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On the Consistency of the Wandering Year as Backbone of Egyptian Chronology

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0. Introduction

In the house of history studying chronology is like puttering about the basement working on the plumbing or furnace instead of joining the conversation in the dining room. But it is occasionally useful to check the basic apparatus. The present paper deals with the fundamental axiom of Egyptian chronology of the period before about 700 B.C.E. This axiom, with which the outline of Old, Middle, and New Kingdom chronology stands or falls, holds that, throughout Egyptian history, years uniformly 365 days long succeeded one another without a single adjustment of the calendar. It is assumed that one simply counted 12 times 30 for the 12 months plus five for the epagomenal days in perpetual sequence.

The last published statement within Egyptology on the validity of this axiom dates back quite a while now. In an article that appeared in 1952, Parker states, after examining the matter, that "[w]e may fairly conclude that no adjustment of the civil year ever did take place until the time of Augustus and the Alexandrian calendar" (Parker 1952: 108). But more recently, the "practical demise" of this same axiom was proclaimed in the *Cambridge Archaeological Journal* (James 1992:127).[1] Independently of the confusion which the stark contradiction between these two statements may invoke, one may wonder about the foundations of so central an axiom.

The study of Old World chronology has experienced something of a revival in recent years. It has been confirmed in the debate that the traditional chronology of the Ancient Near East is dependent on that of ancient Egypt; that the outline of Egyptian chronology, especially of the period before the seventh century B.C.E., rests on the so-called Sothic hypothesis; and that absolute consistency of the Egyptian wandering year is central to the Sothic hypothesis. In short, traditional Old World chronology owes much to the consistency of the Egyptian wandering year as a kind of backbone holding all the soft parts and assorted bones of its body firmly together.[2]

[1] Traditional chronology can only be correct if the Egyptian calendar was *not* tampered with, the revised chronology proposed in James 1993 only if it *was* (cf. ibid.: 227–28).

[2] The late Otto Neugebauer, preeminent student of ancient science, who is not known specifically as an Egyptologist but who began his career in the twenties with a dissertation on Egyptian fractions, describes the *armonia e bellezza* (Schiaparelli 1922: 138) of the Sothic hypothesis as follows. "That modern historical research," he says (1975: 1072), "was able to extend [absolute chronology] back to nearly −3000 within reasonable limits of safety (i.e., no longer with an accuracy of a single day but at least within a few decades) is due only to the lucky accident of the undisturbed reliability of the Egyptian calendar whose uniformly slow rotation, like the hand of a clock, fixes (within narrow limits) the julian date by its passing by the fixed point of the heliacal rising of Sirius. The existence of Egyptian king lists in combination with a great wealth of archaeological evidence thus made it possible to establish a reasonably secure chronology back to about 3000 B.C. Documentary evidence and archaeological evidence relating Egypt to its nearer and more distant neighbours in Syria and Mesopotamia then provided the substructure for the Near-Eastern chronologies. . . . Hence it is in fact only the consistency of the Egyptian calendar that made an extension over two millennia feasible." More recently, Frendo reconfirms that "[t]he chronology of the eastern Mediterranean is linked to that of Egypt" (1993: 306).

On the Venus Tablets of Amisaduqa as evidence for absolute Mesopotamian chronology, see now Huber 1982 and 1987.

The present paper's narrow focus is on the degree of consistency of the Egyptian wandering year. Other important aspects of Egyptian chronology will not be discussed.[3] The basic question regarding consistency is as follows: How plausible or implausible is it that there was no tinkering with the wandering year at any time in Egyptian history?

This problem will be discussed in five parts. Part one provides definitions of six concepts: wandering year, axiom of consistency, Sothic rising, Sothic date, Sothic cycle, and Sothic hypothesis (1.1–6). Part two summarizes past research on these concepts. In part three, the beginning and end are determined of the period in which the *annus vagus* was wandering undisturbedly without the slightest doubt. The plausibility of the wandering year's consistency before that period is discussed in part four. A brief concluding remark follows in part five.[4]

1. Definitions

1.1 Wandering Year

The Egyptian wandering year (Latin *annus vagus*) is a year uniformly 365 days long and wandering backwards slowly in relation to the natural seasons because it is about a quarter day shorter than the solar year.

The 365 day year as we know it is an Egyptian invention. It results from the relation between two prominent natural phenomena. On the one hand, the earth's journey around the sun and the inclination of its axis to the plane defined by this journey's path produce the tangible phenomenon of the cycle of seasons or solar year. On the other hand, the earth's rotation around its own axis effects the equally tangible alternation of night and day. The number expressing the approximate relationship between these two manifest phenomena is 365, since the earth revolves on its own axis about 365 times in the time it takes to revolve once around the sun. The human intellect sooner or later simply had to observe this numerical relationship and adopt a time division lasting 365 days. To Egypt, however, goes the credit for having been first.[5]

But 365 is only the integer closest to the actual number of days in a solar year, the number of terrestrial revolutions in a solar year being 365 plus about a quarter.[6] However, since time divisions larger than the day need to be based on a number of full days in order to be practical, 365 became the chosen number.

From its discrepancy with the solar year, the ancient Egyptian year derives its most characteristic feature. Since it is shorter by about a quarter of a day, it falls behind in relation to the solar year and the seasons by about this same amount of time every four years. This means that a given day, for example New Year's Day, which at a given time fell in summer, would slowly recede into spring, then winter, fall, and again to summer, returning to the same point after about 365 x 4 or 1460 julian years. This motion in relation to the solar year is commonly described as wandering, hence the term "wandering year."

Our modern year is still the same as the ancient Egyptian year except for the intercalated or inserted days. As the wandering of the 365 day year is caused by the fact that it is shorter than the solar day, adding a day occasionally, while not giving any individual year the exact length of the solar year, can keep the man-made calendar years roughly, though continuously, on

[3] For the debate on second millennium Egyptian chronology in which Winfried Barta, Detlef Franke, Wolfgang Helck, Erik Hornung, Rolf Krauss, Christian Leitz, Ulrich Luft, G. W. van Oosterhout, and Jürgen von Beckerath have participated, see the bibliographies in Luft 1992 and the survey article Ward 1992. See now also Bietak 1992, Henne 1992, Krauss 1993 and 1994, Rose 1994, Spalinger 1992 and 1994, and von Beckerath 1993a and 1993b.

The absolute consistency of the Egyptian wandering year is not challenged in any of these works.

[4] An abridged version of this paper was presented at the ARCE meeting held at the University of Toronto in April 1994.

