

Chapter 1

Introduction to Problems with the Historical Chronology of Ancient Egypt

Commenting on the conclusion reached by the SCIEM 2000 Workshop held in Vienna from 30 June to 1 July 2005, Malcolm H. Wiener stated, “*Most participants felt that the resolution of the apparent chronological conflict between the radiocarbon measurements at Dab^ca on the one hand, and the evidence from astronomy, archaeology, and texts on the other, must await future developments.*”¹

Ancient Egyptian Chronology Not Yet Established

Vast amounts of literature have been devoted to ancient Egyptian history including the pursuit of its chronology. With all the resources available, it is remarkable that neither the relative nor the absolute chronology of ancient Egypt has yet been established. Egyptologists who adhere to the commonly assumed chronology derived from written records are fairly confident that their dates of ca. 1540–1530 BCE for the beginning of the 18th Dynasty are accurate. However, these dates are challenged by scientists who rely on recent radiocarbon and other science-based tests, who propose a date in the mid to late 17th century BCE, a disparity of 100–150 years. More specifically, they place the eruption of the Thera volcano on the island of Santorini in the Aegean Sea sometime earlier than the common date for the Thutmoside period early in the 18th Dynasty. Scientists cannot explain how their dates can be so much higher than those derived from written records, and historical chronologists cannot see how one and a half centuries can be added to the chronology based on the kings’ regnal years.

“Future Developments” to Resolve the Impasse

“Future developments” presented in this book offer a solution to the impasse between scientists and Egyptologists. It does so by considering the latest inscriptional evidence from the continuing archaeological enterprise to uncover Egypt’s heritage. And it does so by the use of astronomical data, especially Sothic and lunar evidence found in Egyptian records.

This book also engages with Egyptian chronological issues in the context of bringing the Egyptian chronology into agreement with the dates proposed in my companion book for the original Hebrew chronology, *The Reconstructed Chronology of the Divided Kingdom*.² In particular, that volume demonstrates that the 5th year of Rehoboam synchronized with the 20th year of Shoshenq I (biblical Shishak) occurred in the year 977 BCE and not in 925 as it is commonly dated.

In this book, Egyptian dates, both preceding and succeeding 977, are established by Sothic heliacal risings and are confirmed by numerous lunar dates from the 5th to

¹ M.H. Wiener, “Egypt and Time,” SCIEM 2000 Workshop, *Ä und L* 16 (2006) 336.

² M.C. Tetley, *The Reconstructed Chronology of the Divided Kingdom* (Winona Lake, IN: Eisenbrauns, 2005) originally a Th.D. diss., Australian College of Theology, 1999.

25th Dynasties from computerized tables provided by Lee W. Casperson.³ These dates concur in large part with the dates of science-based research for the early 18th Dynasty.

Aided by the correct dates for the kings of Israel and Judah, correlated to the Egyptian chronology, science-based dates and historical chronology can be reconciled, as the SCIEM conference wished. Early Egyptian calendars played a crucial role in dating the kings.

I begin with the basics of Egyptian chronology.

Introductory Outline

The periods of ancient Egypt as recognized by Egyptologists need to be noted. Then follows an introduction to the resources available to Egyptologists for constructing an absolute chronology. A relative chronology refers to the time-span between kings, whereas an absolute chronology refers to the dates applied to kings. I explain how Egyptologists have derived dates, and how the results are now applied to the chronology cited in the more recent literature since the mid-1980s. A brief summary of science-based tests follows (Table 1.1).

Recognized Periods of Egyptian History

Table 1.1: Designated periods of ancient Egypt

| | |
|----------------------------------|----------------------------------|
| Archaic Period | 1st and 2nd Dynasties |
| Old Kingdom | 3rd–8th Dynasties |
| First Intermediate Period (FIP) | 9th and 10th Dynasties |
| Middle Kingdom | 11th and 12th Dynasties |
| Second Intermediate Period (SIP) | 13th–17th Dynasties |
| New Kingdom | 18th–20th Dynasties |
| Third Intermediate Period (TIP) | 21st–25th Dynasties ⁴ |
| Late Period | 26th–31st Dynasties |
| Ptolemaic Period (Greek) | from 332 to 30 BCE |
| Roman | from 30 BCE to 395 CE |

Resources Available for Reconstructing the Chronology of Ancient Egypt

1. Inscriptions from monuments, stelae, or papyri mentioning specific years of a king's reign are of prime importance in constructing a chronology, especially if they give the regnal year in which the king died. Unfortunately, the final year of a king's reign is often not recorded. Synchronisms between one king and another of a co-existing dynasty, such as between the 22nd and 23rd Dynasties, help to establish the relative chronology.

2. Manetho, a 3rd century BCE priest and historian, copied the regnal years of kings and the total years for dynasties from ancient dynastic king-lists and recorded them in his largest work, *Aegyptiaca*, in which he recounted Egypt's history. Though he was an Egyptian, Manetho wrote in fluent Greek and it is thought he derived his primary resources from a temple library in the Delta region. Manetho composed a chronological list of dynasties from groups of rulers having a common ancestor or origin. These lists survive now only through copyists: Africanus, 3rd century CE; Eusebius, 4th century CE (in Greek and an Armenian translation); Flavius Josephus, the Jewish historian in the 1st century CE has excerpts in his book, *Contra Apionem*. *The Book of Sothis* derives from

³ See Preface iii.

⁴ Some scholars end the TIP with the 24th Dynasty.

Manetho also but in a very corrupt form.⁵ Most lists have suffered in transmission with some kings attributed regnal years that conflict with other sources, or with kings' names and regnal years missing altogether. Nevertheless, combined with other information, some original data can still be isolated and they confirm various kings' regnal years or the length of a dynasty. Manetho's numbering of the dynastic divisions is still universally used.

3. The Royal Annals, which today consist of only two large fragments, namely the Palermo Stone and Cairo 1, and five smaller pieces, once gave the names and regnal years of the kings of Dynasties 1–5. The Turin Canon complements this record with its list of names and years covering the 1st to the 12th Dynasties, after which the canon consists of mostly unidentifiable kings down to the Second Intermediate Period (SIP) with most regnal years damaged or lost. Other king-lists, such as the Abydos King-list and the South Saqqara Stone also aid in establishing the names and regnal years of the kings.

4. Records of new moon dates in the Egyptian calendar can be used to provide Julian dates (the calendar used for ancient Egypt). Computer programs can convert Egyptian dates to Julian dates (and Gregorian dates—the calendar we use now) going back over many centuries BCE. Some occasions, such as the “Stretching-of-the-Cord” ceremony—the foundation act in building a temple—were held on new moon days; that is, the first day of the lunar month. The Egyptians also held specific festivals on a day associated with the beginning of the lunar month, such as the appearance of the god Amun at a feast or the induction of priests, dated to the Egyptian calendar. The installation of Apis bulls at Memphis were held within days of a full moon dated to a specific king's regnal year and some of these have been recorded for the Third Intermediate Period (TIP). Lunar dates recur in a 25-year cycle, but a specific lunar date will only repeat itself in the next 25-year period in 70% of cases. It may fall a day earlier or later.⁶ Therefore, it is important to be sure in which 25-year period a lunar date fell, because the same date could fall in another cycle period and incorrectly be assumed to be the right date.

