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Chronological Framework of Ancient History. 2: Founding of the Nations

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Abstract

In the ancient texts we found 16 durations to Babel, the Dispersion, and the founding of the nations, as well as two astronomical proofs that confirm the historical durations. We find that Babel was founded in 2234/2233 BC and lasted 42 years until the Dispersion in 2192/2191 BC. This paper is the second in the CFAH series and continues the process of systematizing the chronology of the ANE using the durations given by the ancient chroniclers.

Keywords: Babel, Dispersion, Menes, Ninus

Introduction

In reviewing credible durations given by ancient chroniclers we found 14 with known starting dates that extend back to the founding of their nations. Three durations confirm 2234/2233 BC as the date for the founding of Babel, with a fourth rounded estimate that falls within ±50 years of 2184 BC. Three durations place the Dispersion in 2192/2191 BC; two place the founding of the first cities in Egypt in 2189/2188 BC, and a fourth rounded duration places the founding of Egypt within ±50 years of 2136 BC. We also have durations for six other ancient nations which fall in the same general time frame.

Historical Astronomy

In addition to these 14 durations to the founding of nations, there are two astronomical eras identified by Tycho Brahe and Isaac Cullimore. These are the "Embolismal period" for Babylon and Persia and the "Hermaic cycle" of Egypt in terms of which we have precise dates for the founding of these kingdoms. These astronomical founding dates confirm the witness of the 14 historical durations.

Cullimore (1833b) demonstrated that the date of the reign of Menes was synchronized with the Sothic cycle in an epicycle of 25 Sothic periods that he termed the "Hermaic cycle." Cullimore's paper on the subject was published seven decades before Eduard Meyer advanced the current Sothic theory. We will review and test Cullimore's hypothesis here.

The Founding of the Nations

There is biblical evidence that the three primary cities of Assyria were founded by Nimrod immediately after the Dispersion (Genesis 10:11). Identifying the year Nimrod began to rule Assyria represents a reasonable date for the Dispersion. As demonstrated below, there is strong evidence that Nimrod was known to later historians as "Ninus," among several other names, whose reign over Assyria is dated by several ancient sources. The founding of the first temples in the region of Thebes and Thinis seems to have occurred three years later.

If we have correctly identified the dates of the founding of Babel and the Dispersion, then the duration for the construction of the Tower of Babel should be the difference between the two. But is this duration found in any of the ancient writings?

We have found four ancient witnesses from widely disparate cultures that agree within their error ranges that the duration from the founding of Babel until the Dispersion was about 42 years. This quadruply-attested seventeenth duration is the key that ties the other 12 precise durations together. The resulting triangulation, 2191+42=2233, confirms both dates.

Now we will review these foundational durations in detail.

The Root of Chaldean Astronomy: Vernal Equinox, 2233 BC

Four precise durations from widely different sources place the founding of Babel within a year of 2233 BC.

Duration 1: Callisthenes, 1,903 Years from Babel to Alexander

Porphyry and Simplicius were two of the later teachers at Aristotle's school of philosophy in Athens. They each recorded the tradition that Aristotle's friend Callisthenes, who was part of Alexander's retinue, gained access to a library of astronomical observations in Babylon and had attempted to send a copy of them to Aristotle. Unfortunately, the full copy never arrived in Athens, but the summary of its contents had been related in previous letters.

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Rawlinson (1873, 149, 158) states:

> Simplicius relates…that Callisthenes, the friend of Alexander, sent to Aristotle from Babylon a series of stellar observations made in that city, which reached back 1903 years before the conquest of the place by Alexander.

Adding 1,903 to 331/330 BC gives 2234/2233 BC for the beginning of stellar observations in Babylon. This date is based on exceptionally strong evidence because: first, it is from a date, which is universally accepted; and second, it is precise—1,903 years of stellar observations contained on daily tiles; and third, this duration has two witnesses, being recorded by both Porphyry and Simplicius.

In the past, scholars have argued this cannot be valid, because according to Ptolemy, in his time (AD 200) the records of astronomical observations from Babylon only went back to 747 BC, the Era of Nabonassar. Ptolemy lived after the great fire of the Library of Alexandria caused by the invasion of Caesar Augustus. The fact that Ptolemy in Egypt did not have the complete set of Babylonian observations centuries later in a different civilization does not prove that such a set never existed in Babylon when Alexander arrived there. The next duration from Epigenes confirms this record was correct.

Duration 2: Pliny—Epigenes, 720,000 [Days] from Babel to Berossus

> Epigenes, a most important author, teaches that among the Babylonians observations about the movements of the stars have been preserved on baked clay tablets for 720,000 years. Berossus and Kritodemos, however, give a shorter period, 490,000 years. Nevertheless, even with this disagreement, it is apparent that the knowledge of writing is very very ancient. (Pliny 1847, Book 7, Ch. 56) (Verbrugghe 1996, 66)

Though the copies sent to Aristotle by Callisthenes never arrived in Athens, two generations later Berossus (278 BC) and Epigenes (~200 BC) seem to have had access to the originals in Babylon. Though it is uncertain exactly when Epigenes lived, he claimed to have been trained by the Chaldean priests (Cumont 1912, 33), which would require that he studied in Babylon. Therefore he was probably reporting on the same tradition used by Berossus, and possibly the very works of Berossus.

Interpreting the 720,000 years as days, this converts to 1,971 Julian years, 3 months and 1 day. However, it appears to be a rounded number, and has a potential error range of ± 500 days. Seven hundred twenty thousand also happens to be 200 saroi (plural of saros). We postulate that the term "*saros*" meaning 3,600, was used to represent a decade of 3,600 days as well as a larger epoch of 3,600 years, depending on the context. Therefore the translation of 200 saroi to mean "720,000 years" is understood to be in error. The intended period was 200 decades of 360-day years.

Since Berossus dedicated his writings to Antiochus Theos (Ussher 2003, 364, §2826) it is reasonably assumed that the accession of Theos in 262/261 BC is the starting date. Adding 1,971 Julian years takes us back to 2233/2232 BC, with an error of ± 1.4 years. This also confirms the 1,903 year duration of Callisthenes.

Duration 3: Babylon built 1,002 years before Semiramis II

> Philo-Byblius, according to Stephen, made Babylon to have been built 1002 years before Semiramis, whom he considered contemporary with, or a little anterior to, the Trojan War. (Rawlinson 1873, Vol. 1, 189)

Philo of Byblos was a pagan chronicler who lived in the time of Hadrian early in the second century. He translated the writings from the temples at Byblos of the Phoenician historian Sanchonathion, into Greek. He was heavily quoted by Eusebius, through whom his work has been partially preserved.

Scholars will object that the only Semiramis thus far attested by archaeology was Shamurammat, the wife of Shamshi Adad V, who came to the throne of Assyria in 824 BC.

However, the chroniclers identify two earlier women by this name, whom we designate as Semiramis I and Semiramis II. They are distinguished from one another by the times in which they lived.

Semiramis II is attested by the historians Ctesias, Berossus, Herodotus, Philo of Byblos, and Diodorus, and several more including Justin (Justinus 1853, Book I.4–11).

Diodorus conflated Semiramis I and II as if they were one person, not two, and embellished her achievements to legendary status. However, Berossus and Ctesias had direct access to the Babylonian and Persian archives, making their twofold witness highly credible.

A fragment of Cephalion preserved by Eusebius states that the daughter of Belochus II ruled "on her own" for 17 years, implying she had a co-regency with her father (Schoene 1876, 65). We identify Belochus II in Cephalion's list as the same person referred to as Assyrian Belus by Berossus, who was Shalmaneser I. His son Tukulti Ninurta I came to the throne around 1232 BC, according to the Assyrian King List. He defeated King Kashtiliash, conquered and rebuilt Babylon, and also campaigned to Anatolia, Urartu, and Arabia.

The deeds attributed to Semiramis II include defeating the Arab Dynasty of Babylon, invading Urartu, Anatolia, and India, building the walls of

Babylon, and being the child of the Assyrian Belus, Shalmaneser I.

Tukulti Ninurta was a child of Shalmaneser I, invaded Urartu, defeated the Kuti hordes, conquered Babylon, defeated a Kassite king named Kashtiliash, and rebuilt the walls of Babylon. Thus, Tukulti Ninurta is attested by archaeology as having done the very same things that Semiramis II was said to have done by the chroniclers. And his reign began in the same year that the chroniclers date the fall of Babylon to Semiramis II.

We see two possible explanations for the relationship between Semiramis II and Tukulti Ninurta. Either they were siblings, or Tukulti Ninurta I was a woman ruling as a trans man. That is to say, Tukulti Ninurta "himself" may have been the second woman called Semiramis by the chroniclers.

It appears that in the Second Millennium before Christ the office of kingship was universally considered a male office. In the very few cases of women ruling, they ruled as a king not a queen. Examples of this include Semiramis I and Nitocris, for whom we find male names in the king lists. This tradition was followed in part by Hatshepsut, who wore a fake beard, and continued in some form all the way down to Cleopatra, who also wore a fake beard when sitting on the throne.

We accept the historicity of Semiramis II as having conquered and rebuilt Babylon in 1232 BC, and known to archaeology as Tukulti Ninurta I.

Berossus the Babylonian priest and historian dates the First Assyrian Dynasty of Babylon to the conquest of that city by Semiramis (II). While the Assyrians did not maintain control of Babylon continuously after the death of Tukulti Ninurta, they continued to exert influence over Babylon, sometimes ruling it directly, until the death of Sargon II in 705 BC. Thus the First Assyrian Dynasty of Babylon as Berossus called it, began and ended with an Assyrian king literally ruling from the throne of Babylon, but not so much in between.

Herodotus (Book I, §95) places Semiramis II 520 years before the Assyrian revolt. He identifies this revolt as occurring in the reign of Deioces the Mede, who became king around 712 BC and revolted against Assyria in the year that Sargon II was killed. Herodotus also gives the reigns of Median kings until the accession of Cyrus II in 560 as 152 years (Book I, §102–150).

560 BC, accession of Cyrus; plus,
152 years to Deioces; plus,
520 years to Semiramis II; gives:
1232 BC for Semiramis II

Confirming Herodotus, Russell and Wheeler (1865, 364) notes, "Appian says that the Assyrians, Medes, and Persians successively ruled Asia 900 years. Proem. c. 9. But the Persian Empire ended with the death of the last Darius, B.C. 330, from which, counting backwards, 900 years, we get the commencement of the Assyrian dominion, B.C. 1230, as before." This duration appears to be a rounded number, therefore the error could be ± 50 years or ± 5 years depending on how much rounding.

Accepting 1232 BC for the Fall of Babylon to Semiramis II/Tukulti Ninurta I, and returning to the 1,002-year duration we find:

1232 BC for Semiramis II; plus,
1,002 years to the founding of Babylon; gives:
2234 BC ±5 years, Babylon founded

Duration 4: The Co-reign of Yâo and Shun. 2277–2247 BC

In the interest of being thorough, we must consider the Chinese records which can help to bracket the time frame of Babel, even if they do not directly mention that event. The Shu King informs us of the reign of the Emperor Yâo, who began to reign the year after the Flood (Legge 1879, 34–36). Chinese scholars have never interpreted Yâo's flood as the global Flood, but evidence shows that it was. Yâo reigned 70 years before being asked to resign by his descendants. Prior to his resignation, his final 30 years of reign was a co-regency with a young man named Shun. Shun reportedly mourned for three years after Yâo died or stepped down, but continued to serve as ruler over the Chinese people for 50 years after the deposition of Yâo (Legge 1899, 41–42).

The Chinese records place the era called the Kali-Yuga, also used by the Persians and Indians, as beginning in 3104 BC, though the Hindus placed it at 3102 and the Persians in 3103. The Flood was said by Confucius to have occurred in the seven hundred and fifty-sixth year of the Kali-Yuga, which would be 2348 BC (Hamilton 1820, 316). Therefore, the deposition of Yâo occurred 101 years later in 2247 BC, which was the year of Peleg's birth in Ussher's chronology.