[5] According to Neugebauer (1938), the yearly rhythm of the Nile served as a catalyst in attaining this abstraction; to others, it is the heliacal rising of Sirius in July.

[6] The difference between sideric and tropical year plays no role here. The tropical year is the time it takes the earth to return to the same point on its path around the sun. The sideric year is the time it takes the earth to return to the same point in relation to a given star.

track with the solar year. Inserting days involves the intervention of human authority as inspired by insight into the cause of the year's wandering. Three individuals are on record as having been able to muster the required influence, resulting in the creation of two calendars still in use today. All three are well-known citizens of Rome: Julius Caesar, Augustus, and Pope Gregory XIII. The efforts of Caesar and Gregory in 46 B.C.E. (with a correction under Augustus) and 1582 C.E. resulted in the modern julian-gregorian calendar used worldwide. An intervention by Augustus in 30 B.C.E. resulted in another intercalated Alexandrian year; there will be occasion to mention this year, still in use today in the Coptic liturgical calendar, again below. The question that will occupy us below is whether Caesar, Augustus, and Gregory were the only reformers.

1.2 Axiom of Consistency

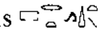
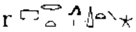
The axiom of consistency holds that no calendar adjustments, that is, additions or subtractions of days, were made in the Egyptian wandering year throughout Egyptian history.

Though "consistent" is the time-honored term, "untouched" or "unperturbed" may be preferable. It can hardly be doubted that the civil year always wandered and that it always did so at the same pace, that is, consistently, in relation to the solar year. Calendrical adjustments do not change the pace of the wandering motion itself as long as the length of the 365 day year as basic unit of measurement is not altered. Adjustments do not as much produce inconsistency as leaps or displacements in the relation between wandering year and solar year.

1.3 Sothic Rising

Without entering into the technicalities of this astronomical phenomenon, the Sothic rising is the heliacal rising of the star Sirius, *Spdt* in Egyptian, hence Sothis in Greek. In short, this is the first time Sirius is again visible after a period of invisibility of about 70 days.[7] Since Sirius is the brightest star in the sky, its heliacal rising in a land of mostly clear skies, without observation being hampered by artificial light, must have been a striking event.

1.4 Sothic Date

Sothic dates are instances in which the heliacal rising of Sirius, that is  or  *prt Spdt*, "the coming forth of Sothis,"[8] is dated according to the Egyptian calendar in Egyptian texts.

The Coming Forth of *Spdt* is mentioned occasionally in texts, but in only a few instances is it dated according to the Egyptian calendar. Each such instance is a Sothic date. The usefulness of each Sothic date for the purpose of establishing an absolute chronology depends on many factors. One thing is certain: any Sothic dates before about 700 B.C.E. are nearly worthless for absolute chronology if it cannot be assumed that the wandering year was consistent.

1.5 Sothic Cycle

The Sothic cycle is also referred to as "Sothic period."[9] The two terms relate to one another as follows. The Sothic period is called so because it is a unit of time or has an extension in time. Like any period, the Sothic period is defined by a beginning point and an end point. But in the case of the Sothic period, beginning point and end point are the same. The period is therefore cyclical, hence the designation "Sothic Cycle." It follows that the Sothic period can be defined by identifying a single point.

In identifying and defining this point, a distinction needs to be made between the historical Sothic cycle and the astronomical Sothic cycle.

[7] For the heliacal rising of Sirius as an astronomical phenomenon, see, for example, the brief description in Parker 1950: 7.

[8] For these two spellings, taken from the Illahun Temple Archive, see Luft 1992: 55 with Plate 7a (Papyrus Berlin 10012 A recto II 19) and 58 with plate 7b (Papyrus Berlin 10012 B recto 2).

[9] Luft 1984 conveniently gathers most relevant information pertaining to the Sothic cycle or period and closely related concepts, but no explicit definition is provided. For the cycle, see also Parker 1976. Among earlier works, Ideler (1825–26, 1:124–25 n. 3) recommends Bainbridge and Greaves's (1648) as the best.

The historical Sothic cycle is what the ancients imagined the cycle to be. The beginning and end point of the cycle is a very specific historical event perceived and reported by human beings. The observation of this event could have persisted until today but, for complex historical reasons, it ceased some time in Late Antiquity.

The astronomical Sothic cycle is more abstract. It is independent of any historical circumstances and purely pertains to the movements of stars and mathematical calculations thereof. Moreover, any point in time can be used as the beginning point of the astronomical cycle and its length can then be calculated up to the time when the beginning point returns. There are therefore an infinite number of astronomical Sothic cycles, whereas there is only a single historical Sothic cycle.

The astronomical cycle provides the precise scientific explanation of the historical cycle and also allows one to calculate the exact length of the historical cycle. But this scientific explanation was obviously never a prerequisite for the historical cycle to be functional in its social and cultural context.

As regards the historical Sothic cycle, then, the defining event serving both as beginning and as end point is the first observation of the heliacal rising of Sirius on the Egyptian New Year's Day after a long period in which this had not been the case but in which the rising had gradually approached New Year's Day in time.

This movement of the heliacal rising of Sirius through the Egyptian year is a result of the fact that the rising always fell on July 17–19 (julian) in Egyptian dynastic history, whereas the wandering year moved in relation to the solar year, as noted above.

The ancient records report the conscious, contemporaneous, observation of only a single Sothic rising on New Year's Day. The relevant classical sources have been compiled in the publications listed in n. 9. The best known testimony is that of the Roman writer Censorinus, who recounts in Chapter 21 of his work *De die natali* that the heliacal rising of Sirius fell on the first day of the Egyptian wandering year, that is, 1 Thoth or I *3ḫt* 1, in 139 C.E., the year being identified by its consuls.[10]

If the solar year were exactly, and not approximately, 365 and a quarter days long, and if the heliacal Sirius rose exactly, and not approximately, at the same point in time in the solar year, and if the observer's view was totally unobstructed by any condition of the earth's atmosphere,[11] then the historical Sothic cycle would last precisely 1460 years, that is 365 x 4 years. This is the number mentioned in the ancient sources (see n. 9).

It may be concluded that there must have been a perception in Greek and Roman antiquity that at some point in history 1460 years before 139 B.C.E., that is, around 1320 B.C.E., the Egyptians may well have observed, and perhaps even celebrated, a coincidence between New Year's Day and the heliacal rising of Sirius. But unlike that of 139 B.C.E., this second rising of Sirius on New Year's Day is not attested in any contemporaneous sources.

