THE ANCIENT JEWISH BEGINNING OF THE YEAR

1. By common agreement--Landsberger, Radau, Ginzel, Schiaparelli, Nilsson, Dahlman, also Josephus and Philo--the earliest known calendar numbered its months from the autumn; and, as a result, the month eventually called "seven" was originally known as the "first." But these authorities give no proof for their conclusion. The early inscriptions even have difficulty in identifying the season to which a month may belong. However, some evidence is found in the Bible, as for example (1) the flood calendar, in whose "first" month the waters were dried up, obviously in the season of drought--surely not in Nisan; and in whose "seventh" month the ark rested, when, consistently, both solar and lunar tidal forces must have been on the decrease, as in the moon's last quarter in early summer, but on the contrary, not in Tishri, when both winds and solar tides are increasing, and sailing dangerous (Acts 27:9); and (2) the agricultural calendar which Isaac followed--sowing and reaping a hundred fold "in the same year" (Gen.27:12); and (3) the Egyptian calendar in the time of Joseph, when the people were reckoning by agricultural years from autumn to autumn (Gen.47:18-23).

2. The exodus year was, as is generally recognized, from spring to spring, especially with reference to the numbering of the months. And Moses also counted years--even his own--from spring to spring (Num.1:1 and 33:38).[a] Nevertheless, the agricultural year was still reckoned from autumn and sowing time, as Ex.23:16; 34:22; and Lev.25:3,4.

3. Under the Judges and after the death of Joshua, the agricultural year seems to have been the principal guide to the calendar; in any event, the land sabbath appears to have been observed for at least 200 years--Judges 3:11; 3:30; 5:31; and 8:28.

   Gideon and Samuel can be mentioned in illustration of judges whose administration began in the fall. The story of Gideon begins in wheat harvest, and continues on into early vintage, during which time he carried to victory the attack against the Midianites and Amalekites, and soon after which the elders made him judge over Israel--obviously in the autumn.

   The judgeship of Samuel ran from fall to fall, consisting of an annual circuit to Bethel, Gilgal, and Mizpeh, the Mizpeh appointment being the last, and ending in late summer, as when Samuel offered the "sucking lamb" (1 Sam.7:5-17), and after which Samuel's "return" (תשובה) was always to Ramah--evidently in the autumn.

4. Saul was crowned in mid summer (1 Sam.11:15 and 12:17). His first official year was therefore in autumn.

5. David was crowned in Hebron in mid summer (2 Sam.4:6 and 5:3). Therefore first official year was in autumn.

6. Solomon was anointed twice--(1) before David died; and (2) was anointed and crowned just before death of David, probably after the year's har-

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[a] Moses was 80. and Aaron 83 in the exodus year (Ex.7:7). In the 11th month of the fortieth year, Moses was 120 (Deut.1:3 and 31:2); while in the 5th month of the same year Aaron was 123 (Num.33:38). They must have counted their birthdays therefore from Nisan, not from Tishri.

vest (1 Chron.29:22,28), and without doubt in the same season during which the silver tax was taken up for the ancient tabernacle.

According to 1 Kings 6:38, Solomon was seven years in building the temple, and he started operations in his fourth year (verse 1). If his regnal year ran from spring to spring, then the total time of building was 7 1/2 years, which would be 8 years by Jewish reckoning. But by beginning his reign in the fall, the time of building = 6 1/2 years, or seven years by Jewish count, in harmony with the text.

7. Division of the Kingdom. The chronology of the approximate two centuries during which Judah and Israel were divided monarchies is represented by about a hundred time statements in Kings, Chronicles, and Isaiah. These chronological statements appear to conform to a spring-beginning Israelite and a fall-beginning Judaite Jewish year, with respect to which (1) two lunar dates are found in the Bible, (2) two eclipses in Ptolemy's canon, and (3) one uncertain eclipse in the Assyrian limmu list, besides a number of inscriptional records pertaining to the kings of Israel and Judah. A simple method of demonstrating the Jewish year under the monarchies is to lay out a short period--one represented by as large a number of time statements as possible, as for example the reigns of Ahab and his two sons Ahaziah and Jehoram with the current reigns of Jehoahaphat and his successors Jehoram and Ahaziah. This is only a method of proof as to what form of year conforms to the Israelite and Judaite kings. It is possible that more than one plan of outline can be demonstrated.

8. Hezekiah's year appears to be in harmony with an agricultural year, which is outlined as sowing, reaping, and eating the fruits (2 Kings 19:29).

9. Jehoiakim = autumn new year. This king's fourth year apparently changed to the fifth in the seventh month (Jer. 36). This conclusion is dependent upon showing that Baruch wrote the roll after the first of Nisan in the fourth year. But if Baruch had written Jeremiah's dictations in the winter previous to Nisan, then the subsequent rain fast would have logically followed in the season of the latter rain. The fact that the fast came in the ninth month is evidence that the roll was written in the interval between the spring fast and the fall fast. For on account of the drought (Jer.14:1-3), the people were desperate, and were even coming up to the temple to pour out their cries to Jehovah.

10. Jehoiachin and Zedekiah. Jehoiakim died in late spring, when the days were hot, and the nights frosty. Jehoiachin then ruled 3 months and 10 days, after which he was taken to Babylon "at the return of the year." At the same time Zedekiah was made king--obviously in the autumn. His years coincide with the captivity year of Ezekiel.

11. Haggai and Zechariah without doubt represent Persian year. No change of year between Haggai's "sixth month" in the second year of Darius and Zechariah's "eleventh month" of the same year. Zechariah's message seems to follow Haggai's.

12. Period of Esther. Persian year. No change of year between Nisan in twelfth year of Ahasuerus (Esth.3:7) through 23rd Sivan (8:9), to 13th Adar (8:12).

13. Period of Daniel. Persian year. Daniel's one date (Dan.10:2-4), being a spring date, and designated as "third year" of Cyrus against Ezra's "second year" for the same event, is proof that Daniel's calendar must have been Persian and Ezra's Jewish. For the Persian year was one in advance of the Jewish during the period from Nisan to Tishri.

14. Ezra and Nehemiah. Jewish year. No change of year between the ninth month Chisleu in the twentieth of Artaxerxes and the subsequent Nisan of the same year. Nehemiah's year must therefore have changed in the autumn. The significant feature of this reckoning is the fact that Ezra and Nehemiah refer to the Persian year in terms of the Jewish calendar, which from Nisan to Tishri was one less than the Persian year. Hence Ezra's "seventh of Artaxerxes" in the period from the first to the fifth months (Ezra 7:7,8) was Jewish time, while the Persians, in the same period, called the same year the eighth of the king.[b]

Ptolemy records three lunar eclipses that belong to the period of the Persian kings; but before the Assuan papyri can be used with assurance to confirm the Persian years, it has to be demonstrated to what calendar the papyri belong. The earliest investigators considered them Jewish reckonings. The latest report dates them in Persian time.[c]

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[b] Eduard Mahler, "Zur Chronologie der Babylonier," Denkschriften der kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Classe. Zweiundsechzigster Band. Wien, 1895, 652.

[c] Richard A. Parker, "Persian and Egyptian Chronology," The American Journal of Semitic Languages and Literatures. July, 1941, 285.

CHRONOLOGICAL OUTLINE--TABLE "X" —Grace Amadon

In the foregoing chronological Table, the years are founded upon four specific new years:

1. The Julian new year, as of January 1.
2. Ptolemy's Egyptian new year for the Nabonassar Era, whose 1 Thoth in the 5th century B.C. was for the most part in December.[5]
3. The Babylonian or Persian new year--1 Nisan, to which the Assuan Papyri seem to conform.[6]
4. The Jewish new year--1 Tisri, upon which the dates of Ezra and Nehemiah depend.[7]

The regnal years in this Table are anchored by the lunar eclipse in the 7th of Cambyses; by the king lists in Ptolemy's Canon; and by the designated years and double dates of the Assuan Papyri. But in addition, the events in Jewish history that took place under the reigns of the Persian kings, as dated in the Bible, also identify these luni-solar years with their corresponding Julian years. And further, the Jewish and Persian reckonings show, that in ancient times from Nisan to Tisri, the Jewish years were numbered the same as the Persian; and that from Tisri to Nisan, the Jewish were one year in advance. Among the years sustaining these calendar and Bible synchronisms in the 5th century B.C., the following series is important:

I 13 Xerxes (472-471 B.C.) = the year appointed by Haman for the destruction of the Jews on the 13th Adar, the Jewish day of full moon.[8]
II 7th Artaxerxes (457 B.C.) = a series of seven specific days of the week, marking activities of Ezra, which cannot consistently be dated on the Jewish Sabbath.
III 20th Artaxerxes (445-444 B.C.) = the building of the wall by Nehemiah in 52 days--demonstrating the length of the month Ab.
IV 20th Artaxerxes (444 B.C.) = reading of the Law by Ezra on 1 Tisri--the Jewish Sabbath.

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5 Ginzel, F.K., "Handbuch der mathematischen und technischen Chronologie," II Band, p. 578. Leipzig, 1911.

6 The English astronomer, E.W. Maunder, insists that the spring moon, inscribed as lying on its back on the ancient Babylonian boundary stones, is a clear symbol that the Babylonians began their year in the spring."--"Astronomy of the Bible," 2nd Edition, p. 316. London.

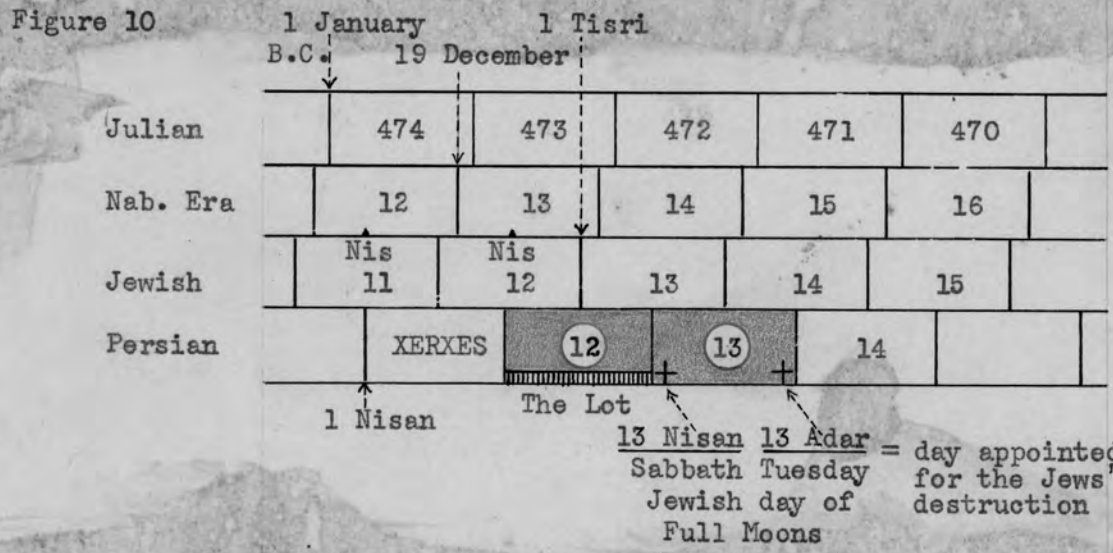
7 Note: The Jewish prophecy in Daniel 9 identifies the Jewish new year with the autumn. For, since the prophetic phrase "midst of the week," or middle of a literal year, was coincident with the crucifixion in the spring, the end of the same year, and hence the beginning of another, must have occurred in the fall.

8 "Since Grotefend's decipherment of the proper names in the Persepolis inscriptions, it has been generally recognized that this monarch is Xerxes. The Hebrew form 'Aḥashwērōsh corresponds to the Babylonian and Aramaic spelling of the Persian Khshayārshā, Xerxes."--"New standard Bible Dictionary," p. 229. 1936.

SYNCHRONISM I

The story of Esther is so well known that it need not be repeated here by way of introduction. It is designed only to show the important relation of this familiar history to early luni-solar time. That Haman followed the Persian year in his reckoning is evident from the fact that he began the "lot" with Nisan, which the writer of Esther calls the "first month", thereby making the Persian name synonymous with the Jewish. This is the only instance in the Bible where the Persian month Nisan is identified with the Jewish first month. The book of Esther also introduces into its narrative three other Persian months, which are defined in terms of the Jewish--Sivan (third), Tebeth (tenth), and Adar (twelfth).[9] It is therefore possible to connect the Persian calendar with the Jewish and Julian set up for the reign of Xerxes, as outlined in Table "X". The following diagram indicates the correspondence relating to these various calendars:

Figure 10



DEMONSTRATION The only logical position for the Persian year is to make its month Nisan begin with the Jewish Nisan, as in Figure 10. In order to accomplish this coincidence, the Persian regnal year itself has to begin after the Jewish. Should it begin before, that is, for example, should the 12th of Xerxes be dated a year earlier, then the Persian Nisan and its subsequent months would be controlled by the Julian year 474 B.C., while the Jewish Nisan of 12th Xerxes and its subsequent months would be governed by the year 473 B.C. Hence the two calendars would disagree in their embolisms. Therefore, the conclusion is obvious that the ancient Persian Nisan, upon which the Esther

9 Esther 8:9; 2:16; 3:12.

dates are based, must have been synchronous, or nearly so at least, with the Jewish Nisan.[10]

The Jewish writer of the book of Esther apparently desired to certify the synthesis between the Persian and Jewish calendars. To this authoritative testimony, Zechariah adds "Chisleu" as the ninth month, and "Sebat" as the eleventh.[11]

Another calendar feature belonging to Synchronism I involves the demonstration that neither 13 Adar, which date Haman set apart for the slaughter of the Jews in Persia, nor the succeeding day, 14 Adar, into which the Jews extended the fight for their lives, could have been otherwise than common days of the week. For even much later than Esther's time we find the Jews giving up life rather than fight on the Sabbath day.[12] And if 13 Adar had been scheduled to fall on the Jewish Sabbath, Esther would surely have appealed to Xerxes relative to such fact, for she was wholly in command of the situation. Furthermore, it is plain from the context that the Persians were able to calculate their moon's in advance, as indicated by Haman's Jewish date of full moon, 13 Adar, 471 B.C.[13] The following luni-solar dates for this historic year are presented in proof of the calendar facts stated:

13th Year of Xerxes the Great
(472-471 B.C.)

B.C.		
472	1 Nisan = April 13, Monday	(Table "g").
	13 Nisan = Sabbath, April 25	" "
	Full Moon = April 25.48	" "
	Conjunction = April 10.27	" "
	Wax. Period = 15.21 days	" "
	Tr. Period = 2.50 days	" "
	Passover = Sunday, April 26	" "
	Length of year = 354 days	" "
	1 Tisri = Wednesday, October 7	(Table "c")
471	13 Adar = Tuesday, March 16	" "
	14 Adar = Wednesday, March 17	" "
	15 Adar = Thursday, March 18	" "

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10 It has not been definitely demonstrated that either the ancient Babylonians or Persians had the same length of Translation Period as the Jews. Hence their new years might differ by a day or two.

11 Zech. 7:1 and 1:7.

12 1 Mac. 2:34-38.

13 Note: The moon commonly fulls around the 12th or 13th of a Jewish month. Hence Haman's "13th" dates are at once suggestive of full moon. From Ginzel it is ascertained that the full moon of Adar, or March, in 471 B.C. is III 15.27, G.M.T. To this date add 15 hours (.63 day) = 15.90 Babylon civ. time, or March 16, J.C.T. as in foregoing Table.

The day that Haman finally chose for sending away the "posts" was Sabbath, 13 Nisan, April 25, both Jewish and civil day of full moon, 472 B.C.[14] And the day he appointed for the destruction of the Jews was 13 Adar, March 16, likewise the Jewish day of full moon, in 471 B.C., the following spring. It may have been the "lot" that decided the first full moon day, although it should be remembered that anciently, war and other serious projects were commonly started about the time of either new moon or full moon.[15] But it was doubtless the coincidence of the Jewish Sabbath and full moon that Haman had in mind for his ill-starred design, for such was the 13th Nisan in 472 B.C. Certainly it must have struck terror and fear into the heart of the Jews in "perplexed" Shushan to see the horses, camels, mules and dromedaries "hastened" off on the Sabbath day to carry their message of death to all the provinces.

But Haman's second day of Jewish full moon was not the Sabbath day. It was Tuesday--a common week day toward the middle of the week. And in this appointment of the fateful day, we see a counter-power working in behalf of the Jews, who, in the end, were free to stand for their lives on a Tuesday, Wednesday, and even on Thursday. The Sabbath day, in this instance when life was at stake, was not made a test of loyalty to the Law of God.

The influence of queen Esther upon the subjects of Ahasuerus was profound, so much so that "many of the people of the land became Jews." This remarkable scripture record, so rich in historical content, is inserted in the law in the synagogue rolls, and it is treated with the highest reverence.[16] In the familiar story of Esther, important features lie hidden that pertain to ancient luni-solar time, both with the Jews and Persians. These calendar features are thus summarized:

1. Four specific Persian months--Nisan, Sivan, Tebeth and Adar--are identified by number with their corresponding Jewish months. The books of Esther and Zechariah alone make these synchronisms between the Persian and Jewish months.

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14 When the moon fulls before sunset, the Jewish day of full moon is the same as the civil.
15 Scaliger, Joseph, "De Emendatione Temporum," Prolegomena, B2. Lugdun, 1598.
16 "New Standard Bible Dictionary," p. 231. Funk and Wagnalls. 1936.

2. It is apparent that Haman knew twelve months in advance the luni-solar date of full moon--13 Adar 471 B.C. From this incident it is obvious that the Persian people, in the 5th century B.C., knew how to calculate the moon's phases. Ahasuerus had "wise men who knew the times;" but so had David the same, 500 years before(1 Chron. 12:32). Jewish chronologers commonly rate these officers in the court of David as astronomers. It is therefore possible and probable that the captive Jews taught the Babylonians and Persians how to compute their moon dates. Haman's intelligence in calendar science is therefore a testimony to the people he tried to annihilate.

3. A third chronological detail in the Esther narrative--and one of great importance--is the rule of correspondence it demonstrates between the Persian and Jewish regnal years and the Julian calendar.

Consequently, the historical record of the book of Esther is synchronal in character, and lines up in importance with eclipse, tablet, papyrus, and boundary stone in establishing the chronological outline of the Persian kings.

(October 20, 1941)

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(October 20, 1941)

THE JEWISH REGNAL YEAR
(Neo-Babylonian and Persian Periods)

In the preface to The Chronology of Ancient Nations, Edward Sachau makes an ~~unquestionable~~ significant assertion. He says: No number in any chronological table can be considered correct, as long as it is not proved by computation to be so.[1] In the face of this ~~significant~~ challenge one cannot but wonder what will become of all the indiscriminate dates appearing in twentieth century monographs, and what impression they will make upon students who succeed to our generation. Many ancient events dates are based upon no proof whatsoever, and have in fact been continually on the change. They may therefore belong either to an unattested outline, or else to no outline at all. The trend of modern research ~~appears to~~ is to accept at face value the inscriptional dates, but the question at once arises whether today's evaluation of the ~~Assyrian~~ ancient records will hold unless given more proof than has as yet been applied. It is not enough to submit an historical epoch to a trial and error computation whose resultant figures merely conform to unproved initial postulates, and also involve emended texts of Scripture.

The modern rabbinical calendar can be extended back to ancient times; but its fictitious moleds, which do not allow the fifteenth of Nisan to occur on Monday, Wednesday, or Friday, could not conform to the OT days of the week, or to the OT dates, which are definitely tied to the perturbations and inequalities of the moon. We know this because every calendar or ~~every~~ chronological outline, that is based upon observation of the moon must necessarily take into account the moon's anomaly and irregular motion. Observation of the moon means all of that. However, the Bible does not mention in detail the complex principles of lunar motion. Hence we just set them aside, and in our biblical reckoning are tempted to employ a calendar that also sets them aside![2] It is said that any calendar is correct if one knows how to use it. If the student therefore understands that a table is not based upon the moon's anomaly and inequalities, then no confusion will result in the use of it, for the user will know that he could not thereby check the exactness of any synchronism in the Bible.

There are several good tables in the text, as

Similarly, intercalation as such is not described anywhere in the Scriptures; yet this indispensable lunar principle is fully presented in the Bible by the simple expedient of tying the paschal full moon to the first full moon of barley harvest. At passover time a sheaf of ripe barley was waved in the temple on the sixteenth of Nisan (Lev. 23:10,11). In this manner an ancient lunar date was made to coincide with the sun-ripened harvest--a solar event. The invention is very old, and reaches back very early in both Jewish and Babylonian history.[3] It has now been replaced in the rabbinical tables by a nineteen year cycle, which is pure calculation and no longer conforms to the cycle of an ancient agricultural calendar.

We repeat: no lunar table whose computation sets aside the anomaly and inequalities of the moon, and also the ancient method of intercalation, can possibly conform to a true biblical outline in chronology. The number of dates in the Bible may be small, but every one belongs to a specific calendaric ~~period~~, and is as important to chronology as an eclipse. The purpose of this study is to demonstrate the working of the Jewish year in the Neo-Babylonian and early Persian era. We have chosen this era as one that particularly illustrates a period when the Jews for a time still had kings of their own to account for, and when at the same time and later also, their writings had to record the regnal years of foreign kings. Many cities fell in this period--Nineveh (612), Carchemish (604), Jerusalem (586), Tyre (573), Babylon (539), Thebes (525), and the Jewish reckoning of foreign events nicely corresponds to ~~represents~~ the chief forms of calendar in use. Moreover, in this period there are about forty biblical dates which are lunar.

Outline of the Sixth-Seventh Centuries B.C.

The period outlined on the accompanying chart and the regnal years introduced are based upon many inscriptional documents.[4] The Babylonian year began in the spring,[5] and it is so represented on the chart. The king list includes four Assyrian kings, six Babylonian kings, and three Persian, who together nearly pat

nearly parallel the XXVIth dynasty of Egypt (666-525 B.C.) Also the first half of this era covers forty years of the last five kings of Judah--from the thirteenth of Josiah to the eleventh of Zedekiah. And in addition, there are the thirty-seven years of Jehoiachin's captivity in Babylon, which extend from the eighth of Nebuchadnezzar to the first of Amel-Marduk, as described by the writer of II[2] Kings and the scribe who completed the record of Jeremiah. The major part of Jehoiachin's captivity period is featured by Ezekiel's prophecy, which includes more lunar dates than any other single book in the Bible~~, fourteen altogether.~~ The dated chapters, with three exceptions, represent a chronological sequence~~, and the prophecies are indicated in the outline by the series of small dots in the years from 592 to 567.~~ The early dates are a year or so apart; but the messages at the time Jerusalem fell were close together--only a few weeks apart. The purport of these final communications is obvious. For the most part they relate to the fall of Egypt, and hence were doubtless ~~probably~~ given as a warning to the Jewish captives against looking to Egypt for support. ~~We shall shortly analyze the Ezekiel year and its~~ highly ~~important relation to the chronology here outlined.~~

There are four forms of calendar represented in this outline: (1) Julian, (2) Egyptian, (3) Babylonian and Persian, and (4) Jewish. The Julian year is the chronologer's year. It is a calendar measurement which has been adopted for the interpretation of ancient records. Its new year was on January 1, which marks the earliest year beginning in the outline until the year 521 B.C., during which the Egyptian new year occurred twice in the year--January 1 and December 31. The Egyptian year was employed for the Ptolemaic kings and eclipses. In 626 B.C., 1 Thoth occurred on January 27, and in 515 B.C., on December 30. As time advanced, the Thoth new year receded at the rate of one day every four years. Certain inscriptions and documents equate the Egyptian year with the Persian, as in the Cambyse 400 Tablet[5] and the Assuan papyri.[6]

Three eclipses occur in this Babylonian-Persian period, and each one is

tied to the regnal year of some king. They therefore not only fix the Julian years in the outline, but they also point out (1) the relation of the Julian year (621 B.C.) and to the Jewish year, to the Egyptian year of the Ptolemaic canon, (2) to the Babylonian regnal year (568 B.C.)[7], and (3) to the Persian regnal year (523 B.C.). In other words, these eclipses show that the Julian new year on January 1 began first; second, that there next followed the Egyptian new year, a January event at least up to 521 B.C.; and third, that there then began the Babylonian New Year on 1 Nisan--a March-April event. The season of the Jewish new year remains to be further demonstrated.

The Ancient Jewish New Year

The earliest known year, both in Israel and Babylonia was autumn-beginning.[8] The months were even numbered from the autumn.[9] The ancient calendar was agricultural, probably similar to the Nile calendar of the Egyptians,[10] and the months were given agricultural names, as the old Canaanite names of the Bible indicate.[11] With the Palestinian farmer, the end of the summer was the end of the year, and the coming of the early rain was the beginning of a new year.[12] Just so the "end of the year" (going out of the year), as in Ex. 23:16, is an expression based upon culture of the land. The word appears to be characteristic of the sun's revolution (Ps. 19:6), as if beginning from the fall of the year (Ex. 34:22). ~~On the contrary~~ In addition, the word when used with is still more specific of the sun's motion. The phrase is commonly translated "turn of the year," and probably relates to the time when the sun crosses the equator. There are only a few instances of in the Bible, and the context usually implies which season is meant--vernal or autumnal.

~~From~~ Or the time of the exodus, Jehovah commanded that the passover month Abib should be counted as the first month of the year (Ex. 12:2), and ever since, this has been good Jewish practice. However, the fact that the numbering of the year was ever changed--even though by divine order--has supplied a rule of procedure with some who otherwise would fail to make the outline of

biblical chronology conform to their dates and figures. Begrich is one such. He proposes a change of year from autumn to spring in the time of Hezekiah.[13] But Welhausen is equally certain that in the time of Josiah a king's reign ~~changed~~ began in the autumn.[14] On the contrary, from almost the same texts, Kugler concludes that the Jewish year changed in the spring.[15] Levy has a similar conclusion.[16] Others insist that the Jewish people adopted a spring-beginning year in Babylon, and returned to Palestine with the same calendar. And all the biblical dates of these various computers are colored by their arguments with reference to the beginning of the Jewish year.

It is impossible to connect the reigns of Jewish kings with an outline of Babylonian and Persian kings unless we know exactly when the Jewish regnal year began. Furthermore, the chronologer must also know what calendar the Jewish writers used when mentioning the reigns of foreign kings--whether spring or autumn beginning. Biblical practice varies with regard to this. The whole pattern is also biased by the possibility that the chronologic trend of a prophet or chronicler may be interjected with dates from a foreign calendar--interpolated by some editor or scribe. And in addition, the Jewish accession year must be understood, and any Hebrew expression defining it. Then there is also the very significant but much garbled Ezekiel chronology which belongs to this period--altogether fourteen consecutive dates, ~~which offer a precise proof of the period to which they belong.~~ Obviously, it is an inconsistent conclusion that one simple rule could govern all this important history, and we are faced with the problem of ascertaining the method of computation which each biblical writer employed, and what calendar he used. We now present several arguments showing (1) that the Jewish year began in the autumn, and (2) that this kind of year was common among the Jews in Babylon, and ~~(3)~~ also after the return from the captivity.

1. Josiah. This young king's work of reform began when he was twenty years old: for "in the twelfth year [of his reign] he began to purge Judah and Jerusalem from the high places, and the graves, and the carved images, and the molten images" (2 Chron. 34:3). The work of cleansing proceeded throughout the

"cities of Manasseh, and Ephraim, and Simeon, even unto Naphtali" (verses 5, 6). The eighteenth year of Josiah's reign had come before his reform had been completed, and the temple was still to be cleansed (verse 8). Sometime within this eighteenth year--in the eighth month, according to the LXX--Josiah began to repair the house of God, and for this purpose the people were bringing an offering of silver to the temple (2 Kings 22:4; 2 Chron. 34:9).

This silver collection was the traditional offering for building and repairing the house of God. The actual silver in the original collection was used to make the hooks and sockets of the tabernacle (Ex. 38:26-31). This offering was taken up in the autumn, about six months after the exodus, and became traditional under the monarchy (2 Kings 12:4,5). And so David without doubt took up his magnificent offering for the new temple in the autumn after the harvest returns were in. On this occasion, Solomon was anointed king the second time (1 Chron. 29:22).

It is important to take note that the addition by the LXX to the MT date in 2 Kings 22:3-- --is consistently supported by Lucian,[17] and that this silver collection in the time of Josiah is consequently in harmony with the ancient half shekel tax of autumn origin. Therefore, since the silver tax for the repair of the temple was in operation in the eighth month in the eighteenth year of Josiah, and since the subsequent passover was observed in the same eighteenth year of the king, ~~it is consistent to~~ we must therefore conclude that the king's reign did not change in the spring of this year, and hence must have changed on the ensuing first of Tishri.

Consequently Josiah's notable and much discussed passover in his eighteenth year was coincident with the Ptolemaic eclipse on April 22, 621 B.C. The eclipse occurred early in the morning of 13 Nisan (April 22), and the moon rose full at sunset on that day in when the paschal lambs were being slain. The eclipse doubtless had a profound effect upon the people. We know that this dating is correct, for if we shift the calendar backward one year, then the eleventh of Jehoiakim ends on the seventh of Nebuchadnezzar, contrary to 2 Kings 24:6,12. And if we advance Josiah's eighteenth one year, then the siege of Jerusalem would have begun on the eighth instead of the ninth of Zedekiah, contrary

to 2 Kings 25:1; Jer. 39:1; 52:4; Ezek. 24:1. Thus this Ptolemaic eclipse ties together four calendars.

Jehoiakim. The Josiah dating just outlined makes the fourth of Jehoiakim coincide with Nebuchadnezzar's accession year and his first year--the latter part of one and the first part of the other. Jeremiah also equates the fourth of Jehoiakim with the first of Nebuchadnezzar (Jer. 25:1).[18] It is quite obvious that the prophet is using the Babylonian calendar for his Babylonian date. On the other hand, Josephus equates the eighth of Jehoiakim with the fourth of Nebuchadnezzar, and thereby employs his own native calendar.[19] The interesting feature in this synchronism lies in the fact that if one date is moved, then the other is disturbed. These two dates therefore lock in position two calendars--Jewish and Babylonian.

On the date--fourth of Jehoiakim = the first of Nebuchadnezzar--Jeremiah offered his wine cup of fury to all the nations (Jer.25:15ff). The prophet was not yet shut up in prison. In this same fourth year, as soon as Necho reached Carchemish on the Euphrates (Jer. 46:2), Jeremiah gives a realistic description of the battle! A little later, we find him shut up in prison, and mentioned in Jer. 36:5.
probably as described in chapters 19 and 20, He ~~then~~ calls Baruch and dictates to him all his prophecies, and then asks that the roll be read to the people on the fast day. These incidents occurred in the fourth year of Jehoiakim, in the first year of Nebuchadnezzar, and during the spring and summer months. When Baruch read the roll on the fast day in the ninth month, the context shows that the ~~king's~~ year had changed to the fifth of Jehoiakim's ~~his~~ reign (Jer. 36:9). The regnal year must therefore have changed on the first of Tishri.

Zedekiah. Nebuchadnezzar made Zedekiah king, and took Jehoiachin captive to Babylon at one and the same time (2 Chron. 36:10). In this connection, the writer of Kings (2 Kings 24:12) and the chronicler (2 Chron. 36:10) equate the the eighth year of Nebuchadnezzar's reign with the "turn of the year." This coincidence could have occurred only in the autumn, for if we locate these in-

He had been doing this for several years.

paschal season--ostensibly in behalf of the sanctuary at Jerusalem, whose corner stone had not yet been laid. However, "in the second year of their coming," the stone was laid. Esdras and Josephus call it the "second year of Cyrus." It was a summer event, when the third of Cyrus on the Persian calendar was equated with the same as the second of Cyrus on the Jewish calendar. This incident is therefore witness to the Jewish reckoning of Ezra.

And within one week after Daniel's vigil the corner stone was laid.

c. Nehemiah is a second witness to Ezra's Jewish calendar. Nehemiah presents the Jewish date "20th of Artaxerxes," for he has no change of year between Kisleu and Nisan inclusive. If in Nisan the Jewish date was 20 Artaxerxes, then the corresponding Persian year must have been 21 Artaxerxes in that time of year. But 21 Artaxerxes Persian = 444 B.C. Hence 20 Artaxerxes must equal the same Julian date. Therefore 7 Artaxerxes = 457 B.C. Jewish. However, in Persian time, 457 B.C. = 8 Artaxerxes. Consequently 7 Artaxerxes was Jewish and 8 Artaxerxes was Persian at one and the same time. Hence Ezra was obviously using the Jewish calendar the same as Nehemiah.

First step in biblical chronology is to discover the calendar employed. No number in any chronological table can be considered correct unless formed by computation to be so. It is not enough to side with the majority. The true date may be in the minority.

cidents in the spring, then we discover that the "turn of the year" at the time of the spring equinox occurred in the seventh of Nebuchadnezzar, contrary to 2 Kings 24:12.

From the foregoing episodes, it should be clear that the Jewish year began in the autumn, and that its new year came after that of the Babylonian spring new year. It therefore happened that during the spring and summer season, the Babylonian regnal year was counted one higher than by corresponding Jewish reckoning. For example, consider the eclipse in 523 B.C.--the seventh of Cambyses. This eclipse occurred on July 16--an event between Nisan and Tishri. The Julian, Egyptian and Persian calendars each record this astronomical event in the seventh year of the Persian king. On the Jewish calendar, however, it was necessarily counted as the sixth year of the Persian king.[20] Another interesting instance of such reckoning is found in Daniel 10, where, in the "third year of Cyrus," Daniel is seen fasting and praying during the paschal period in behalf of the temple project in Jerusalem. He had been keeping such vigils for a long time it appears (Dan.9:3,17). His date--the third of Cyrus--is obviously Persian; for when we pick up another record of the same period, we find the writer of Ezra stating that the corner stone was laid "in the second year of their coming" (Ezra 3:8). Ezra's "second year" in Jewish time was exactly the same as Daniel's "third year" in Persian time, for the incident happened in the spring. The prophet fasted and prayed for three weeks in Nisan, and within a week the corner stone was laid in Jerusalem and his prayer was answered (1 Esdras 5:57).

Josephus calls it the second year of Cyrus (

Still further examples of these staggered regnal years are found in the equations of the Assuan papyri. Papyri J and K are good illustrations. In this period, the Thoth new year came in December, and in Egypt, the Persian king's year was then changed,[21] while in Babylon, the same regnal year did not change until the following spring. The equated dates in Papyri J and K are as follows:

J 12th of Thoth, year 9 of Darius [in Egypt] = 3rd of Chisleu, year 8 [in Persia]

K 9th of Athyr, year 14 of Darius [Egypt] = 24th Shebat, year 13 (Persia)[22]

2. Jewish Regnal Year in Babylon

The prophecy of Ezekiel shows how some Jews at least marked time in Babylon. There are several dated texts in Ezekiel that answer the question with respect to Jewish time during the captivity. In Ezek. 24:1 we read:

> Again in the ninth year, in the tenth month, in the tenth day of the month, the word of the Lord came unto me saying,
> Son of man, write thee the name of the day, even of this same day: the king of Babylon set himself against Jerusalem this same day.

The foregoing text is also recorded by the writer of 2 Kings (2 Kings 25:1), by the prophet Jeremiah (Jer. 39:1), and by the scribe who completed Jeremiah's record (Jer. 52:4). The siege began in the winter on January 17, according to Passover reckoning.[23] In this season between Tishri and Nisan, a Jewish date in Babylon would necessarily be exactly the same as its corresponding Jewish date in Palestine. This same day, the divine pronouncement stated, the king of Babylon set himself against Jerusalem. This text identifies the chronology of Ezekiel with that in Palestine. We thereby know that the ninth year of the de jure year of Jehoiachin was the same as the ninth year of the de facto reign of Zedekiah. If we advance Ezekiel's outline six months to a spring-beginning year, then in the winter an "eighth" of Jehoiachin would match Zedekiah's "ninth." On the contrary, if we retard the Ezekiel outline six months, then Jehoiachin's captivity began in the seventh of Nebuchadnezzar.[24]

In Ezek. 40:1, we have a hapax legomenon-- This phrase is translated "in the beginning of the year," without doubt because the word is used a number of times in the OT to signify beginning. But literally, this Ezekiel phrase means "head of the year." The same expression is not found elsewhere in the OT, and from it the modern rabbinical calendar has apparently derived its name Rosh Hashana, which has been applied only to the first day of Tishri. In Ex. 12:2 Abib is described as the "head of the months."

But in Ezek.40:1, the head of the year, as in our modern Jewish calendar, is the first day of the seventh month! On the tenth day of this month, otherwise known today as Yom Kippur, Ezekiel was given his wonderful vision of the new temple. Thus we have Ezekiel's personal witness to the autumn-beginning of the Jehoiachin captivity year.

Ezek. 26:1 is also a text that nicely ties itself into an autumn-beginning calendar. This text first informs the prophet that Jerusalem had fallen--an event which occurred on the tenth day of the fifth month. Tyre, Edom, Moab and Ammon were all clapping their hands over the fall of the city (Ezek.25:6; Lam. 2:15). Edom stood in the crossway to cut off those who had escaped. Divine reaction was immediate, and "in the first day of the month"--Elul, the only month left before the new year would begin--the prophet is told that Tyre should be destroyed. Nebuchadnezzar began his siege of Tyre in 586 B.C., almost immediately after the fall of Jerusalem. He besieged the city for thirteen years, and Tyre finally fell — probably — in 573 B.C. (Ezek.29:17).

3. The Jewish Year After the Captivity

JEWISH REGNAL YEAR

(SIXTH AND SEVENTH CENTURIES B.C.)

January 1 1 Thoth = Jan 27 April 22

Julian	626	* 625	624	623	* 622	621	620	* 619	618	617	* 616	615	* 614	613
Ptolemy		1	2	3	4	5	Nabopolassar	8	9	10	11	12	13	
Assyria	Assur-banipal							Sin-shar-ishkun						
Babylon	Nis 42	1	2	3	4	5	Nabopolassar	8	9	10	11	12	13	
Jeremiah	13 Tis	14	15	16	17	18	Josiah	20	21	22	23	24	25	26

1st year of Jeremiah

1

Julian	612	* 611	610	609	* 608	607	* 606	605	604	* 603	602	601	* 600	599
Ptolemy	14	15	16	17	18	19	20	21	1	2	3 Nebuchadnezzar			6
Assyria	Nis Assur-uballit II													
Babylon	Nis 14	15	16	17	18	19	20	21	1	2	Nebuchadnezzar		5	6
Jeremiah	27 Tis	28	29	30	31	1	2	3	4	Jehoiakim		7	8	9

Ant.X.XI.1 23rd year of Jeremiah Ant.X.VI.1

Julian	598	* 597	596	* 595	594	593	* 592	591	590	* 589	588	* 587	586	585
Ptolemy	7	8	9	10	11	12	13	14	15	10 Tebet	Siege			20
Babylon	Nis 7	8	9	10	11	12	Nebuchadnezzar	15	16	17	18	19	20	
Jewish	10 Tis	11	1	2	3	4	Zedekiah (vassal king)	8	9	10	11 x	t		10 Ab
Ezekiel	Tis	1	2	3	4	Jehoiachin's Captivity Year		9	10	11	12			

Messenger

Julian	* 584	583	582	* 581	580	579	* 578	577	* 576	575	574	* 573	572	571
Ptolemy	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Babylon	Nis 21	22	23	24	25	Nebuchadnezzar	28	29	30	31	32	33	34	
Ezekiel	13 Tis	14	15	16	17	18	Jehoiachin	21	22	23	24	25	26	

1 Thoth = Jan 12 July 4 Release of Jehoiachin

Julian	* 570	569	* 568	567	566	* 565	564	563	* 562	561	560	* 559	558	* 587
Ptolemy	35	36	37	38	39	40	41	42	43	1	2	1	2	3
Babylon	Nis 35	36	37	38	Nebuchadnezzar	41	42	43	1	x	2	1	2	3
Ezekiel	27 Tis	28	29	30	(31)	(32)	(33)	(34)	(35)	(36)	(37)			

Amêl-Marduk Nergal-Sarusur

Julian	556	555	* 554	553	552	* 551	550	* 549	548	547	* 546	545	544	* 543
Ptolemy	4	1	2	3	4	5	6	7	8	9	10	11	12	13
Babylon Daniel	4	1 Nis	2	3	4	5	Belshazzar Nabonidus		8	9	10	11	12	13
Jewish														

70

Julian	542	541	* 540	539	* 538	537	536	* 535	534	533	* 532	531	* 530	529
Ptolemy	14	15	16	17	1	2	3	4	5	6	7	8	9	1
Persia Daniel	Nis 14	15	16	17	1 Darius the Mede		1	2	x 3	Cyrus	5	6	7	1
Jewish	Messianic prophecy †					Tis	1	2 x	3	Cyrus	5	6	7	

1 Thoth = Jan 2 July 16 Daniel - Ezra date

Julian	528	* 527	526	525	* 524	523	522	* 521	520	* 519	518	517	* 516	515
Ptolemy	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Persia	Nis 2	3	4	Cambyses		7	8	1	2	Darius I		5	6	7
Jewish	1 Tis	2	3	4	Cambyses		7	8	1	2	3	4	5	x 6

Haggai Zechariah Ezra 6:15

* The asterisk indicates an embolismic spring
Accession years are shaded

ANALYSIS OF OUTLINE

1. The Ptolemaic year, based upon the Egyptian year, is tied to the Julian series of years by two eclipses--April 21, 621 B.C. and July 16, 523 B.C.

2. The Babylonian year is Nisan-beginning in this table. It is linked to the Ptolemaic year by the same eclipses, and by one full moon date--July 4, 568 B.C. The Babylonian king lists are confirmed by many inscriptions.

3. The Jewish regnal years are some of them double calendar dated--Jewish and Babylonian. This was common practise in that period. It was also common for each nation or head province to have its own calendar. The relationship between the Jewish and Babylonian regnal years is established by the following simple equations at the hands of four different writers:

We have 3 consecutive years of Zedekiah located in place.

a. 11th Zedekiah in Ab = 19th Nebuchadnezzar (2 Kings 25:2,8; Jer.52:5,12).
b. 10th Zedekiah = 18th Nebuchadnezzar (Jer.32:1).
c. 4th Jehoiakim = 1st Nebuchadnezzar (Jer.25:1). Probably a summer date, for Jeremiah counts the subsequent 9th month as the 5th of Jehoiakim (Jer.36:9).
d. 9th Zedekiah on 10 Tebet = beginning of siege (2 Kings 25:1; Jer.39:1; 52:4; Ezek.24:1).

Discuss "accession"

A very strong synchronism!

If Zedekiah's calendar is advanced six months, it is moved out of range of the siege date. If retarded six months, his 10th and 11th years are dislodged from their connection with Nebuchadnezzar's 18th and 19th years. Also Jehoiakim's 4th year would thereby by disconnected from Nebuchadnezzar's 1st year. From these four synchronisms we therefore conclude that the Jewish year in this period was fall-beginning, as represented in the table, and that it was frequently equated with the spring-beginning Babylonian year. On the contrary, Josephus uses the Jewish calendar for both Jewish and Babylonian kings, and there appear to be a few similar dates interpolated in the closing paragraphs of Jeremiah.

Josiah's 18th year

Josephus: 11th Zed. = 18th N. But this equation Jewish to the same as 11-19 Persian.

4. In this table the Ezekiel outline is also in places, namely, linked to the Jewish fall-beginning calendar. There are two locks--one at the beginning and one at the end of the 37-year period. Jehoiachin's three months' reign and surrender to Nebuchadnezzar are tied to the 8th year of the Babylonian king (2 Kings 24:12). At the "return of the year"--probably at the autumn equinox--Jehoiachin was taken captive to Babylon, and Zedekiah was made king. If the Ezekiel series is moved back six months to a spring-beginning year, the foregoing incidents check with the 7th instead of with the 8th of Nebuchadnezzar. If it be advanced six months, it will be moved out of range with the month Adar in Amêl-Marduk's 1st year.

Necessarily a summer event

In Ezek.40:1, the prophet introduces the term "head of the year," or Rosh Hashana. The expression is not used elsewhere in the OT, and his vision on the tenth day of this seventh month was apparently given in recognition of this solemn Jewish festival--the only festival day among Ezekiel's 14 dates. The prophet thereby would bear witness that in Babylon he was counting the seventh month as the beginning of the Jewish year.

