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THE FIFTH-CENTURY JEWISH CALENDAR AT ELEPHANTINE

S. H. HORN AND L. H. WOOD

THE fourteen dated Aramaic papyri from Elephantine recently discovered among the personal effects of the late Mr. Charles Edwin Wilbour in the Brooklyn Museum[1] form a most welcome addition to the more than eighty previously known papyri from the same Nile island.[2] They are important for a reconstruction of the Aramaic language spoken by the Jews in Egypt during the fifth century B.C. and appreciably supplement our knowledge of the economic, religious, and secular history of the Jewish colony at Elephantine.

Moreover, these new papyri form exceedingly important source material for the study of the calendar in use among the Jews of Elephantine during the fifth century B.C. Of the fourteen new dated papyri, eleven bear double dates, i.e., the Egyptian and Persian (or Jewish) ones. Since only twenty-four of the previously known papyri were dated, of which eleven contained double dates, the new material has at once almost doubled our available evidence for the calendar of the fifth-century Jewry at Elephantine.

Immediately after the publication of the first group of papyri, several scholars attacked the problems in their dates and the calendar system involved. E. Schürer[3] was one of the first who discussed the dates of these documents. He was followed by F. K. Ginzel.[4] Both of them started out from the hypothesis that the Jews of the fifth century had a lunar calendar like the Persians and that they began every month after the visibility of the new moon

[1] These new papyri have been published in a most excellent way by Emil G. Kraeling, *The Brooklyn Museum Aramaic Papyri, New Documents of the Fifth Century B.C. from the Jewish Colony at Elephantine*, (New Haven, 1953). They are quoted in this article as *Kraeling 1–14*. Owing to the generosity of Dr. Kraeling and Mr. J. D. Cooney of the Brooklyn Museum, advanced information and photographs of these papyri were obtained, which made it possible to work on their dates before they were published. The present authors herewith express their deep-felt gratitude for this unusual kindness.

[2] The first series of previously known papyri from Elephantine, acquired by A. H. Sayce and Robert Mond in the years 1901–4, were published by A. H. Sayce and A. E. Cowley, *Aramaic Papyri Discovered at Assuan* (London, 1906). Those discovered during the excavations of 1907–8 were published by Eduard Sachau, *Aramäische Papyrus und Ostraka aus einer jüdischen Militär-Kolonie zu Elephantine* (Leipzig, 1911). All pre-Christian Aramaic papyri known up to 1923 were conveniently collected by A. Cowley, *Aramaic Papyri of the Fifth Century B.C.* (Oxford, 1923). Papyri contained in Cowley's work are quoted in this article as *AP 1* ff.

[3] E. Schürer, book review, "Aramaic Papyri Discovered at Assuan, edited by A. H. Sayce with the assistance of A. E. Cowley. . . . London, A. Moring, 1906 . . . ," *Theologische Literaturzeitung*, Vol. XXXII (1907), cols 1–7; "Der jüdische Kalender nach den aramäischen Papyri von Assuan. Nachtrag zu der Anzeige in Nr. 1," *ibid.*, cols. 65–69.

[4] Friedrich Karl Ginzel, *Handbuch der mathematischen und technischen Chronologie*, II (Leipzig, 1911), 45–52.

as in Babylon. Irregularities and disagreements in the dates were explained as scribal mistakes. L. Belleli, however, tried to prove by the apparently inexplicable disagreements between some of the dates that the documents were modern forgeries,[5] but very few scholars could believe that papyri found by a scientific expedition—as the majority of the papyri had come to light in this way—could have been dumped on the side by forgers who would have no profit from the discovery of the documents. Since the excavated papyri showed the same characteristics as those bought from natives, no doubt in the genuineness of any of them can reasonably be entertained.

The astronomer E. B. Knobel showed from papyri *AP 13* and *25* that a nineteen-year cycle was known to the Jews in the fifth century B.C., as their system of intercalation shows. He concluded from his findings that the Jewish civil calendar was computed and that the Jewish civil year began with Tishri 1.[6] The well-known British astronomer J. K. Fotheringham came similarly to the conclusion that the computed calendar and the year beginning with Tishri 1 were used and also that the intercalation was arbitrarily done by the insertion of a second Adar, without the use of a second Elul.[7]

The chronologist E. Mahler agreed with Knobel and Fotheringham that the Jewish calendar was based neither on the visibility of the first crescent nor on the conjunction but on the application of a regular cycle.[8] However, he believed that the Jewish fall-to-fall calendar was a later institution.[9]

Martin Sprengling, on the other hand, reached entirely different conclusions. Maintaining that the Jewish civil year beginning with Tishri was a later development, he held that the Elephantine papyri attest a year which began with Nisan and that the Jews of the fifth century used a second Elul but dropped it later on.[10] It is not necessary to review in detail the work of P. J. Hontheim, J.-B. Chabot, J. G. Smyly, D. Sidersky, and H. Pognon,[11] because their reasonings vary only in some

[5] L. Belleli, *An Independent Examination of the Assuan and Elephantine Aramaic Papyri* (London, 1909).

[6] E. B. Knobel, "A Suggested Explanation of the Ancient Jewish Calendar Dates in the Aramaic Papyri Translated by Professor A. H. Sayce and Mr. A. E. Cowley," *Monthly Notices of the Royal Astronomical Society*, LXVIII (1907–1908), 334–45; "Note on the Regnal Years in the Aramaic Papyri from Assuan," *ibid.*, LXIX (1908–9), 8–11.

[7] J. K. Fotheringham, "Calendar Dates in the Aramaic Papyri from Assuan," *Monthly Notices of the Royal Astronomical Society*, LXIX (1908–9), 12–20; "Note on the Regnal Years in the Elephantine Papyri," *ibid.*, pp. 446–48; "A Reply to Professor Ginzel on the Calendar Dates in the Elephantine Papyri," *ibid.*, LXXI (1911), 661–63.

[8] Eduard Mahler, "Die Doppeldaten der aramäischen Papyri von Assuan," *Zeitschrift für Assyriologie*, XXVI (1912), 61–76; *Handbuch der jüdischen Chronologie* (Leipzig, 1916), pp. 346–58. One of his statements may be quoted as an example: "Auf jeden Fall aber erkennen wir, dass den jüdischen Kalenderangaben in den zu Assuan und Elephantine gefundenen aramäischen Papyri weder das Neulicht, noch die Bestimmung des wahren Neumondes als Grundlage der Zählung diente; hierfür war die zyklische Bestimmungsmethode der Babylonier mit ihrem 19jährigen Zyklus massgebend" (*Handbuch* p. 355).

[9] Mahler thinks that the fall-to-fall calendar was not introduced among the Jews prior to the Seleucid period (*Handbuch*, pp. 359–60). Since the Syrians possessed Tishri 1 as New Year's Day, it became the ראש השנה of the Jews at that time, he claims. This view cannot be correct because of the conclusive evidence for a fall-to-fall calendar among the Jews in the pre-Exilic and post-Exilic period as shown by Ginzel (*op. cit.*, II, 26, 39, 40), and Edwin R. Thiele, *The Mysterious Numbers of the Hebrew Kings* (Chicago, 1951), pp. 30–33. It also is unthinkable that the Jews should have retained after their liberation an institution forced on them by their most hated enemies, the Seleucid oppressors.

[10] Martin Sprengling, "Chronological Notes from the Aramaic Papyri," *AJSL*, XXVII (1911), 233–52.

[11] P. J. Hontheim, "Die neuentdeckten jüdisch-aramäischen Papyri von Assuan," *Biblische Zeitschrift*, V (1907), 225–34; J.-B. Chabot, "Les Papyri araméens d'Éléphantine sont-ils faux?" *Journal asiatique*, XIV (10th ser., 1909), 515–22; J. Gilbart Smyly, "An Examination of the Dates of the Assouan Aramaic Papyri," *Proceedings of the Royal Irish Academy*, XXVII, Sec. C (1908–1909), 235–50; D. Sidersky, "Le Calendrier sémitique des papyri araméens d'Assouan," *Journal asiatique*, XVI (10th ser., 1910), 587–92; H. Pognon, "Chronologie des papyrus araméens d'Éléphantine," *Journal asiatique*, XVIII (10th ser., 1911), 337–65.

details from the various conclusions reached by the scholars already mentioned. It should be stated, however, that S. Gutesmann thought the Jews possessed a twenty-five-year cycle instead of the Babylonian nineteen-year cycle.[12] This theory has found no acceptance, since the double-dated papyri would have to show the use of such a twenty-five-year cycle over a larger period than is covered by the extant documents. Inasmuch as such a cycle was not employed anywhere else in the ancient world, it seems unlikely that the Jews should have used it.

R. A. Parker, whose study seems to be the last one that has appeared on this subject, holds the view that the Elephantine papyri express their dates in terms of the existing Persian, i.e., Babylonian, calendar.[13] He holds, furthermore, that divergences thus found between the Egyptian and Babylonian dates are due to mistakes made by the scribes, who as foreigners were not very familiar with the Egyptian calendar and therefore apt to confuse dates.[14]

The different views found in the numerous studies dealing with the dates of these papyri reveal that no unassailable conclusions have yet been reached. Most scholars, however, agree that a nineteen-year cycle was in use among the Jews of the fifth century B.C. Many also agree that the Jewish calendar was not completely synonymous with the Babylonian calendar, unless every divergence is explained as a scribal error.

