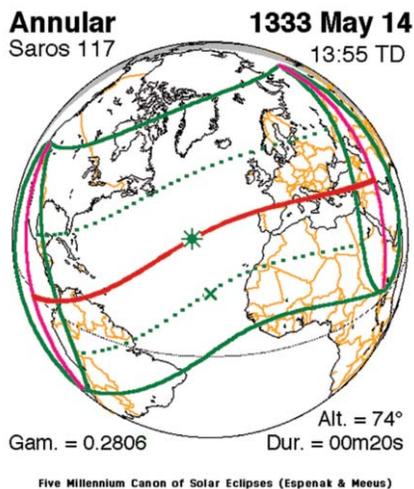
“AD 1333 May 14: Evreux (France)

Three brothers and I, in the presence of the Queen of Navarre, observed the beginning of this eclipse at Evreux near St Germain. And the altitude of the Sun at the moment of the beginning of the eclipse was close to 50 deg, and the altitude at the end of the eclipse was 33 deg. The magnitude of the eclipse, according to our estimate, was 10 digits... And thus the eclipse began after our midday by 2 hours and 20 minutes...

Johannes de Muris noted that the eclipse took place about 17 minutes earlier than as predicted by the Alfonsine tables.” (Stephenson, p. 427)

The back calculation of the Solar Saros Series – 117 is not accurate!

Delta T ~ Zero sec! (JD ~ 2207893.45)



The year of CE 1337

“AD 1337 March 3. Evreux (France)

‘In the current year of our Lord 1337, on the 3rd day of March after sunrise, a Monday we saw the beginning of the eclipse, with the altitude of the Sun 10 deg. And already part was sensibly eclipsed, whereby we concluded that the edges of the luminaries could have touched at the altitude of 9 deg. Similary we saw the exit of the Moon from contact with the Sun, as far as was possible, with the Sun at an altitude of 27 deg and about 30 min... (The magnitude) was only 5 digits. In this experiment there were ten of us present and several had good astrolabes.’

Johannes de Muris remarked that the eclipse occurred about 16 minutes earlier than expected from the Alfonsine tables. Delta T ~ Zero sec! (JD ~ 2209458.86)

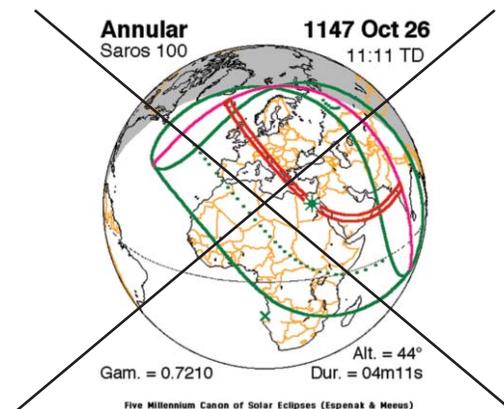
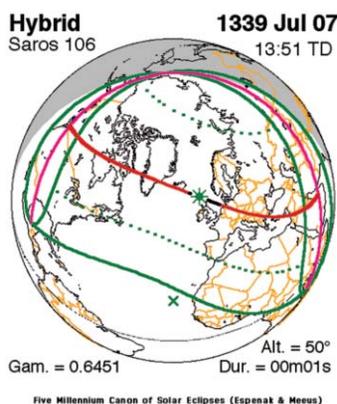
The year of CE 1339 (Traditional AD = CE 1147)

“1147 M, B. Reference: Odon. ‘On that day the sun saw a crime that it could not endure; but in order not to put that crime at the level of the treason done to our Savior, it shone with half its face and veiled the other half.’ The crime was the ‘betrayal’ (that is a betrayal from the Crusaders’ viewpoint) and consequent defeat of the German Crusader army near the town of Dorylaeum, which is the modern Eskisehir about 200 kilometers west of Ankara. This action took place in October of 1147, hence the eclipse is certainly that of 1147 Oct 26.” (Newton, p. 556)

“1147 Oct 26b E, G. Reference: Magdeburgenses. Under 1147 this source writes: ‘In this year on the 5th calends November (= **Oct 28**) an eclipse of the sun about the middle of the day covered the earth with a horrible gloom, to the point that the circle was seen in the shape of a sickle, which signified the shedding of the blood of human kind.’ (Newton, p. 418)

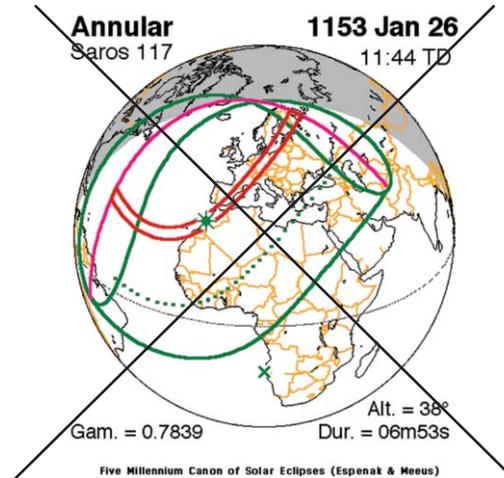
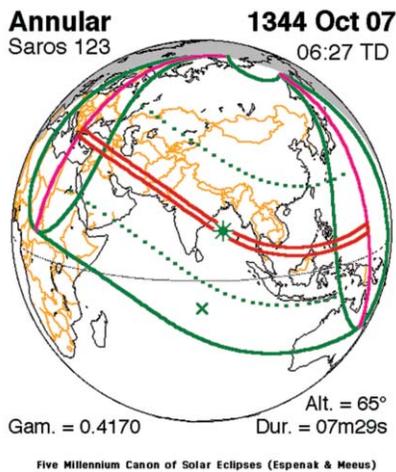
“1147 Oct 26a E, F. Reference: Bellovacense. Under 1147 this source has: ‘There was an eclipse of the sun, 5th calends November (= **Oct 28**), 3rd hour, the Lord’s day.’ (Newton, p. 346)

This solar eclipse really happened on July 7 in CE 1339, not in CE 1147 Oct 26. The back calculation of the Solar Saros Series – 106 is not accurate. Delta T ~ Zero sec! (JD ~ 2210315.07)



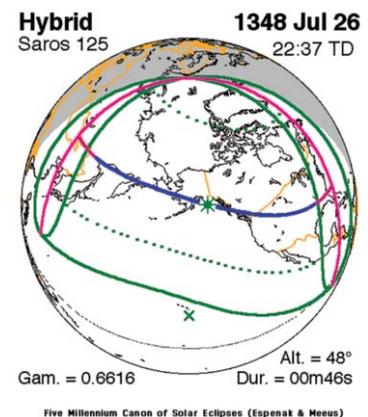
The year of CE 1344 (Traditional AD = CE 1153)

“1153 Jan 26 E, CE. Reference: Admuntenses. This source has: 1153. There was an eclipse of the sun on the 4th calends February (= Jan 29) in the evening.’...The date given is also wrong; the correct date is the 7th calends February.” (Newton, p. 269)
This solar eclipse really happened on Oct 7 in CE 1344, not in CE 1153 Jan 26. Delta T ~ Zero sec! (JD ~ 2212233.77)



The year of CE 1348 (Traditional AD = CE 1157)

“1157 (?) E, Sc. References: Regii and Lögmanns note a myrkr in 1157. There is no umbral eclipse that can be plausibly identified with these records.” (Newton, p. 502)
This solar eclipse really happened on Jul 26 in CE 1348. Delta T ~ Zero sec! (JD ~ 2213622.441)



The year of CE 1354 (Traditional AD = CE 1163)

“AD 1354 Sep 17(total) Perugia (Italy)

In this year on 17 September that novelty appeared. The Sun became dark on a Wednesday at about the third hour and it lasted for the space of two hours. Above the Sun and Moon, which were joined together – that is, the Moon was covering the Sun – there appeared a very large star with fiery rays like a torch... Many people viewed the rays of the small Sun by reflection in a minor or in clear water. And the rays of the Sun were so small and so dark, on account of the Moon covering the Sun, that there did not remain unobscured as much as 3 fingers of the Sun...Everyone appeared deathly pale.

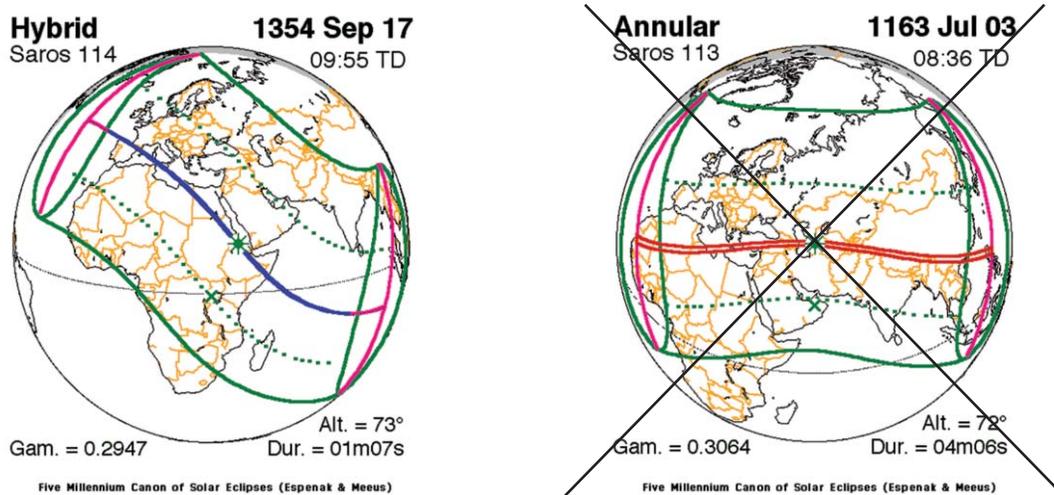
[*Memorie di Perugia dall'anno 1351 al 1438*; in Italian; quoted by Levi-Donati (1987).]

RESULTS For a partial eclipse at Perugia either Delta T < 4200 sec or > 4320 sec. (Stephenson, p. 421)

1163 Jul 3 B, E. Reference: Worcester. The reference has, under the year 1163: ‘Two hours before noon the sun became like a third moon; accordingly it did not have light, except like light of a 14th moon.’...

The words in this record are identical with the words used in Worcester in one of the records of the eclipse of 1133 Aug 2 mentioned above; the hour of the day is reasonable for either eclipse. Something has almost surely been copied wrong. It is possible that this is a record of the eclipse of 1163 Jul 3, but it is safer to ignore it.” (Newton, p. 167)

This solar eclipse really happened on Sep 17 in CE 1354, not in CE 1163 Jul 3. The back calculation of the Solar Saros Series – 114 is not accurate. Delta T ~ Zero sec! (JD ~ 2215865.91)



The year of CE 1361

“AD 1361 May 5 (total, mag. = 1.05): *Sung-chiang*

Chih-cheng reign period, 21st year, 4th month, day hsin-szu, the first day of the month. As the Sun was about to sink (i.e. set), suddenly it lost its light. It took the shape of a plantain leaf. The sky was as dark as night and the stars were shining brightly. For a short time, the sky became bright again. Then in a short time (the light) disappeared once more.” (Stephenson, p. 259-260)

The back calculation of the Solar Saros Series – 108 is not accurate!

