Can the Neo-Babylonian Chronology be Lowered?

Critique of Lynn E. Rose's 'Appendix' to *Pillars of the Past*, Vol. II: *Mesopotamian, Anatolian, Mycenaean, Minoan, and Harappan Chronology by* Charles Ginenthal

PART ONE[1]

The lowering of Ancient Near Eastern chronologies

In his book *Götter, Gräber und Gelehrte* (English: *Gods, Graves, and Scholars*), first published in 1949, author C. W. Ceram[2] noted that the investigation of the chronologies of the Ancient Near East since the early 19th century had resulted in a gradual **lowering** of these chronologies. Discussing the earliest dynastic date in the history of Egypt, the date of Menes' unification of the country, Ceram gives, in chapter 12, the following overview of the gradual lowering of this date that had been going on since the days of Champollion in the 1820s:

> 'Champollion 5867 B.C., Lesueur 5770, Bökh 5702, Unger 5613, Mariette 5004, Brugsch 4455, Lauth 4157, Chabas 4000, Lepsius 3892, Bunsen 3623, Ed. Meyer 3180, Wilkinson 2320, Palmer 2224.' [3]

After that a step backwards was taken. As Ceram[4] points out, Dr. James Henry Breasted dated Menes to 3400 BC and the German scholar Georg Steindorff to 3200 BC. These dates were then lowered again to 2900 BC because of the findings in Mâri at Euphrates in the 1930's and later. Although the 2900 BC date is still in use, decisive evidence of its correctness was not given.

The Mesopotamian chronology has gone through a similar development. In the latter part of the 19th century, for example, the beginning of the reign of Sargon I, the first king of the dynasty of Akkad, was dated to c. 3800 BC[5]. A generation later it had been lowered to 2872 BC[6]. Still later, when the 'high', 'middle', and 'short' chronologies based upon the controversial 'Venus Tablet of Ammisaduqa' had been worked out for the kings of the First Dynasty of Babylon in the 1940s, the 1st year of Sargon I had also to be lowered, and many scholars still date the beginning of his reign to either 2334 or 2270 BC[7]. Then, in 1998, the 'ultra-low' chronology introduced by Gasche *et al* [8] requires a further reduction of the date to 2238 BC. There is no reason to believe that this is the final halt.

That the Mesopotamian chronology for the second millennium BC and earlier periods is still in a state of flux was emphasized by Professor Frederick H. Cryer in 1995:

> 'In contrast with dating of the first millennium, the absolute dates of other chronological periods in Mesopotamia are conjectural. The beginning of the first millennium and the transition from the second millennium is very unclear in all our extant sources, as far as Mesopotamia is concerned. An extreme lack of sources is usually cited as the reason for our ignorance, and in fact, we are largely, if not entirely, reliant on the some times widely divergent kinglists to obtain even a shadowy picture. In this connection, we are hindered by the fact that it appears to have been important to the local chronographers, especially in Assyria, to sketch out at least the illusion of dynastic continuity, so that numerous simultaneously reigning kings of rival principalities (that is, collateral reigns) seem to succeed one another in the records. The same is also true of diverse

> ancient editions of the Sumerian kinglist, a document that gives as a sequence the city-states, together with their succession of rulers, on which gods bestowed the institution of kingship.'[9]

What about the first millennium BC?

The revisions and reductions of the ancient Mesopotamian chronology described above concern the **second** millennium BC and earlier. What about the Mesopotamian chronology of the **first** millennium BC? As explained by F. H. Cryer in the article quoted above, the chronology of the first millennium BC is fixed to absolute dates and therefore on much safer ground. There are several reasons for this, the most important of which being that from the middle of the 8th century BC and on to the beginning of our era an increasing number of astronomical cuneiform tablets are available which help to fix the chronology at numerous points throughout the whole period. The details can then be filled in by means of many other documents from the same period.