For the ancients, this historical supposition most probably only rested on a play with numbers, but some historical flesh was added to this numerical skeleton by the tradition of the Era of Menophris, which ancient sources state begins with the above-mentioned coincidence around 1320 B.C.E. The name Menophris has been identified with kings of that time or with the city of Memphis.[12]

In Egyptological literature, the Era of Menophris is often associated with the distinguished authority of the mathematician Theon, the last attested member of the Alexandrian Museum, who lived in the second half of the fourth century C.E.[13] But there is no evidence for such an imposing association in the manuscripts, as already pointed out by Rome in a footnote remark that seems now to have passed into oblivion (1931: 290–91 n. 1). The Byzantine tradition on the Era of Menophris remains to be assembled

[10] See already Ideler 1825–26, 1: 127–28. For the text, see now Sallmann 1983.

[11] From this third condition and others like it not mentioned here, it appears that, as beginning and end of the historical Sothic cycle, the heliacal rising of Sirius on New Year's Day is not quite an astronomical phenomenon, but rather an astronomical phenomenon observed by human beings.

[12] For further discussion, see, for example, Wente and Van Siclen 1976: 233–34.

[13] On Theon, father of the mathematician and philosopher Hypatia, who was murdered by a Christian mob in Alexandria in 415, see Toomer 1976.

and investigated. Many of the relevant manuscripts are unpublished.[14]

All that can be said so far is that notes on the Era of Menophris have been found in Greek manuscripts also containing works by Theon. In addition, the tradition goes back at least to Theon's lifetime or shortly thereafter, as appears from a manuscript gloss on the Era of Menophris discussed by Biot (1823: 303–9).[15] Tbe note appears on folio 154 of Paris Greek 2039, which contains works by Theon. The note itself is not attributed to Theon, but Biot, who did not see the manuscript, states that "it may be surmised that [the note] is also by Theon, or at least [by someone] from his school" (1823: 303).[16] Theon's authorship has been widely assumed ever since.[17] The note describes how to date the heliacal rising of Sirius in the Year 100 according to the Era of Diocletian (from 284 C.E.). Since Theon could have been alive in 384, the Era of Menophris is as old or nearly as old as he.[18]

Although the Era of Menophris cannot be associated with certainty with Theon, the same author does discuss the difference between the Alexandrian year of 365 and a quarter days and the Egyptian year of 365 days, as well as the cycle of 1460 years in a commentary on Ptolemy's handy tables (Tihon 1978: 203; see already Ideler 1825–26, 1:157–58). From this passage, it is clear that this distinguished professor at the Museum of Alexandria assumed that the Egyptian wandering year had followed its course without disturbance for a period of 1461 Egyptian years prior to Augustus' fifth year (26 B.C.E.).[19]

In the ancient view, 1460 years before 139 C.E., that is, in about 1320 B.C.E., the Sothic rising must have fallen on I *3ḫt* 1. But the conditions mentioned above for the cycle to be 1460 years long do not apply. The Sothic rising moves itself in relation to the solar year. The exact length of the cycle can be determined by calculating astronomical cycles. As noted above, there is an infinite number of such Sothic cycles, because one can take any point in time as the beginning. It appears that, if one takes 139 C.E. as end point of a cycle, this cycle would only be about 1453 years long instead of 1460, and the Sothic rising on I *3ḫt* 1 must therefore have occurred several years later than 1320 B.C.E.[20] Thus, it appears that the length of the astronomical cycles is a crucial element in assigning absolute (julian) dates to Sothic dates.

1.6 Sothic Hypothesis

The Sothic hypothesis[21] combines the consistency of the wandering year with Sothic rising, Sothic dates, and Sothic cycle (see 1.1–5 above) to provide julian dates for each Sothic date. By relating other events to the few Sothic dates, a framework is established for absolutely dating Egyptian history before about 700 B.C.E. Because of variables not discussed in this paper, the absolute dates of Sothic dates are somewhat approximate, but the fluctuation does not exceed a few decades; at least, it is less than a century.

2. Past Research

2.0 As a subject of inquiry, the wandering of the Egyptian year is much older than modern Egyptology. The first reports date to the time when it was still a feature of daily life in antiquity. But it has only played a key role in attempts to date the Pharaonic period for about a century. Three epochs will be distinguished in what follows.

2.1 From the Earliest References to Ideler's Handbuch *(1825–26)*

In this first epoch, before the decipherment of the hieroglyphic script, all knowledge about the

[14] Rome (1931: 290–91 n. 1) presents a preliminary list of manuscripts.

[15] In James 1993: 226, the note is rightly described as "a medieval marginal gloss to a manuscript [containing works] of the 4th-century AD Alexandrian astronomer Theon."

[16] Cf. also Ideler 1825–26, 1: 136 n. 1.

[17] Larcher and R. Lepsius seem to have contributed to the hardening of this assumption (Rome 1931: 290–91 n. 1).

[18] Theon was certainly still alive in 377 C.E. (Tihon 1978: 1).

[19] 1461 Egyptian years of 365 days are equal in length to 1460 Alexandrian years, that is, 1095 years of 365 days and 365 years of 366 days.

[20] For calculations of astronomical Sothic cycles, see Ingham 1969.

[21] The earliest use of this term I have been able to find is that by Schiaparelli 1922. But Schiaparelli (ibid.: 151) rejected the *ipotesi sotiaca* as a *base sicura, precisa, matematica* of Egyptian chronology since he thought it contradicts the evidence from the monuments.

wandering year was derived from classical sources written in Greek and Latin. Ludwig Ideler's handbook of mathematical and technical chronology, published in 1825–26, marks the end of this period[22] and at the same time the beginning of the modern study of ancient chronology.[23] From its first sentence, "In the morning we see the sun rise," it presents, in Ideler's translucent style praised by Böckh (1863: 75), a monumental summation of what was known about ancient chronology at the time.[24] The chapter on Egypt (1: 93–194) lists the known ancient sources on the wandering year as well as references to Renaissance and early modern literature.

In this epoch, the consistency of the Egyptian year is not doubted, but its application does not stretch far back into Egyptian history because of the inability to read native Egyptian sources. The principal hypothetical excursions into earlier Egyptian history revolve around the Sothic period and the Era of Menophris that is based on it. In a modest application of the Sothic hypothesis to the chronology of Pharaonic Egypt, there must have been a perception, as noted above, that around 1320 B.C.E., the Egyptians may well have taken note of a coincidence between New Year's Day and the heliacal rising of Sirius.