Delta T ~ Zero sec! (JD ~ 2218287.87)

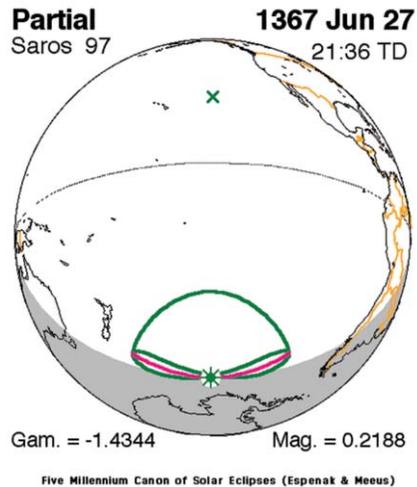
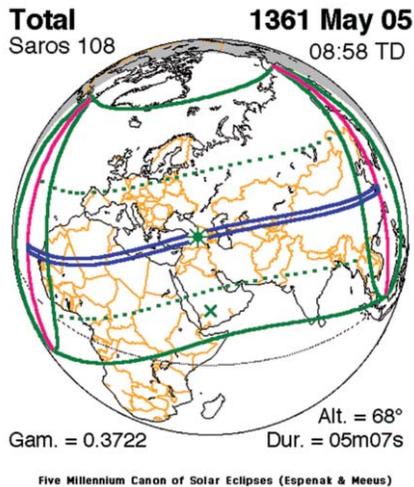
The year of CE 1367

“AD 1367 Jun 28;

Both the Annals of the *Yuan-shih* (chap. 47) and *Ming-shih-lu* (chap. 24) note the occurrence of a solar eclipse which caused ‘darkness by day’ on a date corresponding to

AD 1367 Jun 27. However, this eclipse was only partial on the Earth's surface and would be invisible in China. Presumably the record represents a faulty prediction which to the Ming historians who compiled the Yuan-shih became associated with the downfall of the Yuan dynasty very soon afterwards." (Stephenson, p. 252)

The back calculation of the Solar Saros Series – 97 is not accurate (wrong)! Delta T ~ Zero sec! (JD ~ 2220532.4)



The year of CE 1369/AH 570 (Traditional AD = CE 1175/76)

“AD 1176 Apr 11 (total, mag. = 1.06): River Orontes

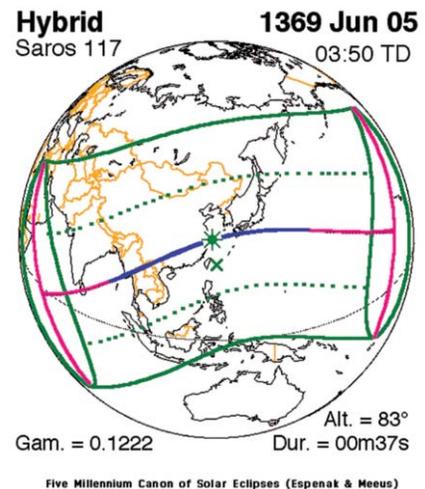
(570 AH.) In the last day of (the month of) Shawwal, I remember we crossed the River al-‘Asi (Orontes) on our return (from Hamah to Damascus). The Sun was eclipsed and it became dark in the day time. People were very frightened and stars appeared. Then we arrived at Hams... [Al-Katib al-Isfahani, as quoted by Abu Shama]

Al-Katib al-Isfahani (AD 1125-1201) accompanied Saladin on many campaigns. However, the date which he gives is incorrect. This corresponds to within a day or two of AD 1175 May 21 but there was no solar eclipse visible at the time.” (Stephenson, p. 444-5)

This solar eclipse really happened on June 5 in CE 1369.

The back calculation of the Solar Saros Series – 117 is not accurate.

Delta T ~ Zero sec! (JD ~ 2221240.66)



The year of CE 1370 (Traditional AD = CE 1177/1178)

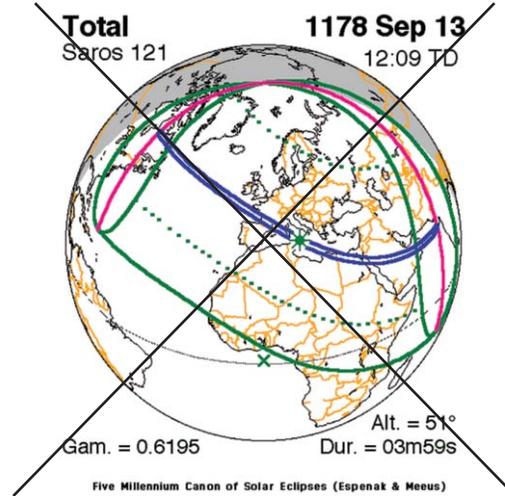
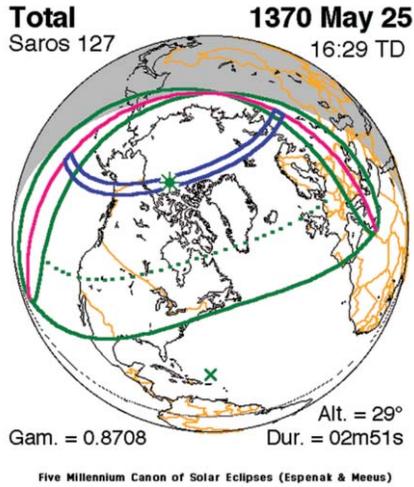
1178 Sep 13c B, E. Reference: Worcester. Under the year **1177**: ‘Violent wind snow, and hail; and an eclipse of the sun.’ In the same year, Worcester records the reconciliation

between the Holy Roman Emperor Frederic and Pope Alexander, which occurred in 1177.” (Newton, p. 168-9)

1178 Sep 13d B, E. Reference: Matthew Paris. ..under 1178 Matthew has: ‘The sun suffered an eclipse on the 6th ides January (= *Jan 8*).’

(Newton, p. 169)

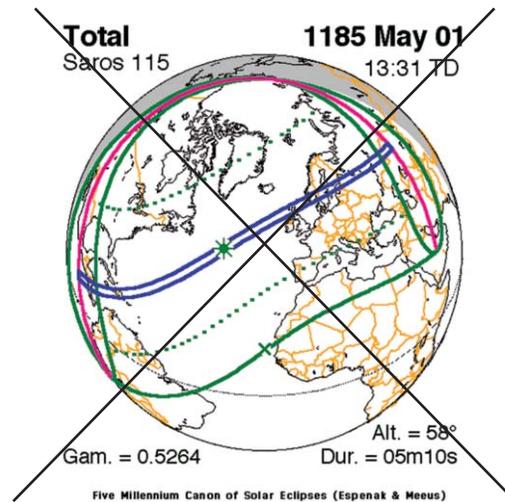
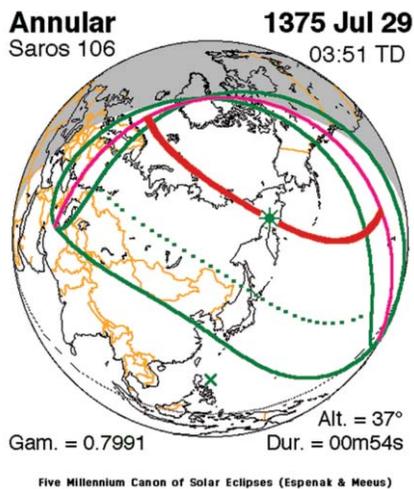
This solar eclipse really happened on May 25 in CE 1370, not in CE 1178 Sep 13. Delta T ~ Zero sec! (JD ~ 2221595.18)



The year of CE 1375 (Traditional AD = CE 1185)

1185 May 1 E, Sc. References: Regii is the record that I take as primary... The record was used in AAO, where it was designated as 1185 May 1 and there is nothing new to add. Reliability: 0.5. Place: Oslo to Frankfurt. Standard deviation of the magnitude: 0.1.” (Newton, p. 502-3)

This solar eclipse really happened on July 29 in CE 1375, not in CE 1185 May 1. Delta T ~ Zero sec! (JD ~ 2223485.66)



The year of CE 1384 (Traditional AD = CE 1191/1194)

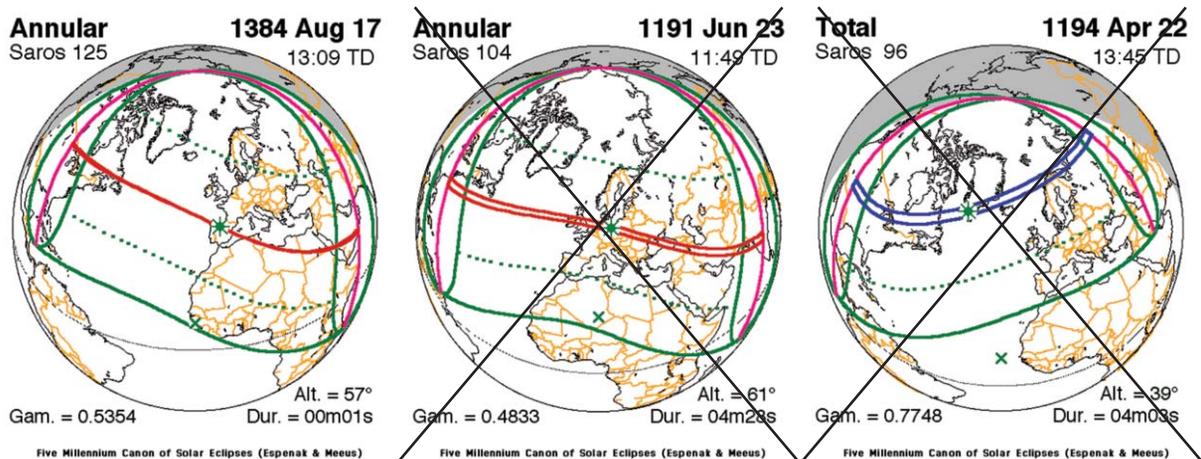
“1191 Jun 23 B. Reference: Appleby [1963]. In Appleby’s edition of the Chronicle of Richard of Devizes, page 35, appears; ‘There was an eclipse of the sun about the third hour of the day. Those who do not understand the causes of things marveled greatly that, although the sun was not darkened by any clouds, in the middle of the day it is shone with less than ordinary brightness. Those who study the working of the world, however, say that certain defects of the sun and moon do not signify anything.’ (Newton, AAO p. 56-7)

“1191 Jun 23d E, G. Reference: Colonienses. This says under 1191: ‘An eclipse of the sun in the month of June, on the 30th of the moon.’ It was actually the 27th of the ecclesiastical moon. Either the annalist made a mistake in calculating the moon, or he believed a statement that an eclipse had to be at the new moon, or he had accurate lunar tables.” (Newton, p. 426)

1194 Apr 22 E, Sc. References: Regii is the assumed primary record. Skalhólts and Gottskalks also refer to this eclipse. All note that there was an eclipse on Apr 22 of the year that give as 1193; one record says that it was a large eclipse.” (Newton, p. 503)

1194 Apr 22 B, E. References: Gervase. The reference has: ‘On the 10th calends of the same there was a partial eclipse of the sun at the 6th hour. Place: Canterbury.’ (Newton, p. 174)

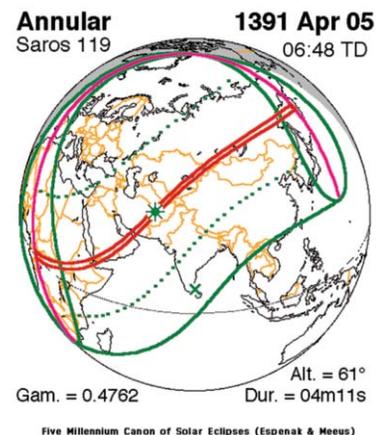
This solar eclipse really happened on Aug 17 in CE 1384, not in CE 1191 Jun 23 or 1194 Apr 22. Delta T ~ Zero sec! (JD ~ 2226793.047)



The year of CE 1391/Era 1237 (Traditional AD = CE 1239)