Professor Abraham J. Sachs, who was a leading authority on the astronomical texts, explains how cuneiform sources have provided an independent confirmation of the well-known **Royal Canon** (often misnamed 'Ptolemy's Canon'), an ancient king list compiled for astronomical use starting with the first year of king Nabonassar of Babylon in 747 BC. Thanks to these sources it has been possible to securely fix the absolute chronology for the Babylonian, Persian, and Seleucid periods. In the statement quoted below, Sachs speaks of the Royal Canon as 'Theon's royal list' because it has traditionally been held that the mathematician Theon (4th century AD) included the king list in his revision of Ptolemy's 'Handy Tablets'. Sachs makes the following comparison between the kinglist and the cuneiform sources:

> 'The absolute chronology of the Babylonian first group of kings is easy to establish because, as has been mentioned, Ptolemy quotes the report of an eclipse in the time of king Mardokempados [the Biblical Merodach-Baladan II, Isaiah 39:1]. Even more important, this absolute chronology has been independently confirmed by cuneiform texts from Babylon which contain astronomical observations. These number more than 1000 pieces of day-to-day astronomical observations of positions and phases of the Moon, Mercury, Venus, Mars, Jupiter and Saturn, beginning around 650 B.C. and continuing, in increasingly dense numbers, into the first century before the beginning of our era. **Thanks to these astronomical diaries, numerous overlaps with the royal list in Theon's Handy Tables have been established, always in agreement.** [**Fig. 1**] In other cases, the lengths of the reigns of individual kings in Theon's royal list can be confirmed by the careful study of the dates given in contemporaneous economic and administrative texts found in Babylonia; this is possible because for parts of the period covered by the royal list, we have so many of these texts that they average out to one every few days. In this way – namely, by using Theon's royal list, Babylonian astronomical diaries, and Babylonian dated tablets – **one is able to establish with confidence the absolute chronology back to the middle of the eighth century B.C.,** i.e. the reign of king Nabonassar of Babylon.' [10] (Emphasis in bold is by the present author.)

A description of some of the most important sources for the chronology of the Neo-Assyrian and Neo-Babylonian periods – astronomical tablets, chronicles, king lists, and eponym lists – was presented in an article by me published in 1987 [11].

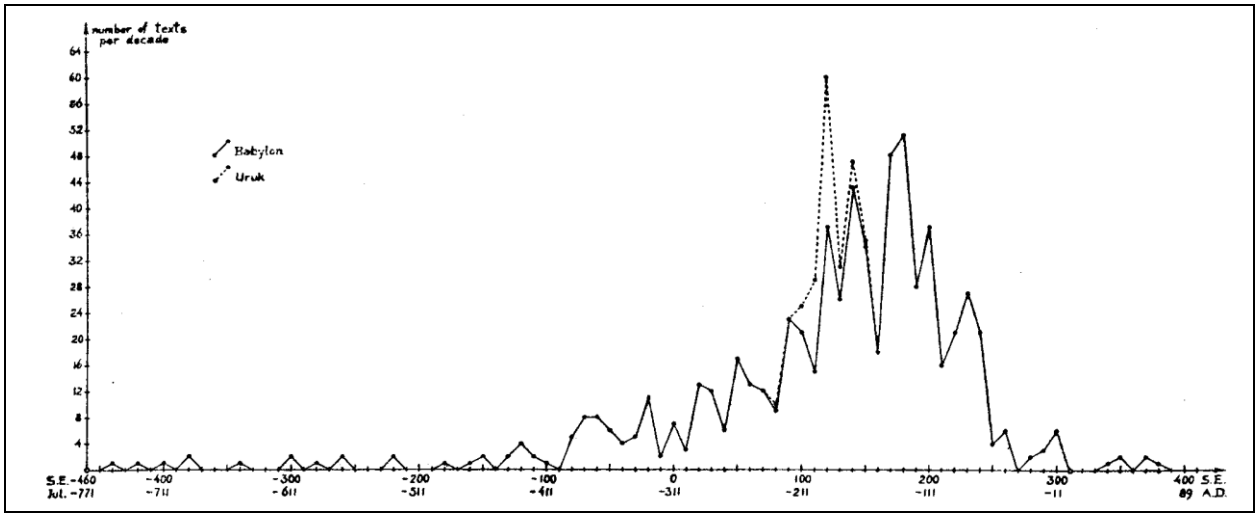

Fig. 1: Number of known astronomical cuneiform texts per decade from the 8th century BC to the 1st century AD. – Graph by O. Neugebauer in *Orientalische Literaturzeitung*, Vol. 52 (1957), pp. 131, 132.