Shun's successor, Yu, became the first emperor of the Xia Dynasty in 2197 BC. Using the chronology of Liu Xin (d. AD 23) the Xia Dynasty lasted 441 years, followed by the Shang Dynasty for 644 years, which in turn was followed by the Western Zhou Dynasty for 336 years until the eclipse of 776 BC. More recent Chinese scholarship adds about nine years to these durations, pushing the Flood back to 2357 BC.

The Chinese data is not as neat as the other durations because we have to sum durations for three dynasties and two rulers, resulting in an error of ± 5 years. But it places the deposing of Noah 101 years after the Flood, which also seems to agree with the Masoretic Text (MT) date for "the earth was divided" in the year of Peleg's birth. While later scholars

assumed that he died, this duration suggests that Noah retired from ruling no later than the division of the land in 2247 BC. This can be taken as evidence that the rebellion against Noah had become public by that time.

The firm date for Yu, the first emperor of the Xia Dynasty, gives us an estimated terminus for the Babel rebellion of 2197 BC. Thus we would expect from the Chinese data that the period of the construction of Babel until Dispersion began no earlier than 2247 BC and ended not much later than 2197 BC.

Duration 5: Embolismal Period: 1,486 years

The Chaldeans had two calendars: a religious calendar based on the phases of the moon, similar to the Hebrew calendar, and a civil calendar with 12 ideal months of 30 days, with which debts were calculated. The civil calendar began with the vernal equinox, while the religious calendar began with the month closest to the autumnal equinox.

The Chaldeans divided the day into 24 hours of 60 minutes, and it is from them that we have received our current system of marking time.

There are 1,440 minutes in one day. To the Chaldeans the idea of 1,440 years, or a divine day, was a sacred division of time over which their civil calendar was designed to be intercalated. Similar to the later Roman calendar, the Babylonian civil calendar had 12 ideal months of 30 days, thus not actual lunations. In order to keep the civil year in sync with the solar year, an "intercalary" month was inserted every six years and every 120 years. Thus the calendar had 12 cycles of 120 years.

The older name for an intercalary month was an "embolismal" month. Scaliger and Cullimore called this sacred Chaldean era of 1,440 years an "Embolismal period" (Cullimore 1833a) which has continued to be used in the calendar of ancient Persia down to the current time in Iran.

Several creationists have pointed out the possibility that the length of the year prior to the Flood was 360 days, and the month, 30 days, (Cooper 2009; Morris 2005); while others argue against it (Faulkner 2012).

As unlikely as that theory may sound, there is a plethora of evidence that the most ancient civilizations on earth, Egypt, Sumeria, Assyria, as well as the Olmecs, and Andeans, considered the ideal year to be 360 days, and the ideal month to be 30 days. The SEC and the world banking system still use the 360-day year to compute interest today (SEC 2021).

After the Flood, the ancients were greatly concerned with understanding the new motions of the heavens. Gobekli-Tepe in Turkey is the oldest observatory yet found and is evidence of the obsession with the heavenly measurement of time at the earliest period of post-Flood humanity.

In the new world, the angle of the sun was the governor of the biological seasons. However, the earliest Chaldeans and Egyptians appear to have had it firmly fixed in their hearts that the year should be 12 months of 30 days. As they attempted to solve the problem of keeping the months in sync with the tropical year, the Chaldeans used leap months instead of leap days. The proper terminology is an intercalary or embolismal month.

Multiplying the 1,440 minutes in a day times 360 days gives 518,400 minutes in a year. The same number of days is 144 saroi, or 1,440 pre-Flood years of 360 days. Thus anyone who loves math can see why the Babylonians thought 1,440 years to be a special era.

The intercalation of the synodic month with the tropical solar year is such a complicated problem that five different civilizations attempted it and gave up on the effort in the span of 2,000 years. All five of them eventually switched to a civil solar calendar with artificial months and only used lunations for religious festivals. These were Egypt, Chaldea, Persia, the Mayans, and Rome, of which we are the heirs. Our civil calendar today still has 12 artificial months in the solar year, and we still determine the date of Easter by the new moon.

The oldest Chaldean civil calendar was the source of the old Persian calendar, which has been preserved for us by the Achaemenid records and continues to be used in Iran today. It originally had 12 months of 30 days, with a thirteenth month added every six years to keep the months in sync with the seasons.

Unlike the Babylonian lunar calendar in which the first month was Tishri near the autumn equinox, the first month of the civil calendar was intended to begin with the vernal equinox.

The intercalary month every sixth year only added five days per year, not 5.24219 days that would be needed to maintain the position of the equinoxes in the tropical year.

To correct for this, another 30-day intercalary month was added every 120 years. But this assumed a tropical year length of 365.25 days, as did the later Egyptian and Julian calendars. After 12 of these 120-year cycles, the intercalary months added should, in theory, bring the first 30-day month of the civil calendar back to vernal equinox, had their estimate of the length of the year not been too long by 11.2464 minutes per year.

So, now we have 1,440 years of 360 days, with 1,440/6=240 intercalary months of 30 days, and 1,440/120=12 additional embolismal months of 30 days, for a total of 7,560 extra days added to keep the Babylonian civil months in sync with the equinoxes. This calendar had a total of 525,960 days in 1,440 years. However, 1,400 tropical years would have only 525,948.75 days. Thus at the end of the divine day

of 1,440 tropical years, the Babylonian clock would be 11.2464 days slow. Curiously, this number of days is the same as the number of minutes by which the Babylonian calendar was too long each year.

This method of intercalation has the same ratio as the Julian calendar correction, of 1 leap day in 4 years, and therefore had the same error as the Julian calendar, being 11.2464 minutes longer than the true tropical year. Just as the Julian calendar caused the equinoxes to recede against the months, the old Chaldean civil calendar did the same. At the end of 1,440 years, the first day of the first civil month would fall 11 days after the vernal equinox, instead of being in conjunction with it.

The question was, how to fix it? If you can only add or omit intercalary 30-day months, then how would you correct the calendar which was now 11¼ days slow? Each additional year that you wait to make the correction sees the error grow by another 11.2464 minutes.

The intercalary month adds 5 days per year in a block of 30 days every sixth year, and an extra intercalary month every 120 years. This means that each year prior to the one hundred twentieth is 0.24219 days short, making the clock a quarter of a day fast per year.

If we divide the number of days we are slow, 11.2464, by 0.24219 days fast per year, we get 46.43 years for the errors to cancel each other out. Therefore, if we delay the new cycle by 46 years, during which we continue the normal intercalations every sixth year, then in year 1486 of the original cycle we will be only 2.5 hours slow for the vernal equinox, which was close enough to serve their purpose. But we will still be four years into a six-year cycle, so the first month of the civil year would still be 20 days before the vernal equinox.

If they had simply waited two more years, 1,488 years is four Gregoriana cycles of 372 years, during which eclipses and new moons fall on the same day of the week and solar year. Thus, they could have started a new civil calendar cycle on the new moon on the vernal equinox in 745 BC, just as they had in 2233 BC, but perhaps their astronomy wasn't good enough to realize that. Or perhaps, since the civil calendar was concerned with debt and taxes, not religious festivals, they were more concerned about alignment of the 30-day civil month than they were about starting a new cycle on a conjunction of the new moon with the vernal equinox. At any rate, they seem to have chosen to wait 46 years and then reset the calendar on the equinox as the solution.

If Brahe was correct, the Era of Nabonassar appears to have been instituted as a reform similar to the Gregorian calendar. Counting back from the vernal equinox of 747 BC, a period of 1,440+46 years, leads to the vernal equinox of 2233 BC. Our guess is that Nabonassar added an intercalary 20 days after the twelfth month and began the civil month of the new embolismic period on the vernal equinox of 747 BC without regard to the new moon.

The calendar reform necessitated the counting of years from the Era of Nabonassar, with older dates requiring a different calendar to calculate. This 20-day adjustment was probably the source of the angst that led to the legend of Nabonassar erasing the records of all the kings who came before him. Brahe's finding suggests the intent was not to erase history but to realign the civil calendar to the solar year.

Brahe calculated that the new moon was conjunct with the vernal equinox on the Julian date of April 9, 2233 BC. This would be the date on which the civil and lunar calendars were in sync and the date they both began. This evidence is precise and can be calculated by any astronomer, as we have done below using the program SkyMapPro 12 (fig. 1). Since the old civil year began with the month of Tishrei at the time of the autumnal equinox, then the civil year in which the observations began ran from September of 2234 to the end of August, 2233 BC.

Brahe calculated that the cycle intercalated with the first day of the first civil month in conjunction with the vernal equinox at Babylon in 747 BC, 1,486 years (the embolismal period) later. He designated these dates as starting the Era of the Chaldeans and the Era of Nabonassar (Cullimore 1833a, 167, 180).

This calendar continued to be used for taxation and debts through the Parthian and Sassanid Persian Empires. Yazdegerd III, the last king of Sassanid Persia, began his reign in AD 632, which was said to be the fifty-ninth year of the twelfth cycle of the Persian calendar. (11 × 120) + 59 = 1,378 years. 747 BC – 1378 – 1=AD 632. And this means the Era of Nabonassar, assuming they had corrected the drift with leap days instead of leap months, would have

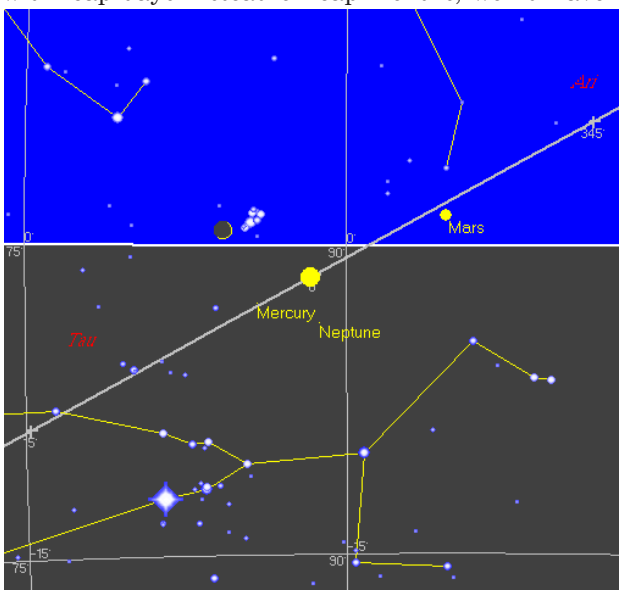

Fig. 1. Dawn of vernal equinox, April 9, 2233 BC viewed from Gobeklitepe. Created by author using SkyMapPro.

ended 61 years later in AD 693. Thus it is possible to calculate back to 747 BC as the origin of the calendar period from Yazdegerd, and back another cycle from Nabonassar to the founding of Babel using the same civil calendar of 30-day months.

The Sassanids and later the Muslims changed the system to use intercalary days instead of intercalary months for the simple reason that in 1,440 years it is impossible to correct the 11.24-day error using only intercalary months of 30 days. This calendar with modifications continues to be used today as the civil calendar of Iran.

These calendrical and astronomical calculations are an independent source which confirms 2233 BC as the "root of Chaldean astronomy" (Cullimore 1833a).

We have thus far listed four independent sources that together demonstrate that the root of the Chaldean astronomical observations began in 2233 BC, give or take a year. While three of the sources come from historical records, Brahe's work stands as a fourth completely independent and repeatable astronomical calculation that correlates the Era of Nabonassar in 747 BC with the Era of the Chaldeans beginning in 2233 BC.

The question remains as to why the Chaldeans would have begun their astronomical observations on this date. Which historical event is it related to? Based on the three other historical durations, the ritual founding of Babel or its associated temple seems the likely answer.

Summary of Durations to Babel

We have five historical durations to the era of Babel: two vague and three specific, dated from the Greek, Babylonian, Phoenecian, and Chinese civilizations, which place it in the year 2234/2333 BC. In addition to these five witnesses, we have both a historical era, the Persian civil calendar which can be counted back to the Era of Nabonassar, and back one more cycle with the 46-year correction to the founding of the system in 2233 BC. And that is in turn confirmed by an astronomical calculation to the new moon in the vernal equinox on the Julian date of April 9, 2233 BC (fig. 2).

