Chapter 10

Resolving the Eponymous Month Conflict

The core puzzle in much of the dialogue over Egyptian calendars in the last century is the problem of feasts held out of their eponymous months in the Greco–Roman Calendar.

Examining the evidence presented for Parker's and Depuydt's lunar calendars with seasons and month-names, as undertaken in the previous chapters, has led me to conclude that Egypt did not utilize a lunar timetable to record the passage of a solar year.

There are, of course, lunar months and days, with phases such as new and full moons dated to a so-called civil calendar. The timing of various festivals and celebrations were prescribed to be held on new or full moons. But no transference of lunar feasts from a lunar calendar to a civil calendar can explain the anomaly of feasts apparently celebrated out of their eponymous months in the Greco–Roman calendar.

Moreover, there are *no examples* of the kind of transfer proposed by Parker, "two dates for each festival, one fixed to the civil year, the other determined by the lunar year, with varying dates in the civil calendar."[1] In this context Parker was referring to Gardiner's examples of feasts set on day one of a civil month, but these feasts do not reappear as lunar feasts set on varying dates in the civil calendar. Conversely, feasts dated to the new or full moon occur on varying days of the month in the civil calendar but they do not have a *counterpart* set on day one of another month.

Furthermore, there is no attestation of a 13th intercalary lunar month to keep the rising of Sothis in the 12th civil month of *wp rnpt*—Sirius/Sothis rises at the beginning of the solar year whenever this occurred in its cycle through the civil calendar—and all theses resting on a 13th intercalary lunar month are invalid, including Nolan's cattle counts.

If lunar calendars are eliminated from consideration, scholars must still deal with the evidence of feasts, which appear to have moved back to day 1 of the previous month as seen in the Greco-Roman calendar beginning with the month of *tḫy* or Thoth. These same feasts are held *in* their eponymous month in a calendar beginning a month earlier such as *wp rnpt* in the Ebers calendar.

This situation caused Gardiner to propose two civil calendars, one beginning with "Mesore" the later name for *wp rnpt*, and one beginning with Thoth, the later name for *tḫy*. Thus Mesore and Thoth both ran concurrently as I *3ḫt*.

However, Gardiner was puzzled about how or why this situation had come about. He suggested that it was due to a philosophical difference between a "Re school" and a "Thoth school," but this idea has not convinced Egyptologists. How, then, can the calendar situation be resolved? I propose the following answer based on the timing of the seasons in the south and north of the country. This discussion will advance from basic simplicity at first, and proceed to the complexities that Egyptologists have grappled with in the descriptions that have already been detailed.

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[1] R.A. Parker, *The Calendars of Ancient Egypt* (SAOC 26; Chicago, IL: Oriental Institute of the University of Chicago, 1950) 58 §290.

Egypt is "Two Lands": Upper Egypt and Lower Egypt

Ancient Egypt was known as the "Two Lands" because it had two defined regions, Upper Egypt and Lower Egypt (see Figure 10.1). Upper Egypt began at its southern border at the first cataract near Elephantine and followed the Nile north almost 1200 kilometers to the south of Memphis. Lower Egypt included Memphis and the region of the Delta with its northern border at the Mediterranean Sea. Thebes was the civil capital of Upper Egypt, Memphis the hub of Lower Egypt. Agriculturally their seasons differed between the highlands of Upper Egypt and the lowlands of the Nile delta.[2]

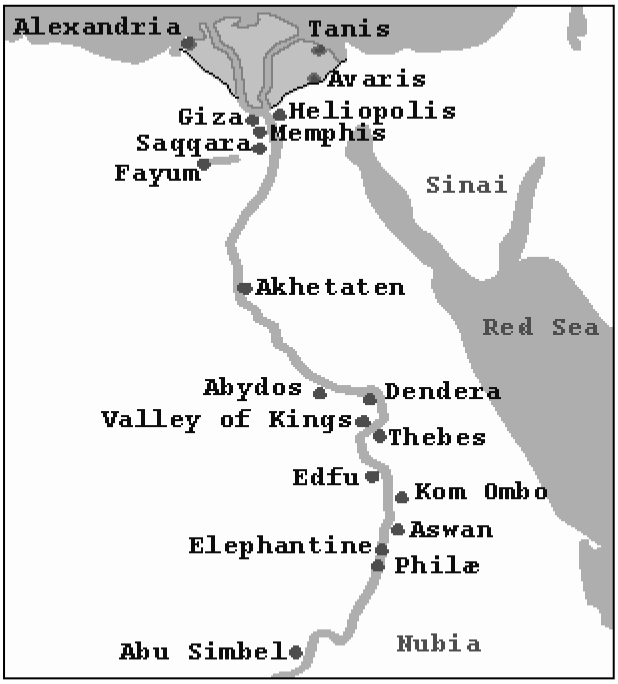

Figure 10.1: Map of Upper and Lower Egypt.

There were differences between the Upper and Lower Egyptians in the ancient world: they spoke different dialects and had different customs that impacted on national life with its festivals and calendars. The regimes of political, military, and civil life also ebbed and flowed over the centuries. Kings of Upper Egypt wore the *hedjet* or White Crown, and kings of Lower Egypt wore the *deshret* or Red Crown. The two kingdoms of Upper and Lower Egypt were united ca. 3000 BCE. The pharaohs were known as the rulers of the Two Lands, and wore the *pschent*, a double crown, each half of the crown representing sovereignty over each of the two kingdoms.

The Nile River was the main communication and transportation route linking north and south. But more importantly it was responsible for the life and livelihood of ancient Egyptians. Every year torrential rains from the Ethiopian Highlands brought rich, silt-laden waters into the Nile, which Egyptians used to fertilize and irrigate the surrounding lands to produce their crops. Without the annual inundation, the crops would fail and the people would starve.

Modern calculations for ancient Egypt set the appearance of the inundation at Aswan by the end of June or early July (using the Gregorian calendar) and at the Delta in August, swelling to its *highest* at Cairo (north of Memphis) by September or October. An average time for the inundation to travel the length of the Nile in Egypt would be

[2] Image from http://www.ancient-egypt.info/2013/09/ancient-egyptian-nile-river.html

about one month.[3] The height of the Nile was unpredictable from one year to the next. The levels fall quickly in November and December, with the lowest levels between March and May/June.

The inundation of the Nile waters lasted about four months, and was known as the season of *akhet* (*3ḫt*) before they receded sufficiently to allow sowing and planting to begin. The growing season of *peret* (*prt*) also lasted approximately four months, and afterwards came the season of *shomu* (*šmw*) when the harvesting took place, which was also a period of four months.

Astronomical time.

While the agricultural seasons provided an annual calendar, the Egyptians were well aware of a celestial timetable. The seasonal phases gave convenient names to the three seasons corresponding to the solar year, the time it takes for the Earth to orbit around the Sun from one starting point until its return to that same point. But the solar year consists of 365¼ days. The timing of the inundation or flooding of the Nile could vary by several months from one year to the next,[4] and was unreliable as an indicator of a new solar year. So the Egyptians reckoned with an astronomical timetable, the solar year that coincided with the heliacal rising of the star Sothis.

The Solar Year Began with the Heliacal Rising of Sothis in the South

The flooding of the Nile was preceded in the south by the heliacal rising of Sothis. When the star was first seen after a period of 70 days invisibility the Egyptians reckoned this as the beginning of their solar and agricultural year because they knew a year had passed since the last time the star had risen. This event occurred near the time of the summer solstice, or when the sun was at its height. The time between each heliacal rising of Sothis was the time it took for the earth to orbit around the sun back to the point where the rising of Sothis could again be seen in early daylight.

