UCLA Encyclopedia of Egyptology

Lunar Calendar

التقويم القمري

Rita Gautschy

Citation:

Gautschy, Rita, 2024, Lunar Calendar. In Annette Imhausen and Willeke Wendrich (eds.), *UCLA Encyclopedia of Egyptology*, Los Angeles. ISSN 2693-7425. DOI https://doi.org/105070/G9.3989

3898 Version 1, November 2024, ark ID 21198/z1354521

UCLA ENCYCLOPEDIA of EGYPTOLOGY

LUNAR CALENDAR

التقويم القمري

Rita Gautschy

Mondkalender
Calendrier lunaire

Every society that practices the division of labor and levies taxes needs to keep track of time in a predictable manner, which usually implies time-keeping based on the movements of celestial bodies. Theoretically, the sun, the fixed stars, the planets, and the moon can be used for time-keeping purposes. Among these, the moon was used in the early stages of most cultures. In ancient Egypt a lunar or lunistellar calendar was in use, as evidenced by lunar festivals and names for the various stages of the moon.

كل مجتمع يمارس عمليات تنظيم وتقسيم العمل وجمع الضرائب يحتاج إلى متابعة الوقت بطريقة يمكن التنبؤ بها، وهو ما يعني عادة تحديد الوقت بناءً على حركات الأجرام السماوية. من الناحية النظرية، يمكن استخدام الشمس، والنجوم الثابتة، والكواكب، والقمر لأغراض تحديد الوقت. ومن بين هذه الخيارات، كان القمر هو الأكثر استخداماً في المراحل المبكرة لمعظم الثقافات. في مصر القديمة، كان يُستخدم التقويم القمري أو "القمري - النجمي"، كما يتضح من الأعياد القمرية والأسماء التي أطلقت على المراحل المختلفة للقمر.

The moon, with its easily perceivable and rather regularly changing shape, which furthermore takes place within a manageable period of time, is virtually ideal as a time-keeping instrument. Thus, it is not surprising to find that mainly lunar calendars were in use in the early stages of civilizations, and that the lunar deity played an important role in mythology, including that of Egypt (see Altmann-Wendling 2024). The ever-repeating cycle of invisibility, waxing, fullness, and waning of the moon furthermore vividly illustrated ***nḥḥ***, the ancient Egyptian cyclical aspect of time and eternity. At second glance, however, the moon as a time-keeper has two unpleasant features: First, a lunar month can last either 29 or 30 days. In antiquity, the exact duration could only be determined by observation, since no regular pattern of 29- and 30-day lunar months exists. Second, the length of a lunar year of twelve lunar months is eleven days shorter than the so-called tropical solar year. This means that an intercalation mechanism is required if lunar years should stay aligned with solar years, the easiest solution being the addition of a thirteenth lunar month every third year.

Lunar Time-keeping

Ancient Egypt was remarkable in that by the first half of the third millennium BCE the so-called civil calendar with a length of 365 days had been developed—at a time when city-states in Mesopotamia, Syria, and the Levant maintained lunar calendars. It is very likely, although not definitely proven, that earlier, during the Predynastic and Protodynastic (Dynasty 0) Periods, there was a lunar calendar in use in Egypt. Strong supporting evidence for such an early lunar calendar is that the Egyptian word for month (***ꜣbd***) is written with the hieroglyph of the lunar crescent. There is no consensus on how this