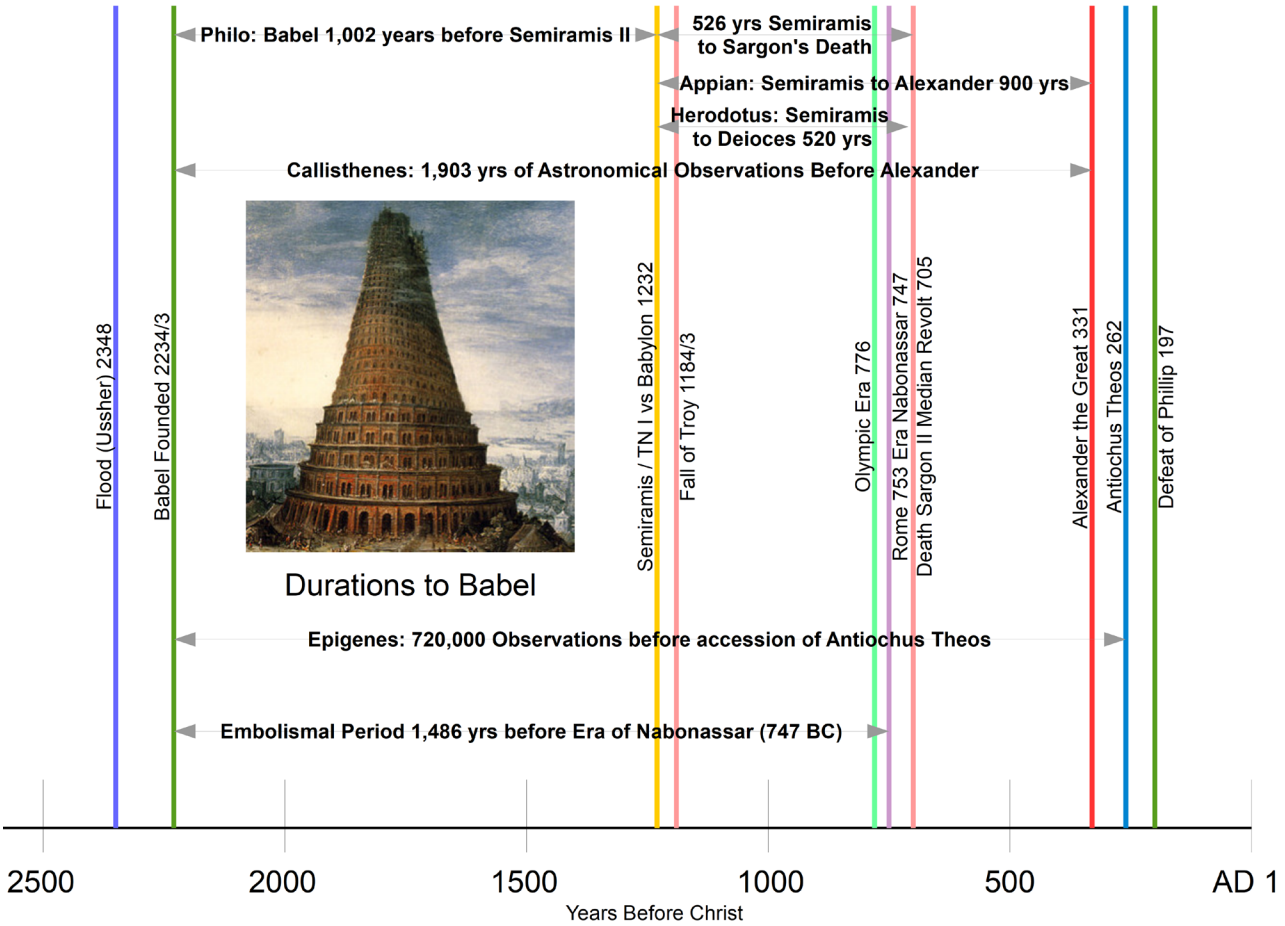

Fig. 2. Durations to Babel. Image adapted from https://www.alamy.com/the-tower-of-babel-hebrew-migdal-bavel-arabic-burj-babil-according-to-the-book-of-genesis-was-an-enormous-tower-built-in-the-plain-of-shinar-hebrew-according-to-the-biblical-account-a-united-humanity-of-the-generations-following-the-great-flood-speaking-a-single-language-and-migrating-from-the-east-came-to-the-land-of-shinar-where-they-resolved-to-build-a-city-with-a-tower-with-its-top-in-the-heavenslest-we-be-scattered-abroad-upon-the-face-of-the-earth-god-came-down-to-see-what-they-did-and-said-they-are-one-people-and-have-one-language-and-no-image344248251. html?irclickid=3plwrNyXHxyNRoZz-83rXzE6UkAxRVTa32ofU40&utm_source=77643&utm_campaign=Shop%20Royalty%20Free%20 at%20Alamy&utm_medium=impact&irgwc=1.

Speaking of the 1,903-year duration to Babel, Hare quotes Niebuhr, the father of modern historiography, "on the authority of Berosus . . . he concludes that the taking of Babylon by the Medes about 1900 years before Alexander is a fact no less certain than that of Rome by the Gauls [in 390 BC]" (Hare 1832, 39).

The Median Dynasty of Babylon recorded for us by Berossus and Polyhistor is not believed by modern scholars to have ever existed. It is so discredited that we cannot even find any papers about it in the past century. However, we shall reexamine that question in the CFAH-5, "The Babylonian Dynasties of Berossus." For now we can say that the Median Dynasty of Babylon, as per Berossus, began with the Dispersion, and thus would be dated by the next set of durations. This suggests that Niebuhr misunderstood the 1,903-year duration to refer to the Dispersion, when it actually refers to the founding of Babel.

The Dispersion: 2192/2191 BC

The following durations are given to the founding of the ancient kingdoms immediately after the Dispersion from Babel after the confusion of tongues. We find the chroniclers converge on 2191 BC for Assyria and the Egyptian Monarchy, but they converge on 2188 BC for the founding of the temples of the first Egyptian cities (fig. 3).

Duration 6: Aemilius Sura, 1,995 Years from Ninus to Defeat of Philip and Antiochus

Aemilius Sura, via Velleius Paterculus, states that Ninus founded Assyria 1,995 years before Rome conquered Philip, King of Macedonia, which occurred in 197 BC (Shipley 1924, 15). This gives the date for the founding of Assyria as 2192 BC with an error of six months.

Assumptions:

1. 197 BC is the end of the 1,995 years: Quoting Paterculus (Hodges 1876, 67):

> They were succeeded by the Medes, then by the Persians, then by the Macedonians and shortly afterwards by two kings Philip and Antiochus, of Macedonian origin, who, not long after the destruction of Carthage, were conquered by the Romans, who then obtained the empire of the world. To this time, from the beginning of the reign of Ninus, king of the Assyrians, who first obtained the empire, there has elapsed a period of 1995 years.

Philip and Antiochus were defeated in 197 BC and 190 BC respectively. The year 197 BC is shortly after the subjection of Carthage to Rome in 202 BC. Rome obtained the world empire in 197 BC, since that is when the alliance between Carthage and Macedonia was broken.

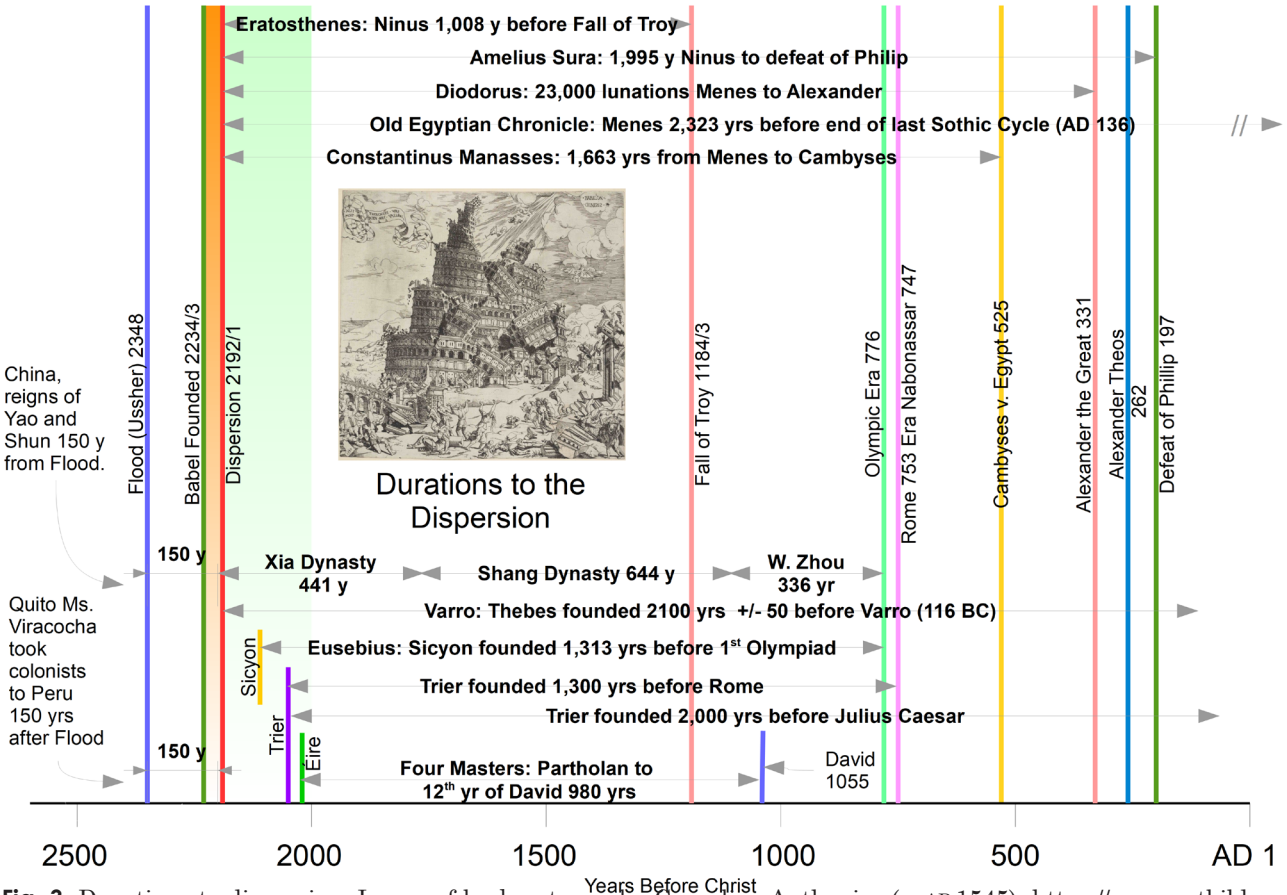

Fig. 3. Durations to dispersion. Image of broken tower by Cornelius Anthonisz (c. AD 1545). https://www.artbible.info/art/large/619.html.

2. Ninus is Nimrod: The Bible states that Nimrod built Nineveh, (Genesis 10:8–11) and the ancient chronicles say Ninus built Nineveh. "Berossus states that Ninus, or Nimrod, using the words interchangeably, was the first king of Nineveh, and thus shows that, in his day, but one person was understood under these separate names" (Buckingham 1851, 40–41).
3. Based upon its triangulation with the next two durations to be given, this source appears to be accurate and independent. Since the 1,995-year duration triangulates with 2234/2233 BC via the 42-year duration for the building of the Tower of Babel, this suggests that accurate sources must have been available in Rome around the time of Christ.

Objection: Ninus omitted from Assyrian King List

While Ctesias gave a list of Assyrian kings going back to Ninus, the founder of Nineveh, the Assyrian King List goes back to "kings who lived in tents," beginning with Tudiya and his son Adamu. These two names are also found in the ancient German king lists, as Teutsch and Herrman, which have the same meaning as Adam. These appear to represent Shem and his son Asshur.