In Upper Egypt the Calendar was Regulated by the Sothic Cycle

The heliacal rising of Sothis was first seen in the south. It eventually regulated the calendar used in Upper Egypt.[5] The people of Upper Egypt held a feast at the beginning of each year on I *3ḫt* 1 calling it *wp rnpt*, "the opener," or the feast of *prt Spdt*, the "going up of Sothis." The occurrence of the *prt Spdt* festival, on the occasion of the heliacal rising of Sothis, becomes significant in subsequent inscriptional evidence.

Lower Egypt

The people in the north, Lower Egypt, could not begin planting at the same time as those in the south because the flood waters would recede about a month later. So the *first* planting month of Lower Egypt was concurrent with the *second* planting month of Upper Egypt. This meant that the agricultural year *started one month later* in the north than in the south. The difference in the start of their respective years was no problem in early periods when the people of each region conducted their farming and Nile-based activities with various degrees of geographical and political separation.

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[3] H.E. Winlock, "The Origin of the Ancient Egyptian Calendar," *Proceedings of the American Philosophical Society* 83 (New York: Metropolitan Museum of Art, 1940) 452; C. Seawright, "The Inundation," at http://www.touregypt.net/featurestories/nile.htm.

[4] The beginning of inundation could vary from 335 to 415 days, according to Winlock, ("Origin," 452).

[5] Wells proposed a luni-stellar calendar for Upper Egypt based on Sothis, using Parker's idea of a lunar calendar. R.A. Wells, "Re and the Calendars," *Revolutions in Time: Studies in Ancient Egyptian Calendrics* (ed. A.J. Spalinger; San Antonio, TX: Van Siclen, 1994) 16-23.

Unlike those in the south, the northerners celebrated their year by the feast of their sun-god Re. According to Wells, Re's mythical birth occurred at the time of the winter solstice and then he began to travel through the horizons over the Two Lands. Six months later he had reached his northern-most point, when the sun was at its height at the time of the summer solstice.[6] This meant that the heliacal rising of Sothis, which was regarded as the beginning of the agricultural year, and the "feast of Re" both occurred near the time of the summer solstice.

The phases of the Nile naturally divided the year into three seasons that were given appropriate names: *3ḫt*, *prt*, and *šmw*. Presumably, with the passing of time, seasons were divided into four months each, and months gained their names from the festivals held in each, such as *wp rnpt* "the opener." Re's travel through the horizons is perhaps implicit in the month-name *R^c ḥr 3ḫty* "Re Horus of the Two Horizons." Renenutet was the harvest goddess, and Renenutet was the name given to the first month of harvest, I *šmw*.

Emergence of a Civil Calendar

At some stage, a calendar emerged having 30 days to each month and 5 epagomenals, becoming the basis of the two calendars: civil calendars using the names of the agricultural seasons of the solar year; inundation, sowing, and harvest.

When numerical designations were applied to these calendars, I *3ḫt* was the month of *wp rnpt* in the calendar of Upper Egypt followed by II *3ḫt*, the month of *tḫy*, and so on. But *tḫy* was I *3ḫt* in the calendar of Lower Egypt because the inundation, equated with the first month of that region, arrived about a month later in the north than in the south. Thus the month of *tḫy* had two designations, and likewise the following months. Feasts set on the first day of each month also had the same two designations, such as the seasonal feast of Hathor on IV *3ḫt* 1 and III *3ḫt* 1, but the month-name of both in the civil calendar was Hathor. How this evolved is lost in the mists of antiquity, but the evidence points towards similar but different calendars in Upper and Lower Egypt.

This arrangement meant that *months of the same names were aligned with each other, but their numerical designations were always one month apart.* The only two months, one in each calendar, that did not have the same names were *wp rnpt* and *R^c-ḥr-3ḫty* and they were aligned with each other, being the first month and the 12th month, respectively. *This simple alignment resolves the problem of feasts supposedly being held out of their eponymous months in the Greco–Roman calendar.*

No "shift" of any feast from a lunar calendar to a civil calendar ever took place. Thus Parker's and Depuydt's lunar calendars, which were proposed to solve the problem, have no basis in fact.

My alignment of the two calendars is displayed in Table 10.1.

[6] Wells proposed that when the Two Lands amalgamated early in predynastic history, the birth of Re falling on the winter solstice in the sixth month had to be moved to the 12th month of the summer solstice. He attributes this to a secondary birthplace of Re in Lower Egypt. ("Re and the Calendars," 4, 6, 21–23). There is no attestation that the birth of Re was ever celebrated in the sixth month, and it may always have been celebrated at the time of the summer solstice in the 12th month.

Table 10.1: Alignment of Calendars of Upper and Lower Egypt

Upper Egypt	Lower Egypt	Month-name
I *3ḫt*	IV *šmw*	*wp rnpt* in Up. Eg. and *R^{c}-ḥr-3ḫty* in L. Eg.
II *3ḫt*	I *3ḫt*	tḫy
III *3ḫt*	II *3ḫt*	mnḫt
IV *3ḫt*	III *3ḫt*	ḥwt ḥr
I *prt*	IV *3ḫt*	k3 ḥr k3
II *prt*	I *prt*	šf bdt
III *prt*	II *prt*	rkḥ wr
IV *prt*	III *prt*	rkḥ nḏs
I *šmw*	IV *prt*	rnnwtt
II *šmw*	I *šmw*	ḫnsw
III *šmw*	II *šmw*	ḫnty ḫty
IV *šmw*	III *šmw*	ipt ḥmt

Table 10.1 shows that the months, and therefore the feasts that named the months, have two designations one month apart. In previous discussions *wp rnpt* "the opener" and the "feast of Re" or the "Birthday of Re" were both dated to I *3ḫt* 1. In this case, the feast of the 12th month, concurrent with the feast of the first month, took on the latter's designation. The feast of Hathor was held on IV *3ḫt* 1 in the calendar of Upper Egypt, but was out of its eponymous month if applied to III *3ḫt* 1 in the calendar of Lower Egypt. The same situation applies to the other months having two designations set on the first day of two consecutive months. These nation-wide festivals were held on the *same day* throughout Egypt, but their numerical designations differed by one month.

Gardiner's alignment, which had the *numerical* designations aligned (I *3ḫt* with I *3ḫt*, II *3ḫt* with II *3ḫt*, etc.) meant that the feasts of their eponymous months always seemed to be one month earlier in his "Mesore"-beginning calendar, than in his Thoth-beginning calendar. Had he aligned the 11 *months with the same names* in his two calendars he would have resolved the alleged "Brugsch and Gardiner phenomena." These phenomena never actually existed as they are based on an incorrect interpretation of the feasts supposedly held out of their eponymous months in the Greco–Roman calendar.

Ebers Calendar, Upper Egypt, Early 18th Dynasty

The first column of the Ebers calendar represents the month order and names of the calendar of Upper Egypt as it was in the early 18th Dynasty. It differs from the calendar of Lower Egypt represented in the Senmut tomb ceiling only in having *wp rnpt* at its head, whereas *wp rnpt* is the 12th month depicted in Senmut's tomb. The later depictions, as we have noticed previously, have the same order as that of Senmut's ceiling with a few variations in names of months. In the Karnak water clock, the Ramesseum and Medinet Habu temple ceilings, and the Edfu temple frieze, the last month is given as *R^{c} ḥr 3ḫty*, though *wp rnpt* is 12th month in the Cairo papyrus 86637. It is found elsewhere in a fragment of the Tanis Geographical Papyrus,[7] in the Esna temple calendar,[8] and in Edfu text IV, 8–9 where *wp rnpt* is the name for IV *ŝmw* in Edfu texts VII, 7 and IV, 2,[9] discussed earlier in regard to supposed "double dates."