early lunar calendar was aligned with the tropical solar year, if at all. Parker (1950: 30–50) proposed an "old" lunar calendar that would actually have been a lunistellar calendar. He assumed this calendar to have functioned such that a new year started with the new moon following the so-called heliacal rising of the star Sirius. The heliacal rising of Sirius, the brightest fixed star in the night sky, indeed became an important event in Egypt in the course of time, as the feast ***prt Spdt*** shows. At its heliacal rising, Sirius can be observed for the first time in the eastern sky before sunrise, after having been invisible in the night sky for a certain period. A misidentification of Sirius on that occasion can be considered virtually impossible, since it is bright and follows the appearance of the well-known constellation ***Sꜣḥ***, which corresponds largely to the constellation known today as Orion. Belmonte and Lull (2023: 307–376) deny the existence of such a sophisticated lunistellar calendar tied to the heliacal rising of Sirius in Predynastic and Protodynastic Egypt. Instead, they consider that at that time there was a "calendar" in which lunar months were simply counted from the arrival of the inundation, without further regulation (ibid.: 328). They argue that this can on the one hand explain one different year-length as recorded on the Palermo stone (ibid.: 326–327), while on the other hand there would otherwise have been no incentive for switching to the civil calendar once a powerful centralized state was formed (ibid.: 323).

While there is nevertheless mutual agreement that some sort of lunar (or lunistellar) calendar existed prior to the inception of the civil calendar (e.g., Spalinger 2018: 4; Depuydt 2017: 273; Belmonte and Lull 2023: 328), opinions seem to diverge on whether there was a lunar calendar still operating afterward. Parker (1950: 24–29, 56) postulated a "later" lunar calendar from c. 2500 BCE onward, though Spalinger (2018: 88), Belmonte (2003: 48), and Belmonte and Lull (2023: 313–320), for example, deny the existence of a lunar calendar once the civil calendar was in operation. Depuydt (1997: 51) argues for a civil-based lunar calendar starting by c. 1300 BCE at the latest, based on a set of month names that he interprets to be clearly lunar.

The diverging views have their root in the use of the term "calendar." A correct use of the term "lunar calendar" would imply that a time-keeping system *independent* of the civil calendar was maintained. But there are only sparse and debated examples that may hint thereof, such as the Ebers calendar from c. 1510 BCE and a few double dates from the Ptolemaic Period. The majority of available material proves that the dates of feasts that were celebrated in a given month on a certain lunar day were simply recorded within the civil calendar. This practice is completely analogous to how the dates of lunar religious feasts such as Easter are set today within the Gregorian calendar and does not justify the assumption that a separate lunar calendar was in use.

Lunar Feasts and Days

Several important lunar feasts with corresponding cultic activities are known from the third millennium BCE onward. One of these, the *wꜣgy*-feast, is most likely associated with wine, and commemorated the death of the god Osiris, and the deceased in general. On two papyri from the mortuary temple of Raneferef, a pharaoh of the Fifth Dynasty (c. 2480 – 2350 BCE), a *wꜣgy*-feast date is mentioned (Posener Kriéger 1985: 40–43). Both dates are incomplete: one records a *wꜣgy*-feast on the third month [...], day 28, with the season missing; the other mentions an event after the *wꜣgy*-feast in the first month of the *ꜣḫt* season, but lacks the number of the day. The surrounding text, however, indicates that the event after the feast must have occurred on a day between I *ꜣḫt* 23 and 29. The latter date likely references the immovable *wꜣgy*-feast, which was fixed on the first month of *ꜣḫt,* day 18, in the civil calendar, while the former one certainly relates to the movable *wꜣgy*-feast, whose dates were determined using lunar time-keeping. That there were indeed two *wꜣgy*-feasts—an immovable one, celebrated on I *ꜣḫt* 18, as well as a movable one, celebrated on a lunar day

18—is confirmed by papyri from the archive at el-Lahun, which derive from the reigns of the Twelfth Dynasty pharaohs Senusret III (1887 – 1848 BCE) and Amenemhat III (1868 – 1822 BCE). Movable feasts in the archive (Luft 1992), of which the *wꜣgy*-feast is just one example, can be identified by the fact that their dates change: the day's date is different and the month as well, if a feast close to the end of a month and the beginning of another is concerned. Luft (1992) was able to show that the priests at el-Lahun were not on duty for whole lunar months in the civil calendar, but rather for a whole lunation starting on lunar day two, which in the civil calendar may fall on any day. These data indicate that in the religious and cultic sphere the moon with its changing shape played a very important role, even long after the civil calendar had been introduced. They also provide additional strong evidence that there was once a lunar (or lunistellar) calendar in use prior to the inception of the civil calendar.