Attempts to shorten the Neo-Babylonian chronology

In this article I briefly examine the attempts by some who are trying to shorten the chronology and move the reigns of its kings forward in time by hundreds of years!

Some revisions resulting in large-scale lowerings of the chronologies of the Ancient Near East, including those of the first millennium BC, were discussed and criticized in a very interesting article written by Professor Lynn E. Rose in 1998.[12] The revisions examined by Rose were those of Gunnar Heinsohn, Benny J. Peiser, and Heribert Illig. Another large-scale revision with similar, far-reaching consequences not criticized by Rose is that of Charles Ginenthal.

In November 2008 Charles Ginenthal sent me Volume II of his work *Pillars of the Past*[13], a book of 670 pages. As most readers of this journal already know, Charles Ginenthal is a follower of the late Immanuel Velikovsky, whose theories he is, evidently, trying to follow up and elaborate further. A separate Appendix has been written by the above-mentioned Lynn E. Rose[14], who is also a well-known Velikovskian.

Now both of these scholars argue that the Neo-Babylonian period should be shortened and moved forward by nearly 300 years, from the 7th and 6th centuries BC down to the 4th and early 3rd centuries BC.

The Saturn Tablet from the reign of Kandalanu

In my book *The Gentile Times Reconsidered*[15], I briefly described the 'Saturn Tablet' from the reign of Babylonian king Kandalanu. This tablet gives dates (regnal year, month, and day) of the last and first visibilities of the planet Saturn during the first 14 years of this king. The translator of the tablet, C. B. F. Walker, was quoted as stating that when the 59-year cycle of the Saturn phenomena is fitted into the Babylonian lunar calendar, 'then identical cycles recur at intervals of rather more than 17 centuries.'[16] Thus, the dating of the 21-year reign of Kandalanu to 647-627 BC seems to be securely fixed.

In the Appendix to Ginenthal's book, Lynn Rose presents evidence indicating that Walker's statement was an exaggeration. He demonstrates that the Saturn phenomena described on the tablet are repeated on the same dates in the Babylonian calendar already after a period of 295 years, beginning in 352 BC[17]. Rose should be commended for this interesting discovery and for calling our attention to it.

However, when Rose goes on to state that the 4th-century fit is 'significantly better' than that in the 7th century and that 'Walker's fit is *not* a good one at all' (p. 613), I must conclude that he, too, is exaggerating. Modern computations of dates of the first and last visibility of a planet and the observations of these phenomena by the ancient Babylonian astronomers are not quite the same thing. For a number of reasons, such as weather conditions, uncertainties in the *arcus visionis*, variations in the planetary magnitude, atmospheric effects, and other observational circumstances, the Babylonian observations of the first and last visibility of a planet could often differ by one, two or a few more days from the factual first and last visibility as computed by modern methods. Teije de Jong, who has examined the above-mentioned problems in detail, explains that these factors 'may introduce an uncertainty of up to five days in the predicted dates.'[18]

A deviation of up to five days between modern calculations and the ancient observations of the visibility of planets in the period we are dealing with lies within the margin of uncertainty. It does not prove that the conventional chronology for Kandalanu is wrong. Walker's examination of the Saturn Tablet shows that all deviations fall within the acceptable margin of uncertainty.

Further, Rose's application of the observations recorded on the Saturn Tablet to the 352-339 BC period is not as good as he thinks it is, if Carl Schoch's Tables from 1928 are as good as he believes[19]. While it is quite understandable that the Babylonian astronomers observed the **last** visibility of Saturn one, two or even more days **before** the factual day of last visibility as computed by modern methods, it would be remarkable if they could continue observing the last visibility of the planet a day or two **after** the computed factual day of last visibility. Yet this is what we find in Rose's table on pages 611 and 612, which shows this to have been the case with four of the eight days of last visibility (in years 350, 347, 343, and 342 BC).