5. After the captivity we find (a) Haggai and Zechariah using the Persian calendar, (b) Daniel also using the same, and (c) the record of Ezra tied to the Jewish calendar. These calendars can easily be demonstrated:

a. There are 9 dates in Haggai and Zechariah, ranging from the 6th to the 11th months without any change of regnal year. These prophets must therefore have employed a spring-beginning calendar.

b. In the "third year of Cyrus," Daniel is fasting and praying during the

THE PLACE OF CHRONOLOGY IN OUR MODERN SYSTEM OF BIBLE STUDY

Many people have given very little thought to the place that chronology should have in Bible study, being willing to take such figures as given by scholars like Ussher, Hales, or Clinton, and abiding by the decisions made by those who apparently have gone into the matter in a thorough way. But in these days when every phase of the Advent message is to be microscopically examined, it behooves us as Bible students to substantiate all our positions most accurately, not because some chronologist of a few centuries ago is followed, but because the statements that we make are supported by the latest finds in archaeology and chronology. For a people who place so much importance on the proper interpretation of the 2300 days, for instance, it is absolutely essential for the intelligent comprehension of our message by the world that we give clear vindication of the dates we propound.

In 1913, G. Campbell Morgan in writing a preface to Martin Anstey's, The Romance of Bible Chronology, said,

> "Bible study is the study of the Bible. There are many methods and departments; none is without value; all of them, when done thoroughly rather than superficially, tend to the deepening of conviction as to the accuracy of the records. In no case is this more marked than in departments which are incidental rather than essential. If, in such a matter as that of dates -- which seems to be purely incidental, and is of such a general nature that few have taken the trouble to pay particular attention to it -- the method of careful study shows that these apparently incidental references are nevertheless accurate and harmonious, then a testimony full of value is borne to the integrity of the writings."

Anstey himself in his preface says:

> "Chronology is a branch of History. As such it is governed by the laws which determine the validity of the results reached by the process of scientific investigation and historical enquiry. It is also a branch of Applied Mathematics, and Mathematics is an exact Science. . . . Like Mathematics, Chronology has its axioms, its postulates, and its definitions, of which the most important and the most fundamental is the trustworthiness of the testimony of honest, capable, and contemporary witnesses, like that of the men whose testimony is preserved in the records of the Old Testament."

At the time most of our chronologers worked and wrote there was but very little objective testimony, and they had to depend for their statements on the writings of the ancient historians, who are notorious for disagreeing among them-

selves. The curtain of history was drawn in such a way as to throw most of the dates back of the destruction of Jerusalem by Nebuchadnezzar into a twilight zone, and many dates back of this time have been demonstrated to be mere guess work. As an illustration of this, I found some amazing statements in Sir Isaac Newton's The Chronology of Ancient Kingdoms, published in London in 1728. He stated, for example that Ramses lived at 887 B. C.[1]; that the father of Solomon's queen "was the first king of Egypt that came into Phoenicia with an army;[2]" that Nitocris finished the third great pyramid in 802 B. C.[3]; that the Trojan war was later than the days of Rehoboam some seventy-four years after the death of Solomon[4]; that the Hyksos "did not enter Egypt 'till after Moses had brought Israel from thence;[5]" that the "Shepherds were expelled from Egypt by Amosis a little before the building of Jerusalem and the temple;[6]" that Shalmaneser took Israel captive, never mentioning the name of Sargon and ignoring the statement concerning him in Isaiah 20[7]; and that from the fifteenth year of Asa, "in which the father of Ramses began his reign," to the era of Nabonasser was two hundred years.[8]

It is very astonishing and almost providential that such a chronologer as Newton, who went so far afield in the dates given for second millennium events, could have so accurately determined the opening date of the reign of Nabonasser, giving it correctly as February 26, 747 B. C. It is also very interesting to see how Newton, by use of the Canon of Ptolemy, places 625 B. C. as the first year of his reign and his death in the year 604 B. C., yet by a series of very interesting mistakes in his methodology makes Nebuchadnezzar take Jerusalem in 606 B. C.[9]; and also to see how he makes the first year of Xerxes reign in 485 B. C. and the first year of Artaxerxes in 464 B. C., yet puts the seventh year of Artaxerxes

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1 Sir Isaac Newton, The Chronology of Ancient Kingdoms, p. 30
2 Id. p. 69
3 Id. p. 34
4 Id. pp. 118, 130
5 Id. p. 204
6 Id. p. 205
7 Id. p. 35
8 Id. p. 253
9 Id. p. 38

as 457 B. C. instead of 458 B. C., subtracting seven from 464 instead of six. (For if the first year of Artaxerxes reign began with the spring of 464 B. C., the seventh year would have to begin with the spring of 458 B. C.)

Now the accuracy of this 457 date will be definitely demonstrated by recently discovered archaeological finds in another paper. It is mentioned here merely to suggest the almost providential covering up of a simple arithmetical blunder on the part of such a prominent scientist as Newton, that a date, later to be proved correct, could be used as the starting point of a message to be heralded to the world announcing the close of the great 2300 day prophecy and the ushering in of most solemn events connected with the second advent of Christ.

In order to present to our minds the great necessity of most careful, painstaking scrutiny of that which Morgan calls the "incidental" side of Bible study, personally investigating and constantly rechecking any chronological data used by means of the most recent archaeological evidences, our attention is called in this paper to the methodology used by Newton in arriving at the date 606 for the first campaign against Jerusalem when Daniel was carried captive to Babylon in the third year of Jehoiakim. Let Newton express in his own words his method of arriving at some of his figures:

> "As the Chaldean Astronomers counted the reigns of their kings by the years of Nabonassar beginning with the month Thoth, so the Jews, as their authors tell us counted the reigns of theirs by the years of Moses, beginning every year with the month Nisan: for if any king began his reign a few days before this month began, it was reckoned to him for a whole year, and the beginning of this month was accounted the beginning of the second year of his reign; and according to this reckoning the first year of Jehoiakim began with the month Nisan, Anno Nabonassar 139, though his reign might not really begin 'till five or six months after: and the fourth year of Jehoiakim, and first of Nebuchadnezzar according to the reckoning of the Jews, began with the month Nisan, Anno Nabonassar 142 and the first year of Zedekiah and of Jeconiah's captivity, and ninth year of Nebuchadnezzar, began with Nisan in the year of Nabonassar 150, and the tenth year of Zedekiah, and eighteenth year of Nebuchadnezzar began with month Nisan in the year of Nabonassar 159. Now in the ninth year of Zedekiah Nebuchadnezzar invaded Judea, and the cities thereof and in the tenth month of that year and tenth day of the month, he and his host besieged Jerusalem. II Kings 25:1; Jer. 34:1; 52:4. From this time to the tenth month in the second year of Darius are just seventy years (Zech. 1:7-12). So then the ninth year of Zedekiah in which his indignation against Jerusalem and the cities of Judah began, commenced with the

month of Nisan in the year of Nabonassar 158 and the eleventh year of Zedekiah and nineteenth of Nebuchadnezzar in which the city was taken and the temple burnt commenced with the month Nisan in the year of Nabonassar 160 as above."[10]

To this excerpt, let us add another, a few pages back in the same book, where he says:

"It appears from the Canon that Asserhadan died in the year of Nabonasser 81, Saosduchinus his successor in the year 101, Chyniladan in the year 123, Nabopolassar in the year 144 and Nebuchadnezzar in the year 187. All these kings, and some others mentioned in the Canon reigned successively over Babylon, and this last king died in the thirty-seventh year of Jechoniah's captivity, II Kings 25:27, and therefore Jechaniah was captivated in the 150th year of Nabonassar.

"This captivity was in the eighth year of Nebuchadnezzar's reign, II Kings 24:12, and eleventh of Jehoiakim's: for the first year of Nebuchadnezzar's reign was the fourth of Jehoiakim's, Jer. 24:1, and Jehoiakim reigned eleven years before this captivity, II Kings 23:36; II Chron. 36:5, and Jechoniah three months, ending with the captivity, and the tenth year of Jechoniah's captivity was the eighteenth year of Nebuchadnezzar's reign, Jer. 32:1, and the eleventh year of Zedekiah in which Jerusalem was taken was the nineteenth year of Nebuchadnezzar, Jer. 52:5,12, and therefore Nebuchadnezzar began his reign in the year of Nabonasser 142, that is two years before the death of his father Nabopolasser, he being made king by his father, and Jehoiakim succeeded his father Josiah in the year of Nabonasser 139 and Jerusalem was taken and the temple burnt in the year of Nabonasser 160, about twenty years after the destruction of Nineveh."[11]

These excerpts are very nice reading, but if one is patient enough to tabulate them, Newton's mistakes clearly appear. Below is a table, (see p. 4a), showing the years from 628 to 559 B. C. which will indicate how Newton did his figuring.

In the second quotation he equalizes the year of Nebuchadnezzar's death 187 with the thirty-seventh year of Jechoniah's captivity. Then subtracting thirty-seven from 187 he gets 150 and says, "therefore Jechaniah was captivated in the 150th year of Nabonassor." This is identically the same kind of reasoning by which he made 457 the seventh year of Artaxerxes when his first year, according to the Canon, was in 464. It is the same identical blunder made by some of our pioneers when they said the 13th day of October, 1844, was the first day of the seventh month, therefore the 10th day of the seventh month would be the 23rd of October instead of the 22nd.

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[10] Id. pp. 296-298
[11] Id. pp. 294,295

TABLE SHOWING SIR ISAAC NEWTON'S ARRANGEMENT OF EVENTS DURING REIGNS OF NABOPOLASSAR AND NEBUCHADNEZZAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B.C. Dates (Julian Calendar) of Years of Nabonassar Era	Nabonassar Era	Regnal Yrs. Accord. to Ptolemaic Canon	Captivity of Jehoiachin	Regnal Yrs. Jewish Reckoning Accord. to Sir I. Newton	Regnal Yrs. Jewish Reckoning Accord. to Sir I. Newton	Regnal Yrs. in terms of Nabonassar Era	B.C. Dates (Julian Calendar) of Years of Nabonassar Era	Nabonassar Era	Regnal Yrs. Accord. to Ptolemaic Canon	Captivity of Jehoiachin	Regnal Yrs. Jewish Reckoning Accord. to Sir I. Newton	Regnal Yrs. Jewish Reckoning Accord. to Sir I. Newton	Regnal Yrs. in terms of Nabonassar Era
628-27	120			Spring	13		592-91	156	13	7	15	7	156-57
7- 6	1			to	14		591-90	7	14	8	16	8	7- 8
6- 5	2			Spring	15		590-89	8	15	9	17	9	8- 9
5- 4	3	1		1	16	123-24	9- 8	9	16	10	18	10	159-60
4- 3	4	2		2	17	4- 5	8- 7	160	17	11	19	11	160-61
3- 2	5	3		3	18	5- 6	7- 6	1	18	12	20		1- 2
2- 1	6	4		4	19	6- 7	6- 5	2	19	13	21		2- 3
621-20	7	5		5	20	7- 8	5- 4	3	20	14	22		3- 4
620-19	8	6		6	21	8- 9	4- 3	4	21	15	23		4- 5
9- 8	9	7		7	22	129-30	3- 2	5	22	16	24		5- 6
8- 7	130	8		8	23	130-31	2- 1	6	23	17	25		6- 7
7- 6	1	9		9	24	1- 2	581-80	7	24	18	26		7- 8
6- 5	2	10		10	25	2- 3	580-79	8	25	19	27		8- 9
5- 4	3	11		11	26	3- 4	9- 8	9	26	20	28		169-70
4- 3	4	12		12	27	4- 5	8- 7	170	27	21	29		170-71
3- 2	5	13		13	28	5- 6	7- 6	1	28	22	30		1- 2
2- 1	6	14		14	29	6- 7	6- 5	2	29	23	31		2- 3
611-10	7	15		15	30	7- 8	5- 4	3	30	24	32		3- 4
610-09	8	16		16	31	8- 9	4- 3	4	31	25	33		4- 5
9- 8	9	17		17	1	139-40	3- 2	5	32	26	34		5- 6
8- 7	140	18		18	2	140-41	2- 1	6	33	27	35		6- 7
7- 6	1	19		19	3	1- 2	571-70	7	34	28	36		7- 8
6- 5	2	20	1	20	4	2- 3	570-69	8	35	29	37		8- 9
5- 4	3	21	2	21	5	3- 4	9- 8	9	36	30	38		179-80
4- 3	4	1	3		6	4- 5	8- 7	180	37	31	39		180-81
3- 2	5	2	4		7	5- 6	7- 6	1	38	32	40		1- 2
2- 1	6	3	5		8	6- 7	6- 5	2	39	33	41		2- 3
601-00	7	4	6		9	7- 8	5- 4	3	40	34	42		3- 4
600-99	8	5	7		10	8- 9	4- 3	4	41	35	43		4- 5
9- 8	9	6	8		11	149-50	3- 2	5	42	36	44		5- 6
8- 7	150	7	9		1	150-51	2- 1	6	43	37	45		186-87
7- 6	1	8	10		2	1- 2	561-60	7	1				7- 8
6- 5	2	9	11		3	2- 3	560-59	8	2				8- 9
5- 4	3	10	12		4	3- 4	9- 8	9	1				189-90
4- 3	4	11	13		5	4- 5	8- 7	190	2				190-91
593-92	155	12	14		6	155-56	557-56	191	3				191-92

Nabopolassar

Nebuchadnezzar

Nabopolassar

Josiah

Captivity of Jehoiachin

Jehoiakim

Zedekiah

Nebuchadnezzar

Nebuchadnezzar

Zedekiah

As may be seen from the diagram, if Newton made the 187th year of the Nabonasser era the 37th year of Jehoiakim's captivity he would have been obliged to make 151 the first year of his captivity and as this would, according to his own statement, be the ninth year of Nebuchadnezzar's reign it would put the first year of Nebuchadnezzar's reign at 605 instead of 606 B. C. He also makes the statement that the tenth year of Jechoniah's captivity was the eighteenth year of Nebuchadnezzar's reign, and quotes Jer. 32:1 to substantiate his point. But this text does not say that, rather it makes the eighteenth year of Nebuchadnezzar's reign synchronize with the tenth year of Zedekiah's reign. According to Newton's figures the reign of Nebuchadnezzar lasted forty-five years which is two years in excess of that granted by Ptolemy's Canon, and by all of the inscriptional material which archaeology has found.

Newton also, as stated in the first quotation, claims that the Jews counted the reigns of their kings by the years of Moses "beginning every year with the month Nisan: for if any king began his reign a few days before this month began it was reckoned to him for a whole year, and the beginning of this month was accounted the beginning of the second year of his reign." In making this statement Newton is denying the evidence of Neh. 1:1 and 2:1 which shows that the Jews in reckoning the reigns of their kings reckoned according to the civil year which began with Tisri, the seventh month and not with Nisan the first month. Therefore on these various accounts the computations offered by Newton concerning this period of world history will have to be set aside.

In its place the following solution of the problem as based upon the scientific methodology resulting from archaeological discovery is presented as illustrating the place that the modern study of Chronology should have in Bible research. Basic in the working out of such a problem is a knowledge (a) of how the chronological years of a king were named and reckoned, (b) of the point in the year where the new year came, whether spring or fall, and (c) how to interpret the dates thus found in terms of our calendrical system.

Scholars are not united in applying the term "accession year," used in connection with the rulers of ancient kingdoms. It is spoken of as "accession year" on the dated contract tablets found in the ancient Babylonian and Persian mounds, but in Scripture it is usually referred to by the statement, "-------- began to reign in the ----- year of -----." (1 Kings 22:41; 2 Kings 13:10; etc.) Albright refers to this system as antedating.[12]

Upon the proper interpretation of this term "accession year" -- which Newton apparently knew nothing about -- depends the correct reckoning of any chronological period, as otherwise the length of a king's rule may be an entire year out. Over a period covering the reigns of several kings this error would mount up rapidly. The Bible, however, gives eight different synchronisms where certain years of a Jewish ruler are equated with certain years of a corresponding Babylonian ruler. These synchronisms show very clearly how this "accession year" is considered not only by the Jews but also by the Babylonians. By a study of Table I and Chart A (pp.17,18), these eight so-called "Synchronisms" may be seen.

Synchronism No. 1

> "The word that came to Jeremiah concerning all the people of Judah in the fourth year of Jehoiakim the son of Josiah, king of Judah; that was the first year of Nebuchadnezzar king of Babylon; the which Jeremiah the prophet spake unto all the people of Judah, and to all the inhabitants of Jerusalem, saying: From the thirteenth year of Josiah the son of Amon, king of Judah, even unto this day, that is the three and twentieth year, the word of the Lord hath come unto me, a nd I have spoken unto you, rising early and speaking; but ye have not hearkened." Jer. 25:1-3.

The same formula is used for recording the "accession year" of Jehoahaz (2 Kings 23:31), and also that of Jehoiakim (verse 36), as was used in recording that of Josiah (2 Chron. 34:1). "--------- was ----- years old when he began to reign," showing that his age is reckoned to his accession year, and not to his first year. Twenty-three years cover the time from the 13th of Josiah through the accession and three months of Jehoahaz, and the accession of Jehoiakim, up to and

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[12] Albright, W. F., "The Seal of Eliakim," Journal of Biblical Literature, LI (1932), p. 96.

including the latter's 4th year.[13] Only by so doing can one make these 23 years span the period required, for Jewish reckoning at this date in history is always "inclusive reckoning,"[14] taking account of both the opening and closing years in any given period.

Synchronism No. 2

> "The word that came to Jeremiah concerning all the people of Judah in the fourth year of Jehoiakim the son of Josiah, king of Judah; that was the first year of Nebuchadnezzar king of Babylon." Jer. 25:1.

Here the 4th year of Jehoiakim synchronizes with the 1st year of Nebuchadnezzar.

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[13] This year was the date of the battle of Carchemish where Nebuchadnezzar defeated Necho. (Jer. 46:2). Breasted, (History of Egypt, p. 583,) makes the battle of Carchemish 605, but Olmstead, (History of Palestine and Syria, p. 510) puts this campaign correctly in 604. G. Cameron, (History of Early Iran," p. 219,) infers the same date by making Nebuchadnezzar's reign 604-562.

[14] A very clear example of "inclusive reckoning" as practiced by the Jewish writers is found in 2 Kings 18:9, 10: "And it came to pass in the fourth year of King Hezekiah, which was the seventh year of Hoshea, son of Elah, king of Israel, that Shalmaneser king of Assyria came up against Samaria, and besieged it. And at the end of three years they took it: even in the sixth year of Hezekiah, that is the ninth year of Hoshea, king of Israek, Samaria was taken." Compare this thought with 2 Kings 24:1; Jer. 36:9,22; D Dan. 2:1. The idea of counting the entire death year of a king as an integral part of his reign, and beginning the first year of the succeeding king with the beginning of the next calendar year, is an ordinary procedure in Biblical chronological reckoning. Notice how it is followed in the chronology of the patriarchs. Adam was 130 years old when he begat Seth. (According to Gen. 7:6,11, Noah was 600 years old in his 600th year -- not in his 601st year, as is reckoned in modern times.) Therefore Seth was born in Adam's 130th year, and at the beginning of his 131st year Seth was counted as one year old. So the record in Gen. 5:3-5 checks. Adam lived 800 years after he begat Seth and all his years were 930 (800 plus 130). In this way no fractions of years are counted, and yet the chronology is accurately maintained. This method may be checked by figuring the years of Methuselah's life. By any other method he survives the flood year.

Coupling the recognized length of Nabopolassar's reign (21 years)[15] the fact that the eclipse of the moon, taking place in 621, occurred in the fifth year of his reign,[16] gives no alternative but to make the "death year" of Nabopolassar the "accession year" of Nebuchadnezzar as shown in the table (see p.17). Thus the statement in Daniel 1:1 -- "In the third year of the reign of Jehoiakim

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[15] The latest date tablet for Nabopolassar's reign is for 21st year/ 2 mo./ 19 da. Strassmaier, Zeitschrift fur Assyriologie, Vol. IV, 145.) This was also the accession year for Nebuchadnezzar, as well as the 3rd year of Jehoiakim, thus accounting for the statement in Daniel 1:1, and 2 Kings 24:1. Nebuchadnezzar at this time took Daniel and his companions captive and this year was the first year of the 70 years' captivity, as prophesied by Jeremiah the following year. (Jer. 25:1-11). Ptolemy's Canon agrees (Wachsmuth, Curt, "Studion der Alten Geschichte" [1895], pp. 305,306) in giving Nabopolassar 21 years. Cameron, ("History of Early Iran," p. 219) places Nebuchadnezzar's reign as 604-562, forgetting his accession year in 605. He has Nabopolassar's reign as 626-604 (p. 232), but tablets and scholars agree in giving him 21 years. If 626 is his accession year, 625 is his first year, and 605 would be his 21st and the accession year of Nebuchadnezzar.

[16] "In the Fifth year of Nabopolassar, which is Egyptian-127th year of Nebonassar-close to the eleventh hour--27th, 28th of the Egyptian month Athyr, someone noticed the moon at Babylon commence her eclipse. Formed in the greatest phase of this eclipse a quarter of the diameter of the meridinal part of the luminary. Since the eclipse commenced at five hours after midnight, and reached the center about six hours, which made in that case at Babylon, 5 1/2 to 1/3 hours, the sun was exactly in the 27th d. of the ram--it is clear that the time of the middle of the eclipse was for Babylon, 5 1/2 - 1/3 hours equinoxial, and for Alexandria, 5 hours only after midnight. Or the time since the epoch is 126 Egyptian years, 86 days, 17 hours equinoxial." (M. Halma, Translator, Composition Mathematique de Claude Ptolemae, 2 vols., Paris: 1813, Vol. II, 340 f.) This corresponds to April 21, 621 B. C., the year in which the Scroll is found, the 18th of Josiah. (2 Kings 22:3-14; 2 Chron. 34:8-22). Claudius Ptolemy (A.D. 70-151) was a native Egyptian mathematician and astronomer. According to his own personal testimony, he observed the heavens at least from 127 A. D. -- 151 A.D. doing most of his work at Alexandria. He compiled a list of kings, starting with the reign of the Babylonian ruler, Nabonassar, beginning his "era" with the first of the month Thoth of the year 747 B. C., the Egyptian New Year. He used a yearly "yard-stick" of exactly 365 days, thus making the New Year wander back through the months at the rate of one day every four years. This list of kings from Nabonassar down to his own time is known as the "Canon of Ptolemy." In his Almagest, the latest translation of which is in French by M. Halma, entitled, Composition Mathematique de Claude Ptolemae (2 Vols., Paris, 1813-1816), he records eclipses of sun and moon falling in certain years of various reigns, thus securely anchoring his king-lists. Many of these eclipses have been carefully checked with other sources (see Pinches, T. G., Proceedings of the Society of Biblical Archaeology, Vol. II, pp. 193-204), and according to S. R. Driver, "The recently-discovered contemporary monuments have fully established the accuracy of the Canon." (Encyclopedia Britannica, 11th ed, Vol. III, p. 861, note 2.)

king of Judah came Nebuchadnezzar king of Babylon unto Jerusalem, and beseiged it" -- is in perfect harmony with Jeremiah 25:1, Nebuchadnezzar was king -- it was his accession year. The next year was counted his first year. Thus the twenty-three years of Jeremiah reach back to the "death year" of Ashurbaniapal and the "accession year" of Nabopolassar.

Synchronism No. 3

> "Jehoiakim was twenty and five years old when he began to reign; and he reigned eleven years in Jerusalem: and he did that which was evil in the sight of the Lord his God. Against him came up Nebuchadnezzar king of Babylon, and bound him in fetters, to carry him to Babylon. Nebuchadnezzar also carried of the vessels of the house of the Lord to Babylon, and put them in his temple at Babylon. Now the rest of the acts of Jehoiakim, and his abominations which he did, and that which was found in him, behold, they are written in the book of the kings of Israel and Judah: and Jehoiachin his son reigned in his stead. Jehoiachin was eight years old when he began to reign; and he reigned three months and ten days in Jerusalem: and he did that which was evil in the sight of the Lord. And when the year was expired, king Nebuchadnezzar sent, and brought him to Babylon, with the goodly vessels of the house of the Lord, and made Zedekiah his brother king over Judah and Jerusalem." 2 Chron. 36: 5-10.
>
> "At that time the servants of Nebuchadnezzar king of Babylon came up against Jerusalem, and the city was besieged. And Nebuchadnezzar king of Babylon came against the city, and his servants did besiege it. And Jehoiachin the king of Judah went out to the king of Babylon, he, and his mother, and his servants, and his princes, and his officers: and the king of Babylon took him in the eighth year of his reign." 2 Kings 24: 10-12.

Jehoiakim reigned 11 years (2 Kings 23:36); Jehoiachin reigned three months and then was taken prisoner to Babylon in the same year, which also became the accession year of Zedekiah, as well as the first year of Jehoiachin's captivity. Inasmuch as the king is not dead, he is counted as ruler, and Zedekiah is thought of as a regent ruling for him. Therefore the period of his captivity is an important one.[17] The discovery of stamped jar handles in Palestine with Jehoiachin's name on them, verifies this hypothesis. "See Albright, op. cit. pp. 77-84,102,103). Thus the 11th year of Jehoiakim's reign, the accession year of Zedekiah, and the first year of Jehoiachin's captivity are equated with the 8th year of Nebuchadnezzar. The Babylonians had been before Jerusalem for nearly a year. (Jer. 39:1; 2 Kings 25:1.)

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[17] The fifth year of Jehoiachin's captivity is the year of Ezekiel's call. Eze. 1:1. It is also the first year of the reign of Psamtik II. (Olmstead, History of Palestine and Syria, p. 523; Breasted, History of Egypt, p. 601.)

Synchronism No. 4

"The word that came to Jeremiah from the Lord in the tenth year of Zedekiah king of Judah, which was the eighteenth year of Nebuchadnezzar." Jer. 32:1.

That the accession year of Zedekiah was properly equated with the eighth year of Nebuchadnezzar is shown by the above synchronism. This would be the only way the 10th year of Zedekiah could synchronize with the 18th year of Nebuchadnezzar.[18]

Synchronism No. 5

"And it came to pass in the twelfth year of our captivity, in the tenth month, in the fifth day of the month, that one that had escaped out of Jerusalem came unto me, saying, The city is smitten." Eze. 33:21.

Here the 12th year of Jehoiachin's captivity is synchronized with the first year of the "smiting of the city." Ezekiel received word on the fifth day of the tenth month, and the Temple was burned the tenth day of the fifth day of the fifth month; so it took practically five months for the news to reach him.

Synchronism No. 6

"And in the eleventh year of Zedekiah, in the fourth month, the ninth day of the month, the city was broken up." Jer. 39:2.

"Now in the fifth month, in the tenth day of the month, which was the nineteenth year of Nebuchadnezzar, king of Babylon, came Nebuzaradan, the captain of the guard, which served the king of Babylon, into Jerusalem." Jer. 52:12.

"And in the fifth month, on the seventh day of the month, (which is the nineteenth year of king Nebuchadnezzar, king of Babylon,) came Nebuzaradan, the captain of the guard, a servant of the king of Babylon, into Jerusalem." 2 Kings 25:8.

Here the eleventh year of Zedekiah is synchronized with the nineteenth year of Nebuchadnezzar. This is the date of the third and final campaign against Jerusalem.

Synchronism No. 7

"In the five and twentieth year of our captivity, in the beginning of the year, in the tenth day of the month, in the fourteenth year after that the city was smitten, in the selfsame day, the hand of the Lord was upon me, and brought me thither." Eze. 40:1.

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[18] It was in the year 588 -- the 17th year of Nebuchadnezzar and the 9th year of Zedekiah that Hophra (Aprios), began his reign in Egypt. (Olmstead, History of Palestine and Syria, p. 525; Breasted, History of Egypt, p. 601.)

The twenty-fifth year of Jehoichin's captivity is synchronized with the fourteenth year of the smiting of the city.

Synchronism No. 8

> "And it came to pass in the seven and thirtieth year of the captivity of Jehoiachin king of Judah, in the twelfth month, in the five and twentieth day of the month, and Evil-merodach king of Babylon, in the first year of his reign, lifted up the head of Jehoiachin king of Judah, and brought him forth out of prison." Jer. 52:31

The thirty-seventh year of the captivity of Jehoiachin is synchronized with the first year of Evil-merodach (Amel Marduk). This harmonizes Nebuchadnezzar's reign with the 43 years given by Ptolemy, and as shown in the Table (Exhibit B)[19]

By a comparison of these eight synchronisms with the details of the Table I (pp.17,18), and with Chart A (p.19), it will be noted that they cover the entire period of Nabopolassar's and Nebuchadnezzar's reigns, extending from the accession year of Nabopolassar through the accession years of both Nebuchadnezzar and Amel Marduk (Evil-merodach), giving three instances of the use of the "accession year" idea.

If one will take the pains to follow these various synchronisms through point by point, he will find that the transition made between the sacred and secular chronology is so firmly anchored that it is impossible to move a peg one way or the other. This is all the more remarkable as it is the first and only place in Biblical history when this is done. From a careful study therefore, of

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19 The latest dated tablet for Nebuchadnezzar's reign is 43 yr./ 5 mo./ 9 da. Ungnad, Vorderasiatische Schriftdenkmaler, Heft III, 36 . Ptolemy's Canon agrees. (Curt Wachsmuth, Studien der Alten Geschichte p. 305). The latest Tablet for Amel Marduk is dated 2 yr./ 5 mo./ 17 da. (Clay, Babylonian Expedition, Vol. VIII, p. 34.) This year is also the accession year for Nergal Sharusur. The earliest tablet found for him is dated Acc. yr./ 3 mo./ 20 da. (Ungnad, Vorderasiatische Schriftdenkaler, Heft IV, 32). Ahmose began his reign in 569. (Olmstead, History of Palestine and Syria, p. 536; Breasted, History of Egypt, p. 601). The latest tablet for Nergal Sharusur is dated 4 yr./ 1 mo./ 2 da. (Evetts, Nergal Sharusur, p. 69). The earliest tablet found for Nabunaid is dated Acc. yr./ 2 mo./ 15 da. (Clay, Babylonian Expedition, Vol VIII, p. 39). Much archaeological evidence has been found indicating that Belshazzar is a historical character, the son of Nabunaid (Nabonidus), and co-regent with him on the throne of Babylon. (Dougherty, R. P., Nabonidus and Belshazzar, pp. 137, 192).

these data, the following important method of chronological reckoning is demonstrated; namely, For purposes of chronology, the entire last calendar year of a king's reign is given to that monarch, and is also called the "accession year" of the following ruler, the next year being called the first year of the new king.

These synchronisms may be verified without use of any definite anchor in the way of harmonizing the dates of these ancient kingdoms with our modern calendrical system. They are merely synchronisms between Biblical and profane history and as such would be true regardless of where the whole block of years was placed in the space of time. However, in order to interpret any of these dates in terms of modern reckoning, we must first link at least one of the systems up with astronomical phenomena and give careful attention to the season of the year in which the new year date of each system of reckoning fell.

In Ptolemy's Almagest we are told that "In the 5th year of Nabopolassar, which is Egyptian-127th year of Nabonasser -- close to the eleventh hour -- 27, 28th day of the Egyptian month Athyr some one noticed the moon at Babylon commence her eclipse. . . . the time since the epoch is 126 Egyptian years, 86 days, 17 hours equinoxial."[20] This has been figured in terms of the Julian Calendar April 21, 621 B. C. Inasmuch as Ptolemy used a 365 day yardstick for his Egyptian year neglecting the fourth of a day extra in the true tropical year, his first of Thoth or new year would drop back in terms of the Julian Calendar one day every four years. He began his Canon at noon, February 26, 747 B. C. and all of his measurements are referred back to that as a starting point. By means of his Canon therefore and the eclipses of 621 we can very definitely say that the reign of Nabopllasser began in 625, and that the reign of Nebuchadnezzar began in 604. That is, the first year of Nabopolassar's reign was from January 27, 625 to January 26, 624, and the first year of Nebuchandnezzar's reign was from January 21, 604 to January 20, 603, Julian time.

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[20] See Note 16, p. 8.

That the Jews reckoned their civil year as beginning with the seventh month Tisri is recognized by most of the scholars today. Only on this basis can one explain the reference in Nehemiah, chapters 1 and 2 and in Ezra 7:8. Josephus also agrees with this when he says "Moses appointed that Nisan which is the same as Xanthicus should be the first month for their festivals because he brought them out of Egypt in that month so that this month began the year as to all the solemnities they observed to the honour of God, although he preserved the original order of the months as to selling and buying and other ordinary affairs."[21]

In harmony with this Schurer says "Among these things the nature of the times and general practice are to be looked into; and first, the perfidy of the Jews, who ever stood boldly against God and Moses, who, when from God through Moses, they accepted the month of March as the beginning of the year, exercising an act of perverseness or pride, name the month of September as the new year itself, even in which month they appoint for themselves magistrates, whom they call Archons."[22]

Ugolino Blasio writing a few years later than Newton, who is sure that the Jewish year began in the spring says, "The beginning of the Jewish year is from the autumnal equinox, which is constant for the first year of the lunar cycle of the Ptolemaic abacus."[23]

John Jackson, Rector of Rossington, writing about the same time as Newton says "It is particularly to be noted, that when Moses speaks of the commencement of the civil year, which was at the autumnal equinox in the month Tisri, he never calls it the first month of the year but always the seventh."[24] He also adds

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21 Josephus, Antiquities, I-3-3.

22 Emil Schurer, History of the Jewish People, 2nd Divi., Vol. II, p. 250, quoting Chrysostom, Tr. G. Amadon

23 Ugolino Blasio, Thesaurus Antiquitatum Sacrarum, Cols. XXI, XXII, Venice, 1755. Translation, Grace Amadon

24 John Jackson, Chronological Antiquities, London, 1752, Vol. I, P. 28

"This account of the old and new year of the Hebrews is evident from Scriptures. In Exodus 23:16 the seventh month in which was celebrated the feast of the Ingathering of all the fruits of the land; and in which they dwelt in tabernacles seven days counting from the 15th day inclusive, is said to be in the end of the year: and so in Deut. 31:10 the same feast is said Ex. 34:22 to be at the revolution of the year; that is, the cardinal point, when the old year began at the autumnal equinox; and which was the seventh month from the vernal equinox, which was the epoch of the new ecclesiastical year."[25]

Some scholars have quoted such references as I Kings 20:22; II Sam. 11:1; I Kings 20:26; II Chron. 36:10, where it speaks of "At the time of the year when kings go forth to battle" as indicating that the year expired in the spring for that was the time of the various campaigns. But Beecher interprets the Hebrew word used here by saying, "The contexts show that the conception intended is that of the middle of the year the goal from which the year turns back, retraces its steps to the point where it began; from which it 'comes around' to its starting point; where it completes its 'going out' and begins its 'coming in.'"[26]

In the reckoning of the regnal year the Egyptians did not use any "accession year" as did the Jews, Babylonians, and Persians. In the Canon of Ptolemy the entire death year of the king is counted as the first year of the succeeding monarch. Thus the "accession year" of Nebuchadnezzar from the standpoint of the Jewish reckoning would synchronize with the last year of the old king, it being always remembered that the civil Jewish year began in the fall about nine months later than the correspondingly numbered Egyptian year. This would make it possible for Nebuchadnezzar as king of Babylon to besiege Jerusalem and take Daniel captive in the third year of Jehoiakim, and at the same time call his first year equivalent with the fourth year of Jehoiakim.

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[25] John Jackson, Chronological Antiquities, London, 1752, Vol. 1, p. 16
[26] Willis J. Beecher, Dated Events in the Old Testament, p. 12

It is only in the past century that we have been able to get any archaeological facts that would give us objective evidence regarding many moot questions. And it is only within the last quarter of a century that inscriptional evidence has piled up and been deciphered to the extent that will enable us to interpret clearly many of the statements found in the Scriptures. That Newton, for example, did a wonderful piece of work considering the material he had to work with goes without saying, and the fact that Providence over-ruled in letting him make the seventh of Artaxerxes 457 does not mean that we should today follow in the various mistakes that he unwittingly made. The deeper we go into the study of chronology the more sure we become of the absolute accuracy of the major dates connected with the 2300 day prophecy. This will be shown in another paper, at least so far as the 457 date is concerned. But a close study of the records both Biblical and profane makes it impossible for Newton's date of 606 for the destruction of Jerusalem, and the captivity of Daniel and his companions, longer to be maintained.

A thoughtful, careful, study of chronology will thus be seen to be of invaluable assistance to us in the proper exegesis of the Word. Another illustration of the ramifications of this problem may be seen by a glance at the various schools of thought regarding the date of the Exodus. By far the greater majority--perhaps one could go so far as to say almost without exception, all -- of the scholars think of the period of Israel's residency in Egypt to be 400-430 years, whereas we can demonstrate from Scriptural authority that it could not be more than 215 years. Before accepting for example, such a theory as that advocated by Petrie, placing the Exodus about 1220, one must ask oneself if the corresponding dates necessitated by Biblical chronology can be accepted. An acceptation of his date would means the following:

Exodus	1220 B.C.
Residency in Egypt	215
Jacob's entrance	1435 B.C.
Abram's Call to entrance	215
Abram left Haran	1650 B.C.
Flood to Abram	427
Date of Flood	2077 B.C.

Petrie sidesteps such a conclusion by thinking of the residency as 430 years which of course cannot be accepted by students believing in the accuracy of Biblical chronology.

Garstang, on the otherhand, in advocating 1447 as the proper date makes use of the following table[27] so widely at variance with Petrie and his fellow thinkers.

Solomon's Temple	967 B.C.
Judges Period	480
Exodus	1447 B.C.
Egyptian Residency	430
Entry into Egypt	1877 B.C.
Patriarchal Period	215
Abraham's Departure from Haran	2092 B.C.

But again Bible students cannot accept his conclusions, for the period of Egyptian residency could not possibly be 430 years. Unless we take into consideration the chronology of the entire sweep of Old Testament history, we are liable to become enamored of the plausible detail offered by some scholar only to find ourselves in a chronological cul de sac. It means deep digging and constant checking, but we should certainly prepare ourselves for that microscopic examination of the cardinal points of our faith that the world is so soon to make. The acid test is certainly coming and may it not find us weighed in the balance and found wanting.

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[27] J. Garstang, The Heritage of Solomon, London: Williams and Norgate (1934), p. 151, Note 1.