With regard to other points there is much difference of opinion. Whether the Jews started their civil year with Nisan or Tishri, whether they made use of a second Elul besides the second Adar, and whether the intercalation was carried out regularly are disputed questions.

The great increase in the number of dated documents through the discovery of the Brooklyn Museum papyri makes a reexamination of the whole problem urgent. They are leading us a step further on the way to the final solution, as the following discussion will show. Although we are not yet able to explain every phase of the Jewish calendar of the post-Exilic period, we actually know much more about it through these papyri than we know about the period of the first Christian century.

PROCEDURES FOLLOWED

In the study of these papyri the first step will be to convert the Egyptian date into terms of the Julian calendar. The Egyptian civil year as used without change throughout its ancient history was solar, being divided into twelve months of thirty days each with five extra days, or epagomenae, at the end of the year, totaling 365 days.[15] The names of the twelve months during the period covered by the Elephantine papyri were the following:

	Days
Thoth	30
Phaophi	30
Athyr	30
Choiak	30
Tybi	30
Mechir	30
Phamenoth	30
Pharmuthi	30
Pachons	30
Payni	30
Epiphi	30
Mesore	30
Epagomenae	5
Total	365

Since the Egyptian civil year was one-quarter day short of the Julian solar year, its Thoth 1 fell one day earlier every four years, wandering through all the seasons in the course of 1,460 years.

[12] S. Gutesmann, "Sur le calendrier en usage chez les Israélites au Ve siècle avant notre ère," *Revue des études juives*, LIII (1907), 194–200.

[13] Richard A. Parker, "Persian and Egyptian Chronology," *AJSL*, LVIII (1941), 288–92.

[14] Parker expressed this conviction in a letter to S. H. Horn dated Nov. 19, 1952.

[15] Parker, *The Calendars of Ancient Egypt* (Chicago, 1950), pp. 7–8.

The Canon of Ptolemy has preserved a continuous list of Babylonian, Persian, Macedonian, and Roman rulers for nine centuries. Ptolemy begins his list with Thoth 1 in the first regnal year of Nabonassar (February 26, 747 B.C.), which he uses as the starting point of his so-called "Nabonassar Era." Since all these dates can be checked astronomically by nineteen lunar eclipses ranging over nine centuries, and have been proved to be correct, Ptolemy's Canon allows us to establish the Julian date of Thoth 1 for any year from 747 B.C. onward.[16] When Thoth 1 has been ascertained, it is easy to convert any Egyptian date into terms of the Julian calendar.

The Elephantine papyri were written in the time when Egypt was a Persian satrapy. Therefore they are with one exception dated according to regnal years of Persian kings. However, the Egyptian regnal year of a given Persian king began, with the Egyptian calendar year, on Thoth 1, which during the fifth century B.C. fell four to five months before Nisan, the first month of the Babylonian calendar.[17] The reader is reminded that although the Persians used the accession-year system, calling the interval between the accession of a king and the next New Year's Day "accession year," the Egyptians called the interval between the king's accession and the next Egyptian New Year's Day "year 1." Therefore the Egyptians began any regnal year of a Persian king several months earlier than the Persians themselves did. Hence, any Egyptian document dated after Thoth 1, and before the Persian New Year's Day in the spring, had a regnal year number which was higher by one than the corresponding Persian year number.

Among these Elephantine papyri all those containing legal documents bear either the Egyptian date only or two date formulas, one of which is always the Egyptian form. Therefore the conclusion is valid that all legal documents were required to bear the Egyptian date. Furthermore, it can be observed that in the majority of double-dated papyri (eighteen against two) which give only one year number, the regnal year number of the Persian king follows the Egyptian month date. Thus the earliest of these typical double-dated papyri (*AP 5*) has the following date line: "On the 18th of Elul [in a calendar using Babylonian month names], that is the 28th day of Pachons [in the Egyptian calendar], year 15 of King Xerxes."

That the year number is really the one according to the Egyptian reckoning, and not according to the Persian reckoning, can be demonstrated in several cases showing that the double dates agree only if the year number is taken to represent the Egyptian way of reckoning the regnal years of Persian kings. For example, papyrus *Kraeling 10* synchronizes the 20th of Adar with the 8th of Choiak in the 3d year of Artaxerxes II. These two dates coincided on March 9, 402 B.C., which was Choiak 8 in the 3d year of Artaxerxes II according to Egyptian reckoning, but Adar 20 in the 2d year of Artaxerxes II according to the Persian reckoning. A year later, when Adar 20 of Artaxerxes II's 3d year according to Persian reckoning fell on March 28, 401 B.C., no syn-

[16] An English translation of Ptolemy's *Almagest* by R. Catesby Taliaferro can now be found in *Great Books of the Western World*, XVI (Chicago, 1952), vii–xiv, 1–478 (the Canon is in Appendix A, p. 466). For a list of Ptolemy's eclipses see Theodor von Oppolzer, *Syzygien-Tafeln für den Mond* ("Publication der astronomischen Gesellschaft," XVI [Leipzig, 1881]), 31–34; for the astronomical eclipse data see his *Canon der Finsternisse* ("Denkschriften der kaiserlichen Akademie der Wissenschaften," Math.-Naturwissensch. Klasse, LII [Vienna, 1887]).

[17] Thoth 1 moved from December 26 in 500 B.C. back to December 1 in 400 B.C., while the earliest and latest dates given in Parker and Dubberstein's tables (*op. cit.*, pp. 28–32), for Nisan 1 are March 23 and April 23.

chronism can be achieved, since Choiak 8 was March 8 in that year. This shows clearly that the Egyptian regnal system was usually used in the papyri, which record only one figure for the regnal year of the king.

In two of the papyri, *AP 25* and *28* (to be discussed later), the scribes were careful enough to give the two variant year numbers. This they should always have done where a difference between the two calendar systems was involved; but it seems to have been felt that it was not always necessary, since everyone knew that the regnal year number of the king was higher by 1 according to the Egyptian reckoning during that portion of the year which fell between Thoth 1 and the next Persian or Jewish New Year. The difference between two documents, *AP 10* and *25*, shows clearly that one scribe had the habit of giving the regnal year numbers according to two systems, while the other failed to do this. These two papyri are both dated in the same months—Kislev and Thoth—although the years are different, but only *AP 25* says that Kislev 3 fell in the year 8, and Thoth 12 in the year 9 of Darius II. The other (*AP 10*), simply states that Kislev 7 is Thoth 4 in the 9th year of Artaxerxes I. If it were as specific as *AP 25*, it should read, "Kislev 7 in year 8, that is Thoth 4 in year 9 of Artaxerxes."

Since the Persians had adopted the Babylonian calendar, the first impression in reading the double-dated papyri is that the non-Egyptian dates are those of the Babylonian calendar. For this latter calendar the excellent monograph of R. A. Parker and W. H. Dubberstein, *Babylonian Chronology 626 B.C.–A.D. 45* (2d ed.; Chicago, 1946), furnishes complete tables which allow us to convert without effort any Babylonian date into its Julian equivalent with a fairly great measure of accuracy.

The Babylonians employed a lunar year, consisting of twelve lunar months of twenty-nine or thirty days each in a common year, which is about ten days shorter than the solar one. Then they added a thirteenth month every two or three years —seven times in nineteen years—to make the lunar year harmonize with the seasons. This extra month was added mostly after Addaru, the last month of the year, and was called Addaru II; occasionally it was placed after the sixth month, Ululu, as Ululu II. This was done irregularly up to the end of the sixth century B.C., but thereafter the intercalation became more regular, and Addaru II was inserted six times and Ululu II once (usually in each seventeenth year) in the nineteen-year cycle. The Babylonian year began with the month of Nisanu in the spring.

Whether the Jews in Elephantine used the Babylonian calendar completely or with modifications will be discussed after the study of the individual papyri has been completed.

All month names of the Jewish calendar are now represented in the datelines of the Elephantine papyri with the exception of Nisan (which is, however, mentioned in *AP 21:8*), and the following is a list of the Babylonian and Jewish month names in their regular sequence:

Babylonian	Jewish	Provenience
Nisanu	Nisan	*AP 21:8*
Aiaru	Iyyar	*Kraeling 14*
Simanu	Sivan	*Kraeling 1, 5*
Duzu	Tammuz	*Kraeling 6*
Abu	Ab	*AP 14*
Ululu	Elul	*AP 5, 20, Kraeling 3*
Tashritu	Tishri	*AP 15, Kraeling 4, 7, 8*

Babylonian	Jewish	Provenience
Arahsamnu	Marcheshvan	*AP 17, 30, 31, Kraeling 9*
Kislimu	Kislev	*AP 6, 8, 10, 13, 25*
Tebetu	Tebeth	*AP 26*
Shabatu	Shebat	*AP 28*
Addaru	Adar	*Kraeling 10*

In our study of the double-dated papyri the differences in the beginning of the days according to the various calendars have to be taken into account. If the Egyptian date has been converted into its Julian equivalent, the date arrived at will cover parts of two Julian calendar days, since the Egyptian day began at dawn.[18] Therefore two figures must be used, and July 7/8 (sr-sr),[19] 465 B.C., designates an Egyptian day that lasted from July 7 at dawn to July 8 at dawn in 465 B.C.