There is a similar problem with the days of **firs**t visibility. It is quite understandable that the Babylonian astronomers sometimes were not able to observe the first visibility of Saturn until one, two, or a few more days **after** the factual first day of visibility as computed by modern methods, but it would be remarkable if these astronomers were able to observe the first visibility of the planet a day or more **before** the day of the computed factual first day of visibility. Yet this is the case with three of the nine days of first visibility in Rose's table (in years 346, 345, and 341). Thus 7 out of 17 Babylonian observations in Rose's alternative chronology – 41% – conflict with Schoch's tables. In Walker's table on the other hand, only 2 of the 17 observations – 11.7% – do not fit in the 7th century period. Either the Saturn phenomena recorded on the Saturn Tablet do not fit in the 4th century period or Schoch's Tables are not as reliable as Rose believes they are. When I tried a modern computer program called 'Planetary, Lunar, and Stellar Visibility 3' (also known to Rose) most of the problems disappeared [20].

The fact that the Saturn phenomena recorded on the Saturn Tablet also may be shown to fit a period in the 4th century BC does not mean that the reign of Kandalanu can be moved from the 7th century down to this period. It must be kept in mind that we have numerous documents from the Neo-Babylonian period that connect and lock this king in a particular historical context. His 21-year reign in Babylon runs parallel with the last 21 regnal years of Assurbanipal in Assyria. In the year after his death Nabopolassar took over the throne in Babylon. Moving Kandalanu down to the 4th century, therefore, requires that his whole historical context, including the reigns of Nabopolassar and his successors, also has to be moved together with him – which is what Rose tries to do.

The reign of Nabopolassar and New Year beginnings

On the basis of the Babylonian astronomical compendium MUL.APIN, originally compiled on two tablets about 1000 BC, Rose argues that the Babylonians tried to keep the vernal equinox within the first Babylonian month, Nisanu. He found that this was not always the case during the 21-year reign of Nabopolassar. While in 13 out of the 21 years the New Year did start on or before the vernal equinox, in the other 8 years (Rose says 7) it began **after** the vernal equinox[21].

On looking into the 4th century, however, Rose found a 21-year period beginning in 342 BC in which Nabopolassar's reign can be placed with 'no Nisanu after Year 5 ending more than one day before the vernal equinox and no Nisanu at all beginning after the vernal equinox!'[22]

The first problem with this argument is that the idea that the beginning of the year in this period was governed by the vernal equinox is wrong. More than 20 years ago I asked Professor Hermann Hunger about this matter. He answered in a letter dated June 26th 1990:

> 'While in general the beginning of the Babylonian year is close to the vernal equinox, it is not determined by observing the equinox, but at the time of Nebuchadnezzar rather by means of observing the appearance of certain constellations (see Schaumberger, *Ergänzungen zu Kugler, Sternkunde und Sterndienst in Babel*, p. 340ff.). It cannot therefore be excluded that the beginning of the year is more than half a month away from the vernal equinox.'[23]

In an article published in 2000 Manuel Gerber examines in detail the beginning of the Babylonian New Year in the 8th and 7th centuries BC. His analysis of 101 New Year's dates between 748 and 539 BC shows that the dates of the New Year shifted. In the 8th century it often began before the vernal equinox. He says that the 'commonly held view' was that 'the aimed-for beginning of the Babylonian year in the eighth century fell about two weeks before vernal equinox.' During the reign of Nabopolassar there was a shift to about ten days **after** the equinox, although in many years the New Year still started before the equinox. Gerber concludes:

> 'In summary, the situation in Babylonia before the last third of the eighth century seems to agree with the statement in MUL.APIN (Hunger and Pingree 1989) that the vernal equinox fell on Nisan 15. Probably around 730 the aimed-for beginning of the Babylonian year was shifted some two weeks upwards in relation to the solar year, so the average New Year's Day fell shortly before the vernal equinox. This holds true for the entire seventh century. Only around 600 did a second shift occur, which pushed the average beginning of the year to about two weeks after the vernal equinox (figure 4B).'[24]

A second problem with Rose's alternative dating of Nabopolassar is that it conflicts with his redating of Kandalanu. As he places Kandalanu's 21-year reign in the period 352-332 BC (followed by a 'kingless year' in 331) he should have started Nabopolassar's 1st year in 330 BC, not in 342. As the contemporary documents show that Nabopolassar was enthroned in Babylon **after** the death of Kandalanu, it cannot be argued that their reigns overlapped. In other words, Rose's redatings of the two kings are in conflict with each other and cannot be correct.