That duties of priests in the temple started on a second lunar day makes perfect sense when the names of the lunar days and their meanings are taken into account. Some of them relate to certain distinct phases of the moon, such as new moon, first crescent, first quarter, full moon, or last quarter, while others are numerical, such as the sixth, the eighth, or the 15th, and still others refer to certain festivals. Complete lists of names for all 30 lunar days only begin to occur in the Ptolemaic and Roman Periods, e.g., in the frieze on the north wall of the pronaos in the Temple of Edfu (Table 1). Earlier, there are names (with variants) for the more important lunar days only.

A new lunar month, a lunation, started with the invisibility of the moon in the morning sky before sunrise. By this definition the first lunar day (LD) coincided in about 70 percent of cases with the new-moon phase. Since one lunation from the first invisibility of the moon to its next may last either 29 or 30 days, and no regular pattern exists, observation on lunar day 29 is crucial if precision is deemed important. If the lunar crescent can still be observed prior to sunrise in the morning sky of LD 29, then the present lunation lasts 30 days and a new lunation will not begin until one day later. If, however, the lunar crescent is not visible on LD 29, then a new lunation starts immediately when the new day begins at dawn. The commencement of duties for temple priests on the second lunar day instead of the first had significant advantages concerning practicability—namely, that the priests would not have to be "on call."

Month Names

Beside the designations of the months in the civil calendar according to the season, and to their place within the season, sets of month names are known from a number of sources from various times throughout Egyptian history. The latter are usually interpreted as being the names of lunar months as well as of a lunar feast that was celebrated within the respective month (Parker 1950; Depuydt 1997; Spalinger 2018), but Belmonte and Lull (2023: 335–342) argue that these month names are civil ones. Table 2 lists the designations of the months in the civil calendar, together with the sets of month names of selected Egyptian sources from different time-periods, as well as the (later) Greek month names (for a more complete compilation see Depuydt 1997).

Many of the month names are quite consistent over time. While the names in the astronomical frieze of the Temple of Edfu seem to follow closely the ones in the Eighteenth Dynasty tomb of Senenmut at Deir el-Bahri, it is obvious how similar the Greek month names are to those in various sources from Deir el-Medina. Belmonte and Lull (2023: 238–239) interpret these two sets of month names to reflect an old set (Senenmut) and a new set (Deir el-Medina), with the change occurring at some point during the New Kingdom. Depuydt (1997, 2017) associates the old set of month names with the lunar calendar, and the new set with the civil calendar.

In the Ebers calendar the sequence of month names is shifted by one compared to all the other sources, but otherwise the names resemble the month names in the tomb of

LD	Name (Meaning)	LD	Name (Meaning)
1	*psḏntjw* (new moon)	16	*mspr sn.nw* (second arrival)
2	*ꜣbdw* (first crescent)	17	*sjꜣw*
3	*mspr* ([first] arrival)	18	*jʿḥ*
4	*prt sm*	19	*sḏm-mdw.f*
5	*jḫt-ḥr-ḫꜣwj*	20	*stpw*
6	*sjs.nt* (sixth)	21	*ʿprw*
7	*ḏnjt* (first quarter)	22	*pḥ-spd*
8	*ḫmnw*	23	*ḏnjt* (last quarter)
9	*kꜣpw*	24	*knḥw*
10	*sjf*	25	*štt*
11	*stt*	26	*prw*
12	*smꜣ.tj stwt*	27	*wšb*
13	*mꜣꜣ-sṯwt*	28	*ḥb-sd Nwt*
14	*sjꜣw*	29	*ʿḥʿ-jrj*
15	*smdt*, *mḏ-ḏj-nt* (full moon, fifteenth)	30	*prt Mn*

Table 1. Names of the lunar days from the list in the Temple of Edfu, based on Altmann-Wendling (2020: 117–119).