5. Egyptians used the Sothic cycle to record events or the passing of time. They reckoned the beginning of the solar year by the heliacal rising of the star Sirius (Sothis in Greek); that is, its reappearance in the early morning light after about 70 days of invisibility due to the star's close proximity to the sun. This annual appearance came shortly before the inundation of the Nile River upon which the Egyptians depended for the irrigation of their crops and their livelihood. The Sothic year was 365¼ days long. The Egyptian calendar was reckoned as 365 days long, being a quarter of a day short every year, because it did not include an extra day every fourth year as we now do using our Gregorian calendar. This meant that New Year's day fell one day ahead of the rising of Sothis every four years, so that after four years the Sothic rising fell on the second day of the first month of the year instead. It took nearly 1460 years to get back to the position where the rising of Sothis coincided again with the first day of the Egyptian calendar. This period of time is referred to as the Sothic cycle.

The rising of Sothis is not seen on the same day throughout Egypt but is seen first in the south and approximately a day later for every degree going north. This meant that the date will be seen earlier at Thebes than at Memphis because of the approximately four degrees of latitude difference between the cities. A small number of Sothic risings

⁵ These are found in *Manetho* (trans. W.G. Waddell; Loeb Classical Library 350; London: William Heinemann Ltd, and Cambridge, MA: Harvard University Press, 1940). Hereafter *Manetho*.

⁶ R. Krauss, “Arguments in Favor of a Low Chronology for the Middle and New Kingdom in Egypt,” *SCIEM II* (2003) 175, 190.

have been recorded associated with the date and regnal year of a king, which may be used to date the king's reign. However, the Sothic date has to be reckoned from the place where the observation was made. This is not always stated. And it also depends on being dated to the calendar used by the ancient observer(s). Computer programs can now give the dates for the heliacal rising of Sothis at any location in Egypt going back many millennia. In dynastic times, the heliacal rising of Sothis fell near the middle of July in the Julian calendar, the date slowly moving later in the year over the centuries. Since each Sothic date occurs only once on four consecutive years in a Sothic cycle, a *lunar* date that is in close proximity to those four years in a king's reign may indicate that a correct date has been established.

6. Calendar depictions constitute a very important resource for clarifying the calendars(s) used by the early Egyptians. One famous example is that of the Ebers papyrus calendar dating to the reign of Amenhotep I of the early 18th Dynasty. It contains a date in his ninth year for the heliacal rising of Sothis. The calendar appears to contain corresponding dates between two columns of 12 months each, one belonging to the Egyptian's so-called civil calendar and the other calendar of uncertain origin. This latter calendar *starts* with the name of a month that in all later calendar depictions is the *last* month of the year. Calendar depictions are found on the ceilings of tombs, on water clocks, and on papyri from the 18th Dynasty down to the Late Period. The identification of the calendars on the Ebers papyrus is an important aid in establishing Egyptian chronology.

7. The enigmatic "Era of Menophres" (Μενόφρεως in Greek), associated with a Sothic cycle, can help confirm the chronology once Menophres has been identified with Memphis.

8. A 30-year festival known as the *heb sed* was celebrated by some kings and indicates that a king reigned at least 30 years. It may be repeated every 3 or 4 years thereafter. This information may extend a king's reign beyond only lower years known for his reign.

9. Genealogies covering numbers of generations may provide approximate time spans for a sequence of kings. Since the period between one generation and the next varies greatly, genealogies can give only a rough estimate of time.

10. A king-list known as the Assyrian Eponym Canon (AEC) mentions a solar eclipse that is reliably dated to the year 763 BCE. Egyptian synchronisms with Assyrian or Babylonian rulers, or kings of Israel and Judah, can be validated *after* this date. But there is no proof that the years *before* 763 constitute a continuous list. Therefore, the years before 763 BCE need to be examined.

11. Scientific studies, such as carbon-14 dating, tree-ring counting (dendrochronology), and ice-core testing, can supply approximate dates to a given time period.

These are some of the available resources on which a relative and absolute chronology of ancient Egypt may be reconstructed. Others will arise as we proceed.

How do Egyptologists Reconstruct the Chronology of Ancient Egypt?

A starting date for the Egyptian chronology has to come from a king of Egypt who can be dated by the Julian calendar. The earliest certain (but late) date comes at the end of the 25th Dynasty when Taharqa acceded the throne in 690 and after a 26-year reign died in 664 BCE. He was succeeded by Psammetichus I who became the first king of the 26th Dynasty.

From this date, Egyptologists proceed backwards using "*known*" regnal years of the kings of Egypt. This system gives a *minimal* chronology. Since the *final* regnal years of most kings are not stated, additional years beyond their highest *attested* years need to be considered. In an effort to tie the minimal chronology to an external date,

Egyptologists look for a synchronism with a neighboring nation. They utilize one at the beginning of the 22nd Dynasty noting that the invasion of Shoshenq I (the biblical Shishak) of Israel and Judah is dated to the fifth year of Rehoboam of Judah (1 Kgs 14:25-26; 2 Chr 12:2-5). This equates in the Egyptian chronology with Shoshenq I's 20th year because his victory stelae describing the campaign dates it to his 21st year.

Egyptologists then look to the chronology of Judah and Israel to find when this invasion took place. They find that in 1944 Edwin R. Thiele, a scholar of St Andrews Seventh Day Adventist Seminary of Berrien Springs, MI, USA, placed Rehoboam's fifth year in 925 BCE with the commencement of the divided kingdom in 931. Where did Thiele get this date from? He looked to records from Assyria, and specifically the AEC, and derived his dates from it.

This Assyrian canon is compiled from fragments of eponym lists found on tablets in the ruins of three sites, Nineveh, Assur, and Sultantepe that were copied in the seventh century BCE from earlier records. The pieces appear to overlap and are now made into one long list that seems to be continuous apart from one section where an eponym appears in one list but not in others. This canon is a list of Assyrian kings and their officials with each year being named after the king or one of his subordinates, and called an eponym year (*limmu* in Assyrian).

If, for example, a king reigned 10 years, he would have 10 eponyms attributed to his reign. For the greater part, the reconstructed canon has three columns. In the first column is the name of the king or his official, usually in descending order of importance. In the second column is the official's title or position, such as commander or governor of the place under his jurisdiction. In the third column is a brief comment, referring to a significant event for that year, often where the king went on campaign.

Significant for chronology is the note against the eponym of a certain Bur-Saggile "of Guzanna" about a "revolt in the citadel: in Siwan the sun had an eclipse."⁷ Scientists are able to date this eclipse to the 15/16 June in 763 BCE. Proceeding upward and downward from this date the surviving eponyms have been attributed to the years from 910 to 649 BCE. Another list, the Babylonian king-list, begins in 747 BCE and together with the AEC and other records the chronology of Assyria is securely linked to the Babylonian king-list from 747 *forward*.

Alan Millard, who republished the AEC in 1994, refers to another list called the Assyrian King-list. He states, "There the length of each reign is stated and the figures agree with the years allotted by the Eponym Lists as described above in every case. Although the King-lists and the Eponym Lists may be generically related, that still serves to confirm the figures as handed down from one generation of scribes to another, and so indicates the reliability of these sources for the Neo-Assyrian period, when correctly understood."⁸

Judging from this statement, the accuracy of the AEC relies on lists that are "generically related" so there is no guarantee that they are independent attestations of the completeness of the AEC. One may be a copy of the other, or both come from a deficient *Vorlage*. It appears that Millard's statement above is the only support for the accuracy of the AEC before the date of 763 BCE. This is disconcerting to say the least, because the *entire Near Eastern chronology relies on the accuracy of the AEC* for the years 910–612. On the *presumed* accuracy of the AEC, most historical chronologists (myself excepted) derive their dates for the ancient Near East including Assyria, Israel/Judah, and Egypt.

⁷ A. Millard, *The Eponyms of the Assyrian Empire 910-612 BC* (State Archives of Assyria Studies Vol. 2; Helsinki: Neo-Assyrian Text Corpus Project, 1994) 41, 58.