Champollion too engaged in speculation on the identity of Menophris (Weill 1926: 10–11). But with Champollion, we have arrived at the second epoch in the study of the *annus vagus.*

2.2 *From Champollion's* Précis *(1824) to Meyer's* Chronologie *(1904)*

More than his *Lettre à Monsieur Dacier* (1822), Jean-François Champollion's *Précis du système hiéroglyphique des anciens égyptiens* (1824) signaled a new epoch in which it became finally possible to adduce native Egyptian evidence.

But in the first decades of this second epoch, it was not possible to draw advantage from the native sources because no Sothic dates became known. The wandering year's regular motion can only be used as a chronological tool if it can be measured against a fixed point. Consequently, Manetho remained the basis for Egyptian chronology during this time.[25]

But in the second part of this epoch, three Sothic dates came to light, one from the Middle Kingdom, one from the New Kingdom, and one Ptolemaic, in which year, month, and day are given, and scholars became gradually aware of the possibilities that the wandering year's regular motion might become the backbone not only of Egyptian chronology but also of all of Near Eastern chronology.[26]

The story of the recovery of Sothic dates begins in 1862, when Edwin Smith acquired in Thebes a medical papyrus later sold to Georg Ebers and hence now known as the Ebers Papyrus. The calendar on the verso of this papyrus mentions a heliacal rising of Sothis and the arrangement of the calendar suggests, though this has been disputed, that this rising fell on III *šmw* 9 in Year 9 of Amenhotep I. Breasted noted that "[a]s far back as 1864 Edwin Smith had already communicated to Goodwin the now famous calendar from the verso of Papyrus Ebers and . . . Smith was the first scholar to read the year date '9' correctly" (1922: 389).

As this date's significance began being discussed, Richard Lepsius in 1865 discovered the bilingual decree of Canopus of 238 B.C.E.[27] The decree dates a Sothic rising to II *šmw* 1 in Year 9 of Ptolemy III Euergetes. Its contents reveal that the cause of the year's wandering was understood. The decree even prescribes that one day should be added every four years to annul the wandering effect. But evidence of later date shows that this royal directive was never executed.

The third Sothic date was found at Illahun in 1899.[28] It is dated to IV *prt* 16 and occurs in a

[22] There is no reference in this work to the decipherment of the hieroglyphic script in 1822. In the addenda to the second volume, it is noted (2:591) that a seventeenth century opinion that Sothis means "dog" in ancient Egyptian has been rejected by Paul Ernst Jabloski (1693–1757).

[23] An earlier landmark is Joseph Scaliger's *De emendatione temporum* (first edition, 1583).

[24] In the introduction, Ideler acknowledges his teacher Friedrich August Wolf (1759–1824), who created philology as a discipline by registering for it at the University of Göttingen in 1777.

[25] For a characterization of this period, see Weill 1926: 1–6.

[26] On this second part of the second era, see Weill 1926: 7–15.

[27] For the text, see Spiegelberg 1922.

[28] Borchardt 1899: 99. For the text, see now also Luft 1992: 55.

temple diary of a Year 7 of a king who must be Sesostris III (Parker 1976: 178–84).

2.3 *From Meyer's* Chronologie *(1904) to the Present*

In the latter part of the nineteenth century, much was written on the Sothic dates that simply assumed—mostly without making this assumption explicit—that the Egyptian year had not wandered. But it is only since the classic formulation in Eduard Meyer's *Ägyptische Chronologie* (1904) that one can justly speak of a Sothic hypothesis.[29] Meyer's treatise brought order and clarity to an obscure and difficult subject that had so far been accessible to few only.

The undisturbed character of the wandering year was also stated as a fact in the first volume of Ginzel's three-volume handbook on mathematical and technical chronology (1906, 1:159), which bears the same title as Ideler's above-mentioned work and updates it, though Ideler can still be read with profit. Moreover, Sethe accepted the hypothesis in his own survey of chronology (1919–20: 307–11), though he also assumed the existence of a fixed civil year (ibid.: 311–16), rejected by Meyer.

In the late nineteenth century and into the early part of this century, there was resistance to the hypothesis. Schiaparelli (1856–1928) lists Jakob Krall (1857–1905), Gaston Maspero (1846–1916), Henri Édouard Naville (1844–1926), Karl Alfred Wiedemann (1856–1936), and Friedrich Wilhelm von Bissing (1873–1956) as opponents in a contribution to the centenary celebration volume of the decipherment in which he voices his own strong opposition (1992: 137).[30] These scholars believed that the evidence from the monuments could not be reconciled with the chronology derived from the Sothic hypothesis and they assumed that calendar adjustments rendered this hypothesis invalid. No record of such an adjustment is known from Pharaonic Egypt, but then, the historical documentation is very fragmentary.[31] The one adjustment described in Egyptian sources, found in the Canopic decree, was never implemented, as has been mentioned above.

The acceptance of the Sothic hypothesis by such prominent figures as Ginzel, Meyer, and Sethe no doubt caused the voices of disagreement to dwindle rapidly. In America, where Egyptology had just been born, James Henry Breasted expressed full agreement with Meyer (1906: 27–28).

In 1926, then, Raymond Weill, a student of Maspero, published an investigation of which one chapter bears as title the statement: "The 'Sothic Theory' Must Be Considered Proven" (1926: 49–66). The Sothic hypothesis never looked stronger than in 1926, for already two years later, in a supplement to this same work, Weill headed a chapter with the title: "Is the Unperturbed Revolution of the Wandering Year Demonstrated in All Rigor?" (1928: 5–11). In this supplement, Weill repeats his main arguments of 1928, but these arguments are circular or otherwise invalid.[32] He

[29] Schiaparelli 1922; Parker 1952: 102 with n. 3.

[30] Weill describes reactions to the Sothic hypothesis around the turn and early part of the century (1926: 28–39).

[31] A possible report of calendar adjustment in the Hyksos period would seem to occur in a quotation from Manetho's works in the Scholia to Plato (cf. James 1993: 378). But the episode probably refers to the conversion of a lunar calendar to a solar calendar. The text is as follows: "Saïtês added 12 hours to the month, so that it was 30 days long, and 6 days to the year, and it became 365 days (long)" (Waddell 1940: 98–99). Since the lunar month is about 29.5 days long, adding 12 hours, or half a day, to a lunar month would make it a standard Egyptian month of 30 days. The second statement can be related to the first: adding 12 hours to each of the twelve months of a year amounts to adding 6 days to the lunar year of 354 days. In the third statement, the epagomenai are perhaps tacitly added to 360, or 12 x 30, to obtain 365. Two other obvious alternatives are not satisfying. First, if both 6 days per year and 12 hours per month were added, the year would be 366 days long. Second, if only 6 days were added, the year would have been 359 days (365 – 6) long; but no such year ever existed in Egypt.