Thus, Ctesias traces the ruling king of Assyria back to the Dispersion, but the Assyrians themselves traced their ancestors back to Asshur and Shem. Their ancestor kings lived in tents, while Nimrod and his successors ruled in the oldest cities of Assyria and Akkad.

Duration 7: Diodorus, 23,000 Lunations from Menes to Alexander

Diodorus (2004, Book I, Ch. II., 29) learned from the priests of Thebes that "From Osiris and Isis to the reign of Alexander the Great…the Egyptians priests reckon above ten thousand years, or (as some write) little less than three-and-twenty thousand years."

Multiplying 23,000 by the 29.53 days in a synodic month and dividing by 365.25 days gives 1,859.52 Julian years. Adding this to Alexander's conquest of Babylon in 331 BC yields 2190 BC. However, if counting from his conquest of Egypt in 332, it gives 2191 BC.

Several Egyptian sources list the "reign of the gods" prior to Menes, the first real king of Egypt, whom Eusebius identified as Mizraim. Eratosthenes listed kings from Menes onward; thus the start of the Theban era matches the founding of Egypt by Menes. This measurement appears to be a rounded number with an error of 500 lunations, or 40 years. However, as seen by the supporting durations, it may be rounded to the nearest 10 lunations, reducing the error to five months, or it could even be an exact duration.

Duration 8: From Menes to the Fall of Troy: 1,008 years

Eratosthenes, the Chief Librarian of the Great Library of Alexandria and the first recorded scholar to calculate the circumference of the earth, kept a list of 38 consecutive Theban rulers and their reigns (Manetho 1964). Dicaearchus informs us that Phruron, or "Nilus," the thirty-seventh king in the list, reigned at the time of the Trojan War, though his chronology for Menes diverges (Ladynin 2018, 10–11). Summing these reigns gives 1,008 years back from the end of the Trojan war to the first year of Menes.

One thousand and eight years prior to the accepted date for the Fall of Troy (1184/1183) yields 2192/2191 BC for the founding of Egypt. This date is three years earlier than the other durations given for the founding of Thebes. If it was intended to signify the same year, 2188 BC, then 3/1008 yields 0.3% error, which is within the acceptable range. Therefore this date can be said to triangulate with the other durations that yield 2188 BC.

However, we believe that this duration was intended to refer to the year of the Dispersion in which Menes founded the Egyptian monarchy. In CFAH-6, we will see that the Book of Sothis also appears to equate the beginning of the reign of Menes with the Dispersion (Manetho 1964, 237). If that was the intent, then this duration is precise to the year.

The Founding of Egypt: 2189/2188 BC

We have four durations and one astronomical calculation that place the foundation of Egypt in either 2188 BC or 2191 BC. The four durations correspond to four different events: the Fall of Troy, the Battle of Pelusium, Alexander's conquest of Egypt, and the marriage of Solomon. This is particularly useful because these events synchronize four different civilizations with Egypt: Troy, Persia, Greece, and ancient Israel. A fifth duration is rounded to the century and agrees with the other four, within its 50-year error range.

However, only one of the durations fulfills all the criteria for a strong triangulation. The others are not as strongly sourced. Despite the weaker quality of three of our durations, the fact that four durations from different sources and different historical events give very nearly the same date for the founding of Egypt is a strong argument for their authenticity and accuracy.

Duration 9: From Thebes to Cambyses was 1,663 years

Constantinus Manasses wrote that the Egyptian state lasted 1,663 years until Cambyses' conquest (Ussher 2003, 22, §50). Cambyses' conquest of

Egypt is well established to have occurred in the year 526/525 BC; therefore, this duration sets the foundation of the Egyptian state at 2189 BC/2188 BC.

Manasses lived in Alexandria, Egypt, and compiled his chronicle in the twelfth century AD. His source confirms the other two precisely, which suggests that accurate data was available to him, possibly from knowledge preserved in the Library of Alexandria.

Duration 10: Menes built Memphis above (or more than) 1,300 years before Solomon's Marriage

Josephus records that Menes preceded Solomon by 1,300 years (Josephus [1737] 1987 v1, b8, c6, 258). This is a rounded duration, so it could be 1,300–1,350 years.

> Now Solomon the King was at this time engaged in building these cities. But if any enquire why all the Kings of Egypt, from Menes, who built Memphis, and was many years earlier than our fore-father Abraham, until Solomon, where the interval was more than one thousand three hundred years, were called Pharaohs, and took it from one Pharaoh that lived after the Kings of that interval, I think it necessary to inform them of it: and this in order to cure their ignorance, and to make the occasion of that name manifest.

The date of Solomon's reign is not an anchor point, though we have high and low estimates from chronologies based on Scripture. The Ussher-Jones chronology places Solomon from 1015 BC to 975 BC. Assuming he married the Egyptian princess at the start of his reign, the wedding took place around 1015 BC. Going back 1,300 years gives 2365 to 2315 BC, which is a century and a half higher than the other dates we have for Menes.

Josephus used an earlier variant of the Septuagint (LXX) chronology and appears to have used a long chronology for the period of Judges in the same book a chapter earlier. Cullimore states that Josephus added 111 years to the chronology of the Judges as the "times of servitude" (Cullimore 1833b, 394). Adjusting the duration downward by 111 years brings it to 2254 BC–2204 BC. This is not a strong or precise duration due to the adjustment, but it generally agrees with the other sources within 50 years, and it ties Egypt to Israel with an extra-biblical duration.

However, there is a more precise fit. Josephus did not specify which event in the life of Menes preceded a specific event in the life of Solomon by 1,300 years. If we measure from the birth of Menes to the birth of Solomon, this duration comes out quite close in the Ussher-Jones chronology of the Bible. Mizraim, being listed as the second son of Ham born after the Flood, would be expected to have been born within two decades of the Flood.

Solomon, being a man when his father died and having been the second child of David and Bathsheba, his date of birth can be pinpointed in the Ussher-Jones chronology to between 1033 BC and 1030 BC. If we count 1,300 years before 1030 BC, we arrive at 2330 BC for the birth of Mizraim/Menes. This was 18 years after the Flood. Given that this duration is rounded to the century, we can see that it is accurate enough according to the Ussher-Jones chronology. However, interpreting it as birth to birth does not give us a date for the foundation of Egypt as a nation.

Duration 11: Thebes founded 2,100 years before Varro

Varro was a Roman scholar and librarian who lived from 116 BC until 27 BC. He is believed to have authored 74 books, of which only one has survived. In his book about agriculture, *de Rustica*, Book III, he states that Thebes, the oldest of Greek cities, was founded 2,100 years before his time (Williams 1789, 538).

Varro began *de Rustica* at the age of 80 in 36 BC, and therefore was born in 116 BC. As 2100 is rounded to the century, this would place the founding of Thebes within 50 years of 2216 BC, 2266 BC–2166 BC, bracketing the dates given by the other durations.

The Greeks record that Thebes in Greece was founded by Cadmus, son of Agenor of Tyre. Cadmus is alleged to have brought Phoenician writing to Greece. He is also said to have named Thebes after Thebes in Egypt, which was founded by his father, Agenor. This suggests that Thebes in Greece may have been an Egyptian colony, or at least may have had a temple and priests that came from Thebes in Egypt. We have seen other instances of a college of priests transplanted to a new colony, counting their own origins back to the founding of the mother city.

Whether Varro's 2,100 years correctly refers to the founding of Greek Thebes or Egyptian Thebes, it triangulates within its error range with the other durations for the founding of the nations after the Dispersion.

Duration 12: Astronomical era of Menes started 2188 BC

Menes was the name given by Manetho to the father and founder of Egypt. The Bible calls him Mizraim.

In 1833, Isaac Cullimore, an early member of the Royal Society for Egyptology, wrote a remarkable paper on Sothic dating in which he interpreted an obscure document preserved by Syncellus to encode the year that Egypt was founded and Menes began to reign (Cullimore 1833b). We will endeavor to reproduce his reasoning and results here.

The source document is called the Old Egyptian Chronicle (OEC), which Syncellus attributed to Manetho, though it is considered "Pseudo-Manetho" (Manetho 1964, 227–230). However, it is the primary source for the existence of the Sothic cycle. Therefore, despite calling it "Pseudo-Manetho," modern scholarship owes their Sothic dating system entirely to this source.

The system described consists of the reigns of the gods and demigods, which add up to 34,201 years, followed by the reigns of the kings, beginning with Menes, which add another 2,324 years for a total of 36,525.

We have three other incomplete versions of this document, which are the recensions of Manetho preserved by Eusebius, Syncellus via Africanus, and the *Excerpta Latina Barbari*. Of the four sources, only the OEC preserved by Syncellus appears to have a nearly complete set of the original numbers, including the full set for the reigns of the gods and a total of 36,525 years at the end, although the list itself falls 127 years short of the stated total, suggesting a copying error (table 1).

Syncellus also summarized the stated purpose of this document (Manetho 1964, Ap. III, 233):

> The sum total of all the 30 Dynasties comprises 36,525 years. If this total is broken up, or divided, 25 times into periods of 1461 years, it reveals the periodic return of the Zodiac which is commonly referred to in Egyptian and Greek books, that is, its revolution from one point back to that same point again, namely, the first minute of the first degree of the equinoctial sign of the Zodiac, the Ram as it is called by them, according to the account given in *The General Discourses of Hermês* and in the *Cyranides*.

Dividing 36,525 by 360 degrees informs us that the Egyptians had idealized the rate of precession as one degree in 101.45 years. It also suggests that like the Chinese, the Egyptians had probably subdivided the zodiac into 25 smaller asterisms, each of which would take one Sothic cycle of 1,461 years, had they correctly calculated the rate of precession.

Cullimore pointed out that 34,201 years of the reigns of the gods prior to Menes represent an intercalation similar to our Julian day. Syncellus, Eusebius, and other Christian chronologists interpreted the cycle as going back to the Egyptian date for Creation, and then they butchered its numbers trying to make them fit the LXX duration from Creation. But, like the Mayan Long Count and the Julian day, that was never its intended purpose.

The Egyptians, at some point after the end of the Middle Kingdom, upgraded their original 360-day calendar and began using a calendar of 365 days (Manetho 1964, 99, 241). This was called the "erratic year" because the solar year and fixed stars moved against it by one quarter of a day per year. Dividing ¼ into 365.25 gives 1461 erratic years which pass during 1,460 Julian years, in which the heliacal rising of the star Sirius completes one full revolution through the Egyptian calendar.

In the Julian and Gregorian calendars, we recognize a period called the Metonic cycle, in which nearly exactly 235 synodic months occur in 19 tropical years. Thus every 19 years, the new moons and eclipses will occur on the same days of the Julian year.

There is a similar lunar cycle for the Egyptian erratic year of 365 days. Exactly 309 lunations occur every 25 erratic years. There was also a cycle of 8,652 lunations in 700 erratic years that Cullimore called the "Lunar Canicular cycle." Though, due to insufficient precision in this calendar, the lunar month would be seven days fast by the end of that period.

Table 1. Egyptian Hermaic cycle 25×1,461 years.

Dynasty/God	Manetho—Eusebius	Manetho—Syncellus	Latina Barbari	Old Egyptian Chronology
Hephaestos		9,000		30,000
Cronos + 12		2,985	1,550	3,984
Demi-gods		214	2,100	217
Subtotal	**24,900**	**12,199**		**34,201**
Kings 1	1,817	2,300		443
Kings 2	1,790	2,121		1703 (in 15 dyn)
Kings 3	350	1,050		
Kings 4	5,813			
Kings 5	1,255			
Subtotal Kings	**11,000**	**5,741**		**2,146**
Total from Text	**35,925**	**17,940**		**36,347**
Total Given in Text	**35,900**			**36,525**

The Hermaic cycle, as Cullimore called it, intercalates the 1,461 erratic years of the Sothic cycle with the 25-year cycle of lunar eclipses by multiplying them to get 36,525. And, curiously, it has the same ratio of 52 lunar canicular cycles to the supercycle as the solar year has weeks.