⁸ Millard, *Eponyms of the Assyrian Empire*, 13.

Thus Egypt gets its dates from the Hebrew chronology of Israel and Judah, and the Hebrew chronological construction gets its dates from the AEC.

In order to give a date to the kings of Judah and Israel, Thiele had to find a starting date or a synchronism between a king of Assyria and a king of Israel or Judah. The first synchronism between Assyria and Israel in the divided kingdom period is provided by the battle of Qarqar fought between the Assyrians and a coalition of Levantine kings, including Ahab of Israel. This event is dated in Assyrian records to the sixth year of Shalmaneser III of Assyria.⁹

Assyrian records, of course, do not give Julian dates, but it was *assigned* the date of 853 BCE on the *assumption* that the AEC contained all the eponyms from 910 to 612 BCE. However, by adding up the reign lengths given for the kings of Israel and Judah as recorded in the English translation of the Hebrew text, Thiele realized that the regnal year numbers given for the kings of Israel for the period of the divided kingdom, from the accession of Rehoboam of Judah and Jeroboam I of Israel until the fall of Samaria in the reigns of Hoshea of Israel and Hezekiah of Judah, were about 23 years higher for Israel than for the concurrent period of Assyrian history, and for the kings of Judah *46 years higher*, based on the dates allocated to the AEC.¹⁰

Thiele had a choice: either recognize that the AEC was deficient and try to reconstruct a chronology for the kings of Israel and Judah from the figures given in the Hebrew/English taking into account variants in the Greek texts, or compress the Hebrew/English data for the kings of Israel and Judah to bring them into line with the years assigned to the AEC.

He chose the latter option, even though the kings of Judah and Israel had a dual system of cross-referenced reigns, whereas the AEC was composed of one linear record of Assyrian kings whose chronology had never been corroborated in the period prior to the solar eclipse of 763 BCE. Thiele decided that the numbers were “mysterious” and proceeded on the basis that the numbers could be harmonized if certain *dating systems* were applied.

Having made this decision, Thiele overlapped the reigns of the kings of Israel and Judah by about 50 years overall to make the reigns fit the years indicated by the AEC. Thus, he dated Ahab’s 22nd and last year to 853 BCE, which was presumed to be the sixth year of Shalmaneser III, and by means of his dating systems arrived at the date of 931 for the commencement of the divided kingdom and Rehoboam’s fifth year in 925.

The excess years for the kings of Judah and Israel were explained away by the use of various dating systems. Two such systems used were antedating and postdating (also called non-accession and accession year dating). In antedating, a king’s first year is the year he comes to the throne and his first full year is his second year; in postdating, the king’s reign is dated from the beginning of the year after his accession. These dating systems give flexibility to the length of a king’s reign. Judah’s kings supposedly used postdating for the first four kings, Rehoboam to Jehoshaphat, then switched to antedating for Jehoram, Ahaziah, Queen Athaliah, and Joash, and then switched back to postdating for the remaining kings. Israel used antedating from Jeroboam I to Jehoahaz and then switched to postdating from Jehoash to Hoshea.¹¹

⁹ Collated from Bull Inscription (ARAB 1: §§646-47; ANET, 279); Black Obelisk (ARAB 1: §563; ANET, 279), and Monolith Inscription (ARAB 1: §§610-11; ANET, 278-79; HAIJ, 258-59; J.K. Kuan, *Neo-Assyrian Historical Inscriptions and Syria-Palestine* [Jian Dao Dissertation Series 1; Hong Kong: Alliance Bible Seminary, 1995] 27-31).

¹⁰ E.R. Thiele, *The Mysterious Numbers of the Hebrew Kings* (3rd ed., Grand Rapids, MI: Zondervan, 1983) 37.

¹¹ *Ibid.*, 59-60; 215-16.

Thiele also started the calendar years six months apart in the two kingdoms; Israel starting in the month of Nisan and Judah in Tishri.¹² He also states that Judah used its (Tishri-commencing) system for recording its years and those of Israel, while Israel used its (Nisan-commencing) system for recording its years and those of Judah.¹³

However, Thiele's main resort to bring the Hebrew chronology into line with the Assyrian chronology dated to the AEC was by introducing co-regencies or overlapping reigns into both kingdoms, some of considerable length. For example, Azariah of Judah was allotted 24 co-regent years with his father Amaziah out of a total of 52.¹⁴ Thiele also proposed that at times there were two kings ruling contemporaneously in both kingdoms; that is, four kings altogether. For instance, while Amaziah and Azariah had a 24-year co-regency in Judah, Jehoash and Jeroboam II had a 12-year co-regency in Israel.¹⁵

The Books of 1 and 2 Kings are silent about these dating methods. The dating method that *is* stated is that a king began to reign *in a certain year of the king of the other kingdom* and that he reigned so many years. When that king died his son or successor began to reign. For example, 1 Kgs 15:1-2 states, "In the 18th year of King Jeroboam the son of Nebat, Abijam began to reign over Judah. He reigned three (Greek variant six) years in Jerusalem." Verse 8: "And Abijam slept with his fathers, and they buried him in the city of David and Asa his son reigned in his stead." This is the only dating system given in the Books of 1 and 2 Kings. The terms postdating or antedating are never used, co-regencies are never stated,¹⁶ nor does it state that Israel and Judah started their calendar years six months apart. Therefore, Thiele's dating systems are not exhibited in the Books of Kings.

Naturally enough, Egyptologists assume that the scholars concerned with the chronology of Israel and Judah have established the correct dates for the Hebrew kings and that they can confidently use Rehoboam's fifth year in 925 BCE as the date for Shoshenq I's 20th year. It seems that they have not investigated the textual evidence for themselves so they do not realize that Thiele's dates are based on many assumptions and not on the actual dating method indicated in the statements of accession given with the regnal years cited.

The following discussion shows that Egyptologists have accepted Thiele's dates for Rehoboam's fifth year, and that they rely on synchronisms with Assyria dated to the AEC while at the same time limiting their use of lunar and astronomical data.

Recent Publications on Egyptian Chronology

One of the most comprehensive monographs written on Egyptian history is Kenneth A. Kitchen's *The Third Intermediate Period in Egypt (1100–650 BC)*.¹⁷ First published in 1972, it was updated with new information and republished with a supplement in 1986. A third edition was published in 1996 with an added preface. The preface was mainly a response to new material that had come to light in the intervening 10 years, and Kitchen's rejoinder to those scholars with whom he had differing points of view.

¹² Ibid., 51-54.

¹³ Ibid., 49-50.

¹⁴ Ibid., 63, 119, 219.

¹⁵ Ibid., 113, 118, 219.

¹⁶ Some scholars point out that a co-regency is inferred because Jotham governed the people after his father Azariah had contracted leprosy (2 Kgs 15:5). Jotham was not king at this time, and the years for his reign do not include a co-regency with his father. See ch. 2, p. 30ff.

¹⁷ K.A. Kitchen, *The Third Intermediate Period in Egypt (1100-650 BC)*, (Warminster, UK: Aris and Phillips, 1973, 1986, 1996).

Kitchen has written other books and numerous articles on Egyptian history and chronology, but it is *TIP* that is his monumental work. It is in recognition of this work and his phenomenal knowledge that brings his writings to the forefront in scholarly discussions on the relative and absolute chronology of Egypt.