As regards the value of this scholion as evidence for calendar adjustments, then, it should be noted, first, that the 30 day month existed well before the Hyksos period. The first statement of the scholion is therefore certainly false. And because the second statement seems related to the first, it too is suspect as a Hyksos innovation. Second, whereas a calendar adjustment is a one time addition of days, changing the year's length, as reported in the scholion, involves changing the very system of the calendar; it is certain, however, that the 365 day year existed since the Old Kingdom, with or without calendar adjustments.

[32] More recently, the statement in Pauly-Wissowa, Second Series, vol. 9: 2388, that Sothic dates are "suitable for checking the calculation of the wandering year" also seems circular since the julian equivalents of Sothic dates are only obtained by assuming that the wandering year was undisturbed.

does rightly note, however, that between 238 B.C.E. and 139 C.E., the Egyptian year had wandered with absolute regularity for about 375 years. We will return to this below.

The nature of Weill's arguments may be illustrated as follows. Since the seasons *3ḫt, prt* and *šmw* were in their proper place in relation to the natural seasons around the time when the heliacal rising of Sirius took place on New Year's Day in 139 C.E., Weill assumed that the seasons must, at some point in the past, also have been in that same position. Indeed, we might specify: How could *3ḫt*, "Inundation Season," ever have received this name if it had not coincided with the inundation of the Nile at some time in the Pharaonic period? At least one full cycle must therefore have occurred. But Weill erroneously extended this proof of the *fact* of the occurrence of one cycle to the *absolute regularity* of that cycle. Absolute regularity is not proven because, even if it is certain that the cycle occurred, any king might have made it longer by adding days or shorter by removing days.

One also has the impression from reading Weill's arguments that he was partly tempted into the assumption of *absolute regularity* by what might be called *perfect consecutiveness*. Perfect consecutiveness means that the order of events suggested by the attested heliacal risings in the Egyptian calendar is in agreement with the order derived from all the other evidence, including Manetho and the monuments. This may seem self-evident, but it could have been otherwise. Perfect consecutiveness guarantees

- that the year was wandering,
- the direction in which it wandered (a year of 366 days would have wandered the other way),
- the approximate pace of wandering,
- that there was another cycle before the one ending in 139 C.E.

In order to illustrate perfect consecutiveness, the five references in Middle and New Kingdom sources to *prt Spdt* in conjunction with a date may be tabulated. Over the years, doubts of one sort or another have been raised against each of these five dates, be it regarding the correct reading of a royal name or the specific arrangement of a calendar. It is not possible to discuss these problems here. The following table shows that the dates, in their traditional interpretation, are consecutive.

King	Date of *prt Spdt*	
Sesostris III, Year 7 (Illahun papyrus)	Month 8	Day 16
Amenhotep I, Year 9 (Ebers calendar)	Month 11	Day 9
Thutmosis III, Year ? (temple at Elephantine)[33]	Month 11	Day 28
Seti I (ceiling of cenotaph of Seti I)[34]	Month 1	?
Ramses III or II (Medinet Habu calendar)[35]	Month 1	?

It is obvious from the monuments that Sesostris III, Amenhotep I, Thutmosis III, Seti I, and Ramses II reigned in that order. A mere glance at the Tables of Abydos and Saqqara confirms this (Meyer 1904: Plate 1).

The chapter in Weill's supplement of 1928 only heralded further doubts. In the mid and late forties, a few years before his death and as the Sothic hypothesis gained near universal acceptance, this erstwhile staunch defender of the hypothesis expressed the opinion that calendar adjustments did occur in the second cycle ending around 1320 B.C.E. This was based on the opinion that the Second Intermediate Period had to be much reduced in length.[36]

This new development sparked an article by Richard Parker (1952), undisputed authority in matters of Egyptian chronology, in which he defends the Sothic hypothesis. There will be occasion to return below to one of the arguments he uses in this article.

But looming large behind Parker's article was his detailed study on the calendars of ancient

[33] On this date, see Borchardt 1935: 18–19.

[34] For this date, see Neugebauer and Parker 1960: 54 bottom. But according to decanal dates on the ceiling of Seti I's cenotaph, Sirius rose on IV *prt* 16, which is, quite remarkably, the same date as the well-known Illahun Sothic date of Year 7 of Sesostris III; because the date does not fit the pattern, it is traditionally assumed that the text is a copy of a Middle Kingdom original; on this date, see recently Leitz 1989: 49–57.

[35] For this date, see Parker 1950: 40 §§205–6.

[36] See, for example, Weill 1946 and 1949.

Egypt, which appeared two years earlier. In it, Parker takes account of all the facts known about calendars to conclude that Egypt had three calendars, an original lunar calendar, the 365 day wandering year, and a later lunar calendar. The harmony achieved between the facts in Parker's work can be viewed as an argument in favor of the Sothic hypothesis.

For example, Parker's later lunar calendar is tied to the Egyptian wandering year.[37] It follows that any adjusting of the wandering year by adding or subtracting days would have repercussions on the arrangement of the lunar year. However, it is not possible to add or subtract just any random number of days to or from a lunar year because the number of days in lunar months is astronomically fixed. Since a lunar year or twelve months is only about 354 days long, lunar years can only be kept on track with the solar year or the Egyptian wandering year by intercalating a full lunar month every two to three years.

It would be possible to speculate here on ways in which the Egyptian wandering calendar and the lunar calendar might have been adjusted simultaneously if the calendar was modified. But may it suffice to state that, if a lunar year was tied to the wandering year, it would have been more complex to organize an adjustment of the calendar system. Therefore, to the extent that Parker's theory on the later lunar year reflects the true state of affairs, the difficulty of supporting assumptions regarding calendar adjustments would be increased at least twofold.[38]

It can also be inferred from the above that any theory favoring calendar adjustments must take issue with Parker's theory about the calendars in Egypt.

Importantly, Parker's article is the last discussion of the consistency of the wandering year to have appeared in Egyptological literature in more than forty years. It is now upon us to make an assessment of the plausibility of the Sothic hypothesis.