“AD 1239 Jun 3: Coimbra (Portugal)

On the 3rd day before the Nones of June (Jun 3), on the same day that Christ suffered, namely the 6th day of the week, and at the same time that darkness occurred over the whole Earth at the Passion of our Lord, namely from the 6th to the 9th hours of the *era 1237*, there occurred...” (Stephenson, p. 399)

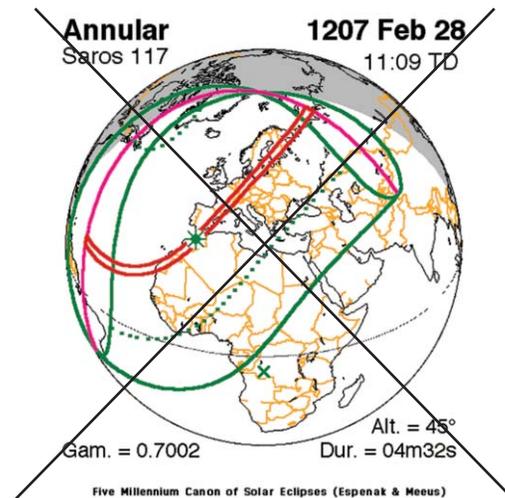
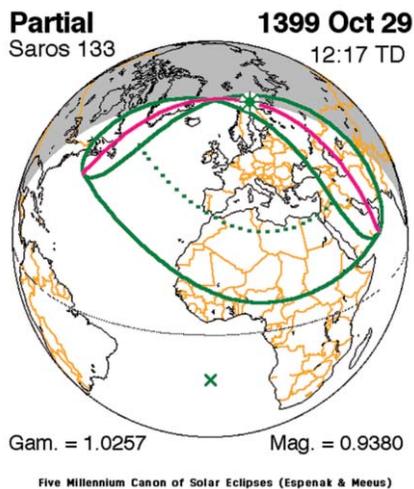


This solar eclipse really happened on Apr 5 in CE 1391.
 The back calculation of the Solar Saros Series – 119 is not accurate!
 Delta T ~ Zero sec! (JD ~ 2229214.78)

The year of CE 1399 (Traditional AD = CE 1207)

“1207 Feb 28c E, G. Reference: Colonienses. This source says under 1206: ‘There was an eclipse of the sun on the 2nd calends March at the 10th hour of the day.’”

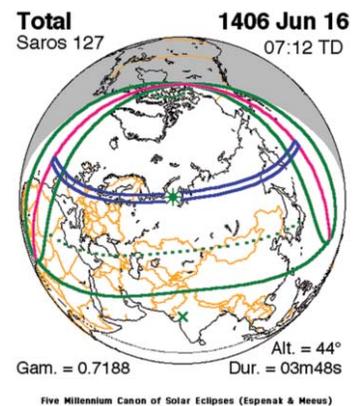
This solar eclipse really happened on Oct 29 in CE 1399, not in CE 1207 Feb 28. Delta T ~ Zero sec! (JD ~ 2232344)



The year of CE 1406

“AD 1406 Jun 16 [Wednesday] (total, 1.06): Braunschweig 1406. In this year there was an eclipse of the Sun so that the Sun stopped shining before the Prime of the day on St. Vitus’ day (Jun 15); it was so dark that people could not recognize one another.” (Stephenson, p. 405)

Delta T ~ Zero sec! (JD ~ 2234765.799)



The year of CE 1415/ Era 1261

“AD 1415 Jun 7 [Friday] (total, 1.0): Nieder Alteich

1415. A dark eclipse of the Sun occurred with the result that the Sun entirely lost its light for twice the duration of the *Misere-mei* (Psalm 51) at the 6th hour of the day on the 7th day of June.” (Stephenson, p. 406)

1415. At that same time, on the 7th day of June, which was the sixth day of the week, after the Feast of S. Boniface (Jun 5), at the 11th hour of the day, the whole Sun was eclipsed. [Prague]” (Stephenson, p. 406-407)

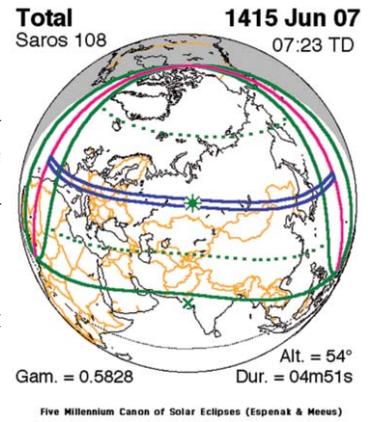
ERA 1261 (obs)CVRAT(us)
 EST SOL(stitio)ER(a)MCCLX(i)

El día 7 de junio habia un eclipse solar en la ciudad de Soria que han conservado grabado en una piedra en la Iglesia de San Nicolás.” (Zoltán Skoda; LA NUEVA CRONOLÓGIA DE LA HISTORIA DE ARAGÓN, p. 80)

This solar eclipse really happened on Jun 7 in CE 1415.

The back calculation of the Solar Saros Series – 108 is not accurate!

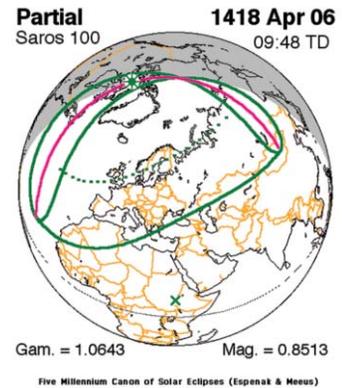
Delta T ~ Zero sec! (JD ~ 2238043.8)



The year of CE 1418 (Traditional AD = CE 1226)

“1226 (?) E, Sc. References: Regii and Oddveria note a darkness at midday. There is no plausible umbral eclipse.” (Newton, p. 503)

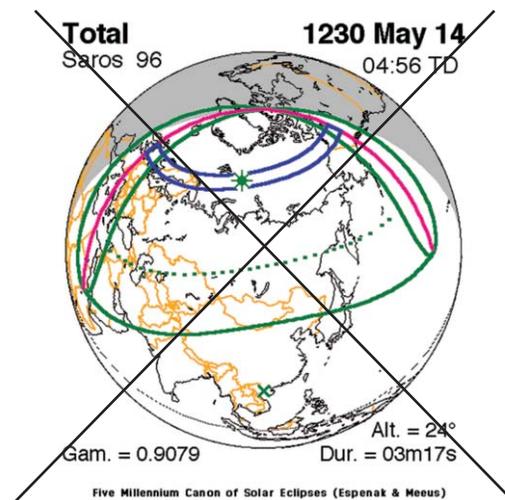
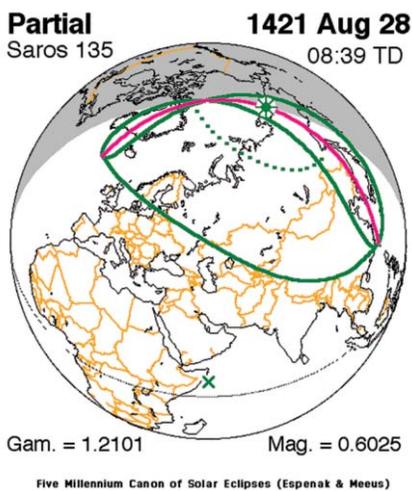
This solar eclipse really happened on Apr 6 in CE 1418. Delta T ~ Zero sec! (JD ~ 2239077.908)



The year of CE 1421 (Traditional AD = CE 1230)

“1230 May 14 E, Sc. Reference: Ryenses. This has under the year 1230: ‘There was an eclipse of the sun and a great pestilence of men and cattle.’ (Newton, p. 488-9)

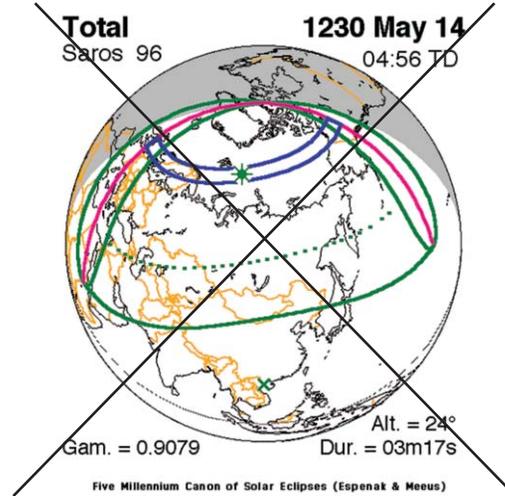
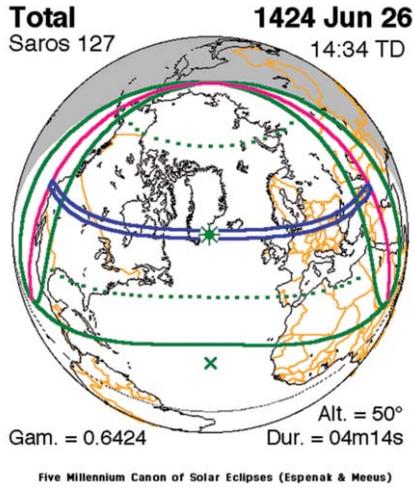
This solar eclipse really happened on Aug 28 in CE 1421, not in CE 1230 May 14. Delta T ~ Zero sec! (JD ~ 2240317.86)



The year of CE 1424 (Traditional AD = CE 1230/1231)

“1230 May 14 E, G. Reference: Colonienses. These annals have the following entry under 1231: ‘There was a partial eclipse of the sun at about sunrise on the 2nd ides June (= Jun 12).’ The editor assigned the date 1231 Jun 12 to this entry.” (Newton, p. 428-9)

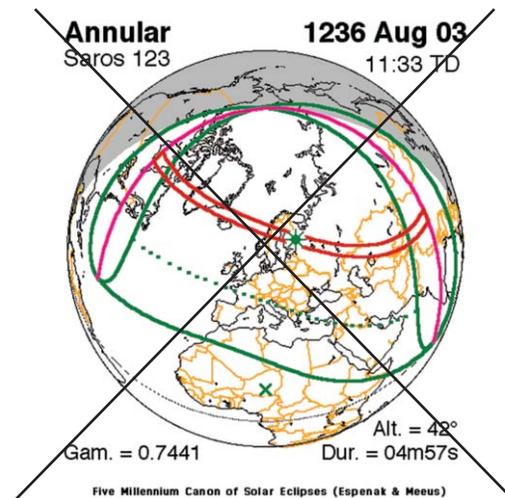
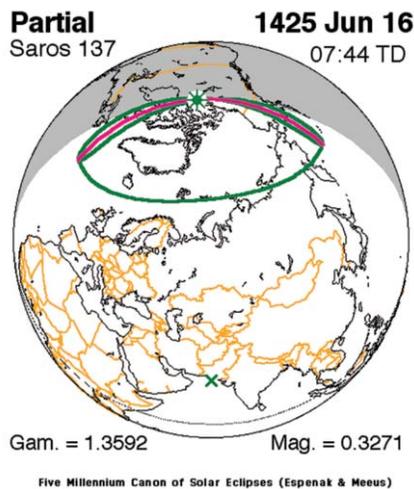
This solar eclipse really happened on Jun 26 in CE 1424, not in CE 1230 May 14. Delta T ~ Zero sec! (JD ~ 2241351.106)



The year of CE 1425 (Traditional AD = CE 1236)

“1236 Aug 3 E, Sc. References: Skalhólts notes an eclipse in Iceland in the summer of 1236. It is safe to assume that this note is a record of the eclipse of 1236 Aug 3 seen in Iceland.” (Newton, p. 504)