TABLE I
REGNAL SYNCHRONISMS
According to
JULIAN, PTOLEMAIC AND JEWISH RECKONINGS

1	2	3	4	5	6	7	8	9	10	11	12	13
B.C. Dates (Julian Calendar) of Years of Nabonassar Era	Years of Nabonassar Era	Regnal Years of Kings According to Ptolemaic Canon	Regnal Years of Judah According to Jewish Years (fall-fall)	Regnal Years Babylonian Kings according to Jewish Yrs. (fall-fall)	Jewish Year (fall-fall) According to Years of Nabonassar Era	70 Years Captivity	Jehoiachin's Captivity	Year of Smiting of City	70 Years Indignation	Years of Prophet	Chronology of Egyptian Kings According to Breasted	
627-26	121	21	12	21	121-22					37		
626-25	2	22	13	22	2- 3					38		
5- 4	3	1	14	1	3- 4				1	39		
4- 3	4	2	15	2	4- 5				2	40		
3- 2	5	3	16	3	5- 6				3	41		
2- 1	6	4	17	4	6- 7				4	42		
621-20	7	5	18	5	7- 8				5	43		
620-19	8	6	19	6	8- 9				6	44		
9- 8	9	7	20	7	129-30				7	45		
8- 7	130	8	21	8	130-31				8	46		
7- 6	1	9	22	9	1- 2				9	47		
6- 5	2	10	23	10	2- 3				10	48		
5- 4	3	11	24	11	3- 4				11	49		
4- 3	4	12	25	12	4- 5				12	50		
3- 2	5	13	26	13	5- 6				13	51		
2- 1	6	14	27	14	6- 7				14	52		S^1-Jer.
611-10	7	15	28	15	7- 8				15	53		25:3
610-09	8	16	29	16	8- 9				16	54		
9- 8	9	17	30	17	139-40				17	1		
8- 7	140	18	31	18	140-41				18	2		
7- 6	1	19	1	19	1- 2				19	3		
6- 5	2	20	2	20	2- 3				20	4		
5- 4	3	21	3	21	3- 4	1			21	5		
4- 3	4	1	4	1	4- 5	2			22	6		S^2-Jer.
3- 2	5	2	5	2	5- 6	3			23	7		25:1
2- 1	6	3	6	3	6- 7	4			24	8		
601-00	7	4	7	4	7- 8	5			25	9		
600-99	8	5	8	5	8- 9	6			26	10		
9- 8	9	6	9	6	149-50	7			27	11		
8- 7	150	7	10	7	150-51	8			28	12		
7- 6	1	8	11	8	1- 2	9	1		29	13		S^3-2 Kg. 24:10-12
6- 5	2	9	1	9	2- 3	10	2		30	14		
5- 4	3	10	2	10	3- 4	11	3		31	15		
4- 3	4	11	3	11	4- 5	12	4		32	16		
3- 2	5	12	4	12	5- 6	13	5		1	1		
2- 1	6	13	5	13	6- 7	14	6		2	2		
591-90	7	14	6	14	7- 8	15	7		3	3		
590-89	8	15	7	15	8- 9	16	8		4	4		
9- 8	9	16	8	16	159-60	17	9		5	5		

Nebuchadnezzar — Jehoiachin — Zedekiah — Jehoiakim — Nebuchadnezzar — Jehoahaz — Jehoiakim — Nebuchadnezzar — Jehoiachin — Zedekiah — Nebuchadnezzar — Josiah — Ashur-bani-apal — Nabopolassar — Ashur-bani-apal — Nabopolassar — Psamtik I — Necho — Psamtik II — Ezekiel — Jeremiah

(Jer. 25:11,12)

(2 Chronicles 36:9,10)

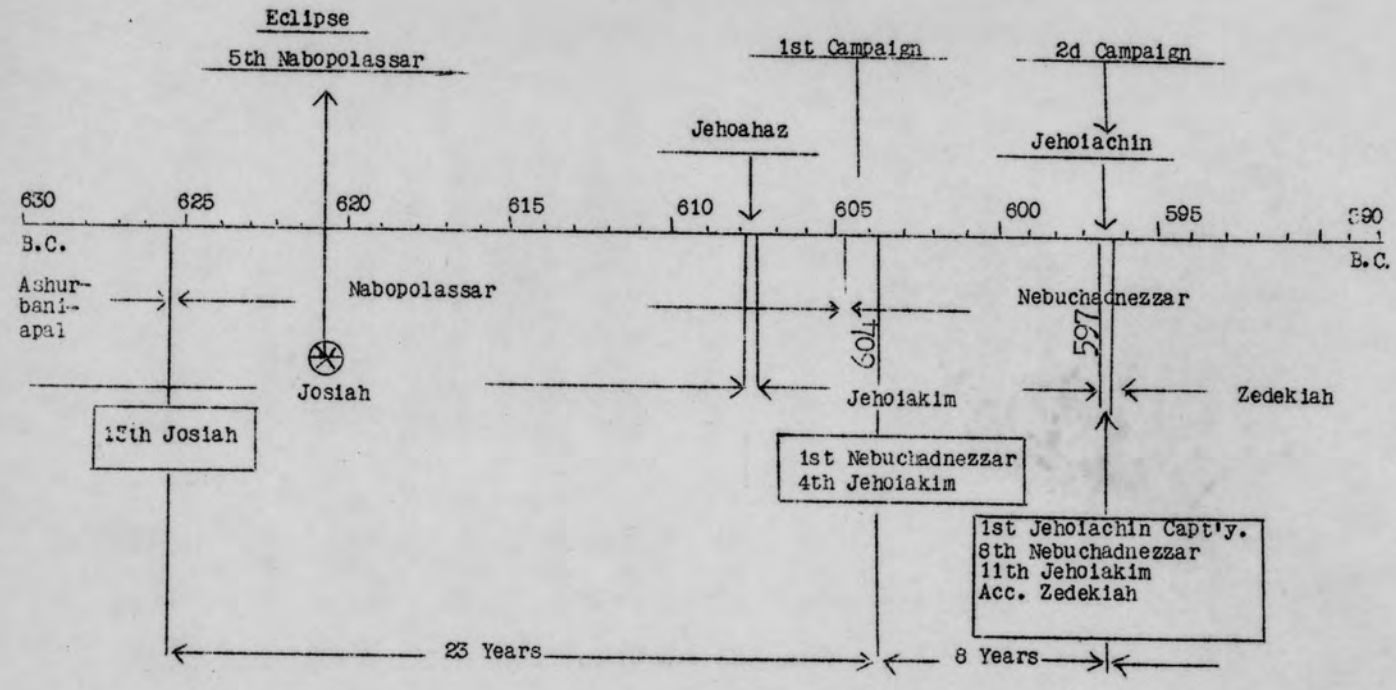
(Ezek. 33:21; Check by Ezek. 40:1)

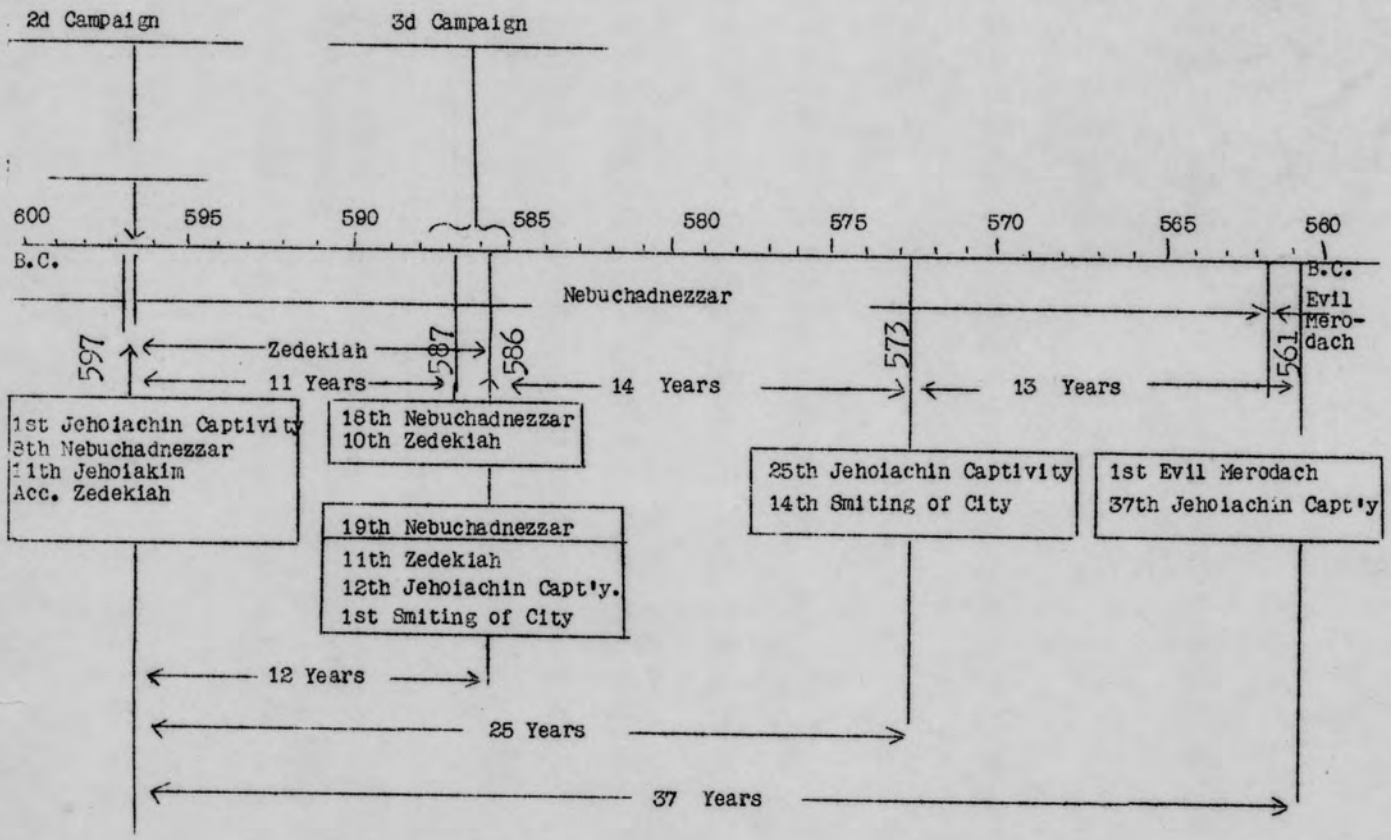
(Ezek. 24:1-2?; Zech. 1:7-12)

TABLE I (Continued)
REGNAL SYNCHRONISMS
According to
JULIAN, PTOLEMAIC AND JEWISH RECKONINGS

1	2	3	4	5	6	7	8	9	10	11	12	13
B.C. Dates (Julian Calendar) of Years of Nabonassar Era	Years of Nabonassar Era	Regnal Years of Kings According to Ptolemaic Canon	Regnal Years of Judah According to Jewish Years (fall-fall)	Regnal Years Babylonian Kings according to Jewish Years (fall-fall)	Jewish Year (fall-fall) According to Years of Nabonassar Era	70 Years Captivity	Jehoiachin's Captivity	Year of Smiting of City	70 Years Indignation	Years of Prophet	Chronology of Egyptian Kings according to Breasted	
588-87	160	17	9	S4 17	160-61	18	10		2	6	1	
7- 6	1	18	10 ↔	18	1- 2	19	11	S5	3	7	2	S4-Jer.32:1
6- 5	2	19	11 ↔	19	2- 3	20	12 ↔	1	4	8	3	S5-Ezek. 33:21
5- 4	3	20		S6 20	3- 4	21	13	2	5	9	Hophra (Apries) 4	S6-Jer.39: 2; 52:12
4- 3	4	21		21	4- 5	22	14	3	6	10	5	
3- 2	5	22		22	5- 6	23	15	4	7	11	6	
2- 1	6	23		23	6- 7	24	16	5	8	12	7	
581-80	7	24		24	7- 8	25	17	6	9	13	8	
580-79	8	25		25	8- 9	26	18	7	10	14	9	
9- 8	9	26		26	169-70	27	19	8	11	15	10	
8- 7	170	27		27	170-71	28	20	9	12	16	11	
7- 6	1	28		28	1- 2	29	21	10	13	17	Hophra (Apries) 12	
6- 5	2	29		29	2- 3	30	22	11	14	18	13	
5- 4	3	30		30	3- 4	31	23	12	15	19	14	
4- 3	4	31		31	4- 5	32	24	13	16	Ezekiel 20	15	
3- 2	5	Nebuchadnezzar 32		Nebuchadnezzar 32	5- 6	33	25 ↔	14	17	21	16	
2- 1	6	33		33	6- 7	34	26	S7	18	22	17	S7-Ezek.40:1
571-70	7	34		34	7- 8	35	27		19	23	18	
570-69	8	35		35	8- 9	36	28		20	24	19	
9- 8	9	36		36	179-80	37	29		21	25	1	
8- 7	180	37		37	180-81	38	30		22		2	
7- 6	1	38		38	1- 2	39	31		23		3	
6- 5	2	39		39	2- 3	40	32		24		4	
5- 4	3	40		40	3- 4	41	33		25		5	
4- 3	4	41		41	4- 5	42	34		26		6	
3- 2	5	42		42	5- 6	43	35		27		7	
2- 1	6	43		43 A	6- 7	44	36		28		8	
561-60	7	Amel Marduk 1		Amel Marduk 1 ↔	7- 8	45	37		29		Ahmose II 9	
560-59	8	2		2 A	8- 9	46		S8	30		10	S8-Jer.52:31
9- 8	9	Nergal Sarusur 1		Nergal Sarusur 1	189-90	47			31		11	
8- 7	190	2		2	190-91	48			32		12	
7- 6	1	3		3	1- 2	49			33		13	
6- 5	2	4		4 A	2- 3	50			34		14	
5- 4	3	Nabonidus 1		Nabonidus 1	3- 4	51			35		15	
554-53	194	2		2	194- 95	52			36		16	

CHART A



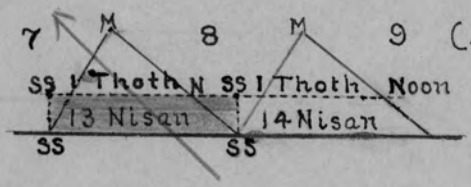


– Grace Amadon

Rule of Correspondence

The assertions in the Aramaic papyri that had prompted an Aramaean to say that in a certain regnal year, "18 Elul equaled 28 Pachons" (Papyrus "A"), must have been based upon some rule of correspondence between the Jewish and Egyptian calendars. The papyri do not state the form of this rule, but they suggest what it was. They are the best evidence in hand that point out this calendar relation in the fifth century B.C. The following diagrams illustrate three possible forms of this rule of correspondence:

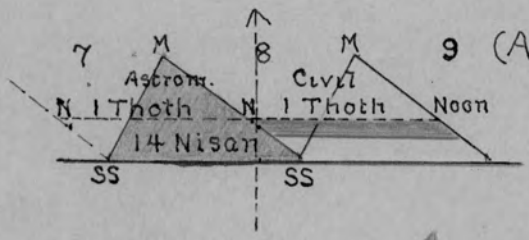
I



= 1 Thoth (April 7) = 13 Nisan (April 7)

Passover on day of full moon

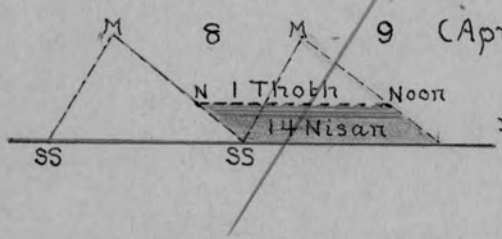
II



= 1 Thoth (April 8, civil = 14 Nisan (Apr. 8, civ.)

Civil day in progress "one moment after noon" – Draper

III



= 1 Thoth (April 8, astro.) = 14 Nisan (Apr. 9, civ.)

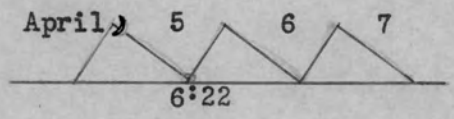
Rule of correspondence followed in problem here presented

No II and III are the same

Full Moon Date for 523 B.C. --

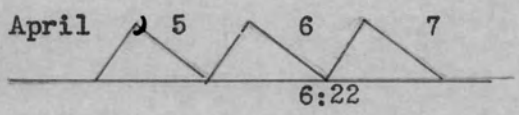
19-year cycle for century leading up to 523 B.C. shows that full-moon date lies between Apr 19 and 20, and that hence 1 Nisan was either Apr 6 or 7. April new moon for 523 was Apr 4.42 (G.M.T.) and Apr 5.01 (J.C.T.). The following is the translation:

Apr 6 for 1 Nisan



Tr. Per. = $18^h\ 21^m$ (too short)

Apr 7 for 1 Nisan



Tr. Per. = $1^d\ 18^h\ 21^m$
O.K. for "horned moon" in sign of long setting like April (Hevelius, "Selenographia," p. 281.

The foregoing translation shows plainly that 1 Nisan in 523 B.C. was on April 7. It could not have been Apr 6, for the second, or horned moon never appears within so short a time after conjunction; and it could not have been April 8, for the 19-year cycle, over so short a period would not jump ahead that fast. In backward trend, the moons increase a day about every 300 years, Julian time.

Not having Guinness, the foregoing shows how I first arrived at "Apr. 7"
G. Amadon

THE JEWISH CALENDAR IN THE FIFTH CENTURY B. C.

— Grace Amadon

Introductory Note:

The papyri documents under consideration came from a Jewish colony established at Elephantine near the Nubian frontier under the protection of a Persian garrison. As early as 1878, it was recognized that the Aramaic papyri coming from Egypt pertained to the Persian administration in the age of Ezra and Nehemiah. Some of these papyri were found rolled up, tied and sealed. For nearly 2500 years, these seals had remained unbroken. Of additional interest is the fact that these texts were written by Jews, and, outside of the Bible, are among the earliest Jewish writings. In the words of the translator Mr. Cowley, "they present therefore a trustworthy picture of their surroundings, not distorted by lapse of time, nor obscured by textual corruption." ("Aramaic Papyri in the Fifth Century B. C.," Preface, p. xiv). Oxford, 1923.)

The confusion between modern Jewish computation and early Jewish reckoning, led the Greek author, M. L. Belleli, to doubt the authenticity of the Elephantine papyri, concerning which M. M. Sayce and A. E. Cowley made their report in 1900. After examining the double Semitic dates in these valuable documents, and finding them not in agreement with the modern Jewish calendar, Mr. Belleli summarily concluded that they were not authentic, completely overlooking the fact that in the 5th century B. C., modern Jewish computation had not yet been devised. The unsoundness of this opinion and conclusion has been ably refuted by various authors; furthermore, the futility of applying the principles of modern Jewish calendation to the Aramaic dates has been shown by Dr. Fotheringham in his criticism of E. B. Knobel's date argument ("Monthly Notices of the Royal Astronomical Society," Vol. LXIX, p. 12, ff. London, 1909).

Many attempts have been made by chronologers to reconstruct synthetically, an ancient method of Jewish calendation. The fact that modern Rabbinical computation does not agree with early Jewish dates is generally recog-

nized; but, even though this is often stressed, yet, the simple Mosaic principles that governed early Jewish time are almost completely overlooked. An important feature of the ancient history written in the various papyri, about which there is no doubt, relates to an order from the Persian king, Darius II, to keep the passover.

The command concerning the Passover was given in few words: "In the month of Tybi (?) let there be a Passover for the Jewish garrison" ("Aramaic Papyri in the Fifth Century B. C.," p. 60). The date is the 5th year of Darius. Although the papyrus is imperfect, and somewhat broken, yet enough remains to show that it gives instructions to keep the festival of unleavened bread. The edict continues: "Now you accordingly count fourteen days of the month Nisan, and keep the Passover, and from the 15th day to the 21st day of Nisan (are) seven days of Unleavened bread. Be clean and take heed. Do no work on the 15th day, and on the 21st day. Also drink no beer, and anything at all in which there is leaven do not eat, from the 15th day from sunset till the 21st day of Nisan, seven days, let it not be seen among you; do not bring (it) into your dwellings, but seal (it) up during these days. Let this be done as Darius the king commanded. (Address) To my brethren Yedoniah and his colleagues the Jewish garrison, your brother Hananiah" ("Idem," p. 63). Cowley's comment on this passover edict (Papyrus "No. 6" of Ungnad, and "Plate 6" of Sachau) is that it "removes all reason for doubting the genuineness of the Persian letters [by Artaxerxes] in Ezra" ("Idem," p. 62).

The papyri themselves, therefore, show that the members of the Jewish garrison in Elephantine and Assuan were fully acquainted with the Mosaic passover regulations that commanded this feast to be kept at sunset (Deut. 16:6) on the 14th of Nisan (Ex. 12:6). Consequently, it is fully in harmony with the circumstances forming the background of the Aramaic dates to offer a method of interpretation that is based on passover observance. The calendric outline (page 21) pertaining to the Aramaic or Jewish dates, has already been applied to the crucifixion date problem. In this calendar problem, it

is employed in a specific form as representative of Mosaic calendation.

The Egyptian calendar made use of in this solution is the same as has been standardized for Egyptian time, with the exception, that in harmony with Ptolemy's reckoning of intervals and eclipses, Oppolzer's "Canon," and the testimony of Censorinus, the Era of Nabonassar is made to begin on February 27 instead of February 26.

OUTLINE OF DISCUSSION

EGYPTIAN NEW YEAR (1 THOTH) TABLE AND ITS JULIAN EQUIVALENT DATE
(NOON TO NOON, ASTRONOMICAL TIME -- FROM 1356 B.C. TO 238 A.D.)*

B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth
824 17	748-Feb 26	672	596	520	444	368
823 17	747 Nabonassar	671	595	519	443	367
822 17	746 Era	670	594	518	442	366
821-Mar 16	745-Feb 26	669-Feb 7	593-Jan 19	517-Dec 31	441-Dec 12	365-Nov 23
820 16	744 Feb 25	668	592	516	440 Papyrus "F"	364
819 16	743 "	667	591	515	439 Papyrus "G"	363
818 16	742 "	666	590	514	438	362
817-Mar 15	741-Feb 25	665-Feb 6	589-Jan 18	513-Dec 30	437-Dec 11	361-Nov 22
816 15	740 " 24	664	588	512	436	360
815 15	739 "	663	587	511	435	359
814 15	738 "	662	586	510	434	358
813-Mar 14	737-Feb 24	661-Feb 5	585-Jan 17	509-Dec 29	433-Dec 10	357-Nov 21
812 14	736 " 23	660	584	508	432	356
811 14	735 "	659	583	507	431	355
810 14	734 "	658	582	506	430	354
809-Mar 13	733-Feb 23	657-Feb 4	581-Jan 16	505-Dec 28	429-Dec 9	353-Nov 20
808 13	732	656	580	504	428	352
807 13	731	655	579	503	427	351
806 13	730	654	578	502	426	350
805-Mar 12	729-Feb 22	653-Feb 3	577-Jan 15	501-Dec 27	425-Dec 8	349-Nov 19
804 12	728	652	576	500	424	348
803 12	727	651	575	499	423	347
802 12	726	650	574	498	422	346
801-Mar 11	725-Feb 21	649-Feb 2	573-Jan 14	497-Dec 26	421-Dec 7	345-Nov 18
800 11	724	648	572	496	420 Papyrus "H"	344
799 11	723	647	571	495	419	343
798 11	722	646	570	494	418	342
797-Mar 10	721-Feb 20	645-Feb 1	569-Jan 13	493-Dec 25	417-Dec 6	341-Nov 17
796 10	720	644	568	492	416 Papyrus "J"	340
795 10	719	643	567	491	415	339
794 10	718	642	566	490	414	338
793-Mar 9	717-Feb 19	641-Jan 31	565-Jan 12	489-Dec 24	413-Dec 5	337-Nov 16
792 9	716	640	564	488	412	336
791 9	715	639	563	487	411	335
790 9	714	638	562	486	410 Papyrus "K"	334
789-Mar 8	713-Feb 18	637-Jan 30	561-Jan 11	485-Dec 23	409-Dec 4	333-Nov 15
788 8	712	636	560	484	408	332
787 8	711	635	559	483	407	331
786 8	710	634	558	482	406	330
785-Mar 7	709-Feb 17	633-Jan 29	557-Jan 10	481-Dec 22	405-Dec 3	329-Nov 14
784 7	708	632	556	480	404	328
783 7	707	631	555	479	403	327
782 7	706	630	554	478	402	326
781-Mar 6	705-Feb 16	629-Jan 28	553-Jan 9	477-Dec 21	401-Dec 2	325-Nov 13
780 6	704	628	552	476	400	324
779 6	703	627	551	475	399	323
778 6	702	626	550	474	398	322
777-Mar 5	701-Feb 15	625-Jan 27	549-Jan 8	473-Dec 20	397-Dec 1	321-Nov 12
776 5	700	624	548	472	396	320
775 5	699	623	547	471 Papyrus "A"	395	319
774 5	698	622	546	470	394	318
773-Mar 4	697-Feb 14	621-Jan 26	545-Jan 7	469-Dec 19	393-Nov 30	317-Nov 11
772 4	696	620	544	468	392	316
771 4	695	619	543	467	391	315
770 4	694	618	542	466	390	314
769-Mar 3	693-Feb 13	617-Jan 25	541-Jan 6	465-Dec 18	389-Nov 29	313-Nov 10
768 3	692	616	540	464 Papyrus "B"	388	312
767 3	691	615	539	463	387	311
766 3	690	614	538	462	386	310
765-Mar 2	689-Feb 12	613-Jan 24	537-Jan 5	461-Dec 17	385-Nov 28	309-Nov 9
764 2	688	612	536	460 Papyrus "D"	384	308
763 2	687	611	535	459	383	307
762 2	686	610	534	458	382	306
761-Mar 1	685-Feb 11	609-Jan 23	533-Jan 4	457-Dec 16	381-Nov 27	305-Nov 8
760 "	684	608	532	456	380	304
759 "	683	607	531	455	379	303
758 Mar 1	682	606	530	454	378	302
757-Feb 29	681-Feb 10	605-Jan 22	529-Jan 3	453-Dec 15	377-Nov 26	301-Nov 7
756 Feb 28	680	604	528	452	376	300
755 "	679	603	527	451 Papyrus	375	299
754 "	678	602	526	450 Ungnad "30"	374	298
753-Feb 28	677-Feb 9	601-Jan 21	525-Jan 2	449-Dec 14	373-Nov 25	297-Nov 6
752 Feb 27	676	600	524	448	372	296
751 "	675	599	523 Cambyse	447 Papyrus "E"	371	295
750 "	674	598	522 Tablet	446	370	294
749-Feb 27	673-Feb 8	597-Jan 20	521-Jan 1	445-Dec 13	369-Nov 24	293-Nov 5

* This period covers the Sothic Cycle from 1322 B.C. to 139 A.D. Date of 1 Thoth is placed opposite the Julian leap year, at which time it occurs a day earlier, and continues for four years. For example, February 27 is Egyptian new year day for years 749 to 746 B.C.

EGYPTIAN NEW YEAR (1 THOTH) TABLE AND ITS JULIAN EQUIVALENT DATE (NOON TO NOON, ASTRONOMICAL TIME -- FROM 1356 B.C. TO 238 A.D.)*

B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	A.D. 1 Thoth	A.D. 1 Thoth	A.D. 1 Thoth
292	216	140	64	13	89	165
291	215	139	63	14	90	166
290	214	138	62	15	91	167
289-Nov 4	213-Oct 16	137-Sep 27	61-Sep 8	16-Aug 20	92-Aug 1	168-Jul 13
288	212	136	60	17	93	169
287	211	135	59	18	94	170
286	210	134	58	19	95	171
285-Nov 3	209-Oct 15	133-Sep 26	57-Sep 7	20-Aug 19	96-Jul 31	172-Jul 12
284	208	132	56	21	97	173
283	207	131	55	22	98	174
282	206	130	54	23	99	175
281-Nov 2	205-Oct 14	129-Sep 25	53-Sep 6	24-Aug 18	100-Jul 30	176-Jul 11
280	204	128	52	25	101	177
279	203	127	51	26	102	178
278	202	126	50	27	103	179
277-Nov 1	201-Oct 13	125-Sep 24	49-Sep 5	28-Aug 17	104-Jul 29	180-Jul 10
276	200	124	48	29	105	181
275	199 Rosetta	123	47	30	106	182
274	198 Stone	122	46	31	107	183
273-Oct 31	197-Oct 12	121-Sep 23	45-Sep 4	32-Aug 16	108-Jul 28	184-Jul 9
272	196	120	44	33	109	185
271	195	119	43	34	110	186
270	194	118	42	35	111	187
269-Oct 30	193-Oct 11	117-Sep 22	41-Sep 3	36-Aug 15	112-Jul 27	188-Jul 8
268	192	116	40	37	113	189
267	191	115	39	38	114	190
266	190	114	38	39	115	191
265-Oct 29	189-Oct 10	113-Sep 21	37-Sep 2	40-Aug 14	116-Jul 26	192-Jul 7
264	188	112	36	41	117	193
263	187	111	35	42	118	194
262	186	110	34	43	119	195
261-Oct 28	185-Oct 9	109-Sep 20	33-Sep 1	44-Aug 13	120-Jul 25	196-Jul 6
260	184	108	32	45	121	197
259	183	107	31	46	122	198
258	182	106	30	47	123	199
257-Oct 27	181-Oct 8	105-Sep 19	29-Aug 31	48-Aug 12	124-Jul 24	200-Jul 5
256	180	104	28	49	125	201
255	179	103	27	50	126	202
254	178	102	26	51	127	203
253-Oct 26	177-Oct 7	101-Sep 18	25-Aug 30	52-Aug 11	128-Jul 23	204-Jul 4
252	176	100	24	53	129	205
251	175	99	23	54	130	206
250	174	98	22	55	131	207
249-Oct 25	173-Oct 6	97-Sep 17	21-Aug 29	56-Aug 10	132-Jul 22	208-Jul 3
248	172	96	20	57	133	209
247	171	95	19	58	134	210
246	170	94	18	59	135	211
245-Oct 24	169-Oct 5	93-Sep 16	17-Aug 28	60-Aug 9	136-Jul 21	212-Jul 2
244	168	92	16	61	137	213
243	167	91	15	62	138 End of	214
242	166	90	14	63	139 Sothic Cycle	215
241-Oct 23	165-Oct 4	89-Sep 15	13-Aug 27	64-Aug 8	140-Jul 20	216-Jul 1
240	164	88	12	65	141	217
239	163	87	11	66	142	218
238	162	86	10	67	143	219
237-Oct 22	161-Oct 3	85-Sep 14	9-Aug 26	68-Aug 7	144-Jul 19	220-Jun 30
236	160	84	8	69	145	221
235	159	83	7	70	146	222
234	158	82	6	71	147	223
233-Oct 21	157-Oct 2	81-Sep 13	5-Aug 25	72-Aug 6	148-Jul 18	224-Jun 29
232	156	80	4	73	149	225
231	155	79	3	74	150	226
230	154	78	2	75	151	227
229-Oct 20	153-Oct 1	77-Sep 12	1-Aug 24	76-Aug 5	152-Jul 17	228-Jun 28
228	152	76	1	77	153	229
227	151	75	2	78	154	230
226	150	74	3	79	155	231
225-Oct 19	149-Sep 30	73-Sep 11	4-Aug 23	80-Aug 4	156-Jul 16	232-Jun 27
224	148	72	5	81	157	233
223	147	71	6	82	158	234
222	146	70	7	83	159	235
221-Oct 18	145-Sep 29	69-Sep 10	8-Aug 22	84-Aug 3	160-Jul 15	236-Jun 26
220	144	68	9	85	161	237
219	143	67	10	86	162	238 Censorinus
218	142	66	11	87	163	239
217-Oct 17	141-Sep 28	65-Sep 9	12-Aug 21	88-Aug 2	164-Jul 14	240-Jun 25

* This period covers the Sothic Cycle from 1322 B.C. to 139 A.D. Date of 1 Thoth is placed opposite the Julian leap year, at which time it occurs a day earlier, and continues for four years. For example, February 27 is Egyptian new year day for years 749 to 746 B. C.

PASSOVER METHOD FOR DETERMINING JULIAN EQUIVALENT OF ARAMAIC DATES*

YEAR	FULL MOON G.M.T.**	NISAN 13 J.C.T.	NISAN 14 J.C.T.	NISAN 1 J.C.T.	CONJUNCTION MER. CIV. T.	TRANSLATION PERIOD (DAYS)	LENGTH OF YEAR (DAYS)		
481	May 4.04	4.63	May 5	Apr 22	Apr 19.28	2.47			
480	Apr 23.12	23.71	Apr 24	Apr 11	Apr 8.99	1.76	(11)	354	
479	Apr 12.16	12.75	Apr 14	Apr 1	Mar 29.64	2.10	(12)	355	
478	Apr 30.93	31.52	May 2	Apr 19	Apr 17.58	1.16	(13)	383	
477	Apr 19.38	19.97	Apr 21	Apr 8	Apr 5.90	1.84	(14)	355	
476	Apr 9.03	9.62	Apr 10	Mar 28	Mar 25.95	1.79	(15)	354	
475	Apr 28.04	28.63	Apr 29	Apr 16	Apr 13.64	2.10	(16)	384	
474	Apr 17.71	18.30	Apr 19	Apr 6	Apr 2.80	2.94	(17)	355	
473	May 5.62	6.21	May 7	Apr 24	Apr 20.68	3.06	(18)	384	
472	Apr 24.89	25.48	Apr 26	Apr 13	Apr 10.27	2.47	(19)	354	6939 DAYS
471	Apr 13.93	14.52	Apr 15	Apr 2	Mar 30.98	1.76	(1)	354	
470	May 2.61	3.20	May 4	Apr 21	Apr 18.99	1.75	(2)	384	
469	Apr 20.83	21.42	Apr 22	Apr 9	Apr 7.51	1.23	(3)	354	
468	Apr 10.35	10.94	Apr 12	Mar 30	Mar 27.73	2.01	(4)	355	
467	Apr 29.34	29.93	May 1	Apr 18	Apr 15.42	2.32	(5)	384	
466	Apr 19.06	19.65	Apr 20	Apr 7	Apr 4.45	2.29	(6)	354	
465	May 7.04	7.63	May 8	Apr 25	Apr 22.21	2.53	(7)	384	
464	Apr 26.52	27.11	Apr 28	Apr 15	Apr 11.63	3.11	(8)	355	
463	Apr 15.73	16.32	Apr 17	Apr 4	Apr 1.29	2.45	(9)	354	
462	May 4.40	4.99	May 6	Apr 23	Apr 20.30	2.44	(10)	384	19 YEAR CYCLE
461	Apr 22.45	23.04	Apr 24	Apr 11	Apr 8.96	1.78	(11)	354	
460	Apr 11.75	12.34	Apr 13	Mar 31	Mar 29.40	1.34	(12)	354	
459	Apr 30.68	31.27	May 2	Apr 19	Apr 17.18	1.56	(13)	384	
458	Apr 20.36	20.95	Apr 22	Apr 9	Apr 6.23	2.51	(14)	355	
457	Apr 9.05	9.64	Apr 10	Mar 28	Mar 25.31	2.43	(15)	354	
456	Apr 28.02	28.61	Apr 29	Apr 16	Apr 13.12	2.62	(16)	384	
455	Apr 17.44	18.03	Apr 19	Apr 6	Apr 2.61	3.12	(17)	355	
454	May 6.18	6.77	May 8	Apr 25	Apr 21.59	3.15	(18)	384	
453	Apr 24.22	24.81	Apr 26	Apr 13	Apr 10.31	2.43	(19)	354	6940 DAYS
452	Apr 13.32	13.91	Apr 15	Apr 2	Mar 30.92	1.82	(1)	354	
451	May 2.14	2.73	May 4	Apr 21	Apr 18.82	1.92	(2)	383	
450	Apr 21.67	22.26	Apr 23	Apr 10	Apr 8.02	1.72	(3)	355	
449	Apr 10.36	10.95	Apr 12	Mar 30	Mar 27.05	2.69	(4)	355	
448	Apr 29.38	29.97	May 1	Apr 18	Apr 14.76	2.98	(5)	384	
447	Apr 18.97	19.56	Apr 20	Apr 7	Apr 4.02	2.72	(6)	354	
446	Apr 8.30	8.89	Apr 10	Mar 28	Mar 24.59	3.15	(7)	355	(384)
445	Apr 26.02	26.61	Apr 27	Apr 14	Apr 11.61	2.13	(8)	383	(354)
444	Apr 15.04	15.63	Apr 16	Apr 3	Apr 1.31	1.43	(9)	354	Change of
443	May 3.74	4.33	May 5	Apr 22	Apr 20.28	1.46	(10)	384	Embolism
442	Apr 23.07	23.66	Apr 24	Apr 11	Apr 9.71	1.03	(11)	354	
441	Apr 11.67	12.26	Apr 13	Mar 31	Mar 28.84	1.90	(12)	355	
440	Apr 30.69	31.28	May 2	Apr 19	Apr 16.52	2.22	(13)	384	19 YEAR CYCLE
439	Apr 20.37	20.95	Apr 22	Apr 9	Apr 5.60	3.14	(14)	355	
438	Apr 9.90	10.49	Apr 11	Mar 29	Mar 25.97	2.77	(15)	354	
437	Apr 27.72	28.31	Apr 29	Apr 16	Apr 12.92	2.82	(16)	384	
436	Apr 16.83	17.42	Apr 18	Apr 5	Apr 2.61	2.13	(17)	354	
435	May 5.50	6.09	May 7	Apr 24	Apr 21.62	2.12	(18)	384	
434	Apr 24.61	25.20	Apr 26	Apr 13	Apr 11.24	1.50	(19)	354	6939 20818=
433	Apr 13.02	13.61	Apr 14	Apr 1	Mar 30.58	1.16	(1)	354	DAYS
432	May 1.97	2.56	May 3	Apr 20	Apr 18.30	1.44	(2)	384	IN 3
431	Apr 21.68	22.27	Apr 23	Apr 10	Apr 7.33	2.41	(3)	355	CYCLES
430	Apr 11.36	11.95	Apr 13	Mar 31	Mar 27.48	3.26	(4)	355	
429	Apr 29.27	29.86	May 1	Apr 18	Apr 14.34	3.40	(5)	384	
428	Apr 18.57	19.16	Apr 20	Apr 7	Apr 3.91	2.83	(6)	354	
427	May 7.29	7.88	May 9	Apr 26	Apr 22.92	2.83	(7)	384	
426	Apr 26.31	26.90	Apr 28	Apr 15	Apr 12.63	2.11	(8)	354	
425	Apr 14.50	15.09	Apr 16	Apr 3	Apr 1.16	1.58	(9)	354	
424	May 3.37	3.96	May 5	Apr 22	Apr 19.99	1.75	(10)	384	19 YEAR
423	Apr 22.98	23.57	Apr 24	Apr 11	Apr 9.11	1.63	(11)	354	CYCLE
422	Apr 12.70	13.29	Apr 14	Apr 1	Mar 29.14	2.60	(12)	355	
421	Apr 30.69	31.28	May 2	Apr 19	Apr 15.89	2.85	(13)	384	
420	Apr 20.20	20.79	Apr 22	Apr 9	Apr 5.28	3.46	(14)	355	
419	Apr 9.41	10.00	Apr 11	Mar 29	Mar 25.91	2.83	(15)	354	
418	Apr 28.09	28.68	Apr 29	Apr 16	Apr 13.93	1.81	(16)	383	
417	Apr 16.14	16.73	Apr 18	Apr 5	Apr 2.61	1.12	(17)	354	
416	May 4.90	5.49	May 6	Apr 23	Apr 21.54	1.20	(18)	384	
415	Apr 24.34	24.93	Apr 26	Apr 13	Apr 10.86	1.88	(19)	355	6940 27758=
414	Apr 13.98	14.57	Apr 15	Apr 2	Mar 30.92	1.82	(1)	354	DAYS
413	May 2.00	2.59	May 3	Apr 20	Apr 17.60	2.14	(2)	384	IN 4
412	Apr 21.67	22.26	Apr 23	Apr 10	Apr 6.78	2.96	(3)	355	CYCLES
411	Apr 11.09	11.68	Apr 12	Mar 30	Mar 27.24	2.50	(4)	354	
410	Apr 29.86	30.45	May 1	Apr 18	Apr 15.23	2.51	(5)	384	
409	Apr 17.90	18.49	Apr 19	Apr 6	Apr 3.93	1.81	(6)	354	
408	May 6.59	7.18	May 8	Apr 25	Apr 22.93	1.82	(7)	384	
407	Apr 25.80	26.39	Apr 27	Apr 14	Apr 12.46	1.28	(8)	354	
							(9)	355	

* The Passover dates, reckoned from full moon, determine length of year, which, in turn, establishes the length of each month.

** Ginzel, "Handbuck der mathematischen und technischen Chronologie," Vol. II. Astronomical dates are reduced to Jerusalem Civil Time (J.C.T.) by adding to each G.M.T. date $14^h\ 20^m$, or .59 of a day.

Ancient Egyptian Monument Dates, Based on 365-Day Year Ptolemy's "Mathematical Syntaxis," the Reckoning of which Began at Noon, Feb. 26/27, 747 B.C.

ANALOGUE OF ANCIENT EGYPTIAN, JEWISH, AND MACEDONIAN DATES

A Calendar Problem

Ancient Aramaic Observation Dates of Papyrus, Tablet, and Stone Computed in Jerusalem Civil Time (Julian Calendar) from Ginzel Tables.

TABLE I EGYPTIAN CALENDAR (Alexandrian Astronomical Time)

Series Number* 1		Persian Regnal Year 2	Julian Year B. C. 3	Date of 1 Thoth (pp.1,2) 4	Egyptian Date on Papyrus 5	Egyptian Interval From 1 Th. 6	Julian Date Alex. M.T. Noon 7	Calendar Difference 8
1	"400"	7 Cambyses	523	Jan. 2	17 Phamenoth	196	July 17	+1
2	"A"	15 Xerxes	471	Dec. 20	28 Pachons	267	Sept 13	+1
3	"B"	1 Artaxerxes	465	Dec. 18	17 Thoth	16	Jan 3	+1
4	"D"	6 Artaxerxes	460	Dec. 17	1 Mesore	330	Nov 12	+1
5	"30"	9 Artaxerxes	451	Dec. 15	4 Thoth	3	Dec 18	+1
6	"E"	19 Artaxerxes	447	Dec. 14	10 Mesore	339	Nov 18	+2
7	"F"	25 Artaxerxes	440	Dec. 12	19 Pachons	258	Aug 27	+1
8	"G"	No Year	439	Dec. 12	6 Epiphi	305	Oct 13	+1
9	"H"	4 Darius	420	Dec. 7	Payni	269-299	Sept 1 to Oct 1	+1
10	"J"	9 Darius	416	Dec. 6	12 Thoth	11	Dec 17	+1
11	"K"	14 Darius	410	Dec. 5	8 or 9 Athyr	67	Feb 10	+1
12	"R.S."	9 Ptol. Epiph.	199	Oct. 13	18 Mechir	167	Mar 29	+1

TABLE II ARAMAIC (JEWISH) CALENDAR (Jerusalem Civil Time)

Jewish Regnal Year 9	Passover 14 Nisan J.C.T. 10	Year Length (Days) 11	1 Nisan Civil Date 12	Translation Period 13	Aramaic Date on Papyrus 14	Aramaic Interval From 1 Nis. 15	Julian Equivalent Date Jer.C.T. 16
7 Cambyses	Apr 20		Apr 7	1.75	14 Tammuz	102	July 18
14 Xerxes	Apr 15	384	Apr 2	1.76	18 Elul	165	Sept 14
21 Xerxes	May 8	355	Apr 25	2.53	18 Kisleu	254	Jan 4
5 Artaxerxes	Apr 13	384	Mar 31	1.35	21 "Hesvan"	227	Nov 13
8 Artaxerxes	May 4	354	Apr 21	1.93	7 Kisleu	242	Dec 19
19 Artaxerxes	Apr 10	383	Mar 28	3.15	2 Kisleu	237	Nov 20
24 Artaxerxes	May 2	355	Apr 19	2.22	14 Ab	131	Aug 28
No year	Apr 22	354	Apr 9	3.15	23 Tisri	199	Oct 14
3 Darius	Apr 22	354	Apr 9	3.46	Elul	147-176	Sept 3 to Oct 2
8 Darius	May 6	355	Apr 23	1.20	3 Kisleu	239	Dec 18
13 Darius	Apr 12	384	Mar 30	2.50	24 Shebat	318	Feb 11
8 Ptol. Epiph.	Apr 9		Mar 27	3.33	4 Xanthicus	3	Mar 30

TABLE III PTOLEMAIC LUNAR ECLIPSE CHECK ON EGYPTIAN NEW YEAR TABLE

Series Number* 1	Regnal Year 2	Julian Year B. C. 3	Date of 1 Thoth (pp. 1,2) 4	Egyptian Interval From 1 Th. 5	Oppolzer's Julian Dates of Eclipses (Green. Civ.Time) 6	Ptolemaic and Exact Eclipses	Egyptian Dates Position of (pp. 9,10) 7	Full Moon Date of Eclipses(Ginzel) (Alex. Civ. Time) 8	Computation of Eclipses in Ptolemy's Catalog by Egyptian New Year Table (Alexandrian Civil Time) 9
1	1 Mardokempad	721	Feb. 21	27	Mar 19 29 30 "Thoth"		"3 1/3 hr. before mid."	Mar 19.91[a]	Feb 21+27=8+19=Mar 19
2	2 Mardokempad	720	" 20	16	Mar 8 18 19 "Thoth"		"5/6 hr. before midnight."	Mar 9.06[a]	Feb 20+16=8+8=Mar 8
3	2 Mardokempad	720	" "	179+14	Sept 1 15 16 "Phamenoth"		"4 1/3 hr. before midnight"	Sept 1.76[a]	Feb 20+193=8+31+30+31+30+31+31+1=Sept 1
4	5 Nabopollassar	621	Jan. 27	59+27	Apr 22 27 28 "Athyr"		"5 hr. after midnight"	Apr 22.27[a]	Jan 27+86=5+29+31+22=Apr 22
5	7 Cambyses	523	Jan. 2	179+16	July 16 17 18 "Phamenoth"		"1 hr. before midnight"	Jul 17.05[a]	Jan 2+195=29+28+31+30+31+30+16=July 16
6	20 Darius	503-2	Dec. 28	299+27	Nov 19 28 29 "Epiphi"		"1 1/4 hr. before midnight"	Nov 20.06[a]	Dec 28+326=3+31+28+31+30+31+30+31+31+30+31+19=Nov 19
7	31 Darius	491	Dec. 25	119+2	Apr 25 3 4 "Tybi"		"midst of 6th hour of night"	Apr 25.92	Dec 25+121=6+31+28+31+25=Apr 25
8	Archon Phanostratos	383-2	Nov. 28	179+23	June 18 24 25 "Phamenoth"		"8 1/4 hr. after noon of 24th"	June 18.87	Nov 28+202=2+31+31+28+31+30+31+18=June 18
9	55th of 2nd Callipic period	200	Oct. 13	329+5	Sept 12 5 "Mesore"		"2 1/3 civ. hr. after mid."	Sept 12.11	Oct 13+334=18+30+31+31+28+31+30+31+30+31+31+12=Sept 12
10	197th from Alexander	129-8 A.D.	Sep. 25	209+10	May 2 11 "Pharmuthi"		"5 civ. hr. before noon 11th"	May 2.28	Sept 25+219=5+31+30+31+31+28+31+30+2=May 2
11	20 Hadrian	135-6	Jul. 21	209+20	Mar 19 20 6 Mid. N "Pharmuthi" SS		"4 hr. after midnight"	Mar 6.01	July 21+229=10+31+30+31+30+31+31+29+6=Mar 6
12	Sirius rose at Alexandria	139	July 21		Censorinus, "De Die Natali," tr. by Maude, p. 33. New York, 1900.				
13	Sirius rose	238	June 25						

[a]Nos. 2, 5 and 6 run over into another day, because of the Guinness constants ("Idem, col.9).

* References on pages 6-10

[a]Guinness, Vol. II, p. xlviii

COMPUTATIONS EMPLOYED IN ANALOGUE TABLES I,II,III

1. Procedure in Computation of Egyptian Dates (Table I)

From Egyptian New Year Table (pp. 1,2), find Julian date for 1 Thoth of specified year. Determine interval from 1 Thoth to Egyptian date inclusive (col. 5), and add interval to civil date of 1 Thoth. Resultant figure is Julian equivalent in astronomical time (noon to noon) for the Egyptian date of papyrus, tablet or stone, as the case may be.

For example: In the year 465 B. C. (Papyrus "B"), the civil date for the Egyptian new year is Dec 18 (col. 4), corresponding to a noon-to-noon day. Interval from 1 Thoth to 17 Thoth (Papyrus date, col 5) is 16 days. Add 16 days to Dec 18 and get Jan 3 -- the Julian equivalent in astronomical time for 17 Thoth in year 465-464 B. C. To this date add one calendar day to reduce to Jewish civil time. Result is Jan 4, the coincident Aramaic date in Papyrus "B." (Comp. col. 16.)

2. Procedure in Computation of Jewish or Aramaic Dates (Table II)

From Jewish Passover Table (page 3), find Julian date for 1 Nisan of specified year, and note also length of year between passovers, as given in last column. (The length of the Jewish year determines the length of its variable months. If the year has an extra day, as in a 355-day year, that day is given to Ḥesvan; if the year is short one day, as in a 383-day year, a day is taken from Kisleu.) Determine interval from 1 Nisan to Aramaic papyrus date inclusive, and add to civil date of 1 Nisan. Resultant figure is the Julian equivalent, in Jerusalem civil time, of the Aramaic date.