3. The Period in Which the Year Wandered with Regularity beyond Doubt

3.0 To determine the overall plausibility of the Sothic hypothesis, it will be useful to attempt first to establish the limits of the period in which the Egyptian year wandered with absolute regularity without the slightest doubt. Remarkably, these limits are inferred, not from Egyptian sources, but from Aramaic and Greek manuscripts. In order to place the quest for the earliest certain date into perspective, it may be useful to address two related questions in 3.1–2 in order to show current limitations of Egyptian chronology. A first question is as follows.

3.1 What Is the Limit of Absolute Dating if the Sothic Hypothesis Is Correct?

Dating an event absolutely means determining how many times the earth revolved around its axis since that event. Since it has been determined that Taharqa's Year 1 fell in the Egyptian year 690/89 B.C.E. or julian 12 February 690–11 February 689,[39] the limit of absolute dating in Egyptian chronology is that portion of the Egyptian year 690/89 that coincides with Taharqa's Year 1,[40] which lasts from his accession to the throne on an unknown date in 690 or 689 till the last day of the year (11 February 689).[41]

[37] Parker 1950: 24–29, 53–56. Parker suggests that this second lunar year was introduced about 2500 B.C.E. (1950: 56).

[38] A good example of a double date in which a date in the wandering year is juxtaposed to a lunar date is found in lines 4–5 of the papyrus Louvre No. 7848, written in abnormal hieratic (Parker 1957: 210–12); the text is unpublished (cf. Vleeming 1980: 3 n. 14). This double date challenges the statement that "not one [Egyptian] document appears to be dated by more than one [calendar] system" (James 1993: 227).

[39] The year of Taharqa's accession and the dates of the reigns of the Saite Pharaohs (660–527/5 B.C.E.) have been known within a range of one or two years for a long time. For a summation of the evidence, see Kienitz 1953: 154–59 and Gardiner 1945: 17–20.

But the exact years have been determined on the basis of only two pieces of evidence, as interpreted by Parker (1957 and 1960). The items are both at the Louvre in Paris. One is a lunar date in the abnormal hieratic papyrus no. 7848 (see n. 38) and the other a set of dates in Apis stela IM 3733 from the Serapeum in Memphis.

[40] Because of the Egyptian custom of predating regnal years, the 365 day year 690/89 encompasses both the last year of Taharqa's predecessor Shabataka and Taharqa's first, each year being shorter than 365 days, unless Taharqa succeeded Shabataka on New Year's Day (12 February 690).

[41] This is a refinement of my observation on the limit of absolute dating in *JEA* 79 (1993): 269. Cf. also Leclant 1985: 167 n. 3.

This means that any event in Year 1 of Taharqa can be dated absolutely down to the day. Because Taharqa's accession day is not known, the beginning and length of this earliest stretch of time in which absolute dating is possible also remains unknown.[42] A second question arises from this.

3.2 What Is the Earliest Absolutely Dated Event in Egyptian History if the Sothic Hypothesis Is Correct?

No dated events from Taharqa's Year 1 are attested in the sources. There are documents from Year 2, but the month and day dates of the reported events are not specified.[43] For the earliest absolutely dated event, one must proceed to his Year 3 (11 February 688–10 February 687 B.C.E.). This concerns the sale of a slave, a *rmṯ ᶜ mḥty* "man of the north,"[44] reported in papyrus Louvre E3228d, written in abnormal hieratic.[45] The month and day date is I *prt* 10, that is, *June 11, 688 B.C.E. (julian).*[46] The sale of a slave on June 11, 688 is, then, for the time being, not the beginning of absolute dating in Egypt, but of absolutely dated Egyptian history. This is a much lower date than 19 July 4241 B.C.E., proposed by Eduard Meyer (1904: 45) as earliest dated event in Egyptian history, namely the institution of the calendar.[47]

Note.—The Interpretation of Louvre IM 3733.

The date June 11, 688 B.C.E. hinges on two pieces of evidence cited in n. 39. There is a small window of doubt regarding Louvre IM 3733, a Serapeum stela pertaining to the Apis who died in Year 20 of Psammetichus I. But the only other possible solution would merely push back the earliest absolutely dated event by 365 days to 10 June 689 B.C.E. (not 11 June because julian 689 or 688 is a leap year).

Doubt is possible because the information provided by IM 3733 is incomplete. On the one hand, both the life span of 3733, described as *jr n rnpt* 21 "amounting to 21 years,"[48] and the date of birth, Year 26 of Taharqa, are given *without indication of month or day.*[49] On the other hand, the date of installation is given as Month 8 Day 9 *without mention of the year.*

"Rounding off" (Parker 1960: 268) of some sort seems to have occurred in the case of the "21 years." There are two possibilities: rounding off upward or downward. Traditional chronology assumes, with Parker (1960), rounding upward, according to the following line of argument.

The date of birth, Taharqa's Year 26, is followed immediately in the text by the date of installation, Month 8 Day 9. This would seem to imply that the installation also occurred in Taharqa's Year 26. Moreover, since the bull as a rule lived several months before being installed, the present Apis must have been born in the beginning of Year 26.

Since it is known that the bull died at the very end of Year 20 of Psammetichus I, namely in Month 12 Day 20, a date of birth in the very beginning of Year 26 of Taharqa is best explained by assuming a lifespan of nearly 21 years ronnded off upward to a full 21. From the beginning of the 365 day wandering year encompassing Taharqa's last and Psammetichus' first regnal years (5 February 664), the bull would then have lived nearly 20 years. According to this first hypothesis, it is assumed that the bull was born in the beginning

[42] If it would appear, as new sources emerge, that Taharqa came to the throne only in 689, that is, later than Month 10 Day 23 (31 December 690 B.C.E.), then absolute dating would begin only in 689.

[43] For a list of monuments dating to the reign of Taharqa, see Leclant 1985: 168–72 n. 11 and Spalinger 1978: 44. Year 2 is also mentioned in a document dated to Year 7, Louvre E3228c, edited by Malinine (1951).

[44] On this term, see, for example Parker (1966: 113–14), who, referring among others to the present text, thinks it likely that it denoted Egyptians of the Delta.

[45] Schmidt (1958: 128) also refers to this as the earliest precise date in Taharqa's reign.

[46] For the text, see Malinine 1953: 43–49.

[47] Cf. Neugebauer 1938.

[48] *jr n rnpt* 21 can hardly mean "made in Year 21," first because *jr n* "amounting to" is a common expression (Gardiner 1957: 341, §422, 3; 199 bottom, §266, 2 end), and second, because the same brief inscription twice uses the preposition *m* "in" with *rnpt* to express "in the year" and not *n*.