This solar eclipse really happened on Jun 16 in CE 1425, not in CE 1236 Aug 3. Delta T ~ Zero sec! (JD ~ 2241705.822)



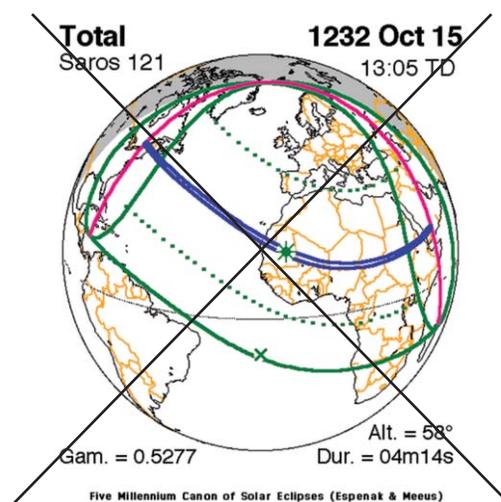
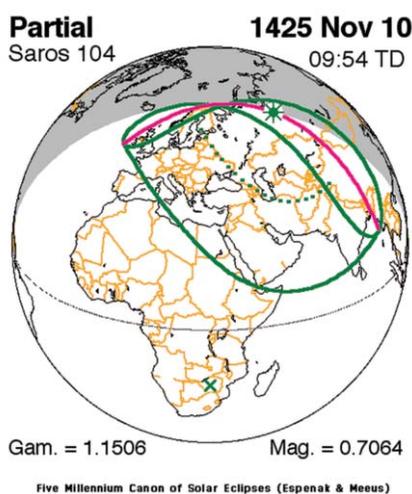
The year of CE 1425 (Traditional AD = CE 1232)

“1232 Oct 15 E, G. Reference: Colonienses. This source notes another partial eclipse in 1232: ‘A partial eclipse of the sun after midday was seen this year, but not very notable, however.’ This can only be the eclipse of 1232 Oct 15...” (Newton, p. 429)

This solar eclipse really happened on Nov 10 in CE 1425, not in CE 1232 Oct 15.

The back calculation of the Solar Saros Series – 104 is not accurate!

Delta T ~ Zero sec! (JD ~ 2241852.91)



The year of CE 1431, Era 1277, AH 634, Seljuk AH 834 (Traditional AD = CE 1239/1241)

“AD 1431 Feb 12 [Monday] (total, mag. = 1.04)

Two separate accounts of this eclipse – which was also observed to be total in Italy (see chapter 11) – are preserved by contemporary Arab writers: al-Maqrizi and al-Asqalani, both of whom lived in Cairo.

(843 AH) In (the month of) Jumada al-Ukhra, the astrologers warned that the Sun would be eclipsed and in Cairo there were callings to the people that they should pray and do good deeds. However, the eclipse did not occur and those who gave the warning were denounced. Then arrived from al-Andalus of the occurrence of an eclipse there covering all of the Sun’s body except one-eighth of it. That was after midday on the 28th of the month. [Al-Maqrizi]

(843 AH) In (the month of) Jumada al-Ula it was known that the calendar experts agreed that the Sun was to be eclipsed on the 28th of the month after the Zawal. The Sultan and the people were prepared for it and were watching the Sun until set but nothing of it had changed at all.” (Stephenson, p. 446)

“1431. Memorandum, that on the 12th day of February at the 21st hour which was the Monday of the Carnival, the Sun was so greatly obscured that it became as dark as night and the eye of the Sun became black like charcoal. And on that day the Moon turned (i.e. was new)...[Foligno, Perugia, Italy]” (Stephenson, p. 407-8)

“...In view of the above remarks, I have not assumed totality unless the complete dis-

appearance of the Sun is clearly described. This means rejecting a number of unusually vivid records, such as the following from Toledo which relates to the eclipse of **AD 1239 Jun 3**:

The Sun was obscured on Friday at the 6th hour of the day, and it lasted for a while between the 6th and 9th hours and it lost all its strength and there was as though night. There appeared many stars, and then the Sun grew bright again of its own accord, but for a long time it did not regain the strength that it usually has. Era 1277 (Julian = AD 1239). [Anales Toledanos Segundos; in Spanish; **Florenz 1747**] (Stephenson, p. 385)

“1239 Jun 3a B, E, Reference: Matthew Paris. ‘Also within the year, on the third day of June, the sun experienced an eclipse at the 6th hour, in sign that may be intended for the church, which like the sun enlightens mankind. (An editor’s note says that this quotation is on an erasure except for the last clause.)” (Newton, p. 176)

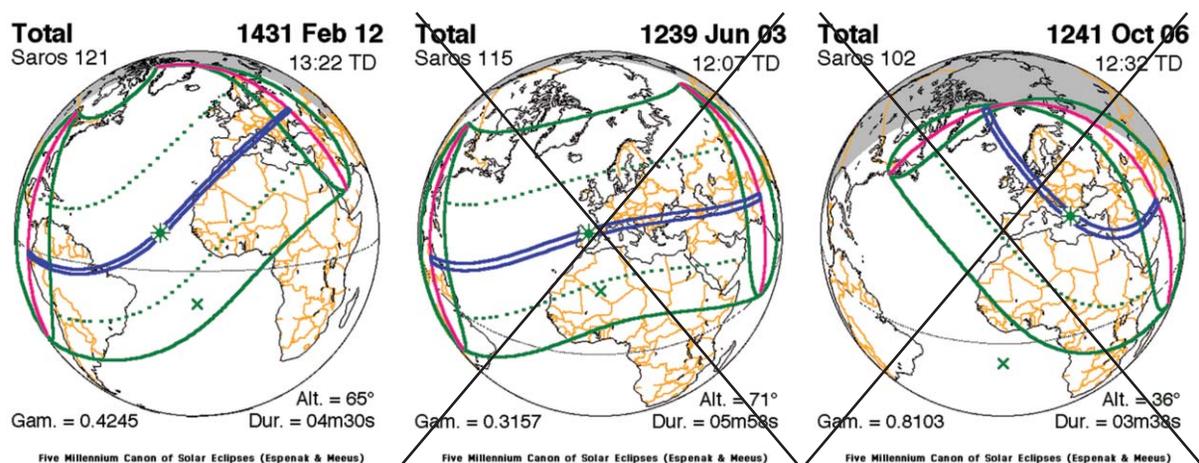
“1239 Jun 3a E, CE. Reference: S. Rudberti. ‘On the 3rd nones June there was an eclipse of the sun that lasted for 2 hours.” (Newton, p. 273)

“1241 Oct 6 E, Sc. Reference: Eskinbek, which has: ‘Year MCCXLI. WALDEMAR II died. An eclipse of the sun on the 2nd nones October.’ Esromenses, Ryenses, and Sialandiae merely note the eclipse without giving the date, which Eskinbek gives correctly.” (Newton, p. 489)

This solar eclipse really happened on Feb 12 in CE 1431, not in CE 1239 Jun 3, or CE 1241 Oct. 6.

The back calculation of the Solar Saros Series – 121 is not accurate!

Delta T ~ Zero sec! (JD ~ 2243773.06)



**The year of CE 1433, Era 1279, AH 636, Seljuk AH 836
(Traditional AD = CE 1239/1241)**

“AD 1433 Jun 17 [Wednesday] (total, 1.07):Celle (Germany)

1433. At Celle in the Duchy of Braunschweig, after midday the whole (*totus*) Sun was eclipsed by the intervention of the Moon in the Tail of the Dragon....

1433. [Nurnberg] Afterwards, on the 17th day of June, there was a transformation of the Sun, which entirely lost its light, and this happened on St Ullerus’ day (Jun 17). At 12 hours and 4 minutes after (sunrise) the change reach its greatest....

1433 [Karlsteijn] In this same year on the 4th day of the week, after St Vitus’ Day (Jun

15), at about the 21st hour (after sunset), the Sun was eclipsed totally in its body...” (Stephenson, p. 413-4)

“AD 1433 Jun 17 [Wednesday] (total, 1.06): Aleppo

There are two records of this eclipse from Aleppo.

(836 AH.) On the 28th of Shawwal, the Sun was eclipsed after the Afternoon Prayer and continued until the time of sunset...

[Al-‘Asqalani: Inba’ al-Ghumr bi ‘Bna’ al-‘Umr]

The eclipse was dense and it became dark such that we thought that the Maghrib (Sunset) Prayer had arrived. Then we reckoned that it was still afternoon. I looked at the Sun and found that it was eclipsed and that the eclipse was great...” (Stephenson, p. 446-7)

“1241 Oct 6a B, E. Reference: Matthew Paris, who has under the year 1241: ‘Also, that same year, the day before the nones of October, that is the day of S. Fidis an eclipse of the sun occurred.’ The date is correct. Reliability: 1. Place: S. Albans. Standard deviation of the magnitude: 0.1.” (Newton, p. 176-7)

“1241 Oct 6 E, BN. Reference: Fossenses. The annals of Fosse say under the year 1241: ‘In this year the sun went into an eclipse from midday to vespers on the octave of S. Lambert.’ The hours of the day look reasonable. I believe that few people outside of Belgium would date an eclipse by means of S. Lambert’s day, and at that the annalist is wrong. S. Lambert’s day is Sep 17 and the octave is the 8th day thereafter, inclusive, or Sep 24...” (Newton, p. 248)

“AD 1239 Jun 3 [Friday] (total, 1.08): Montpellier (France)

The King (James the Conqueror) entered the city of Montpellier on Thursday the 2nd of June of the year 1239; and on the next day, Friday, between midday and the ninth hour, the King writes that the Sun was eclipsed in a way people did not remember ever having seen before, because it was entirely covered by the Moon and the day grew so dark that one could see the stars in the sky.

[Zurita, Anales de la Corona de Aragon, in Spanish.]

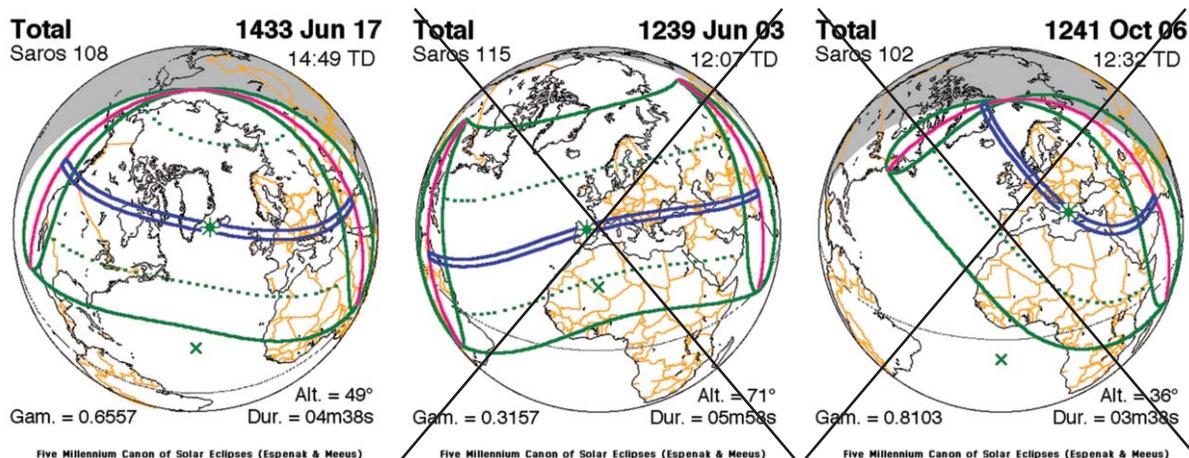
(Stephenson, p. 400)

This solar eclipse really happened on Jun 17 in CE 1433, not in CE 1239 Jun 3, or CE 1241 Oct 6.