Cullimore's hypothesis was that by listing the reigns of the gods prior to Menes as 34,201 years, the author of this system was giving us a date within his supercycle for the beginning of the Egyptian state. The figure 34,201 represents 23 complete Sothic periods, and 598 years of the 24th, leaving 2,324 erratic years until the end of the supercycle, which would also be the end of the twenty-fifth Sothic period. If we knew when the end of a Sothic cycle was, we could calculate that date.

Censorinus (238, 33) recorded the date of the dedication of his book on his patron's birthday in AD 239 in multiple eras including year of Rome, Olympiad, and the Sothic year. He said the Sothic year had reset 100 years earlier on the twelfth of August, when the heliacal rising of Sirius occurred on the first day of Thoth, which was the Egyptian new year. Since the erratic year takes four years to move one degree against the stars, Sirius would rise on Thoth 1 four years in a row.

The first of these years, AD 136, is considered to be the start of a new Sothic cycle, using July 20 rather than August 12 as given by Censorinus (Cullimore 1833b; Luft 2006, 312; O'Mara 2003, 25). We reproduced this using SkyMapPro in fig. 4, showing the heliacal rising of Sirius at 5 am, July 20th, AD 136 in Thebes was the first year of the new cycle.

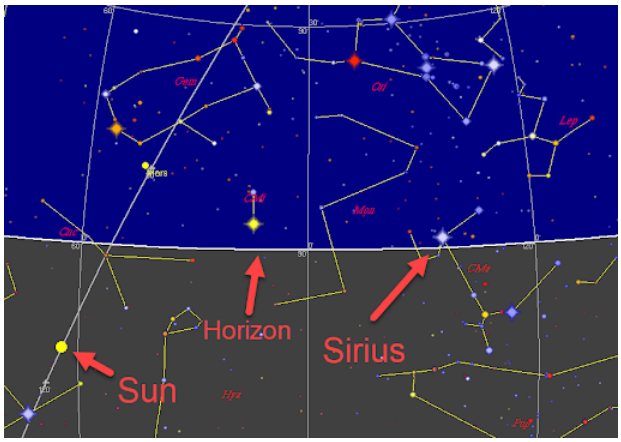

Fig. 4. Thebes, Egypt: Heliacal Rising of Sirius at 5 am, July 20th, AD 136. Created by author using SkyMapPro.

To convert erratic years to Julian years, we multiply by 365/365.25; thus 2,324+1 erratic years is 2,323.4 Julian years. Counting back that number from July 20, AD 136 takes us to March of 2188 BC for the reign of Menes. This triangulates with durations 8, 9, 10, and 11 above, confirming all four as correct. (See the Appendix for discussion of objections to this duration.)

Summary of Durations to the Dispersion

We have three exact durations placing the Dispersion in 2191 BC, one from Assyria and two from Egypt, confirming that the Egyptian monarchy began in the year that Babel was scattered.

We have another set of three durations to the founding of Egyptian temples or cities in 2189/2188 BC, however, only one of them is precise. Confirming this date, we have the astronomical confirmation from the Old Egyptian Chronicle that Menes began to reign 2,324 years before the terminus of the 36,525-year Hermaic cycle, which appears to have ended, according to Censorinus as adjusted by Luft, in AD 136.

Other Nations Founded

In addition to the precise durations to Babel and the Dispersion, we have durations to the founding of six other ancient nations.

Duration 13: The Reign of Yu of China: 2197 BC

Chinese records state the lengths of the first three dynasties prior to the solar eclipse of 776 BC as:

441 years, Xia Dynasty
644 years, Shang Dynasty
336 years, Western Zhou Dynasty; gives:
776 BC, solar eclipse; gives:
2197 BC

Summing these and adding to 776 BC gives 2197 BC for the founding of the Xia Dynasty by Yu, the successor of Shun, with an error of ±3 years. The 50-year reign of Shun, and 100-year reign of Yâo, take us back to the Flood, which is dated by the Chinese to the seven hundred and fifty-seventh year of the Kali-Yuga Era, which was dated 3104 BC by Chinese calculations in the nineteenth century. Therefore, this date for the founding of China triangulates from two directions. This suggests that the Chinese tribes may have begun organizing as a separate group a few years prior to the Dispersion.

The reign of Yu, the first Xia emperor who succeeded Shun, is sometimes given as nine years higher. Chinese scholars, therefore, place his reign in 2205 BC. The extra nine years is probably a co-reign with his predecessor. We find 1997 BC to be the best fit for the start of his sole reign.

Duration 14: The Founding of Sicyon: 2089 or 2076 BC

Ussher cites Eusebius saying that Egialeas founded Sicyon 1,313 years before the first Olympiad, giving 2089 BC (Ussher 2003, §55).

Castor of Rhodes gives a slightly different duration.

He recorded that Sicyon was founded by Aegialus 962 years before the fifteenth year after the return of the Hericlidae to Greece. However, Castor misdated the Fall of Troy to 1209 BC, as reflected in the Parian Chronicle (Rotstein 2016, Ch. 2, §3.24).

The Hericlidae are known to have returned 80 years after the Fall of Troy. Therefore, 1209 – 80 – 15 gives 1114 BC as the terminus for this duration and 2076 BC for the date of its founding, a difference of only 13 years.

Some scholars interpret Aegialus as Elisha, son of Javan, because Greece was called Hellas after him for many centuries. This is about 100 years later than the oldest nations. But it demonstrates that the era of founding nations was more than 2,000 years before Christ.

Duration 15: The Founding of Trier, Germany: 2053 BC

The city of Trier claims to be the oldest city in Europe, founded about 2053 BC. According to the Gesta Treverorum, the city was founded by Trebeta, a son of Ninus prior to Ninus' marriage to Semiramis I. After Ninus died c. 2068 BC, when Semiramis took over the Kingdom, Trebeta left Assyria and went to Europe.

Hoeh states (1967, Ch. 19):

> "The inhabitants of Trier maintain that their city is the oldest in all Europe," writes Josef K.L. Bihl in his textbook "In deutschen Landen", p. 69. "Trier was founded," he continues, "by Trebeta, a son of the famous Assyrian King Ninus. In fact, one finds . . . in Trier the inscription reading, 'Trier existed for 1300 years before Rome was rebuilt.'"

753 BC + 1300 years = 2053 BC. Another source (Dornberg 1997) suggests 2,000 years before Caesar. 79/60 BC + 2,000 years = 2079/2060 BC.

Hoeh (1969, Ch. 1) suggests that the German chronicles, based on Tumair's writings, state that Tuisto left for Europe 153 (131+24) years after the Flood in 2193 BC. This falls within a year and a half of the other durations to the Dispersion in 2192/1 BC.

None of this information seems to be supported by more than one witness. Nevertheless, one record is better than none, and thus may be used until contradictory records or synchronisms appear.

Duration 16: The Colonization of Ireland: 2035 BC

Three ancient Irish sources, all of which precede Bishop Ussher, nearly agree with one another but differ somewhat for the date of founding of the country by Partholan. They generally agree that Partholan colonized Ireland about three centuries after the Flood.

The *Annals of Clonmacnoise* place Partholan's arrival in the first year of Semiramis, 313 years after the Flood, but date his occupation of Ireland from the twelfth year of Semiramis, and the invasion of Milead in the twelfth year of King David (Murphy 1896).

According to the *Annals of the Four Masters*, from the first year of Partholan's reign in Ireland to the invasion of Milead was 980 years (Ryan 2002).

The Book of Invasions dates the arrival of the Milesians as 440 years after the Exodus, (Macalister 1941), which gives 1051 BC, the fourth year of David, if they used Ussher's date for the Exodus.

Using the Ussher-Jones dates for the Flood (2348 BC), the Exodus (1491 BC), and the accession of King David (1055 BC), the first year of Partholan's occupation of Ireland, 12 years after his arrival, would be 2023 BC, from which the 980 years were counted to Milead in 1043 BC, and the first year of Semiramis I would be 2035 BC. Due to having three sources that do not precisely agree, this calculation has an error of about ±5 years.

The difference between Partholan's arrival 313 years after the Flood and his occupation 12 years later may mean that he spent a little over decade exploring the land and living in tents until breaking ground on his first settlement in 2023 BC.

Duration 17: The Colonization of Peru: 2198/7 BC

Fernando Montesinos was a Spaniard who collected the songs and legends of the Indians of Peru and Ecuador in the sixteenth century. His record of these legends is called the *Quito Manuscript*. In it, he records the Peruvian oral tradition of their ancestors being led by Noah, called Viracocha, to colonize Peru in the distant past (Hylands 2010, 121):

> This is collection of the poems and ancient songs of the Indians, and it is according to what great authors say, that one hundred and fifty years after the deluge, there were so many people who grew and multiplied in those lands of Armenia, that seeing the Patriarch Noah so much number of people, moved by the urgent need and divine plan that the men of God had to fill the world, he commanded his children and grandchildren to go with his families to look for land to populate; and there is no lack of those who say that the Patriarcha himself Noah went to show and distribute the land, and that he gave back to everyone.

One hundred and fifty years after Ussher's date for the Deluge is 2198 ±5 years. This comes within seven years of the other durations for the Dispersion. Both the Chinese and Peruvians date their first kingdom to 150 years after the Flood, while the other precisely triangulated dates fall around 2192/1 BC. It seems possible that some of the Semitic tribes may have departed from Babel about seven years before the confusion of tongues definitively ended the project.

Duration 18: The Founding of India

According to the Hindu traditions the world was

divided after the Flood, and the Indian ancestors were given their portion. After 150 years of ruling themselves, a foreigner named Pradyato usurped the throne and established his own dynasty over them (Hamilton 1820, 124). They date the usurpation of Pradyato to the one thousandth year or year 1002 of the Kali Yuga depending on the source (Hamilton 1820, 123,126,153). The Kali Yuga was 3,725 years before the Hijirah of Mohammed in AD 622 (Hales 1830, 197), therefore, 3104 BC. However, Indian calculations from the Middle Ages dated the Kali Yuga two years later in 3102 BC.

Using the astronomically corrected date for the Kali Yuga, the usurpation of Pradyato occurred in 2104 BC, and the division of the earth 150 years before that, in 2254 BC. However this is a slight oversimplification of the raw Hindu durations which favor a date one or two years later.

In our fifth paper (CFAH-5), we will examine other evidence that the division of the earth into territories for inheritance by Noah and his sons was a seven-year process which began in 2254 BC and was completed in 2247 BC, the year of Peleg's birth.

Summary of Founding Other Nations

While 12 precise durations confirm 2191 BC for the Dispersion and 2188 BC for the founding of Egypt, we find six other nations giving dates clustered within 160 years of this date, with China's Xia Dynasty beginning six years earlier and Ireland being founded 156 years later.

Era of the Tower of Babel : 2233–2191 BC

Having found several durations that give a date for the founding of Babel or Chaldean astronomy in 2233 BC and several others that point to the Dispersion around 2191 BC, a single duration that ties these two events together in time would provide a triangulation, confirming both dates. We have found four ancient sources for this duration, and they are generally in agreement (fig. 5).