By the time of the 18th Dynasty, any earlier differences in month-names in the two regions had merged. The two calendars were operating at the same time as attested in various inscriptions from ostraca and papyri from the 18th to the 20th Dynasties.

7 L. Depuydt, *Civil Calendar and Lunar Calendar in Ancient Egypt* (Orientalis Lovaniensia Analecta 77; Leuven: Peeters, 1997) 116-17.

8 Spalinger, "From Esna to Ebers: An Attempt at Calendrical Archaeology," *Studies in Honor of William Kelly Simpson* Vol 2; (Boston: Museum of Fine Arts, 1996) 759.

9 R.A. Parker, "The Problem of the Month-Names: A Reply," *Rd'É* 11 (1957) 103.

Heliacal Risings of Sothis used in Upper Egypt

It might be wondered why the ancient Egyptians tolerated two calendars from antiquity down to the New Kingdom. A very important reason is that the calendar of Upper Egypt was used to date the heliacal risings of Sothis as it moved through the days of the civil calendar in its nearly 1460 year cycle. The date of III *šmw* 9 in the ninth year of Amenhotep I in the Ebers calendar not only demonstrates the significance that Egyptians attributed to dating key events by the Sothic cycle, it also shows its referential starting point at the commencement of the Sothic cycle some 1356 years earlier.

Significant dates were located within the Sothic cycle, by reference to the time it took Sothis to move through the civil calendar from I *3ḫt* 1 until IV *šmw* 9. Thus, from I *3ḫt* 1 to III *šmw* 9 are 339 days, which equates to 1356 years. Having commenced dating by the Sothic cycle using the calendar of Upper Egypt, it was necessary to use the same calendar for subsequent sightings at the same latitude (in this instance, Thebes), in order for the passage of time to be measured with relative accuracy.

Since heliacal risings were dated to a king's specific regnal year, the time between two kings could be measured by the civil dates attributed to each *providing that* the observations were taken from the same latitude and dated by the same calendar. If two kings are at *different locations* at which the heliacal risings were recorded, then adjustments are required to take account of the difference of one year per 1 degree of latitude proceeding north when reckoning the time interval between them. For example, Thutmose III has a date of III *šmw* 28 recorded at Elephantine.[10] If the recording had been made at Thebes, it would be dated to III *šmw* 30 because there are about 2 degrees of difference in latitude between the two centers.

Sothic Calendar is Important for Recording Long Passages of Time

The use of the heliacal risings of Sothis to reckon on years between kings or events was important for keeping track of time covering long periods. Each solar year—the period between Sothic risings—was 365¼ days long, as the latter's appearance in the morning sky was regulated by its same position relative to the sun every year.[11] The appearance of Sothis after 70 days of invisibility (due to its closeness to the sun) was recorded using the civil calendar of Upper Egypt. But unfortunately, the *civil* calendar was short of the solar year because it was only constructed to have 365 days not 365¼ days. Because of the deficiency, the civil calendar gained 6 hours every year, and 24 hours or one day every four years.

Without the addition of an extra day every four years, the civil calendar of Upper Egypt clicked one day forward every four years, so that after about 730 years the civil calendar date of I *3ḫt* 1 was six months ahead of the heliacal rising of Sothis. In other words, the seasons of the civil calendar were displaced by six months from their original position in the solar/agricultural year.

The correspondence of the solar year to the calendar of the civil year gradually but constantly changed over the centuries. The solar and seasonal year inexorably continued year after year, but a device was needed to locate any particular year in the long-term calendar, in the manner that the Gregorian calendar is our internationally accepted measure of the passage of time.

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[10] A.J. Spalinger, "Sothis and 'Official' Calendar Texts," *VA* 10/2-3 (1995) 176.

[11] According to Teije de Jong, "In the course of 4000 years the date of the heliacal rising of Sirius moves forward with respect to the summer solstice by one day in about 120 years," ("The Heliacal Rising of Sirius," *Ancient Egyptian Chronology*, [eds. E. Hornung, R. Krauss, D.A. Warburton; Leiden and Boston: Brill, 2006] 438).

Ebers Calendar

The reason that the Ebers calendar (as shown in Table 10.2) is significant to Egypt's chronology is that it displays the correspondence between the solar/agricultural months and the civil calendar. It indicates that the "going up of Sothis" on III *šmw* 9 fell in Amenhotep I's ninth year in the calendar of Upper Egypt. III *šmw* 9 was the first day of the new solar/agricultural year, equated with the first day of *wp rnpt*, and the Inundation (*3ḫt*) s*eason.*

Table 10.2: The Ebers Calendar

Year 9 under the majesty of the king of Upper and Lower Egypt *Dsr-k3-R*ᶜ **may he live forever**			
wp rnpt	III *šmw*	day9	going up of Sothis
tḫy	IV	day9	•
mnḫt	I *3ḫt*	day9	•
ḥwt ḥr	II	day9	•
k3 ḥr k3	III	day9	•
šf bdt	IV	day9	•
rkḥ wr	I *prt*	day9	•
rkḥ nds	II	day9	•
rnnwtt	III	day9	•
ḫnsw	IV	day9	•
ḫnt ḫt	I *šmw*	day9	•
i̓pt ḥmt	II	day9	•

• = ditto.

The purpose of the calendar was to show that III *šmw* 9 was the beginning of the solar/agricultural year and that the following months could be counted off from day 9 as given in the third column. The four months of Inundation were equated in the calendar from III *šmw* 9 to III *3ḫt* 8, corresponding to the *seasonal* (not civil) months of *wpr npt*, *tḫy*, *mnḫt*, and *ḥwt ḥr*. When the waters had receded sufficiently, the Nile workers could begin their planting. Approximately four months later, the harvesting could begin around III *prt*. (This applies to an agricultural scenario, but the calendar could be used for other purposes—noting that the other side of the papyrus appears to be a record of medical treatment.)

Such a calendar enabled the Egyptians to keep track of the months and seasons of the solar/agricultural year by equating the seasons with the civil calendar commencing with the day of the rising of Sothis as it moved through the centuries. While the Ebers calendar may have been constructed as an occasional document for a particular year, the heading of the calendar assists us to locate it within the full Sothic cycle, and relate it to other years within the cycle.

Following the ninth year of Amenhotep I, Sothis would take another 228 years to reach the end of the cycle before its heliacal rising coincided with I *3ḫt* 1 again at the beginning of a new Sothic cycle. By knowing the civil date of the Sothic rising that began the solar/seasonal year, any particular date can easily be computed.

The repetition of the large dots under the "going up of Sothis" in the fourth column of the Ebers calendar (Table 10.2), understood as ditto marks, infer that the solar/agricultural months changed to the next solar/agricultural month at "day 9" in the civil calendar. This assumes a 30-day month. The "day 9" for all months is somewhat schematic as another 5¼ days have to be taken into account in the 365¼ days of the solar year. But "day 9" would be used for convenience and the extra five days would not matter materially because for four years (rarely three or five years) the "going up of Sothis" would remain on III *šmw* 9 then move on to III *šmw* 10 in the civil calendar.

The Ebers Calendar's Significance for Egyptian Chronology

The Ebers calendar has a more significant role to play than merely stating the correspondence of months of the calendar of Upper Egypt and the solar/agricultural year, or being used to give the time between specific regnal years of two kings dated to a heliacal rising of Sothis. With the help of another Sothic cycle date, the Ebers calendar can provide a Julian date for Amenhotep I's ninth year.