This is only a beginning of the problems. The 43-year reign of Nabopolassar's son and successor, Nebuchadnezzar, is fixed by several astronomical cuneiform tablets. Some of these contain many observations. The astronomical tablet VAT 4956 (Diary -567) records about 30 observations of planetary and lunar positions dated within the 37th year of his reign. And the cuneiform tablet LBAT 1420 gives details of about two dozens of lunar eclipses dated within the first 29 years of his reign[25]. Mentioning the first of these two tablets, Rose admits on page 636 that 'Diary -567 contains so many astronomical details that it would be very difficult if not impossible to place it anywhere other than in -567/66.'

To solve this problem he believes (p. 635) it is possible to lower the reign of an earlier king of the Second Dynasty of Isin by the name Nebuchadnezzar (Nebuchadnezzar I, conventionally dated to 1125-1104 BC) 'all the way down to the 7th and 6thcenturies and to attribute Diary -567 and other astronomical documents to **his** reign.' In this way he feels that Nebuchadnezzar II can be moved down to the 4th and 3rd centuries BC.

One of the many problems with this solution is that Nebuchadnezzar I of the Second Dynasty of Isin is considered to have ruled only for 21 years, while the Diary -567 is dated to the 37th year of king Nebuchadnezzar II. It does not seem to me that the roles of the two namesakes can be exchanged.

The lunar eclipse in the 2nd year of Nabonidus (554 BC)

In my book I described a lunar eclipse that took place in the second year of Nabonidus, the last king in the Neo-Babylonian period[26]. The eclipse, which is mentioned in a cylinder inscription, is stated to have been observed in the morning of Ululu 13 and to have 'set while eclipsed.' It is not explained whether it was total or not. Ululu 13 in Nabonidus' 2nd year corresponded to September 26, 554 BC in the conventional chronology and the most exact modern calculations confirm that in the morning of that day there was indeed a lunar eclipse that 'set while eclipsed.'

Lynn Rose questions the 554 BC date because one modern astronomical program referred to earlier,'Planetary, Lunar and Stellar Visibility 3.1', shows the magnitude of the eclipse drop to 0% just as the Moon was setting below the horizon. However, he also mentions that other modern programs do show the Moon setting while eclipsed at this date (pp. 633, 634). Strangely, his statement that the 'Starry Night' programme shows the eclipse magnitude at the Moon's setting to be 'of not much more than 10%' is downplayed by Ginenthal[27], who states that if both programmes 'are correct, then this eclipse cannot be correctly placed where historians claim it belongs.' However, this is not applicable to the 'Starry Night' programme, because if it shows that the magnitude at setting was 10% or more, this would be enough for the Moon to be seen as setting eclipsed.

As the question, whether the Moon really set eclipsed or not on that day, had already been brought up after the 3rd edition of my book had been published in 1998, I wrote to Professor F. Richard Stephenson at Durham, England, who is a leading expert on ancient eclipses. His book *Historical Eclipses and Earth's Rotation* [28], is a very thorough modern examination of the ΔT, the variations in the length of day over the historical past. His answer to my question, therefore, is one of the most reliable that can be given at present. In his letter, dated March 5, 1999, he explained:

> 'My computed details are as follows (times to the nearest tenth of an hour):
>
> (i) Beginning at 3.0 h[our] local time, lunar altitude 34 deg[rees] in the SW.
>
> (ii) End at 6.1 h[our] local time, lunar altitude -3 deg[rees] in the W.
>
> 'The eclipse would thus end about 15 minutes after moonset. A deep penumbral eclipse may possibly be visible for a very few minutes and there is always the possibility of anomalous refraction at the horizon. However, I would judge that the Moon indeed set eclipsed on this occasion.'[29]

If Nabonidus is to be moved down to the 3rd century as both Rose and Ginenthal argue, it is necessary to find an eclipse on Ululu 13 in his 2nd year that fits this new chronological context. Rose's alternative is the lunar eclipse of 2 October 294 BC. He points out (p. 634):

> 'All three of the PC programs that were mentioned have the Moon setting totally eclipsed on that date.'