For example: In the year 465 (Papyrus "B"), 1 Nisan is dated Apr 25 (col. 12), and the length of year is 355 days (last column of Passover Table). Ḥesvan gets the extra day, and is therefore 30 days long, making the interval from 1 Nisan to 18 Kisleu, 254 days. Add 254 days to April 25 (5+31+30+31+31+30+31+30+31+4), and the result is Jan 4, the Julian civil date of 18 Kisleu. This whole computation is based on the simple fact that the ancient Jewish Passover followed the Jewish day of full moon in Jerusalem at the time of barley harvest.

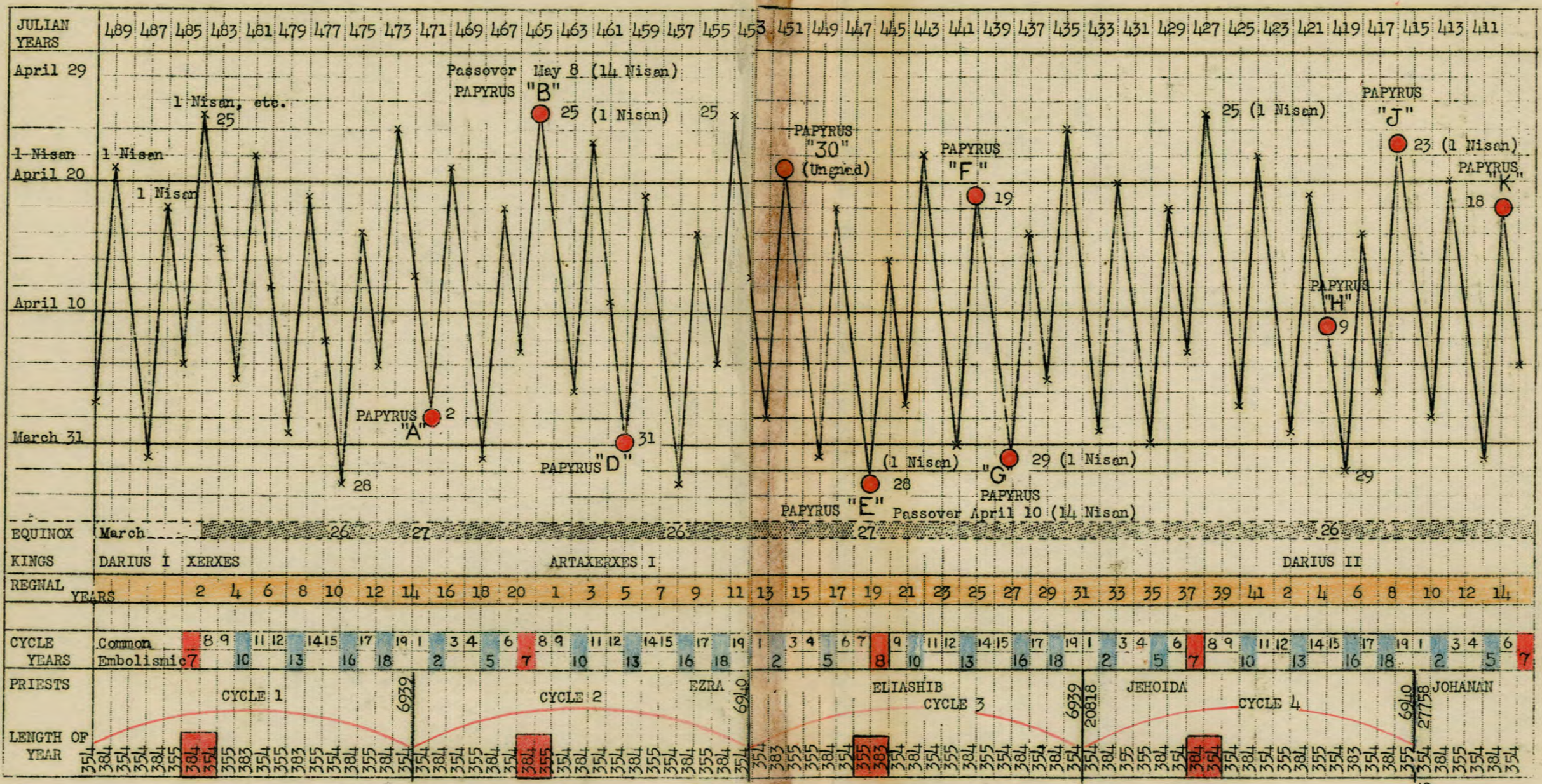
It is always necessary to take note of the Julian leap years, when February has 29 days. If the year B. C., when divided by 4 has a remainder of 1, then it is a leap year. But, as in the case of the year 465, which had its leap day in early spring, the computation does not always pass over the leap month, and this fact has to be carefully watched.

3. Procedure in Computation of Ptolemaic Eclipses (Table III)

Each eclipse is worked out in connection with Table III, and discussed in detail on pages 11 to 19.

CONSTRUCTION OF ARAMAIC CALENDAR IN TIME OF EZRA AND NEHEMIAH
(Nisan Limits Marked by Assuan Papyri)*

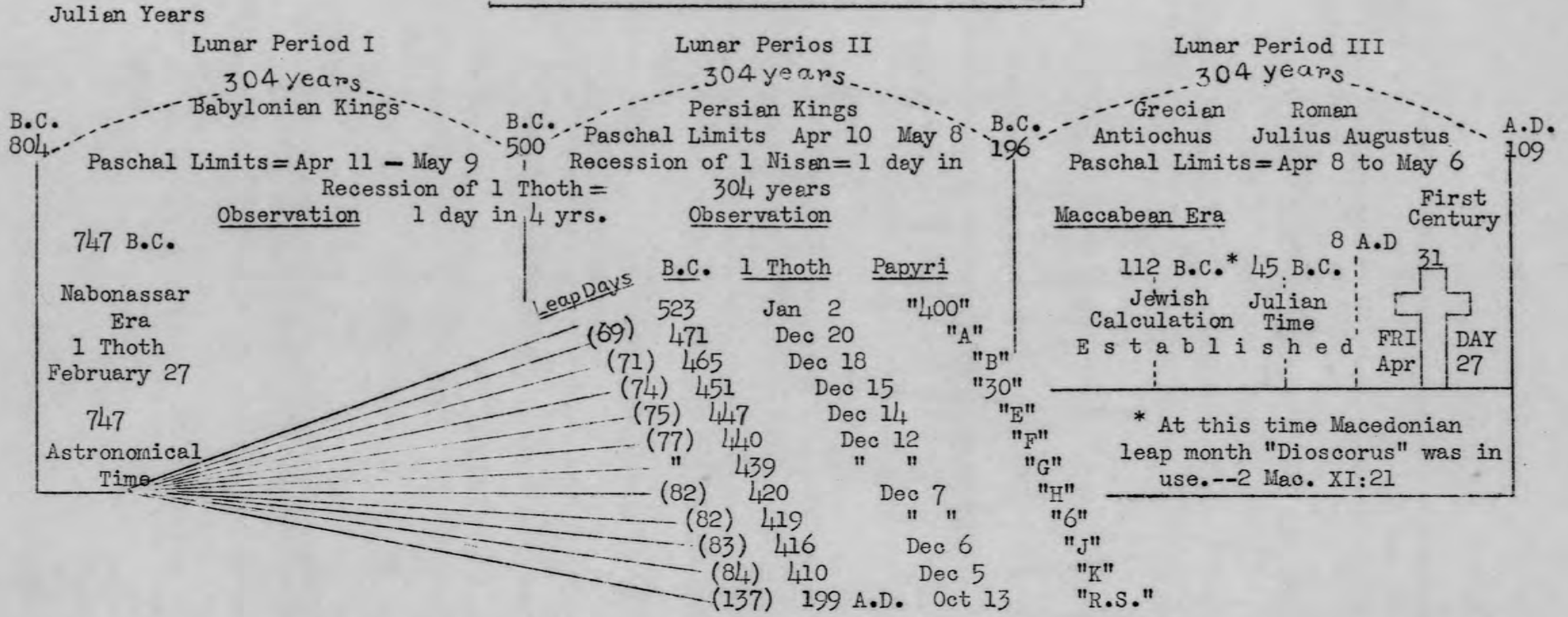
* Cowley, A.E., "Aramaic Papyri of the Fifth Century B.C.," p. 10, ff. Oxford, 1923.



(From passover to passover -- reckoned from Ginzel moon tables)

In the accompanying diagram, the papyri, with one exception, occur at the earliest and latest limits of 1 Nisan. By counting ahead to 14 Nisan, it may be noted that the passover limits in this century are from the date April 10 to May 8. (Cf. "E" and "B".) These limits are in harmony with those of the first century A.D., that Scaliger reports as April 8 to May 6 ("De Emendatione Temporum," p. 265), and which would of necessity be dated two days earlier, owing to the earlier occurrence of the moon one day every 300 years on the Julian calendar (Scaliger, "De Emendatione Temporum," p. 70). The papyri dates therefore confirm Scaliger's testimony, which he derived from early Jewish cycles he had in hand.

RECESSION OF ARAMAIC AND EGYPTIAN NEW YEARS



Each year in the accompanying diagram corresponds to a certain number of leap days, as reckoned from the beginning of the Nabonassar Era, February 27, 747 B.C. Inasmuch as 1 Thoth, the Egyptian new year, slips back one day every 4 years, the position of 1 Thoth for any year, will be just as many days earlier than February 27, as there are leap days in the interval between 747 and the selected year (of course in advance of the beginning of the era). The following series of months corresponds to the monthly position of 1 Thoth during the Sothic Cycle from 1322 B.C. to 139 A.D.:

B. C.		
1369	-- 1246	July
1249	-- 1126	June
1125	-- 1002	May
1001	-- 882	April
881	-- 759	March
758	-- 642	February
641	-- 518	January

B. C.		
517	-- 394	December
393	-- 274	November
273	-- 150	October
149	-- 30	September
A.D.		
29	-- 95	August
96	-- 219	July

TABLE p. 5-a

PAPYRUS REFERENCES FOR ANALOGUE TABLE (PAGE 4)

(Translated by A. E. Cowley from original texts)

Papyrus "A" -- Grant of building rights. Date said to be quite certain, 471 B. C. Found rolled up, tied, and sealed.

Translation of Date: "On the 18th of Elul, that is the 28th day of Paḥons, year 15 of King Xerxes, etc."--Cowley, A. E., "Aramaic Papyri of the Fifth Century B. C.," p. 11. Oxford, 1923.

Papyrus "B" -- Concerning property rights. Papyrus is almost perfect, but the number in the Egyptian month is broken. Gutesmann and Hontheim calculate "17" to be the required number. Fotheringham and Shürer -- and therefore Ginzel, who made all the calculations for Shürer --favor "17 Thoth" (Monthly Notices of the Royal Astronomical Society, Vol. LXIX, 1909, p. 14).

Translation of Date: "On the 18th of Chisleu, that is the 7th (17th, in harmony with foregoing) day of Thoth, in year 21, the beginning of the reign when King Artaxerxes sat on his throne, etc."--Idem, p. 16.

Papyrus "D" -- Translation of Date: "On the 21st of Chisleu, that is the 1st day of Mesore, the 6th year of Artaxerxes, the king, etc."-- Idem, p. 23.

Concerning this papyrus, Cowley reasons that Artaxerxes I is signified because the transaction relates to the same persons whose names appear in "B." But the 21st Kisleu as 1 Mesore would mean that 1 Thoth would have to occur a month earlier than its position in the 6th of Artaxerxes -- Dec. 16/17 for 460 B. C. -- and Fotheringham and Shürer solve the difficulty by making the Aramaic date read a month earlier, that is, as 21 Ḥesvan, instead of 21 Kisleu. With this reading, the synchronism is exact. See Fotheringham's "Calendar Dates," in Monthly Notices of the Royal Astronomical Society, Vol. LXIX, p. 15.

Papyrus "30" -- Ungnad No. "30" is the same as No. "10" in Cowley. Papyrus refers to a contract for a loan. Was a long document almost perfectly preserved, found still folded, tied and sealed.

Translation of Date: "On the 7th of Chisleu, that is the 4th day of the month Thoth, the 9th year of Artaxerxes the king, etc."--"Aramaic Papyri," p. 30.

The synchronization does not take place in the 9th of Artaxerxes, as reckoned from his first year in 464 B. C., but from the 9th year after the revolt of Egypt in 460 B. C., as soon as the Persians had again obtained control. The coincident year of the two dates is 451 B. C. Although the war, incited by the Libyan king Inaros, lasted six years (Thucydides, "History of the Peloponnesian War," Book 1, CVIII. 5-CX. 2. p. 183. Tr. Smith. Harvard Press, 1935), yet in a short time "the remnant of the Persians held out, and gave Artaxerxes time to send a new army to their aid" (Brugsch, Henry, "History of Egypt," Second Edition, p. 332. London, 1881). Dr. Brugsch quotes the text of a rock-inscription, in which the Persian eunuch Aliurta mentions his service under Artaxerxes as "the five years of the king of Upper and Lower Egypt, the sovereign, Arta-khshesesh (Artaxerxes), and the 16 years, etc." Evidently the Egyptian revolt in 460 B. C., resulted in the two periods of Aliurta's office (Idem, p. 314), and Papyrus "30" seems to confirm this short lapse of Persian rule.

Papyrus "E" -- Cowley says that "a peculiarity of this text is the number of mistakes in spelling, though the scribe, Nathan b. Ananiah, must have been a professional notary, since he also wrote Nos. 10 and 15."

Translation of Date: "On the 3rd of Chisleu, that is the 10th day of the month Mesore, year 19 of Artaxerxes the king, etc."-- "Aramaic Papyri," p. 38.

In Cowley's comment on this date, he says: "According to Gutesmann it should be Chisleu 2 = Mesore 10, or Chisleu 3 = Mesore 11. Hontheim reads 2."-- Idem. It would be easier to drop a figure out of the Aramaic text than to insert one. Hence we accept the alternative reading, "Chisleu 2 = Mesore 10."

Papyrus "F" -- Settlement of claim. Date is 441-440 B. C.

Translation of Date: "On the 14th of Ab, that is the 19th day of Pahons, year 25 of Artaxerxes the king, etc."-- Idem, p. 42. "The papyrus is in an excellent state of preservation."

Papyrus "G" -- Marriage contract. "About 441 B. C." Text shows that the number of the king's year is lost, for the first line is much broken. Cowley says that the text is very difficult, "partly owing to its broken condition, and partly to the many unknown words." Owing to the age of the sons, "present marriage cannot have taken place much after 440." Synchronization does occur in 439 B. C. for 23rd of Tisri. The date for Tisri is uncertain.

Translation of Date: "On the 25th (?) of Tisri that is the 6th day of the month Epiphi, year. . . of Artaxerxes the king, etc."-- Idem, p. 45.

Papyrus "H" -- Settlement of a claim. 420 B. C. "The date is the 4th year of Darius, who must be Darius II, and the year is therefore 420 B. C."

Translation of Date: "In the month Elul, that is Payni, 4th year of Darius the king at that time in Yeb the fortress, etc."-- Idem, p. 58.

Cowley's comment: "The day of the month is not given, which is unusual. The Egyptian month may be Payni or Paophi. From the calculations of Mr. Knobel and Dr. Fotheringham,it seems that Payni suits the chronology best. So also Gutesmann."-- Idem, p. 59.

Since Elul has 29 days, and Payni, 30, the coincidence would have to occur either at the beginning or end of the month. In 420, it occurred at the end of Elul and Payni.

Papyrus "J" -- Renunciation of claim. "The date, which is given twice, is the 8th (Egyptian 9th) year of Darius (II) = 416 B. C."-- Idem, p. 83. Cowley further comments on the date, saying that "the Egyptian year began with Thoth, and did not coincide with the Jewish year beginning with Nisan. This synchronism is important." Idem.

Translation of Date: "On the 3rd of Chisleu, year 8, that is the 12th day of Thoth, year 9 of Darius the king at that date in Yeb the fortress, etc."-- Idem, p. 85.

Papyrus "K" -- Assignment of slaves. Papyrus very well preserved, and "hardly any letter really doubtful." Cowley emphasizes the double reckoning of the regnal years, that counts 13 Jewish and 14 Egyptian for Darius II in Shebat and Athyr in 412-411 B. C. (Idem, p. 103.)

Translation of Date: "On the 24th of Shebat, year 13, that is the 9th day of Athyr, year 14 of Darius the king in the fortress of Yeb, etc."-- Idem, p. 104.

Stone "R. S." -- Rosetta Stone. Ptolemy Epiphanes -- the fifth Ptolemy -- is the king of the Rosetta Stone (Mahaffy, J. P., "Flinders Petri Papyri," p. 27, note. Dublin, 1891), and the inscription "was certainly decreed in the 9th year of his reign" (Mahaffy, "History of Egypt," p. 151). But when Philopator

died, young Ptolemy Epiphanes (5 years old) had already been co-regent from the year of his birth (Smyley, J. Gilbart, "Greek Papyri from Gurob," p. 28. Dublin, 1921; Mahaffy, "History of Egypt," p. 151). He was only later crowned at Memphis "in the 9th year of his reign" (Revillout, E, "Papyrus Bilingue du temps de Philopator," p. 42. London, 1892). His 9th year was doubtless taken to be the 9th of his co-regency, and hence of his birth year, for it is in 199 B. C. that the Rosetta Stone dates synchronize. Dr. Smyley argues (loco citato) that Epiphanes was born in 210 B. C., and was made co-regent 50 days after birth. On the basis of this history, the Rosetta Decree harmonizes with 199 B. C.

Translation of the Rosetta Inscription Date: "In the 9th year. . . of the god Epiphanes Eucharistos. . . the 4th of the month Xanthicus, according to the Egyptians the 18th of Mecheir."-- Mahaffy, J. P., "History of Egypt," p. 152. London, 1899. See also Mülleri, C and T., "Fragmenta Historicorum Graecorum, Inscription de Rosette." Tr. by Latronne. Paris, 1853.

ECLIPSE REFERENCES FOR TABLE (PAGE 4)

(Translated from Ptolemy's Greek text)

1. "Therefore, of three ancient eclipses of those observed in Babylon, which we have taken, the first is recorded in the first year of Mardokempad, on the 29/30 of the Egyptian Thoth. The eclipse began, they say, fully an hour after the rising, and it was total. Since the sun stood in the last of the Fishes, the night had properly 12 equinoctial hours exactly, and so the beginning of the eclipse of course fell 4 1/2 equinoctial hours before midnight, but the middle, when now the eclipse was full, 2 1/2 hours before midnight. . . but in Alexandria we found the middle of the submitted eclipse 3 1/3 equinoctial hours before midnight."--Claudiou Ptolemaiou, "Mathematikē Suntaxis," pp. 244, 245. In Halma. Paris, 1813. [721 B. C., Mar 19.]

2. "And the second eclipse was recorded in the second year of the same Mardokempad on the 18/19 of the Egyptian Thoth. . . the middle of the eclipse occurred in Babylon at the middle of the night itself, but in Alexandria it appeared at 5/6 of an hour before midnight."-- Idem, p. 245. [720 B. C., Mar 8]

3. "And the third eclipse was recorded in the second year of Mardokempad, on the 15/16 of the Egyptian Phamenoth. . . In Alexandria the middle of the time of the eclipse was complete at 4 1/3 equinoctial hours before midnight."-- Idem, pp. 245, 246. [720 B. C., Sept 1.]

4. "For in the 5th year of Nabopollassar, which is the 127th year of Nabonassar, on the 27/28 Egyptian Athyr, toward the end of the 11th hour, in Babylon the moon began to eclipse, and for the most part a quarter of the diameter was obscured on the south. . . in Alexandria it (the middle of the eclipse) occurred only 5 hours after midnight."-- Idem, pp. 340, 341. [621 B. C., April 22.]

5. "Again in the 7th year of Cambyses, which is the 225th year from Nabonassar, according to the Egyptian 17/18 Phamenoth, one hour before midnight, the moon was eclipsed in Babylon on the northern half of its diameter. . . in Alexandria it occurred 1 5/6 equinoctial hours before midnight."-- Idem, pp. 341, 342. [523 B. C., July 16.]

6. "The second eclipse employed by Hipparchus, occurred in the 20th year of Darius, the successor to Cambyses, in the 28/29 of the Egyptian Epiphi, the night having advanced 6 1/3 equinoctial hours, in which the moon, in like manner, eclipsed the fourth part of its diameter on the south. . . in Alexandria the middle of the eclipse occurred 1 1/4 equinoctial hours before midnight."-- Idem, pp. 269, 270. [502 B. C., Nov. 19.]

7. "As the first eclipse, we have named that one which, under Darius I in Babylon, in the 31st year of his reign, was observed on the 3/4 Egyptian Tybi, in the midst of the 6th hour of the night. At the same time, as the exact report runs, the moon was eclipsed two inches on the south, that is, 1/6 part of its diameter."-- Idem, p. 267. [491 B. C., April 25.]

8. "Again, they say that the eclipse occurred when Phanostratos the Athenian was archon, in the month Skirophorion, on the 24/25 Egyptian Phamenoth. . . Now the sun stood in the last part of the Gemini, thus the hour of the night amounted to 12 time-degrees, that is, 48^m; consequently made 5 1/2 civil hours, or 4 2/5 equinoctial hours. The beginning of the eclipse had therefore taken place 4 2/5 hours before midnight, or 7 3/5 equinoctial hours after the noon of the 24th; but since the whole length of the eclipse was given at 3 hours, thus the middle was evidently 9 1/10 equinoctial hours after the noon. In Alexandria, consequently, it must have entered 8 1/4 equinoctial hours after noon of the 24th."-- Idem, pp. 276, 277. [382 B. C., June 18.]

9. "They say that the third eclipse occurred in the 55th year of the second period on the 5th Egyptian Mesore. . . Now since the sun stood in the midst of the Virgin, thus in Alexandria, the hour of the night amounted to 14 2/5 time-degrees, that is 57 $3/5^m$; consequently made out the 2 1/3 civil hours after midnight, or 2 1/4 equinoctial. Therefore the middle (of eclipse) was 14 1/4 equinoctial hours after the noon of the 5th."-- Idem, p. 281. [200 B. C., Sept 12.]

10. "Hipparch asserts that he observed the sun and moon with the help of instruments in Rhodes on the 11th of the Egyptian Pharmuthi, at the beginning of the second hour -- 197th year after the death of Alexander. . . Now if the observation took place at the beginning of the second hour, that is, about 5 civil hours before the noon of the 11th, etc."-- Idem, p. 300. [128 B. C., May 2.]

11. "The third eclipse had occurred in the 20th year of Hadrian, on the 19/20 of the Egyptian Pharmuthi. The middle, according to our reckoning, entered at 4 equinoctial hours after midnight."-- Idem, p. 255. [136 A. D., Mar 6.]

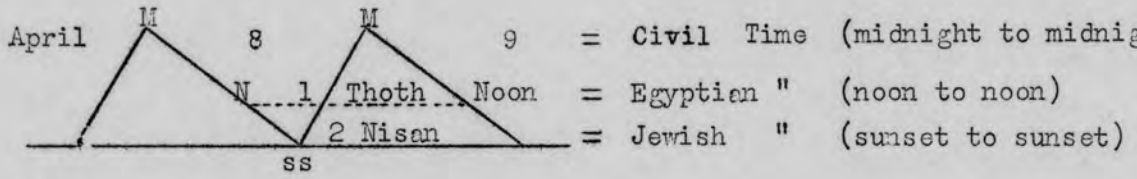
CORRESPONDING OPPOLZER REFERENCES
(Greenwich Civil Time)

1.	Von Oppolzer, Th. Ritter, "Canon der Finsternisse," Wien, 1887.				
		No. 741,	p. 332 = Mar 19.	$19^h\ 4^m$.	721 B. C.
2.	Idem.	No. 743,	p. 332 = Mar 8.	$21^h\ 30^m$.	720 B. C.
3.	Idem.	No. 744,	p. 332 = Sept 1.	$17^h\ 4^m$.	720 B. C.
4.	Idem.	No. 901,	p. 334 = April 22.	$2^h\ 38^m$.	621 B. C.
5.	Idem.	No. 1056,	p. 335 = July 16.	$21^h\ 0^m$.	523 B. C.
6.	Idem.	No. 1090,	p. 335 = Nov 19.	$21^h\ 24^m$.	502 B. C.
7.	Idem.	No. 1107,	p. 336 = April 25.	$19^h\ 55^m$.	491 B. C.
8.	Idem.	No. 1276,	p. 337 = June 18.	$18^h\ 31^m$.	382 B. C.
9.	Idem.	No. 1547,	p. 340 = Sept 12.	$0^h\ 28^m$.	200 B. C.
10.	Idem.	No. 1660,	p. 341 = May 2.	$4^h\ 35^m$.	128 B. C.
11.	Idem.	No. 2075,	p. 345 = Mar 6.	$1^h\ 43^m$.	136 A. D.

THE PROBLEM.--In order to understand the meaning of the ancient Egyptian and Aramaic double dates, found on papyrus, tablet, and stone, it is essential first of all (1) to demonstrate the relation between the three calendars involved -- Egyptian, Jewish, and Julian. Although Julian time did not exist before the age of the Caesars, yet all the chronological tables and eclipse canons which extend back to ancient periods of history are based upon a projected Julian year. The Julian calendar is therefore definitely related to the solution of this problem, and becomes the common denominator of time between the other two. A second feature (2) concerns the synthetic construction of suitable calendar tables, upon which the papyri dates can be oriented, and their epochs demonstrated.

1. Relation Between the Calendars.--According to both tradition and authoritative chronology, the Egyptian day was astronomical, and probably extended from noon to noon. It was doubtless the forerunner of the nautical astronomical day, which was in operation until 1925. Tradition has it that the Egyptian day began when the hour angle of the sun was zero, that is, when the sun crossed the meridian. The Egyptian new year day, 1 Thoth, started at noon, and, according to Albîrûnî, the day was reckoned from the moment "when the sun arrives on the plane of the meridian, till the same moment of the following day." ("Chronology of Ancient Nations," p. 6.) The day was designated by one single date, though it passed through the midnight hour. Anciently, people were induced to prefer the meridian to the horizon, because the day from sunset to sunset varies in length, while the time between meridians is constant, and regular everywhere on earth. The horizons, on the other hand, vary for every latitude. The Jewish day, on the contrary, consists of parts of two days; but on the calendar, it is customary to civil-date the Jewish day by the Julian day with which it coincides from midnight to sunset. This is the second civil day of the two with which the Jewish year agrees.

While chronologers are not unanimous in their opinion concerning the Egyptian day, as from noon to noon, yet this plan is in harmony with a reasonable solution of the papyri double dates. The following diagram further demonstrates the exact relation between Egyptian and Jewish time:



Therefore 2 Nisan (April 9, civ. time) = ~~5 Athyr~~ 1 Thoth (April 8, astronom. time) --on the calendar, one day difference.

In this diagram, the Egyptian day, 1 Thoth, starts at noon, and is calendar-dated April 8 until the subsequent noon. It takes the date of the civil day in progress "one moment after the noon" at which it begins. The Jewish day, 1 Nisan, starts at sunset of April 8 and extends to sunset of April 9. While it covers parts of two days, April 8 and April 9, on the calendar, it is designated April 9 only. Although both Jewish and Egyptian days have 18 hours in common, yet, on the calendar, the Jewish day is dated one day later than the Egyptian. There is consequently one day's difference between these two days in their calendar dating. This is the first feature of the papyrus problem to be understood.

2. The Tables.--The second feature relates to the preparation of Jewish and Egyptian calendar tables, which will outline the two kinds of time involved--civil and astronomical. The Jewish Table, found on page 3, is based on the two crucifixion postulates: (a) The passover moon in time of barley harvest; and (b) the passover on the day following Jewish full-moon-day in Jerusalem. The Ginzel full moon dates (G.M.T.) were used in determining the true passover dates, and were first changed to Jerusalem civil time by adding $12^h + 2^h\ 20^m (0^d.59)$ to each full moon. Those full moon Julian dates that then came before sunset were designated 13 Nisan, and those civil dates that occurred after sunset, were designated 12 Nisan. 14 Nisan was then counted

as the day following Jewish full moon day in Jerusalem, and the 1st day of Nisan was reckoned as the 14th day earlier. Each translation period was computed as the difference between conjunction and 1 Nisan, 6 o'clock sunset. Length of year was calculated from one passover to another, using the Julian calendar. If year was 354 days long, the months alternated a regular sequence of 30 and 29 days, from Nisan to end of year. If year was 355 days, Hesvan was made 30 days; if 383 days, Kisleu was given 29 days. In leap year, Adar had 30, and Veadar, 29. Barley harvest moons determined whether year was common or embolismic. (For Table of Jewish and Egyptian months, cf. page 19.)

The Egyptian New Year Table (pp. 1,2) is based upon months, each one of which had 30 days, except 12th month Mesore, which had 35. The Egyptian year was therefore only 365 days long, and never changed. Its new year, 1 Thoth, slipped back one day every four years, and continued for the 4-year period. (Comp. Table V for 1 Thoth months from Nabonassar era to end of Sothic cycle.) The 1 Thoth dates of the Table (pp. 1,2) are founded upon 15 or more Ptolemaic lunar eclipses (Table III, p. 4), upon coincident Julian eclipse dates from Oppolzer's Canon, and upon the corresponding full moon dates from the Ginzel and Guinness tables (Table III, p. 4, col. 8). In the "Almagest" references (pp. 9, 10), are the translations from Ptolemy's Greek text, giving the exact position of each eclipse, first in Babylon, and then in Alexandria. From these direct quotations, it will be noted that the descriptions are not given in astronomical time, in connection with the Egyptian date, but are directly related to a single point of time -- either midnight, noon, or Babylonian sunset. However, Ptolemy usually concludes with an Alexandrian dating of each eclipse. And when the Alexandrian dates are compared with Oppolzer's Greenwich civil time eclipses, they are found in almost exact agreement. Frequently Ptolemy mentions the eclipse as between two Egyptian dates; sometimes only one date is given; and then again the eclipse may occur on his second date, as is the case with No. 11, of the series here presented.

From these canons and tables, it is possible to establish the exact position of each Ptolemaic eclipse, its coincident Julian date, full moon date, and Egyptian date. (All these details are diagramed in columns 6, 7, and 8 of Table III, p. 4, and the eclipse references are pp. 9, 10.) But first, from Table V, p. 5^{-a}, find the civil month that corresponds to 1 Thoth for the regnal year selected, as for example, 720 B. C., in eclipse No. 3. In this instance, 1 Thoth was in February. The statistics for eclipse No. 3 in 720 B. C., with 1 Thoth in February point to September --193 days later-- as the time of the eclipse. For September, 720 B. C., Oppolzer gives Sept. 1 $17^h\ 4^m$ ("Canon," No. 744, p. 332.) The equation therefore becomes possible that --

September 1 $17^h\ 4^m + 2^h\ 10^m$ (Oppolzer's eclipse in Alexandrian time) = "4 1/3 hours before midnight," 15 Phamenoth (Ptolemy's eclipse for Alexandria.)

In this equation, both Ptolemy and Oppolzer are in practical agreement in civil-dating the eclipse. Oppolzer's "$19^h\ 14^m$" (Alex.C.T.) was 7:14 p.m.; Ptolemy's "4 1/3 hours before midnight" was 7:40 p.m. Hence, both dates must be treated as civil time. The important feature only is to determine which Egyptian date ends the interval, that extends back to the true date of 1 Thoth. In the diagram (Table III, column 6), the day ending each interval is stippled. In No.1 instance, the eclipse position adds a part of a day to the interval. If this interval is less than 12 hours, as when eclipse occurs before midnight, it can not be designated as a whole day on the calendar without breaking the correlation of the calendars, and the two kinds of time involved. If the interval is more than 12 hours, as is the case when the eclipse occurs after midnight, then the Egyptian day of the eclipse is the end of the interval, as in Nos. 4, 9, 10, and 11.

For example: In No. 9, 200 B. C., according to the testimony of Ptolemy, we may look for an eclipse on 5 Mesore, "2 1/3 hours after midnight," which would be 334 days after 1 Thoth. In 200 B. C., 1 Thoth occurred 137 days earlier than in February, 747, (cf. leap-day Table V, p. 5^{-a}) or about the

middle of October; 334 days later than this point of Time, point to September for the eclipse. Oppolzer's Canon, No. 1547, p. 340, records just one lunar eclipse in the autumn of 200 B. C.--September 12 0^h 28^m. The equation, therefore, can be written that --

September12 0^h 28^m + 2^h 10^m (Oppolzer's eclipse in Alexandrian civil time) = "2 1/3 hours after midnight," 5 Mesore (Ptolemy's eclipse for Alexandria)

Oppolzer's date is 2:38 a.m., and Ptolemy's, 2:20 a.m. They are therefore both in civil time. To this eclipse and to one more of the series in Table III (No. 10), Ptolemy ascribes a single Egyptian date. This helps much in discovering the Julian date that corresponds to his beginning of the Nabonassar era. In No. 9, he counts the interval from the beginning of the "epoch" as 547 years, 334 days, and $14\frac{1}{4}$ hours ("Mathematikē Suntaxis," p. 281). These figures plainly declare that he was reckoning as if from February 27 as 1 Thoth in 747 B. C., which the following calendric argument shows:

If February 27 was 1 Thoth in 747 B. C., as the Egyptian New Year Table represents, then in 200 B. C., the new year would have receded 137 days to October 13, as given on page 2 of the Table. Ptolemy counted 5 Mesore -- the day of the eclipse -- as the 335th day of the year, which is the equivalent of 1 Thoth + 334 days. By adding 334 days to 1 Thoth, or October 13 (18+30+31+31+28+31+30+31+30+31+31+12), we get Sept. 12 as the result, which is Oppolzer's date for the eclipse.

Consequently, the 5th Mesore must be the end of the interval, and 1 Thoth is found by reckoning back 334 days from Sept. 12, thus making October 13 to be civil date for 1 Thoth in 200 B. C., and February 27 in 747 B. C. In column 9, the reckoning is reversed, adding 334 days to October 13, thus marking September 12 as the civil date of the eclipse. The ruling is therefore important that when the eclipse occurs after midnight, the Egyptian day in progress at that time is the end of the interval. Eclipse No. 10 Ptolemy also computes in the same way ("Idem," p. 300). Both eclipses are important witnesses for making February 27 the beginning of the Nabonassar era.

No. 11 offers a slight variation from the others, in that the eclipse occurs on the second Egyptian date mentioned by Ptolemy, that is, 20 Pharmuthi. But this position is established by the testimony of Censorinus, requiring July 21 ("12th of the calends of August") as 1 Thoth in the 4-year period from 136 to 139 A. D. His statement follows:

"The aeras of the Egyptians always commence on the first day of the month, Thoth, a day which, this present year, corresponds to the 7th calends of July, whilst a hundred years ago [139 A. D.], under the second consulate of the Emperor Antoninus Pius and of Bruttius Praesena, this same day corresponded to the 12th of the calends of August, the ordinary epoch of the rising of the Canicular star in Egypt. Thus we see that we are to-day really in the hundredth year of the Annus Magnus, which, as I have stated above, is called the solar and canicular year and Year of God."--"De Die Natali," tr. by Maude, p. 33. New York, 1900.

On the basis, therefore, of these well-authenticated Ptolemaic eclipses, eleven of which are given in Table III, and of the corresponding Oppolzer Canon eclipse dates in Julian time, the Egyptian New Year Table, is here offered with which to solve the double dating of papyrus, tablet and stone. 1 Thoth being established for the eclipse years, it was then possible to compute 1 Thoth for the intervening years, by simply making it one day earlier every fourth year. In this manner, the New Year Table was built up. When Egyptian dates are computed according to the position of 1 Thoth, as given in the Table for the various 4-year periods, the resulting dates will occur earlier by one day than their companion Aramaic dates, the one being given in astronomical time, and the Aramaic in civil time. (Comp. Tables I and II, cols. 7 and 16, p. 4). This difference of one day was demonstrated to have existed between ancient Egyptian and Jewish calendation. The synthetic tables here presented for the solution of this calendar problem -- the Jewish, based upon the two important principles governing the crucifixion date, and the Egyptian, definitely tied to two authentic canons of eclipses -- similarly differ by one day in their resultant computed dates.

With the exception of Papyrus "E," which investigators of this problem recognize to be an extra day out of alignment, the other eleven monument dates have this constant difference of one day. If the tables of Schram,

Ginzel or P. V. Neugebauer, should be substituted, the results would differ. Ginzel starts his Nabonassar era with February 27, the same as the Table here presents, but some of his 1 Thoth dates are out of agreement with important eclipses. However, when he comes to the year 139 A. D., he places the rising of Sirius on July 21 ("Handbuch der mathematischen und technischen Chronologie," p. 187. Leipzig, p. 1906). This is in harmony with Censorinus, and with the eclipse in 136 A. D., March 6, the 20th year of Hadrian. In commenting on the relation of Egyptian and Julian calendars, the following remark comes from Glenn Draper, Associate Astronomer, U. S. Naval Observatory:

"If one were privileged to tell early chronologers how to have dated their events in different calendars, the rule of correspondence should be, the day in progress one moment after noon. As it is, their confusion has come on down to modern times."--Glenn Draper, Washington, D. C., September 20, 1940.

Dr. O. Neugebauer, professor of mathematics in Brown University, finds the Egyptian dates in Schram and Ginzel too early to agree with a dated motion of the five major planets. He was therefore interested in the Egyptian Table here presented, that begins the Nabonassar era with February 27.

The principles of calendation employed in the construction and use of the Jewish Table (page 3), have been briefly outlined in the beginning of this discussion. It should be further stressed, however, that the small constant difference between the resultant Egyptian and Aramaic dates is of great importance in support of the calendar features that characterize the Jewish Table. The Egyptian calendar has no variations whatsoever; its months are each 30 days long, and five days are always added at the end of every year. The Jewish calendar is just the opposite -- varying all the time outside of its fixed feast period of seven months. Consequently, this constant difference of one day between the two systems of time reckoning -- a large portion of which is a permanent calendar arrangement that never changes -- shows that the last five months of the Jewish year, although subject to regular, repetitive change, are nevertheless balanced by the moon's motion. It is therefore these variable calendar months that exhibit this uniform difference between two very dissim-

ilar methods of time calculation. Such is the paradox existing between Jewish computations and the Egyptian Sothic Cycle.

The Cycle Table (page 5) is a rearrangement of the very revealing Wood 19-year cycles. Instead of conjunction dates, 1 Nisan dates have been substituted in laying out the calendar curve. This enables the passover limits to be demonstrated for the papyrus period. Papyrus "B" and Papyrus "E" point to April 10 and May 8, respectively, as the extreme dates for the passover. These limits are in harmony with those of Scaliger for the first century, April 8 to May 6, which are necessarily two days earlier at the end of a 600-year period of Julian time.

The irregular intercalation presented by Papyrus "E," which demands embolism in year 8 of Cycle 3 instead of year 7, has been a source of much comment by various scholars. Fotheringham says that irregular intercalation was a definite characteristic of the ancient Babylonian cycle. ("Monthly Notices of the Royal Astronomical Society," Vol. LXIX, p. 18). Yet he does not consider the papyri cycles Babylonian. He quotes Shürer as concluding that in the papyrus period, the intercalations "were determined on principles similar to those which guided the Sanhedrin at a later date when the weather and the state of the crops were considered as well as the course of the sun."--Idem. M. Oppert has also proved, by his contract tablets, that the intercalations of the Babylonian calendar were irregular. ("La fixation exacte de la chronologie des derniers rois de Babylone," Zeitschrift für Assyriologie, 1893, pp. 56-74). Consequently, the change in embolism in Papyrus "E," which represents the Jewish calendar, would seem to indicate that observation was governing the passover date, rather than a fixed mnemonic. The fact that the papyri dates keep 1 Nisan away from the equinox, that is, they do not place 1 Nisan on or before it, is also evidence of observation only, in the papyrus period. Calculation was introduced in the Maccabean era, about 112 B. C. (Albîrûnî, "Chronology of Ancient Nations," Tr. by Sachau, p. 68). The Macedonian leap month "Dioscorus," was also in use in Syria at this time (2Mac. XI:21).

In 45 B. C., the Julian calendar reform was initiated, and the finishing touches were added by Augustus, in 8 A. D. Thus the way was prepared for efficient calendar reckoning in the time of Christ, based upon both observation and calculation.

ANCIENT CALENDAR MONTHS

Egyptian		Hebrew			Macedonian
Thoth	30	Nisan	30		Xanthicus
Paophi	"	Iyar	29		Artemisius
Athyr	"	Sivan	30		Daesius
Choiak	"	Tammuz	29		Panemus
Tybi	"	Ab	30		Löus
Mechir	"	Elul	29		Gorpiaeus
Phamenoth	"	Tisri	30		Hyperberetaeus
Pharmuthi	"	Ḥesvan	29	(30)	Dius
Pachons	"	Kisleu	30	(29)	Apellaeus
Payni	"	Tebeth	29		Audynaeus
Epiphi	"	Shebat	30		Peritius
Mesore	35	Adar	29	(30)	Dystrus
		Veadar	29		Dioscorus

Macedonian months are considered commensurate with the Hebrew. This is asserted by Josephus, Scaliger, Brown and other chronologers.

C O N C L U S I O N S

The foregoing pages represent the synchronization of double-dated monuments -- papyrus, tablet and stone -- belonging to the ancient Persian period in the age of Ezra and Nehemiah. The problem necessitated the construction of calendar tables for both Egyptian and Jewish reckoning, according to which these historic dates could be computed. The use of these tables involved particular and exact specifications relating to calendation in these two kinds of time. The final solution of this calendar question has given assurance of the certainty and soundness of the principles herein employed. By the eclipse calculations, Ptolemy, Oppolzer, and the Egyptian Table of 1 Thoth dates agree. It is revealing to list the various features of the calendric outline, according to which the synchronization was made. The series pertaining to the two calendars -- Egyptian and Jewish -- follow the conclusions here offered:

1. The Egyptian New Year Table of 1 Thoth dates -- constructed on the basis of Ptolemy's catalog of eclipses, and of Oppolzer's "Canon der Finsternisse"-- is thereby able to certify computations made according to its 1 Thoth positions, which cover a period of 1600 years.

2. The Jewish Table -- built up upon the two crucifixion postulates, involving all the principles of calculation employed in the solution of the crucifixion date, and of the 1844 event of prophecy -- offers a specific method of Mosaic reckoning, which, by virtue of its coincidence with the ancient Egyptian system, is therefore attested by the supporting canons of the Egyptian calendar.

3. The constant, resultant one-day difference obtained in the computed dates, determined by the use of these two calendar Tables, is indicative of the certainty and precision of the calendar rules applied.

4. The fact that the calendric principles governing the crucifixion date, solved also the papyrus dates, and provided an independent calculation confirming the Millerite 1844 chronology, shows that all three epochs of prophecy are controlled by one and the same luni-solar system of calculation.

The following calendric series was employed in the solution of the problem --

1. <u>Jewish Calendation</u>

   (a) Jewish day calendar-dated by its second civil date.
   (b) Passover following Jewish full moon day in Jerusalem.
   (c) Passover limits (April 8 to May 6, 1st century) determined by barley harvest moons.
   (d) Length of Jewish year -- from passover to passover.

THE JEWISH CALENDAR IN THE FIFTH CENTURY B. C.

—Grace E Amadon

Introductory Note:

The papyri documents under consideration came from a Jewish colony established at Elephantine near the Nubian frontier under the protection of a Persian garrison. As early as 1878, it was recognized that the Aramaic papyri coming from Egypt pertained to the Persian administration in the age of Ezra and Nehemiah. Some of these papyri were found rolled up, tied and sealed. For nearly 2500 years, these seals had remained unbroken. Of additional interest is the fact that these texts were written by Jews, and, outside of the Bible, are among the earliest Jewish writings. In the words of the translator Mr. Cowley, "they present therefore a trustworthy picture of their surroundings, not distorted by lapse of time, nor obscured by textual corruption." ("Aramaic Papyri in the Fifth Century B. C.," Preface, p. xiv). Oxford, 1923.)