Civil calendar	Ebers calendar (c. 1520 BCE)	Senenmut tomb (c. 1475 BCE)	Deir el-Medina sources	Ramesseum ceiling (c. 1250 BCE)	Edfu frieze (c. 120 BCE)	Greek
I *ꜣḫt*	*mnḫt*	*tḫ*	*ḏḥwty*	*tḫy*	*tḫ*	Θώθ
II *ꜣḫt*	*ḥwt ḥr*	*mnḫt*	*p n jpt*	*ptḥ rsy jnb.f*	*mnḫ*	Φαωφί
III *ꜣḫt*	*kꜣ ḥr kꜣ*	*ḥwt ḥr*	*ḥwt ḥr*	*ḥwt ḥr*		Ἀθύρ
IV *ꜣḫt*	*šf bdt*	*kꜣ kꜣ*	*kꜣ ḥr b*	*sḫmt*	*kꜣ ḥr kꜣ*	Χοιάκ
I *prt*	*rkḥ*	*šf bdt*	*ṯꜣ ʿbt*	*mn*	*šf bt*	Τυβί
II *prt*	*rkḥ*	*rkḥ*	*p n pꜣ mḫr*	*rkḥ wr*	*rkḥ wr*	Μεχίρ
III *prt*	*rnnwtt*	*rkḥ*	*p n jmn ḥtp*	*rkḥ nḏs*	*rkḥ nḏst*	Φαμενώθ
IV *prt*	*ḫnsw*	*rnnwtt*	*p n rnnwtt*	*rnnwtt*	*rnn*(*wtt*)	Φαρμουθί
I *šmw*	*ḫnt ḫt*	*ḫnsw*	*p n ḫnsw*	*ḫnsw*	*ḫnsw*	Παχών
II *šmw*	*jpt ḥmt*	*ḫnt ḫjj prty*	*p n jnt*	*ḫnt jj*	*ḥrtjj ḫd*	Παϋνί
III *šmw*	*wpt rnpt*	*jpt ḥmt*	*jp jp*	*jpt ḥmt*	*jpt*	Ἐπιφί
IV *šmw*	*tḫy*	*wpt rnpt*	*wpt rnpt*	*rʿ ḥr ꜣḫty*	*rʿ ḥr ꜣḫty*	Μεσορή

Table 2. Sets of month names from various sources (Depuydt 1997: 116–119; Belmonte and Lull 2023: 335–338).

Year	*ꜣḫt*				*prt*				*šmw*			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
1*	1	1	30	30	29	29	28	28	27	27	26	26
2	20	20	19	19	18	18	17	17	16	16	15	15
3*	9	9	8	8	7	7	6	6	5	5	4	4
4	28	28	27	27	26	26	25	25	24	24	23	23
5	18	18	17	17	16	16	15	15	14	14	13	13
6*	7	7	6	6	5	5	4	4	3	3	2	2
7	26	26	25	25	24	24	23	23	22	22	21	21
8	15	15	14	14	13	13	12	12	11	11	10	10
9*	4	4	3	3	2	2	1	1	30	30	29	29
10	24	24	23	23	22	22	21	21	20	20	19	19
11	13	13	12	12	11	11	10	10	9	9	8	8
12*	2	2	1	1	30	30	29	29	28	28	27	27
13	21	21	20	20	19	19	18	18	17	17	16	16
14*	10	10	9	9	8	8	7	7	6	6	5	5
15	30	30	29	29	28	28	27	27	26	26	25	25
16	19	19	18	18	17	17	16	16	15	15	14	14
17*	8	8	7	7	6	6	5	5	4	4	3	3
18	27	27	26	26	25	25	24	24	23	23	22	22
19	16	16	15	15	14	14	13	13	12	12	11	11
20*	6	6	5	5	4	4	3	3	2	2	1	1
21	25	25	24	24	23	23	22	22	21	21	20	20
22	14	14	13	13	12	12	11	11	10	10	9	9
23*	3	3	2	2	1	1	30	30	29	29	28	28
24	22	22	21	21	20	20	19	19	18	18	17	17
25	12	12	11	11	10	10	9	9	8	8	7	7

Table 3. Layout of the calendar scheme in Papyrus Carlsberg 9, with the three seasons, *ꜣḫt* (inundation), *prt* (winter), and *šmw* (summer) featured. From Depuydt (1997: 1292). "Great" years are indicated by an asterisk.