The discovery that the calendar of Upper Egypt ran concurrently with the calendar of Lower Egypt throws into disarray the chronology of ancient Egypt as it is now understood by scholars. Dates based on the calendar of Upper Egypt must be considered independently of those of the calendar of Lower Egypt.

A difference of one month between the start and finish of both calendars amounting to a 30-day month, will, in terms of the Sothic cycle, take Sothis 120 years to traverse. For example, if III *šmw* 9 for Amenhotep I's ninth year is dated to the calendar of Upper Egypt it will occur 120 years earlier than if dated to the calendar of Lower Egypt, which has a further month of its calendar to run. Therefore, a date of III *šmw* 9 in Upper Egypt equates to II *šmw* 9 in Lower Egypt.

This difference also means that a Sothic cycle dated to the calendar of Upper Egypt will start and finish one month ahead of a calendar dated to Lower Egypt if the star's rising is observed from the *same* location. But observations from Upper or Lower Egypt would be from different latitudes, which would mean that the distance between the sites must be taken into account when reckoning the time between the beginning of one Sothic cycle and another. Provided the location and Egyptian date of a heliacal rising of Sothis is known, and depending on which calendar is used to record it, we can convert a Sothic date to the Julian calendar and find the commencement date of the Sothic cycle. I take up this subject again below with respect to various records of the rising of Sothis including the Ebers calendar date.

Merging of the Calendars of Upper and Lower Egypt

By the end of the 20th Dynasty, it seems that a gradual merging of the calendars was virtually complete since examples of two calendars are no longer found. The calendar of Lower Egypt predominates during the merger, with *tḫy* as its first month and *R*^{c}*-ḥr-3ḫty* in 12th place. The calendar of Lower Egypt supplanted the calendar of Upper Egypt regulated by the heliacal rising of Sothis, with *wp rnpt* in first place and *ipt hmt* (later Epiphi) in 12th place.

The calendar of Lower Egypt was the precursor of the Greco–Roman calendar having *tḫy* at its head, and *wp rnpt* and *R*^{c}*-ḥr-3ḫty* vying for last place. It is evident that the calendar of Lower Egypt spread south, no doubt taken there as the population itself spread southwards with its kings taking up residence at Thebes in the 18th Dynasty, contrary to a spread from south to north as Wells has stated.[12]

[12] Wells, "Re and the Calendars," 21-23.

Two Calendars in Operation for a Time

The two civil calendar designations given to fixed feasts demonstrate that two calendars were in use concurrently long after they had reached a written form.[13] A result of the merger of calendars is seen in the fact that the feasts of *wp rnpt*, the "opener of the year" and the "birthday of Re" could both be celebrated on I *3ḫt* 1, with the latter feast taking on the designation of I *3ḫt*. This situation, however, would have pertained only while *wp rnpt* was in first month position and *R*ᶜ*-ḥr-3ḫty* ran concurrently with it. One can imagine, with the spread of the population from north to south and vice versa, that the existence of two calendars running concurrently would cause problems in dating transactions, festivals, etc. It would be much less complicated if one calendar was used throughout.

Lower Egypt Calendar Prevails in the New Kingdom

By the New Kingdom, the calendar of Lower Egypt predominated over that of Upper Egypt. This meant that the month of *wp rnpt* "the opener" aligned with *R*ᶜ*-ḥr-3ḫty* had to share 12th position with *R*ᶜ *ḥr 3ḫty*—or otherwise be lost from the calendar altogether. Apparently reluctant to let go of *wp rnpt* and its same-named feast, the Egyptians retained both *wp rnpt* and *R*ᶜ*-ḥr-3ḫty* as names for the 12th month down to Greco–Roman times. Mesore ("the birthday of Re") replaced *R*ᶜ*-ḥr-3ḫty* in the Greco–Roman calendar. Unlike *wp rnpt* and *R*ᶜ*-ḥr-3ḫty* competing for the 12th month position, the other 11 months with the same names merged into the calendar of Lower Egypt. Only the different numeration for their months reveals their "pre-merger" identity in the two different calendars.

The Senmut tomb ceiling calendar (18th Dynasty), and the Ramesseum and Medinet Habu Temple ceiling calendars of the 19th and 20th Dynasties, show the calendar of Lower Egypt; whereas the Ebers calendar (18th Dynasty) and the Festival Calendar of Medinet Habu originating with Ramesses II (19th Dynasty) attest to the calendar of Upper Egypt. Both calendars were in use in the days of Ramesses II, which led to their inevitable merger by the 20th Dynasty.

Dates for Sothic Risings in Upper and Lower Egypt

By identifying two calendars, one in Upper Egypt and another in Lower Egypt, which begin and end one month apart, we are able to positively date Amenhotep I's ninth year by the date of the Sothic rising on III *ŝmw* 9. Two calendars or two observation sites for the "going up of Sothis" imply two Sothic cycles beginning and ending at different times. In order to date Amenhotep I's ninth year, one must first date the Sothic cycle known from later times, and then work backward to the 18th Dynasty. To do so, I review the following well-known records.

Sothic Cycle Ends/Begins in 139 CE

Censorinus, a Latin writer living in the 3rd century CE, recorded that the first day of the Egyptian month Thoth—the first month of the year—fell in 238 CE in the Roman calendar on VII Kal. Iul. Scholars equate this with June 25th.[14] Censorinus also noted

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[13] Contrary to Wells, who asserts that the two calendars had amalgamated before Upper and Lower Egypt had unified in the first two dynasties, with the spread of writing necessitating a simple calendar ("Re and the Calendars," 2, 23).

[14] Cited from XXI, 10 in *Censorini de die natali liber*, (ed. F. Hultsch, 1867, p. 46) by J. Finegan, *Handbook of Biblical Chronology: Principles of Time Reckoning in the Ancient World and Problems of Chronology in the Bible* (Princeton, NJ: Princeton University Press (1964) 27 §46. For the Roman method of reckoning dates, in which Kal stands for Kalends or the first day of every month, see p. 75 §141. See also R. Long, "A Re-examination of the Sothic Chronology of Egypt," *Orientalia* 43 **(**1974) 272-73.

that 100 years previously in the second year of Antoninus Pius who was consul for the second time along with Bruttius Praesens,[15] the Egyptian Thoth 1 fell on XII Kal. August = 21 July 139 CE. Scholars note that this date should be corrected to XIII Kal, August or 20 July 139 CE, a day earlier, to agree with the date of the heliacal rising of Sothis for that period.[16] But the two dates, 100 years apart for the beginning of new Sothic cycles, invite further consideration of the differences for the commencement of the Sothic cycles for Upper and Lower Egypt, respectively.

Additional support for the 139 CE date for the end/beginning of a Sothic cycle also comes from coins minted in Alexandria at the time of the aforementioned Antoninus Pius and Bruttius Praesen's consulship in 139 CE. The coins show a phoenix with a shining crown and the word AIΩN (denoting a significant period of time; an era) on it. Dated to the proconsulship, the minting of the coins suggests the end of one cycle and the commencement and celebration of a new Sothic cycle.[17]

Casperson's lunar table for the year 139 CE (Table 10.3) demonstrates that IV *šmw* 29 equates to 13 July. IV *šmw* 30 equates to 14 July, and a further five epagomenal days concludes the Egyptian civil year on 19 July. I *3ḫt* 1 occurs on 20 July, thus confirming the date for the end of the Sothic cycle on 19 July 139 CE. This provides a fixed end-date from which to work backward.