The confusion between modern Jewish computation and early Jewish reckoning, led the Greek author, M. L. Belleli, to doubt the authenticity of the Elephantine papyri, concerning which M. M. Sayce and A. E. Cowley made their report in 1900. After examining the double Semitic dates in these valuable documents, and finding them not in agreement with the modern Jewish calendar, Mr. Belleli summarily concluded that they were not authentic, completely overlooking the fact that in the 5th century B. C., modern Jewish computation had not yet been devised. The unsoundness of this opinion and conclusion has been ably refuted by various authors; furthermore, the futility of applying the principles of modern Jewish calendation to the Aramaic dates has been shown by Dr. Fotheringham in his criticism of E. B. Knobel's date argument ("Monthly Notices of the Royal Astronomical Society," Vol. LXIX, p. 12, ff. London, 1909).

Many attempts have been made by chronologers to reconstruct synthetically, an ancient method of Jewish calendation. The fact that modern Rabbinical computation does not agree with early Jewish dates is generally recog-

nized; but, even though this is often stressed, yet, the simple Mosaic principles that governed early Jewish time are almost completely overlooked. An important feature of the ancient history written in the various papyri, about which there is no doubt, relates to an order from the Persian king, Darius II, to keep the passover.

The command concerning the Passover was given in few words: "In the month of Tybi (?) let there be a Passover for the Jewish garrison" ("Aramaic Papyri in the Fifth Century B. C.," p. 60). The date is the 5th year of Darius. Although the papyrus is imperfect, and somewhat broken, yet enough remains to show that it gives instructions to keep the festival of unleavened bread. The edict continues: "Now you accordingly count fourteen days of the month Nisan, and keep the Passover, and from the 15th day to the 21st day of Nisan (are) seven days of Unleavened bread. Be clean and take heed. Do no work on the 15th day, and on the 21st day. Also drink no beer, and anything at all in which there is leaven do not eat, from the 15th day from sunset till the 21st day of Nisan, seven days, let it not be seen among you; do not bring (it) into your dwellings, but seal (it) up during these days. Let this be done as Darius the king commanded. (Address) To my brethren Yedoniah and his colleagues the Jewish garrison, your brother Hananiah" ("Idem," p. 63). Cowley's comment on this passover edict (Papyrus "No. 6" of Ungnad, and "Plate 6" of Sachau) is that it "removes all reason for doubting the genuineness of the Persian letters [by Artaxerxes] in Ezra" ("Idem," p. 62).

The papyri themselves, therefore, show that the members of the Jewish garrison in Elephantine and Assuan were fully acquainted with the Mosaic passover regulations that commanded this feast to be kept at sunset (Deut. 16:6) on the 14th of Nisan (Ex. 12:6). Consequently, it is fully in harmony with the circumstances forming the background of the Aramaic dates to offer a method of interpretation that is based on passover observance. The calendric outline (page 21) pertaining to the Aramaic or Jewish dates, has already been applied to the crucifixion date problem. In this calendar problem, it

is employed in a specific form as representative of Mosaic calendation.

The Egyptian calendar made use of in this solution is the same as has been standardized for Egyptian time, with the exception, that in harmony with Ptolemy's reckoning of intervals and eclipses, Oppolzer's "Canon," and the testimony of Censorinus, the Era of Nabonassar is made to begin on February 27 instead of February 26.

OUTLINE OF DISCUSSION

EGYPTIAN NEW YEAR (1 THOTH) TABLE AND ITS JULIAN EQUIVALENT DATE (NOON TO NOON, ASTRONOMICAL TIME -- FROM 1356 B.C. TO 238 A.D.)*

B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth
824	748-Feb 27	672	596	520	444	368
823	747 Nabonassar	671	595	519	443	367
822	746 Era	670	594	518	442	366
821-Mar 16	745-Feb 26	669-Feb 7	593-Jan 19	517-Dec 31	441-Dec 12	365-Nov 23
820	744	668	592	516	440 Papyrus "F"	364
819	743	667	591	515	439 Papyrus "G"	363
818	742	666	590	514	438	362
817-Mar 15	741-Feb 25	665-Feb 6	589-Jan 18	513-Dec 30	437-Dec 11	361-Nov 22
816	740	664	588	512	436	360
815	739	663	587	511	435	359
814	738	662	586	510	434	358
813-Mar 14	737-Feb 24	661-Feb 5	585-Jan 17	509-Dec 29	433-Dec 10	357-Nov 21
812	736	660	584	508	432	356
811	735	659	583	507	431	355
810	734	658	582	506	430	354
809-Mar 13	733-Feb 23	657-Feb 4	581-Jan 16	505-Dec 28	429-Dec 9	353-Nov 20
808	732	656	580	504	428	352
807	731	655	579	503	427	351
806	730	654	578	502	426	350
805-Mar 12	729-Feb 22	653-Feb 3	577-Jan 15	501-Dec 27	425-Dec 8	349-Nov 19
804	728	652	576	500	424	348
803	727	651	575	499	423	347
802	726	650	574	498	422	346
801-Mar 11	725-Feb 21	649-Feb 2	573-Jan 14	497-Dec 26	421-Dec 7	345-Nov 18
800	724	648	572	496	420 Papyrus "H"	344
799	723	647	571	495	419	343
798	722	646	570	494	418	342
797-Mar 10	721-Feb 20	645-Feb 1	569-Jan 13	493-Dec 25	417-Dec 6	341-Nov 17
796	720	644	568	492	416 Papyrus "J"	340
795	719	643	567	491	415	339
794	718	642	566	490	414	338
793-Mar 9	717-Feb 19	641-Jan 31	565-Jan 12	489-Dec 24	413-Dec 5	337-Nov 16
792	716	640	564	488	412	336
791	715	639	563	487	411	335
790	714	638	562	486	410 Papyrus "K"	334
789-Mar 8	713-Feb 18	637-Jan 30	561-Jan 11	485-Dec 23	409-Dec 4	333-Nov 15
788	712	636	560	484	408	332
787	711	635	559	483	407	331
786	710	634	558	482	406	330
785-Mar 7	709-Feb 17	633-Jan 29	557-Jan 10	481-Dec 22	405-Dec 3	329-Nov 14
784	708	632	556	480	404	328
783	707	631	555	479	403	327
782	706	630	554	478	402	326
781-Mar 6	705-Feb 16	629-Jan 28	553-Jan 9	477-Dec 21	401-Dec 2	325-Nov 13
780	704	628	552	476	400	324
779	703	627	551	475	399	323
778	702	626	550	474	398	322
777-Mar 5	701-Feb 15	625-Jan 27	549-Jan 8	473-Dec 20	397-Dec 1	321-Nov 12
776	700	624	548	472	396	320
775	699	623	547	471 Papyrus "A"	395	319
774	698	622	546	470	394	318
773-Mar 4	697-Feb 14	621-Jan 26	545-Jan 7	469-Dec 19	393-Nov 30	317-Nov 11
772	696	620	544	468	392	316
771	695	619	543	467	391	315
770	694	618	542	466	390	314
769-Mar 3	693-Feb 13	617-Jan 25	541-Jan 6	465-Dec 18	389-Nov 29	313-Nov 10
768	692	616	540	464 Papyrus "B"	388	312
767	691	615	539	463	387	311
766	690	614	538	462	386	310
765-Mar 2	689-Feb 12	613-Jan 24	537-Jan 5	461-Dec 17	385-Nov 28	309-Nov 9
764	688	612	536	460 Papyrus "D"	384	308
763	687	611	535	459	383	307
762	686	610	534	458	382	306
761-Mar 1	685-Feb 11	609-Jan 23	533-Jan 4	457-Dec 16	381-Nov 27	305-Nov 8
760	684	608	532	456	380	304
759	683	607	531	455	379	303
758	682	606	530	454	378	302
757-Feb 29 Mar 1	681-Feb 10	605-Jan 22	529-Jan 3	453-Dec 15	377-Nov 26	301-Nov 7
756	680	604	528	452	376	300
755	679	603	527	451 Papyrus	375	299
754 Mar 1	678	602	526	450 Ungnad "30"	374	298
753-Feb 28 29	677-Feb 9	601-Jan 21	525-Jan 2	449-Dec 14	373-Nov 25	297-Nov 6
752 Feb 28	676	600	524	448	372	296
751	675	599	523 Cambyse	447 Papyrus "E"	371	295
750	674	598	522 Tablet	446	370	294
749-Feb 27	673-Feb 8	597-Jan 20	521-Jan 1	445-Dec 13	369-Nov 24	293-Nov 5

(521-18 = Dec 31 = New)

* This period covers the Sothic Cycle from 1322 B.C. to 139 A.D. Date of 1 Thoth is placed opposite the Julian leap year, at which time it occurs a day earlier, and continues for four years. For example, February 27 is Egyptian new year day for years 749 to 746 B.C.

Papyrus "F" could stand intercalation in 442 instead of 441

Papyrus "E" shows where intercalation comes, because an extra day in 446 would make 3 too many instead of 2.

No "S" in 410 because of "E"

Thoth
Paophi
Athyr
Choiak
Tybi
Mechir
Phame.
Phar.
Pachons
Payni
Epiphi
Mesore

EGYPTIAN NEW YEAR (1 THOTH) TABLE AND ITS JULIAN EQUIVALENT DATE (NOON TO NOON, ASTRONOMICAL TIME -- FROM 1356 B.C. TO 238 A.D.)*

B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	B.C. 1 Thoth	A.D. 1 Thoth	A.D. 1 Thoth	A.D. 1 Thoth
292	216	140	64	13	89	165
291	215	139	63	14	90	166
290	214	138	62	15	91	167
289-Nov 4	213-Oct 16	137-Sep 27	61-Sep 8	16-Aug 20	92-Aug 1	168-Jul 13
288	212	136	60	17	93	169
287	211	135	59	18	94	170
286	210	134	58	19	95	171
285-Nov 3	209-Oct 15	133-Sep 26	57-Sep 7	20-Aug 19	96-Jul 31	172-Jul 12
284	208	132	56	21	97	173
283	207	131	55	22	98	174
282	206	130	54	23	99	175
281-Nov 2	205-Oct 14	129-Sep 25	53-Sep 6	24-Aug 18	100-Jul 30	176-Jul 11
280	204	128	52	25	101	177
279	203	127	51	26	102	178
278	202	126	50	27	103	179
277-Nov 1	201-Oct 13	125-Sep 24	49-Sep 5	28-Aug 17	104-Jul 29	180-Jul 10
276	200	124	48	29	105	181
275	199 Rosetta	123	47	30	106	182
274	198 Stone	122	46	31	107	183
273-Oct 31	197-Oct 12	121-Sep 23	45-Sep 4	32-Aug 16	108-Jul 28	184-Jul 9
272	196	120	44	33	109	185
271	195	119	43	34	110	186
270	194	118	42	35	111	187
269-Oct 30	193-Oct 11	117-Sep 22	41-Sep 3	36-Aug 15	112-Jul 27	188-Jul 8
268	192	116	40	37	113	189
267	191	115	39	38	114	190
266	190	114	38	39	115	191
265-Oct 29	189-Oct 10	113-Sep 21	37-Sep 2	40-Aug 14	116-Jul 26	192-Jul 7
264	188	112	36	41	117	193
263	187	111	35	42	118	194
262	186	110	34	43	119	195
261-Oct 28	185-Oct 9	109-Sep 20	33-Sep 1	44-Aug 13	120-Jul 25	196-Jul 6
260	184	108	32	45	121	197
259	183	107	31	46	122	198
258	182	106	30	47	123	199
257-Oct 27	181-Oct 8	105-Sep 19	29-Aug 31	48-Aug 12	124-Jul 24	200-Jul 5
256	180	104	28	49	125	201
255	179	103	27	50	126	202
254	178	102	26	51	127	203
253-Oct 26	177-Oct 7	101-Sep 18	25-Aug 30	52-Aug 11	128-Jul 23	204-Jul 4
252	176	100	24	53	129	205
251	175	99	23	54	130	206
250	174	98	22	55	131	207
249-Oct 25	173-Oct 6	97-Sep 17	21-Aug 29	56-Aug 10	132-Jul 22	208-Jul 3
248	172	96	20	57	133	209
247	171	95	19	58	134	210
246	170	94	18	59	135	211
245-Oct 24	169-Oct 5	93-Sep 16	17-Aug 28	60-Aug 9	136-Jul 21	212-Jul 2
244	168	92	16	61	137	213
243	167	91	15	62	138 End of	214
242	166	90	14	63	139 Sothic Cycle	215
241-Oct 23	165-Oct 4	89-Sep 15	13-Aug 27	64-Aug 8	140-Jul 20	216-Jul 1
240	164	88	12	65	141	217
239	163	87	11	66	142	218
238	162	86	10	67	143	219
237-Oct 22	161-Oct 3	85-Sep 14	9-Aug 26	68-Aug 7	144-Jul 19	220-Jun 30
236	160	84	8	69	145	221
235	159	83	7	70	146	222
234	158	82	6	71	147	223
233-Oct 21	157-Oct 2	81-Sep 13	5-Aug 25	72-Aug 6	148-Jul 18	224-Jun 29
232	156	80	4	73	149	225
231	155	79	3	74	150	226
230	154	78	2	75	151	227
229-Oct 20	153-Oct 1	77-Sep 12	1-Aug 24	76-Aug 5	152-Jul 17	228-Jun 28
228	152	76	1	77	153	229
227	151	75	2	78	154	230
226	150	74	3	79	155	231
225-Oct 19	149-Sep 30	73-Sep 11	4-Aug 23	80-Aug 4	156-Jul 16	232-Jun 27
224	148	72	5	81	157	233
223	147	71	6	82	158	234
222	146	70	7	83	159	235
221-Oct 18	145-Sep 29	69-Sep 10	8-Aug 22	84-Aug 3	160-Jul 15	236-Jun 26
220	144	68	9	85	161	237
219	143	67	10	86	162	238 Censorinus
218	142	66	11	87	163	239
217-Oct 17	141-Sep 28	65-Sep 9	12-Aug 21	88-Aug 2	164-Jul 14	240-Jun 25

* This period covers the Sothic Cycle from 1322 B.C. to 139 A.D. Date of 1 Thoth is placed opposite the Julian leap year, at which time it occurs a day earlier, and continues for four years. For example, February 27 is Egyptian new year day for years 749 to 746 B. C.

PASSOVER METHOD FOR DETERMINING JULIAN EQUIVALENT OF ARAMAIC DATES*

YEAR	FULL MOON G.M.T.**	NISAN 13 J.C.T.	NISAN 14 J.C.T.	NISAN 1 J.C.T.	CONJUNCTION MER. CIV. T.	TRANSLATION PERIOD (DAYS)	LENGTH OF YEAR (DAYS)		
481	May 4.04	4.63	May 5	Apr 22	Apr 19.28	2.47			
480	Apr 23.12	23.71	Apr 24	Apr 11	Apr 8.99	1.76	(11)	354	
479	Apr 12.16	12.75	Apr 14	Apr 1	Mar 29.64	2.10	(12)	355	
478	Apr 30.93	31.52	May 2	Apr 19	Apr 17.58	1.16	(13)	383	
477	Apr 19.38	19.97	Apr 21	Apr 8	Apr 5.90	1.84	(14)	355	
476	Apr 9.03	9.62	Apr 10	Mar 28	Mar 25.95	1.79	(15)	354	
475	Apr 28.04	28.63	Apr 29	Apr 16	Apr 13.64	2.10	(16)	384	
474	Apr 17.71	18.30	Apr 19	Apr 6	Apr 2.80	2.94	(17)	355	
473	May 5.62	6.21	May 7	Apr 24	Apr 20.68	3.06	(18)	384	
472	Apr 24.89	25.48	Apr 26	Apr 13	Apr 10.27	2.47	(19)	354	6939 DAYS
471	Apr 13.93	14.52	Apr 15	Apr 2	Mar 30.98	1.76	(1)	354	
470	May 2.61	3.20	May 4	Apr 21	Apr 18.99	1.75	(2)	384	
469	Apr 20.83	21.42	Apr 22	Apr 9	Apr 7.51	1.23	(3)	354	
468	Apr 10.35	10.94	Apr 12	Mar 30	Mar 27.73	2.01	(4)	355	
467	Apr 29.34	29.93	May 1	Apr 18	Apr 15.42	2.32	(5)	384	
466	Apr 19.06	19.65	Apr 20	Apr 7	Apr 4.45	2.29	(6)	354	
465	May 7.04	7.63	May 8	Apr 25	Apr 22.21	2.53	(7)	384	
464	Apr 26.52	27.11	Apr 28	Apr 15	Apr 11.63	3.11	(8)	355	
463	Apr 15.73	16.32	Apr 17	Apr 4	Apr 1.29	2.45	(9)	354	
462	May 4.40	4.99	May 6	Apr 23	Apr 20.30	2.44	(10)	384	19 YEAR CYCLE
461	Apr 22.45	23.04	Apr 24	Apr 11	Apr 8.96	1.78	(11)	354	
460	Apr 11.75	12.34	Apr 13	Mar 31	Mar 29.40	1.34	(12)	354	
459	Apr 30.68	31.27	May 2	Apr 19	Apr 17.18	1.56	(13)	384	
458	Apr 20.36	20.95	Apr 22	Apr 9	Apr 6.23	2.51	(14)	355	
457	Apr 9.05	9.64	Apr 10	Mar 28	Mar 25.31	2.43	(15)	354	
456	Apr 28.02	28.61	Apr 29	Apr 16	Apr 13.12	2.62	(16)	384	
455	Apr 17.44	18.03	Apr 19	Apr 6	Apr 2.61	3.12	(17)	355	
454	May 6.18	6.77	May 8	Apr 25	Apr 21.59	3.15	(18)	384	
453	Apr 24.22	24.81	Apr 26	Apr 13	Apr 10.31	2.43	(19)	354	6940 DAYS
452	Apr 13.32	13.91	Apr 15	Apr 2	Mar 30.92	1.82	(1)	354	
451	May 2.14	2.73	May 4	Apr 21	Apr 18.82	1.92	(2)	383	
450	Apr 21.67	22.26	Apr 23	Apr 10	Apr 8.02	1.72	(3)	355	
449	Apr 10.36	10.95	Apr 12	Mar 30	Mar 27.05	2.69	(4)	355	
448	Apr 29.38	29.97	May 1	Apr 18	Apr 14.76	2.98	(5)	384	
447	Apr 18.97	19.56	Apr 20	Apr 7	Apr 4.02	2.72	(6)	354	
446	Apr 8.30	8.89	Apr 10	Mar 28	Mar 24.59	3.15	(7)	355	(384)
445	Apr 26.02	26.61	Apr 27	Apr 14	Apr 11.61	2.13	(8)	383	(354)
444	Apr 15.04	15.63	Apr 16	Apr 3	Apr 1.31	1.43	(9)	354	Change of Embolism
443	May 3.74	4.33	May 5	Apr 22	Apr 20.28	1.46	(10)	384	
442	Apr 23.07	23.66	Apr 24	Apr 11	Apr 9.71	1.03	(11)	354	
441	Apr 11.67	12.26	Apr 13	Mar 31	Mar 28.84	1.90	(12)	355	
440	Apr 30.69	31.28	May 2	Apr 19	Apr 16.52	2.22	(13)	384	19 YEAR CYCLE
439	Apr 20.37	20.95	Apr 22	Apr 9	Apr 5.60	3.14	(14)	355	
438	Apr 9.90	10.49	Apr 11	Mar 29	Mar 25.97	2.77	(15)	354	
437	Apr 27.72	28.31	Apr 29	Apr 16	Apr 12.92	2.82	(16)	384	
436	Apr 16.83	17.42	Apr 18	Apr 5	Apr 2.61	2.13	(17)	354	
435	May 5.50	6.09	May 7	Apr 24	Apr 21.62	2.12	(18)	384	
434	Apr 24.61	25.20	Apr 26	Apr 13	Apr 11.24	1.50	(19)	354	6939 20818= DAYS IN 3 CYCLES
433	Apr 13.02	13.61	Apr 14	Apr 1	Mar 30.58	1.16	(1)	354	
432	May 1.97	2.56	May 3	Apr 20	Apr 18.30	1.44	(2)	384	
431	Apr 21.68	22.27	Apr 23	Apr 10	Apr 7.33	2.41	(3)	355	
430	Apr 11.36	11.95	Apr 13	Mar 31	Mar 27.48	3.26	(4)	355	
429	Apr 29.27	29.86	May 1	Apr 18	Apr 14.34	3.40	(5)	384	
428	Apr 18.57	19.16	Apr 20	Apr 7	Apr 3.91	2.83	(6)	354	
427	May 7.29	7.88	May 9	Apr 26	Apr 22.92	2.83	(7)	384	
426	Apr 26.31	26.90	Apr 28	Apr 15	Apr 12.63	2.11	(8)	354	
425	Apr 14.50	15.09	Apr 16	Apr 3	Apr 1.16	1.58	(9)	354	
424	May 3.37	3.96	May 5	Apr 22	Apr 19.99	1.75	(10)	384	19 YEAR CYCLE
423	Apr 22.98	23.57	Apr 24	Apr 11	Apr 9.11	1.63	(11)	354	
422	Apr 12.70	13.29	Apr 14	Apr 1	Mar 29.14	2.60	(12)	355	
421	Apr 30.69	31.28	May 2	Apr 19	Apr 15.89	2.85	(13)	384	
420	Apr 20.20	20.79	Apr 22	Apr 9	Apr 5.28	3.46	(14)	355	
419	Apr 9.41	10.00	Apr 11	Mar 29	Mar 25.91	2.83	(15)	354	
418	Apr 28.09	28.68	Apr 29	Apr 16	Apr 13.93	1.81	(16)	383	
417	Apr 16.14	16.73	Apr 18	Apr 5	Apr 2.61	1.12	(17)	354	
416	May 4.90	5.49	May 6	Apr 23	Apr 21.54	1.20	(18)	384	
415	Apr 24.34	24.93	Apr 26	Apr 13	Apr 10.86	1.88	(19)	355	6940 27758= DAYS IN 4 CYCLES
414	Apr 13.98	14.57	Apr 15	Apr 2	Mar 30.92	1.82	(1)	354	
413	May 2.00	2.59	May 3	Apr 20	Apr 17.60	2.14	(2)	384	
412	Apr 21.67	22.26	Apr 23	Apr 10	Apr 6.78	2.96	(3)	355	
411	Apr 11.09	11.68	Apr 12	Mar 30	Mar 27.24	2.50	(4)	354	
410	Apr 29.86	30.45	May 1	Apr 18	Apr 15.23	2.51	(5)	384	
409	Apr 17.90	18.49	Apr 19	Apr 6	Apr 3.93	1.81	(6)	354	
408	May 6.59	7.18	May 8	Apr 25	Apr 22.93	1.82	(7)	384	
407	Apr 25.80	26.39	Apr 27	Apr 14	Apr 12.46	1.28	(8)	354	
							(9)	355	

* The Passover dates, reckoned from full moon, determine length of year, which, in turn, establishes the length of each month.

** Ginzel, "Handbuck der mathematischen und technischen Chronologie," Vol. II. Astronomical dates are reduced to Jerusalem Civil Time (J.C.T.) by adding to each G.M.T. date $14^{h}\ 20^{m}$, or .59 of a day.

Ancient Egyptian Monument Dates, Based on 365-Day Year Ptolemy's "Mathematical Syntaxis," the Reckoning of which Began at Noon, Feb. 26/27, 747 B.C.

ANALOGUE OF ANCIENT EGYPTIAN, JEWISH, AND MACEDONIAN DATES

A Calendar Problem

Ancient Aramaic Observation Dates of Papyrus, Tablet, and Stone Computed in Jerusalem Civil Time (Julian Calendar) from Ginzel Tables.

TABLE I EGYPTIAN CALENDAR (Alexandrian Astronomical Time)

Series Number* 1		Persian Regnal Year 2	Julian Year B. C. 3	Date of 1 Thoth (pp.1,2) 4	Egyptian Date on Papyrus 5	Egyptian Interval From 1 Th. 6	Julian Date Alex. M.T. Noon 7	Calendar Difference 8
1	"400"	7 Cambyses	56 523	Jan.(1)2	17 Phamenoth	196	July 17	+1
2	"A"	15 Xerxes	69 471	Dec.(19) 20	28 Pachons	267	Sept 13	+1
3	"B"	1 Artaxerxes	71 465	Dec.(17) 18	17 Thoth	16	Jan 3	+1
4	"D"	6 Artaxerxes	72 460	Dec.(16) 17	1 Mesore	330	Nov 12	+1
5	"30"	9 Artaxerxes	74 451	Dec.(14) 15	4 Thoth	3	Dec 18	+1
6	"E"	19 Artaxerxes	75 447-6	Dec.(13) 14	10 Mesore	339	Nov 18	+2
7	"F"	25 Artaxerxes	77 440	Dec.(11) 12	19 Pachons	258	Aug 27	+1
8	"G"	No Year	77 439	Dec.(11) 12	6 Epiphi	305	Oct 13	+1
9	"H"	4 Darius	82 420	Dec.(6) 7	Payni	269-299	Sept 1 to Oct 1	+1
10	"J"	9 Darius	82 416	Dec.(5) 6	12 Thoth (11)	11	Dec 17	+1
11	"K"	14 Darius	84 410	Dec.(4) 5	8 or 9 Athyr	678	Feb 10	+1
12	"R.S."	9 Ptol. Epiph.	137 199	Oct.(12) 13	18 Mechir	167	Mar 29	+1

TABLE II ARAMAIC (JEWISH) CALENDAR (Jerusalem Civil Time)

Jewish Regnal Year 9	Passover 14 Nisan J.C.T. 10	Year Length (Days) 11	1 Nisan Civil Date 12	Translation Period 13	Aramaic Date on Papyrus 14	Aramaic Interval From 1 Nis. 15	Julian Equivalent Date Jer.C.T. 16
7 Cambyses 523	Apr 20		Apr 7[a]	1.75	14 Tammuz	102	July 18
14 Xerxes 471	Apr 15	384	Apr 2	1.76	18 Elul	165	Sept 14
21 Xerxes 465	May 8	355	Apr 25	2.53	18 Kisleu	254	Jan 4
5 Artaxerxes 460	Apr 13	384	Mar 31	1.35	21 "Hesvan"	227	Nov 13
8 Artaxerxes 451	May 4	354	Apr 21	1.93	7 Kisleu	242	Dec 19
19 Artaxerxes 446	Apr 10	383	Mar 28	3.15	2 Kisleu	237	Nov 20
24 Artaxerxes 440	May 2	355	Apr 19	2.22	14 Ab	131	Aug 28
No year (446)	Apr 22	354	Apr 9	3.15	23 Tisri (26)	199 ×	Oct 14
3 Darius 420	Apr 22	354	Apr 9	3.46	Elul	147-176	Sept 3 to Oct 2
8 Darius 416	May 6	355	Apr 23	1.20	3 Kisleu	239	Dec 18
13 Darius 411	Apr 12	384	Mar 30	2.50	24 Shebat	318	Feb 12
8 Ptol. Epiph.	Apr 9		Mar 27	3.33	4 Xanthicus	3	Mar 30

[a] New Moon (Guinness, p.194) J.C.T. = Apr 4.99 Tr. Per. = 4.99 − 3.97 = .01 .25 1.02 1.28

TABLE III PTOLEMAIC LUNAR ECLIPSE CHECK ON EGYPTIAN NEW YEAR TABLE

× Last day of Pachons and Last day of Payni

Series Number* 1	Regnal Year 2	Julian Year B. C. 3	Date of 1 Thoth (pp. 1,2) 4	Egyptian Interval From 1 Th. 5	Oppolzer's Julian Dates of Eclipses (Green. Civ.Time) 6	Ptolemaic and Exact Eclipses	Egyptian Dates Position of (pp. 9,10) 7	Full Moon Date of Eclipses(Ginzel) (Alex. Civ. Time) 8	Computation of Eclipses in Ptolemy's Catalog by Egyptian New Year Table (Alexandrian Civil Time) 9
1	1 Mardokempad	721	Feb. 20	28	Mar 19 29 30 "Thoth" p. 219		"3 1/3 hr. before mid."	Mar 19.91[a]	Feb 20+28=8+19=Mar 19
2	2 Mardokempad	720	" 20	16	Mar 8 18 19 "Thoth" p. 236		"5/6 hr. before midnight."	Mar 9.06[a]	Feb 20+16=8+8=Mar 8
3	2 Mardokempad	720	" "	179+14	Sept 1 15 16 "Phamenoth"		"4 1/3 hr. before midnight"	Sept 1.76[a]	Feb 20+193=8+31+30+31+30+31+31+1=Sept 1
4	5 Nabopollassar	621	Jan. 27	59+27	Apr 22 27 28 "Athyr"		"5 hr. after midnight"	Apr 22.27[a]	Jan 27+86=5+29+31+22=Apr 22
5	7 Cambyses	523	Jan. 2	179+16	July 16 17 18 "Phamenoth"		"1 hr. before midnight"	Jul 17.05[a]	Jan 2+195=29+28+31+30+31+30+16=July 16
6	20 Darius	503-2	Dec. 28	299+27	Nov 19 28 29 "Epiphi" p. 242		"1 1/4 hr. before midnight"	Nov 20.06[a]	Dec 28+326=3+31+28+31+30+31+30+31+31+30+31+19=Nov 19
X 7	31 Darius	491	Dec. 25	119+2	Apr 25 3 4 "Tybi" p. 239		"midst of 6th hour of night"	Apr 25.92	Dec 25+121=6+31+28+31+25=Apr 25
8	Archon Phenostratos	383-2	Nov. 28	179+23	June 18 24 25 "Phamenoth" p. 248-9		"8 1/4 hr. after noon of 24th"	June 18.87	Nov 28+202=2+31+31+28+31+30+31+18=June 18
9	55th of 2nd Callipic period	200	Oct. 13	329+5	Sept 12 5 "Mesore" p. 252		"2 1/3 civ. hr. after mid."	Sept 12.11	Oct 13+334=18+30+31+31+28+31+30+31+30+31+31+12=Sept 12
10	197th from Alexander	129-8 A.D.	Sep. 25	209+10	May 2 11 "Pharmuthi" p. 271		"5 civ. hr. before noon 11th"	May 2.28	Sept 25+219=5+31+30+31+31+28+31+30+2=May 2
11	20 Hadrian	135-6	Jul. 21	209+20	Mar 19 20 6 "Pharmuthi" p. 229		"4 hr. after midnight"	Mar 6.01	July 21+229=10+31+30+31+30+31+31+29+6=Mar 6
12	Sirius rose at Alexandria	139	July 21		Censorinus, "De Die Natali," tr. by Maude, p. 33. New York, 1900.				
13	Sirius rose	238	June 25						

[a] Nos. 2, 5 and 6 run over into another day, because of the Guinness constants ("Idem, col.9).

Thoth Paophi athyr Choiak Tybi Mechir Phamenoth Pharmuthi Pachon Payni Epiphi Mesore

Page 184 17 Hadrian

* References on pages 6-10

p. 247, 248 = 26/27 Thoth (5½h after mid.)

[a] Guinness, Vol. II, p. xlviii

COMPUTATIONS EMPLOYED IN ANALOGUE TABLES I,II,III

1. Procedure in Computation of Egyptian Dates (Table I)

From Egyptian New Year Table (pp. 1,2), find Julian date (4) for 1 Thoth of specified year. Determine interval (6) from 1 Thoth to Egyptian date (5) inclusive (col. 5), and add interval to civil date of 1 Thoth. Resultant figure (7) is Julian equivalent in astronomical time (noon to noon) for the Egyptian date of papyrus, tablet or stone, as the case may be.

For example: In the year 465 B. C. (Papyrus "B"), the civil date for the Egyptian new year is Dec 18 (col. 4), corresponding to a noon-to-noon day. Interval from 1 Thoth to 17 Thoth (Papyrus date, col 5) is 16 days. Add 16 days to Dec 18 and get Jan 3 -- the Julian equivalent in astronomical time for 17 Thoth in year 465-464 B. C. To this date add one calendar day to reduce to Jewish civil time. Result is Jan 4, the coincident Aramaic date in Papyrus "B." (Comp. col. 16.)

2. Procedure in Computation of Jewish or Aramaic Dates (Table II)

From Jewish Passover Table (page 3), find Julian date for 1 Nisan of specified year, and note also length of year between passovers, as given in last column. (The length of the Jewish year determines the length of its variable months. If the year has an extra day, as in a 355-day year, that day is given to Ḥesvan; if the year is short one day, as in a 383-day year, a day is taken from Kisleu.) Determine interval from 1 Nisan to Aramaic papyrus date inclusive, and add to civil date of 1 Nisan. Resultant figure is the Julian equivalent, in Jerusalem civil time, of the Aramaic date.

For example: In the year 465 (Papyrus "B"), 1 Nisan is dated Apr 25 (col. 12), and the length of year is 355 days (last column of Passover Table). Ḥesvan gets the extra day, and is therefore 30 days long, making the interval from 1 Nisan to 18 Kisleu, 254 days. Add 254 days to April 25 (5+31+30+31+31+30+31+30+31+4), and the result is Jan 4, the Julian civil date of 18 Kisleu. This whole computation is based on the simple fact that the ancient Jewish Passover followed the Jewish day of full moon in Jerusalem at the time of barley harvest.

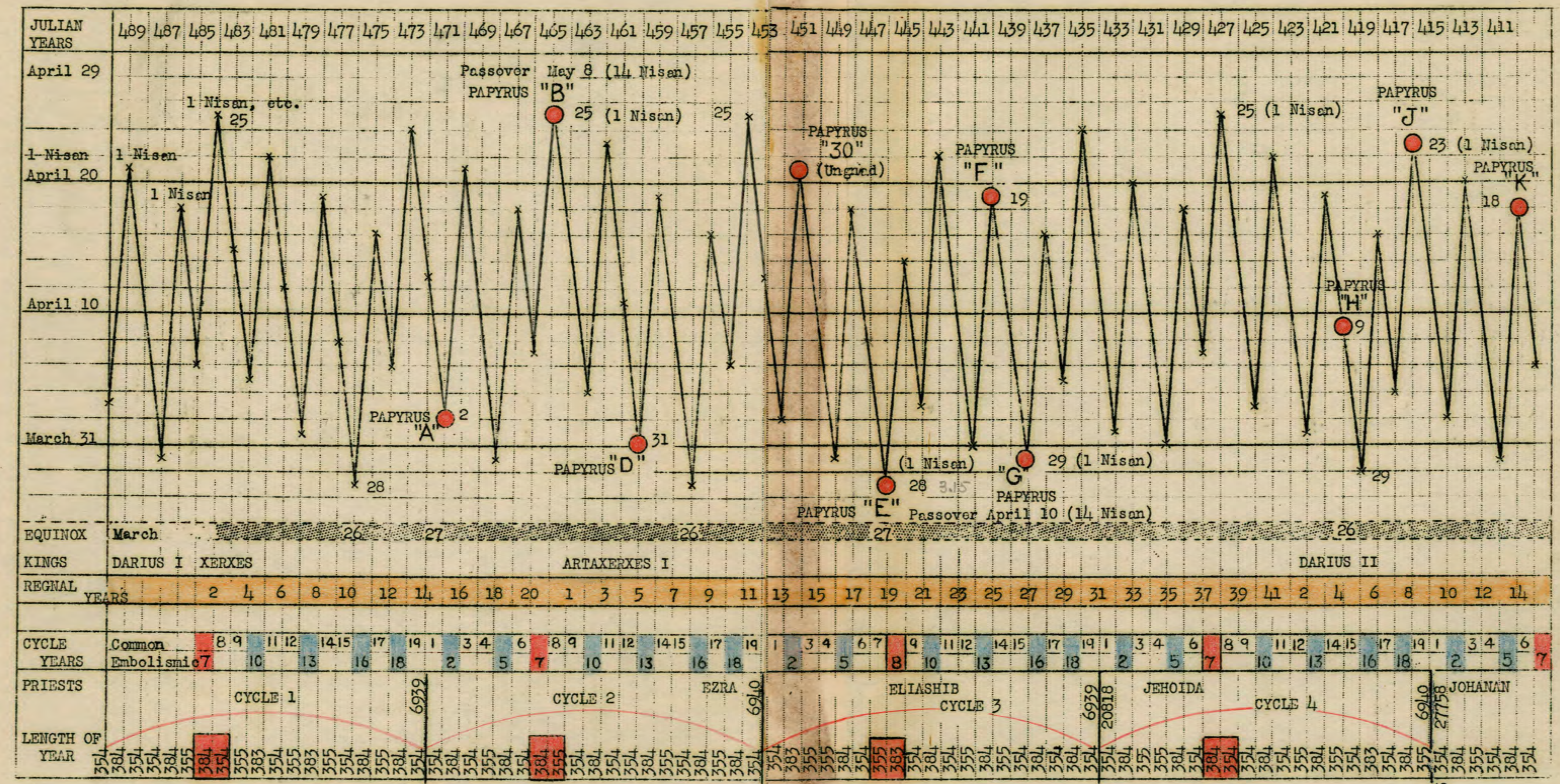
It is always necessary to take note of the Julian leap years, when February has 29 days. If the year B. C., when divided by 4 has a remainder of 1, then it is a leap year. But, as in the case of the year 465, which had its leap day in early spring, the computation does not always pass over the leap month, and this fact has to be carefully watched.

3. Procedure in Computation of Ptolemaic Eclipses (Table III)

Each eclipse is worked out in connection with Table III, and discussed in detail on pages 11 to 19.

CONSTRUCTION OF ARAMAIC CALENDAR IN TIME OF EZRA AND NEHEMIAH
(Nisan Limits Marked by Assuan Papyri)*

* Cowley, A.E., "Aramaic Papyri of the Fifth Century B.C.," p. 10, ff. Oxford, 1923.



(From passover to passover -- reckoned from Ginzel moon tables)

Change of Embolism

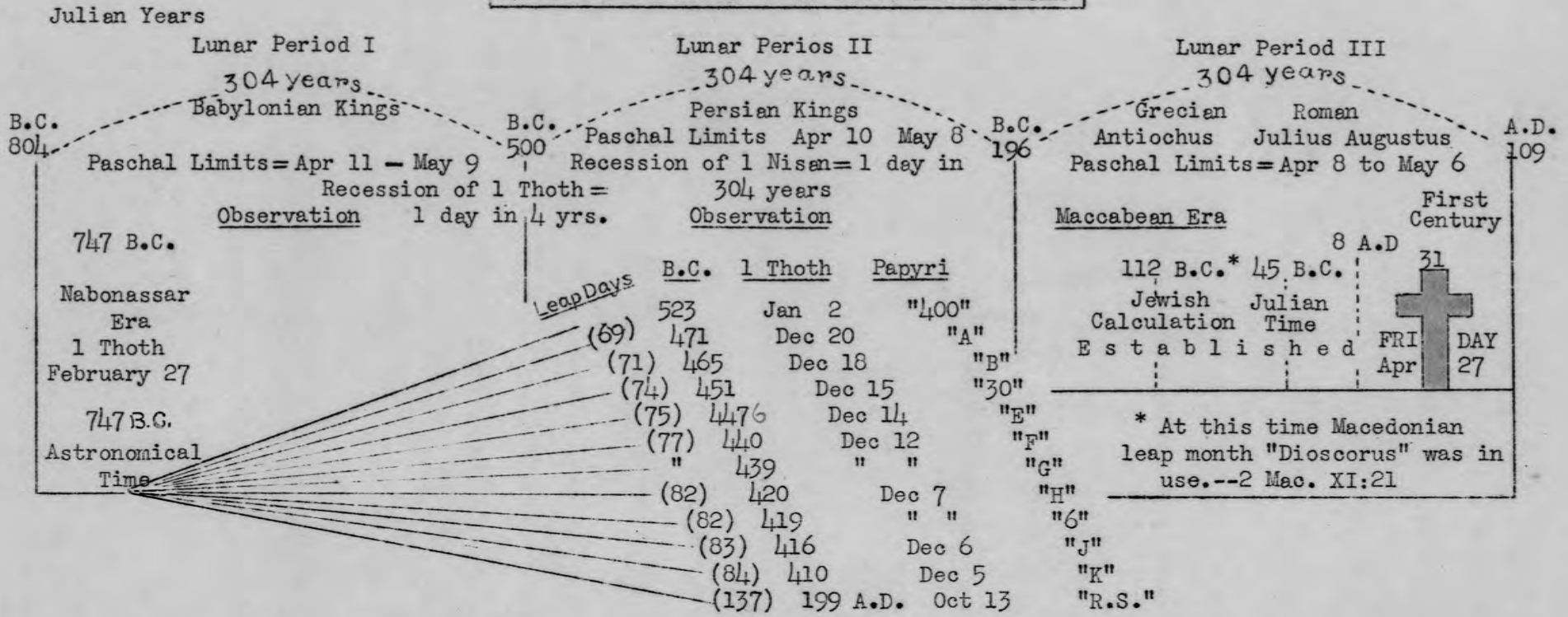
20819.06 (Days)

Mnemonic Restored

27758.75

In the accompanying diagram, the papyri, with one exception, occur at the earliest and latest limits of 1 Nisan. By counting ahead to 14 Nisan, it may be noted that the passover limits in this century are from the date April 10 to May 8. (Cf. "E" and "B".) These limits are in harmony with those of the first century A.D., that Scaliger reports as April 8 to May 6 ("De Emendatione Temporum," p. 265), and which would of necessity be dated two days earlier, owing to the earlier occurrence of the moon one day every 300 years on the Julian calendar (Scaliger, "De Emendatione Temporum," p. 70). The papyri dates therefore confirm Scaliger's testimony, which he derived from early Jewish cycles he had in hand.

RECESSION OF ARAMAIC AND EGYPTIAN NEW YEARS



Each year in the accompanying diagram corresponds to a certain number of leap days, as reckoned from the beginning of the Nabonassar Era, February 27, 747 B.C. Inasmuch as 1 Thoth, the Egyptian new year, slips back one day every 4 years, the position of 1 Thoth for any year, will be just as many days earlier than February 27, as there are leap days in the interval between 747 and the selected year (of course in advance of the beginning of the era). The following series of months corresponds to the monthly position of 1 Thoth during the Sothic Cycle from 1322 B.C. to 139 A.D.:

B. C.		
1369	-- 1246	July
1249	-- 1126	June
1125	-- 1002	May
1001	-- 882	April
881	-- 759	March
758	-- 642	February
641	-- 518	January

B. C.		
517	-- 394	December
393	-- 274	November
273	-- 150	October
149	-- 30	September
A.D.		
29	-- 95	August
96	-- 219	July

TABLE p. 5a

PAPYRUS REFERENCES FOR ANALOGUE TABLE (PAGE 6)

(Translated by A. E. Cowley from original texts)

Papyrus "A" -- Grant of building rights. Date said to be quite certain, 471 B. C. Found rolled up, tied, and sealed.

Translation of Date: "On the 18th of Elul, that is the 28th day of Pahons, year 15 of King Xerxes, etc."--Cowley, A. E., "Aramaic Papyri of the Fifth Century B. C.," p. 11. Oxford, 1923.

Papyrus "B" -- Concerning property rights. Papyrus is almost perfect, but the number in the Egyptian month is broken. Gutesmann and Hontheim calculate "17" to be the required number. Fotheringham and Shürer -- and therefore Ginzel, who made all the calculations for Shürer --favor "17 Thoth" (Monthly Notices of the Royal Astronomical Society, Vol. LXIX, 1909, p. 14).

Translation of Date: "On the 18th of Chisleu, that is the 7th (17th, in harmony with foregoing) day of Thoth, in year 21, the beginning of the reign when King Artaxerxes sat on his throne, etc."--Idem, p. 16.

Papyrus "D" -- Translation of Date: "On the 21st of Chisleu, that is the 1st day of Mesore, the 6th year of Artaxerxes, the king, etc."-- Idem, p. 23.

Concerning this papyrus, Cowley reasons that Artaxerxes I is signified because the transaction relates to the same persons whose names appear in "B." But the 21st Kisleu as 1 Mesore would mean that 1 Thoth would have to occur a month earlier than its position in the 6th of Artaxerxes -- Dec. 16/17 for 460 B. C. -- and Fotheringham and Shürer solve the difficulty by making the Aramaic date read a month earlier, that is, as 21 Hesvan, instead of 21 Kisleu. With this reading, the synchronism is exact. See Fotheringham's "Calendar Dates," in Monthly Notices of the Royal Astronomical Society, Vol. LXIX, p. 15.