Duration 19: The Construction of the Tower of Babel

Three clear statements from the ancient chronicles and one monumental inscription that is centuries older than the chronicles agree that the duration of the

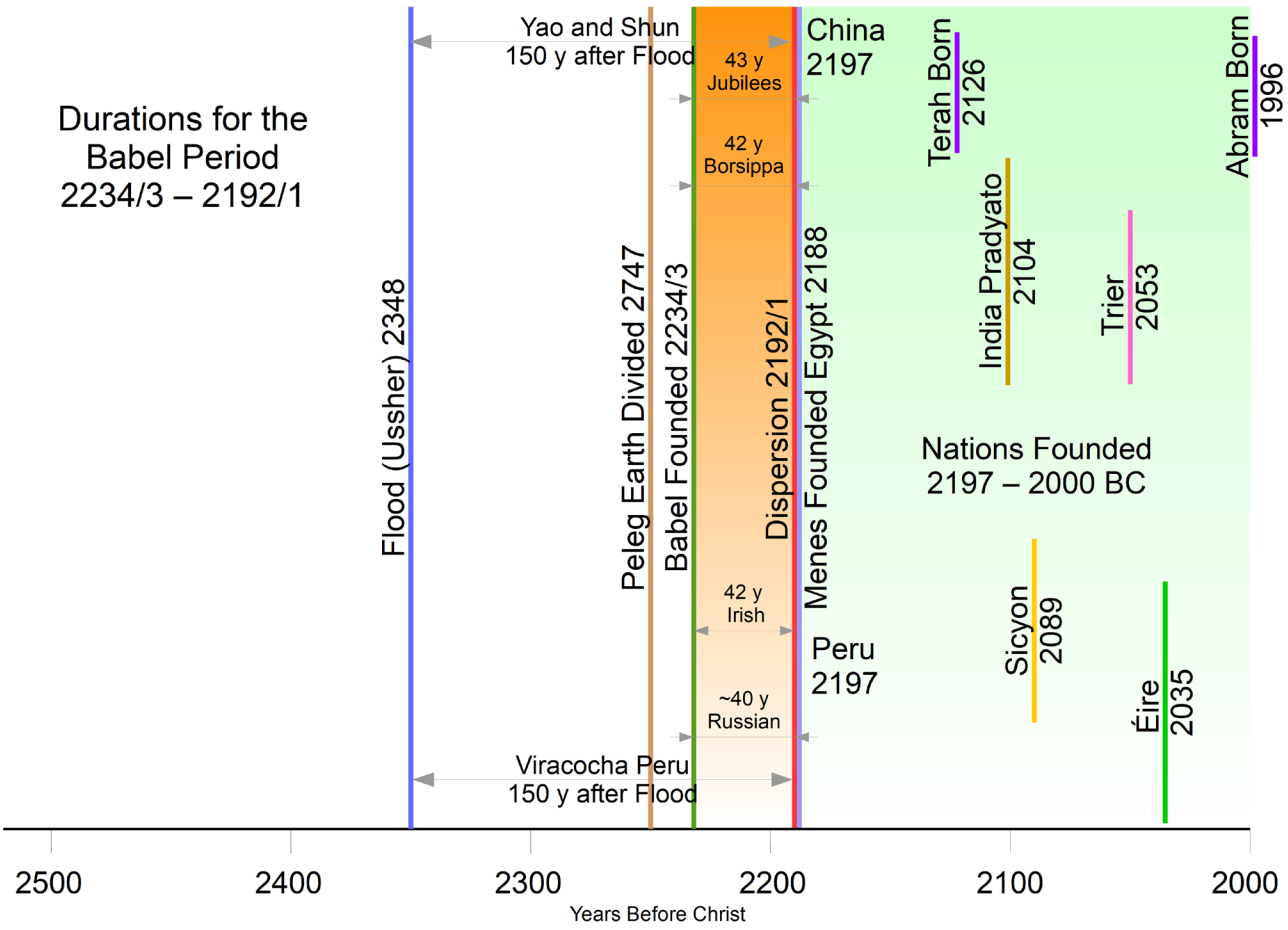

Fig. 5. The Era of Babel and Founding of Nations.

construction of the Tower of Babel was about 42 years.
1. In the *Book of Jubilees,* the earliest manuscript of which dates from the second century BC, the following information confirms the above dates: "And they built it [Babel]: forty and three years…were they building it;…" (Charles 1913, Chapter 10: 21) then the Dispersion occurred.
2. In the Irish *Book of Invasions*, construction of the Tower of Babel is mentioned, then it states that after 42 years, Ninus came to rule the world (Macalister 1941, §13). Not only does this independently confirm the 43 years of the *Book of Jubilees*, but it also confirms that Ninus started his reign as sole-rex immediately after the Dispersion.
3. The *Russian Primary Chronicle* states, "Thus they gathered together in the plain of Shinar to build the tower and the city of Babylon round about it. But they wrought upon the tower for forty years, and it was unfinished" (Cross and Sherbowitz-Wetzor 1953, 52).
4. Nebuchadnezzar left a dedicatory inscription in Borsippa (fig. 6) which "is now certainly identified with the Temple of Nebo at Borsippa….This temple of the 'Seven Lights of the Earth' was rebuilt by Nebuchadnezzar…"(Jeffery 1869, 116). "The dedicatory inscription of that king [Nebuchadnezzar], lately discovered among the ruins, contains the following passage, as deciphered by Oppert: 'A former king built it, they reckon forty-two ages, but he did not complete its head.…Since a remote time…" (Jeffery 1869, 116, 117). The 42 years or ages to build seems likely to refer to the Tower of Babel since it was not completed and was the most ancient (Jones 2004, 3).

Of the four witnesses, the Borsippa Inscription, if it were accurately translated, is by far the strongest due to its proximity in space and time, as well as being an original inscription rather than a copy of a copy.

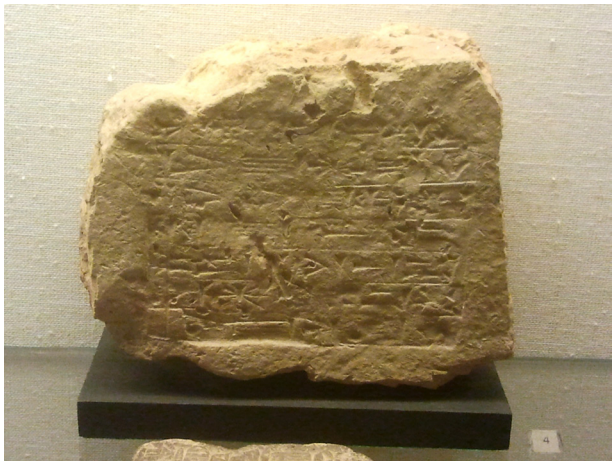

Fig. 6. Borsippa inscription. Hannay, "Nebuchadnezzar II Inscription," https://commons.wikimedia.org/wikipedia/commons/7/74/Nebuchadnezzar_II_inscription.jpg.

Furthermore, the Borsippa Inscription was found in situ on the foundation stone of the larger tower that Nebuchadnezzar built around an older tower. Though it was 1,600 years removed from the event, this is a region that maintained written records of history and astronomy for the entire duration of the time in between. As shown above, these records were still extant three centuries later, when Alexander conquered Babylon.

Translators differ on whether the text reads "ages" or "cubits" (Rawlinson 1861, 30,31). Rawlinson, who discovered the dedicatory tablets, gave "42 ages" as his initial translation but later changed his mind and gave the translation as cubits. Oppert and Loftus supported the translation as ages as well.

Some scholars have also questioned whether Borsippa was even in the right location for the Tower of Babel. We find that there is a strong case that the original Babel may have been located in upper Mesopotamia (Habermehl 2011). Regardless of whether Nebuchadnezzar correctly identified the Tower of Babel or not, his inscription appears to record the tradition that they spent 42 years building it. Given the other three supporting durations, we accept Oppert's translation.

The *Book of Jubilees* dates to the second century and therefore represents a pre-Roman Jewish tradition, only four centuries younger than the Borsippa Inscription. The difference between the Hebrew and the Babylonian durations can be explained by the use of different calendar periods. Since these durations aren't identical, it suggests two independent witnesses.

The origins of the Irish and Russian sources are not as obvious. Both come from medieval manuscripts compiled from much older sources. The monastery of Clonmacnoise was founded in the sixth century and had 3,000 scholars and scribes who preserved much of the literature from the earlier Roman period, even though Ireland was never under Roman rule. Due to the similar figures, one might suppose that the Irish source for the duration of Babel was based on *Jubilees*. However, it is not believed that there were any surviving copies of *Jubilees* in Greek or Latin in Europe after the sixth century. The only copies known to remain were the Ge'ez texts in Ethiopia.

Invasions is believed to be a tenth or eleventh century composition of Irish poems of traditional folklore. However, *Invasions* includes precise information about the reign of Semiramis I that agrees with Egyptian and Babylonian records but is unknown from any other sources. This suggests that *Invasions* contains an authentic independent record.

The Russian source appears rounded to the nearest decade and could therefore be derived from either the *Jubilees* or the Irish tradition. However, the Russian

source also tells the story of the division of the earth after the Flood and differs from the *Jubilees* tradition as to the lands given as an inheritance to the patriarchs.

The Russian Primary Chronicle is largely based on *The Chronicle of John Malalas*, a sixth century chronicler from Antioch. Malalas is one of the extractors of Manetho, whose work has been mostly preserved, although any section about the Tower of Babel, if there ever was one, has not survived. The 40-year figure given in the *Russian Primary Chronicle* may have originated from a passage of Manetho that has not been preserved elsewhere but was transmitted to Russia through the work of Malalas in the early Byzantine Era.

Even if we dismiss the three unprovenanced sources, we are left with *Jubilees* as a Seleucid Era tradition that the Era of Babel lasted 43 years. Substantial historical theories have been based on far less evidence.

Yet, in their agreement, we appear to have four independent ancient witnesses that the Tower of Babel was built in about 42 years. With no contradictory evidence from the ancient chroniclers, we accept this as an accurate record. The 42-year duration for the construction of the Tower of Babel triangulates with the other dates to confirm that the city and tower were started in 2234/2233 BC (2192/2191 BC + 42) when Babel was founded and astronomical records started to be recorded.

Noah and his family must have been making precise astronomical observations for over a century prior to the founding of Babel in order to be able to predict the coincidence of the new moon and vernal equinox of 2233 BC. The Chinese Shu King records that Yâo set up four observatories immediately after the Flood to find the equinoctial points.

Apparent Conflicting Durations Cited by Scholars

There are six conflicting durations recorded by various chroniclers, ancient inscriptions, and a medieval chronologist.

1. The Dispersion in the Fifth year of Peleg

Ussher has been cited by some scholars (White 1872, 129) as supporting the year of Peleg's birth in 2247 BC, as the year of the Dispersion, while others cite him as supporting the fifth year of Peleg's life in 2242 BC (Hodge 2010). In the *Annals*, section 49, for the year 2247 BC, which includes the citation of Syncellus, Ussher distances himself from this conclusion by saying "according to Syncellus." Syncellus promoted the LXX chronology, which Ussher viewed as the false paradigm he needed to disprove.

A close reading of his comments suggests that his view was that the Babel project began around 2234 BC/2233 BC. *Annals* section 50, for the year 2234 BC discusses Nimrod in that section. Those who cite Ussher as dating the Dispersion to 2247 BC have overstated the case.

Ussher cites *The Book of Sothis*, which states: "the Dispersion took place in the 34th year of the rule of Arphaxad and the 5th year of Phalec" (Manetho 2004, 239). Parallel sentence structure suggests that "the fifth year **[of the rule]** of Phalec" was what the author meant.

There are several reasons to accept the interpretation that this duration refers to the rule of both Arphaxad and Peleg over their clans rather than their ages. If both durations refer to ruling over a clan, then Arphaxad began to rule his clan at age 150 and Peleg at age 51.

It seems likely that the people organized as tribes and clans during the Babel era. Thus, Arphaxad would have been one of the oldest tribal leaders, while Peleg would have been one of the youngest ones. The *Book of Jubilees* and the rule of Yu beginning in 2197 BC also support this notion.

2. Asshurbanipal Monument—1,635 years

George Rawlinson uses the 1,635-year duration given on an Assyrian monument as the start of the Second Dynasty of Babylon. "Assyrian monuments… inform us, first, that there was a conquest of Babylon by a Susianian monarch 1635 years before the capture of Susa by Asshur-bani-pal, the son of Esarhaddon,…Susa was taken by Asshur-bani-pal probably in B.C. 651; and 1635 years before this is B.C. 2286…" (Rawlinson 1873, 151).