Table 10.3: Sothic cycle ends/begins in 139 CE (new moon listing from +139)

Memphis; Lat. 29.9, Long. 31.2; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			**Gregorian**			**Egyptian**			**DoW**	**ToD**	**Morning visibility**					
Yr	**Mo**	**D**	**Yr**	**Mo**	**D**	**Yr**	**Mo**	**D**			**−2**		**−1**		**0**	
139	6	14	139	6	13	2921	11	30	7	6:49	5:03	203	5:03	77	5:03	−8
139	**7**	**13**	139	7	12	2921	**12**	**29**	1	19:36	5:04	279	5:05	148	5:05	52
139	8	12	139	8	11	2922	1	24	3	10:45	5:21	214	5:22	117	5:22	26

DoW = day of week; ToD = time of day.

The Decree of Canopus in 238 BCE Gives a Date for the Heliacal Rising of Sothis

Centuries before, an earlier reference to the heliacal rising of Sothis concurs with the date 139 CE, which is assumed to have been observed at Memphis. This is referred to in the Decree of Canopus (in the western Delta), which was instituted in the ninth year of Ptolemy III Euergetes I in 238 BCE (reigned 247–221 BCE), when it was decreed that a sixth epagomenal day would be added every fourth year to keep the calendar adjusted to the appropriate seasons.[18] The relevant part of Spalinger's translation states:

> "Let each year a celebration at public expense be celebrated in the temples and throughout all the land to King Ptolemy and Queen Berenice, Benefactor Gods, on the day on which the star of Isis heliacally rises, which is regarded/considered by the sacred writings to be a new year, and is now celebrated in the 9th year, the first day of the month of Payni …"[19]

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[15] Years were dated by Roman consuls two of whom gave their name to one year at a time (Finegan, *Handbook*, 26 §46, 93-95 §§172-78).

[16] Ibid., 26 §46; R.A. Parker, "The Sothic Dating of the Twelfth and Eighteenth Dynasties," *Studies in Honor of George R. Hughes* (SAOC 39; Chicago, IL: Chicago: Oriental Institute of the University of Chicago (1976) 182; U. Luft, "Priorities in Absolute Chronology," *SCIEM II* (2003), 201.

[17] E. Hornung, *Untersuchungen zur Chronologie und Geschichte des neuen Reiches* (Ägyptologische Abhandlunen II; Weisbaden: Harrassowitz, 1964) 17; Parker, "Sothic Dating," 182 and n. 15.

[18] Hornung, *Untersuchungen zur Chronologie*, 17-18; R.D. Long, "A Re-examination of the Sothic Chronology of Egypt," *Orientalia* 43 (1974) 271-72; Parker, "Sothic Dating," 186-8; A.J. Spalinger, "The Canopus Stela," *Three Studies on Egyptian Feasts and their Chronological Implications* (Baltimore, MD: Halgo, 1992) 35, 44, and n. 1 on p. 31 for more references to the Canopus Stela.

[19] Spalinger, "Canopus Stela," 35.

The Sothic rising dated to the first of Payni is otherwise II *šmw* 1.[20] Casperson provides the information in Table 10.4.

Table 10.4: Ptolemy III Euergetes I's ninth year in −237 (new moon listing from −237)

Memphis; Lat. 29.9, Long. 31.2; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			**Gregorian**			**Egyptian**			**DoW**		**ToD**			**Morning visibility**		
Yr	**Mo**	**D**	**Yr**	**Mo**	**D**	**Yr**	**Mo**	**D**				**−2**		**−1**		**0**
−237	6	2	−237	5	29	2545	8	14	1	8:12	5:08	206	5:08	74	5:07	−16
−237	7	1	−237	6	27	2545	9	13	2	17:18	5:01	329	5:02	145	5:02	28
−237	**7**	**31**	−237	7	27	2545	**10**	**13**	4	1:32	5:11	221	5:12	**86**	5:12	−30
−237	8	29	−237	8	25	2545	11	12	5	9:57	5:32	277	5:33	142	5:34	19

DoW = day of week; ToD = time of day.

II *šmw* 13 equates to 31 July 238 BCE, so II *šmw* 1 equates to 19 July, applicable to a Sothic rising in this year according to the HELIAC Program.

Sothic Cycle Starts in 1314 BCE

A late reference to a Sothic cycle was recorded by a certain Theon, an Alexandrian astronomer, who lived during the reign of Theodosius the Elder (379–395 CE).[21] Jack Finegan writes:

> Expressly using the Egyptian shifting year, Theon reckons 1605 years "from Menophres" (ἀπὸ Μενόφρεως) to the end of the era of Augustus. The era of Diocletian began on Aug 29, 284 C.E. and the last year of the Augustan era was accordingly 283/284. One thousand six hundred and five of the shorter shifting Egyptian years are equal to 1604 Julian years less thirty-six days; and 1604 years before A.D. 283/284 brings us back to 1321/1320 B.C."[22]

It was earlier thought that the Sothic cycle observed from Memphis and ending in 139 CE had begun 1460 years earlier in the quadrennium 1321–1318. However, it is now known that the Sothic cycle was somewhat shorter. M.R. Ingham computed that a Sothic cycle took approximately 1453 years with a constant *arcus visionis*, and 1452 years with a changing *arcus visionis*;[23] therefore, less than the projected 1460 years of earlier scholars. This can be explained by the fact that Sothis does not follow a strictly linear pattern but sometimes advances and retracts, and that on two occasions in the cycle Sothis rose heliacally on only three, not four, days; thus, accounting for the 7–8 years' difference.[24]

Theon's estimate that there were *1604* years from 283/284 CE back to the beginning of the "Era of Menophres" in 1321/1320 BCE (284 + 1320) has to be corrected to *1598/1597* years. The 1453 years of the Sothic cycle that ended in 139 CE began in 1314 BCE and ended in 139 CE. Despite slight modifications, Theon affirms the ending/starting point of the Sothic cycle based on the Egyptian calendar for Lower Egypt, which subsequent examples confirm.

The "Era of Menophres"

We noted above that Theon referred to the "Era of Menophres" (ἀπὸ Μενόφρεως) by which he seemed to be referring to a Sothic cycle. Scholars have long

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20 Ibid., 34-35.

21 Long, "Re-examination," 269.

22 Finegan, *Handbook*, 27 §47. The Greek of Theon's statement is given by Long in, "Re-examination," 269.

23 M.F. Ingham, "The Length of the Sothic Cycle," *JEA* 55 (1969) 39-40.

24 Spalinger, "The Canopus Stela," 44.

understood that the "Era of Menophres" refers to a Sothic cycle but have been undecided who or what was meant by "Menophres."

The date of 1321/1320 BCE, proposed by Theon, led scholars to look to pharaohs whom they thought reigned about this time; that is, prior to their dates for Ramesses II (1304 or 1290, now touted as 1279). Horemheb was eliminated because his name could not be construed as "Menophres."[25] Ramesses I, whose prenomen was *Mn-phty-r*', was considered by some as a possible candidate.[26] Merenptah, son of Ramesses II, presumed by scholars to have reigned from 1224 to 1214, was a century too late as a candidate for "Menophres."[27] Sety I, whose common epithet is Merenptah (*Mr-n-ptah*) received favorable support,[28] but Redford wrote, "The name Menophris can only with great difficulty be derived from 'Merneptah'. The same is true of a derivation from *Mn-pḥty-rc*."[29]

Rowton, Redford, and other scholars suggested instead that "Menophres" refers to the city of Memphis by its earlier name Men-efer.[30] Redford writes, "... there is a perfect *Vorlage* to be found in *Mn-nfr*, 'Memphis'. Linguistically this is precisely the vocalization that would be expected".[31] No linguistic problem prevents the derivation of Memphis from "Menophres".