Papyrus "30" -- Ungnad No. "30" is the same as No. "10" in Cowley. Papyrus refers to a contract for a loan. Was a long document almost perfectly preserved, found still folded, tied and sealed.

Translation of Date: "On the 7th of Chisleu, that is the 4th day of the month Thoth, the 9th year of Artaxerxes the king, etc."--"Aramaic Papyri," p. 30.

The synchronization does not take place in the 9th of Artaxerxes, as reckoned from his first year in 464 B. C., but from the 9th year after the revolt of Egypt in 460 B. C., as soon as the Persians had again obtained control. The coincident year of the two dates is 451 B. C. Although the war, incited by the Libyan king Inaros, lasted six years (Thucydides, "History of the Peloponnesian War," Book 1, CVIII. 5-CX. 2. p. 183. Tr. Smith. Harvard Press, 1935), yet in a short time "the remnant of the Persians held out, and gave Artaxerxes time to send a new army to their aid" (Brugsch, Henry, "History of Egypt," Second Edition, p. 332. London, 1881). Dr. Brugsch quotes the text of a rock-inscription, in which the Persian eunuch Aliurta mentions his service under Artaxerxes as "the five years of the king of Upper and Lower Egypt, the sovereign, Arta-khshesesh (Artaxerxes), and the 16 years, etc." Evidently the Egyptian revolt in 460 B. C., resulted in the two periods of Aliurta's office (Idem, p. 314), and Papyrus "30" seems to confirm this short lapse of Persian rule.

Papyrus "E" -- Cowley says that "a peculiarity of this text is the number of mistakes in spelling, though the scribe, Nathan b. Ananiah, must have been a professional notary, since he also wrote Nos. 10 and 15."

Translation of Date: "On the 3rd of Chisleu, that is the 10th day of the month Mesore, year 19 of Artaxerxes the king, etc."-- "Aramaic Papyri," p. 38.

In Cowley's comment on this date, he says: "According to Gutesmann it should be Chisleu 2 = Mesore 10, or Chisleu 3 = Mesore 11. Hontheim reads 2."-- Idem. It would be easier to drop a figure out of the Aramaic text than to insert one. Hence we accept the alternative reading, "Chisleu 2 = Mesore 10."

Papyrus "F" -- Settlement of claim. Date is 441-440 B. C.

Translation of Date: "On the 14th of Ab, that is the 19th day of Pahons, year 25 of Artaxerxes the king, etc."-- Idem, p. 42. "The papyrus is in an excellent state of preservation."

Papyrus "G" -- Marriage contract. "About 441 B. C." Text shows that the number of the king's year is lost, for the first line is much broken. Cowley says that the text is very difficult, "partly owing to its broken condition, and partly to the many unknown words." Owing to the age of the sons, "present marriage cannot have taken place much after 440." Synchronization does occur in 439 B. C. for 23rd of Tisri. The date for Tisri is uncertain.

Translation of Date: "On the 25th (?) of Tisri that is the 6th day of the month Epiphi, year. . . of Artaxerxes the king, etc."-- Idem, p. 45.

Papyrus "H" -- Settlement of a claim. 420 B. C. "The date is the 4th year of Darius, who must be Darius II, and the year is therefore 420 B. C."

Translation of Date: "In the month Elul, that is Payni, 4th year of Darius the king at that time in Yeb the fortress, etc."-- Idem, p. 58.

Cowley's comment: "The day of the month is not given, which is unusual. The Egyptian month may be Payni or Paophi. From the calculations of Mr. Knobel and Dr. Fotheringham,it seems that Payni suits the chronology best. So also Gutesmann."-- Idem, p. 59.

Since Elul has 29 days, and Payni, 30, the coincidence would have to occur either at the beginning or end of the month. In 420, it occurred at the end of Elul and Payni.

Papyrus "J" -- Renunciation of claim. "The date, which is given twice, is the 8th (Egyptian 9th) year of Darius (II) = 416 B. C."-- Idem, p. 83. Cowley further comments on the date, saying that "the Egyptian year began with Thoth, and did not coincide with the Jewish year beginning with Nisan. This synchronism is important." Idem.

Translation of Date: "On the 3rd of Chisleu, year 8, that is the 12th day of Thoth, year 9 of Darius the king at that date in Yeb the fortress, etc."-- Idem, p. 85.

Papyrus "K" -- Assignment of slaves. Papyrus very well preserved, and "hardly any letter really doubtful." Cowley emphasizes the double reckoning of the regnal years, that counts 13 Jewish and 14 Egyptian for Darius II in Shebat and Athyr in 412-411 B. C. (Idem, p. 103.)

Translation of Date: "On the 24th of Shebat, year 13, that is the 9th day of Athyr, year 14 of Darius the king in the fortress of Yeb, etc."-- Idem, p. 104.

Stone "R. S." -- Rosetta Stone. Ptolemy Epiphanes -- the fifth Ptolemy -- is the king of the Rosetta Stone (Mahaffy, J. P., "Flinders Petri Papyri," p. 27, note. Dublin, 1891), and the inscription "was certainly decreed in the 9th year of his reign" (Mahaffy, "History of Egypt," p. 151). But when Philopator

died, young Ptolemy Epiphanes (5 years old) had already been co-regent from the year of his birth (Smyley, J. Gilbart, "Greek Papyri from Gurob," p. 28. Dublin, 1921; Mahaffy, "History of Egypt," p. 151). He was only later crowned at Memphis "in the 9th year of his reign" (Revillout, E, "Papyrus Bilingue du temps de Philopator," p. 42. London, 1892). His 9th year was doubtless taken to be the 9th of his co-regency, and hence of his birth year, for it is in 199 B. C. that the Rosetta Stone dates synchronize. Dr. Smyley argues (loco citato) that Epiphanes was born in 210 B. C., and was made co-regent 50 days after birth. On the basis of this history, the Rosetta Decree harmonizes with 199 B. C.

Translation of the Rosetta Inscription Date: "In the 9th year. . . of the god Epiphanes Eucharistos. . . the 4th of the month Xanthicus, according to the Egyptians the 18th of Mecheir."-- Mahaffy, J. P., "History of Egypt," p. 152. London, 1899. See also Mülleri, C and T., "Fragmenta Historicorum Graecorum, Inscription de Rosette." Tr. by Latronne. Paris, 1853.

ECLIPSE REFERENCES FOR TABLE (PAGE 4)

(Translated from Ptolemy's Greek text)

1. "Therefore, of three ancient eclipses of those observed in Babylon, which we have taken, the first is recorded in the first year of Mardokempad, on the 29/30 of the Egyptian Thoth. The eclipse began, they say, fully an hour after the rising, and it was total. Since the sun stood in the last of the Fishes, the night had properly 12 equinoctial hours exactly, and so the beginning of the eclipse of course fell 4 1/2 equinoctial hours before midnight, but the middle, when now the eclipse was full, 2 1/2 hours before midnight. . . but in Alexandria we found the middle of the submitted eclipse 3 1/3 equinoctial hours before midnight."--Claudiou Ptolemaiou, "Mathematikē Suntaxis," pp. 244, 245. In Halma. Paris, 1813. [721 B. C., Mar 19.]

2. "And the second eclipse was recorded in the second year of the same Mardokempad on the 18/19 of the Egyptian Thoth. . . the middle of the eclipse occurred in Babylon at the middle of the night itself, but in Alexandria it appeared at 5/6 of an hour before midnight."-- Idem, p. 245. [720 B. C., Mar 8]

3. "And the third eclipse was recorded in the second year of Mardokempad, on the 15/16 of the Egyptian Phamenoth. . . In Alexandria the middle of the time of the eclipse was complete at 4 1/3 equinoctial hours before midnight."-- Idem, pp. 245, 246. [720 B. C., Sept 1.]

4. "For in the 5th year of Nabopollassar, which is the 127th year of Nabonassar, on the 27/28 Egyptian Athyr, toward the end of the 11th hour, in Babylon the moon began to eclipse, and for the most part a quarter of the diameter was obscured on the south. . . in Alexandria it (the middle of the eclipse) occurred only 5 hours after midnight."-- Idem, pp. 340, 341. [621 B. C., April 22.]

5. "Again in the 7th year of Cambyses, which is the 225th year from Nabonassar, according to the Egyptian 17/18 Phamenoth, one hour before midnight, the moon was eclipsed in Babylon on the northern half of its diameter. . . in Alexandria it occurred 1 5/6 equinoctial hours before midnight."-- Idem, pp. 341, 342. [523 B. C., July 16.]

6. "The second eclipse employed by Hipparchus, occurred in the 20th year of Darius, the successor to Cambyses, in the 28/29 of the Egyptian Epiphi, the night having advanced 6 1/3 equinoctial hours, in which the moon, in like manner, eclipsed the fourth part of its diameter on the south. . . in Alexandria the middle of the eclipse occurred 1 1/4 equinoctial hours before midnight."-- Idem, pp. 269, 270. [502 B. C., Nov. 19.]

7. "As the first eclipse, we have named that one which, under Darius I in Babylon, in the 31st year of his reign, was observed on the 3/4 Egyptian Tybi, in the midst of the 6th hour of the night. At the same time, as the exact report runs, the moon was eclipsed two inches on the south, that is, 1/6 part of its diameter."-- Idem, p. 267. [491 B. C., April 25.]

8. "Again, they say that the eclipse occurred when Phanostratos the Athenian was archon, in the month Skirophorion, on the 24/25 Egyptian Phamenoth. . . Now the sun stood in the last part of the Gemini, thus the hour of the night amounted to 12 time-degrees, that is, 48^m; consequently made 5 1/2 civil hours, or 4 2/5 equinoctial hours. The beginning of the eclipse had therefore taken place 4 2/5 hours before midnight, or 7 3/5 equinoctial hours after the noon of the 24th; but since the whole length of the eclipse was given at 3 hours, thus the middle was evidently 9 1/10 equinoctial hours after the noon. In Alexandria, consequently, it must have entered 8 1/4 equinoctial hours after noon of the 24th."-- Idem, pp. 276, 277. [382 B. C., June 18.]

9. "They say that the third eclipse occurred in the 55th year of the second period on the 5th Egyptian Mesore. . . Now since the sun stood in the midst of the Virgin, thus in Alexandria, the hour of the night amounted to 14 2/5 time-degrees, that is 57 $3/5^m$; consequently made out the 2 1/3 civil hours after midnight, or 2 1/4 equinoctial. Therefore the middle (of eclipse) was 14 1/4 equinoctial hours after the noon of the 5th."-- Idem, p. 281. [200 B. C., Sept 12.]

10. "Hipparch asserts that he observed the sun and moon with the help of instruments in Rhodes on the 11th of the Egyptian Pharmuthi, at the beginning of the second hour -- 197th year after the death of Alexander. . . Now if the observation took place at the beginning of the second hour, that is, about 5 civil hours before the noon of the 11th, etc."-- Idem, p. 300. [128 B. C., May 2.]

11. "The third eclipse had occurred in the 20th year of Hadrian, on the 19/20 of the Egyptian Pharmuthi. The middle, according to our reckoning, entered at 4 equinoctial hours after midnight."-- Idem, p. 255. [136 A. D., Mar 6.]

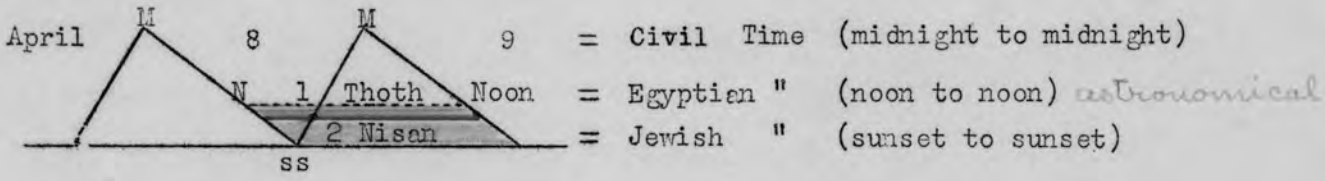
CORRESPONDING OPPOLZER REFERENCES
(Greenwich Civil Time)

1.	Von Oppolzer, Th. Ritter, "Canon der Finsternisse," Wien, 1887.				
		No. 741,	p. 332 = Mar 19.	$19^h\ 4^m$.	721 B. C.
2.	Idem.	No. 743,	p. 332 = Mar 8.	$21^h\ 30^m$.	720 B. C.
3.	Idem.	No. 744,	p. 332 = Sept 1.	$17^h\ 4^m$.	720 B. C.
4.	Idem.	No. 901,	p. 334 = April 22.	$2^h\ 38^m$.	621 B. C.
5.	Idem.	No. 1056,	p. 335 = July 16.	$21^h\ 0^m$.	523 B. C.
6.	Idem.	No. 1090,	p. 335 = Nov 19.	$21^h\ 24^m$.	502 B. C.
7.	Idem.	No. 1107,	p. 336 = April 25.	$19^h\ 55^m$.	491 B. C.
8.	Idem.	No. 1276,	p. 337 = June 18.	$18^h\ 31^m$.	382 B. C.
9.	Idem.	No. 1547,	p. 340 = Sept 12.	$0^h\ 28^m$.	200 B. C.
10.	Idem.	No. 1660,	p. 341 = May 2.	$4^h\ 35^m$.	128 B. C.
11.	Idem.	No. 2075,	p. 345 = Mar 6.	$1^h\ 43^m$.	136 A. D.

THE PROBLEM.--In order to understand the meaning of the ancient Egyptian and Aramaic double dates, found on papyrus, tablet, and stone, it is essential first of all (1) to demonstrate the relation between the three calendars involved -- Egyptian, Jewish, and Julian. Although Julian time did not exist before the age of the Caesars, yet all the chronological tables and eclipse canons which extend back to ancient periods of history are based upon a projected Julian year. The Julian calendar is therefore definitely related to the solution of this problem, and becomes the common denominator of time between the other two. A second feature (2) concerns the synthetic construction of suitable calendar tables, upon which the papyri dates can be oriented, and their epochs demonstrated.

1. Relation Between the Calendars.--According to both tradition and authoritative chronology, the Egyptian day was astronomical, and probably extended from noon to noon. It was doubtless the forerunner of the nautical astronomical day, which was in operation until 1925. Tradition has it that the Egyptian day began when the hour angle of the sun was zero, that is, when the sun crossed the meridian. The Egyptian new year day, 1 Thoth, started at noon, and, according to Albîrûnî, the day was reckoned from the moment "when the sun arrives on the plane of the meridian, till the same moment of the following day." ("Chronology of Ancient Nations," p. 6.) The day was designated by one single date, though it passed through the midnight hour. Anciently, people were induced to prefer the meridian to the horizon, because the day from sunset to sunset varies in length, while the time between meridians is constant, and regular everywhere on earth. The horizons, on the other hand, vary for every latitude. The Jewish day, on the contrary, consists of parts of two days; but on the calendar, it is customary to civil-date the Jewish day by the Julian day with which it coincides from midnight to sunset. This is the second civil day of the two with which the Jewish day agrees.

While chronologers are not unanimous in their opinion concerning the Egyptian day, as from noon to noon, yet this plan is in harmony with a reasonable solution of the papyri double dates. The following diagram further demonstrates the exact relation between Egyptian and Jewish time:



Therefore 2 Nisan (April 9, civ. time) = ~~& Athyr~~ 1 Thoth (April 8, astronom. time) --on the calendar, one day difference.

In this diagram, the Egyptian day, 1 Thoth, starts at noon, and is calendar-dated April 8 until the subsequent noon. It takes the date of the civil day in progress "one moment after the noon" at which it begins. The Jewish day, 1 Nisan, starts at sunset of April 8 and extends to sunset of April 9. While it covers parts of two days, April 8 and April 9, on the calendar, it is designated April 9 only. Although both Jewish and Egyptian days have 18 hours in common, yet, on the calendar, the Jewish day is dated one day later than the Egyptian. There is consequently one day's difference between these two days in their calendar dating. This is the first feature of the papyrus problem to be understood.

Their date of correspondence is based upon an interval of time.

2. The Tables.--The second feature relates to the preparation of Jewish and Egyptian calendar tables, which will outline the two kinds of time involved--civil and astronomical. The Jewish Table, found on page 3, is based on the two crucifixion postulates: (a) The passover moon in time of barley harvest; and (b) the passover on the day following Jewish full-moon-day in Jerusalem. The Ginzel full moon dates (G.M.T.) were used in determining the true passover dates, and were first changed to Jerusalem civil time by adding $12^h + 2^h\ 20^m (0^d.59)$ to each full moon. Those full moon Julian dates that then came before sunset were designated 13 Nisan, and those civil dates that occurred after sunset, were designated 12 Nisan. 14 Nisan was then counted

as the day following Jewish full moon day in Jerusalem, and the 1st day of Nisan was reckoned as the 14th day earlier. Each translation period was computed as the difference between conjunction and 1 Nisan, 6 o'clock sunset. Length of year was calculated from one passover to another, using the Julian calendar. If year was 354 days long, the months alternated a regular sequence of 30 and 29 days, from Nisan to end of year. If year was 355 days, Hesvan was made 30 days; if 383 days, Kisleu was given 29 days. In leap year, Adar had 30, and Veadar, 29. Barley harvest moons determined whether year was common or embolismic. (For Table of Jewish and Egyptian months, cf. page 19.)

The Egyptian New Year Table (pp. 1,2) is based upon months, each one of which had 30 days, except 12th month Mesore, which had 35. The Egyptian year was therefore only 365 days long, and never changed. Its new year, 1 Thoth, slipped back one day every four years, and continued for the 4-year period. (Comp. Table V for 1 Thoth months from Nabonassar era to end of Sothic cycle.) The 1 Thoth dates of the Table (pp. 1,2) are founded upon 15 or more Ptolemaic lunar eclipses (Table III, p. 4), upon coincident Julian eclipse dates from Oppolzer's Canon, and upon the corresponding full moon dates from the Ginzel and Guinness tables (Table III, p. 4, col. 8). In the "Almagest" references (pp. 9, 10), are the translations from Ptolemy's Greek text, giving the exact position of each eclipse, first in Babylon, and then in Alexandria. From these direct quotations, it will be noted that the descriptions are not given in astronomical time, in connection with the Egyptian date, but are directly related to a single point of time -- either midnight, noon, or Babylonian sunset. However, Ptolemy usually concludes with an Alexandrian dating of each eclipse. And when the Alexandrian dates are compared with Oppolzer's Greenwich civil time eclipses, they are found in almost exact agreement. Frequently Ptolemy mentions the eclipse as between two Egyptian dates; sometimes only one date is given; and then again the eclipse may occur on his second date, as is the case with No. 11, of the series here presented.

From these canons and tables, it is possible to establish the exact position of each Ptolemaic eclipse, its coincident Julian date, full moon date, and Egyptian date. (All these details are diagramed in columns 6, 7, and 8 of Table III, p. 4, and the eclipse references are pp. 9, 10.) But first, from Table V, p. 5^{-a}, find the civil month that corresponds to 1 Thoth for the regnal year selected, as for example, 720 B. C., in eclipse No. 3. In this instance, 1 Thoth was in February. The statistics for eclipse No. 3 in 720 B. C., with 1 Thoth in February point to September --193 days later-- as the time of the eclipse. For September, 720 B. C., Oppolzer gives Sept. 1 $17^h\ 4^m$ ("Canon," No. 744, p. 332.) The equation therefore becomes possible that --

September 1 $17^h\ 4^m$ + $2^h\ 10^m$ (Oppolzer's eclipse in Alexandrian time) = "4 1/3 hours before midnight," 15 Phamenoth (Ptolemy's eclipse for Alexandria.)

In this equation, both Ptolemy and Oppolzer are in practical agreement in civil-dating the eclipse. Oppolzer's "$19^h\ 14^m$" (Alex.C.T.) was 7:14 p.m.; Ptolemy's "4 1/3 hours before midnight" was 7:40 p.m. Hence, both dates must be treated as civil time. The important feature only is to determine which Egyptian date ends the interval, that extends back to the true date of 1 Thoth. In the diagram (Table III, column 6), the day ending each interval is stippled. In No.1 instance, the eclipse position adds a part of a day to the interval. If this interval is less than 12 hours, as when eclipse occurs before midnight, it can not be designated as a whole day on the calendar without breaking the correlation of the calendars, and the two kinds of time involved. If the interval is more than 12 hours, as is the case when the eclipse occurs after midnight, then the Egyptian day of the eclipse is the end of the interval, as in Nos. 4, 9, 10, and 11.

For example: In No. 9, 200 B. C., according to the testimony of Ptolemy, we may look for an eclipse on 5 Mesore, "2 1/3 hours after midnight," which would be 334 days after 1 Thoth. In 200 B. C., 1 Thoth occurred 137 days earlier than in February, 747, (cf. leap-day Table V, p. 5^{-a}) or about the

middle of October; 334 days later than this point of Time, point to September for the eclipse. Oppolzer's Canon, No. 1547, p. 340, records just one lunar eclipse in the autumn of 200 B. C.--September 12 0^h 28^m. The equation, therefore, can be written that --

September12 0^h 28^m + 2^h 10^m (Oppolzer's eclipse in Alexandrian civil time) = "2 1/3 hours after midnight," 5 Mesore (Ptolemy's eclipse for Alexandria)

Oppolzer's date is 2:38 a.m., and Ptolemy's, 2:20 a.m. They are therefore both in civil time. To this eclipse and to one more of the series in Table III (No. 10), Ptolemy ascribes a single Egyptian date. This helps much in discovering the Julian date that corresponds to his beginning of the Nabonassar era. In No. 9, he counts the interval from the beginning of the "epoch" as 547 years, 334 days, and 14¼ hours ("Mathematikē Suntaxis," p. 281). These figures plainly declare that he was reckoning as if from February 27 as 1 Thoth in 747 B. C., which the following calendric argument shows:

If February 27 was 1 Thoth in 747 B. C., as the Egyptian New Year Table represents, then in 200 B. C., the new year would have receded 137 days to October 13, as given on page 2 of the Table. Ptolemy counted 5 Mesore -- the day of the eclipse -- as the 335th day of the year, which is the equivalent of 1 Thoth + 334 days. By adding 334 days to 1 Thoth, or October 13 (18+30+31+31+28+31+30+31+30+31+31+12), we get Sept. 12 as the result, which is Oppolzer's date for the eclipse.

Consequently, the 5th Mesore must be the end of the interval, and 1 Thoth is found by reckoning back 334 days from Sept. 12, thus making October 13 to be civil date for 1 Thoth in 200 B. C., and February 27 in 747 B. C. In column 9, the reckoning is reversed, adding 334 days to October 13, thus marking September 12 as the civil date of the eclipse. The ruling is therefore important that when the eclipse occurs after midnight, the Egyptian day in progress at that time is the end of the interval. Eclipse No. 10 Ptolemy also computes in the same way ("Idem," p. 300). Both eclipses are important witnesses for making February 27 the beginning of the Nabonassar era.

No. 11 offers a slight variation from the others, in that the eclipse occurs on the second Egyptian date mentioned by Ptolemy, that is, 20 Pharmuthi. But this position is established by the testimony of Censorinus, requiring July 21 ("12th of the calends of August") as 1 Thoth in the 4-year period from 136 to 139 A. D. His statement follows:

"The aeras of the Egyptians always commence on the first day of the month, Thoth, a day which, this present year, corresponds to the 7th calends of July, whilst a hundred years ago [139 A. D.], under the second consulate of the Emperor Antoninus Pius and of Bruttius Praesena, this same day corresponded to the 12th of the calends of August, the ordinary epoch of the rising of the Canicular star in Egypt. Thus we see that we are to-day really in the hundredth year of the Annus Magnus, which, as I have stated above, is called the solar and canicular year and Year of God."--"De Die Natali," tr. by Maude, p. 33. New York, 1900.

On the basis, therefore, of these well-authenticated Ptolemaic eclipses, eleven of which are given in Table III, and of the corresponding Oppolzer Canon eclipse dates in Julian time, the Egyptian New Year Table, is here offered with which to solve the double dating of papyrus, tablet and stone. 1 Thoth being established for the eclipse years, it was then possible to compute 1 Thoth for the intervening years, by simply making it one day earlier every fourth year. In this manner, the New Year Table was built up. When Egyptian dates are computed according to the position of 1 Thoth, as given in the Table for the various 4-year periods, the resulting dates will occur earlier by one day than their companion Aramaic dates, the one being given in astronomical time, and the Aramaic in civil time. (Comp. Tables I and II, cols. 7 and 16, p. 4). This difference of one day was demonstrated to have existed between ancient Egyptian and Jewish calendation. The synthetic tables here presented for the solution of this calendar problem -- the Jewish, based upon the two important principles governing the crucifixion date, and the Egyptian, definitely tied to two authentic canons of eclipses -- similarly differ by one day in their resultant computed dates.

With the exception of Papyrus "E," which investigators of this problem recognize to be an extra day out of alignment, the other eleven monument dates have this constant difference of one day. If the tables of Schram,

Ginzel or P. V. Neugebauer, should be substituted, the results would differ. Ginzel starts his Nabonassar era with February 27, the same as the Table here presents, but some of his 1 Thoth dates are out of agreement with important eclipses. However, when he comes to the year 139 A. D., he places the rising of Sirius on July 21 ("Handbuch der mathematischen und technischen Chronologie," p. 187. Leipzig, p. 1906). This is in harmony with Censorinus, and with the eclipse in 136 A. D., March 6, the 20th year of Hadrian. In commenting on the relation of Egyptian and Julian calendars, the following remark comes from Glenn Draper, Associate Astronomer, U. S. Naval Observatory:

"If one were privileged to tell early chronologers how to have dated their events in different calendars, the rule of correspondence should be, the day in progress one moment after noon. As it is, their confusion has come on down to modern times."--Glenn Draper, Washington, D. C., September 20, 1940.

Dr. O. Neugebauer, professor of mathematics in Brown University, finds the Egyptian dates in Schram and Ginzel too early to agree with a dated motion of the five major planets. He was therefore interested in the Egyptian Table here presented, that begins the Nabonassar era with February 27.

The principles of calendation employed in the construction and use of the Jewish Table (page 3), have been briefly outlined in the beginning of this discussion. It should be further stressed, however, that the small constant difference between the resultant Egyptian and Aramaic dates is of great importance in support of the calendar features that characterize the Jewish Table. The Egyptian calendar has no variations whatsoever; its months are each 30 days long, and five days are always added at the end of every year. The Jewish calendar is just the opposite -- varying all the time outside of its fixed feast period of seven months. Consequently, this constant difference of one day between the two systems of time reckoning -- a large portion of which is a permanent calendar arrangement that never changes -- shows that the last five months of the Jewish year, although subject to regular, repetitive change, are nevertheless balanced by the moon's motion. It is therefore these variable calendar months that exhibit this uniform difference between two very dissim-

ilar methods of time calculation. Such is the paradox existing between Jewish computations and the Egyptian Sothic Cycle.

The Cycle Table (page 5) is a rearrangement of the very revealing Wood 19-year cycles. Instead of conjunction dates, 1 Nisan dates have been substituted in laying out the calendar curve. This enables the passover limits to be demonstrated for the papyrus period. Papyrus "B" and Papyrus "E" point to April 10 and May 8, respectively, as the extreme dates for the passover. These limits are in harmony with those of Scaliger for the first century, April 8 to May 6, which are necessarily two days earlier at the end of a 600-year period of Julian time.

The irregular intercalation presented by Papyrus "E," which demands embolism in year 8 of Cycle 3 instead of year 7, has been a source of much comment by various scholars. Fotheringham says that irregular intercalation was a definite characteristic of the ancient Babylonian cycle. ("Monthly Notices of the Royal Astronomical Society," Vol. LXIX, p. 18). Yet he does not consider the papyri cycles Babylonian. He quotes Shürer as concluding that in the papyrus period, the intercalations "were determined on principles similar to those which guided the Sanhedrin at a later date when the weather and the state of the crops were considered as well as the course of the sun."--Idem. M. Oppert has also proved, by his contract tablets, that the intercalations of the Babylonian calendar were irregular. ("La fixation exacte de la chronologie des derniers rois de Babylone," Zeitschrift für Assyriologie, 1893, pp. 56-74). Consequently, the change in embolism in Papyrus "E," which represents the Jewish calendar, would seem to indicate that observation was governing the passover date, rather than a fixed mnemonic. The fact that the papyri dates keep 1 Nisan away from the equinox, that is, they do not place 1 Nisan on or before it, is also evidence of observation only, in the papyrus period. Calculation was introduced in the Maccabean era, about 112 B. C. (Albîrûnî, "Chronology of Ancient Nations," Tr. by Sachau, p. 68). The Macedonian leap month "Dioscorus," was also in use in Syria at this time (2Mac. XI:21).

In 45 B. C., the Julian calendar reform was initiated, and the finishing touches were added by Augustus, in 8 A. D. Thus the way was prepared for efficient calendar reckoning in the time of Christ, based upon both observation and calculation.

ANCIENT CALENDAR MONTHS

Egyptian		Hebrew			Macedonian
Thoth	30	Nisan	30		Xanthicus
Paophi	"	Iyar	29		Artemisius
Athyr	"	Sivan	30		Daesius
Choiak	"	Tammuz	29		Panemus
Tybi	"	Ab	30		Löus
Mechir	"	Elul	29		Gorpiaeus
Phamenoth	"	Tisri	30		Hyperberetaeus
Pharmuthi	"	Ḥesvan	29	(30)	Dius
Pachons	"	Kisleu	30	(29)	Apellaeus
Payni	"	Tebeth	29		Audynaeus
Epiphi	"	Shebat	30		Peritius
Mesore	35	Adar	29	(30)	Dystrus
		Veadar	29		Dioscorus

Macedonian months are considered commensurate with the Hebrew. This is asserted by Josephus, Scaliger, Brown and other chronologers.

C O N C L U S I O N S

The foregoing pages represent the synchronization of double-dated monuments -- papyrus, tablet and stone -- belonging to the ancient Persian period in the age of Ezra and Nehemiah. The problem necessitated the construction of calendar tables for both Egyptian and Jewish reckoning, according to which these historic dates could be computed. The use of these tables involved particular and exact specifications relating to calendation in these two kinds of time. The final solution of this calendar question has given assurance of the certainty and soundness of the principles herein employed. By the eclipse calculations, Ptolemy, Oppolzer, and the Egyptian Table of 1 Thoth dates agree. It is revealing to list the various features of the calendric outline, according to which the synchronization was made. The series pertaining to the two calendars -- Egyptian and Jewish -- follow the conclusions here offered:

1. The Egyptian New Year Table of 1 Thoth dates -- constructed on the basis of Ptolemy's catalog of eclipses, and of Oppolzer's "Canon der Finsternisse"-- is thereby able to certify computations made according to its 1 Thoth positions, which cover a period of 1600 years.

2. The Jewish Table -- built up upon the two crucifixion postulates, involving all the principles of calculation employed in the solution of the crucifixion date, and of the 1844 event of prophecy -- offers a specific method of Mosaic reckoning, which, by virtue of its coincidence with the ancient Egyptian system, is therefore attested by the supporting canons of the Egyptian calendar.

3. The constant, resultant one-day difference obtained in the computed dates, determined by the use of these two calendar Tables, is indicative of the certainty and precision of the calendar rules applied.

4. The fact that the calendric principles governing the crucifixion date, solved also the papyrus dates, and provided an independent calculation confirming the Millerite 1844 chronology, shows that all three epochs of prophecy are controlled by one and the same luni-solar system of calculation.

The following calendric series was employed in the solution of the problem --

1. <u>Jewish Calendation</u>

   (a) Jewish day calendar-dated by its second civil date.
   (b) Passover following Jewish full moon day in Jerusalem.
   (c) Passover limits (April 8 to May 6, 1st century) determined by barley harvest moons.
   (d) Length of Jewish year -- from passover to passover.

(e) Jewish feast period (Nisan to Tisri) -- an alternate sequence of 30- and 29-day months.
(f) Hesvan = 30 days in 355-day year; Kisleu = 29 days in 383-day year; in leap year, Adar = 30 days, and Veadar, 29 days.
(g) Translation period = 1 to 4 days.
(h) Leap months determined by moon's place on the calendar.
(i) The 19-year cycle curve of the papyrus dates demonstrate the passover limits for the fifth century B. C. (April 10 to May 8).

2. Egyptian Calendation (used in this problem)

(a) Egyptian year was only 365 days long, and consequently receded through all the seasons in 1460 years.
(b) Egyptian day, from noon to noon, designated by one single civil date.
(c) Egyptian day calendar-dated by the civil day that is in progress "one moment after its first noon."
(d) Date of the Egyptian New Year recedes one day every 4th year, and continues as new year date throughout the 4-year interim.
(e) Egyptian New Year -- 1 Thoth -- continues in the same Julian month for about 120 years, according to length of Julian month.
(f) Nabonassar Era began at noon, February 27, 747 B. C.

These double-dated Aramaic papyri were rolled up, tied, and sealed nearly 2500 years ago. In 1900, or thereabouts, these seals were broken for the first time. They therefore present an undistorted picture of the age in which the papyri were written. Many calendar tables, cycles, and various solar and lunar constants have been tried out in the effort to harmonize these dates. But the synchronization is accomplished by the application of the two crucifixion postulates, which revive the Mosaic order of time, bring harmony and symmetry to primitive calendation, and unity and certainty to the understanding of the prophetic period under study.

Grace E. Amadon.

JEWISH AND BABYLONIAN TIME-KEEPING IN THE SIXTH CENTURY B.C.
(An Important Principle) -Grace E. Amadon

To the century during which Solomon's temple was burned belongs an extraordinarily large amount of source material--discoveries during the last hundred and fifty years. Aside from the biblical prophets and scribes who focus their messages and communications upon this period, there are historiographers and chronologers--Jewish, Greek, Chaldaean, Egyptian--and, in addition, dated tablets and documents shedding light upon this memorable era. It would seem, therefore, that no consistent reason should exist why an accurate and acceptable chronological table for the key events of the sixth century B.C. can not be constructed.

And indeed, it is of significance that the chronological series of Driver in 1890,[1] supposed to harmonize with textual criticism, is practically the same, though abbreviated, as Albright's outline forty years later, which is based upon monumental investigation.[2] A small but interesting difference between the two tables reveals that Driver dates Necho's defeat at Carchemish in 604 B.C., while, after four decades, the inscriptions obviously have not as yet convinced the archaeologist of any date at all for this battle, although the inscriptions and ancient chronicles have doubtless been thoroughly combed for the Neo-Babylonian and Persian periods.

It is the purpose of this study to demonstrate more fully the biblical account of this same period; and thereby to show that the Bible presents internal and actual proofs of its chronology, and to outline an important time-keeping principle underlying the biblical computations and order of events. The accompanying Table W is offered as a suggestive aid for studying the various dates and periods connected with the Jewish captivity in Babylon. And in

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1 S.R. Driver, An Introduction to the Literature of the Old Testament, New York, 1898, 247.
2 W.F. Albright, "The Seal of Eliakim and the Latest Preëxilic History of Judah, with Some Observations on Ezekiel," Journal of Biblical Literature, Vol. LI, Part II, 1932, 85,86.

this connection it is fitting to recall the unquestionable words of Edward Sachau with reference to every chronological table:

"No number in any chronological table can be considered correct, as long as it is not proved by computation to be so, and even in the simplest historical narrative the editor and translator may most lamentably go astray in his interpretation, if there is something wrong with his method of research." [3]

Table W begins a little earlier than the turn of the sixth century B.C., and includes the death of the last Assyrian king Assurbanipal, whose reëdited library of ancient cuneiform texts has been housed in the British museum for nearly fifty years. Josiah had reached his 13th year, during which the young priest Jeremiah was called to the prophetic office. Zephaniah and Habakkuk were prophesying of the imminent rise of the Chaldaean power. Daniel was a boy prince in the royal family in Jerusalem.[4]

I DESCRIPTION OF TABLE W

The chronological outline here presented corresponds primarily to the synchronistic history of the closing years of the Jewish monarchy and the period of the exile. The table is built up upon four distinct systems of time--Julian, Egyptian, Babylonian, and Jewish. The eight consecutive groups of years crossing the page extend from the year 626 B.C. to 515 B.C. inclusive, and cover the reigns of the Babylonian and early Persian kings. Each calendar series is designated by name on the left of the table.

1. The Julian year begins at midnight of January 1 on the meridian of Greenwich. This arrangement is for chronological purposes only, namely, to tie the outline to certain eclipses which determine the Julian year, and which are recorded in "weltzeit" in Oppolzer's Canon.[4] In the period which Table W represents, there is no point of time introduced by prophet or scribe that demands a more exact reckoning than year, month, or day. Frequently the season alone will link an event to the outline of its period.

2. The name Ptolemy represents the Nabonassar era, which is established by well-authenticated lunar eclipses. Ptolemy employs the Egyptian year, and, for purely astronomical reasons,[5] reckons the day from noon to noon. In the year

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[3] C.Edward Sachau, The Chronology of Ancient Nations, London, 1879, Preface.
[4] Th. Ritter v. Oppolzer, Canon der Finsternisse, Wien, 1887.
[5] F.K. Ginzel, Handbuch der mathematischen und technischen Chronologie, I Band, Leipzig, 1911, 163.

the year 625 B.C., the Egyptian new year was on January 27, while in 515 B.C., this Thoth new year had retrograded to December 30 at the rate of one day backward in every four advancing years. Consequently, the beginning of each Ptolemaic year varies a little throughout the table; but the actual 1 Thoth date for any year can be obtained from any one of several standard reckonings of the Egyptian vague year.[6] In Table W, two of the 19 lunar eclipses of Ptolemy are recorded, together with the interval of years, days, and hours, which he counted from the beginning of the Nabonassar era--noon of Feb. 26, 747 B.C.

Length of reign

Ptolemy's Canon does not record the reign of any king who ruled less than a year. This feature not only increases the time of certain kings listed, but it ascribes earlier dates to some of the reigns than the eclipses allow. The combined result is a sort of "ante-dating" which characterizes the Canon,[7] for which allowance must be checked.

The king lists of the Babylonian and Persian reigns are fixed not only by two lunar eclipses which Ptolemy describes--one on April 21, 621 B.C., in the 5th year of Nabopolassar, and another on July 16, 523 B.C., in the 7th of Cambyses,[8] but in addition, an "observation text" in the Berlin Museum[9] yields an ancient saros date on 15 Simannu (July 4), 568 B.C., which identifies the 37th year of Nebuchadnezzar II. This lunar eclipse was not seen in Babylon, but the full moon date left on record is of importance in establishing the year.

The Ptolemaic eclipse in the 7th of Cambyses on July 16, is also confirmed by the Cambyses "400" Tablet, whose synchronism makes 14 Tammuz = 17 Phamenoth.[10] This eclipse is indeed unique in linking together the last day of Ptolemy's Nabonassar interval of 224 years, 196 days, 10 1/6 hours, with Oppolzer's Julian eclipse date (July 16, No. 1056), the Persian 14 Tammuz, and the Egyptian 17 Phamenoth--four calendars altogether. By such astronomical records is the 7th of Cambyses fully established.

3. The Neo-Babylonian year is represented by the third calendar line in each group of the table. The year runs from spring to spring, as commonly recognized,[11] and, as will later be demonstrated, is the Babylonian year employed by Jewish writers under the monarchy. Here we are confronted with a new kind of synchronism--one that equates the spring-beginning Babylonian year with the Jewish regnal year, which, with possibly two exceptions in the

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6 P.V. Neugebauer, "Ära Nabonassar," Astronomische Nachrichten, Band 261, 6261, 1937, col.381ff; Ginzel, Chronologie, II Band, Tafel V, Leipzig, 1911, 576ff.

7 Franz Xaver Kugler, Sternkunde und Sterndienst, Schweiter Teil, Münster, 1909, 390, 391. "Ante-dating" explained in Von Moses bis Paulus, 1922, 169.

8 Composition Mathématique de Claude Ptolémée, par Halma, Paris, 1813, 340,341.

9 Paul V. Neugebauer und Ernst F. Weidner, "Ein astronomischer Beobachtungstext aus dem 37. Jahre Nebukadnezzars II (= 567/66)," Berichte über die Verhandlungen der Königl. Sächsischen Gesellschaft der Wissenschaften zu Leipzig, Philologisch-historische Klasse, 67. Band, 2 Heft, 1915, 29, 50.

10 Strassmaier, Inschriften von Cambyses, Nr. 400; Epping, Zeitschrift f. Assyriol. V, S. 281ff; Kugler, ib. XVII, S. 203ff und Sternkunde I, S. 61ff.

11 B. Landsberger, "Der Kultische Kalender der Babylonier und Assyrer," Leipziger Semitische Studien VI, Leipzig, 1915, 21; Heinrich Zimmern "Zum babylonischen Neujahrsfest," Berichte über die Verhandlungen der Sächsischen Gesellschaft der Wissenschaften zu Leipzig Philologisch-historische Klasse, 70 Band, 1918, 5 Heft.

sixth century B.C., began in the autumn.[12] And in this connection, let us not pass over the fact that the Jewish scribes in preëxilic times must have been familiar with this kind of synchronism, when recording the reigns of the kings of Israel and Judah, whose official first years, it can be shown, did not begin at one and the same time of year.[13] As this study progresses, it will be seen that a spring-to-spring Babylonian year exactly conforms to the biblical time equations connected with the fall-beginning Jewish year, which is thereby locked in position.

In the Babylonian year as here outlined, provision is made for the accession year so frequently mentioned in the inscriptions.[14] The Babylonian day, like the Jewish, began at sunset, the only hour of day in which the nascent moon appears first to the naked eye after conjunction.[15] The new crescent, with its horns upturned, sets after the sun at varying intervals--in half an hour or so when the moon is near perigee, and within two or three hours, if the moon is near apogee. Those nations who followed the new moon in starting their months, necessarily had to begin at sunset.

4. The Jewish year in this series is based upon the records of prophets, priests, and scribes. It has to agree (1) with the chronology of Jeremiah, which extends from the 13th of Josiah at least to the fall of Jerusalem; (2) it has to agree with the calendar of Ezekiel and his 14 dates, which also must check back with the records of Jeremiah, and with the writer of 2 Kings, from the death of Jehoiakim to the release of Jehoiachin; (3) it must agree with the writings of Ezra, Nehemiah, and Daniel, in the time of Cyrus; and lastly (4) with the prophecies of Haggai and Zechariah, whose dates identify a spring-beginning Persian calendar in the second year of Darius I.

There are only two places in the table where Jewish accession years occur--at the beginning of the reigns of Jehoiakim and Zedekiah respectively. The detailed reckoning of these two accession periods, and their Hebrew description will be considered under Part II.

It is obvious that the afore-mentioned Jewish writers and compilers must have written their individual portions of the biblical account at different times and in different places. The primary object of this study is to demonstrate the chronological harmony that exists in their records.

II BEGINNING OF THE JEWISH YEAR BEFORE THE CAPTIVITY

Aside from actual periods and dates, many features enter into the identification of a season or point of time in the Bible. Chiefly among these can be mentioned the customs and operations of agriculture in the Near East, that have not materially changed in centuries of life around the Mediterranean. To the Palestinian farmer, „das Ende des Jahres ist das Ende des Sommers, der An-

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12 Discussed in Part II. [ginning reigns of the Judaean kings.

13 A spring-beginning Israelite year is the key to harmony with the fall-be-

14 Albert T. Clay, The Babylonian Expedition of the University of Pennsylvania, Series A: Cuneiform Texts, Vol. VIII, Part I, Phil., 1908, 35.

15 Hevelius writes of actually seeing the "horned moon" in the afternoon of a clear day, although he could not see it at sunset of the following day. (Selenographia, Gedani, 1647, 282.)

fang des Jahres ist der Anfang der Regenzeit." [16] And so the "end of the year" (literally going out of the year), as in Ex.23:16, and the "year's end" (תקופת) in Ex.34:22 are expressions based upon culture of the land. The word תקופת is used four times in the OT, one of which is Ps.19:6, where it characteristically represents the sun's circuit. This word seems always to refer to the fall of the year, and is significant in 2 Chron.24:23, where the Syrians must have made a surprise attack in the autumn upon Israel and Judah, when assembling for the Tishri festivals.