(Zoltán Skoda; LA NUEVA CRONOLÓGIA DE LA HISTORIA DE ARAGÓN, p. 92)

The back calculation of the Solar Saros Series – 108 is not accurate.

Delta T ~ Zero sec! (JD ~ 2244629.116)

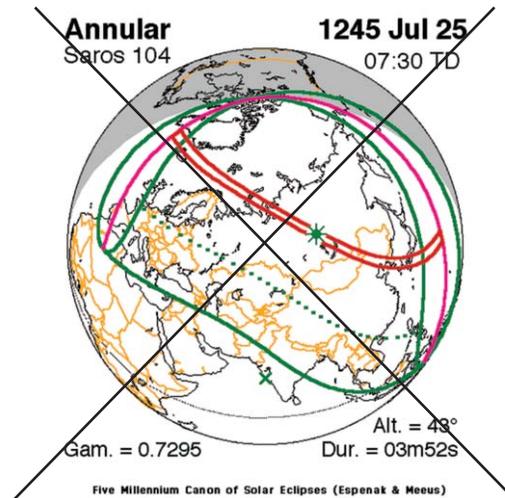
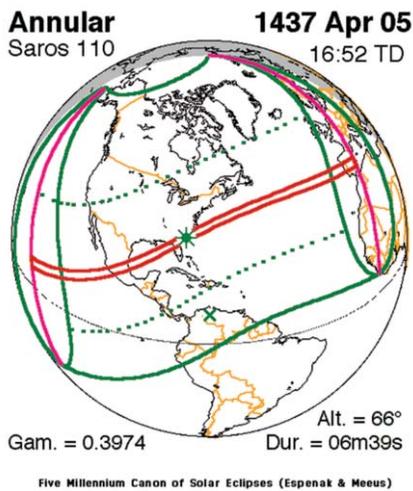


The year of CE 1437 (Traditional AD = CE 1245)

“1245 Jul 25 E, G. Reference: Albertus. Albertus has given us the only record of this eclipse that I have found. It occurs under 1245: ‘An eclipse of the sun on Jacob’s day 1st hour, 3rd feria, 27th of the moon; and the next lunation was so much in error that full moon occurred on the 12th.’ (Newton, p. 435)

This solar eclipse really happened on Apr 5 in CE 1437, not in CE 1245 Jul 25.

The back calculation of the Solar Saros Series – 110 is not accurate (wrong)! Delta T ~ Zero sec! (JD ~ 2246017.2)

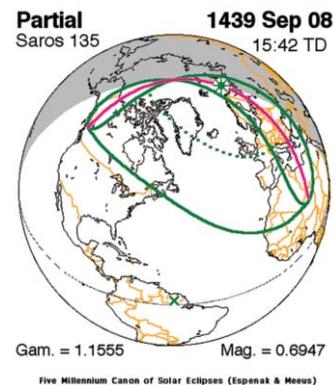


The year of CE 1439 (Traditional AD = CE 1249)

“Neresheimenses [ca. 1296] records a solar eclipse on 1249 Aug 16 (17 calends September). There was no such eclipse. I have not been able to think of any plausibly set of errors that would change this into any eclipse date, whether lunar or solar.” (Newton, p. 435)

This solar eclipse really happened on Sep 8 in CE 1439.

Delta T ~ Zero sec! (JD ~ 2246903.154)

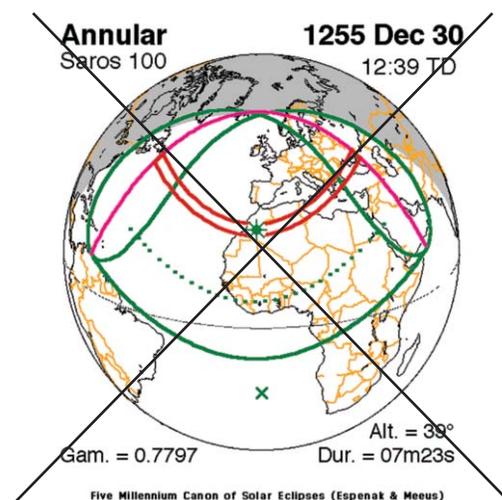
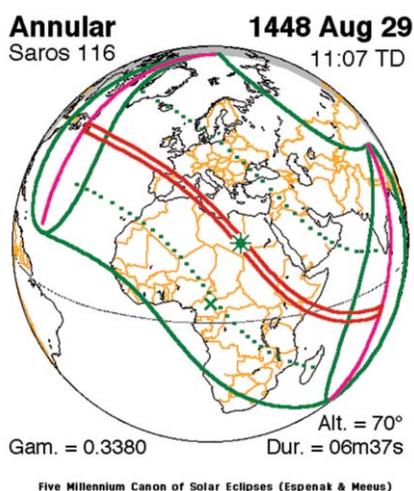


The year of CE 1448 (Traditional AD = CE 1255/1256)

“1255 Dec 30 B, E. Reference: Oxenedes. The reference describes how the king spent Christmas at Winchester and then adds: ‘...and while the joys of the Nativity were still being celebrated there was an eclipse of the sun on the 3rd calends January (= Dec 30.’ The reference gives the year as 1256, but that may be because the reference calends was the calends of January, 1256.” (Newton, p. 177-8)

This solar eclipse really happened on Aug 29 in CE 1448, not in CE 1255 Dec 30.

The back calculation of the Solar Saros Series – 116 is not accurate (wrong)! Delta T ~ Zero sec! (JD ~ 2250180.963)



The year of CE 1453 (Traditional AD = CE 1261/1263)

“1261 Apr 1 B, E. Reference: Florence of Worcester. The continuation at Bury S. Edmund has: ‘An eclipse of the sun occurred on the calends of April, at the end of the 4th Arabic month, 6th feria, 3rd hour of the day.’ The year is not specifically identified in the continuation, at least not in the cited edition; however, Pope Alexander IV died and Urban IV was elected in the same year, which is therefore 1261. 1261 Apr 1 was indeed on the 6th feria.” (Newton, p. 178)

“1263 Aug 5a B, E. Reference: Waverley. ‘This year an eclipse of the sun happened on the day of S. Dominic the confessor at about the 9th hour; and it lasted for the space of a meal or longer and it was the 27th of the moon.’”

“1263 Aug 5b B, E. Reference: Wykes. ‘That same year on the nones of August there was an eclipse of the sun at the 6th hour.’ The year is given as 1263. The ‘6th hour’ is much too early, but the error has the merit of showing that this is an independent record.” (Newton, p. 179)

“1263 Aug 5b B, E. Reference: Blandinienses. The reference has: ‘This year there was an eclipse of the sun on the nones of August (= Aug 5) at about the 10th hour’ under the year 1263.” (Newton, p. 248)

“1263 Aug 5b E, Sc. Reference: Ryenses. I find it odd that this is the only eclipse reported in both Danish and Norwegian sources that I have found. The record with ‘a’ following the date appears in the next section. Under 1262 Ryenses has: ‘There was an eclipse of the sun on the nones of August.’” (Newton, p. 489)

“1263 Aug 5c E, Sc. Reference: Eskinbek. This under 1263: ‘There was an eclipse of the sun on the 3rd nones August (= Aug 4).’” (Newton, p. 490)

“1263 Aug 5a B, Sc. References: Lögmanns and Oddveria. Lögmanns notes an eclipse seen at ‘Biorguin’ (the original spelling of the modern Bergen) on the nones of August of 1263.” (Newton, p. 504)

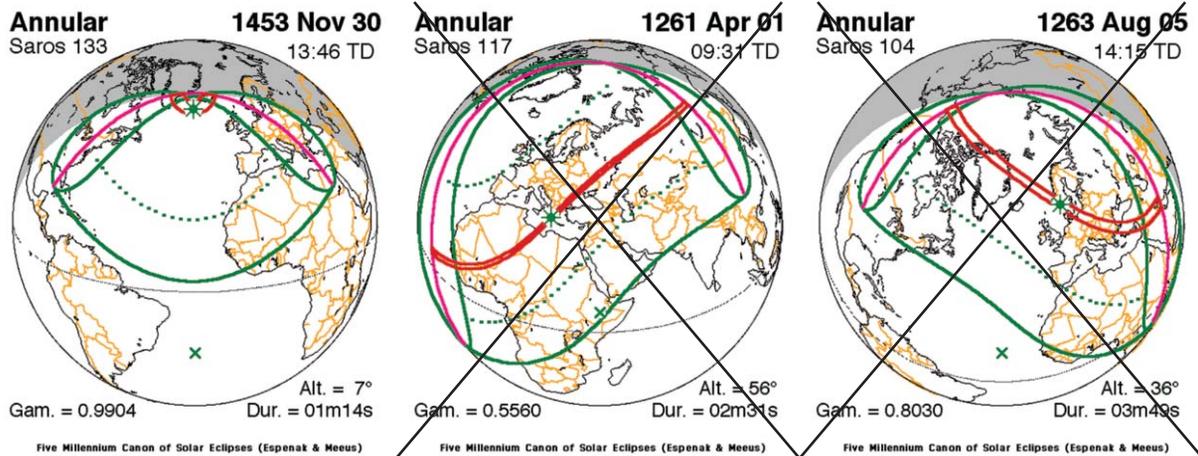
“AD 1263 Aug 5: Orkney (Scotland)

The eve of St Olaf was on a Sunday...When King Hacon lay in Rognvaldsvoe, a great darkness (*myrkur*) overtook the Sun, so that a little ring was bright round it on the out-

side, and that lasted a while of the day...On St. Lawrence's day king Hacon sailed out of Rognvaldsvoe over the Pentland firth.

[Haconer Saga]" (Stephenson, p. 404)

This solar eclipse really happened on Nov 30 in CE 1453, not in CE 1261 Apr 1, or 1263 Aug 5. Delta T ~ Zero sec! (JD ~ 2252100.073)

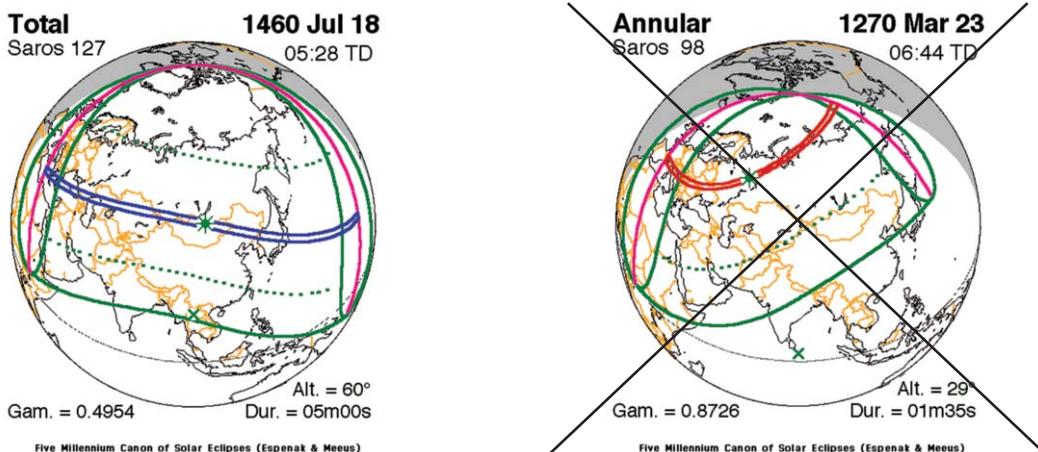


The year of CE 1460 (Traditional AD = CE 1270)