The 1,635-year duration is not credible, at least as years, for the following reasons:

a. *The Text is Questionable and Inconsistent*: Jones states it is recorded as 1,535 years (Jones 2004, 54); in another place, it is suggested that the second digit is questionable. George Smith states: "There is one serious objection to this idea. Although the date B.C. 2280 appears to be given in the inscription of Assurbanipal for the ravages of Kudur-nanhundi, yet the other mutilated notices of the Elamite monarch are combined with names of Babylonian monarchs who do not appear to be anything like so ancient" (Smith 1876, 188–190).

This is a reference to Kutir-Nakhkhunte, one of three Elamite kings by that name who ruled between 1200 BC and 680 BC according to the conventional chronology. Assuming the reference is to Khudur Nakhhunte I, who preceded Ashurbanipal by about 530 years, we find that 1635/530 = 3.08, which suggests that this duration was denominated in quadrimestrals (Censorinus 238, 25) of four lunations (118 days) rather than years. The quadrimestral is discussed in greater detail in CFAH-5. 1635/3.095 = 528.27 years.

b. *Unsupported by other Durations*: The 1,635-year duration is not supported by any other duration given by the ancient chroniclers. Only a mistaken interpretation and arbitrary assignment by Rawlinson (1873, 151) leads him to believe that 2286BC is supported by Berossus' Babylonian dynasties.
c. *Does Not Fit*: It does not triangulate with any other durations, but conflicts with numerous triangulations.

We find similar problems with several other Assyrian durations. It is enough to make us wonder if the Assyrians sometimes used a different unit of time, such as the quadrimestral, mistranslated as years.

3. Manetho—3,555 years

Johannes von Gumpach (1857, 6) asserted that some chronologists based their dating of Menes on the 3,555 years given in Manetho. In the "Old Egyptian Chronicle" Syncellus summarized Manetho's chronology thus: "For in his three books, 113 generations are recorded in 30 Dynasties, and the time which he assigns amounts in all to 3,555 years, beginning with Anno mundi 1586 and ending with 5147 [5141], or some 15 years before the conquest of the world by Alexander of Macedon" (Manetho 1964, 233).

This cannot be used as a credible duration for the following reasons:
a. The key phrase is "reigned *altogether*." The 30 dynasties include overlapping reigns and overlapping generations. The 3,555 years is probably a sum of reigns, not a duration. This would be like saying the governors of the 50 American states ruled together for 7,500 years.
b. It conflicts with ancient chroniclers who suggest that Egypt was founded by Menes about 2188BC, yet it doesn't triangulate with any other duration.
c. The resulting date 3898BC (343+3,555 years) places Menes over 1,000 years before the Flood, which, assuming a global Flood, is impossible even using the longest LXX chronology.

4. Nabonidus—3,200 years

In an inscription of Nabonidus there is a chronological note: "the foundation stone of Naram-Sin, which no king before me had found for 3,200 years—[this] Shamash the great Lord of E-barra…showed to me.…If we accept this, we are carried back to 3750 for the date of Naram-Sin" (Rogers 1900, 318).

Since Naram Sin is near the end of the Sumerian King List, extending this reasoning, the Sumerian King List would extend back to about 4500BC (556BC+3,200 years to Naram Sin+700 years to Gasir of Kish=4456BC). No biblical or secular chronologist seriously considers this an accurate duration. It is rejected for the following reasons:

- It contradicts durations given by the ancient chroniclers.
- It is not supported by any triangulations from durations of the ancient chroniclers.
- It appears to be doubtful, even to conventional chronologists.
- It does not fit, so do not use it.

Our study of the older parts of the Sumerian king list finds that the reigns are multiplied by 36 for some cities and 3.3 for others. This duration seems to be using the multiple of 3.3, indicating a unit of 110 days. Later in this series, our paper CFAH-5 on the dynasties of Berossus and the Sumerian king list will show that Naram Sin of Akkad reigned about 1,000 years before Nabonidus. 3200/3.3=970.

5. Nabonidus—700 years

"In an inscription of Nabonidus occurs this statement with reference to one of the early kings: 'The name of Hammurabi, one of the old kings, who seven hundred years before Burnaburiash had built E-barra and the temple pyramids on the old foundations, I saw therein and read.' Like the preceding notice, this, also, is of doubtful application and therefore of doubtful weight…" (Rogers 1900, 317).

We reject this duration for the same reasons given for the 3,200-year duration. Hammurabi seems to have predated Burnaburiash II by only 450 years, even in the conventional chronology. Our coming papers on Berossus and Babylon find that Hammurabi died a little more than a century before the reign of Burnaburiash II. The 700-year duration seems to be multiplied by 6, indicating that the unit was probably the bimestral (60 days).

6. Villani—Tower of Babel built in 107 years

An Italian chronologist, Giovanni Villani, wrote his *Nuova Chronica* in the fourteenth century. He relates that the Tower of Babel "was begun 700 years after the Flood, and there were 2,354 years from the beginning of the world to the confusion of the Tower of Babel. And we find that they were 107 years working at it; and men lived long in those times" (Villani 1906, 3–4).

While Villani's numbers appear to support the LXX chronology, as a "chronologist" rather than a "chronicler," his duration doesn't meet our requirements, and we know of no other supporting durations. It seems likely that 107 years is a calculation.

7. Dicaearchus—2,500 years from Horus to the Fall of Troy

Dicaearchus, a protege of Aristotle, records in *The Life of Hellas* (Ladynin 2018, 10–11):

> [A]fter Oros, the son of Isis and Osiris, Sesonchosis became king. From Sesonchosis to the kingship of Nilus was 2500 years,…from the capture of Ilium to the first Olympiad was 436 years, altogether 2943 years.

The first question we must answer is, who was Sesonchosis? At first glance it appears that Sesonchosis is a reference to Menes, who reigned immediately after the gods in Manetho's work. However, Dicaearchus lived two generations prior to Manetho.

A different recension of the text helps to see who Sesonchosis is. From *Codex Parisinus 2727*:

> Dicaearchus says that Sesostris became king after Oros, son of Osiris and Isis so that there were 2500 years from the kingship of Sesostris to (the kingship) of Nilus, from the kingship of Nilus to the first Olympiad 436 years, so that the total is 2936 years.

Ladynin argues that Dicaearchus chose this name because he intended to portray Alexander the Great as the new Sesostris. The Greeks considered Sesostris III to be the greatest conqueror of antiquity, prior to Alexander. But Dicaearchus seems to have combined the features of Senusret I and Senusret III into one person and coined the name Sesonchosis (Ladynin 2018, 10–11).

776; the first Olympiad; plus,
2936; years to Sesonchosis, gives:
3712 BC for Senusret I or III

The year 3712 BC is nearly 1,800 years older than the longest conventional chronology for Senusret I (1971 BC). This duration does not triangulate with any other, but we can explain its probable origin in our third paper, CFAH-3. For now, we will just set it aside as a puzzle piece that does not fit in anybody's chronology.

Conclusions

The set of durations we have found in the ancient chroniclers agree within very close tolerances and tie the dates for the founding of Babel, the Dispersion from Babel, and the founding of Egypt to ten well-dated events (table 2).

The fact that many different sources dating from ten different events and from several different ancient nations agree so closely with each other indicates that we have a strong witness to the true dates for Babel, the Dispersion, and the founding of the nations.

Ancient Chroniclers Spoke Consistently

Table 2 shows the consistency between the ancient chroniclers from eleven independent national backgrounds: Babylon, Phoenicia, Egypt, Assyria, Sicily, Greece, Rome, Judea, Persia, Ireland, and Russia. Their credible durations form many connecting paths between known dates (Nebuchadnezzar, Cyrus, and Alexander) back to the

Table 2. Consensus of dates from extra-biblical sources.

Event	Duration	Date BC	Source
Root of Babylonian Astronomy	1,903 years of observations to Alexander (330 BC)	2234/2233	Callisthenes
Root of Babylonian Astronomy	720,000 days of observations to Antiochus Theos	2233/2232	Berossus
Embolismal Period	1,440 + 46 years prior to the reform of Nabonassar in 747 BC	2233	Tycho Brahe, Joseph Scaliger
Babylon Founded	1,002 years before Semiramis II	2234/2233	Philo of Byblos
Dispersion	1,995 years from Ninus to the defeat of Philip & Antiochus	2192/2191	Aemilius Sura
Founding of Egyptian Monarchy	1,008 years from Menes to Fall of Troy	2192/2191	Eratosthenes
Founding of Thebes	23,000 lunations from Thebes to Alexander	2188/2187	Diodorus
Astronomical Era of Menes	2,324 years before end of Hermaic Cycle in AD 136	February 21, 2188	Manetho, via Syncellus, interpreted by Cullimore
Founding of Thebes	1,663 years from Thebes to Cambyses	2188	Constantinus Manassas
Founding of Thebes	2,100 years	2186–2136	Varro
Chinese Xia Dynasty	1,421 years before 776 BC eclipse	2197	Liu Xin
Duration of Babel	43 years	2234–2191	*Book of Jubilees*
Duration of Babel	42 years	2233–2191	Nebuchadnezzar
Duration of Babel	42 years	2233–2191	*Irish Book of Invasions*
Duration of Babel	40 years	2231 ± 5 years	*Russian Primary Chronicle*

founding of Babel, the Dispersion, and, as we will show in paper CFAH-4, the Flood.

Accurate Data was Available

Based on the consistency of the results, it is reasonable to conclude that quite a few of the ancient chroniclers had access to accurate source data which enabled them to precisely calculate durations from past ancient events to key events near their time. Even the ridiculously large numbers, such as 720,000 years, appear upon closer examination to be accurate day counts based on real data.

Ussher's Biblical Chronology

We have tried to allow the ancient extra-biblical evidence to tell its own story. As will be shown in CFAH-4 on the Flood, there is a plethora of evidence in the ancient chroniclers that triangulates 2348/2347 BC as the date of the Flood, affirming Ussher's overall interpretation and the chronology of the Masoretic Text.

We believe the best explanation of the evidence given by the ancient chroniclers is that Noah made the final territorial division of the inheritance of the earth to his sons around the time of Peleg's birth in 2247 BC, thus "in his days the land (*eretz*) was divided" (Genesis 10:25). This implies the intent that the sons would disperse to settle their own territories.

Cush and Nimrod apparently desired to build an advanced society, which required centralization of the population in order to enjoy the specialization from division of labor. "Come, let us build ourselves a city, and a tower whose top is in the heavens; let us make a name for ourselves, lest we be scattered abroad over the face of the whole earth." While the rebellion against Noah and his three sons appears to have come into the open no later than 2247 BC, the city or tower of Babel was formally founded on the vernal equinox of 2233 BC. The Babel rebellion lasted 42 years until the enterprise was frustrated by the confusion of tongues in 2191 BC, resulting in the Dispersion.

Though Nimrod is credited in Genesis as "beginning his kingdom" with Babel, ancient records indicate that he did so as co-rex under the rule of his father, Cush, who is remembered as Bel Marduk. After the Dispersion, Nimrod used Assyria as his capital, from which he imposed some form of rule on several of the surrounding nations, despite the language barrier. We will examine more detailed evidence of this in papers CFAH-5 and CFAH-6.

The three year difference we find between the Dispersion and the founding of Thebes is most likely explained by the length of time it took to travel with women, children, animals, and livestock from Babel to the region of Upper Egypt.

Though the monarchy of Menes began in 2191 BC, the founding of the first capital at Thinis in upper Egypt appears to have been three years later in 2188 BC.

Anchor Points

For reference in future papers in this series, we will begin our table of computed anchor points with the triangulations found in this paper (table 3).

Ancient Chronology of the Nations is Connected

When solving a puzzle, it is always helpful to begin with the edges and find the outer boundaries of the problem. The chronologies of Egypt, Babylon, and other second millennium civilizations are smaller puzzles inside the larger one. Since the Flood, founding of Babel, and the Dispersion were important dates to every nation, we find that many of them measured durations from these events.