In *TIP*, Kitchen restates the dating systems used by Thiele. He writes: “(i) that Judah initially used the accession-year custom of counting regnal years, (ii) that Israel initially used the non-accession mode of counting regnal years, (iii) that, in synchronisms, each kingdom reckoned the years of its neighbor in terms of its *own* method, not that of its neighbor, and (iv) that Judah used an autumn New Year (Tishri) and Israel a spring New Year (Nisan).”¹⁸

In the year after the second edition of *TIP* appeared, an international colloquium on absolute chronology was held at the University of Gothenburg in Sweden, on 20–22 August 1987.¹⁹ Its title “High, Middle or Low?” indicated that the main discussion centered on whether Egypt should be given high or low dates—the higher dates giving a longer chronology than the lower dates.

The opinions expressed were influential in changing dates for ancient Egypt. Indications for a lower chronology had been previously suggested by John A. Brinkman in 1970 after he noted that the dates for the kings of Assyria/Babylon in the last four centuries of the second millennium could be reduced by 9–18 years. However, these dates are based on the AEC. He writes, “This Assyrian chronology is founded ultimately on the evidence of the Assyrian King-list and, for the period after 910 BCE, on the eponym lists as well. Beginning with the fixed date of 763 BCE for the famed eclipse in the eponymy of Bur-sagale, one then reckons by means of these lists to obtain dates for all the reigns of the Assyrian kings back to Enlil-našir II (1432–1427).”²⁰ However, since these dates come before 763 BCE, they have no corroboration and therefore any lowering of dates has no validation.

Morris Bierbrier sought to date the reign of Ramesses II taking as his starting point the date of the (supposed) biblical evidence that Shoshenq I became the first king of Dynasty 22 in 945–940 BCE.²¹ Again, this reflects Thiele’s dates. On astronomical grounds (the new moon in Ramesses II’s 52nd year), Bierbrier noted that 1304, 1290, or 1279 were possible. The latter date, however, was only possible if synchronisms with Assyrian, Babylonian, and Hittite sources could be lowered. Thus it seemed that Brinkman’s lowering of the Mesopotamian chronology allowed the date of 1279 for Ramesses II’s accession. Based on generation counts, Bierbrier concluded that either 1290 or 1279 could be the accession date of Ramesses II.²²

Rolf Krauss suggested in 1978 that Elephantine and not Thebes or Memphis could be the observation site of the going up of Sothis in the ninth year of Amenhotep I as noted on the Ebers calendar,²³ which would lower the accession date of Ramesses II.

¹⁸ Kitchen, *TIP*, 74–75 §59 nn. 363–64 (emphasis his) citing *MNHK*¹ 20–23; *MNHK*² 23–26.

¹⁹ *High, Middle or Low? Acts of an International Colloquium on Absolute Chronology Held at the University of Gothenburg 20th–22nd August 1987* (ed. P. Åström; Gothenburg: Paul Åström’s Förlag, Part 1 and 2, 1987; Part 3, 1989).

²⁰ J.H. Brinkman, “Notes on Mesopotamian History in the Thirteenth Century BCE.” *BiOr* 27 (1970) 305–6 and n. 52.

²¹ M.L. Bierbrier, *The Late New Kingdom in Egypt (c. 1300–664 BC) A Genealogical and Chronological Investigation* (Warminster, UK: Aris and Phillips, 1975) 111.

²² *Ibid.*, 109–13.

²³ R. Krauss, *Das Ende der Amarnazeit* (HÄB 7; Hildesheim: Gerstenberg, 1978) 189–91. See also, *idem*, “Sothis, Elephantine and die altägyptische Chronologie,” *GM* 50 (1981) 71–72; *idem*, *Sothis und Monddaten. Studien zur astronomischen und technischen Chronologie Altägyptens* (HÄB 20; Hildesheim: Gerstenberg, 1985) 109–10; *idem*, “Egyptian Sirius/Sothic Dates and the Question of the Sirius based

It seemed to Krauss that Bierbrier's lowering of Ramesses II's accession from 1304 to 1290 or 1279, lowering also the accession date of Thutmose III to 1479, 200 years before, was justifiable on astronomical grounds. He supported Bierbrier's claim that the observation point of the rising of Sothis was Elephantine.²⁴ Based on his own astronomical calculations of the new moon in Ramesses II's 52nd year, Krauss concluded at Gothenburg that Ramesses' accession fell in 1290, 1279, or 1276.²⁵

Most of the scholars at the Gothenburg colloquium favored the lower dates for the chronology even though some objected that because the Ebers papyrus was found at Thebes where Amenhotep resided, it was not likely that the observation point for the Sothic date was Elephantine.²⁶

Wolfgang Helck thought that the Ebers Sothic date was meaningless²⁷ and stated that, "We are not allowed to use this date for chronological calculations."²⁸ The noted archaeologist, Manfred Bietak, also at the colloquium, thought that a consensus of opinion was forming for the dates of the New Kingdom and that the regnal dates and genealogical data provided a secure framework. Therefore, it was no longer necessary to depend on the Ebers Sothic date "and [it] should not be used any more."²⁹

Kitchen contributed two papers to the colloquium outlining the chronology of ancient Egypt. He reiterated his position: "The 21 year reign of the founder of the 22nd Dynasty, Shoshenq I, can be set at ca. 945–924 BCE, thanks (i) to his synchronism with the detailed chronology of Judah and Israel, itself linked closely to a firm Assyrian chronology (details, Kitchen, 1986, 72–76, 544, with references), and (ii) to the series of known regnal years of his successors, which fill up the interval 924–716/712 BCE almost completely..."³⁰ In addition, he accepted the "low" date giving Ramesses II's accession in 1279 though he warned that a consensus was no guarantee of truth.³¹

Erik Hornung proposed that the previously held dates should be abandoned in favor of lower ones. He stated, "Egyptology has relied too much for a long time on so called absolutely fixed astronomical data."³² Furthermore, "We have not to rely on kinglists like Manetho or the Turin Canon and we have not to rely on astronomical computation for the famous Ebers' datum or for lunar dates of the New Kingdom."³³ Also he writes, "I think it is now very clear that Ramesses II cannot have started his reign before 1279 and Thutmosis III before 1479." Further on; "So I think our chronology of the New Kingdom is fairly well established without all the problems connected with astronomical data."³⁴

Lunar Calendar," *Ancient Egyptian Chronology* (eds. E. Hornung, R. Krauss, D.A. Warburton; Leiden and Boston: Brill, 2006) 441. Hereafter *AEC* (2006).

²⁴ Idem, *Sothis und Monddaten*, 65-66.

²⁵ Idem, "Note on Modern Computational Errors in Astronomical Dating," *High, Middle or Low?* Part 3, 162.

²⁶ E. Hornung, "E. Hornung's paper," *High, Middle or Low?* Part 3, 35.

²⁷ "Discussion following W. Helck's paper," *High, Middle or Low?* Part 3, 44.

²⁸ W. Helck, "W. Helck's paper," *High, Middle or Low?* Part 3, 41.

²⁹ M. Bietak, "The Middle Bronze Age of the Levant – A New Approach to Relative and Absolute Chronology," *High, Middle or Low?* Part 3, 91.

³⁰ K.A. Kitchen, "The Basics of Egyptian Chronology in Relation to the Bronze Age," *High, Middle or Low?* Part 1, 38.

³¹ Idem, "Supplementary Notes on 'The Basics of Egyptian Chronology'," *High, Middle or Low?* Part 3, 158.

³² Hornung, "E. Hornung's paper," *High, Middle or Low?* Part 3, 34.

³³ *Ibid.*, 34.

³⁴ *Ibid.*, 35.