“AD 1460 July 18: The situation on Jul 18 in AD 1460 is more interesting. On this occasion, as many as ten reports note either the occurrence of totality and/or darkness. In the sources compiled by Kanda, individual descriptions include remarks such as: ‘It was like a cloudless night for about half an hour’; ‘There was a total eclipse and the stars were all visible’. It is unfortunate that the place where any of these records originated cannot be established. For example, there is nothing to relate them to the capital of Kyoto.” (Stephenson, p. 268)

“1270 Mar 23 E, Sc. Reference: Ryenses, which has under 1270: ‘There was an eclipse of the sun in the early morning of ‘Laetare Jerusalem’....Stralius gives this eclipse, but only says that it came on Sunday in Lent. I shall not use his report.” (Newton, p. 490)

This solar eclipse really happened on July 18 in CE 1460, not in CE 1270 Mar 23. Delta T ~ Zero sec! (JD ~ 2254521.727)



The year of CE 1463

“AD 1463 May 18 [Wednesday]: Cairo

(867 AH.) In the month of Sha’ban, the Sun was eclipsed and the eclipse was excessive from late forenoon almost to the afternoon such that the Earth was darkened in the eyes of the people. [Ibn Iyas, older edition]

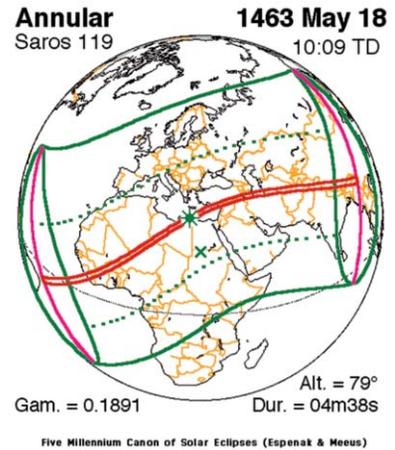
(867 AH.) In the month of Sha’ban, there was a complete eclipse of the Sun such that the Earth was darkened. These eclipse continued for about 40 degrees (i.e. 2 hours and 40 minutes). [Ibn Iyas, new edition]

A contemporary writer, Ibn Iyas lived at Cairo. In his chronicle, he often omitted to state the day of the month (which on this occasion would be the 28th of Sha’ban).

...Both this and the following observation recorded by Ibn Iyas (which also alleges totality) would appear to be unreliable.” (Stephenson, p. 447-8)

The back calculation of the Solar Saros Series – 119 is not accurate!

Delta T ~ Zero sec! (JD ~ 2255555.92)



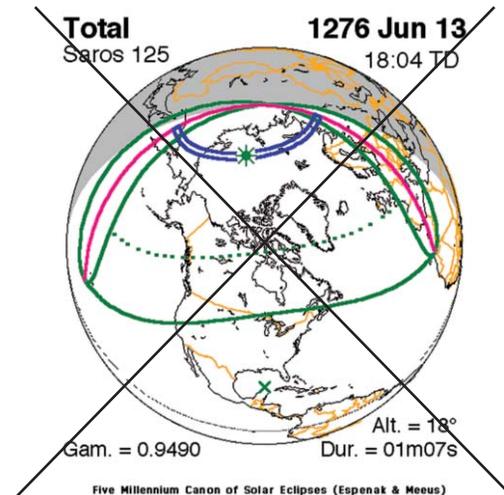
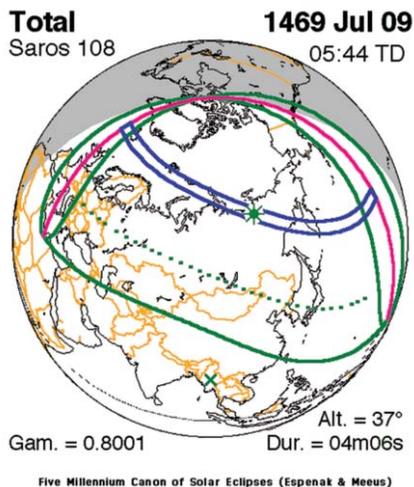
The year of CE 1469 (Traditional AD = CE 1276)

“1276 (?) E, Sc. References: Ann. Vetust and Hoyers. Both references simply note an eclipse of the sun in 1276.” (Newton, p. 504)

This solar eclipse really happened on Jul 9 in CE 1469, not in CE 1276 Jun 13.

The back calculation of the Solar Saros Series – 108 is not accurate!

Delta T ~ Zero sec! (JD ~ 2257799.739)



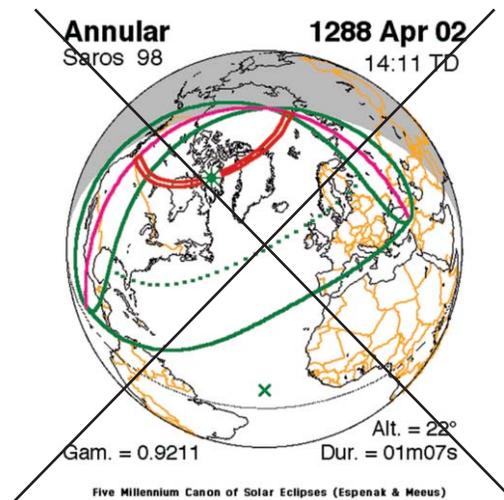
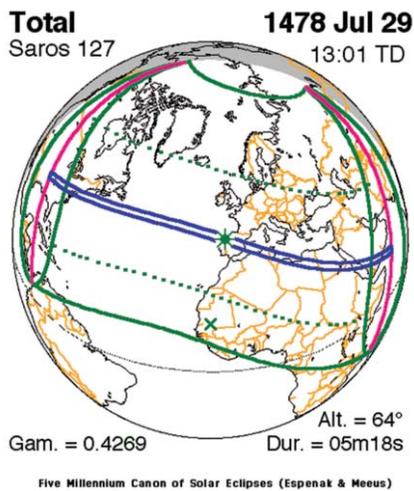
The year of CE 1478 (Traditional AD = CE 1288)

“1288 Apr 2 B, E. Reference: Wykes. The reference has, under the year 1288: ‘On the day of Venus in Easter week, that is the 4th nones April (= Apr 2) appeared an eclipse of the sun about the 6th hour.’ (Newton, p. 179-180)

“1288 Apr 2 B,W. Reference: Cambriæ. Only the C text continues to this year, and the last entry in the text is: ‘On the 2nd day of April at the 9th hour there was an eclipse of the sun in the upper part of the sun and it was seen entering the body of the sun, and the was seen to have two horns lifted upward, and it lasted thus until the hour of vespers.’

(Newton, p. 214)

This solar eclipse really happened on Jul 29 in CE 1478, not in CE 1288 Apr 2. Delta T ~ Zero sec! (JD ~ 2261107.042)



The year of CE 1485

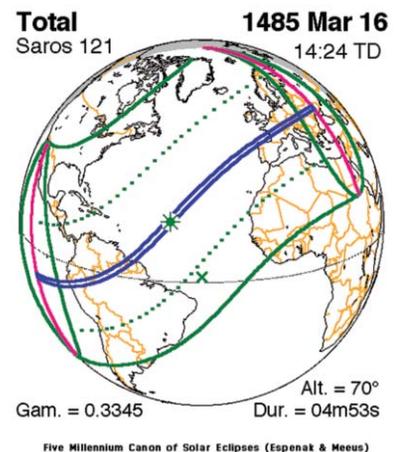
“AD 1485 Mar 16 [Wednesday] total. 1.05): Augsburg

In the year of salvation 1485, in the month of January, according to the ancient custom, the consul of Augsburg... were elected. On the 16th day of March, at the 3rd hour, during meal-time, the Sun was totally eclipsed. This produced such horrid darkness on our horizon for the space of half an hour that stars appeared in the sky. Crazy birds fell from the sky and bleating flocks and fearful herds of oxen unexpectedly began to return from their pastures to their stables.

[Achilli Pirmini Gassari: *Annales Augustburgenses*]”
(Stephenson, p. 408-409)

The back calculation of the Solar Saros Series – 121 is not accurate!

Delta T ~ Zero sec! (JD ~ 2263529.1)



The year of CE 1491

“AD 1491 May 8 [Sunday] annular, mag. = 0.94): Cairo (896 AH.) In the month Jumada al-Ukhra, the Sun was eclipsed totally. The Sun stayed eclipsed for about 30 degrees (i.e. two hours).

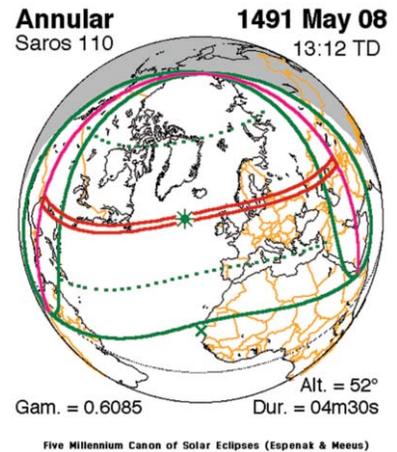
[Ibn Ilyas: Bada’i’ al-Zuhur fi Waga’i’ al-Duhur, vol. III, p. 282.)

The calculated date of this event is equivalent to the 28th of the month Jumada al-Ukhra. As in the previous entry, although this eclipse was described by Ibn Iyas (a contemporary) as total, it was in fact generally annular. The record is lacking both in descriptive detail and any reference to the place of *observation*. The configuration of this eclipse track is such that only impossibly high values of Delta T (between 28 000 and 30 000 sec) could lead to annularity at Cairo. Using equation (8.1) (Delta T = 280 sec) only 0.40 of the solar diameter would be covered at maximum phase around 17.1 h. Possibly Ibn Iyas is quoting the results of prediction rather than observation. As it happens, the computed duration of the eclipse at Cairo is 2h 0m (30 deg), identical to the reported figure.” (Stephenson, p. 448)

The back calculation of the Solar Saros Series – 110 is not accurate!

Delta T ~ Zero sec! (JD ~ 2265773.05)

It is quite interesting that up to now never entered somebody’s mind such idea that the back calculation of the 110 Solar Saros Series perhaps is not perfect...



The year of CE 1502 (Traditional AD = CE 1310/1312)

“1310. On the last day of January at the 8th hour of the day at Avignon there was an eclipse of the Sun, and it was eclipsed in an extraordinary manner, and was notably sparkling. There appeared as if at nightfall a single star, a second was the opinion of the crowd (vulgi). Then a remarkable semicircle was seen and it lasted until past the ninth hour.