Senenmut to a high degree. Since the Ebers calendar is a highly disputed document that contains further peculiarities (see, e.g., Parker 1950: 37–38; Krauss 1992; Clagett 1995: 46; Depuydt 1996: 66–67; 1997; Spalinger 2018: 69; Krauss 2022; Belmonte and Lull 2023: 373–376), and the shifted month names are the only evidence that may be considered representative of a lunar calendar in operation alongside the civil calendar until the start of foreign rule in Egypt, the present author follows the proposition of Belmonte and Lull (2023: 373–376) that both sets are indeed civil month names.

Foreign Rulers and Calendars

Starting with the Assyrian conquest of Egypt in 673 BCE and lasting until the end of the Dynastic Period (with only brief disruptions), the Egyptians were ruled by people who used lunisolar calendars in their respective core areas. Not surprisingly, these foreign lunisolar calendars have left some traces in Egypt, namely the Babylonian calendar (Parker 1959) and its adaptation to Jewish needs (Stern 2000), and the Macedonian calendar (Depuydt 2017: 283; Bennett 2011). Their use in Egypt, however, remained rather limited—mainly to the circle of representatives of the rulers and those who interacted with them. These

lunisolar calendars were never actually competing, nor did they replace the Egyptian civil calendar.

Lunar Cycles – Papyrus Carlsberg 9

By the Ptolemaic and Roman Periods at the latest, the Egyptians were aware that lunar phases repeat themselves to a high percentage after 25 years in their civil calendar, since 25 Egyptian civil years add up to 9,125 days, and 309 lunar months add up to c. 9,124.95 days. Papyrus Carlsberg 9 illustrates a simple scheme that allows the determination of the civil-calendar date of the beginning of lunar months (LD 1) over such a 25-year cycle. The scheme accepts deviations from reality, the advantage being predictability. The earliest 25-year cycle mentioned in the text starts in year 6 of emperor Tiberius (19 CE), the latest one in year 8 of emperor Antoninus Pius (144 CE). The text was likely written around the middle of the second century CE (Depuydt 2016: 40). The papyrus lists two series of numbers, from which the whole scheme can be reconstructed (Depuydt 1997: 1281–1293). The first of these consists of 25 numbers arranged in five lines that are interpreted to be the civil-day dates of LD 1 of the first lunar month of each of the 25 years (Table 3, *ꜣḫt*, column I). The information given in the second series, arranged in 27 lines, allows the completion of the scheme. Table 3 shows the resulting calendar scheme with the LD 1 dates in the civil calendar (Depuydt 1997: 1282). A further list denotes the "great" and "small" years of the cycle. "Great" years are those with 13 lunar months; there are nine such years within the 25-year cycle.

In this way, the civil calendar date of the beginnings of 300 out of 309 total lunar months in 25 years can be easily determined. The remaining nine ones are hidden where there occurs a jump from 1 to 30 within the sequence, or where the beginning of a new month falls on one of the five additional or epagomenal days, which are not part of this scheme. The first case appears, for example, at the beginning: in year 1 of the cycle, a new lunar month begins on II *ꜣḫt* 1 in the civil calendar; the next date in the scheme is III *ꜣḫt* 30. Between these two dates lie not one lunar month whose beginning is not stated, but two. Either the month II *ꜣḫt* or the month III *ꜣḫt* contained two beginnings of a lunar month, namely on day 1 and on day 30. The scheme is rather simple: in a specific year the day number always decreases by one from left to right, with jumps between the numbers 1 and 30. At the end of the year, from IV *šmw* to the first given date for II *ꜣḫt* in the following year, the numbers usually decrease by six, due to the five epagomenal days at the end of the year. Occasionally the decrease amounts to only five days (e.g., between years 4 and 5 of the cycle).