Since the Jews and Babylonians began the day at sunset,[20] their day also overlapped two Julian calendar days, and Jewish dates will henceforth also be indicated by two figures. Thus July 7/8 (ss-ss), 465 B.C., means the day which began at sunset July 7 and ended at sunset July 8. We see therefore that the Egyptian day did not coincide exactly with the day as reckoned by any of the other peoples mentioned. Hence a legal document signed on the Egyptian day July 7/8 (sr-sr) would give two possible dates in terms of a Jewish calendar, depending on the part of the day when the signing of the document occurred. If therefore a double-dated papyrus equates a certain Egyptian date with one of the Jewish calendar, it is still uncertain whether the Jewish day referred to began the evening preceding the Egyptian day mentioned or on the evening of that Egyptian day. If it was signed before sunset, it would be dated one day earlier by the Jewish date than if it was signed after sunset.

The Jews had a lunar calendar, in which the first day of the month must begin a reasonable time after the conjunction of the moon, since the interval between conjunction and the evening when the first crescent becomes visible (this interval is called henceforth "translation period") is a length which varies from about 16 to 42 hours in the Near East.[21] Our conclusions will therefore lead us in a few cases to assume that a document was made up after sunset,[22] if otherwise the time between conjunction and the beginning of the first day of the month at sunset would become too small to be reasonable. Thus it must be recognized that an uncertainty of one day cannot be avoided, owing to the facts that (1) the Egyptian and Jewish days did not completely overlap and (2) that the scribes in no case indicated during which part of the day the documents were written.

After having briefly explained the procedures followed in the interpretation of the double dates, we shall proceed to their discussion, taking them up in chronological sequence.

DISCUSSION OF DATE LINES

AP 5. Elul 18 = Pachons 28, year 15 of Xerxes (471 B.C.).—The 15th year of Xerxes is the year 277 of the Nabonassar Era of Ptolemy's Canon beginning December 19, 472 B.C., and lasting through

[18] Parker, *The Calendars of Ancient Egypt*, p. 10.

[19] The abbreviation "sr-sr" meaning "sunrise to sunrise" is used in contrast to the "ss-ss" ("sunset to sunset") used for the Jewish day, and not to insist that the day began at the actual time of sunrise.

[20] For the Jews see Gen. 1:5, 8, etc.; Lev. 23:32; Mark 1:32; and article "Day," in *The Universal Jewish Encyclopedia*, III, 493. For the beginning of the Babylonian day see Parker and Dubberstein, *op. cit.*, p. 24.

[21] Parker, *The Calendars of Ancient Egypt*, p. 4.

[22] For "sunset" a mean is taken, for the purposes of this study, at 6:00 P.M. Elephantine civil time (that is, local time at Elephantine, counted from midnight), although this time naturally varied somewhat during the seasons of the year.

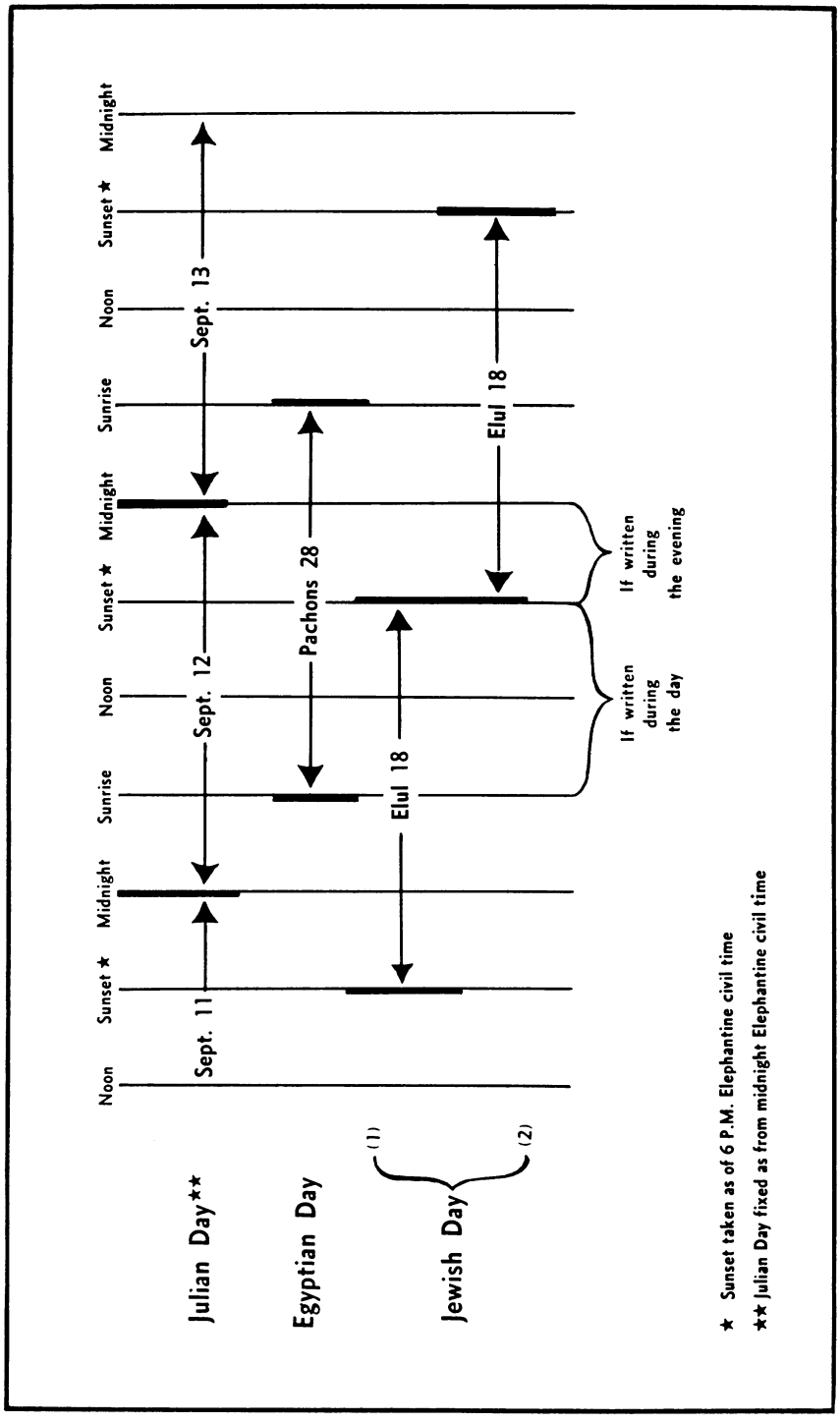


FIG. 1

December 18, 471 B.C. Pachons 28 fell on September 12/13 (sr-sr), 471 B.C. Since the Jewish day began at sunset, as has already been explained, Elul 18 would not coincide exactly with Pachons 28 but would overlap parts of two Egyptian days. Therefore, as Figure 1 shows, there are two possibilities: (1) September 11/12 (ss-ss) if the agreement was drawn up during the hours of the day, or (2) September 12/13 (ss-ss) if it was written after sunset of September 12. This would then result in two possible dates for Elul 1, either (1) August 25/26 (ss-ss) if the document was written during the hours of the day or (2) August 26/27 (ss-ss) if it was written after sunset.

Since the preceding conjunction of the moon took place August 24.78 (= August 24 at 6:43 P.M. Elephantine civil time counted from midnight), the translation period amounted to .97 of a day (23 hours, 17 minutes) if August 25/26 (ss-ss) was Elul 1, or 1.97 days (47 hours, 17 minutes) if August 26/27 (ss-ss) was Elul 1. Not until all the various papyri have been discussed can we reach reasonable conclusions. Hence we have to defer making a decision as to which of the two dates mentioned was Elul 18.

AP 6. Kislev 18 = Thoth [17], year 21, the beginning of the reign of Artaxerxes I (464 B.C.).—The Egyptian day number is broken. Cowley suggested restoring it to 7 or to 14; Gutesmann and Hontheim restored it to 17.[23] No other restorations are paleographically possible. A three-quarter-inch break in the papyrus obliterates part of the number, leaving four vertical strokes. In this break the last two characters of the word יום, "day," have to be supplied, since only the letter י is extant. The remaining gap is then about half an inch. It can be filled with three strokes, making the number 7. This actually gives paleographically the best picture as the accompanying reproduction (Pl. I, *A*) shows. The restoration of a "10" in the gap does not fill it well (Pl. I, *B*), and the figure 14 can therefore be disregarded. The insertion of the figure for 10, followed by 3 strokes, making the figure 17 (Pl. I, *C*), is the only day number which can be made to agree astronomically with Kislev 18, but it must be admitted that the figure looks rather crowded, as Plate I, *C* shows.

This papyrus is important, since it seems to equate the 21st year of one king with the accession to the throne of a king Artaxerxes. Since only Artaxerxes I succeeded to the throne in the 21st year of his predecessor (Xerxes), this latter king's name must be inferred.

In contrast to the usual method of the Jews in Elephantine, of giving only the Egyptian year if only one is mentioned, this is one of the two exceptional cases (also *Kraeling 6*) where only the Persian or Jewish year number is given instead.