Seeding of wheat in Palestine is in November and December, and sowing of barley, in January and February, after the early rain has prepared the field.[17] Thus when Isaac dwelt in Gerar, and had sowed the land and reaped a hundredfold "in the same year" (Gen.26:12), it obviously is an agricultural year referred to--that is, one from fall to fall. But in ancient times the agricultural year was the calendar year also, for not only the descendants of Jacob, but the Egyptians too seem to have marked off their years according to seedtime and harvest (Gen.8:22).

There is the episode of the famine in Joseph's time, when the Egyptians had been fed with bread for a full year in exchange for their cattle. And "when that year was ended, they came unto him [Joseph] in the second year" and said, "buy us and our land for bread. . . and give us seed that we may live, and not die" (Gen.48:18,19). And Joseph did so, answering, "lo, here is seed for you, and ye shall sow the land" (verse 23). Clearly, before the Egyptian bondage, there was an agricultural year in Egypt that began and ended in the autumn.

Harvest too had a vital relation to war and siege, for armies were fed from the land they invaded. In southern Palestine, barley harvest is about

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[16] Gustaf Dalman, Arbeit und Sitte in Palästina, I Band, I Hälfte, 1928, 23.
[17] John Kitto, Palestine, 1900, 29.

a fortnight earlier than that of wheat, which ripens in May in the plain of Jordan, but not until June, on the coast and farther north.[18] The general vintage is in September, but the first grapes ripen in July,[19] pomegranates, in October,[20] and mulberries, in May.[21]

While the year of husbandry begins in the autumn in the Near East, to which the Gezer stone also is witness,[21] the season of war commonly began in early spring, and campaigns would extend into the time of harvest. Indeed, the fruits of the earth were the chief cause of war among the ancient peoples, who sought food for man, and provender for cattle (Judges 6). Egypt, which had no vineyards,[22] and Syria too, anticipated the inviting grape harvests of Palestine (1 Kings 20:16), and would seem to have planned their campaigns accordingly. Such bands of raiders were the "grapegatherers" of the prophets (Jer.49:9 and Obad.5). And so, according to the writer of Samuel (2 Sam.11:1, margin), and the Chronicler (1 Chron.20:1), the kings on the occasion mentioned went forth to battle "at the return of the year" which was probably in the spring. But spring was not always the season for war and invasion, especially in event of a siege.

The word for "return" in 2 Sam.11:1 is תשובת, and is a noun derivative of the verb שוב, the common word for return in the Bible, and which requires many pages of references in the concordance. But the noun itself, aside from its use by Job, occurs in only four instances, one of which, as mentioned above, may refer to the spring of the year. But the other three cases of its use can with equal force be referred to the autumn in agreement with the history involved.[23] Let us analyze these three texts:

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18 Ibidem, 24.
19 Ibidem.
20 William M. Thompson, The Land and the Book, New York, 1880, 285.
21 Ibidem.
21 Martin P. Nilsson, Primitive Time-Reckoning, London, 1920, 234.
23 Contrary, however, to Brown, Driver and Briggs, who appear to base a precedent upon 2 Sam.11:1. Not so Gesenius.

1. According to 1 Sam.7:17, the prophet's return (תשובה) was always to Ramah, after each annual itinerary of judging, of which Mizpeh each year was the last appointment. On this occasion (verse 6) Sammuel offered a "sucking lamb" (verse 9)--an act which obviously points to late summer, for lambing time was regularly in harvest (Ps.65:13). The prophet's return to Ramah, therefore, must have been near autumn, probably before the feast period in Tishri, and before the early rains began.

2. In 2 Chron. 36:10, the word תשובה is an important link in the chronology of this period. That this Hebrew noun may refer to the fall of the year can be inferred from this context also. At the time Jehoiakim was captured, more conceivably in the spring, in harmony with Babylonian military strategy, than in the fall, Nebuchadnezzar was doubtless at the garrison in Riblah in the north (Jer.52:9). Ultimately Jehoiakim was brought to him in chains (Ezek.19:9), probably taken to Babylon (2 Chron.36:10; 1 Esdras 1:40), and Jehoiachin was made king.

Late spring in the Near East exactly fits the time when Jehoiakim died. The days were hot, and the nights frosty (Jer.36:30).[25] Jehoiachin reigned three months and ten days, and "at the return of the year"--clearly in the fall--Nebuchadnezzar sent and brought him to Babylon. At the same time Zedekiah was made king of Judah, in conformity to Judaic custom.

In 1 Kings 20:22, the word תשובה is undoubtedly used with reference to the spring, just as Brown, Driver, and Briggs conclude; for the context is dealing with an Israelite king, and a Syrian king, both of whose peoples employed a spring-beginning year. But in 2 Chron.36:9,10, the narrative has to do with three Judaean kings--death of Jehoiakim, and reigns of Jehoiachin and Zedekiah. Naturally, the "return of the year" under the Judaean monarchy was in the fall. It is also significant that in connection with 2 Sam.11:1 and 1 Kings 20:22, Josephus particularly mentions the spring, while in the case of of 2 Chron. 36:10, he does not mention it or imply it.

On the other hand, the context in 1 Kings 20:22 can be used conversely to show that the Israelite year did actually begin in the spring.

Thus the first year of Zedekiah and the first year of Jehoiachin's captivity were coincident,[26] and the reign of the de facto king must have begun in the autumn. That this is the necessary chronology here can be further be

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[25] Cf. Prov.25:13. In speaking of the strong contrasts of spring weather in Palestine, Dalman says: „Hier mag dem auch nochmals der zweitägige Schneefall oder eigentlich Schloszenfall erwähnt werden, dem ich Anfang April, 1906, bei el-kerak ausgesetzt war.) So stehen Früling und Winter in engem Zusammenhang. Eigentümlich sind für Palästina die starken Gegensätze, welche infolge davon der Früling vereinen kann." Here is also another similar statement:

Arbeit und Sitte 1 Band, 1928, 305

„In volkstümlicher Weise wird anderwärts von der Sonne gesagt, dass sie im Nisan, Ijjar und Siwan auf den Bergen wandele, um den Schnee zu schmelzen, im Tammuz, Ab und Elul im bewohnten Lande, um die Früchte zu reifen, im Tischri, Marcheschwan und Kislew auf den Meeren, um die Ströme auszutrocknen, im Tebeth, Schebat und Adar in der Wüste, um die Saaten (des bewohnten Landes) nicht zu dörren."--Arbeit und Sitte in Palästina, III Band, Gütersloh, 1928, 47.

[26] W.F. Albright, "The Seal of Eliakim," Journal of Biblical Literature, Vol. LI, Part II, 1932, 86.
John Battersby Harford, Studies in the Book of Ezekiel, Cambridge, 1935, 40.
E.G. White, Prophets and Kings, pp. 448, 452. Pacific Press, California.

proved from Synchronism IX. However, the surrender of Jehoiachin, and his final removal to Babylon "at the return of the year," were not events that initiated a new Babylonian campaign, which customarily might have set forth in the spring.[27] These late summer military activities were merely accessory to an earlier Babylonian siege of Jerusalem, which had been in progress for about a year (2 Kings 24:10,11). And they all occurred in the eighth year of Nebuchadnezzar's reign, as outlined in the table (2 Kings 24:12). Synchronism III

From the incidents just described, it should be clear that the word תשובת is not, like the word תקופת, tied to any one season of the year, and the context has to determine what time is signified. And in addition, the narrative in 2 Chron.24:23, in employing the word תקופת, not only identifies the fall of the year, but shows that the Syrians would attack in the fall as well as in the spring. The same is also true of the Babylonians, whose long and final siege of Jerusalem began in the tenth month (2 Kings 25:1). In this case, however, sudden action was caused by Zedekiah's breaking his oath to the Babylonians (2 Chron.36:13). So Josephus.[28]

Let us now further examine the official first year of other Jewish kings.

Josiah. This young king's work of reform actually began when he was twenty years old: for "in the twelfth year [of his reign] he began to purge Judah and Jerusalem from the high places, and the groves, and the carved images, and the molten images" (2 Chron.34:3). The work of cleansing proceeded throughout "the cities of Manasseh, and Ephraim, and Simeon, even unto Naphtali" (verses 5,6), and the eighteenth year of Josiah's reign had come before his reform had been concluded--a period of over five years. And the temple had not yet been cleansed (verse 8). Sometime within this eighteenth

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27 Cf. Kugler's series of campaigns in Von Moses bis Paulus, 1922, 149. G. Schiaparelli, Astronomy in the Old Testament, Oxford, 1905, 116.

28 Ant.X.VII.3.

year--in the eighth month, according to the LXX--Josiah began to "repair the house of his God," and for this purpose, he asked Hilkiah the high priest to sum up the silver which was being brought into the house of the Lord (2 Kings 22:4; 2 Chron.34:9).

This offering of silver was the traditional offering for building and repairing the house of God. It was first taken up in the desert of Sinai, when the tabernacle was constructed, and on that occasion, each man from twenty years old and upward was taxed a half shekel of silver when the tribes were numbered (Ex.30:12-14). The actual silver in this first collection was used to make the hooks and sockets of the sanctuary (Ex.38:26-31).

The offering must have been taken up about the middle of the exodal year, which was reckoned from Nisan; for, after reaching Sinai in the third month, the law was given, the covenant made, and Moses was twice in the mount of God--forty days each time--all of which adds up to more than three months, and brings the calendar at least to the month Tishri. The tabernacle was set up on the first day of Nisan in the second year (Ex.41:17), and consequently required about six months to build. The silver offering must therefore have been made in the fall of the year, and it became traditional under the monarchy (2 Kings 12:4,5). Obviously, the autumn, after the returns from the harvest were in, was the propitious time for special gifts. And so David probably took up the magnificent offering for the new temple at this time of year, when Solomon was anointed king the second time (1 Chron.29:22). After the return from Babylon, Nehemiah restored the silver tax "for the service of the house of our God" (Neh.10:32).

Returning now to the temple tax in the eighteenth year of Josiah, it is important to take note that the addition to the date in 2 Kings 22:3 by the LXX-- ἐν τῷ μηνὶ τῷ ὀγδόῳ --is most consistent, notwithstanding Kugler's opposing argument;[29] for it is in precise harmony with the traditional history with reference to the half shekel tax ~~its origin~~ in the autumn season. When Shaphan came to Hilkiah, the high priest produced the book of the covenant, which had recently been found, and as a result, the command for a subsequent passover was issued by Josiah. And it was kept in his eighteenth year "on the fourteenth day of the first month" (2 Chron.35:1,19). The argument for the fall-beginning of Josiah's reign is therefore as follows:

Since the silver tax for the repair of the temple was in operation in the eighteenth year of Josiah, with all probability in the eighth month, or thereabouts, and the subsequent passover was observed still in the same eighteenth

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[29] Kugler, Von Moses bis Paulus, p. 141. He insists that Josiah began his year in Nisan.

year of the king, therefore the king's reign did not change in the spring, and hence must have changed in the fall on the first of Tishri.

Jehoiakim. The OT prophecies of Jeremiah and Daniel mention in detail the third, fourth and fifth years of Jehoiakim in connection with the corresponding years of Nebuchadnezzar, but there is very little recorded with respect to Jehoiakim's first year. There is no way of proving that the Hebrew expression ראשית מלכות in either Jer.26:1 or 27:1 refers to his accession year, because the date is tied to only one king, instead of two kings, as in Jer.25:1, or as in the double dated reigns of Israel and Judah. Furthermore, the same Hebrew phrase is used in connection with the fourth year of Zedekiah (Jer.28:1), all of which makes its exact meaning involved.

But in the fourth of Jehoiakim episodes occur that combine to establish the beginning and end of his reigning year. There is the important mention of the accession year of the king of Babylon in Jer.25:1. The Hebrew phrase employed in this connection is השנה הראשנית. It only occurs once in the the OT--a hapax legomenon--yet scholarship accepts its application to the accession period of Nebuchadnezzar in the fourth of Jehoiakim.[30] For it agrees with the chronology of Josephus--based upon Berosus--who ties the fourth of Jehoiakim and the battle of Carchemish to the time when Nebuchadnezzar "took over the government," and the eighth of Jehoiakim to the fourth of the king of Babylon.[31] It also agrees with the indispensable statement of Daniel, who refers to this same accession year of Nebuchadnezzar, linking it with the third of Jehoiakim (Dan.1:1), and therefore ending his own third year of royal schooling in the "second" of the Babylonian king (Dan.2:1ff).

All of these records are in perfect agreement, and Synchronism II of the

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30 Albright, Levy, etc.

31 Ant.X.VI.1. A tabulated outline of the kings of Judah and Babylon, such as Table W represents, is one way of determining the accession years, and of discovering the actual Hebrew words that describe them.

table represents the one arrangement according to which all the chronology checks. On this basis, the Jewish year obviously has to begin with Tishri, and the Babylonian year, with Nisan; and thereby the accession year of Nebuchadnezzar becomes a landmark of reference in the third/fourth year of Jehoiakim in harmony with Jeremiah, Daniel, Josephus, and Berosus.

Conditions in the early part of Jehoiakim's reign are described by the prophets Jeremiah and Ezekiel (Ezekiel 19). Judah is to become a wilderness if she does not repent (Jer.22:6). Already the famine was increasing, as in Jeremiah 14, "for there was no rain in the earth." And by the fourth of Jehoiakim, a general fast--obviously a rain fast--was appointed (Jer.36:9). The events of this period fall into line as follows:

	Ref.	Event		Regnal Year	
1.	Dan. 1	Daniel taken by Nebuchadnezzar, probably en route to Egypt	=	3rd Jehoiakim	
2.	Jer. 25	Accession year of Nebuchadnezzar	=	4th Jehoiakim	"Wine cup"
	Jer. 35	Rechabites--Jeremiah at large	=		"Pots of wine"
3.	Jer. 36	Jeremiah "shut up," roll written, a fast foreseen	=	4th Jehoiakim	summer
4.	Jer. 45	Message to Baruch after roll was finished	=	4th Jehoiakim	summer
5.	Jer. 46	Defeat of Necho at Carchemish	=	4th Jehoiakim--probably late summer	
6.	Jer. 36	Fast appointed	=	5th Jehoiakim, 9th month	
7.	Dan. 2	End of 3 years of Daniel's study	=	2nd Nebuchadnezzar	

Maimonides describes in detail the ancient fasts, a continuous cause for which, he states, was a deficient supply of water:

> In the spring, near passover time, a fast occurred in case the latter rain had not fallen. And there was also a fast in the month, or period, of the solemnity of tabernacles for the express purpose of filling up the cisterns, pools, and pits. [Cf. Jer.14:3] And when the season of the early rain came, and no rain had fallen, as indicated in the ninth month of Jehoiakim's fifth year, additional fast days were appointed. And if this failed, then the people assembled in the synagogues week after week, and poured out their cries to God. But they did not fast and pray when rain was not due:
>
> "Confecta periodo Martia, nimirum cum sol signum ingreditur, qui Taurus appellatur, nullum porro jejunium instituitur: pluvia enim ejus temporis malo est omini cum prorsus ab initio anni non pluerit." [32]

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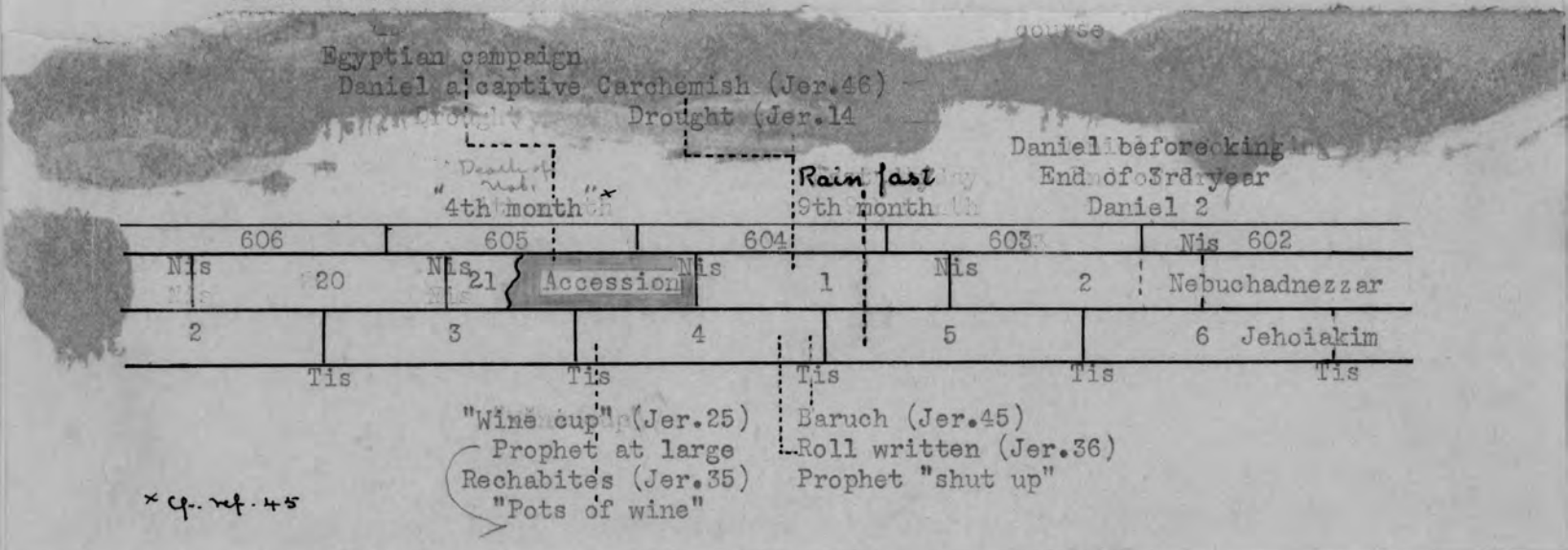
[32] Ex Rabbi Mosis Maiemonidae, De Jejunio. Tr. De Compiegne, Paris, 1667, 43.

The fast, of which Jeremiah seemed to be fully informed (Jer.36:6), was doubtless appointed, not only because of much needed rain, but ~~equally~~ possibly also in fear of the outcome of the imminent battle between Nebuchadnezzar and Necho at Carchemish, where the forces of war were gathering, if not already in action. Earlier in this fourth year of Jehoiakim, the prophet was at large, and he had presented the "wine cup" of fury in person to all the petty kings on the outskirts of Judah. He had met the Rechabites in the temple,[33] and had tempted them with wine, obviously in the season of wine. But summer had come when Necho was on his way north through Palestine, just as Jeremiah had vividly foretold that Egypt would rise up with the rising Nile (Jer.46:8).

The prophet dictates to Baruch all of his previous messages, and instructs him to read them to the people at the time of the appointed fast. Jeremiah is "shut up" and cannot go to the temple, but, nevertheless, the people are to hear the prophecy of the Egyptian defeat at Carchemish (Jer.46:8-24). When the fast day came, in the subsequent ninth month, the fourth of Jehoiakim had changed to the fifth of the king. By this we know that Jehoiakim's reigning year changed in Tishri. The following diagram makes a little plainer the order of succession of these events:



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[33] Nebuchadnezzar's invasion of Palestine "in the third of Jehoiakim" had driven the Rechabites to Jerusalem for protection, when the prophet was still free to go about. (Jer. 35:11.)

Argument. If the fourth of Jehoiakim should be shifted six months in advance, then Nebuchadnezzar's accession year would wholly coincide with Jehoiakim's third, contrary to Jer.25:1; and the fourth of Nebuchadnezzar would coincide with the seventh of Jehoiakim, instead of the eighth, as reported by Josephus.[34] And if the fourth of Jehoiakim should recede six months, then the battle of Carchemish would occur in the winter instead of the summer, which is conflicting for two reasons: (1) Necho would necessarily plan to feed his army on the Palestinian harvests, for the Jews were depending upon him for help against Babylon; and (2) Jeremiah had prophesied that the Egyptians would come up at the time of the rising of the Nile, which was in mid summer. Hence Synchronism II is locked in position as it stands, and all the records are in harmony.

For two main reasons the scene in the fore part of Jeremiah 36 must be ascribed to the summer: (1) the fact that Jeremiah was in prison, when earlier in the year during the vintage, he had been at large;[35] and (2) the time of the battle of Carchemish, which in all probability had been fought, and Necho defeated when the fast occurred. This was without doubt the cause of Jehoiakim's anger, for it was his word against the prophet's as to the efficacy of help from Egypt, whose king had now been confounded.

III JEWISH YEAR DURING THE CAPTIVITY

The principal source with respect to the Jewish year during the Babylonian captivity is the prophecy of Ezekiel and his fourteen dates. The young priest was probably taken captive at the same time as Jehoiachin,[36] in whose fifth year he had been called to the prophetic office. It is several times stated in his prophecy that the years are counted according to the captivity year of Jehoiachin: (1) Ezek.1:2; (2) Ezek.33:21; (3) Ezek.40:1; and (4) Ezek. 1:1,[37] which evidently is to be taken as a captivity date, since it reads, "In the thirtieth year. . . as I was among the captivity" (margin). The background of Ezekiel's chronology is as follows:

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34 Ant.X.VI.1.

35 With a fall-beginning calendar, vintage, sowing, early rain, latter rain = the first half of the year, while harvest and summer fruits = the second half.

36 Ant.X.VI.3

37 ~~30~~ Consistently, verses 2 and 3 represent the original superscription of the call vision and of the prophecy as a whole. This was repeated in the sixth year (Ezek.8-11), and again in the "30th" year (43:1-3), when for the third time the glorious scenes of Ezekiel's call are given. Most naturally he would introduce this last vision into the beginning of his prophecy. Cf. ref. 47-1

No other single book in the Bible has as many calendar dates--including year, month, and day--as the prophecy of Ezekiel. These dates are significant, because only one of them is a feast date, though not given its full significance in the translation.[38] Throughout the whole series there is not mentioned any special day of the week. This absence of calendrical landmarks in Ezekiel, such as the Jewish Sabbath, or any other day of the week, is outstanding as compared with other biblical records.

The dates themselves, for the most part, cluster around one calamitous event--the destruction of the first temple. The prophet is informed by the Deity when the siege begins in Jerusalem (Ezek.24:1). This date is recorded three times elsewhere by three other different writers. Apparently on this very day Ezekiel's beloved wife dies. That date would not be forgotten! In vision he marks the death of prince Pelatiah (Ezek.11:13). About five months after the burning of the city, an escaped messenger reports to the prophet, "The city is smitten," and at the same time Ezekiel's mouth is opened, and he is no longer dumb (Ezek.33:22). The prophet would not forget that date.

And "in the fourteenth year after" the destruction of the temple, Ezekiel is taken in vision to the land of Israel, and shown a measured plan for the new temple. This occurred "in the beginning of the year, in the tenth day of the month." The Authorized Version, "beginning of the year", wholly covers up the chronological significance of M, which reads the head of the year, and appears to be the origin of the Jewish new year--Rosh Hashana--the name for the first day of Tishri. This Hebrew expression is not found elsewhere in the OT, and hence cannot be applied to any other month than that denoted by Ezekiel.

Ezekiel the priest was also able to foretell the very year when the temple would be destroyed--the time was approximately six years future from the date of his call. In answer to divine command he portrays upon a tile the siege of the city--the mount, the camp, and the batteringrams! Then comes the commission that he, Ezekiel, a sin-bearing priest, is to symbolize the temple period in its entirety--390 days for Israel, and 40 days for Judah; he is to bear the iniquity of the people, or 430 days in all. All that the prophet had to do was to add 430 years--each prophetic day representing a literal year--to the date of Solomon's dedication of the temple, and thereby would be obtained the fatal year when the period would expire, and the temple service cease.[39] And henceforth for many years no earthly priest would bear the sins of Israel and Judah into the innermost temple place before the vail.

The Ezekiel scenes are connected with actual events in the prophet's own time. Some of them are introduced in action by the prophet, as for example, the Zedekiah scene depicting the blind king being led away to his Babylonian prison (Ezek.12:1-11). Unless these enacted warnings had been given either before, or at the time of, the event described, then the stern reality of the prophecy--its purpose and office--would have been altogether nullified and meaningless. And without a clear understanding of the circumstances underlying the prophecy, the chronology is apt to become twisted and meaningless also. Obviously, Ezekiel must have been a prophet during the exile, or else,

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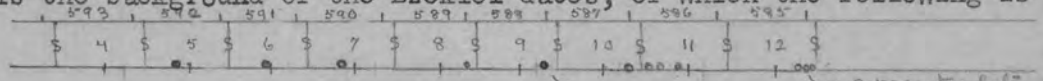
[38] Ezek.40:1, explained in succeeding paragraph.

[39] C.F. Burney, Notes on the Hebrew Text of the Book of Kings, Oxford, 1903, 60.

aside from Daniel, who was tied to the royal court, no one would appear to have been divinely chosen to encourage and build up the stricken tribes of Israel and Judah.

Throughout the period of the exile there were frequent communications between Babylon and Jerusalem.[40] For over six years Ezekiel's warnings were received with mocking derision. False prophets contended that with the help of Egypt the captives would shortly return to the home land. But the false prophets died. Some even were roasted in fire by the king of Babylon! Step by step, dating his messages, the prophet pictures the doom hanging over the ancient city, and all the neighboring petty kingdoms. Egypt is to lie desolate for four decades. Tyre is to be besieged. Ezekiel himself is a pathetic sign of disaster. But when Jerusalem falls, as intimated to the prophet by exulting scenes in Moab, Ammon, Edom, and Tyre--all clapping their hands over the desolation of the city (Ezekiel 25 & 26), then all the events foretold in detail, are "suddenly and brilliantly confirmed."[41]

Such is the background of the Ezekiel dates, of which the following is the series:



E Z E K I E L D A T E S

Julian Year	Ezekiel y	m	d	Difference in time	Character of Message	Reference
Apr 19 TB.C.	592*	5	4	5 S	Visions of God by the river Chebar	1:1,2
				13 mo.	Call vision repeated	
Apr. 9 T	591	6	6	5 S	~~Idolatry in Jerusalem~~	8:1
				11 mo.		
Mar 29 S	590	7	5	10 S	Law of Jehovah	20:1
				17 mo.		
Apr. 6 W	588	9	10	10 F	Siege of Jerusalem begins--Ezekiel's wife dies	24:1
				12 mo.		
	588	10	10	12 S	Prophecy against Egypt--40 years of desolation (1)	29:1
				15 mo.		
Apr. 14 S	586	11	1	7 F	Message against Pharaoh (2)	30:20
				2 mo.		
	586	11	3	1 T	Message against Pharaoh (3)	31:1
				38 days		
	586	11	4	9 F	Zedekiah flees	Dates of Jeremiah and 2 Kings
	586	11	5	10 S	1 mo. Jerusalem burnt	
		(6)		20 days		
	586	11	?	1 S	Message against Tyre, who exults over fa fall of Jerusalem	26:1
				5 mos.		
	586	12	10	5 W Jan 9	Report to Ezekiel--5 months after fall of city	33:21
				2 mo.		
	586	12	12	1 T	Message against Pharaoh (4)	32:1
				45 days		
	586	12	12	15 S	Wail against Egypt (5)	32:17
				14 years		
Apr. 19 B 573*	572	25	7	10 T	Vision of new temple on day of atonement	40:1
				3 2.5 yrs.		
Apr. 17 M	570*	27	1	1 M	Fall of Tyre at hands of Neb.	29:17
				3.25 yrs.	Message concerning again	
Apr. 13 M	567	30	4	5 W	Call vision repeated (43:1-3)	1:1

Period of siege and fall of city

* Embolismic years

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[40] Cf. Jeremiah 29.

The numbered months of Ezekiel, instead of the use of Babylonian names, not only challenges a late date for the prophecy, but they also indicates that the prophet is employing native Jewish reckoning, and not the Babylonian system. The chronological outline of Ezekiel's century is pegged up by well authenticated lunar eclipses, and by other synchronisms than those of the exilic prophet; but it remains to prove that Ezekiel's chronology agrees with the fall-beginning of the captivity year of Jehoiachin as represented by the language of the Chronicler, Jeremiah, and the writer of Kings. However, we should not pass over the chronological sequence that characterizes Ezekiel's dated messages,[41] and, most important, is their increasing frequency during the climax of the period--the burning of Jerusalem. This established frequency of one or two months, around the time of the fall of the city up to the last wail against Egypt (32:17), should prevent the chronologer from adding a whole year to the date when the messenger reports to Ezekiel (33:21). But Ezekiel's calendar also interferes with such dating, as we shall proceed to discover.

Jerusalem fell in the 11th year of Zedekiah, and the 19th year of Nebuchadnezzar, according to Jeremiah and the writer of Kings. Ezekiel confirms this date in at least three ways: (1) the exultation of Tyre in the 11th captivity year, and obviously after the city had fallen, must have finalized the fact in the prophet's mind (Ezek.26:1,2); (2) the arrival of the messenger in the 10th month of the captivity year--hence early in the year of a fall-beginning calendar--informed Ezekiel that the city had fallen five months earlier (Ezek.33:21);[42] and (3) three years before this, in the "ninth year, tenth month, and tenth day of the month," Jehovah said to the prophet, "the king of Babylon set himself against Jerusalem this same day" (Ezek.24:2).

Thus, by vision, a human messenger, and direct communication with Jehovah,

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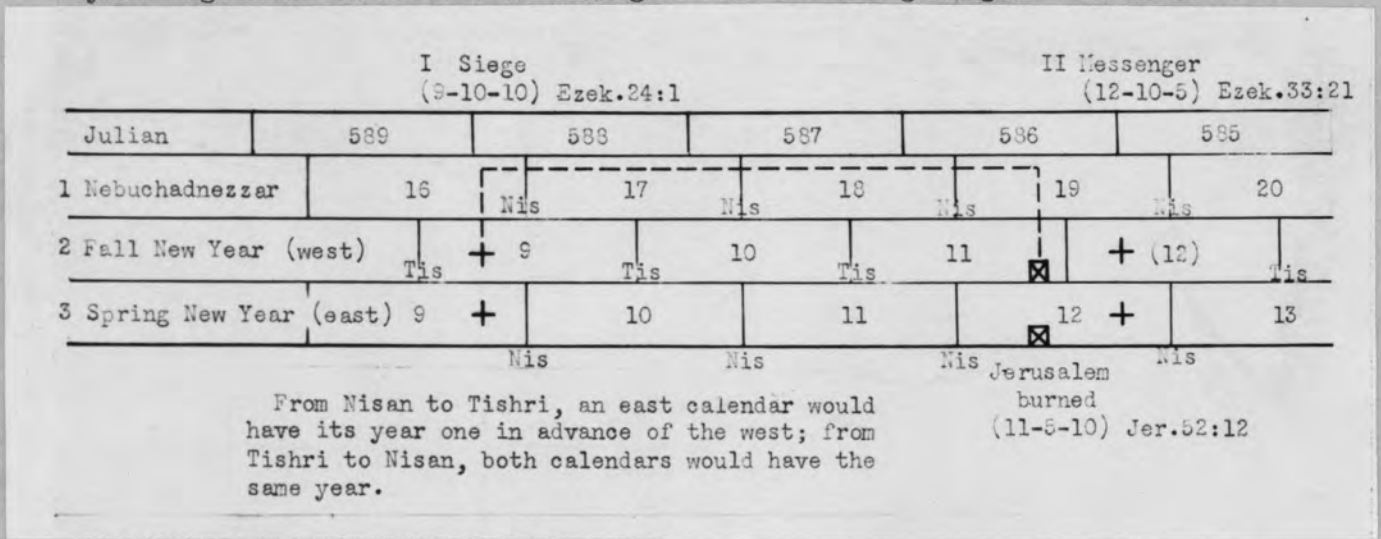
41 Chapters 26 and 32 fall out of line, however.

42 If chronology should delay this report a whole year, as some insist, it would break the frequency of Jehovah's warnings to Ezekiel at this very time; moreover, five months approximately correspond to the actual time it would take the messenger to go from Jerusalem to Tel-abib.

Ezekiel was kept in touch with affairs in his home land. The date for beginning the siege--ninth year, tenth month, and tenth day of the month--must be of unusual importance, for it is recorded four times by four different biblical writers--Jeremiah (39:1), writer of Kings (2 Kings 25:1), compiler of Jeremiah (52:4), and Ezekiel (24:1).[43] While this fact alone would not prove that each Jewish writer was using the same kind of calendar, yet the fact that the siege date was a winter date (9-10-10) would very definitely prove that in each case the regnal year was the same. For during the summer months, the Babylonians were one year in advance of the Jews, because their new year came first, that is, in the spring; but in the winter, both peoples reckoned the same regnal year. Consequently, the siege date, being a winter date, would correspond to one and the same regnal year whether a Babylonian or Jewish calendar were employed. And this fact is of extreme importance with reference to the divine message to Ezekiel declaring that the siege had begun. For if any of the captive Jews were signing their contracts in Babylonian time,[44] there could be no possible misunderstanding as to the year signified in the divine message. The following diagram illustrates:



[43] Josephus also gives this same date for the siege--Ant.X.VII.4.

[44] Joseph Scaliger, De Emendatione Temporum, Francofurt, 1593, 79. "Ab illis temporibus, inquam, anno Chaldaico uti coeperunt in contractibus suis, eoque ab initio Nabopollassari, quod consurgit ex anno Nabonassari 123 cyclo Lunae quarto, ut ex Ptolomaeo didicimus."

In Diagram Z, line 1 represents the Babylonian reckoning of Nebuchadnezzar's reign, with the year beginning in Nisan; line 2 represents the Jewish year beginning in Tishri; and line 3, the Jewish year assumed to begin in Nisan. The winter siege date 9-10-10 is designated "I", while "II" represents the winter date 12-10-5, when the messenger came to Ezekiel.

The foregoing diagram plainly shows that in both I and II the tenth month belonged to the same regnal year--in I, to the 9th year, and in II, to the 12th year, had there been a "12th" in Zedekiah's reign. The decisive feature regarding the messenger date is the fact that in a fall-beginning year, the figures given in Ezek.33:21 could not possibly involve more than a five months' period; for if the interval were a year and five months, then the calendar--cf. Table W--would thereby be advanced a whole year, and thus make the first official year of Jehoiachin coincide with the ninth of Nebuchadnezzar instead of the required eighth (2 Kings 24:12). Hence the validity of Synchronism V, which is based upon Ezek.33:21, is an important landmark in Ezekiel chronology, in fixing the exact time when the messenger appeared.

But the problem still demands further checking as regards a fall-beginning year for the Ezekiel dates. Let us examine Synchronism IX. Here the compilers of Jeremiah and 2 Kings are tied up with the Ezekiel captivity year, the 37th of which is equated with the "first year" of Evil-Marduk in the twelfth month. The M text translated "began to reign" in 2 Kings 25:27 is מלכו and in Jer.52:31, the words בשנת מלכתו are translated "in the first year of his reign." The LXX does not furnish further light. But it is very clear that neither one of these Hebrew expressions could refer to the accession year of Evil-Marduk. Since this king only reigned two years,[45] the M text necessarily refers to his official first year, which must coincide with the 37th of Jehoiachin in the twelfth month. Only a fall-beginning Ezekiel year checks with this equation. If the Ezekiel year is made to begin in the spring, the year 37 would coincide with the 2nd of Evil-Marduk in the

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45 Albert T. Clay, The Babylonian Expedition, Vol. VIII, Part I, Philadelphia, 1908, 4.

twelfth month instead of with Evil-Marduk's first year. Therefore, by tying Jehoiachin's captivity years--the 1st and 37th--to the spring-beginning Babylonian calendar in the 8th of Nebuchadnezzar and the 1st of Evil-Marduk, the ancient Jewish writers fixed the form of Ezekiel's calendar as beginning in the fall of the year.

The decisive effect of an autumn new year upon the chronology of Ezekiel is shown in many ways. In Ezek.26:1, a Tishri-beginning year supplies the missing month; for, after the fall of the city in the fifth month, the sixth month Elul is the only month left before the year changed on 1 Tishri. This fact an intelligent scribe would have known, and offers a good reason for the neglect of naming the month. On the contrary, an Ezekiel year dated from the spring would bring confusion into Ezekiel 32, causing the wail against Egypt from verse 17 and on to precede the date in verse 1, although this lamentation is a logical sequence belonging to the second half of the chapter. In verse 17, the LXX consistently reads τοῦ πρώτου μηνὸς for the missing figure in M; but in verse 1, even though the Syriac version may insist on "11th year" instead of "12th," as in M, with a calendar year beginning in Tishri, the M text is more harmonious just as it is than the Syriac revision. Some Syriac scribe doubtless forgot that with an autumn new year, the months seven to twelve naturally precede those from one to six, which order exactly fits the chapter.

An autumn new year in Ezekiel lends ~~important~~ material significance to Ezek.40:1, and focusses the Authorized Version "beginning of the year" upon the month Tishri, even though the LXX reads ἐν τῷ πρώτῳ μηνί. The Hebrew phrase בראש השנה is not found elsewhere in the Bible.[46] The original divine instruction to Moses commanded him to count the paschal month as "first" only--ראשון--of the months of the year. And Jewish months

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[46] A phrase with much the same meaning בראשית השנה is found in Deut.11:12, and doubtless there refers to the autumn season when the agricultural year begins in the Near East] also

have ever since been numbered from Nisan. Even Moses and Aaron counted their individual years from the paschal month.[47] But the whole Ezekiel chronology agrees with the month Tishri as the "head of the year."[47-1] For centuries, on the first day of Tishri, the trumpets had been blown almost continuously--but not so on the first day of Nisan (Num.29:1).[48] And in the time of Christ, the new year was autumnal. This fact Daniel had incorporated into his prophecy.[49] Similarly, also, the modern Jewish new year occurs in the autumn, and, like Ezek.40:1, its name is Rosh Hashana, "head of the year."

It has been questioned whether the Jewish writers, in computing the Babylonian and Persian reigns, employed the Jewish calendar, or the foreign one. For example, in 2 Kings 25:8, is the "nineteenth" year of Nebuchadnezzar Jewish or Babylonian terminology? Table W answers this question. As has already been explained, the Babylonian year in this table runs from spring to spring, and its dates are fixed by eclipses and the Ptolemaic king lists. Likewise the Persian year. Thus far this study has proved, at least to the end of Babylonian rule, that the Jewish new year was in the autumn. If, in 2 Kings 25:8, the "nineteenth" of Nebuchadnezzar were Jewish reckoning, and

47-1 Note: Ezek.43:1-3, for example, is a part of the same vision as in ch.40:1, and hence would have the same date, which, as demonstrated, was the seventh month of the twenty-fifth captivity year. At this time the prophet sees the return of the "glory of the God of Israel"--the shekinah--which he had seen depart in the sixth month of the sixth year of the captivity (Ezek.8:1), the year following his call. Harmonious is the fact that the "glory" departed in the sixth month and is seen returning in the seventh month nineteen years later.

Again, in Jer.32:1, where the prophet equates the 10th of Zedekiah with

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47 Moses was 80, and Aaron 83 in the exode year (Ex.7:7). After 40 years, in the 11th month, Moses was 120 (Deut.1:3 & 31:2); and in the 5th month of the same year Aaron was 123 (Num.33:38). They must have reckoned therefore from Nisan.

48 On the first day of every month, however, the trumpet was blown over the burnt offering. Cf. Num.10:10.

49 Since Jesus died "in the midst of the week," --cf. Dan.9:27--which was the spring of the year, the actual end of the prophetic week, or literal year, would obviously be in the autumn. end of the

the 18th of Nebuchadnezzar. Here the month is not given. But if, in the summer, the "18th" of Nebuchadnezzar were Jewish terminology, then the "19th" would be Babylonian; or, if it were winter, then both Jews and Babylonians would count the year as the 18th. On the contrary, Table W shows that the winter months of the 10th of Zedekiah check only with Nebuchadnezzar's 17th year, and that no month at all of Zedekiah's 10th comes anywhere near Nebuchadnezzar's 19th. Hence the conclusion is both consistent and imperative that Jewish writers employed in their records the Babylonian year for the Babylonian kings, and that its new year was in the spring.

The foregoing conclusion is most consequential to the chronology of the Babylonian period; for it not only furnishes Babylonian records with biblical support for important reigns of Babylonian kings, but, what is of greater import, it ties the key Jewish dates of this same period to two calendars--one spring-beginning, and one fall-beginning--whereby their validity is established. Consequently, to link the regnal dates of scribe and prophet with a Jewish calendar that has a Nisan new year, as Kugler, for example, removes the very instrument by which their chronology can be ratified. For the use of two different forms of calendar comprises an absolute check upon any chronicle or historic time record, and this method of confirmation was common practice among nations of antiquity.[50]

The same conclusion that appraises the use of double calendars also adds validity to certain dates of Josephus, who gives the sources from which he took his chronology. He dates the fall of Jerusalem according to Jewish records. These are his words: "These accounts [Chaldaean] agree with the true histories in our books: for in them it is written that Nebuchadnezzar, in the eighteenth year of his reign, laid our temple desolate," etc.[51] This statement shows definitely that the Jewish records which Josephus had in hand,

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[50] For example, the trilingual inscription of the Rosetta stone.
[51] Against Apion, Book I, 21.

counted the fall of Jerusalem to have occurred in the "18th" of Nebuchadnezzar, while the Babylonian records (Jer.52:12 and 2 Kings 25:8) date it in the "19th" of this king. However, both assertions are correct; for the first is Jewish, and the second, Babylonian, and in the summer month Ab, when the city fell, Babylonian reckoning would necessarily be one in advance of the Jewish.

Josephus records the correct date for the Babylonian siege of Jerusalem,[52] in harmony with the four biblical records, and with the foregoing confirmation of his date for the fall of the city, credance may also be given to his important chronology in X.VI.1, which is of material aid in establishing the date of the battle of Carchemish.

In the last two decades of Table W appear new prophets and new kings, for Babylon has fallen, and the kingdom of Persia has taken over.

IV JEWISH YEAR UNDER EARLY PERSIAN RULE

In the "first year of Cyrus king of Persia," about 50,000 captive Jews returned to Jerusalem and their native estates. (Julian year 536/535 in Table W.) One of the first steps taken toward organizing the people was the consecration of the new moon (Ezra 3:5); and the burnt sacrifices that were a witness to this calendar event (Num.10:10) were offered on the first day of the seventh month (Ezra 3:6). This month was called Tisritu in Babylonia, but, with one exception, the record of Ezra has numbers only for the months. The consecration of the new moon on the first day of the Jewish Tishri, accompanied by a religious ceremony, is good evidence that the Jews returned from Babylon still observing a fall-beginning official year, although they had no king. And, what is most interesting, they also dated the reigns of the Persian kings on this same calendar.[53]

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52 Ant. X.VII.4.

53 Nehemiah counts the "20th" of Artaxerxes from the ninth month Chisleu on into the first month Nisan (Neh.1:1 and 2:1). It is still the 20th when he was appointed governor (Neh.5:14). The year must therefore have changed in Tishri.

Ezra called this year of the return the first year of their coming unto the house of God at Jerusalem (Ezra 3:8). In the second month of the second year of their coming, they began to build the temple. The Chronicler adds that they "laid the foundation of the house of God in the first day of the second month" (1 Esdras 5:57). Evidently it was thought fitting to begin operations at the same time in which Solomon began to build the first temple. There was one difference, however. Solomon began on the second day of the second month (2 Chron.3:2), while Zerubbabel, according to 1 Esdras, began on the first day of the second month. The reason seems obvious:

> In this second year of the return, which was the third year of Cyrus, according to Persian reckoning in the summer (Julian 534 B.C.), the first day of Nisan was April 9, Wednesday, on the Jewish calendar. (Conjunction = April 6.33, J.C.T. [54]) The second day of the second month would therefore have been the Jewish Sabbath, and for this reason necessarily, they appear to have began operations on the first day of the second month, which was Friday.

It was an impressive occasion.

Daniel's one lunar date--in the third year of Cyrus--seems to belong to this very time of laying the temple foundation in Ezra 3. The proof of this statement is tied to Daniel's own personal experience, and the events connected with the return of the first captive Jews to the homeland. The combined narrative and argument that follows represent the basis upon which the prophet's single calendar date can be affirmed:

> The first year of Cyrus marked the seventieth year of his captivity, just as Josephus records,[55] and as Jeremiah foretold (Jer.29:10). The aged Daniel may have shown young Cyrus the prophecies of Isaiah and Jeremiah, which concerned not only the release of the Jews from captivity, but also portrayed the detailed part in the course of events which Cyrus himself was destined to perform (Is.45:1,13).
>
> In answer to Daniel's persistent prayer, the angel revealed to him that a decree would go forth to rebuild Jerusalem (Dan.9:25). The prophetic time periods in the vision were not understood; nevertheless, it was at least clear to the prophet that the return of the first captives would register the end of the seventy years. Daniel kept on praying. Finally, in the "third year of Cyrus," during the paschal season, the prophet fasted and mourned twenty-one days. The angel came again and told him that during his entire three weeks' fast the prince of Persia had been intractable--obviously with respect to the project in Jerusalem--and that he, Gabriel, would return and fight with Cyrus, and see the matter through (Dan.10:13,20).