[49] For the text, see now Malinine, Posener, and Vercoutter 1968: 146 no. 192. A graffito of uncertain reading following *jr n rnpt* 21 at the end of the inscription was once thought to indicate month and day (Schmidt 1958; Parker 1960). But an old photograph discovered later revealed that the graffito is modern (Malinine, Posener, and Vercoutter 1968: 146).

of the wandering year before that. Since the year of birth is Taharqa's 26th according to the text, Year 26 is Taharqa's last full 365 day year of rule and his last regnal year is his 27th. Thus, this stela makes it possible to establish how long Taharqa reigned and when his reign began.

An alternative theory involves roundiug off downward. The bull would have lived a little over 21 years, having been born shortly before Month 12 Day 20 of Year 26 of Taharqa. If the rule that installation follows birth by several months was observed, then the bull was installed in Year 27. From what has been said above, it can be inferred that the bull was born in the year before Taharqa's last full year of rule. His last full year would be his 27th and his last regnal year his 28th. Taharqa would then have died in his Year 28 and the beginning of his reign would have been a year earlier in the wandering year 691/90 B.C.E. But one serious objection is that, as already noted by Parker, the change of regnal year from birth to installation would curiously remain without mention in the text!

In conclusion, to the extent that IM 3733 rather suggests that birth and installation occurred in the same year, Year 27 is to be preferred as Taharqa's last and the absolute date mentioned above stands. Those who maintain otherwise will need to seek the earliest absolutely dated event in the beginning of Psammetichus I's reign.

3.3 What Is the Earliest Absolutely Dated Event without Relying on the Sothic Hypothesis?

So far we have assumed the Sothic hypothesis to be correct. But if the wandering calendar could have been randomly adjusted at any time, the quest for the earliest absolutely dated event has to begin afresh. Egyptian events are dated absolutely if they can be related to dates already absolute. Such relations are established in the well-known Aramaic double dates.

A number of the Aramaic papyri found in Egypt have Babylonian-Egyptian double dates. The Egyptian and Neo-Babylonian calendars differ completely in structure. But to find that pairs of dates, of which each member is independently converted into julian dates, as a rule match is the most striking confirmation ever to emerge of the correctness of our insight into the two calendars, at least back to the fifth century. The earliest double date, corresponding to julian 2 November 473 B.C.E., is found in a text known as the Memphis Shipyard Journal or Journal of the Memphis Arsenal, found in a papyrus from Saqqara (Porten 1990: 29). Several other dates from 472 and 471 B.C.E. can be cited in support. There is therefore not the least doubt that, from about 473 onwards, the Sothic hypothesis is not really a hypothesis but simply the truth.

Before that time, there is much that could be said about dating in the Saite period (690–527/5) that would make the Sothic hypothesis extremely plausible for that period as well, yet not absolutely certain.[50]

[50] Since the Egyptian month and day date of the astronomical date recently proposed by Smith (1991) for the year 610 B.C.E. is unknown, a minor calendar adjustment after 610 would not significantly affect Smith's proposal, and the date is therefore not absolute evidence for the consistency of the wandering year back to that time. What follows is a brief discussion of this date.

A literary narrative in the fragmentary Demotic papyrus P. Berlin 13,588 datable to the first century B.C.E. (for the text, see Erichsen 1956) mentions a celestial phenomenon, previously interpreted as a solar eclipse (Hornung 1966, referring to a proposal by Otto Neugebauer), and a certain king Psammetichus. Because the text is fragmentary, relations between persons, places, and objects are obscure, but Smith argues coherently that the text associates a lunar eclipse occurring in the evening of 22 March 610 B.C.E. with the death abroad of Psammetichus I. One way of challenging a good proposal constructively is to suggest an alternative not lightly falsifiable. For example, Psammetichus III, who died shortly after Cambyses' conquest of Egypt in 527/5 B.C.E., is not considered because the lunar eclipse of 5 September 525, visible in the evening in Babylon (Kudlek and Miller 1971: 149), could not have been observed at Daphnae in Egypt (Smith 1991: 107). But the text does not state that the observation was made at Daphnae, only that the occurrence of the eclipse was announced there. If the king was Psammetichus III, then, the protagonist of the narrative, a young scribe, copied mortuary texts for a deposed king in exile who would otherwise have been buried without them. An argument against this, though, is that Herodotus (III, 15) seems to imply that Psammetichus III died in Egypt. Then again, lunar observation flourished in Babylonia whereas it was much less significant in Egypt. Therefore, when lunar eclipses are mentioned in Demotic texts, Babylonian influence in the wake of the Persian conquest may be suspected (Parker 1959: 28–30, 53–54); reports in Demotic texts of lunar eclipses are more easily reconciled with the Persian period than with the Saite period. For example, *3.4 What Is the Latest Absolutely Dated Event according to the Wandering Year without Relying on the Sothic hypothesis?*

Astronomical treatises, and even literary works such as Censorinus' *De die natali,* will be excluded as evidence in answering this question, because the Egyptian wandering year was used until the Middle Ages for astronomical purposes.[51] But from documents pertaining to daily life, it is clear that the wandering year was used well into the third century. For example, Papyrus Cornell 9, dealing with an engagement of castanet dancers, is dated so in 206 C.E.[52] The date is identified as κατ' ἀρχαίους "according to the ancients," a designation for the wandering year, as distinct from the Alexandrian year.[53] In a discussion of the use of the two calendars in Greek documents, Ulrich Wilcken cites a papyrus text dated "according to the ancients" as late as 237 (1899: 794–96).

When did the common use of the wandering year fade away? It may be surmised that the institution of the Era of the Martyrs, counting from 284 C.E. and used especially by Christians, together with the rise of Christianity in the fourth century, and perhaps also the establishment of the indiction system by Diocletian, played a role. The Era of the Martyrs and the counting according to indictions use the Alexandrian year. At all events, the most famous latest dates of 394 C.E. for hieroglyphic sources and 452 C.E. for Demotic sources are according to the Alexandrian intercalated year.

3.5 Period in which the Wandering Year Was Undisturbed without Doubt

The earliest and latest dates mentioned above yield a period lasting from 473 B.C.E. to 237 C.E.,[54] more than 700 years long.[55] The following six observations can be made regarding this period.