At the close of the conference a vote was taken, and the “low” chronology was adopted. Hornung later wrote, “It is absolutely clear for Egypt that for the NK, this is the only chronology with which we can live. There [at Gothenburg], I endeavoured to avoid the astronomical problems when discussing the chronology of the NK.”³⁵

As a follow-on from the Gothenburg colloquium, a further conference was held in 1990 at Schloss Haindorf among scholars who again debated the Ebers calendar and its Sothic date and the chronology of the NK. The papers were published in 1992.³⁶ Aspects of these papers are discussed later.

The above conferences were succeeded by several symposiums on the chronology and related topics of the Eastern Mediterranean under the title *The Synchronization of Civilizations in the Eastern Mediterranean in the Second Millennium BCE*, (known as SCIEM). The first was held in Schloss Haindorf in November 1996, and another at the Austrian Academy, Vienna in May 1998.³⁷ These were followed by others in May 2001,³⁸ June 2003,³⁹ and June 2005.⁴⁰ Many of the papers majored on science-based subjects concerning the dating of ancient Egypt and surrounding nations. We consider these below. Kitchen contributed a paper on historical chronology in the first⁴¹ and third SCIEM conferences.⁴²

In these, Kitchen emphasized the independence of his construction from dynastic lists and astrochronology, while utilizing Near-Eastern synchronisms. For example, in the 1996 SCIEM conference (papers published in 2000), Kitchen wrote,

His [Manetho’s] work ceased to be the basis of Egyptian chronology many decades ago. From original contemporary sources, we may construct a basic Egyptian chronology dependent on no other source. The king-lists (including Manetho) contribute their mite to establishing some royal sequences and regnal years, but no longer dominate. Egyptian dates can sometimes then be refined in detail by use of synchronisms with other ancient Near-Eastern states, especially Mesopotamia from ca. 1400 BCE onwards, and occasionally (only occasionally) by use of a tiny handful of astronomical data (one definite Sothic date in the 12th Dynasty; lunar dates with this; and one lunar date each in the 18th and 19th Dynasties). Egyptian chronology overall is not based on these meagre astronomical data – these merely help to limit the options in fine detail.⁴³

³⁵ Idem, “Introduction,” *AEC* (2006) 8.

³⁶ Published in *Ä und L* 3 (1992). Those most applicable are: J. von Beckerath, “Das Kalendarium des papyrus Ebers und die Chronologies des ägyptischen Neuen Reiches. Gegenwärtiger Stand der Frage,” 23-27; W. Helck, “Zur Chronologiediskussion über das Neuen Reich,” 63-68; R. Krauss, “Das Kalendarium des papyrus Ebers und seine chronologische Verwertbarkeit,” 75-96; C. Leitz, “Bemerkungen zur astronomischen Chronologie,” 97-102; U. Luft, “Remarks of a Philologist on Egyptian Chronology,” 109-14.

³⁷ Proceedings of both symposiums were published in *The Synchronization of Civilizations in the Eastern Mediterranean in the Second Millennium BCE: Proceedings of an International Symposium at Schloß Haindorf, 15-17 November 1996 and at the Austrian Academy, Vienna, 11-12 May 1998*, (ed. M. Bietak; Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 2000).

³⁸ *The Synchronization of Civilizations in the Eastern Mediterranean in the Second Millennium BCE II: Proceedings of the SCIEM 2000 EuroConference Haindorf, 2-7 May 2001* (ed. M. Bietak; Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 2003).

³⁹ *The Synchronization of Civilizations in the Eastern Mediterranean in the Second Millennium BCE III: Proceedings of the SCIEM 2000 –2nd EuroConference Vienna, 28 May-1 June 2003* (eds. M. Bietak and E. Czerny; Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 2007).

⁴⁰ *SCIEM 2000 Workshop on Precision and Accuracy of the Egyptian Historical Chronology, Vienna, 30 June-2 July 2005*. Proceedings published in *Ä und L* 16 (2006).

⁴¹ K.A. Kitchen, “Regnal and Genealogical Data of Ancient Egypt (Absolute Chronology I): The Historical Chronology of Ancient Egypt, a Current Assessment,” *SCIEM II* (2000) 39-52.

⁴² Idem, “Egyptian and Related Chronologies – Look, no Sciences, no Pots!” *SCIEM II* (2007) 163-71.

⁴³ Idem, “Regnal and Genealogical Data,” 39.

There are far more astronomical data than Kitchen allows for, which can be seen by the lunar tables in this book. Concerning the Sothic-rising date of the Ebers papyrus, Kitchen says in the same paper, “Most opinion now disallows this document as real evidence of the record of a specific rising of Sothis.”⁴⁴

Following these assertions, Kitchen assigns 125 years to the 21st Dynasty, which is not far from the 130 years that Manetho’s list gives.⁴⁵ Then he writes, “The Ramesside 20th Dynasty (and the New Kingdom) ended beyond any serious doubt, in or about 1070 BCE. *None* of the above relies on Manetho by himself, or on astronomy, or on foreign synchronisms except to confirm positions *already* arrived at by dead-reckoning; the overall dates are limited biologically by genealogical data.”⁴⁶

It should be understood that dead-reckoning provides the most *minimal* chronology possible, since it gives only the highest *known* regnal year for each king, not necessarily the final year. No-one can tell how many *unknown* years might have been reigned by various kings unless further information is available; therefore, dead-reckoning is only useful to give a base-line number of years. Appeal to the length of a period by generations known to have lived during the time is highly subjective depending on how short or long one wishes to assign to a generation, and is therefore of limited value—as Kitchen himself expounded in a paper written for the SCIEM 2005 conference.⁴⁷

One of the reasons why astronomy was not helpful in securing chronological dates is explained by Krauss at the SCIEM conference held in 2001 (papers published in 2003). He writes:

Egyptologists have traditionally calculated the Illahun Sothic date first and then related the lunar dates to it. But because of uncertainties surrounding the interpretation of Sothic dates in general, a better approach establishes a possible time span on the basis of minimal chronology and seeks to correlate the lunar dates to it.⁴⁸

Illahun Sothic Date

The Illahun Sothic date referred to dates to the seventh year of Sesostris III of the 12th Dynasty. Difficulties in obtaining a date for this has led Krauss to abandon Sothic dating in general and concentrate on dead-reckoning and then applying lunar dates to fix the reign within a period of 25 years. This implies that he does not look higher than the minimal chronology allows. Since Sothic dates and lunar dates that fall in a closely defined period in the Egyptian calendar (as they do for Sesostris III of the 12th Dynasty and Thutmose III of the 18th Dynasty) they must also fall in the same respective time frame in the Julian calendar.

The *lack* of a given Sothic date to act as a control for a given *lunar* date means that there can be no assurance that the correct Julian calendar years have been established for the lunar date. At the same conference in 2001, Ulrich Luft contributed a paper entitled “Priorities in Absolute Chronology.” He states:

The aim of the research at SCIEM 2000 is to get data for the chronology of the 2nd millennium BCE that are fixed to a defined year and leave no possibility for shifting some years backwards or forwards in the frame of the Julian calendar.⁴⁹

⁴⁴ Ibid., 44. Kitchen refers to J. von Beckerath, “Das kalendarium des Papyrus Ebers und die Chronologie des ägyptischen Neuen reiches. Gegenwärtiger Stand der Frage,” *Ä und L* 3, (1992) 23-27.

⁴⁵ Ibid., 41.

⁴⁶ Ibid. Kitchen’s emphases.

⁴⁷ Idem, “The Strengths and Weaknesses of Egyptian Chronology – A Reconsideration,” *Ä und L* 16 (2006) 299.

⁴⁸ Krauss, “Arguments in Favor,” 197.

⁴⁹ U. Luft, “Priorities in Absolute Chronology,” *SCIEM II* (2003) 199.