That Memphis was chosen as the new site for the observation of the heliacal rising of Sothis is inferred by a certain Olympiodorus, who, in the year 6 CE, noted that the Alexandrians observed the heliacal rising of Sothis at Memphis in the late Roman period.[32] It is apparent that the Sothic cycle using the calendar of Lower Egypt starting in 1314 initiated the "Era of Menophres," which can now be understood as the "Era of Memphis." This appellation differentiates it from the previous Sothic sightings, which were observed using the calendar of Upper Egypt.

Memphis Sothic Cycle Beginning in 1314 BCE

The commencement of a new Sothic cycle in 1314 BCE (−1313) can be demonstrated from Casperson's lunar table (Table 10.5), which uses the Greco–Roman calendar applicable to a Sothic observation at Memphis.

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[25] Long, "Re-examination," 269-70.

[26] For discussion on Ramesses I as "Menophres" see J. Černý, "Note on the Supposed Beginning of a Sothic period under Sethos I," *JEA* 47 (1961) 151-52; Finegan, *Handbook*, 26 §47; R. O. Faulkner, "Egypt: From the Inception of the Nineteenth Dynasty to the Death of Ramesses III," *CAH* 2/2 (1975) 218; D.B. Redford, *History and Chronology of the Eighteenth Dynasty of Egypt* (Toronto: University of Toronto Press, 1967) 212 and n. 108; Long, "Re-examination," 269-70.

[27] Long, "Re-examination," 269.

[28] See discussion by M.B. Rowton, "Mesopotamian Chronology and the 'Era of Menophres'," *Iraq* 8 (1946) 107-10; Černý, "Supposed Beginning," 150-52; Long, "Re-examination," 269-71.

[29] Redford, "History and Chronology," 214. See R. Krauss for earlier attempts at derivation in *Das Ende der Amarnazeit: Beiträge zur Geschichte und Chronologie des Neuen Reiches* (HÄB 7; Hildesheim: Gerstenberg, 1981) 269.

[30] See discussion by Rowton, "Mesopotamian Chronology," 108-10; Redford, *History and Chronology of the Eighteenth Dynasty*, 214-15; Long, "Re-examination," 269-71; E.R. Wente and C.C. van Siclen, "A Chronology of the New Kingdom," *Studies in Honor of George R. Hughes*, SAOC 39; Chicago, IL: Oriental Institute of the University of Chicago (1976) 233 and n. 100.

[31] Redford, *History and Chronology*, 214.

[32] M. Bietak, "The Middle Bronze Age of the Levant—A New Approach to Relative and Absolute Chronology," *High, Middle or Low?* Part 3, 92, 103 n. 61; W.A. Ward, "The Present Status of Egyptian Chronology," *BASOR* 288 (1992) 59.

Table 10.5: Sothic cycle beginning at Memphis in 1314 BCE (new moon listing from −1313)

Memphis; Lat. 29.9, Long. 31.2; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			**Gregorian**			**Egyptian**			**DoW**	**ToD**	**Morning visibility**					
Yr	**Mo**	**D**	**Yr**	**Mo**	**D**	**Yr**	**Mo**	**D**			**−2**		**−1**		**0**	
−1313	6	17	−1313	6	5	1468	12	5	1	9:47	5:05	186	5:05	70	5:05	−6
−1313	**7**	**17**	−1313	7	5	1468	**13**	**5**	3	1:11	5:02	156	5:02	**63**	5:02	**−18**
−1313	8	15	−1313	8	3	1469	**1**	**29**	4	18:01	5:15	240	5:16	140	5:16	51
−1313	9	14	−1313	9	2	1469	2	29	6	11:09	5:39	216	5:40	122	5:41	27

DoW = day of week; ToD = time of day.

The last day of the Egyptian year in −1313 fell on 17 July corresponding to the fifth epagomenal (13 5). The following day, I *3ḫt* 1 coincided with 18 July, an appropriate date for the heliacal rising of Sothis at this period of history using the calendar of Lower Egypt. According to the HELIAC Program using an altitude of 2–3 degrees, the date of the Sothic rising fell on the dates of 18–19 July at Memphis,[33] concurring with the above table.

The above references confirm that a Sothic cycle ran from 1314 BCE to 139 CE based on the calendar of Lower Egypt.[34]

Heliacal Rising of Sothis in the Reign of Ptolemy IV Philopator (221–205 BCE)

An enigmatic reference to the passage of Sothis through the civil year comes from the reign of Ptolemy IV Philopator (reigned 221–205 BCE.). It was found on an inscription at Elephantine (Aswan). Unfortunately, it does not mention the king's regnal year. The heliacal rising of Sothis referred to seems to have been observed at Memphis as it comes from the same sequence of dates as those of Ptolemy III in 238 BCE.

Marshall Clagett provides the inscription:

> Col. 1. Hail to you, Isis-Sothis …
>
> Col. 2. Lady (?) of 14 [centuries?] and mistress of 16 [what?], who has followed her dwelling place (i.e. been advancing through the civil year up to now?) for 730 years, 3 months, 3 days, and 3 hours.[35]

According to Leo Depuydt it is the "only such reference to the cycle in hieroglyphic sources."[36] Clagett affirms his confidence in his interpretation of it "as the recording of the position of Sirius rising on a specific year relating to a datable year of the reign of Ptolemy IV" but believes "it has not been so recognized because it is presented in numbers that are mixed measures."[37]

The confusing text appears to refer to the time-span from the beginning of a Sothic cycle until a certain year in the reign of Ptolemy IV Philopator. Clagett reckoned that the period added up to 1102½ years. Because Sothis stays on the same day for four

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[33] Jean-Pierre Lacroix, "Heliacal Rising of Sirius in Thebes," at http://www.ancientcartography.net/LEVERheliaqueAN.html. Hereafter denoted as HELIAC.

[34] Long refers to two additional dates, one from Theon claiming that in 26 BCE a period of 1460 years terminated in the fifth year of the reign of Augustus, after which the Egyptians found themselves every year a quarter of a day in advance again. The other date comes from Alburuni, an Arabian chronologist (lived 973–1048 CE), claiming that Augustus delayed reforming the calendar for five years in order to wait for the completion of a Sothic cycle in 26 BCE ("Re-examination," 273-74). Where this Sothic cycle originated and ended is not stated, and whether the date is correct is open to doubt.

[35] M. Clagett, *Ancient Egyptian Science, Vol 2: Calendars, Clocks, and Astronomy* (Memoir Series vol. 214; Philadelphia, PA: American Philosophical Society, 1995) 331.

[36] L. Depuydt, Review of M. Clagett's *Ancient Egyptian Science, Vol. 2: Calendars, Clocks, and Astronomy* in *JAOS* 118.1 (1998) 75.

[37] Clagett, *Ancient Egyptian Science, Vol. 2*, 331.

years, the "months" and "days" have to be multiplied by four to obtain the number of "years" it took Sothis to travel through the cycle. The 730 years is half a Sothic cycle. Three months of 30 days equals 90, which is multiplied by four to total 360 years through the cycle. The 3 days = 12 years, and the 3 hours = ½ year. Three hours is an eighth of a day, and an eighth of any four-year "day" (a quadrennia) in the Sothic cycle is half a year. Altogether it is 1102½ years.[38]

In order to date the year of Ptolemy IV Philopator's reign when the Sothic rising was observed, Clagett subtracted 1102½ years from the quadrennium 1321–1318 that he believed the Sothic cycle started on. Consequently, he dates the Sothic rising in Philopator's reign to the year 218 BCE.[39] However, this is incorrect because he should have subtracted 1102½ years from the date of 1314 BCE. The result is half-way through the year 211 BCE. Philopator began to reign in 221, so 211 is his 11th year. This date comes only 27½ years after the Sothic date falling on 19 July in 238 BCE in the reign of Ptolemy III Euergetes II on II *šmw* 1. Therefore, 27½ years later, in the year 211, the Sothic rising in Philopator's reign was observed on II *šmw* 7. This is illustrated schematically in Table 10.6.