The dates in the scheme hold consistently in the Egyptian civil calendar, but since 309 lunar months are slightly shorter than 9,125 days, the lunar phase of the beginning of the lunar months changes over time. At the time the Carlsberg 9 papyrus was created in the mid-second century CE, the majority of the given dates referred to the first visibility of the lunar crescent in the evening sky rather than to the first invisibility of the moon in the morning sky.

Preserved receipts from the temple administration of Soknopaiou Nesos, in the Fayum, dating from the years 24 BCE to 91 CE, prove that priests were on duty for one lunar month. Lippert (2009) showed that the respective beginnings of lunar months were very likely not determined by observation, but rather by the use of a schema comparable to the one on Papyrus Carlsberg 9.

Bibliographic Notes

Since later works heavily refer to or rely on it, Parker's *The Calendars of Ancient Egypt* (1950) is still a must-read to acquaint oneself with time-keeping in ancient Egypt, although most chapters are now at least partially outdated. In *Calendars*, Parker put forward the idea that there were three different

calendar years in parallel use in Egypt from c. 2500 BCE until the end of ancient Egyptian history (i.e., through the Ptolemaic and Roman Periods). This view has been subsequently challenged by previously unknown material on the one hand, and by alternative interpretations of earlier available material on the other. Luft (1992) published the papyri from the temple archive of el-Lahun. He was able to show that the list of civil dates for the beginnings of monthly duties of priests (*wrš*) mentioned on P. Berlin 100056A are LD 2 dates, and thus do not constitute a sequence of beginnings of lunar months as was previously assumed. Depuydt (1997, 2017) and Krauss (1985) argued in favor of the existence of a lunar calendar that functioned in parallel to the civil calendar, while Spalinger (2018), Belmonte (2003), and Belmonte and Lull (2023) deny the existence of a lunar calendar once the civil calendar was in operation. There is agreement, however, that some form of lunar time-keeping was important throughout ancient Egyptian history. Observations of the moon, as well as feasts celebrated at times that related to a certain lunar phase in temples, confirm this. The difference in opinion occurs mainly in the use of the term "calendar," due to the fact that the lunar dates were expressed *within* the civil calendar. Use of the term "lunar date-keeping" instead of "calendar" would likely eliminate most of the controversy. Quack (2002) provides an overview of time-keeping in ancient Egypt in general. The latest comprehensive compilation with extensive references to most of the earlier work is the chapter by Belmonte and Lull on the Egyptian calendar (2023: 307–376). For a discussion of the Ebers calendar, see Depuydt (1996); concerning Papyrus Carlsberg 9, see Depuydt (1998, 2016). Bennett (2011) collected the available traces of the lunar Macedonian calendar in Egypt. Stern (2000) summarizes extant traces of the Babylonian lunar calendar and its adaptation to Jewish needs in Elephantine.

References

Altmann-Wendling, Victoria

2020 Die 30 Tage des Mondmonats und ihre Schutzgötter. In *Zeit in den Kulturen des Altertums: Antike Chronologie im Spiegel der Quellen*, ed. Roland Färber and Rita Gautschy, pp. 117–126. Cologne: Böhlau Verlag.

2024 Conceptualizations of the moon. In *UCLA encyclopedia of Egyptology*, ed. Tanja Pommerening, Annette Imhausen, and Willeke Wendrich. Los Angeles. ISSN 2693-7425. https://doi.org/10.5070/G9.3924.

Belmonte, Juan Antonio

2003 Some open questions on the Egyptian calendar: An astronomer's view. *Trabajos de Egiptología* 2, pp. 7–56.

Belmonte, Juan Antonio, and José Lull

2023 *Astronomy of ancient Egypt: A cultural perspective*. Cham: Springer Nature.