1. For more than 700 years the Egyptian year wandered undisturbed without the least doubt, and this period can easily be extended to about a millennium with high plausibility.
2. At the end of the 700-year period, which is about half a Sothic cycle long, the days of the wandering year had moved roughly six months in the solar year and reached a point that could hardly be farther removed from their point of departure.
3. During much of this period, kings, astronomers, and mathematicians were aware of what made the year wander. There is ample testimony of this. There is even, in the decree of Canopus of 238 B.C.E., a royal ordinance to add a day every four years, but this was never implemented.
4. The wandering year continued to be used alongside the Alexandrian year instituted by Augustus. This means that the wandering year survived certainly for about 250 years and most probably for more than three centuries in spite of competition from a fixed calendar that had sprung forth from it and that was widely used alongside it.
5. The Egyptian calendar is the simplest calendar ever invented. All one needs to do is keep counting 12 times 30 plus 5 in sequence.
6. Scholars such as Nigidius Figulus, Geminus, and Theon, mentioned in all modern accounts of the ancient sources for the wandering year, assumed that the calendar had not been adjusted. Also the Canopus Decree refers to the wandering year as that of the ancients; and Herodotus (II, 4) mentioned in the fifth century that the Egyptian calendar had 365 days.

All this gives, I believe, a powerful boost of plausibility in terms of assuming unperturbability of the calendar also before, say, the Saite period. This plausibility is at least as strong as any other that can be construed in favor of an alternative chronology in light of the available evidence.

in P. Berlin 13,588 (III 9–10; cf. III 15–16), the king consults an astronomical papyrus: "Let the book be brought . . . and let us find out whether Re has *jn-sȝn* the disk (that is, the moon)" (Erichsen [1956: 73] suggests that *jn-sȝn* is a writing for *jn-snj* "pass by").

[51] Neugebauer (1942: 230 n. 25) notes that Pappus still uses the Egyptian calendar to date the solar eclipse of October 18, 320 C.E. But it cannot be inferred from this that the calendar was still in daily use at that time.

[52] For the text, see Pestman 1990: 210–11 no. 52.

[53] The Alexandrian year, instituted in 30 B.C.E. by Augustus, is the 365 day wandering year stopped in its drift in relation to the solar year by the insertion of intercalary days at the time when 1 Thoth fell on julian 29 August.

[54] As I have not systematically checked editions of documents from Egypt, it is possible that dates later than 237 C.E. have emerged since Wilcken.

[55] This period is longer than that of 475 years, lasting from 238 B.C.E. to 238 C.E., proposed by Weill (1926: 59–60).

4. The Wandering Year before 473 B.C.E.

There is, to my knowledge, no incontrovertible evidence for the consistency of the wandering year before 473 B.C.E. But to those familiar with the way in which the chronology of the Saite Period (664–527/5 B.C.E.) has been derived from Serapeum stelae providing dates of birth and death and the length of life of Apis bulls and priests spanning the reign of more than one king, there may seem to be little point in stating lengths of life exactly in years, months, and days, if not all years are 365 days long.

Moreover, the early centuries of the Era of Nabonassar and Ptolemy's Royal Canon are obtained by converting Babylonian dates into Egyptian wandering year dates back to 747 B.C.E., an endeavor in which Hipparchus (second century B.C.E.) may have played a role. The dates from Ptolemy's Canon have been confirmed by the contemporary evidence that has emerged and deciphered in this and the last century. This would seem to indicate that good cuneiform records were kept back to that time. It is reasonable to assume that, if earlier Babylonian history was known that well when the dates were converted, earlier Egyptian history may have been too, and that the conversion would have been inspired by the desire to give historical Egyptian dates rather than equivalents in an artificial calendar if the calendar had been adjusted between 747 and 473 B.C.E.

As regards Egyptian chronology before the Saite period, instead of calibrating the plausibility of the wandering year's consistency, only one general remark, pertaining especially to the Third Intermediate Period, will be made here.

Assumptions of calendar adjustments have generally involved shortening Sothic cycles to conclude that, for example, the Sesostrises and Ramses II had not reigned as long ago as it is generally thought they did. Two examples are the shortening of the Second Intermediate Period by Weill and the shortening of the Third Intermediate Period by James and others.

An objection raised by Parker against Weill's proposal also affects the new Third Intermediate Period chronology. Shortening implies taking away days, including feast days. According to Parker (1952: 106), this would have the following effect: "On the economic and fiscal side, there would be trouble with taxes, with contracts, with loans falling due, with wages, with temple service, and with a host of other matters. On the religious side, all festivals falling within the period would be wiped out completely, with the consequent loss to the temples of all the attendant sacrifices and offerings. Then, too, unless the step were announced to all the country well in advance there would certainly be confusion between the old and the adjusted year dates for some time. One might well ask what could be the gain from calendar adjustment to offset all the inevitable trouble and difficulties!"

To this objection one might add the following consideration. It is known that around the time of Ramses II, the calendar had come to coincide roughly with the seasons; that is, the first month, I *3ḫt*, fell in July and August. Now if we assume that Ramses reigned, say, around 900 B.C.E. instead of around 1200, then to have the calendar back to where we certainly know it was around 500, it is necessary to take away about two months. Now it may be possible to imagine Egyptian scribes in the decades after Ramses II taking note of the fact that New Year's Day and the entire year were falling behind again against the natural seasons and such astronomical phenomena as the Sothic rising. But in order to halt it, the scribes would have had to add days, an easy thing to do, since they already had epagomenal or added days. However, what they must have done, if one assumes that Ramses II reigned around 900, is to subtract about sixty days, that is, to go into the opposite direction, or to make the effect of the year's falling behind much worse.

Third Intermediate Period chronology can therefore only be shortened by assuming that days were subtracted. This would not only generate all the difficulties described by Parker, but also worsen the year's retardation in relation to the seasons lamented in literary texts (Weill 1926: 107–11). And preventing this retardation seems to be the only imaginable ground for calendar adjustments in the first place.

5. Conclusion

Modern Egyptologists have been described as "stubborn" and "arrogant" for clinging to a

Sothic chronology deemed "ossified" (James 1993: 257–59).[56] My impression is that what can be known about the wandering year makes it possible to hold on to this hypothesis with an attitude of flexibility and cooperativeness. Without dramatic new evidence, it does not look as if definitive proof either way is forthcoming. But if the current evidence persists, to assume that the Egyptian year was not tampered with a bit does not require a whole lot of imagination.

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[56] This lone lapse in many pages of balanced discourse needs to be seen in light of the fact that there is no way of reducing the traditional chronology significantly without snapping the backbone of the wandering year's consistency.

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