The aim was not realized because there was no resolution about how the calendar of the Ebers papyrus with its Sothic date for Amenhotep I's ninth year should be understood, though Luft proposed that the Ebers calendar was "evidence for the failure to establish the regnal year." Nor was it determined what calendars Egyptians used.⁵⁰

For the SCIEM II conference held in 2003, Kitchen writes:

During last century highly ingenious "scientific" procedures have been developed to try to overcome the problem of fixing absolute dates, especially when explicit written records are lacking, including use of astronomy, radio-carbon, tree-rings, ice-cores and so on. However, each of these is subject to various flaws that prevent attainment of absolutely reliable results so far.⁵¹

Kitchen continues to date by dead-reckoning and Near East synchronisms. Krauss's SCIEM II paper published in 2007 brings together various lunar dates from Dynasties 18 to 25. However, he prejudices the outcome of using them for a chronology by again establishing lunar dates "without reference to traditional Sirius dates."⁵²

In a SCIEM "Egypt & Time Workshop" held in 2005, Kitchen presented a paper in absentia, discussing the strengths and weaknesses of Egyptian chronology. He proposed two options for the 22nd and 23rd Dynasties to take into account new findings that lengthened the dynasties by a number of years.⁵³ Malcolm Wiener presented a paper on the reliability of the Egyptian historical chronology and scientific studies, and stated:

Kitchen's paper ... addressed many contentious chronological issues within the T.I.P. and presented his current position with respect to the whole of Egyptian historical chronology, relying largely on texts and 'dead reckoning', of reigns. The dates proposed have received widespread general acceptance.⁵⁴

At the same workshop, Gerard Broekman also presented a paper in absentia,⁵⁵ outlining an ongoing contention between Kitchen and David Aston on the place of Takeloth II, either in the 22nd Dynasty where Manetho places him as argued by Kitchen, or in a hypothetical 23rd *Theban* Dynasty, which Aston had proposed in 1989.⁵⁶ Kitchen had hotly defended his position in *TIP* in 1996.⁵⁷ The initial date for the 22nd Dynasty still remains at 945 in both chronologies.⁵⁸

A recent comprehensive discussion on the historical chronology of ancient Egypt is found in *Ancient Egyptian Chronology* edited by Erik Hornung, Rolf Krauss, and David A. Warburton, published in 2006.⁵⁹ It majors on relative and absolute chronology compiled from the contributions of many experts in their fields, including chapters on lunar dates and the heliacal rising of Sothis.

⁵⁰ Ibid., 203.

⁵¹ Kitchen, "Egyptian and Related Chronologies," 163.

⁵² R. Krauss, "An Egyptian Chronology for Dynasties XIII to XXV," *SCIEM II* (2007) 173.

⁵³ Kitchen, "Strengths and Weaknesses," 293-308.

⁵⁴ Wiener, "Egypt and Time," 325.

⁵⁵ G.P.F. Broekman, "Once Again the Reign of Takeloth II; Another View on the Chronology of the Mid 22nd Dynasty," *Ä und L* 16 (2006) 245-56.

⁵⁶ D.A. Aston, "Takeloth II – A King of the 'Theban Twenty-Third Dynasty'?" *JEA* 75 (1989) 139-53.

⁵⁷ Kitchen, *TIP*, xxiii-xxiv.

⁵⁸ Broekman, "Once Again the Reign of Takeloth II," table 1, p. 246.

⁵⁹ *Ancient Egyptian Chronology* (eds. E. Hornung, R. Krauss, D. A. Warburton; Leiden and Boston: Brill, 2006). This volume is part of a series entitled Handbook of Oriental Studies 83; Section One: The Near and Middle East.

Erik Hornung, nearly 20 years after the conference on “High, Middle, or Low?”, wrote in 2006:

Already at Gothenburg, there was general agreement about the dates for beginnings of the New Kingdom. Helk, Kitchen and Hornung/Krauss all worked with the very narrow range of 1540 to 1530 for the start of the reign of Ahmose, and after some debate, there is now general acceptance for the reign of Ramesses II at 1279–1213 BCE. Although we must be wary of confusing consensus with actual fact, for the New Kingdom we now have such a fine mesh of relative dates which are themselves woven into NE dates that major adjustments can probably be excluded. While there is room for minor cosmetic corrections, we are relatively confident about the framework.⁶⁰

Referring to the TIP (Dynasties 21–24), which followed the New Kingdom, Karl Jansen-Winkeln noted in this same book:

We lack a continuous series ... of dates for any given sovereign, and thus by no means can we confidently suggest that the highest known date for any reign reflects its actual length. Given this paucity of dates, the chronology of this era is imprecise and uncertain in many respects.⁶¹

He concluded his chapter on the TIP by asserting:

The date of the campaign of Shoshenq I, presumably towards the end of his reign, can be placed with the aid of Near Eastern chronology in 925/926. Between these two [the date of 690 at the end] there is not one single firm date, but the sequence of kings and the highest known dates for these kings does not leave significant gaps. The general framework of this age is certain.⁶²

A significant publication in 2009 covering the same 21st to 24th Dynasties, designated the Libyan Period (that is, the TIP), was compiled from contributors at a special conference at Leiden, in the Netherlands, held in 2007.⁶³ Papers from this conference are wide-ranging but focus mainly on historical developments—the chief of these being the chronological issues.⁶⁴ Kitchen contributed a comprehensive paper detailing the state of the debate on Egyptian chronology, which had become quite heated in some areas of scholarly disagreement.⁶⁵ One of the most controversial topics continues to be whether Takeloth II was a king of the 22nd Dynasty or a hitherto unknown 23rd Theban Dynasty. (Kitchen favored the first view; Aston, Broekman, and Jansen-Winkeln favored the second view.)⁶⁶ This debate is ongoing. Nevertheless, the chronology still retains Shoshenq I’s accession in 945.⁶⁷

Certain conclusions may be drawn from the above comments. Foremost is the observation that historical chronology is based on “dead-reckoning” of regnal years and synchronisms with the ancient Near East. The latter derive from the dates assigned to the AEC. On this framework, Shoshenq I’s accession and the beginning of the 22nd Dynasty

⁶⁰ E. Hornung, “Introduction,” *AEC* (2006) 13.

⁶¹ K. Jansen-Winkeln, “The Chronology of the Third Intermediate Period: Dyns. 22-24,” *AEC* (2006) 235. ⁶² *Ibid.*, 264.

⁶³ *The Libyan Period in Egypt: Historical and Cultural Studies into the 21st-24th Dynasties: Proceedings of a Conference at Leiden University, 25-27 October 2007* (eds. G.P.F. Broekman, R.J. Demarée, and O.E. Kaper; Leiden: NINO, 2009).

⁶⁴ “Introduction,” *Libyan Period*, vii.

⁶⁵ Kitchen, “The Third Intermediate Period in Egypt: An Overview of Fact and Fiction,” *Libyan Period*, 161-202.

⁶⁶ “Introduction,” *Libyan Period*, viii-ix; Kitchen, “Third Intermediate Period,” 161-202. These topics will be discussed later in context.

⁶⁷ Kitchen, “The Third Intermediate Period,” 202.

are dated to 945 BCE and lunar dates are used to define the accession of Ramesses II in 1279, and Thutmose III in 1479. The Sothic rising date on the Ebers calendar for Amenhotep I's ninth year is not factored into these dates.