Ginenthal, too, emphasizes the fact that the Moon at the 294 BC eclipse was still total at setting in contrast to that in 554 BC. He even claims that the cylinder inscription, too, states that the Moon was **totally** eclipsed at its setting:

> 'Nabonidus's lunar eclipse conventionally dated to September 26, 554 B.C. – in the ancient calendar to the 13th of the month Ululu – in no way can be considered a proper astronomical fit. The Moon, **according to the document,** was completely eclipsed above the horizon and stayed totally eclipsed when it set below the horizon.'[30] (Emphasis in bold is by present author.)

If this were true, then the 554 BC eclipse would, of course, be excluded, but he document does not contain such a statement. The Babylonian astronomers were interested in and recorded all kinds of eclipses, partial as well as total ones. As the cylinder inscription does not tell whether the Moon at its setting was totally eclipsed or not, the fact that the 294 BC eclipse was total is not a valid criterion for giving it preference to the 554 BC eclipse.

The Neo-Babylonian chronology of Rose and Ginenthal – a Procrustean bed

The real problem is that Rose's date is in flagrant conflict with his other revised dates. As far as they are known, all the lengths of reign of the Neo-Babylonian kings are shown in detail both in my book and a web review article[31]. I consider that the lengths of their reigns are securely established, not only by king lists, chronicles, and royal inscriptions, but also by tens of thousands of economic and administrative tablets dated to this period. This evidence should not be ignored or dismissed. Based on this amount of contemporary documents, we know that the time interval from the first year of Kandalanu to the second year of Nabonidus was exactly 93 years, corresponding to 647-554 BC in the conventional chronology and the astronomical observations, dated to specific years within the reigns of Kandalanu, Nabopolassar, Nebuchadnezzar, and Nabonidus fit excellently into this chronological time frame. The records on the Saturn tablet dated to the first 14 years of Kandalanu fit with 647 BC as being the first year of his reign in the conventional chronology, and the lunar eclipse that 'set eclipsed' on Ululu 13 in the second year of Nabonidus occurred 93 years later, confirming that his second year corresponded to 554 BC.

Such agreements between the lengths of reign and the astronomical records dated to specific years, months, and days in the various reigns cannot be found within Rose's and Ginenthal's revised Neo-Babylonian chronology. Rose's redatings of the astronomical tablets to the 4th and 3rd centuries (all but one unreservedly accepted by Ginenthal) are in conflict with each other. From the new date for the first year of Kandalanu, 352 BC, to the new date for the second year of Nabonidus, 294 BC, there are 58 years, not 93 years as required by the lengths of reign established for the kings ruling from Kandalanu to Nabonidus. The Rose/Ginenthal chronology is 35 years too short. It is a Procrustean bed that requires an extensive amputation, a cutting off of 35 years from the Neo-Babylonian reigns, in contradiction with the many thousands of economic tablets dated to these 35 years. Their alternative Neo-Babylonian chronology collapses for this reason alone.

Concluding remarks

Immanuel Velikovsky's fascinating reconstruction of ancient history and his lowering of the chronologies for ancient Egypt and Mesopotamia forced a contraction of the chronologies of later periods. This caused a crisis for his attempts to revise the chronology of the first millennium BC. When he reached down to the Neo-Assyrian and Neo-Babylonian periods, a number of his supporters, particularly historians with a thorough knowledge of the history and chronology of these periods, realized that he was on the wrong track and that his revision was on a collision course with the historical reality. Among these scholars were David Rohl, Peter James and Bernard Newgrosh.

The reason for this is the increasing number of historical sources available from these later periods. From the Neo-Babylonian period there are quite a number of dated documents. In addition to the tens of thousands of dated economic and administrative texts there are also chronicles, king lists, royal inscriptions, and astronomical tablets.

True, the number of economic and administrative tablets gradually decreases after the reigns of the first Persian kings, Cyrus, Cambyses, and Darius. On the other hand, such texts are replaced by an increasing number of astronomical tablets that securely establish the absolute chronology of the Persian era. Let us consider just one example, the 46-year reign of Artaxerxes II (404–359 BC).