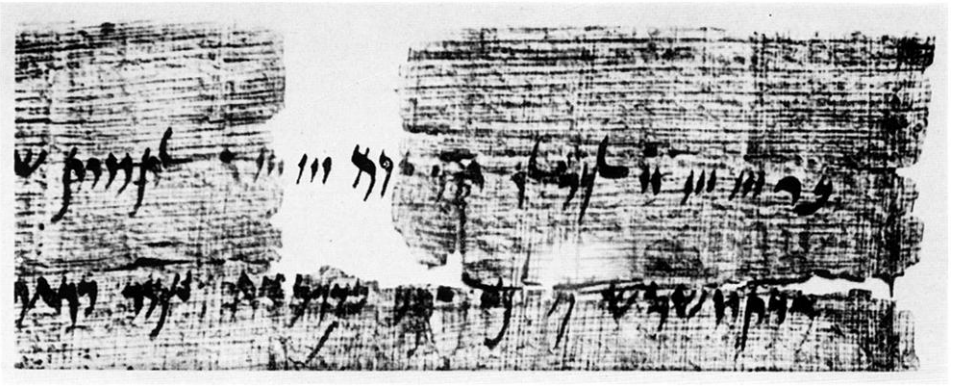
The 21st year of Xerxes, which was also the accession year of Artaxerxes I, began in the spring of 465 B.C. according to the Persian system of reckoning and in the fall of the same year according to the Jewish civil year. The month Kislev, the 9th month of the Babylonian calendar, always fell toward the end of the Julian calendar year—thus from December, 465, to January, 464 B.C., during the year under discussion. The Egyptian month Thoth of that period began December 17, 465, and ended January 15, 464 B.C. That only Thoth 17 can be made to agree with Kislev 18 can be seen from the following results:

Thoth 7 = December 23/24 (sr-sr), 465 B.C.
Thoth 14 = December 30/31 (sr-sr), 465 B.C.
Thoth 17 = January 2/3 (sr-sr), 464 B.C.

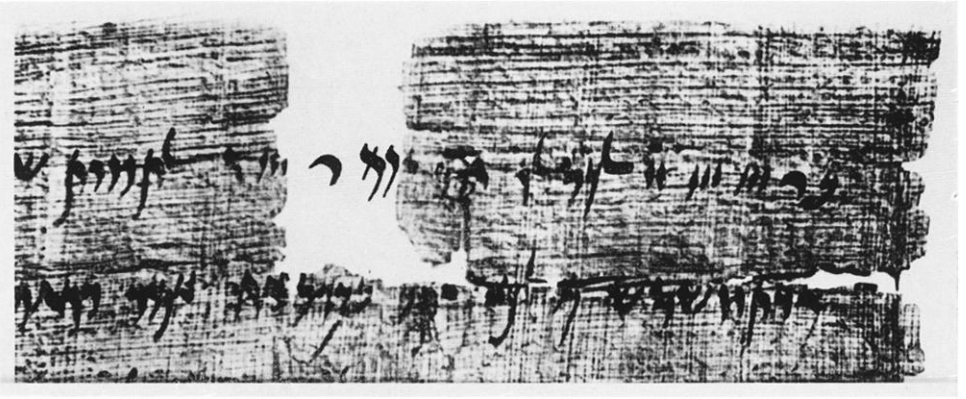
The conjunction of the moon took place December 15.04 (12:57 A.M.), 465 B.C. The earliest date possible for Kislev 1

[23] Cowley, *op. cit.*, p. 17.

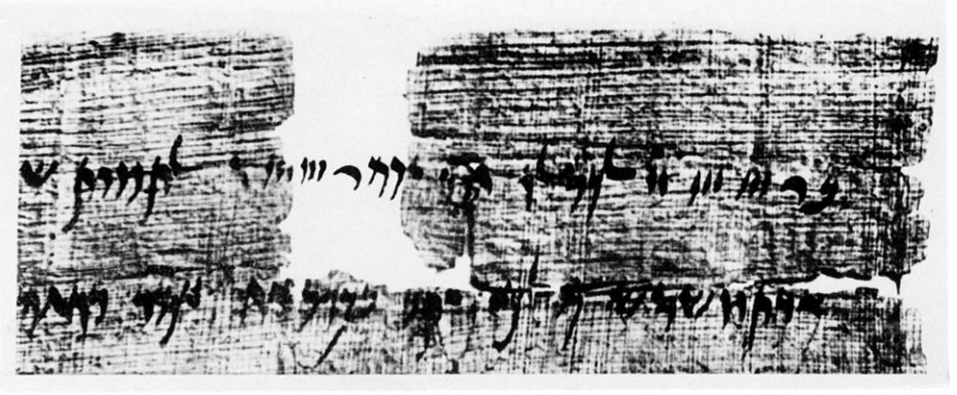
PLATE I



A. Day Number Reconstructed to "7"



B. Day Number Reconstructed to "14"



C. Day Number Reconstructed to "17"

would hence be December 15/16 (ss-ss), 465 B.C., and the 18th of Kislev would then be January 1/2 (ss-ss), 464 B.C..

If Kislev 1 was December 15/16 (ss-ss), 465 B.C., the translation period amounted to .71 of a day (17 hours, 2 minutes); if Kislev 1 was December 16/17 (ss-ss), the translation period would be 24 hours longer (41 hours, 2 minutes), and the document would have been written in the evening after sunset, since Kislev 18 would in that case have been January 2/3 (ss-ss), 464 B.C.

Since there are no known cuneiform texts dated to either year 21 of Xerxes or the accession year of Artaxerxes I, this papyrus is of great importance. The scribe of *AP 6*, living in Upper Egypt, was still on January 2, 464 B.C., in the habit of dating a document to the 21st year of a king whose death must already have been known, since the accession of Artaxerxes I is mentioned. This indicates that the change from one king to the other had only recently been made. This interpretation seems to have been that of Parker and Dubberstein,[24] and of Olmstead, who states that Xerxes was assassinated "near the end of 465."[25]

This conclusion can now be proved to be correct through a cuneiform tablet found in the excavation campaign of 1930–31 in Ur, dealing with the rearrangement of land parcels among four brothers. The agreement is dated in the 13th year of Artaxerxes I but states that the original arrangement had been signed in the month Kislimu of the 21st year of Xerxes.[26] In Babylonia Kislimu began, according to the Parker-Dubberstein tables,[27] on December 17 in 465 B.C., the earliest day on which the document could have been written. On that day the scribe writing the agreement in Ur knew no more than that Xerxes was still alive, or he would have dated the document in the accession year of his successor. This shows that Xerxes' death cannot have been much earlier than December 17, even if it took some days to become known in Ur. We do not know where the murder of Xerxes took place, although the most likely place was either Susa or Persepolis; but in either case the news of the king's death would not have taken long to be known in the Mesopotamian Valley. That Xerxes' death did not occur much later than December 17, 465 B.C., is proved by *AP 6*, written in Egypt on January 2, 464 B.C., in which the accession of Artaxerxes is already mentioned. These two documents, agreeing completely with one another, make it thus certain that Artaxerxes came to the throne shortly before the end of 465 B.C.

AP 8. Kislev 21 = Mesore 1, year 6 of Artaxerxes I.—The papyrus is well preserved and creates no reading problems. However, the dates as given can be made to agree by no known methods, so that a scribal error must be involved. If the scribe mistakenly wrote Mesore 1 instead of a correct Mesore 21, the dates agree astronomically, though not with the Babylonian calendar. They are also in harmony if the months and day numbers are assumed to be correct, with the year 6 an error for year 5. But again no agreement would exist with the Babylonian calendar. The two possible results would be the following:

1. Kislev 21 = Mesore 1, year 5 (?) of Artaxerxes I (460 B.C.). Mesore 1 in the 5th year of Artaxerxes I's Egyptian regnal years (288th year of the Nabonassar Era) fell on November 11/12 (sr-sr), 460 B.C. Kislev 21 would then have been either November 10/11 (ss-ss) or November

[24] Parker and Dubberstein, *op. cit.*, p. 15.

[25] Olmstead, *History of the Persian Empire*, p. 289.

[26] H. H. Figulla, *Ur Excavations Texts, IV: Business Documents of the New-Babylonian Period* (London, 1949), No. 193, pp. 4, 15. (Professor A. Leo Oppenheim's kindness in providing a written translation of the tablet is here gratefully acknowledged.)

[27] Parker and Dubberstein, *op. cit.*, p. 30.

11/12 (ss-ss), and Kislev 1 either October 21/22 (ss-ss) or October 22/23 (ss-ss). Since the conjunction of the moon took place October 21.09 (2:09 A.M.), the translation period would have amounted to .66 of a day (15 hours, 50 minutes) in the first case, and 1.66 days (39 hours, 50 minutes) in the second. However, it should be noticed that Kislev 1 was one lunar month later according to the Babylonian calendar.

2. Kislev 21 = Mesore 21 (?), year 6 of Artaxerxes I (459 B.C.). Mesore 21 in the 6th Egyptian year of Artaxerxes I fell on December 1/2 (sr-sr), 459 B.C. Kislev 21 was therefore either November 30/December 1 (ss-ss) or December 1/2 (ss-ss), 459 B.C., and Kislev 1 either November 10/11 or November 11/12 (ss-ss). The conjunction took place November 9.14 (3:21 A.M.), and the translation period would have been 1.61 days (38 hours, 38 minutes) or 2.61 days (62 hours, 38 minutes). Again if the results were correct, Kislev would have been a whole month earlier than according to the Babylonian calendar.