Scientists' Views on Egyptian Chronology

Having touched on the historical chronology, I turn now to what scientists are saying about their dates for the Egyptian chronology. A publication of 2004 entitled *Tools for Constructing Chronologies* is also devoted to eliciting the chronology of the ancient Near East. Chapter 4 summarizes results of the SCIEM 2000 Project.⁶⁸ Cichoki et al. state:

Unfortunately, this new, very early date (17th century BCE) seemed to make the sequences drift apart. It appears to be quite impossible to squeeze an additional 150 years out of the traditional sequence of time based on the regencies of Egyptian kings. Scholars who were used to chronological discrepancies of 20 to 30 years suddenly saw themselves confronted with a completely new, utterly irritating situation.⁶⁹

According to Bietak and Höflmayer in their introduction to the SCIEM conference held in 2003 (proceedings published in 2007) the latest scientific studies indicate that the beginning of the 18th Dynasty should be raised by about 100–150 years to the middle-to-second-half of the 17th century BCE (1650–1600) above the dates currently being advocated for it on the basis of historical chronology, ca. 1500 BCE.⁷⁰ Thus there is a real conflict between the dates given to historical chronology and radiocarbon dating. They write,

It would not make sense to try to remedy this situation by unilaterally raising the Aegean chronology by 100 to 150 years, claiming that a new proportion of the relationship between Egypt and the Aegean has been found. The previous generation of scholars who have established the historical chronology by comparative methods of prehistoric archaeology were certainly no fools and have done their best to establish a timeframe based on exports and imports, with all the difficulties such as time lags and heirloom effects involved.⁷¹

The conclusion of Bietak and Höflmayer is that “either the radiocarbon chronology or the historic chronology is wrong, or both have a defect.”⁷²

Thera Eruption

The Thera eruption is central to the dating of the early 18th Dynasty. Manfred Bietak stated at the May 2001 SCIEM II conference, “Theran pumice suddenly appears in large quantities at the 18th Dynasty levels from stratum C/2 onwards to be dated to the Tuthmoside period. At the Hyksos and early 18th Dynasty levels pumice is very rare and does not originate from Thera.”⁷³ Malcolm Wiener at the 2003 conference noted that Theran pumice was found in large quantities in the workshops of Thutmose III or his

⁶⁸ Otto Cichoki, Max Bichler, Gertrude Firneis, Walter Kutschera, Wolfgang Müller, and Peter Stadler, “The Synchronization of Civilizations in the Eastern Mediterranean in the Second Millennium BC: Natural Science Dating Attempts,” *Tools for Constructing Chronologies: Crossing Disciplinary Boundaries* (eds. C.E. Buck and A.R. Millard; London: Springer, 2004) 83-110.

⁶⁹ Cichoki et al., “Synchronization of Civilizations,” 84.

⁷⁰ Bietak and Höflmayer, “Introduction: High and Low Chronology,” *SCIEM II* (2007) 16; see also Wiener, “Egypt and Time,” 331.

⁷¹ *Ibid.*, 16.

⁷² *Ibid.*, 19.

⁷³ M. Bietak, “Science versus Archaeology: Problems and Consequences of High Aegean Chronology,” *SCIEM II* (2003) 28.

successor Amenhotep II and were abandoned “in any event after ca. 1450 BCE.”⁷⁴ He notes though, that in “Workshop N in area H/I, the pumice may appear as early as the reign of Tuthmosis I, around 1500 BCE.” The latest date for the eruption, being for him ca. 1525 would separate the abandonment of the workshops by two to three generations, and if the eruption was ca. 1600 it would mean five to six generations.⁷⁵ Thus it seems impossible for Wiener to date the Thera eruption to the 17th century.

Bietak concluded, “All the evidence strongly suggests that this event [the eruption of Thera] happened sometime in the early 18th Dynasty most probably before the reign of Tuthmosis III.”⁷⁶ But he also states: “The network of Egyptian chronology and its synchronism with Near Eastern, particularly Assyrian chronology makes this, at least for the time being, somewhat difficult to accept.”⁷⁷

Radiocarbon-dating of Seeds

Wiener also commented on a challenge to the standard chronology in noting that radiocarbon dates of seeds collected at Tell el-Dab^a in the C/2 stratum for the post-Hatshepsut Thutmose III period “gave central dates of 1620, and earlier, far too early on textual, archaeological and astronomical grounds.”⁷⁸ Also, he writes, that the dates for the New Kingdom “cannot move very much from those stated above ... because of the correlations with the chronology of the ancient Near East fixed via the correspondence of Amenophis III and Akhenaten with Near Eastern rulers whose dates are known to within about a decade.”⁷⁹

Consequently, Wiener concludes that the ca. 1620 date for the post Hapshepsut Thutmose levels cannot be correct, and proceeds to discuss possible reasons why the radiocarbon dating might have been affected to give high dates. He does not come to any definitive conclusion.⁸⁰ He awaits “future developments”.⁸¹

Ice-core Samples and Dendrochronology

Another line of scientific research concerned ice-core samples taken from Greenland containing rough-textured volcanic glass particles (pumice), such as that found in the workshops of Thutmose III and Amenhotep II. The samples yielded the date of ca. 1645 ± 4 BCE based on the counting of the laminations (done repeatedly) and their chemical analysis.⁸² Some scholars declared that the glass particles came from the Thera eruption;⁸³ others argued that the chemical composition of the ice particles was so close to those obtained from the Aniakchak eruption in the Aleutian Chain near Alaska that they were more likely to come from that area.⁸⁴ Because the origin of the pumice

⁷⁴ M.H. Wiener, “Times Change: The Current State of the Debate in Old World Chronology,” *SCIEM II* (2007) 40, citing M. Bietak, “Towards a Chronology of Bichrome Ware? Some Material from ‘Ezbet Helmi and,” *The Chronology of Base-ring Ware and Bichrome Wheelmade Ware* (ed. P. Åström; Stockholm: The Royal Academy of Letters, History and Antiquities, 2001) 175-201.

⁷⁵ *Ibid.*, 40.

⁷⁶ Bietak, “Science versus Archaeology,” 30.

⁷⁷ *Ibid.*, 30.

⁷⁸ Wiener, “Egypt and Time,” 326.

⁷⁹ *Ibid.*, 326, 331; similarly *idem*, “Times Change,” 26.

⁸⁰ *Ibid.*, 331-36.

⁸¹ *Ibid.*, 336.

⁸² *Idem*, “Times Change,” 27.

⁸³ C.U. Hammer, G. Kurat, P. Hoppe, W. Grum, and H. Clausen, “Thera Eruption Date 1645 BC Confirmed by New Ice Core Data?” *SCIEM II* (2003) 87-94.

⁸⁴ Wiener, “Times Change,” 27 citing N.J.G. Pearce, et al., “Identification of Aniakchak (Alaska) Tephra in Greenland Ice Core Challenges the 1645 BC Date for Minoan Eruption of Santorini,” *Geochemistry*,

particles in the ice-cores has been contested, they have not yet been able to confirm the years of the Thera eruption nor the 18th Dynasty.