Bennett, Chris

2011 *Alexandria and the moon: An investigation into the lunar Macedonian calendar of Ptolemaic Egypt*. Studia Hellenistica 52. Leuven: Peeters.

Clagett, Marshall

1995 *Ancient Egyptian science II: Calendars, clocks and astronomy*. Philadelphia: American Philosophical Society.

Depuydt, Leo

1996 The function of the Ebers calendar concordance. *Orientalia* 65, pp. 61–88.

1997 *Civil calendar and lunar calendar in ancient Egypt*. Leuven: Peeters.

1998 The Demotic mathematical astronomical Papyrus Carlsberg 9 reinterpreted. In *Egyptian religion: The last thousand years: Studies dedicated to the memory of Jan Quaegebeur*, ed. Willy Clarysse, Antoon Schoors, and Harco Willems, pp. 1277–1297. Orientalia Lovaniensia Analecta 85. Leuven: Peeters.

2016 The regnal years of the "mathematical astronomical" Demotic Papyrus Carlsberg 9 reinterpreted. In *Rich and great: Studies in honour of Anthony J. Spalinger on the occasion of his 70th Feast of Thoth*, ed. Renata Landgráfová and Jana Mynářová, pp. 39–60. Prague: Charles University.

2017 The calendars and the year-counts of ancient Egypt. *Chronique d'Égypte* 92, pp. 271–295. https://doi.org/10.1484/J.CDE.5.115207.

Krauss, Rolf
1985 *Sothis- und Monddaten: Studien zur astronomischen und technischen Chronologie Altägyptens*. Hildesheimer Ägyptologische Beiträge 20. Hildesheim: Gerstenberg Verlag.
1992 Das Kalendarium des Papyrus Ebers und seine chronologische Verwertbarkeit. *Ägypten und Levante/Egypt and the Levant* 3, pp. 75–96.
2022 The layout of the Papyrus Ebers calendar. *Orientalia* 91, pp. 309–313.
Lippert, Sandra
2009 *Au clair de la lune*: The organisation of cultic service by moon calendar in Soknopaiou Nesos. In *Actes du IX^e^ Congrès International des Études Démotiques: Paris, 31 août – 3 septembre 2005*, ed. Ghislaine Widmer and Didier Devauchelle, pp. 183–194. Cairo: Institut Français d'Archéologie Orientale.
Luft, Ulrich
1992 *Die chronologische Fixierung des ägyptischen Mittleren Reiches nach dem Tempelarchiv von Illahun*. Vienna: Verlag der Österreichischen Akademie der Wissenschaften.
Parker, Richard A.
1950 *The calendars of ancient Egypt*. Studies in Ancient Oriental Civilization 26. Chicago: The University of Chicago Press.
1959 *A Vienna Demotic papyrus on eclipse- and lunar-omina*. Brown Egyptological Studies 2. Providence, RI: Brown University Press.
Posener-Kriéger, Paule
1985 Remarques préliminaires sur les nouveaux papyrus d'Abousir. In *Ägypten – Dauer und Wandel: Symposium anlässlich des 75jährigen Bestehens des Deutschen Archäologischen Instituts, Kairo am 10. und 11. Oktober 1982*, Sonderschrift 18, pp. 35–43. Mainz: Philipp von Zabern.
Quack, Joachim F.
2002 Zwischen Sonne und Mond – Zeitrechnung im Alten Ägypten. In *Vom Herrscher zur Dynastie: Zum Wesen kontinuierlicher Zeitrechnung in Antike und Gegenwart*, Vergleichende Studien zu Antike und Orient 1, ed. Harry Falk, pp. 27–67. Bremen: Hempen.
Spalinger, Anthony J.
2018 *Feasts and fights: Essays on time in ancient Egypt*. Yale Egyptological Studies 10. Yale: Yale Egyptological Institute.
Stern, Sacha
2000 The Babylonian calendar at Elephantine. *Zeitschrift für Papyrologie und Epigraphik* 130, pp. 159–171. https://www.jstor.org/stable/20190614.