If the date line of the papyrus needed no emendation to achieve an agreement with astronomical facts, we should have the proof here that the Jews of Elephantine had failed to observe a second Adar in harmony with the Babylonian year in 462 B.C.[28] and had not inserted it during the years 461 and 460; in that case they were one lunar month behind the Babylonian calendar. Unfortunately, these results are gained through conjectural corrections of the date line of *AP 8*, which make them rather doubtful. If another mistake is involved, different from those two conjectures, the results may be different.

AP 9. Year 6 of Artaxerxes I.—The document is related to *AP 8* and may have borne the same date, perhaps without a scribal error. The date line, however, is so badly preserved that no certain conclusions can be reached.

Cairo Sandstone Stele.[29] בירח *Sivan = Mechir, year 7 of Artaxerxes I (458 B.C.).* —Because of the wide range of this date and its ambiguity, this stele does not settle the problem raised by *AP 8*. If the 7th year of Artaxerxes is recorded here according to the Egyptian system of reckoning, as is most likely the case, it is the 290th year of the Nabonassar Era, beginning December 16, 459, and ending December 15, 458 B.C. The month Mechir of the 7th year of Artaxerxes I as reckoned in the Egyptian calendar extended from May 15 through June 13, 458 B.C. The month Sivan according to the Babylonian calendar extended from June 6 through July 5 458 B.C.,[30] or, according to the hypothetical reconstruction of the Elephantine calendar based for those years on *AP 8* (in which the months of the Jewish calendar preceded those of the Babylonian calendar by one lunar month), from May 8 through June 5, 458 B.C.

If the word בירח of the inscription is to be read "in the month," it can fit both schemes, since Sivan 1–8 of the Babylonian calendar overlapped with the last eight days of the Egyptian month Mechir, and Sivan 8–29 according to the hypothetical Jewish calendar, based on *AP 8*, overlapped with the first 22 days of Mechir also. If, however, בירח means "on the first day of the lunar month,"[31] only a calendar in which the months coincided with the Babylonian months can be meant,

[28] However, it should not be forgotten that the second Addaru in Parker and Dubberstein's tables (*op. cit.*, p. 30) is still unattested, although its insertion in 462 B.C. is probably correct there.

[29] For the monument see M. le Marquis Melchior de Vogüé, "Inscription araméenne trouvée en Égypte," *Comtes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*, July 3, 1903, pp. 269–76, and Plate.

[30] Parker and Dubberstein, *op. cit.*, p. 30.

[31] As Professor Kraeling suggested orally to S. H. Horn.

since the first day of Sivan of the supposed Jewish calendar did not fall in Mechir.

Kraeling 14. Iyyar [8] = Tybi 20.—In this badly broken marriage document the name and regnal year number of the king are missing. Only five strokes of the day number of Iyyar are preserved. The preceding gap seems to allow a restoration to the number 8, the only possible date which agrees with Tybi 20 (well preserved) during the whole fifth century B.C.[32] A careful analysis of all years during the fifth century—the period in which these papyri were written—leads to the conclusion that Iyyar 8 agrees with Tybi 20 only five times, once during the reign of Darius I, in 496 B.C.; twice under Xerxes, in 482 and 471 B.C.; and twice during the reign of Artaxerxes I, in the years 457 and 446 B.C. It seems unnecessary to present the calendrical evidence for each one of these dates, since the fragmentary state of this document and the absence of a royal name do not permit a final conclusion for any of the five possible dates.

Kraeling 1. Phamenoth 25 = Sivan 20, year 14 of Artaxerxes I (451 B.C.).—Although the scribe used an unusual sequence in this papyrus, giving the Egyptian month first—a method followed only once more, in *Kraeling 6*—the year number was, as in most cases, the Egyptian regnal year of Artaxerxes I, because no harmony between the dates could be achieved, if year 14 was meant to be counted according to the Jewish reckoning. The reversed sequence must therefore be ascribed to a scribal slip.

Phamenoth 25 in Artaxerxes I's 14th Egyptian regnal year was July 6/7 (sr-sr), 451 B.C. Sivan 20 was consequently either July 5/6 (ss-ss) or July 6/7 (ss-ss). The conjunction of the moon took place June 16.59 (2:09 P.M.), giving a translation period of .16 of a day (3 hours, 50 minutes) if Sivan 1 was June 16/17 (ss-ss), or 1.16 days (27 hours, 50 minutes) if Sivan 1 was June 17/18 (ss-ss), 451 B.C.

Kraeling 2. [Tammuz] 18 = Pharmuthi [3], year 16 of Artaxerxes I (449 B.C.).—The Jewish month name and the Egyptian day number are broken away in the papyrus. They are restored here on the basis of calendrical computations, since Tammuz is the only Jewish month which has an 18th day that will synchronize with any day of the month Pharmuthi in the 16th Egyptian regnal year of Artaxerxes I. The day number 3 for Pharmuthi is restored because it gives the best translation period. In view of some of the low translation periods of the previous papyri, Pharmuthi 2 as the correct Egyptian date cannot be ruled out entirely as impossible. The following statistics will show the different possibilities.

Pharmuthi 2 in the 16th Egyptian regnal year was July 12/13 (sr-sr), 449 B.C.; Pharmuthi 3 was July 13/14 (sr-sr). Tammuz 18 would have been one of the three possible dates, July 11/12, 12/13, or 13/14 (ss-ss). The conjunction of the moon took place June 23.92 (10:04 P.M.), and the translation period would have been .83 of a day (19 hours, 55 minutes) if Tammuz 1 was June 24/25, 1.83 days (43 hours, 55 minutes) if Tammuz 1 was June 25/26, and 2.83 days (67 hours, 55 minutes) if Tammuz 1 was June 26/27.

AP 13. Kislev 2 (?) = Mesore 11 (?), year 19 of Artaxerxes I (446 B.C.).—The reproduction of the papyrus[33] shows only two visible strokes of the day number for Kislev, with no room for the third stroke that Cowley considers "probable."[34] Since Kislev 3 would give extremely low translation periods, Kislev 2—also read thus by

[32] A restoration of the number to 15 or 25 is impossible, since Iyyar 15 or 25 never coincided with Tybi 20 during the fifth century B.C.

[33] Sayce and Cowley, *op. cit.*, Plate, containing "Papyrus E, 1–13."

[34] Cowley, *op. cit.*, p. 38.

Hontheim and allowed by Gutesmann as possible[35]—is most probably the correct Jewish date.

There are only faint traces of the figure which goes with the Egyptian month Mesore. Cowley, who had the original before him, read 10,[36] but from the published facsimile one could also read 11,[37] in which case the translation period for Kislev 2 would be reasonable, as the following discussion shows.

Mesore 11 was November 18/19 (sr-sr), 446 B.C., and Kislev 2 was consequently November 17/18 (ss-ss) or November 18/19 (ss-ss). Since the conjunction took place November 16.25 (6:00 A.M.), the translation period was .50 of a day (12 hours) if Kislev 1 was November 16/17 (ss-ss), or 1.50 days (36 hours) if Kislev 1 was November 17/18 (ss-ss).

This papyrus is important, since it shows that the Jews had not inserted a second Elul during that year. Parker and Dubberstein have in their tables an unattested second Ululu in the Babylonian calendar for the year 446/5 B.C.[38] However, since no complete regularity existed in the insertion of second Ululus in the Babylonian calendar before the fourth century, we are not sure that there was a second Ululu in the Babylonian calendar in that year. This uncertainty with regard to unattested intercalary months is demonstrated by two recently published tablets from Ur[39] which show that a second Ululu was inserted in the Babylonian calendar in the year 409 B.C. instead of 408 and another one in 621 B.C. instead of 622, as Parker and Dubberstein's tables have it.[40]

If it could be shown that the Babylonians had a second Ululu in 446/5 B.C., we would have a proof that the Jews did not intercalate by the use of a second Elul but only by employing a second Adar. As the matter stands now, it can only be stated that no proof can be given that the Jews ever used a second Elul, but to prove that they never did so is not yet possible.

AP 14. Ab 14 = Pachons 19, year 25 of Artaxerxes I (440 B.C.).—Pachons 19 in the 25th Egyptian year of Artaxerxes was August 26/27 (sr-sr), 440 B.C., and Ab 14 either August 25/26 (ss-ss) or August 26/27 (ss-ss). The conjunction of the moon occurred August 12.81 (7:26 P.M.). If Ab 1 was August 12/13 (ss-ss), it would have begun even .06 of a day (1 hour, 26 minutes) *before* the actual conjunction took place, which is unthinkable. If Ab 1 was August 13/14 (ss-ss), the translation period would have been of a more reasonable length, .94 of a day (22 hours, 33 minutes).