Another area of investigation concerns dendrochronology or the dating of tree rings. Concerning a 1503-year tree-ring sequence involving trees from Gordion, the capital of Phrygia, Sturt Manning commented that:

A remarkable growth anomaly occurs over a few years in this Aegean dendrochronology starting in ring 854 (in 61 constituent trees as of early 2004). It has been suggested that this anomaly could be consistent with the impact of a massive low-mid latitude northern hemisphere volcanic eruption, and in particular Thera (Santorini). However, there is at present absolutely no positive evidence that connects the two events.⁸⁵

Tree ring 854 is dated ca. 1653–1650 in a sequence based on “many high-precision radiocarbon dates on specific decadal blocks of wood.”⁸⁶ Manning asserts, “This dendrochronology is a fact and its dating is very near absolute.”⁸⁷ He recognizes the possibility that there could be “a temporal overlap with the large volcanic signal in the Dye 3/GRIP ice-core ca. 1645 BCE – however this is not certain ... and, moreover, this volcanic signal seems not to be related to Thera on current evidence.”⁸⁸

Wiener makes the following statement concerning pottery evidence for the eruption of Thera: “The earliest certain appearance of W[hite] S[lip] I pottery in Egypt and the Near East comes in the Tuthmoside era, not long before ca. 1500 BCE with the possible exception of WS I sherds found at Tell el^cAjjul whose context, while uncertain, makes them potential candidates for an earlier arrival.”⁸⁹ Bietak notes that at Thera, the white slip I (WS I) ware comes from a pre-eruption layer, and a WS I bowl in Egypt from Tell el-Dab^ca is not seen there before the 18th Dynasty.⁹⁰ He dates WS I’s earliest appearance with the reign of Thutmose I onwards.⁹¹ In an effort to make the pottery dates meet conventional chronology, Wiener poses four extenuating circumstances then concludes, “The date of the eruption would still move no earlier than 1550 BCE.”⁹² He concludes, “A delay of 100 or more years between the time a WS I bowl reaches Thera and the time the ware reaches the Near East and Egypt appears unlikely.”⁹³

Problems Remain

The above discussion illustrates problems with the dating of the beginning of the 18th Dynasty. Radiocarbon dates give a high chronology in the 17th century, and historical chronology based on dead-reckoning of known regnal years, results in a low chronology. While the scientists are re-examining their scientific results, others still cling

Geophysics, Geosystems 5:3, (2004); Pearce, et al., “Reinterpretation of Greenland Ice-Core Data Recognises the Presence of the Late Holocene Aniakchak Tephra (Alaska), not the Minoan Tephra (Santorini), at 1645 BC,” *SCIEM II* (2007) 139-47.

⁸⁵ S.W. Manning, “Clarifying the ‘High’ v. ‘Low’ Aegean/Cypriot Chronology for the Mid Second Millennium BC: Assessing the Evidence, Interpretative Frameworks, and Current State of the Debate,” *SCIEM II* (2007) 103.

⁸⁶ *Ibid.*, 103.

⁸⁷ *Ibid.*

⁸⁸ *Ibid.*, 103-4; See also S. W. Manning, B. Kromer, P. I. Kuniholm, M. W. Newton, “Anatolian Tree Rings and a New Chronology for the East Mediterranean Bronze-Iron Ages,” *Science* 294, Issue 5551 (2001) 2532-35; Wiener, “Times Change,” 28-29.

⁸⁹ Wiener, “Times Change,” 39. Tell el^cAjjul is in Canaan.

⁹⁰ Bietak, “Science versus Archaeology,” 23-25.

⁹¹ *Ibid.*, 23-25 and see discussion to p. 28.

⁹² Wiener, “Times Change,” 39.

⁹³ *Ibid.*, 39-40.

to the dates derived for the historical chronology based on Thiele's dates for Rehoboam's fifth year in 925 BCE. They cite the lower dates as being compatible with the ancient Near East while not being able to close the gap between them and the science-based dates. The fallacies of Thiele's chronology have already been suggested and will be demonstrated further in the next chapter. Results from the Gothenburg colloquium demonstrated that Egyptologists were disinclined to use resources that were unhelpful in confirming their dates, such as Manetho's dynastic lists, Sothic dates (especially that of the Ebers calendar), and only applied lunar dates to fit their already dead-reckoned dates.

What is needed is a new historical chronology, one that takes into account all the available resources including the results of science-based studies. An historical chronology that accommodates the raising of the 18th Dynasty by 100–150 years is presented in these chapters.

For example, in my chronology, Thutmose I began to reign in 1630 BCE, which would place the Theran eruption before the Thutmosides at about the same time as the date attributed to the ice-core samples from Greenland of about 1645 ± 4 years. (That does not prove the ice shards came from Thera).

Regarding the carbon dating of seeds, the central date of 1620 for post-Hatshepsut and Thutmose III is a little too early compared with my dates for Hatshepsut beginning to reign in 1604 (as Thutmose III's guardian, and regent) and Thutmose III's accession in 1590. But the *earlier* dates for the seeds would accord with the reigns of Thutmose I (my dates 1630–1622) or Thutmose II (my dates 1622–1604), *or even before*, and would be consistent with the Theran pumice and Greenland ice-core dates.

Furthermore, the appearance of the WS I pottery comes at the appropriate time, after the accession of Thutmose I being an update of between 100 and 150 years from the commonly assumed chronology.

Sturt Manning gives a pertinent comment with respect to the chronology of the middle second millennium and the date of the Thera eruption—an observation that is applicable to all areas of research. He writes:

Various authors begin any study with a largely pre-determined position. They believe some set of views or set of data are effectively right or paramount and everything else is then analysed accordingly – thus alternative evidence receives intense critical comment and or dismissal (even is ignored), while confirmatory evidence or scholarship is simply stated and or praised with little critical consideration or self-reflection.... The outcome of such pre-conceived positions and assumptions, the resultant selective filtering of information, and the not unimportant role of the academic ego, is that only small and incremental changes and revisions are made to the “right” basic position. Radical revision is avoided where possible, and the approximate status quo is maintained almost on principle.⁹⁴

A new chronology for ancient Egypt cannot be proposed by merely making a few slight changes here and there. It starts by dispensing with Thiele's dates and dating methods for Israel and Judah and Rehoboam's fifth year in 925. A “new” but old chronology for Israel and Judah comes from analyzing the textual history and chronological data found in the early Greek recensions of the Books of 1 and 2 Kings complemented by comparison with the late Hebrew Masoretic Text. When the relative chronology is established, Julian calendar dates can be applied to give the dates of the absolute chronology. A new starting date for the divided kingdom and Rehoboam's fifth year emerges—a date 52 years earlier than currently assumed. This goes a long way in closing the gap between the science-based dates and those of current Egyptian historical

⁹⁴ Manning, “Clarifying the ‘High’ v. ‘Low’,” 101-2.

chronology. Then other chapters will show how the gap is closed even further. Finally, a reconstruction of Dynasties 1–25, validated by modern astronomical analysis of numerous references in the archaeological record, will provide a full and credible chronology of the kings of Egypt.

Finally, a warning is apposite. Egyptology is a gigantic field of research. The study of its chronology is huge in itself, so there exists the tendency to specialize on the chronology of particular periods or artifacts. But turning to selected chapters of interest without following the consecutive argument herein will leave the researcher exposed. The argument is consecutive, and the omission of any chapter may lead the reader to miss vital information.

Failure to grasp how the astronomical tables work will vitiate a large portion of vital evidence. Dismissing the 20th century wrangle over “feasts held out their eponymous months” will ensure that the evidence for the eventual solution in chapter 10 is utterly missed. The three chapters about Sesostris III and Illahun are pivotal to establish the key earliest fixed date in Egyptian chronology in Chapter 14, of Neferefre in 1750 BCE.

The dates of dynasties before and after 1750 BCE, while contentious in the current Egyptological community, can only be responsibly challenged if the anchor links in the chain of evidence presented are conclusively disproven. Isolated disagreements from prior presuppositions will carry little weight unless this author’s methodology, supported by astronomical evidence and its consecutive application herein, are conclusively disproven. Ultimately that chain of evidence leads to 977 BCE as the meeting point between Shoshenq I in his 20th year and Rehoboam of Judah in his 5th year.

Picking up this work will involve the reader in an adventure of discovery, even if every step will require careful consideration to assure validation and dependability along the way. That does not mean this author has all the answers. By no means. But where assumptions must be made and uncertainties admitted, they too are openly stated, given due consideration, and the passage to the next anchor point undertaken with extra caution.