There are about 25 astronomical "diaries" and about 15 lunar and planetary tablets dated to the reign of Artaxerxes II. Hundreds of astronomical observations are recorded on these tablets. Even if we

disregard the observations that are damaged and only partially legible, there are still about 750 observations dated to this king that can be read and identified![32]. Similarly, there are hundreds of astronomical observations that cover the reigns of the last three kings of the Persian Empire, Artaxerxes III (358-338 BC), Arses (337-336 BC), and Darius III (335-331 BC).

The challenge meeting those who want to revise the chronology of this period is to find alternative dates for these more than one thousand observations dated to this period. There is no indication to show that any of these observations were tampered with by later copyists, as some have argued. The evidence is that most if not all of the "diaries" from this period, for example, are original tablets[33]. That the absolute date for the end of the Persian Empire is 331 BC seems clearly to be established beyond all reasonable doubt.

If now Nabonidus' 2nd year should be dated to 294 BC, as Rose and Ginenthal argue, Cyrus' conquest of Babylonia in the 17th year of Nabonidus has to be dated to 279 BC. **This would mean that Cyrus by this conquest founded the Persian Empire 52 years after the end of that empire in 331 BC**! This is probably the most absurd consequence of Ginenthal's and Rose's revised chronology.

[1] This discussion is the first part of a critical review of Ginenthal's Volume II written in 2008. This first part has also been published in the British journal *Chronology & Catastrophism Review* of 2011. The second part deals with some other arguments used by Ginenthal in his attempt to revise the chronology of the Neo-Assyrian and Neo-Babylonian periods, including the date of the eponym canon solar eclipse (763 BC), the eclipses in the reign of Esarhaddon, the Adad-guppi' stele, and the prosopographical evidence from the Neo-Babylonian period.

[2] C. W. Ceram, *Gods, Graves, and Scholars*. Gollancz in association with Sidgwick & Jackson, London, 1952.

[3] *Ibid.*, chapter 12.

[4] *Loc. cit.*

[5] W. St. Chad. Boscawen, *The Bible and the Monuments*, Eyre and Spottiswoode, London, 1895, p. 22.

[6] Will Durant, *The Story of Civilization*, Vol. 1: *Our Oriental Heritage*, Simon and Schuster, New York, 1935, p. 113.

[7] The standard publication of the Venus Tablet is: E. Reiner and D. Pingree, *The Venus Tablet of Ammisaduqa* (*Babylonian Planetary Omens*, Part I = BiMes 2/1, Malibu, 1975). Cf. also C. B. F. Walker, "Notes on the Venus Tablet of Ammisaduqa," *Journal of Cuneiform Studies*, Vol. 36/1, pp. 64-66. That the Venus Tablet is useless for chronological purposes has been shown by several leading scholars, including Hermann Hunger and David Pingree in *Astral Sciences in Mesopotamia*, Brill, Leiden-Boston-Köln, 1999, pp. 32-41.

[8] H. Gasche *et al*, *Dating the Fall of Babylon. A Reappraisal of Second-Millennium Chronology*, University of Ghent and the Oriental Institute of the University of Chicago, 1998.

[9] F. H. Cryer, 'Chronology: Issues and Problems,' in Jack M. Sasson *et al* (eds.), *Civilizations of the Ancient Near East*, Vol. II, Charles Scribner's Sons, New York, 1995, p. 657. Cf. Hermann Hunger, "How uncertain is Mesopotamian chronology," in *Time's Up! Dating the Minoan eruption of Santorini*, David A. Warburton (ed.), Monographs of the Danish Institute at Athens, Volume 10 (2009), pp. 145-152.

[10] A. J. Sachs, 'Absolute dating from Mesopotamian records,' *Philosophical Transactions of the Royal Society of London*, Ser. A, Vol. 26, 1971, p. 20. Emphasis added.

[11] Jonsson, 'The Foundations of the Assyro-Babylonian Chronology.' *Chronology & Catastrophism Review*, Vol. IX. Society for Interdisciplinary Studies, November 1987, pp. 14-23.

[12] Lynn E. Rose, 'In Defence of Higher Chronologies,' *Chronology & Catastrophism Review*, 1998:2. Society for Interdisciplinary Studies, March 1999, pp. 4-10.