Kraeling 3. Elul 7 = Payni 9, year 28 of Artaxerxes I (437 B.C.).—Payni 9 in Artaxerxes' 28th Egyptian year was September 14/15 (sr-sr), 437 B.C., and Elul 7 consequently either September 13/14 (ss-ss) or September 14/15 (ss-ss). Since the conjunction occurred September 7.55 (1:12 P.M.), the translation period would have been only .20 of a day (4 hours, 48 minutes) if Elul 1 was September 7/8 (ss-ss), but the more reasonable length of 1.20 days (28 hours, 48 minutes) if Elul 1 was September 8/9 (ss-ss).

AP 10. Kislev 7 = Thoth 4, year [2]9 of Artaxerxes I (437 B.C.?).—The papyrus is perfectly preserved and offers no reading difficulties. However, its year number 9 seems to be a mistake for 29, since, in all the regnal years of Artaxerxes I, Kislev 7 agrees with Thoth 4 only in his 4th[41] and 29th Egyptian years.

[35] *Ibid.* [36] *Ibid.*

[37] Sayce and Cowley, *op. cit.*, Plate, containing "Papyrus E, 1–13."

[38] Parker and Dubberstein, *op. cit.*, p. 30.

[39] Figulla, *op. cit.*, p. 6 (Nos. 202 and 93).

[40] Parker and Dubberstein, *op. cit.*, pp. 25, 32.

[41] Since it is easier to assume that the scribe made a mistake by writing a 9 instead of a correct 29 for the year number, no consideration is given in the text to the other possibility that he wrote a mistaken 9 in-

Thoth 4 in Artaxerxes' 29th Egyptian regnal year was December 13/14 (sr-sr), 437 B.C., and therefore Kislev 7 either December 12/13 (ss-ss) or December 13/14 (ss-ss). The conjunction of the moon took place December 5.74 (5:45 P.M.), and the translation period amounted to 1.01 days (24 hours, 14 minutes) if Kislev 1 was December 6/7 (ss-ss), or 2.01 days (48 hours, 14 minutes) if Kislev 1 was December 7/8 (ss-ss), 437 B.C.

If the year 29 is a correct reconstruction of the date of this papyrus, it was written in the same Julian calendar year as the preceding papyrus (*Kraeling 3*), although the regnal years differed, the 1st of Thoth being a turning point for the beginning of a new regnal year in Egypt. In this way they check one against the other. It is only unfortunate that the year number 29 is a conjecture, although one based on good evidence.

AP 15. [Tishri 25] = Epiphi 6, year [30] of [Artaxerx]es I (435 B.C.?).—The first line, containing the date, is badly damaged. Epiphi 6 is preserved, but, although the reading "Tishri 25" fits the poor remnants of some visible letters, it is far from certain that the reconstruction proposed here presents the correct or only possible reading. Nothing remains of the year number, and only the last letter remains of the king's name, which must have been Artaxerxes I, as the contents of the document show.[42] Although no weight can be placed on the results obtained from any computation about this papyrus, they are nevertheless presented here for the sake of completeness.

A near agreement between Tishri 25 and Epiphi 6 can be obtained only in the years 449 and 435 B.C. For the year 449 a check is provided now by *Kraeling 2*, which is unfortunately also a broken papyrus. To make both papyri fit, Pharmuthi 3 in *Kraeling 2* would have to be changed to Pharmuthi 2, and Tishri 25 in *AP 15* to Tishri 24.[43] Since the computations for the year 435 B.C. require no such changes, they are presented here.

Epiphi 6 in 435 B.C. was October 11/12 (sr-sr), and Tishri 25 consequently October 10/11 (ss-ss) or October 11/12 (ss-ss). The conjunction of the moon had taken place September 15.44 (10:33 A.M.), so that the translation period amounted to 1.31 days (31 hours, 26 minutes) if Tishri 1 was September 16/17 (ss-ss), but 2.31 days (55 hours, 26 minutes) if Tishri 1 was September 17/18 (ss-ss).

Kraeling 4. Tishri 25 = Epiphi 25, year 31 of Artaxerxes I (434 B.C.).—Epiphi 25 in Artaxerxes' 31st Egyptian year was October 30/31 (sr-sr), 434 B.C., and Tishri 25 either October 29/30 (ss-ss) or October 30/31 (ss-ss). The conjunction had taken place October 4.37 (8:52 A.M.), and the translation period amounted therefore to 1.38 days (33 hours, 7 minutes) if Tishri 1 was October 5/6 (ss-ss), or to 2.38 days (57 hours, 7 minutes) if Tishri 1 was October 6/7 (ss-ss).

Kraeling 5. Sivan 20 = Phamenoth 7, year 38 of Artaxerxes I (427 B.C.).—Phamenoth 7 in the 38th Egyptian year of Artaxerxes was June 12/13 (sr-sr), 427 B.C. Since Sivan 20 was therefore either June 11/12 (ss-ss) or June 12/13 (ss-ss),

stead of the number 4. But for completeness' sake the computations for year 4 will be given here. Thoth 4 in the 4th Egyptian regnal year of Artaxerxes I was December 20 (sr-sr), 462 B.C. Consequently, Kislev 7 would have been either December 19/20 (ss-ss) or December 20/21 (ss-ss). Since the conjunction had occurred December 12.53 (12:43 P.M.), the translation period would have amounted to 1.22 days (29 hours, 16 minutes) if Kislev 1 was December 13/14 (ss-ss) or to 2.22 days (53 hours, 16 minutes) if Kislev 1 was December 14/15 (ss-ss).

[42] Cowley, *op. cit.*, p. 44.

[43] There are 95 or 96 days in a lunar calendar from Tammuz 18 to Tishri 25 but only 93 from Pharmuthi 3 to Epiphi 6 in the Egyptian solar calendar. To make the two different intervals equal requires therefore a lengthening of one and a shortening of the other. From Pharmuthi 2 to Epiphi 6 are 94 days and from Tammuz 18 to Tishri 24 are 94 or 95 days.

and the conjunction of the moon had taken place May 22.21 (5:02 A.M.), the translation period amounted to 1.54 days (36 hours, 57 minutes) if Sivan 1 was May 23/24 (ss-ss), or 2.54 days (60 hours, 57 minutes) if Sivan 1 was May 24/25 (ss-ss).

Kraeling 6. Pharmuthi 8 = Tammuz 8, year 3 of Darius II (420 B.C.).—With the exception of *Kraeling 1* and this papyrus, all double-dated papyri mention the Jewish date first and then its Egyptian equivalent, the latter apparently being the official date in legal documents written in Egypt, as has already been discussed before. That is, the sequence is: Jewish month and day, Egyptian month and day, Egyptian year. *Kraeling 6*, however, contains the Egyptian date first, and then the Jewish month date, followed by the regnal year number. This could perhaps be explained as an exception, but the additional fact that the two dates do not agree in the Egyptian year 3 of Darius II, although they agree in the following year, seems to indicate that the unusual sequence followed in dating this document was responsible for giving it a regnal year number that does not fit the Egyptian system of reckoning.

Pharmuthi 8 in the 3d Egyptian year of Darius II fell on July 11/12 (sr-sr), 421 B.C., while Tammuz 8 according to the Babylonian calendar was July 21/22 (ss-ss).[44] Since Tammuz is the fourth month of the Babylonian calendar, July 21/22, 421 B.C., fell in the 3d regnal year of Darius II also according to Persian reckoning, and no agreement between the two dates can be achieved if one would assume that the scribe used either the Persian or Egyptian system of reckoning the 3d year of Darius.

However, in the summer of 420 B.C., when every document dated according to the Egyptian or Persian system of reckoning would carry the year number 4, complete agreement can be reached: Pharmuthi 8 was, as in the previous year, July 11/12 (sr-sr), and Tammuz 8 either July 10/11 (ss-ss) or July 11/12 (ss-ss). The conjunction had occurred July 2.77 (6:28 P.M.), and the translation period amounted to .98 of a day (23 hours, 31 minutes) if Tammuz 1 was July 3/4 (ss-ss) or to 1.98 days (47 hours, 31 minutes) if Tammuz 1 was July 4/5 (ss-ss). This agreement in 420 B.C. leads to the conclusion either that there is a scribal error involved, and that year 3 stands for year 4, or that the scribe used the Jewish system of reckoning the regnal years of Persian kings beginning with Tishri 1.

The Palestinian Jews had a fall-to-fall civil calendar, as Neh. 1:1 and 2:1 clearly show, according to which texts the month Kislev preceded the month Nisan in the 20th year of Artaxerxes.[45] The third year of Darius II according to this Jewish system did not begin until the fall of 421, and any dated document written in the summer of 420 B.C. would have to be dated in the 3d year of Darius II if the Jewish way of reckoning was applied, as Figure 2 shows.

The death of Artaxerxes I and the accession of his son, Darius II, to the throne must have occurred in February, 423 B.C., since the last tablet of Artaxerxes' reign and the first one of Darius are both dated in that month.[46] The accession year of Darius, according to the Babylonian reckoning, lasted to the following New Year's Day, Nisan 1, which fell on April 11, 423 B.C., according to the Babylonian calendar.[47]

[44] Parker and Dubberstein, *op. cit.*, p. 31. The double-dated papyri *AP 25* and *28* (to be discussed below) provide conclusive proof the Egyptian 3d year began in December, 422 B.C.

[45] For a discussion of the fall-to-fall calendar among the Jews even before the Exile see Thiele, *op. cit.*, pp. 30–31; Ginzel, *op. cit.*, pp. 26, 39.