[Ptolomaei Lucensis Hist. Eccles. lib XXIV] “ (Stephenson, p. 382)

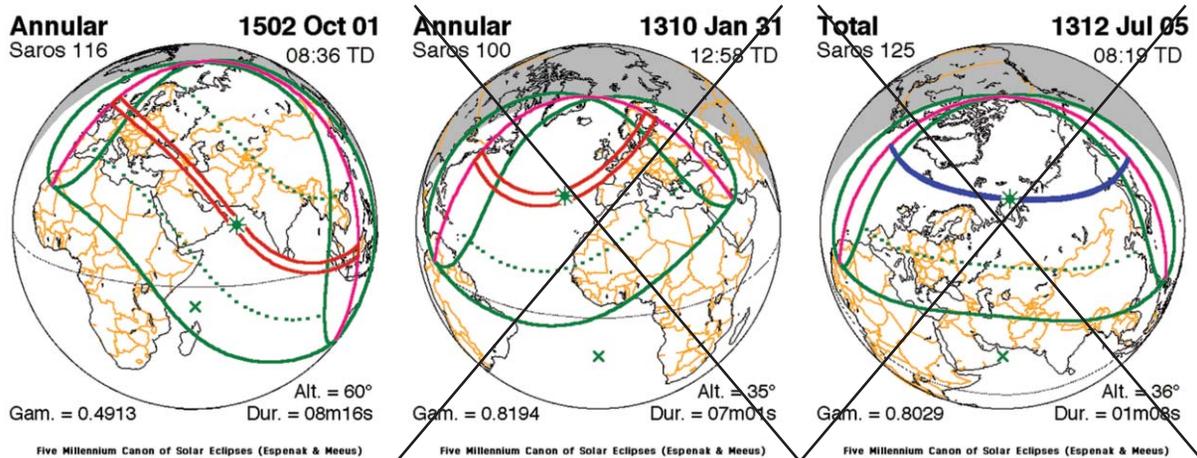
“AD 1312 Jul 5 [Wednesday] (total): Lanercost (England)

AD 1312. On the third of the Nones of July (Jul 5), on the vigil of the octave of the Apostles Peter and Paul, was a new Moon (the thirtieth lunation), and an eclipse of the Sun about the first hour of the day, and the Sun appeared like a horned Moon, which was small at first and then larger, until about the third hour it recovered its proper an usual size; though sometimes it seemed green, but sometimes of the colour which it usually has.” (Stephenson, p. 419-420)

This solar eclipse really happened on Oct 1 in CE 1502, not in CE 1310 Jan 31., or 1312 Jul 5.

The back calculation of the Solar Saros Series – 116 is not accurate (wrong)!

Delta T ~ Zero sec! (JD ~ 2269936.86)



The year of CE 1504 (Traditional AD = CE 1312)

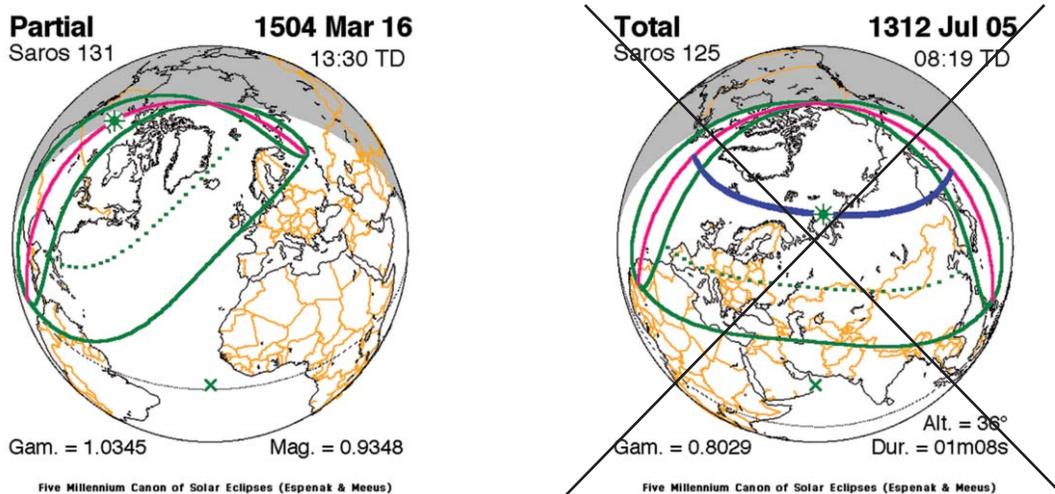
“AD 1312 Jul 5 [Wednesday] (total, 1.01): Eastern Iceland

1312. A solar eclipse occurred in *the month of March*; there was such great darkness in the eastern fjords that one could not find one’s way about, neither on the water nor indeed on land. Afterwards came a great mortality of men.

[Oddaverja annal; in Icelandic; trans. into German by Thorkellson (1933).]

The month is incorrectly given as March” (Stephenson, p. 425)

This solar eclipse really happened on **March 16** in CE 1504, not in CE 1312 Jul 5. Delta T ~ Zero sec! (JD ~ 2270469.06)



The year of CE 1525/Era 1371 (Traditional AD = CE 1333)

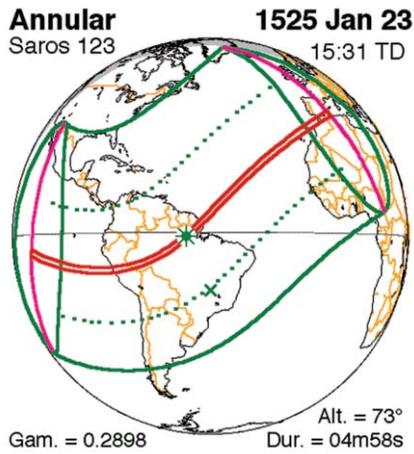
“AD 1333 May 14 [Friday] (annular, 0.997):Coimbra (Portugal)

In the (Julian) year 1371, on the 14th day of the month of May, there was an eclipse of the Sun and the Sun became so diminished that it resembled nothing so much as the new Moon, very small in appearance. It increased in size and returned to its normal state; and as it grew it went through many colours, in such a way that the day was very

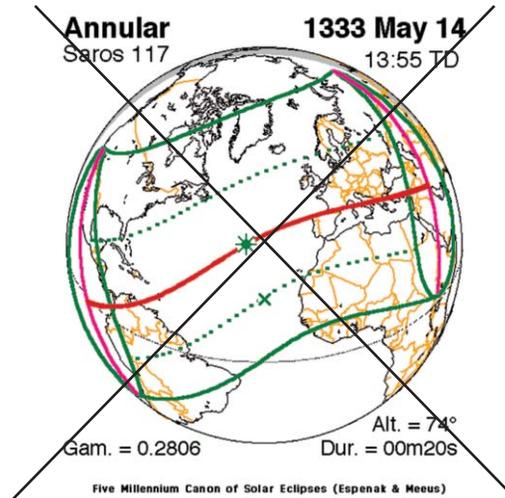
dark, deprived of its brightness. This occurred at the hour of midday, and the Sun remained thus for one hour and a half.

[Chronicon Conimbricense; in Portuguese; Florenz 1747...]" (Stephenson, p. 420-1)

This solar eclipse really happened on Jan 23 in CE 1525, not in CE 1333 May 14. Delta T ~ Zero sec! (JD ~ 2278087.146)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)



Five Millennium Canon of Solar Eclipses (Espenak & Meeus)

[The dating of the Kensington Runestone – AD 1362 = CE 1542!]



The year of CE 1544

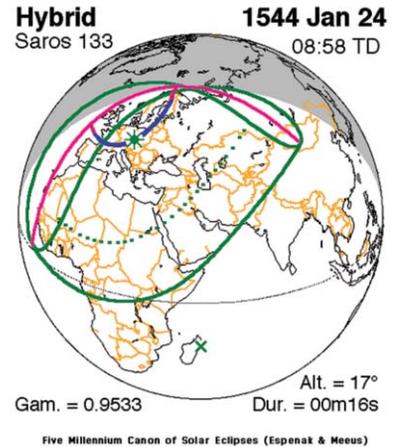
“AD 1544 Jan 24 [Thursday] (total, 1.004): Nieder Alteich

In the year of Our Lord 1544, on the Feast of St. Timothy the Apostle, there was an eclipse of the Sun before breakfast at the 9th hour, and there was darkness over the whole world as if it was entirely night, with the result that people could not see one another well. Such an eclipse was not in the memory of men.

[Notae Alahenses; MGH, XVII, 426]” (Stephenson, p. 426)

This solar eclipse really happened on January 24 in CE 1544.

Delta T ~ Zero sec! (JD ~ 2285026.873)

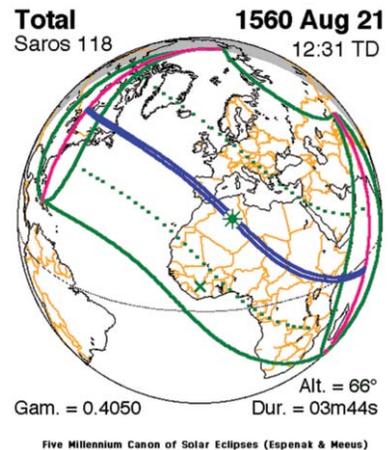


The year of CE 1560

“1560 Aug 21 [Wednesday] (total, 1.05): Coimbra

I shall cite two remarkable eclipses of the Sun, which happened in my own time and thus not long ago. One of these I observed about midday at Coimbra in Lusitania in the year 1559 (*sic*), in which the Moon was placed between my sight and the result that it covered the whole Sun for a considerable length of time. There was darkness in some manner greater than night; neither could one see clearly where one stepped. Stars appeared in the sky and (marvelous to behold) the birds fell down from the sky to the ground in terror of such horrid darkness... [Clavius 1593, p. 508]” (Stephenson, p. 409)

This solar eclipse really happened on Aug 21 in CE 1560. Delta T ~ Zero sec! (JD ~ 2291081.021)

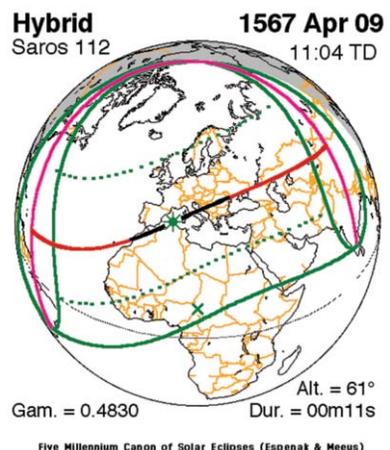


The year of CE 1567

“AD 1567 Apr 9 [Wednesday] (annular-total, 1.003): Rome

...The other (eclipse) I saw in Rome in the year 1567 also about midday in which although the Moon was placed between my sight and the Sun... [Clavius 1593, p. 508]” (Stephenson, p. 410-1)

This solar eclipse really happened on Apr 9 in CE 1567. Delta T ~ Zero sec! (JD ~ 2293502.961)



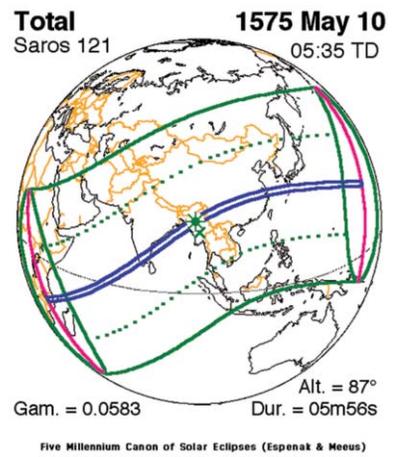
The year of CE 1575

“AD 1575 May 10 (total, mag. = 1.07): Sung-chiang [class A]

Fang-li reign period, 3rd year, 4th month, day chi-szu, the first day of the month. The Sun was eclipsed. At about the hour of wu the eclipse was total. The bright day became dark.” (Stephenson, p. 261-2)

The back calculation of the Solar Saros Series – 121 is not accurate!

Delta T ~ Zero sec! (JD ~ 2296455.732)



The End and the consequences...

The year of CE 152: the starting year of the Julian calendar.

The year of CE 212 (AD 14): Augustus dies in August.

The year of CE 228 (AD 29-33): Crucifixion of Christ

The year of 603 (AD 410): Alaric, capture and sack Rome.

The year of 632: The first year of Yazdijerd Era (YZ).

The year of CE 816 (AD 622): Beginning of Islamic calendar (AH).

The year of CE 828 (AD 632): Death of Muhammad; succession of Abu Bakr.

The year of CE 1004 (AD 814): Charlemagne dies in January.

The year of CE 1222: The Golden Bull of 1222; the first constitutional document of the nation of Hungary.