[13] C. Ginenthal, *Pillars of the Past*, Vol. II: 'Mesopotamian, Anatolian, Mycenaean, Minoan, and Harappan Chronology' (Vol. VII:2-4 of *The Velikovskian*). With the addition of an Appendix by Lynn E. Rose. Forest Hills, New York, 2008.

[14] Lynn E. Rose, Appendix to C. Ginenthal's *Pillars of the Past*, Vol. II: 'The Astronomical Evidence for a Shortened Chronology in First-Millennium Mesopotamia', pp. 597-644.

[15] C. O. Jonsson, *The Gentile Times Reconsidered*, 4th ed. Commentary Press, Atlanta, 2004, pp. 169-171.

[16] *Ibid.*, p. 170.

[17] Rose, Appendix to *Pillars of the Past*, Vol. II, pp. 597-620.

[18] Teije de Jong, 'Early Babylonian Observations of Saturn: Astronomical Considerations,' J. M. Steele and Annette Imhausen (eds.), *Under One Sky. Astronomy and Mathematics in the Ancient Near East*. Ugarit-Verlag, Münster, 2002, p. 177.

[19] Rose, Appendix, pp. 599-610.

[20] Available at http://www.alcyone.de/PVis/english/ProgramPVis.htm.

[21] Rose, Appendix p. 626. Rose tells that he, 'just for curiosity,' tried having each of the Babylonian months one month earlier than in the tables of Parker and Dubberstein (*Babylonian Chronology 626 B.C. – A.D. 75*, 1956, p. 27), but concludes that this creates serious problems. The fact is that the idea is refuted by an astronomical tablet that includes dates from the reign of Nabopolassar, viz., BM 41222. (Published as No. 52 in H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*, Vol. V, Wien: Verlag der österreichischenAkademie der Wissenschaften, 2001, pp. 149-153.) For year 12 of Nabopolassar the tablet reports that in 'month V, the 15th, Mars was balanced 2 cubits above α [Tauri]', and in 'Month VI, the 13th, Mars was 2/3 cubit above the Chariot.' Only on the condition that in year 12 month V began on July 19/20 and month VI on August 18/19, as shown by P&D, do observations fit.

[22] Rose, Appendix, p. 629.

[23] This, of course, also controlled the insertions of intercalary months in this period. See Hermann Hunger's article 'A Scheme for Intercalary months from Babylonia,' in *Wiener Zeitschrift für die Kunde des Morgenlandes*, 67. Band, Wien 1975, pp. 21-28; cf. also Hunger's comments in *Reallexikon der Assyriologie*, Band 10, Walter de Gruyter, Berlin, New York, 2005, p. 592.

[24] Manuel Gerber, 'A Common Source for the Late Babylonian Chronicles Dealing with the Eighth and Seventh Centuries,' *Journal of the American Oriental Society*, Vol. 120:4, October-December 2000, p. 559.

[25] Jonsson, *The Gentile Times Reconsidered*, 4th ed., pp. 157-164, 180-182.

[26] Jonsson, *Ibid*., pp. 109, 110.

[27] Ginenthal, *op. cit*., p. 210.

[28] F. R. Stephenson, *Historical Eclipses and Earth's Rotation*. Cambridge University Press, 1997.

[29] Quoted in Jonsson, *The Gentile Times Reconsidered*, 4th ed., p. 110, n. 44. By using the most modern astronomical theories two other leading experts on ancient eclipses, Peter J. Huber and Salvo de Meis, arrived at similar results in their recent book, *Babylonian Eclipse Observations from 750 BC to 1 BC*, Mimesis, Milano, 2004. Their lunar eclipse table on page 187 shows that sunrise on this day occurred at 05.50 and moonset at 06.00, while the eclipse lasted until 06.09. Thus this up-to-date work confirms that the Moon did set eclipsed.

[30] Ginenthal, op. cit., p. 222.

[31] Available at: http://kristenfrihet.se/english/epage.htm.

[32] All these tablets have been transliterated and translated in A. J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*, Vol. I. Wien: Verlag der österreichischen Akademie der Wissenschaften, 1988, pp. 66-139; and in H. Hunger, *op. cit*., Vol. V, 2001, pp. 198-261.

[33] Jonsson, *The Gentile Times Reconsidered*, 4th ed., p. 371.