[46] Parker and Dubberstein, *op. cit.*, pp. 15–16.

[47] *Ibid.*, p. 31.

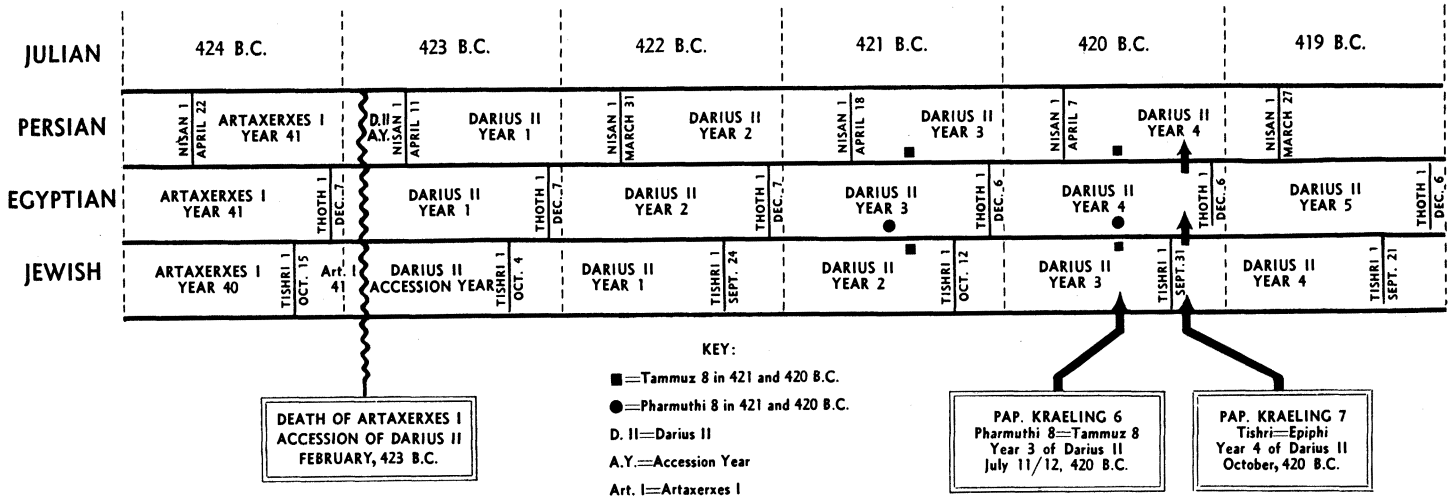


FIG. 2

The Egyptian civil calendar, however, had begun on the previous Thoth 1, which fell on December 7, 424 B.C. The year beginning on that date is the 325th of the Nabonassar Era, the 1st year of Darius II according to Ptolemy's Canon. Since the Egyptians could not know the death date of Artaxerxes I before it occurred, they must have dated all documents after December 7, 424 B.C., in the 42d regnal year of Artaxerxes I until they received word about the accession of Darius II, from which day they began to date documents in the 1st year of Darius, since they did not use the accession-year system.

The Jews, on the other hand, using the accession-year system,[48] and a fall-to-fall civil year, must have counted Darius' accession year from February, 423 B.C., to the following October, when with Tishri 1 they began to date events in Darius II's 1st regnal year.

It is therefore not necessary to assume the existence of a scribal error in the date line of this document. On the contrary, this papyrus, presenting the date line in an exceptional sequence by giving the Egyptian date first and the Jewish one afterward, has evidently appended to the Jewish month date the regnal year of Darius according to the Jewish way of reckoning.

AP 20. בירח *Elul = Pa[yni], year 4 of Darius II (420 B.C.).*—Although only the first two letters of the word "Payni" are preserved in the papyrus, this reconstruction is certainly correct; a reconstruction to the alternative month Pha[ophi] is impossible, because Elul and Phaophi lay months apart during the whole fifth century B.C.

Payni 1 in the 4th regnal year of Darius III according to the Egyptian reckoning fell on September 2/3 (sr-sr), 420 B.C. The nearest conjunction to this date occurred August 31.12 (2:52 A.M.), and the 1st of Elul could probably have been counted September 1/2 (ss-ss) with a translation period of 1.63 days (39 hours, 7 minutes), so that September 2 could have been called "first day of the month" if this meaning can be given to the word ירח However, the traditional translation of בירח "in the month" also makes sense, since the two months are almost synchronous, and this document, the settlement of a claim, could have been written on almost any day of Elul to synchronize with Payni.

Kraeling 7. בירח *Tishri = Epiphi, year 4 of Darius II (420 B.C.).*—This papyrus was written in the month following the one recorded in *AP 20.* Epiphi 1 was October 2/3 (sr-sr), 420 B.C., and the 1st of Tishri was probably September 30/October 1 (ss-ss), since the conjunction had taken place September 29.83 (7:55 P.M.), which would allow a translation period of .92 of a day (22 hours, 4 minutes). But Tishri 1 could also have been October 1/2 (ss-ss), with a translation period of 1.92 days (46 hours, 4 minutes), so that once more an Egyptian month began at approximately the same time as a Jewish month, and Epiphi 1 could have been called "the first" of Tishri, allowing such a translation for ירח.

Since this papyrus was written in Tishri after the beginning of a new Jewish civil year, and before the close of the Egyptian civil year, the regnal year 4 of Darius was the same according to each one of the three systems in use, as can be seen from Figure 2.

Kraeling 8. Tishri 6 = Payni 22, year 8 of Darius II (416 B.C.).—Inasmuch as the Egyptian month Payni synchronized with the month Elul in the 4th Egyptian year of Darius (*AP 20*), it is impossible for the same month to coincide with Tishri four

[48] That the Jews used the accession-year system as the Babylonians did already in the pre-Exilic period has been shown by Thiele, *op. cit.*, pp. 40–41.

years later. However, harmony can be achieved between Tishri 6 and Epiphi 22 in the 8th regnal year of Darius II. Hence it can be assumed that the scribe made a mistake in writing Payni instead of the next month, Epiphi.

Epiphi 22 fell on October 22/23 (sr-sr), 416 B.C., and Tishri 6 consequently on either October 21/22 (ss-ss) or October 22/23 (ss-ss). The conjunction had taken place October 14.71 (5:02 P.M.), so that the translation period had a length of 2.04 days (48 hours, 57 minutes) if the 1st of Tishri was October 16/17 (ss-ss). That Tishri 1 could have been October 17/18 (ss-ss) is almost impossible, since the translation period in that case would have amounted to 3.04 days (72 hours, 57 minutes).

Another possibility would be to assume a mistake in the Jewish rather than the Egyptian month name, that is, to read Elul instead of Tishri. In that case Payni 22 would stand, which was September 22/23 (sr-sr), 416 B.C., and Elul 6 would be either September 21/22 (ss-ss) or September 22/23 (ss-ss). The conjunction took place September 15.23 (5:31 A.M.), allowing a translation period of 1.52 days (36 hours, 28 minutes) if Elul 1 was September 16/17 (ss-ss), or of 2.52 days (60 hours, 28 minutes) if Elul 1 was September 17/18 (ss-ss).

However, it is very unlikely that the scribe made the mistake of writing Tishri instead of Elul, since Tishri follows Elul, and it is very unusual to fall into the mistake of confusing a future month with the current one. It is, however, a common mistake to write the name of a past month instead of the new one. This would have happened here if the scribe mistakenly continued to write Payni, although he was already living in Epiphi, the next month.

AP 25. Kislev 3, year 8 = Thoth 12, year 9 of Darius II (416 B.C.).—This papyrus and the following are exceptionally important for the fact that they record the regnal year of Darius according to both Jewish and Egyptian reckonings; this was not done in all cases where the years actually differ.

Thoth 12 in the 9th Egyptian year of Darius II was December 16/17 (sr-sr), 416 B.C., and therefore Kislev 3 in either the 8th Jewish or the 8th Persian year was December 15/16 (ss-ss) or December 16/17 (ss-ss). The conjunction of the moon took place December 12.98 (11:31 P.M.), which allows a translation period of .77 of a day (18 hours, 28 minutes) if Kislev 1 was December 13/14 (ss-ss) or of 1.77 days (42 hours, 28 minutes) if Kislev 1 was December 14/15 (ss-ss).

AP 28. Shebat 24, year 13 = Athyr 9, year 14 of Darius II (410 B.C.).—Athyr 9 fell on February 10/11 (sr-sr), 410 B.C., in the 14th Egyptian regnal year of Darius II, which makes Shebat 24 either February 9/10 (ss-ss) or February 10/11 (ss-ss). The conjunction took place January 17.13 (3:07 A.M.), and the translation period amounted to .62 of a day (14 hours, 52 minutes) if the 1st of Shebat was January 17/18 (ss-ss) or to 1.62 days (38 hours, 52 minutes) if Shebat 1 was January 18/19 (ss-ss).

The two papyri last mentioned, *AP 25* and *AP 28*, show clearly that the scribes who wrote these documents employed different systems of reckoning the regnal years of their Persian overlords, one according to the Egyptian and the other according to the Jewish system. They were not always consistent enough to mention both years, when a difference existed, as in *AP 10* which mentions the same Jewish and Egyptian months as *AP 25*, as has already been discussed.[49]

Kraeling 9. Marcheshvan 24 = Mesore

[49] See p. 5.