The year of CE 1325 (AD 1135): Death of Henry I of England.

The year of CE 1379 (AD 1189): Henry II of England is succeeded by Richard the Lion-heart.

The year of CE 1389 (AD 1199): Death of Richard the Lion-heart. Accession of John.

The year of CE 1405 (AD 1215): King John of England seals the Magna Carta.

The year of CE 1406 (AD 1216): King John of England is succeeded by his nine-year old son, Henry.

Henry IV lived between 1366 and 1413 mostly as a royal prince and from 1406 as a king.

The year of 1413: Henry V accedes to English throne upon death of his father.

The year of 1417 (AD 1227): In October Henry III of England reaching his years of discretion takes over the power in his country. (Henry V is busy with reconstructing Plantagenet power in France).

The year of 1422: The King of England Henry dies.

The year of 1431: In the Notre Dame of Paris the child Henry VI was crowned the King of France.

The year of 1443 (AD 1253): The King of England Henry III negotiates with the barons and the Church.

The year of 1447 (AD 1257): The seven prince-electors of Europa elect a German King, where one of the victors is John Lackland, Richard's son. The other one was Alphonse X, the King of Castile.

The year of 1460 (AD 1270): Plantagenet Richard is killed in the battle of Wakefield. Henry III is very ill. His supporters marked out Richard Cornwall for his successor.

The year of 1461: On 28 June Plantagenet Richard's son is crowned King of England. According to the SPDV (the School Professing the Dominant View) he is "Edward IV" (1422-1483). Richard Cornwall gets a brain haemorrhage.

The year of 1462 (AD 1272): Richard Cornwall dies on 2 April. Henry III dies on 16 November.

The year of 1464 (AD 1274): Edward I (1272-1307), Henry's III son comes back from the Crusade in August. On 19 August he is crowned by the Bishop of Canterbury, Robert Kildvare.

The year of 1467 (AD 1277): Edward's I campaign against the independent Wales.

The year of 1470: "Edward IV" flees from England into France.

The year of 1476 (AD 1286): Edwards I leaves for Gascone for three years!

The year of 1483 (AD 1293): On 9 April “Edward IV” died, and left behind two minors, “Edward V” and Richard. “Richard III” was crowned on 6 July.

The King of France Philippe looked at Edward I as a vassal.

The year of 1485: Henry, the Tudor, who married Edward’s IV daughter Elizabeth and stepped up as pretender (to the throne) on 22 August conquered in a battle the 32 year old Richard III.

The year of 1497 (AD 1307): At the age of 67 Edward I became demented and died on 7 July. His successor, Edward II was born in Wales.

The year of 1498 (AD 1308): Edward II of England marries Isabella of Spain.

The year of 1509: Henry VIII succeeds to the English throne.

The year of 1517 (AD 1327): Murder of English king, Edward II, following his deposition by parliament.

The year of 1534: Act of Supremacy: Henry VIII of England breaks with Rome.

The year of 1542 (AD 1362): The dating of the Kensington Runestone!

The year of 1553: Mary Tudor, a Roman Catholic, succeeds the Protestant king of England “Edward VI”. Roman Catholic bishops are restored.

The year of 1567 (AD 1377): The crowning of the 10 year old Richard was on 16 July.

The year of 1570 (AD 1380): The Parliament declared Richard a major at the age of 13.

The year of 1582: The Julian calendar (46 BCE) is replaced by the Gregorian calendar, by papal decree.

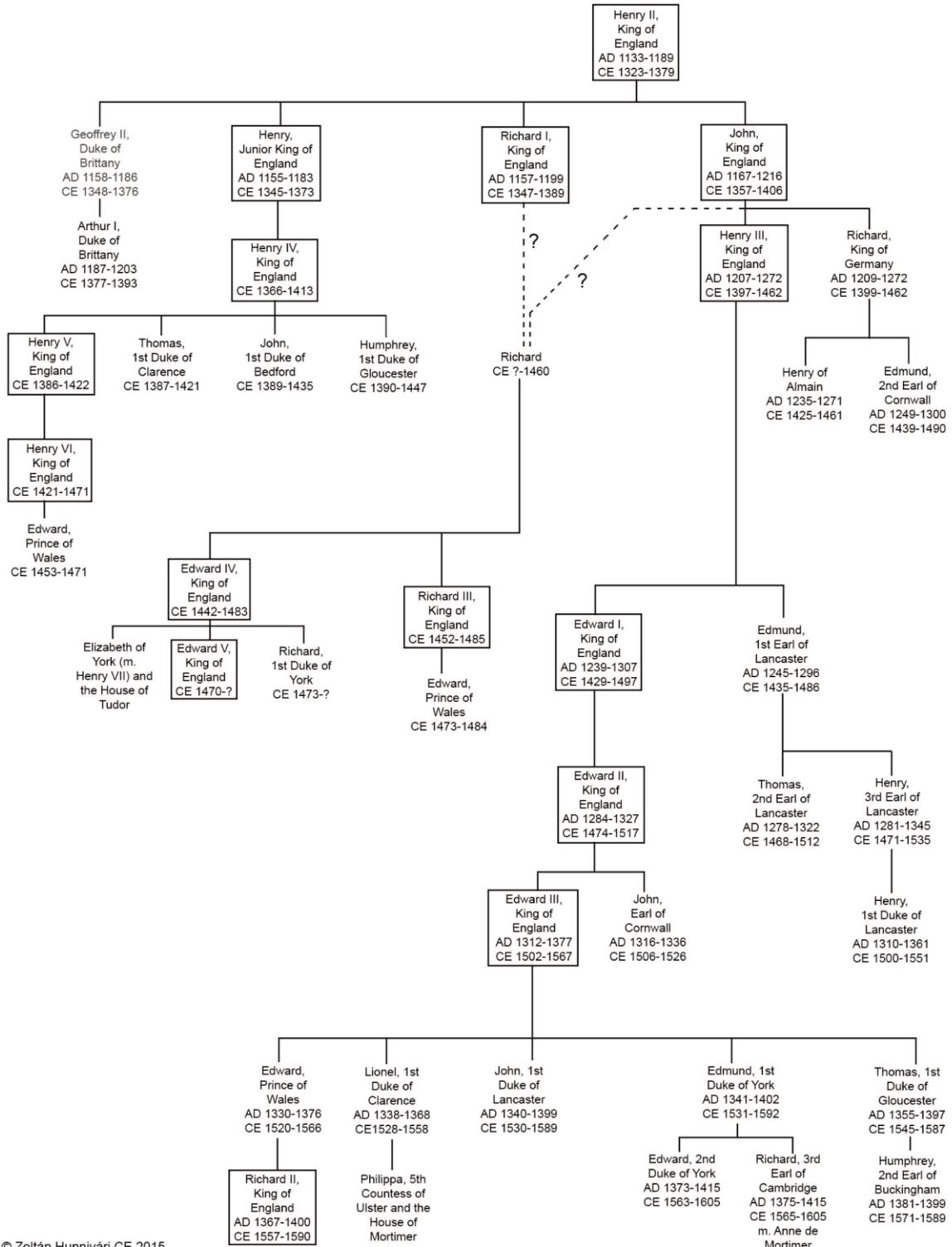
The year of 1589 (AD 1399): The death of Richard II...

The year of 1603: Death of Queen Elizabeth I of England. James VI of Scotland is her successor, uniting the English and Scottish thrones.

My supposition is that beginning with this period of time parallel persons, or events may hardly occur in the English history.

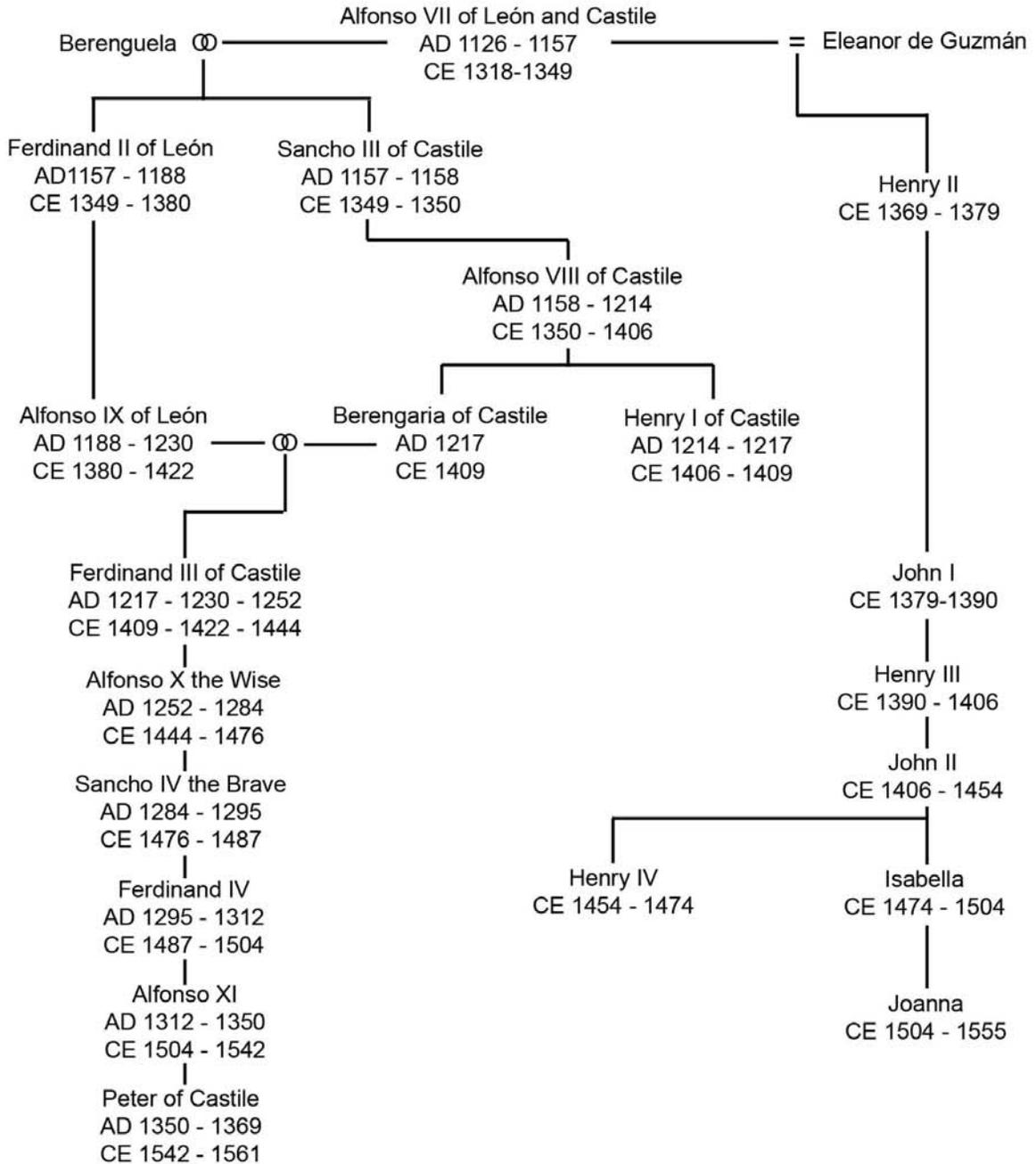
House of Plantagenet Family Tree

Common Era (CE) not equivalent to Anno Domini (AD)
(AD1 = CE 191)



© Zoltán Hunnivári CE 2015

House of Burgundy Family Tree
Common Era (CE) not equivalent to Anno Domini (AD)
AD 1 = CE 193



LOS DESCENDIENTES DE PETRONILA Y RAMÓN BERENGUER IV

Era Comun = EC