Table 10.6: Quadrennia between 238 and 211 BCE in the reigns of Ptolemy III Euergetes II and Ptolemy IV Philopator

		Year date range
Sothic rising falling on 238 in reign of Ptolemy III Euergetes II	II *šmw* 1	238–235
	II *šmw* 2	234–231
	II *šmw* 3	230–227
	II *šmw* 4	226–223
221: 1st yr Ptolemy IV Philopator	II *šmw* 5	222–219
	II *šmw* 6	218–215
211: 11th yr Ptolemy IV PhilopatorI	II *šmw* 7	214–211

The date of II *šmw* 7 for the Sothic rising in Ptolemy IV Philopator's 11th year in 211 BCE can be confirmed by its coincidence with the Julian date in that year. According to the HELIAC Program, the rising of Sothis in 211 fell on 22 or 23 July at Memphis. We can use Casperson's new moon table, not for establishing a new moon date, but to determine when the Egyptian date of II *šmw* 7 coincided with the Julian date. In the Table 10.7, II *šmw* 21 equates to August 1 in −210 (211 BCE). Fourteen days earlier, on II *šmw* 7, the Julian date would be July 23 at Memphis, concurring with the date of the HELIAC Program.

Table 10.7: Ptolemy IV Philopator's 11th year −210 (new moon listing from −210)

Memphis; Lat. 29.9, Long. 31.2; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			Gregorian			Egyptian			DoW	ToD	Morning visibility					
Yr	Mo	D	Yr	Mo	D	Yr	Mo	D			−2		−1		0	
−210	7	2	−210	6	28	2572	9	21	2	23:43	5:02	332	5:02	194	5:02	95
−210	**8**	**1**	−210	7	28	2572	**10**	**21**	4	8:51	5:12	252	5:12	141	5:13	31
−210	8	30	−210	8	26	2572	11	20	5	17:44	5:33	303	5:34	186	5:35	67

DoW = day of week; ToD = time of day.

The date affirms that the obscure reference at Elephantine can be understood to refer to the progress of Sothis through the civil calendar. There were 1102½ years before 211 BCE, indicating the beginning of a Sothic cycle in the year 1314 BCE, and 350 years after 211 BCE, indicating the end/beginning of a Sothic cycle in 139 CE. The length of the Sothic cycle was 1453 years, which is in accord with modern estimations.

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[38] Ibid., 331-33. L. Depuydt recommends Clagett's book as "very reliable and useful," and cites the interpretation described here as "an original contribution" 75-76.

[39] Clagett, *Ancient Egyptian Science*, *Vol. 2*, 333.

Heliacal Rising of Sothis in the Reign of Ramesses III?

Another date for the heliacal rising of Sothis is found in List 23, Section 21, (line 629) of the Medinet Habu Festival calendar followed by a list of food for the festival offerings (lines 630–645).

> The inscription states, "First month of inundation, the coming out of Sothis on its day, offerings for Amon-Re, King of the gods and the portable image of King of Upper and Lower Egypt, *Wosermaatre meriamon,* with his Ennead in this day of festival.[40]

The king named is Ramesses III. The regnal year is not stated and there is no day-date. Nevertheless, a general timeframe can be determined for this Sothic rising. The preceding lists, Lists 20, 21, and 22, refer to the coronation of the king. List 21 states, "First month of summer, 26th day; day of the accession of King of Upper and Lower Egypt, Wosermaatre Meriamon; offerings for Amon-Re with his Ennead." List 24 dates the eve of the *w3gy* feast to I *3ḫt* 17, and List 25 dates the day of the *w3gy* feast to I *3ḫt* 1[8]. Therefore, the rising of Sothis appears to have taken place between the king's accession on I *ŝmw* 26 and I *3ḫt* 17.

A heliacal rising in I *3ḫt* indicates a day near the beginning of a Sothic cycle. Since Sothis rises on the same day for four consecutive years, I *3ḫt* 17 would fall 68 years after the beginning of a Sothic cycle. If this Sothic cycle was dated to the calendar of Lower Egypt (the calendar of Upper Egypt seems to have become obsolete), and began in 1314, the Sothic rising date in the reign of Ramesses III occurred sometime between 1314 and 1246. In my chronology, Ramesses III reigned for 31 years from 1293 to 1262 BCE. One of these years would allude to his Medinet Habu Sothic date, but without a regnal year, this is about as close as can be determined.

Recognizing the Sothic Cycle for Upper Egypt at Thebes

Our present search is for a date from another Sothic cycle by which we can ascertain the date of the Sothic rising in Amenhotep I's ninth year, on III *ŝmw* 9, given in the Ebers calendar.

Evidence for the date of 1314 for the commencement of a Sothic cycle dated to the calendar of Lower Egypt at the latitude of Memphis has been presented. Now it is necessary to adjust this date to the criteria of the Ebers calendar date of III *ŝmw* 9, assuming it records an observation at Thebes where the papyrus was found; where Amenhotep I resided; and where the calendar of Upper Egypt would apply.

According to the HELIAC Program, the heliacal rising of Sothis at Memphis fell on 18 or 19 July 1314, and in Thebes on 13 or 14 of July, depending on the factors taken into account, such as the height of the sun, etc. The latitude of Thebes at 25.7 degrees and Memphis at 29.9 degrees north is equivalent to about five days' difference in the sighting of the heliacal rising of Sothis in any one year. In terms of the Sothic cycle, the star is about 20 years further through the calendar at Memphis than at Thebes using the same calendar. If a month of 30 days had passed at the same location, the difference would amount to 120 years in the Sothic cycle, but because Sothis is further through its cycle at Memphis, the 20 years have to be deducted from the 120 years, leaving 100 years between the Sothic cycle ending at Thebes and the Sothic cycle beginning at Memphis in 1314. This 100-year period between 1414 and 1314 is fully documented by the reigns of kings of the 18th and 19th Dynasties, as we shall see.

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40 S. el‑Sabban, *Temple Festival Calendars of Ancient Egypt* (Liverpool Monographs in Archaeology and Oriental Studies; Liverpool: Liverpool University Press, 2000) 88.

The end of the Sothic cycle observed at Thebes can be demonstrated from Casperson’s lunar table for the year −1413 (Table 10.8), when another cycle would also have commenced.

Table 10.8: End of Sothic cycle at Thebes in −1413 (new moon listing from −1413)

Thebes; Lat. 25.7, Long. 32.6; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			**Gregorian**			**Egyptian**			**DoW**	**ToD**	**Morning visibility**					
Yr	**Mo**	**D**	**Yr**	**Mo**	**D**	**Yr**	**Mo**	**D**			**−2**		**−1**		**0**	
−1413	6	13	−1413	5	31	1368	11	6	5	17:16	5:16	262	5:16	139	5:15	45
−1413	**7**	**13**	−1413	6	30	1368	**12**	**6**	7	4:34	5:11	208	5:11	93	5:11	−12
−1413	8	11	−1413	7	29	1368	13	5	1	14:45	5:20	279	5:20	155	5:21	37

DoW = day of week; ToD = time of day.