29, year 1 of Artaxerxes II (404 B.C.)—There are no contemporary tablets of the last six years of Darius II or of the accession year of Artaxerxes II. Therefore we have heretofore depended on Ptolemy's Canon and the Saros Tablet for fixing the 1st year of Artaxerxes II.[50] The dates thus reached are now verified and corroborated by this new double-dated papyrus and the next one.

The first regnal year of Artaxerxes II according to Ptolemy's Canon was the 344th year of the Nabonassar Era, beginning with Thoth 1 on December 2, 405 B.C. Mesore 29 fell therefore on November 25/26 (sr-sr), 404 B.C., and Marcheshvan 24 was consequently either November 24/25 (ss-ss) or November 25/26 (ss-ss). The conjunction occurred November 1.43 (10:19 A.M.), and the translation period was therefore .32 of a day (7 hours, 40 minutes) if Marcheshvan 1 was November 1/2 (ss-ss) or 1.32 days (31 hours, 40 minutes) if Marcheshvan 1 was November 2/3 (ss-ss).

Kraeling 10. Adar 20 = Choiak 8, year 3 of Artaxerxes II (402 B.C.).—Choiak 8 of the 3d regnal year of Artaxerxes II according to Egyptian reckoning fell on March 9/10 (sr-sr), 402 B.C. Adar 20 was then either March 8/9 (ss-ss) or March 9/10 (ss-ss), and Adar 1 either February 17/18 (ss-ss) with a translation period of .90 of a day (21 hours, 36 minutes) or February 18/19 (ss-ss) with a translation period of 1.90 days (45 hours, 36 minutes), since the conjunction had taken place February 16.85 (8:24 P.M.).

CONCLUSIONS

The results obtained from the study of the double-dated papyri are very instructive. However, not all the documents discussed so far can be used for a reconstruction of the Jewish calendar of the fifth century B.C.

Two of them, *AP 8* and *AP 10*, obviously contain errors, since their dates, as given, cannot be made to agree by any known method of computation. It is uncertain whether the corrections proposed above are sound, especially for *AP 8*, since the correction leads to conclusions which are at variance with a regular intercalation like that of the nineteen-year-cycle.

Two other papyri, *Kraeling 14* and *AP 15*, are so badly broken that great parts of the date lines have been reconstructed without certainty that the reconstruction is correct. Since the conclusions reached in this way show once more a divergence from the nineteen-year cycle, it is safer not to rely on the results reached through reconstructed date lines.

Documents which contain no day number, as the *Cairo Sandstone Stele, AP 20*, and *Kraeling 7*, are valuable in supporting the over-all picture but cannot be used for an exact reconstruction of the Jewish calendar.

On the other hand, some broken documents have certainly been correctly reconstructed (*AP 6, Kraeling 2*), and the mistake in *Kraeling 8*, where the scribe evidently wrote an erroneous Payni instead of a correct Epiphi, can be easily detected. Hence it is valid to use these three last mentioned documents as evidence in the conclusions to be reached below.

Table 1 offers a comparison of the results achieved from the study of the several papyri which can be used as reasonably trustworthy evidence. For each document the table presents the Egyptian date with its Julian equivalent; then it gives the Jewish month date with the two possibilities of its Julian equivalent, the first date being correct if the document was written

[50] We must depend on Ptolemy's Canon, the Saros Tablet, and thousands of dated cuneiform business documents for the fixing of the 1st year of Artaxerxes II, since there are no tablets covering the last six years of his predecessor (see Parker and Dubberstein, *op. cit.*, p. 16).

during the day; the second one, if the document was written after sunset. The translation periods added indicate how much time elapsed from the conjunction of the moon until the evening of the day when the 1st of the month began. Dates resulting from a reasonable translation period are starred.

Table 1 shows that six dates arrived at from the fourteen papyri will give reasonable translation periods only if one assumes that they were written after sunset; the other eight could have been written during the hours of daytime. Five of the dates starred differ by one day from those given in Parker and Dubberstein's *Babylonian Chronology*. This difference of about 35 per cent can be accounted for by the fact that for the Babylonian dates complete accuracy cannot be achieved, for reasons already set forth.[51]

Nevertheless, the close harmony with the Babylonian calendar is striking. Since most translation periods have a low tendency, there is the possibility that the Jews in Elephantine did not entirely rely on the observation of the new crescent to determine the beginning of the new month. But the paucity of our source material makes it uncertain whether the Jews had developed, through a long period of experimentation and observation, a fixed calendar in which the number of days of each month had been calculated beforehand. The comparatively low translation periods can perhaps be explained by the fact that Elephantine knows hardly any overcast sky, and therefore a new crescent can

TABLE 1

No. of Papyrus	Year B.C.	Egyptian Date		Jewish Date				
					If Written during Day		If Written after Sunset	
		Egyptian Month and Day	Julian Month and Day	Jewish Month and Day	Julian Month and Day	Translation Period[a]	Julian Month and Day	Translation Period[a]
AP 5...	471	Pach. 28	Sept. 12/13	Elul 18	*Sept. 11/12	23^h17^m	Sept. 12/13	47^h17^m
AP 6...	464	Tho. 17	Jan. 2/3	Kisl. 18	*Jan. 1/2	17 2	Jan. 2/3	41 2
Kr 1...	451	Pham. 25	July 6/7	Siv. 20	July 5/6	3 50	*July 6/7	27 50
Kr 2...	449	Phar. 3	July 13/14	Tam. 18	*July 12/13	19 55	July 13/14	43 55
AP 13...	446	Mes. 11	Nov. 18/19	Kisl. 2	Nov. 17/18	12 0	*Nov. 18/19	36 0
AP 14...	440	Pach. 19	Aug. 26/27	Ab 14	Aug. 25/26	(−1 26)[b]	*Aug. 26/27	22 33
Kr 3...	437	Pay. 9	Sept. 14/15	Elul 7	Sept. 13/14	4 48	*Sept. 14/15	28 48
Kr 4...	434	Epi. 25	Oct. 30/31	Tish. 25	*Oct. 29/30	33 7	Oct. 30/31	57 7
Kr 5...	427	Pham. 7	June 12/13	Siv. 20	*June 11/12	36 57	June 12/13	60 57
Kr 6...	420	Phar. 8	July 11/12	Tam. 8	*July 10/11	23 31	July 11/12	47 31
AP 25...	416	Tho. 12	Dec. 16/17	Kisl. 3	*Dec. 15/16	18 28	Dec. 16/17	42 28
AP 28...	410	Ath. 9	Feb. 10/11	Sheb. 24	Feb. 9/10	14 52	*Feb. 10/11	38 52
Kr 9...	404	Mes. 29	Nov. 25/26	Mar. 24	Nov. 24/25	7 40	*Nov. 25/26	31 40
Kr 10...	402	Choi. 8	Mar. 9/10	Adar 20	*Mar. 8/9	21 36	Mar. 9/10	45 36

* Dates resulting from a reasonable translation period.

[a] The translation period given here is the time between the conjunction of the moon and the evening with which the first day of the month began.

[b] In this case the beginning of the month would have occurred 1 hour and 26 minutes *before* conjunction; hence the minus sign.

[51] A 20 per cent inaccuracy of Parker and Dubberstein's tables can be demonstrated by an actual check of published cuneiform business documents (from Nabopolassar to Artaxerxes I) that happen to be dated on the 30th of various months. Of 73 such 30-day months thus attested, 15 are given a length of only 29 days in the tables of Parker and Dubberstein's *Babylonian Chronology*.

easily be observed as soon as it reaches the minimum elevation of visibility.

Unfortunately our papyri do not contain the names of any intercalary months, and we are not yet in a position to prove, as Jewish scholars have always maintained, that the Jews used only a second Adar but never a second Elul. *AP 13* shows only that no second Elul was inserted in year 446 B.C., where Parker and Dubberstein's *Babylonian Chronology* contains an unattested Ululu II.[52] As long as this Babylonian Ululu II remains unattested, the fact that the Jews definitely used no second Elul during that year is no proof that they never did so, although the assumption seems plausible that they would have been reluctant to lengthen the interval between the great feasts of Nisan and those of Tishri.

However, one important aspect of these papyri is the proof which *Kraeling 6* gives of the existence of the civil fall-to-fall calendar among the fifth-century Jews at Elephantine. Since this papyrus supports statements made in Neh. 1:1 and 2:1, implying the existence of such a calendar among post-Exilic Jewry, there is no reason left for doubt concerning the correctness of the date line of *Kraeling 6*, and the alternative assumption that a scribal error is involved must be rejected.

These papyri provide most welcome material for a reconstruction of some phases of the Jewish calendar of the pre-Christian era, for which no other source material is available except the meager information which the Bible provides. Yet the small number of documents available as witnesses is far too scanty to arrive at unassailable conclusions as to every aspect of their lunar calendar.

However, the recent discovery of additional source material on which the above-given conclusions have been based allows us to entertain reasonable hope that further data will fill the still existing gaps and permit a more complete reconstruction of the ancient Jewish calendar system.

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[52] Parker and Dubberstein, *op. cit.*, p. 30.