The key dates above, combined with other records, will allow us to find the proper historical placement for numerous events in ancient history, which in turn allow us to find synchronisms and also to make sense out of many anachronisms.

We now have boundary parameters for Egyptian history from its founding in 2188 BC to the conquest of Cambyses in 525 BC; for Babylon from its founding in 2233 BC down to Alexander's conquest in 331 BC, and for Assyria from the founding of Nineveh in 2191 BC down to the destruction of Nineveh by the Medes in 612 BC.

By accurately finding the beginnings of the histories of Babel, Egypt, and Assyria first, we are much more likely to have success in placing the dynasties known from ancient annals in their proper places.

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Table 3. Anchor points of ancient history found in this paper.

#	Event	Year BC	Sources
AP-1	Babel Founded	2234/2233	Callisthenes, Berossus, Brahe, Scaliger, Philo Biblius
AP-2	Dispersion	2192/2191	Aemilius Sura, Eratosthenes
AP-3	Egyptian Cities Founded	2189/2188	Diodorus, Manetho, Cullimore, Constantinus Manassas, Varro
AP-4	Chinese Xia Dyn.	2197	Liu Xin

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Appendix—Sothic Dating

Possible Objections to This Duration

Some readers will object that the 2,324 years of reigns from Menes end with Alexander's conquest in 332 BC, and therefore Menes must have begun to reign in 2656 BC, not 2187 BC. But that misses the point of what the author of the *Old Egyptian Chronicle* (OEC) was doing.

Syncellus, a Byzantine monk, despised the writings of both Berossus and Manetho as pagan propaganda, but he preserved their histories for us. He relates (Manetho 1964, 15):

> Manetho of Sebennytos, chief priest of the accursed temples of Egypt, who lived later than Berossos in the time of Ptolemy Philadelphus, writes to this Ptolemy, with the same utterance of lies as Berossos, concerning six dynasties or six gods who never existed…But one must rather say that it is a ludicrous falsehood which they have tried to pit against the Truth.

Berossus had arranged his Greek history of Babylon to appear to last 36,000 years from the Flood to Cyrus, as the Babylonians estimated precession at 1 degree per century. The Egyptian priests no doubt felt pressure to show their educated sovereign and sponsor of the Great Library, Ptolemy Philadelphus, that their own culture was older, more astronomically advanced, and more glorious than that of Babylon. Thus, the author of the OEC outdid Berossus by showing Egypt to be 525 years older than Babylon while using a similar method of encoding real durations as large numbers and using the current calendar of Egypt.

Unlike Berossus, who appears to have composed his 36,000-year historical framework from scratch, Cullimore (1833b, 396) shows evidence that Manetho had inherited this zodiacal system from an Egyptian priest remembered as Hermes Trismegistus, who had invented it around 1550 BC, a few decades after Sesostris III established the Egyptian astronomical college. While Berossus had the freedom to compose his entire scheme, Manetho had to work with one that already existed and had been maintained and appended by the priests for over a thousand years.

Manetho also inherited the Egyptian dynasties, as the Palermo Stone and Turin Canon show the divisions of dynasties had already been made more than a millennium before his era.

Therefore, the challenge was to compose a system more impressive than that of Berossus using data from the historical lists and encoding the zodiacal year of the Hermaic cycle. To do that, Manetho needed to add the 468 remaining years of the last Sothic cycle, even though they had not yet occurred.

As we will explore in CFAH-6, the first 14 dynasties of Manetho cover the same period from the Dispersion to the Exodus multiple times over, as several of these dynasties ruled in parallel. There were also parallel dynasties in the later period of 15–30, however, these had already been published in some form prior to the reign of Ptolemy Philadelphus, as evidenced by Dicearchus' citations of them. Whichever priest composed the OEC truncated the years from Dynasties 2–15 in order to accommodate the accepted number of years in the later dynasties to Alexander, making sure the total would give 36,525. Thus we see the paradox that the OEC truncates reigns before the Sixteenth Dynasty, but adds extra years to the time between the sixteenth and thirtieth in order to fill out a complete Hermaic cycle.

Despite his being a member of the Royal Society, Cullimore's papers on Egyptian chronology fell into obscurity for 170 years until manuscripts became available on the internet. We have not found any scholarly treatments of his thesis since his time.

Several creationists have written books and papers critical of Sothic dating, (Courville 1971; Mackey 2003; Mitchell 2010; Olaussen 2009; Stewart 2003) which make some good points. However, they tend to throw the baby out with the bathwater by denying the Sothic cycle existed *at all*. Attempts to "absolutely" date rulers in the Twelfth and Eighteenth Dynasties based on a single reference to the date of the heliacal rising of Sirius are problematic, but for different reasons than any of the cited papers give.

The Sothic cycle fits 1,461 years of 365 days into 1,460 Julian years of 365.25 days. However, just like the Julian year, this was long by about 11.25 minutes per year, which resulted in the drift of the equinoxes and risings of the stars against the calendar, just as occurred with the Julian calendar. Thus, Sirius could be expected to arrive early by $11.25 \times 1460/1440 = 11.4$ days for each Sothic cycle that had elapsed. Censorinus recorded that 1 Thoth fell on the August 12 100 years before his time. Modern scholars "corrected" him by showing the heliacal rising of Sirius on July 20, AD 136.

But Censorinus was in fact correct for the day of the month that the Sothic cycle reset. The fact that Thoth 1 arrived 23 days late allows us to compute how far back the Sothic cycle had been computed by its creator. Twenty-three days divided by 11.4 days per Sothic cycle gives 2.02 Sothic cycles. This could mean one of two things. Either the Sothic cycle was invented two full cycles, or 2,920 years, before that date, though Meyer (1904) somehow stretched this into nearly 4,000 years; or the system had been invented about the middle of that period, but the author had calculated back to the beginning using 365.25 days as his estimate of the year. This would have doubled the total error in the span of time that elapsed during the two full cycles from his calculated start until the terminus in AD 136.

Diodorus (Diodorus 2004, Book I, Ch. II, 33) informs us that the Egyptian Belus, whom we identify as Senusret III, established the Egyptian astronomical college after his campaign to Asia, which followed his Nubian campaigns. Given that he campaigned for 20 years in Nubia, this requires that the astronomical college was founded more than 20 years into his reign. In the next paper (CFAH-3), we will examine 11 witnesses to that event, three of whom date it precisely.

Manetho attributed the addition of five days to the calendar to the first of the Hyksos kings (Manetho 1964, 99), who came to power after the culmination of Twelfth Dynasty, while the Book of Sothis attributes this change to the last king before Ahmose I (Manetho 1964, 241). This is dismissed out of hand by modern scholars such as Waddell (Manetho 1964, 99, fn. 3) and Childe (1952, 3), who claim the 365-day Sothic year goes back to the time of the construction of the pyramids.

We beg to differ. Sesostris III established the astronomical college about 50 years before the end of the Twelfth Dynasty. Egyptian priests were notoriously resistant to changing tradition, as Akhenaten later learned. The astronomers would have recommended the new calendar of the Sothic period, which would add five days per year, but it would have undoubtedly been resisted by a substantial faction of the priesthood, as calendar changes always have been. Courville, Stewart, and Osgood agree that the Exodus appears to have occurred near the end of the Twelfth Dynasty. At this time, the Hyksos invaders flooded into Egypt, when the first Hyksos king, Salitis, is reputed to have changed the calendar. We would argue that the destruction of Egypt by the 10 plagues and the change of power to a Hyksos king with no regard for Egyptian religious traditions gave the astronomical college the opportunity they needed to impose their new calendar upon the nation.

In the case of Gregorian Calendar reform, made for similar reasons, religious resistance to it led to different adoption dates in different countries, up to two centuries apart. Both Manetho and Sothis may be correct if we understand the Sothic calendar to have first been adopted in Memphis under the reign of Salatis, the first Hyksos king, but it was not adopted in Thebes until a few centuries later.

The rising of Sirius by which Meyer and Petrovich peg the Twelfth Dynasty was in year seven of an unnamed king, assumed to be Senusret III (Mackey 2003; Petrovich 2019, 37). Assuming that skilled astronomers were required to invent the Sothic cycle, it seems very unlikely to have been created prior to the establishment of the astronomical college after year 20 of Senusret III. This means the observation in year seven, if it was in the reign of Senusret III, would have been using a different calendar, most likely the 360-day Egyptian year used prior to the 365-day year of the Sothic system. Using the original Egyptian 360-day year the heliacal rising of Sirius would rotate through the entire calendar year in only 70 tropical years. This would make it impossible to compute the year from that observation alone, since we do not know of a Julian terminus for Thoth 1 using a 360-day year.

In the 70-year cycle of the old calendar, there would be one year in each cycle in which the old 360-day calendar and the new 365-day calendar generally agreed for Thoth 1. However, this would not be precise in most cases because the old calendar jumped by 5 days per year. So exact agreement on the day of Thoth 1 could only be expected about once in five cycles, or once every 350 years. Therefore, it is possible that, if we had a large enough set of Sirius-rising dates from the old calendar, about 1 in 350 of them would agree on both calendars. Unfortunately, the total number of known Sirius rising inscriptions for the Old, Middle, and New Kingdoms can be counted on two hands. Therefore, there is insufficient data to correlate the old calendar to the new one.

Cullimore (1833b, 395–397) pointed out that the OEC preserved enough information to allow us to estimate the date of its composition, ending with Thoth 1 once again in the first minute of the first degree of Aries (Manetho 1964, 231). The 36,525-year period was supposed to be one revolution of the equinox through the zodiac. However, that length of time assumes the rate of precession to be 101.5 years per degree, which exceeds the true number by 30 years per degree. Therefore, the great Sothic zodiac was a clock that was only right once a day, which is to say, in the year that it was invented. (Which may have preceded the year it was first implemented by up to a century.)

The equinox had already passed the first degree of Aries into Pisces centuries prior to the end of the Sothic cycle in AD 136. Using SkyMapPro, we estimate that the equinox left Aries in about 336 BC, while Cullimore, without the benefit of computers, estimated it at 378 BC.

Dividing the difference of 473 years by 30 years gives 15.77 degrees of precession between the date of the system's invention and the end of the cycle in AD 136. The figure 15.77 multiplied by 101.5, which is the Sothic rate of precession, gives 1,600 years prior to the end of the cycle. Thus, we find that the observations on which the cycle was based were made around 1463 BC, while Cullimore's estimate gives 1590 BC. This agrees with our previous observation that the arrival of Sirius was early by 23 days in AD 136, suggesting that whoever had invented the system did so roughly in the middle of the two preceding Sothic cycles, which is to say, not far removed from 1400 BC. This gives us a range of 1600 BC to 1400 BC for the invention and implementation of the Sothic cycle, which, as will be demonstrated in CFAH-6 through CFAH-8, agrees with the calendar change being made in the reign of Salitis, the Hyksos founder of the Fifteenth Dynasty.

Since Meyer wrote his paper on the Sothic period, a number of papyri have been found from the Ptolemaic period with dual dates in the Sothic and Greek calendars We will examine these in more detail in CFAH-7 on the Twelfth Dynasty.

We find that the reign of Menes can be precisely calculated from the OEC, because we are given the total number of years in the cycle, plus the number of years in the cycle prior to his reign, as well as the terminus of the cycle in the summer of AD 136. This calculation had to have been made in the era of the new calendar and projected back to the reign of Menes, which was a known number of years.

Unlike the Embolismal period of the Chaldeans, the founding date for Thebes in 2188 BC does not point back to a particular astronomical event. The inventor of the system knew how many years it was back to Menes, but if Egyptian astronomy was improved at the time of Egyptian Belus (Sesostris III), then we would not expect to find any astronomically calculable dates prior to his establishment of the astronomical college. While Sirius was undoubtedly important in the Old Kingdom, with their original calendar being a 360-day year, the heliacal risings of Sirius recorded before the adoption of the 365-day calendar cannot give valid Sothic dates. Therefore, the chronology of ancient Egypt must be determined by historical durations and synchronisms, not by astronomical calculations from the rising of Sirius.