In addition to using Casperson’s lunar tables for listing new moons, they also provide the synchronisms between the Egyptian calendar and Julian dates. The above table is based on the calendar of Lower Egypt (that is, the civil calendar of Greco–Roman times). Note **12 6** in the Egyptian column. When adjusted to the calendar of Upper Egypt by aligning the Egyptian months with a month earlier in the Julian calendar than that shown, 13 July corresponds to 13 6 (i.e. the sixth day of the 13th month). But since there is no 6th epagomenal day, the date equates to I *3ḫt* 1, validating the end of a Sothic cycle at Thebes in the Julian year of year −1413 or 1414 BCE.

Amenhotep I’s Ninth Year

To determine when Amenhotep I’s ninth year fell, we reckon the days between III *ŝmw* 9 and the last epagomenal, which is 57 days, and multiply it by four to bring it to years, which amounts to 228. Add 228 years to the date of 1414 and the ninth year of Amenhotep I is the year 1642!

Table 10.9 reports the Egyptian-dated column showing II *ŝmw* 9 and the Julian-dated column showing 13 July –1641. We have to convert II *ŝmw* 9 (the Lower Egyptian date to which the table is aligned) to III *ŝmw* 9 (the Upper Egyptian date).

Table 10.9: Amenhotep I’s ninth year in 1642 BCE (new moon listing for −1641)

Thebes; Lat. 25.7, Long. 32.6; visibility coefficients: c1 = 11.5, c2 = 0.008																
Julian			**Gregorian**			**Egyptian**			**DoW**	**ToD**	**Morning visibility**					
Yr	**Mo**	**D**	**Yr**	**Mo**	**D**	**Yr**	**Mo**	**D**			**−2**		**−1**		**0**	
−1641	6	13	−1641	5	30	1140	9	9	7	22:36	5:17	277	5:16	162	5:16	81
−1641	**7**	**13**	−1641	6	29	1140	**10**	**9**	2	13:59	5:11	229	5:11	136	5:11	**50**
−1641	8	12	−1641	7	29	1140	11	9	4	5:55	5:19	199	5:20	104	5:20	**8**

DoW = day of week; ToD = time of day.

II *šmw* 9 in the Lower Egyptian calendar equates to the Julian date of 13 July of the year –1641 (1642 BCE), also confirmed by the HELIAC Program, which supplies the date of either 12 or 13 July at Thebes using an altitude of 3 degrees for Sothis.[41] Coincidentally, the table also shows that II *šmw* 9 (10 9), the date given for the Sothic rising, is also the date of a new moon![42]

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[41] De Jong, “Heliacal Rising of Sothis,” *AEC* (2006) 438; M.G. Firneis and M. Rode-Paunzen, “Progress-Report on Egyptian Astrochronology,” *SCIEM II* (2003), 85.

[42] Borchardt had earlier suggested that the squiggle now read as “day 9” should be read as “new moon,” but this view has now been rejected by scholars (*Die Mittel zur Zeitlichen Festlegung von Punkten der ägyptischen Geschichte und ihre Anwendung*, [Quellen und Gorschungen zur Zeitbestimmung der ägyptischen Geschichte 2; Kairo: Selbstverlag, 1935] 20).

The Ebers date also provides a means of dating other heliacal risings of Sothis that are attributed to a specific regnal year dated to an Egyptian calendar, when converted to the Julian calendar. A more significant date would be hard to find.

Why Was the New Sothic Cycle Based on Memphis?

Recall that by the 18th–19th Dynasties the expanding population was moving southward from the Delta into Upper Egypt, and had virtually made obsolete the calendar of the south—its main remaining function being to date the heliacal risings of Sothis. If the heliacal rising of Sothis was to continue to be recorded, it must connect to the calendar now being used throughout Egypt: the calendar of Lower Egypt.

The appropriate time to make a change would be when the new year on I *3ḫt* 1 in the calendar of Lower Egypt coincided with the heliacal rising of Sothis at Memphis; that is, at the beginning of a new Sothic cycle. This occurred 100 years after the end of the cycle of Upper Egypt observed at Thebes.

The old Sothic cycle ended at *Thebes* in 1414 BCE, and the new one began at *Memphis* 100 years later in 1314 BCE. The end of the Theban-based cycle presented a not-to-be missed opportunity for the ancient Egyptians to make a change to an *official* observation site for the recording of Sothic dates by the calendar of Lower Egypt. The inauguration of a new Sothic cycle meant that not only Sothic rising dates, but all events, records, and festivities could be dated by the same calendar over the *entire* country.

Thanks to the Ebers calendar, we can attribute the explanation and solution of the puzzling ἀπὸ Μενόφρεως, the "*Era of Menophres*." Without the *Ebers papyrus explicitly showing us a calendar that began with wp rnpt* and recording the date of III *ŝmw* 9 for a Sothic rising in Amenhotep I's ninth year, the transition of the Sothic cycle recordings to the calendar of Lower Egypt would have been much more difficult to detect, and the "*Era of Menophres*" may have remained an enigma.

Conclusion

The Ebers calendar, which has caused so much discussion and bewilderment, is really quite a simple little table, and easy to understand in its corresponding months and seasons using the calendar of Upper Egypt. It is of profound chronological significance with its record of the Sothic rising on III *ŝmw* 9 in Amenhotep I's ninth year.

There is no lunar calendar in the first column, and the second column is not an "aborted experiment" of a regnal year calendar beginning with Amenhotep I's accession eight years earlier on III *šmw* 9. Nor is it what Spalinger described as being "more valuable as an intellectual aspect of ancient Egyptian calendrics than as a solution to the chronology of the New Kingdom."[43]

Far from being of no chronological value, and its use disallowed for chronological purposes as stated in the Gothenburg colloquium of 1987,[44] the Ebers calendar is probably the most valuable chronological tool from Egypt that we are ever likely to possess.

In the preceding chapters I have sought to determine the calendars used by the ancient Egyptians, recognizing an unresolved problem concerning certain feasts that appeared to be dated out of their eponymous months in the Greco–Roman calendar. The search has led to recognizing two calendars, those of Upper Egypt and of Lower Egypt used by Egyptians in their respective regions. These calendars merged into one with the inauguration of the Sothic cycle at Memphis in 1314 BCE. This cycle became known as the "Era of Menophres." From 1314 on there was only one calendar of note: the civil

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[43] Spalinger, "From Esna to Ebers," 761.

[44] See chap. 1 pp. 8–10.

calendar, which was based on the calendar of Lower Egypt—the prototype of the later Greco–Roman calendar.

Until now, the reconstruction of Egyptian chronology has relied on the assumption of only one civil calendar by which the heliacal risings of Sothis were recorded. No difference was understood between the calendar used to record the Sothic rising in Amenhotep I’s ninth year at Thebes, and the calendar used to record the Sothic cycle that began in 1314 BCE at Memphis.

With the identification of a calendar of Upper Egypt, we can now reconstruct the chronology of ancient Egypt taking into account the effect that this calendar has had on the dates attributable to the regnal years of the kings. The date of 1642 BCE can be used to fix other Sothic risings considering the calendar and location.

From these dates, the regnal year dates recorded for kings—especially when set on lunar phases dated to the calendar of either Upper or Lower Egypt—give us the opportunity to reconstruct a credible chronology for ancient Egypt.

In the next three chapters, the utilization of the Sothic cycle and lunar phases at Illahun (Middle Kingdom) is demonstrated in the reigns of Sesostris III and his son Amenemhet III. The remainder of this book establishes the dynastic chronology of Egypt.