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54 Schram's Kalendariographische.

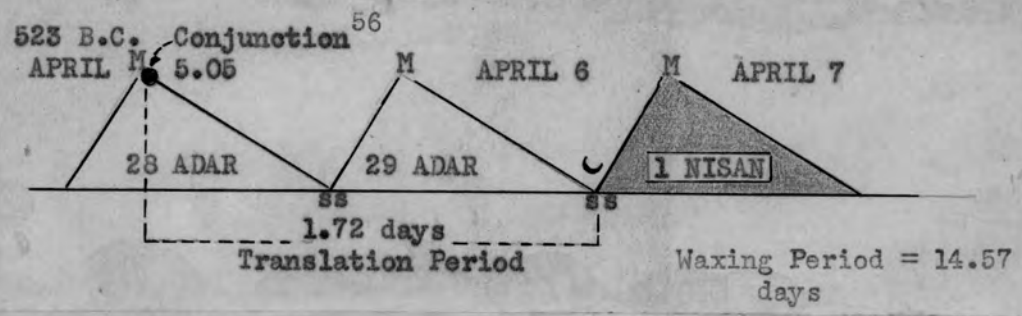
55 Ant.11.I.1.

In less than a week, over in Jerusalem, on a certain day that was dated by the Chronicler as the second year of their coming, in the second month (Ezra 3:8), and the "first day of the second month" (1 Esdras 5:57), Zerubbabel began to work on the temple. According to Daniel, this took place in the "third year" of Cyrus, but, according to the Chronicler, it was the "second year." Both reckonings are correct, for the one (Daniel's) is dated in Persian time, and the other, obviously, in Jewish time.

Here therefore is another instance in which the eastern year is one in advance of the western Jewish year, which began in the autumn six months later. This rule of correspondence between Babylonian and Jewish time is so important to chronology that biblical history ties this exemplar to the narratives of Daniel and the Chronicler.

It is obvious that the three weeks of Daniel's devotion and prayer in the first month immediately preceded the work on the temple in the second month, and that this event in Jerusalem was in reality an answer to Daniel's plea in Persia that Jehovah would restore the desolation of the holy city (Dan.9).

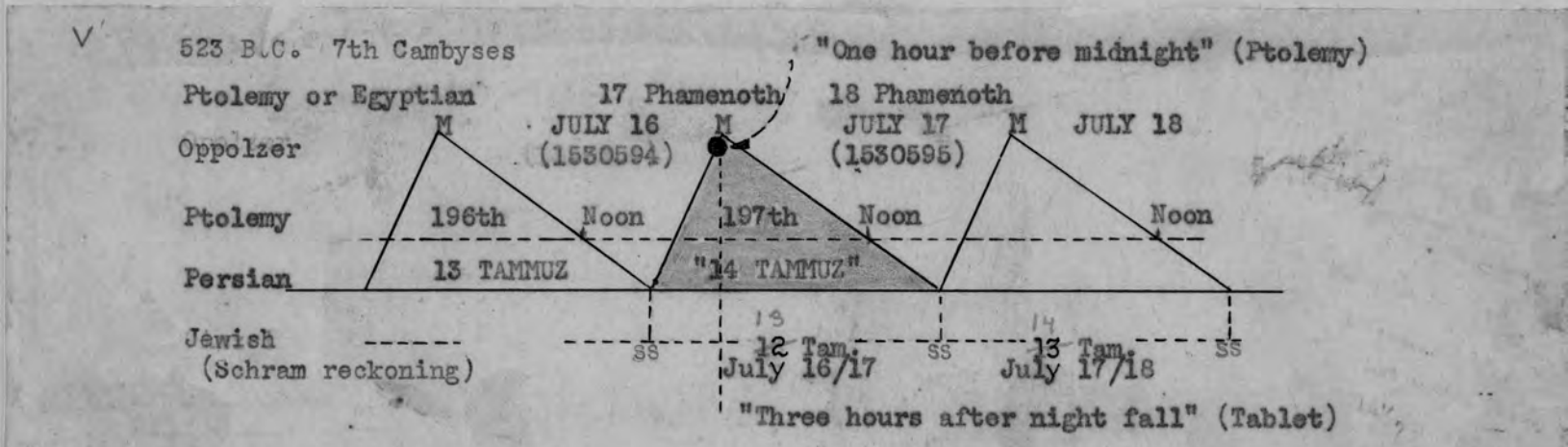
But there was not only a difference between the regnal years of Babylon or Persia and Jewish reckoning, a difference also existed between their lunar dates. This is nicely illustrated by the third lunar eclipse in Table W--Synchronism XII. Before comparing in detail the various computations of the eclipse, let us first ascertain the 1 Nisannu Persian date for the eclipse year 523 B.C. The translation of the Persian new moon of April for this year is as follows:



56 Schram's tables.

Argument: The conjunction on April 5.05 gives a choice of only one sunset for the new moon's first appearance--that on April 6. For if the calendar should date the phasis at sunset on April 5, then the young moon would thereby be represented as appearing on the very day of conjunction--in a position too near the sun to be seen. Therefore the phasis must be dated near near sunset of April 6, making the calendar date for 1 Nisannu to be April 6/7. The translation period then becomes 1.72 days in full agreement with a waxing period of 14.57 days.

But the Jewish date for 1 Nisan in this same year was also April 6/7. This can be shown from the passover date. In 523 B.C., the passover moon was full on April 19.58 in Jerusalem,[57] and the passover on 14 Nisan therefore followed on April 20--always on the day after full moon. Hence 1 Nisan was 13 days previous, or on April 7. Let us now examine the various computations for the Persian eclipse on 14 Dazu in this year. The several days in progress at the time of the eclipse--Julian day, Ptolemy's noon to noon day, lunar day from ss to ss--are here placed in a diagram according to their specified relation:



Description: In the accompanying diagram, all of the calendaric names for the day of the eclipse have been inserted in their defined positions. In the scientific record of Alexandria, the phenomenon occurred on 17 Phamenoth; on the Cambyses "400 tablet" it was 14 Dazu (Tammuz), reckoned from sunset to sunset;[58] in Ptolemy's computation, the day was the 197th after 0 Thoth of the eclipse year;[59] in Oppolzer's Canon, it was July 16, from midnight to mid-

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57 Schram's tables.
58 David Sidersky, Etude sur la chronologie Assyro-Babylonienne, Paris, 1916, 41.
59 Claude Ptolemy, Mathematical Syntaxis, Book 5, tr. Halma. Paris, 1813, 341.

or July 17 on the Julian calendar;

night, or J.D.N. 1530594 from noon to noon. In Jewish reckoning, it was 12 Tammuz, not 14 Tammuz as in Persia.

So, although Persia and Jerusalem had the same date for the new moon of Nisan, the Persian calendar was two days in advance of the Jewish when the eclipse occurred. The explanation is as follows:

one or possibly

Argument: From the Persian new moon date 1 Nisannu (April 7) inclusive to the the eclipse date 14 Dazu (July 17) inclusive, are exactly 102 days, which the Persians would divide up as follows: Nisannu = 29, Airu = 29, Simannu = 30, Dazu = 14. But during this same period the Jews would have counted: Nisan = 30, Iyar = 29, Sivan = 30, and therefore Tammuz = 13 -- 102 days in all. Hence the Persians were at least one days in advance of the Jews in mid summer, and their 14 Dazu Dazu was only 13 Tammuz on the Jewish calendar. of this year,

It is well known that the ancient Jews had an element of calculation in their calendar that the Babylonians do not appear to have had, or else had a different calculation. Inasmuch as the Jews have always had a double-day new moon feast at the end of every 30-day month day month,[60] they had to know in advance when the 30-day months would occur. Scaliger mentions several instances in which he finds a one-day difference between the Chaldaean and Jewish dates.[61] In the twelfth century also chronology discovered that in ancient times an eastern and western lunar date existed--the eastern date commonly being the later date of the two,[62] not earlier, even though sometimes the young crescent was seen in Palestine before it appeared in Babylon. (Albiruni)

The foregoing facts consistently explain the two-day difference in dates between Jer.52:31 and 2 Kings 25:27, the Jeremiah date corresponding to a Jewish scribe, while that in 2 Kings could reasonably be ascribed to Babylonian influence. The two texts therefore seemingly belong to two calendars. However, the regnal year of Evil-Marduk is necessarily the same in both texts because the date lies between Tishri and Nisan.

The eclipse on July 16, 523 B.C. ties the Egyptian, Persian, and Jewish calendars to the canons of Ptolemy and Oppolzer. Astronomical Synchronism XII

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60 Cf. Jewish almanac. Also Horace, Opera, Sermonum, Lib.I.IX, lines 67-74.
61 Scaliger, De Emendatione Temporum, Francofurt, 1593, 77,78. Scaliger admits that he does not carry the Jewish new moons to the third day after conjunction. Had he so done, he would have discovered a two-day difference between his eastern and western dates.
62 Jewish Quarterly Review, Vol. 10, 1897, 153; Vol. 11, 107. "Fragmente syrischer und arabischer Historiker," ed. Baethgen, text p. 84, tr. p. 141.

is of indispensable aid to problems associated with ancient lunar time, for it not only fixes the date of the seventh of Cambyses, but, what is of great significance, it reveals the rule of correspondence between Persian and Jewish calendation as can be demonstrated in connection with the papyrus rolls found at the Egyptian Syene.

At least one more date under early Persian rule is a witness to the fall-beginning Jewish calendar. The date is recorded in Zech.7:1, and its background is as follows:

> Work on the new temple, whose foundation had been laid by Zerubbabel in the second year of Cyrus, Jewish reckoning, was delayed until the second year of Darius (Ezra 4:24). The divine acknowledgment to Zechariah that the seventy years of captivity had transpired (Zech.1:12), identifies the "second year of Darius" as that of Darius I. But, there appears to be two distinct seventy-year periods: (1) the first, as recognized by Daniel to be nearing its end in the first year of Darius the Mede (Dan.9:1,2), and corresponding to the return of the Jews in the first year of Cyrus; and (2) the second, ending later in the fourth year of Darius I, and fully discerned by the people of Bethel, who sent men to inquire of the prophets and priests if they should longer fast and weep in the fifth month (Zech.7:1-3).
>
> Daniel lived to see the fall of Babylon, which too was to mark the end of the seventy years (Jer.25:12). But Jeremiah introduces another event that was to tally with the end of this same period. He had foreseen that the land itself would lie desolate until the neglected agricultural sabbaths should be redeemed (2 Chron.36:21). This ancient land sabbath, occurring every seventh year, provided rest for the land (Lev.25:4-6), release of the slaves (Ex.21:2), and a rehearsal of the law before all Israel (Deut.31:11, 12). It was called the year of release (Deut.15:1).
>
> The last instance on record of the year of release being observed, is recorded in Jeremiah 34. The final siege of Jerusalem had begun--in fact, only two defenced cities remained, Lachish and Azekah. Zedekiah had made a covenant with the people to let the slaves go free (verse 14), and both king and people had entered into the solemn ceremony of cutting the calf in twain, and walking between the parts. But they broke the oath; and as a result, the king of Babylon, who had left the siege to measure his strength against against Egyptian threats was given divine command to return and destroy Jerusalem (Jer.34:21,22).

Obviously therefore, the seventy years of desolation, during which time the the land sabbaths were to be redeemed, must have followed upon the year when Zedekiah and the princes defiantly compelled the slaves to return to their masters. This was not the first year of the siege, but the latter part of the second, which date is recorded in Jer.32:1 as the 10th of Zedekiah and

the 18th of Nebuchadnezzar. This date is just right and needs no correction as some have suggested. By comparing Table W again, it can be observed that the only coincident time between these two regnal years is from Nisan to Tishri, and that this period checks solely with the Julian year 587, which therefore consistently marks the beginning of the seventy years' land rest, ~~of the land~~, while the fourth year of Darius in the fall of the Julian year 518 marks the end of the period.

It was in the ninth month "Chisleu" when the men of Bethel came up to the temple to inquire if the desolation of Jerusalem had ended. The divine answer was propitious, and the promise was given that there should be dew and rain as needed, and that the land should henceforth be prosperous (Zech.8:12). The people were also encouraged to pray for rain in the time of the spring rain (Zech.10:1)--not in the fall only.

It is essential to note that the men of Bethel recognized the fall-to-fall agricultural year that characterized the seventy years of desolation, for otherwise they would have come in the spring. And it is of further significance that since the period ended in the fall, it must have begun in the fall of the 18th of Nebuchadnezzar, when Zedekiah was just entering upon his 11th year. In other words, the last year for Jerusalem had come, and it was an autumn-beginning regnal year that initiated the seventy years of desolation.

Thus it will be seen that biblical dates and chronological periods are very dependent upon biblical narrative. The confirmation of any point of time may demand review of a series of episodes, for the Bible is not a dissertation on chronology, and yet its records are intimately linked with every branch of this science.

V C O N C L U S I O N S

Let us summarize the basic features upon which Table W is constructed. The most important date is of course the 10th of Ab in the summer of 586 B.C.,

when the first temple was burned by Nebuchadnezzar.[63] This was his nineteenth year, both according to his own calendar, in conformity to eclipse and canon, and according to biblical record. The chronological factors that establish this date are first of all the biblical synchronisms that tie the fall-beginning Jewish year of Kings, Chronicles, prophets and scribes to the spring-beginning Babylonian year, which is certified by the same authorities. These synchronisms lock in place the historical landmark that signified the end of the first Jewish monarchy.

And in addition, the two eclipses I and XII, and the saros full moon date VIII, together with Ptolemy's canon, establish the Babylonian and early Persian king lists of the Table for more than a century.

All of the dates and periods in the outline are outstanding. They involve no small part of OT writings. The regnal year argument is not founded upon emendation of the text, but originates with common practice among nations of antiquity. Its calculation is based, not only upon a calendar relation that existed among nations of the Near East, but also can be demonstrated in detail from the biblical context, as has been demonstrated. It is a simple factor that gives technical character to important Hebrew phrases, thereby being both selective and definitive, and therefore bringing an understanding harmony into the biblical chronology of the period under consideration.

Two things are therefore essential in stating biblical time accurately: (1) the name of the authority or scribe and his calendar--whether eastern or western time; and (2) the place and season of any dated event.

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63 G. Woosung Wade, Old Testament History, London, 1903, 321. (Gives 586 B.C.)
Julius Oppert, "Noli Me Tangere," Proceedings of the Society of Biblical Archaeology, Vol. XX, 28th Session, 1898, 45. (Gives 587 B.C.)

Comments by S.L. Golden on Ezek. 40:1 Tr. by Israel Shapiro

Rosh Hashana mentioned for first time in Bible.

"According to the old Jewish tradition was originally in the autumn. It was the first of the year for the peasantry. Ex. 23:16. Feast of the harvest in Ex. 24:22, when the year finishes the circuit - then Tishri begins. On the other hand, the national tradition of the Exodus that fell in the spring, which is considered the first month of the year, according to the Babylonian tradition, where the spring months with equal days and nights was the first of the year.

Thus there were two Rosh Hashanas. Month of Nisan was National Rosh Hashana, while Tishri was the religious Rosh Hashana. R. Hashana was celebrated in the seventh month, and was ultimately accepted for the civil.

Referring to the 10th of the month. In the old times, Rosh Hashana was celebrated, not on the first, but on the 10th of the seventh month - yom kippur. Later they started to celebrate Rosh Hashana on the first, while the 10th remained as Yom Kippur.

(this is new to me)

THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND

ORIENTAL SEMINARY

June 10th, 1943

Dear Miss Amadon,

I have read your article on sixth-century chronology with great interest. It seems to me that you have swung to an extreme position in one direction, just as Kugler has in another. How can you explain practically all OT references to the beginning of the year as referring to the autumn when the official numeration of months begins (as you also accept without discussion) in the spring? There can be no doubt whatever that in earlier Israel the year began in the autumn (the Gezer Calendar is incidentally a much stronger witness than supposed, since it unquestionably offers a total of twelve months, not of eight as often stated). On the other hand, in later Judah and in post-exilic times it began in the spring. (When it is stated that the ~~Temple was destroyed~~ Jerusalem fell into the hand of the Chaldeans in the ninth day of the fourth month of the eleventh year of Zedekiah, how can you reasonably reckon the fourth month as beginning six months before the fourth month following the autumn new-year?*) In view of the fact that the Assyro-Babylonian calendar had been introduced into most of Palestine in the eighth century, as we know from business documents found at Samaria and Gezer, it is scarcely surprising that it was accepted by the men of Judah for civil purposes as early as the reign of Hezekiah. Substitution of ordinal numbers for Accadian names of months was only a natural procedure; after the Exile the month-names came in gradually through Aramaic influence.

(I do not understand the question in parentheses)

*according to your system of reckoning regnal years.

You should work through Begrich's book, even if you disagree with him strenuously, since it is the latest and in some respects the most systematic attempt to solve these problems. I must say that I begin to doubt whether a final solution is at all possible until we have contemporary Jewish business or other documents which throw direct light on the problem.

How can Nebuchadnezzar have taken Jerusalem before the Battle of Carchemish, at which he overthrew the Egyptian army and made an advance on Egypt possible?

I sent your corrections (all minor) to Pfeiffer, but have not heard from him.

I am afraid that my review of Allis is very severe (coming out in JBL this autumn, probably). I don't see how the author can write such a superficial book on such an important subject (which he stresses much more than I should).

Cordially, W. F. Albright

P.S. I shall be in Madison, Wis., for the Linguistic Institute from about May 20th to the end of July, after which I return here.

CHART G

REGNAL SYNCHRONISMS

of the

JULIAN, PTOLEMAIC, AND JEWISH CALENDARS

626	625	624	623	622	621	620	Julian	618	617	616	615	614	613
	1	2	N.E.	4	5	6	7 Nabopolassar			10	11	12	13
22	A	1	2	Jewish	4	5	6	Nabopolassar		9	10	11	12
13	14	15	16	17	Josiah			20	21	22	23	24	25

612	611	610	609	608	607	606	605	604	603	Julian	601	600	599
14	15	16	17	N.E.	19	20	21	1	2	Nebuchadnezzar		5	6
13	14	15	16	Jewish	18	19	20	21	A	1	Nebuchadnezzar		5
26	27	28	29	30	31	A	1	2	Jehoiakim		5	6	7	8

598	597	596	595	594	593	592	Julian	590	589	588	587	586	585
7	8	9	10	Nebuchadnezzar			14	15	16	N.E.	18	19	20
6	7	8	9	10	Nebuchadnezzar			14	15	16	17	18	19
9	10	11	A	1	2	Zedekiah		5	6	7	8	9	10	11

584	583	582	581	580	Julian	578	577	576	575	574	573	572	571
21	22	N.E.	24	25	26	Nebuchadnezzar			30	31	32	33	34
20	21	22	23	Jewish	25	26	27	28	29	Nebuchadnezzar			33

570	569	568	567	566	565	Julian	563	562	561	560	559	558	557
35	36	37	N.E.	39	40	41	42	43	1	2	1	2	3
34	35	36	37	Jewish	39	40	41	42	43	A	1	2	A	1	2

Amel Marduk

Nergal Sarusur

556	555	554	553	552	551	550	549	Julian	547	546	545	544	543
4	1	2	3	N.E.	5	6	7	8	Nabonidus		11	12	13
3	4	A	1	2	3	4	Jewish	6	7	8	9	Belshazzar		11	12

542	541	540	539	538	537	536	Julian	534	533	532	531	530	529
14	15	N.E.	17	1	2	3	4	Cyrus		7	8	9	1
13	Jewish	15	16	17	A	1	2	A	1	2	Cyrus		5	6	7	A

Darius the Mede

528	527	526	525	524	523	522	521	520	519	Julian	517	516	515
2	N.E	4	Cambyses		7	8	1	2	3	4	Darius		7
1	2	Cambyses		5	Jewish	7	8	A	1	2	Darius		5	6

Gaumata

COINCIDENCE

REGNAL OUTLINE OF THE SIXTH AND FIFTH CENTURIES B.C.
(Cf. Tables W and W')

ARGUMENT: (1) The autumn-beginning year of Ezra and Nehemiah in the 5th century B.C. must link up with a similar series of Jewish years in the 6th century B.C. The Jehoiachin captivity year, if running from fall to fall, is the logical series with which the Nehemiah years should connect; for upon the Jehoiachin line of descent God placed his approval even before the time of Ezra (Hag.2:23). But if the Ezekiel captivity years were to begin in the spring, it would not only thereby fail link up with the Nehemiah regnal years, but, in addition, the 37th captivity year would coincide with Adar in the second of Amel-Marduk instead of in the first.

And furthermore, if in Table W, the Ezekiel captivity years were made to begin from the autumn, coinciding with the "8th of Nebuchadnezzar" as suggested by the writer of 2 Kings, then the messenger to Ezekiel would arrive in the 13th year of Jehoiachin's captivity, contrary to Ezek.33:21. This is forbidding also for the reason that Jehoiakim apparently died in the summer, when his body was "cast out in the day to the heat" (Jer.36:30), after which Jehoiachin ruled 3 months and 10 days, and then Nebuchadnezzar besieged the city (2 Kings 25:11,12).

The "return of the year" in 2 Chron.36:10, when Nebuchadnezzar sent and brought Jehoiachin to Babylon, must therefore, in this instance, check with the autumn and not with the spring. But this alignment demands that the city be burned in 586 B.C. instead of 585 B.C.

(2) And if again in Table W, the 12th captivity year should begin in the autumn, and therefore follow the 11th of Zedekiah, then the 37th captivity year would exactly coincide with the second of Amel-Marduk, contrary to the Jeremiah and 2 Kings record.

The conclusion therefore is obvious that the Ezekiel captivity year cannot be harmonized with Table W. And it is equally conclusive that the last chapters of Jeremiah and 2 Kings must have been written according to a Babylonian reckoning of Babylonian kings, and according to a Jewish reckoning of Jewish kings. For only by this method of dating the regnal years do all of the records come into harmony. On this basis of computation, the fall of the Holy City occurred in 586 B.C., making the length of the siege about 30 months. This length of siege better fits the tragic results recorded by Lamentations than would the 18 months siege recorded by Josephus, although it is not clear that the 18 months of Josephus extended to the actual burning of the temple (X.VIII.1).

It is therefore a consistent conclusion that after the Jewish kings ceased, and especially after the setting up of the Pentateuchal new moons by Zerubbabel, Ezra and Nehemiah (Ezra 3:2-5; Neh.10:29-33), the Jews counted the reigns of foreign kings from fall to fall in like manner as the kings of Judah were reckoned throughout the theocracy. And it is possible that we have to recognize a fall reckoning of Babylonian kings by Josephus when he places the burning of the city in the 18th of Nebuchadnezzar (X.VIII.5).

not sent

Psammetich = 666-610 = 26th Dynasty

Near Eastern Meridians

BABYLONIAN KINGS

(Old Testament Synchronisms)

January 1 1 Thoth = Jan 27

April 22 I

Julian	626	625	624	623	622	621	620	619	618	617	616	615	614	613
Ptolemy	Nis	1 (123)	2	3	4 (126)	5	6	7	8	9	10	11	12	13
Babylonian	22	1	2	3	4	5	6	Nabopolassar	9	10	11	12	13	
Assyrian														
Jeremiah	13	14	15	16	17	Josiah	19	20	21	22	23	24	25	26

1st year of Jeremiah — Zephaniah — Jer. 29:10 — Tis

Julian	612	611	610	609	608	607	606	605	604	603	602	601	600	599
Ptolemy	Nis 14	15	16	17	18	19	20	21 (143)	1	2	Nebuchadnezzar	5	6	
Babylonian	14	15	16	17	18	Nis 19	20	21	II 1	2	+ Nebuchadnezzar	5	6	
Assyrian														
Jeremiah	27	28	29	30	31	1	2	3	4	Jehoiakim	7	8	9	

Tis — 2 Chron. 35:20 — Ant. X. XI. — Tis 23rd year of Jeremiah — Ant. X. VI. 1

Julian	598	597	596	595	594	593	592	591	590	589 Jan. 17	588	587	586	585
Ptolemy	Nis 7	8	9	10	11	12	13	14	15	10 Tebet	Siege			20
Babylonian	7	8	9	10	11	12	Nebuchadnezzar	15	16	17	18	19	20	
Jewish	10	11	1	2 de facto	3	4	Zedekiah (vassal king)	8	9	10	11	Jan. 9	10 Ab	
Ezekiel		III	1	2 de jure	3	4	Jehoiachin's Captivity Year		9	10	11	12		

1 Es. 1:45 — Tis — Ant. X. VI. 3 — Messenger (Ezek. 33:21)

Julian	584	583	582	581	580	579	578	577	576	575	574	573	572	571
Ptolemy	Nis 21	22	23	24	25	26	27	28	29	30	31	32	33	34
Babylonian	21	22	23	24	25	Nebuchadnezzar	28	29	30	31	32	33	34	
Ezekiel	13 3	14 4	15 5	16 6	17 7	18 8	19 9	Jehoiachin	11	22 12	23 13	24 14	25	26

Tis — Jan. 12 — July 4 — Release of Jehoiachin — (2 Kings 25:27) (Jer. 52:31)

Dougherty 58

Julian	570	569	568	567	566	565	564	563	562	561	560	559	558	557
Ptolemy	Nis 35	36	37	38	39	40	41	42	43	1	2	1	2	3
Babylonian	35	36	Nebuchadnezzar 39		40	41	42	43	1	2	1	2	3	
Ezekiel	27	28	29	30	(31)	(32)	(33)	(34)	(35)	(36)	(37)			

Tis — Ant. X. XI. 1 — Amel-Marduk — Nergal-Sarusur

Julian	556	555	554	553	552	551	550	549	548	547	546	545	544	543
Ptolemy	Nis 4	1	2	3	4	5	6	7	8	9	10	11	12	13
Babylonian	4	1 +	2	3 +	Nabonidus	and 6 B	7	8	9	10	11	12	13	
Jewish														

Tis — Ant. II. I. 1 — 70

Julian	542	541	540	539	538	537	536	535	534	533	532	531	530	529
Ptolemy	Nis 14	15	16	17	1	2	3	4	Cyrus	6	7	8	9	1
Persian	14	15	16	17	1	Darius	1	2	+ Cyrus	4	5	6	7	1
Jewish								1	2	3	4	5	6	7

Tis — Jan. 2 — July 16 — Daniel - Ezra date

Julian	528	527	526	525	524	523	522	521	520	519	518	517	516	515
Ptolemy	Nis 2	3	4	5	6	7	8	1	2	3	4	5	6	7
Persian	2	3	4	Cambyses	6	7	8	1	2	Darius I	4	5	6	7
Haggai Zechariah	2	3	4	Cambyses	6	7	8	1	2	Darius I	4	5	6	7
Jewish	1	2	3	4	Cambyses	7	8	1	2	3	4	5	6	

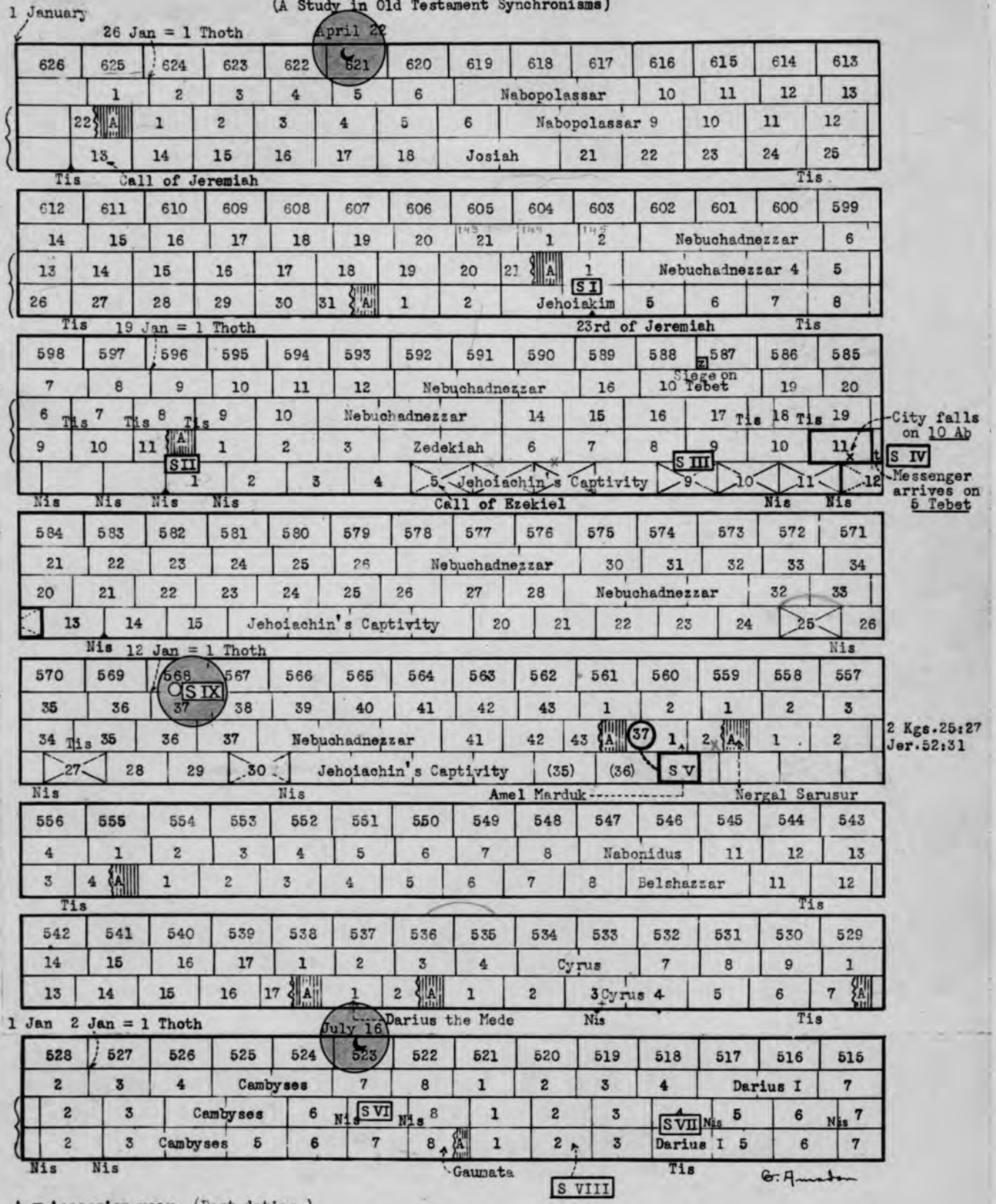
Tis — G. Amadon — end of 70th year of desolation — Ezra 6:15

Barges — Nebuchadnezzar III = 1 mo. 21

Aug. 9, 1942

BABYLONIAN KINGS

(A Study in Old Testament Synchronisms)



A = Accession year. (Post dating.)

S I -- Links Jewish regnal year to Babylonian regnal year. Jer.25:1-3.

S II -- Ties Ezekiel year to the Kings' designation of Babylonian year. 2 Kings 24:12.

S III -- Unites Ezekiel year, Jeremiah year and year of Kings. Ezek.24:1.

S IV -- Relates Ezekiel year to year the Holy City fell. Ezek.33:21. [Jer.52:31.

S V -- Ties Kings' year and Jeremiah year of captivity to Babylonian regnal year. 2 Kings 25:27 and

S VI -- Synchronizes Julian date, Persian date and Egyptian date. Cambyse "400" Tablet.

S VII -- Synchronizes the 4th Kisleu in the 4th year of Darius with 518 B.C. -- a date synchronism. Zach.7:1.

S VIII -- Identifies Haggai-Zachariah year with Persian year. Hag.1:1 and Zach.1:7.

S IX -- Ties full moon on 14 Sivan, July 4, 568 B.C. (Babylonian calendar) to 37th of Nebuchadnezzar II. Observation text reported by P.V. Neugebauer and E.F. Weidner, Leipzig, 1915.

7th Risleu = 4th Thoth =
9th yr Artaxerxes
Ungnad "30" 456

A Restudy of the Assuan Papyri with a View of Determining the Synchronism of the Various Calendars In Use During the Persian Period

For

14th Tammuz
7th Cambyses 523
J. Brassmäer
Cambyse 400 Tablet
night of 17th or 18th Phamenoth
224 yrs
196 days,
10 hrs.
after
Feb. 26, 747
(upon)

In order to understand the chronology of the Persian Period, it is necessary to understand the basis of calendrical reckoning used by the various writers, for at that time there was no universal calendar. Information has come down to modern times by authors using at least four different systems of chronology: the Babylonian-Persian, the Egyptian, the Greek, and the Hebrew or Aramaic. An attempt is made in this discussion to translate these various calendars in terms of the Julian, as this system of reckoning furnishes our modern method of all time calculations, both historical and civil.

In the Babylonian-Persian calendar, the year began in the spring, the Persian month Hadukannuia being equivalent to the Babylonian Nisannu or the Aramaic Nisan.[1] The day began at sunset.[2] The year was strongly lumi-solar in character based on an agricultural scheme which was clearly connected with the various festivals of the year. This necessitated an intercalation of an additional month seven times in every nineteen years. Olmstead is confident that the definite nineteen-year cycle of intercalation was introduced in 747 by the Babylonian Nabu-nasir and as early as the beginning of the fifth century, Nabu-rimanni, the great Babylonian astronomer historian, was able to compute the true date of the new or full moon and to determine both lunar and solar eclipses.[3]

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[1] Arno Poebel, "The Names and the Order of the Old Persian and the Elamite Months during the Achaemenian Period", American Journal Semitic Language and Literature, Vol. LV, 130-141. E. W. Maunder, the English astronomer, speaking of an inscription on a Babylonian boundary stone where the crescent moon is seen lying on its back, says, "It is most nearly upright at the time of the autumnal equinox; it is most nearly horizontal, lying on its back, at the spring equinox. It is clear from this symbol, therefore, that the Babylonians began their year in the spring." The Astronomy of the Bible, 2d Edition, London, p. 316.

[2] S. H. Langdon, Babylonian Menologies and the Semitic Calendars, p. 54. See also Revue d'Assyriologie, Vol. XXVIII, 15,16.

[3] A. T. Olmstead, "Babylonian Astronomy - Historical Sketch", A J S L, Vol. LV (1938), 113-129.

To keep this luni-solar year in proper synchronization with the seasons, the Babylonians and Persians introduced these embolismic months at such times during the nineteen-year cycle as would guarantee the barley and date harvest coming at the proper time for their religious festivals. Langdon makes a splendid comparison of the Babylonian calendar with contracts bearing on the agricultural operations in which he quotes from a letter by Mr. Webster of the Agricultural (1926) Directorate of Baghdad, giving the limits of the barley harvest in the Babylonian-Nippur district as April 10 to May 15.[4]

The Babylonians and Persians possessed no eras of calculation such as the Greeks had in their Olympiads by which it was possible to continually check the length of reigns, but Strassmaier discusses quite at length a saros table found in the British Museum in 1884 and first published in the Proceedings of the Society of Biblical Archology, giving a list of kings ruling at the eighteen-year intervals of the saros period, together with the year of their reigns.

Insofar as the tablet goes, these periods begin with the seventh year of Nabonidus. The number just before the king's name is year one of the eighteen-year saros period. Thus year seven of Nabonidus equals year one of Saros period. Year seven of Cyrus, therefore, equals year eighteen of the cycle and year eight of Cyrus equals year one of the ~~new~~ next 18-yr. cycle.[5] The following table shows these cycles carried down from Nabonidus through the Persian Period:

Portion of the Saros Table[6] Covering the Fifth Century

7	Nabonidus	17	(18)
(8)	Cyrus	9	18
9	Darius	8	18
27	Darius	36	18
9	Xerxes	21	18
6	Artaxerxes	41	18
(24)	Artaxerx)es		(18)
(1	Darius II	19	18)
19	Darius II		18
18	Artaxerxes II	46	18
36	Artaxerxes II		18

Length of reign
Insert Diagrams
Definition of "Saros"
explain curves

[4] S. H. Langdon, Venus Tablet Ammizaduga, pp. 69-75.

[5] Strassmaier, Zeitshreift fur Assyriologie, Vol. VII (1892) 199 ff; Vol. VIII (1893) 106 ff.

[6] Arno Poebel, (Republished and discussed) A J S L, LVI (1939), 121-146.

This table, therefore, becomes an excellent means of checking the reigns of the Persian Period from an astronomical viewpoint, and as will be demonstrated, proves that in the Babylonian-Persian chronology the death year of a king is counted as the last year of his reign and is also counted as the accession year of the following king, the first year of the new king's reign beginning with the new calendar year. Many tablets are found dated in the accession year of the new king, but these saros cycles show exactly how this accession year is to be related to the last year of the retiring king.

In the Egyptian calendar, religious texts inscribed in the fifth and sixth dynasty show that a calendar of 365 days was used. This calendar comprised twelve months of thirty days each with five epagomenae or blank days to complete the year.[7] There was no intercalation in this calendar with the result that every four years the calendar lost a day and the first of Thoth, the new year's day, of the first month dropped back one day in terms of the Julian calendar. 1460 From the time of Nabu-nasir, 747, B. C., this Egyptian calendar was used more and more. It is difficult to determine when the Egyptians began their civil day. By critical analysis of ~~the~~ Ptolemy's Almagest it is easy to prove that Ptolemy based all his astronomical calculations of time intervals on noon, February 26, 747, as a starting point. But Ginzel says that Ptolemy did this for astronomical reckoning only[8] and he quotes several ancient authorities as disagreeing as to the exact time of the beginning of the civil day. Some authorities want it to be reckoned from dawn to dawn while others think the Egyptians began the day from midnight, while still others want it to begin at sunset. For the purpose of this discussion the day is arbitrarily considered as beginning at sunset as it makes computations and charts a bit clearer.

In reckoning the years of a king's reign, Ptolemy digresses from the method used by other nations by giving the death year of the king to the incoming occupant of the throne and giving the new king no "accession" year. Thus at whatever time

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[7] T. Eric Peet, "Egyptian Calendar", Encyclopedia Britannica, 11th edition, Vol. IV, 575.

[8] F. K. Ginzel, Handbuch der Mathematischen und Technischen Chronologie, Vol.I, 163.

in the year a king came to the throne, Ptolemy counted his reign as beginning with the first of Thoth, or new year's day in that year. This may be checked at various points in his Canon. For instance, the death of Alexander is given in May, B. C. 323, but the era of Philip Aridiaeus, his successor, began with the first of Thoth, the 425th year of the Canon, which in terms of the Julian calendar was November 12, 324. Tiberius died in March, A. D. 37, but Ptolemy makes the reign of Caligula begin with the first of Thoth in the 784th year of the Canon, or August 14, A. D. 38.[9] For the purpose of reference that portion of the Canon which deals with the Persian Period is given herewith.

Portion of Canon of Ptolemy
Covering the Persian Period

Ginzel Rel. Time

King	Length of Reign	Last Year of King in Year of Canon	Years B. C.
Nabonidus	17	209	9 Jan. 555 - 5 Jan. 538 Babylon
Cyrus	9	218	5 Jan. 538 - 3 Jan. 529
Cambyses	8	226	3 Jan. 529 - 1 Jan. 521
Darius I	36	262	1 Jan. 521 -23 Dec. 486
Xerxes	21	283	23 Dec. 486 -17 Dec. 465
Artaxerxes	41	324	17 Dec. 465 - 8 Dec. 424
Darius II	19	343	8 Dec. 424 - 2 Dec. 405
Artaxerxes II	46	389	2 Dec. 405 -21 Nov. 359

With such a wandering calendar as the Egyptians possessed, it was not possible to tie their calendar in with agricultural seasons but when once understood, the calendar becomes very useful in checking with the saros tablet and the Olympiads, in determining the exact length of the reigns of the various kings.

The Greek era began in 776 B. C., a few days after the summer solstice. This system of chronology was used quite extensively by the ancient historians, but it is not tied in to any agricultural system. It is divided into Olympiads of four years each with each year named after the archon of Athens. While it makes an excellent means of checking other data, it has many times to be used advisedly, or as will be seen in future discussion, one may be a whole year off in his reckoning.

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[9] A complete list of the kings of the Canon may be found in a number of places. See, for instance, Curt Wachsmuth, Studien der Alten Geschichte, pp. 305,306.

No one doubts that the Hebrew calendar was of a luni-solar origin nor that the sacred year began with the crescent moon of Nisan nor that the civil Jewish day began with sunset. But whether in the time of the Persian Period this month Nisan began so that the passover could fall at the time of the first full moon after the vernal equinox as is always generally the case in the modern reformed Jewish calendar, is open to serious question. The majority of scholars feel that the Jews of the fifth century B.C. regulated their months by observation and that this nation did not develop the monthly sequence of 29, 30 days nor accept the nineteen-year cycle method of computation with a definite mnemonic until very late in their history. Festivals dates = J.C.T.

As a result of a restudy of the Aramaic Papyri discovered in Assuan about the turn of the century and published by Sayce and Cowley in Aramaic Papyri Discovered at Assuan in 1906, the following hypotheses are offered subject to proof:

1. That the luni-solar year was intercalated in such a way as to bring the passover in the time of barley harvest (April 7 to May 6). April 8 to May 6 Longitude

2. The first of Nisan was figured in such a way as to bring the passover on the day immediately following the full moon. "After sunset" ×

3. The year was computed by a monthly sequence of 30, 29 days during the first six months subject to constant check by observation and adjusted during the last six months by the addition or deduction of a day in some month, perhaps Marcheswan, perhaps sometimes Chisleu, as demanded by the moon in giving the lunar year 354, 355, 383, or 384 days in 12 or 13 lunations. "Length of year"

4. An extra month was intercalated according to a definite mnemonic for the nineteen-year cycle (perhaps not as definitely adhered to at this early date as later, but closely enough to establish the fact of its use).

5. The Jewish civil year used in the reckoning of the reigns of kings began in Tishri and not Nisan. What use?

6. The numbers as well as the names of the months were according to their place in the sacred year regardless of which year was being used.

These hypotheses will be taken up point by point.

Hypothesis: The luni-solar year was intercalated in such a way as to bring the passover in the time of barley harvest, April 7 to May 7.

Chart A shows a plot of the new moons of March and April, from 455 B. C. to 404 B. C. as given in Ginzel's tables.[10] Chart B shows how a nineteen-year cycle may be constructed so as to make possible the passover on the first full moon after the vernal equinox. Chart C shows how a similar nineteen-year cycle may be constructed so that the conjunctions will lie entirely within the month of April. Chart D shows how a nineteen-year cycle may be constructed so as to bring no passover earlier than the seventh of April. A study of the five Papyri coming within this period shows that they fit exactly a nineteen-year cycle with intercalations made as shown on Chart D. From the 10th of Mesore (3d of Chisleu), 446 B. C., to the 12th of Thoth (2d of Chisleu), 416 B. C., shows an interval of 10,987 days. This period demands eleven embolysmic years. As 446 is the earliest, and 416 one of the latest, moons in the cycle, it is quite evident that these five Papyri would not fit the nineteen-year cycle plan developed on either Chart B or C. As the eleven embolysmic years agree with Chart D and as the years mentioned in the double-dated contracts in the Papyri would fit no other mnemonic, it may be considered as proved that Chart D refers, in at least a general way, to the position of the Nisan conjunctions for the period under question. It is interesting to notice that in Chart D the passover will never come earlier than the sunset seventh of April and this is right in the time of the barley harvest, for one of the requirements at the passover season was the waving of the sheaf of ripened barley on the second day following the passover.[11] In harmony with this is the statement by Michaelis:

> "The fests which Moses commanded to be celebrated in the first, third, and seventh month, do not agree with the climate of Palestine in March, May, and September."[12]

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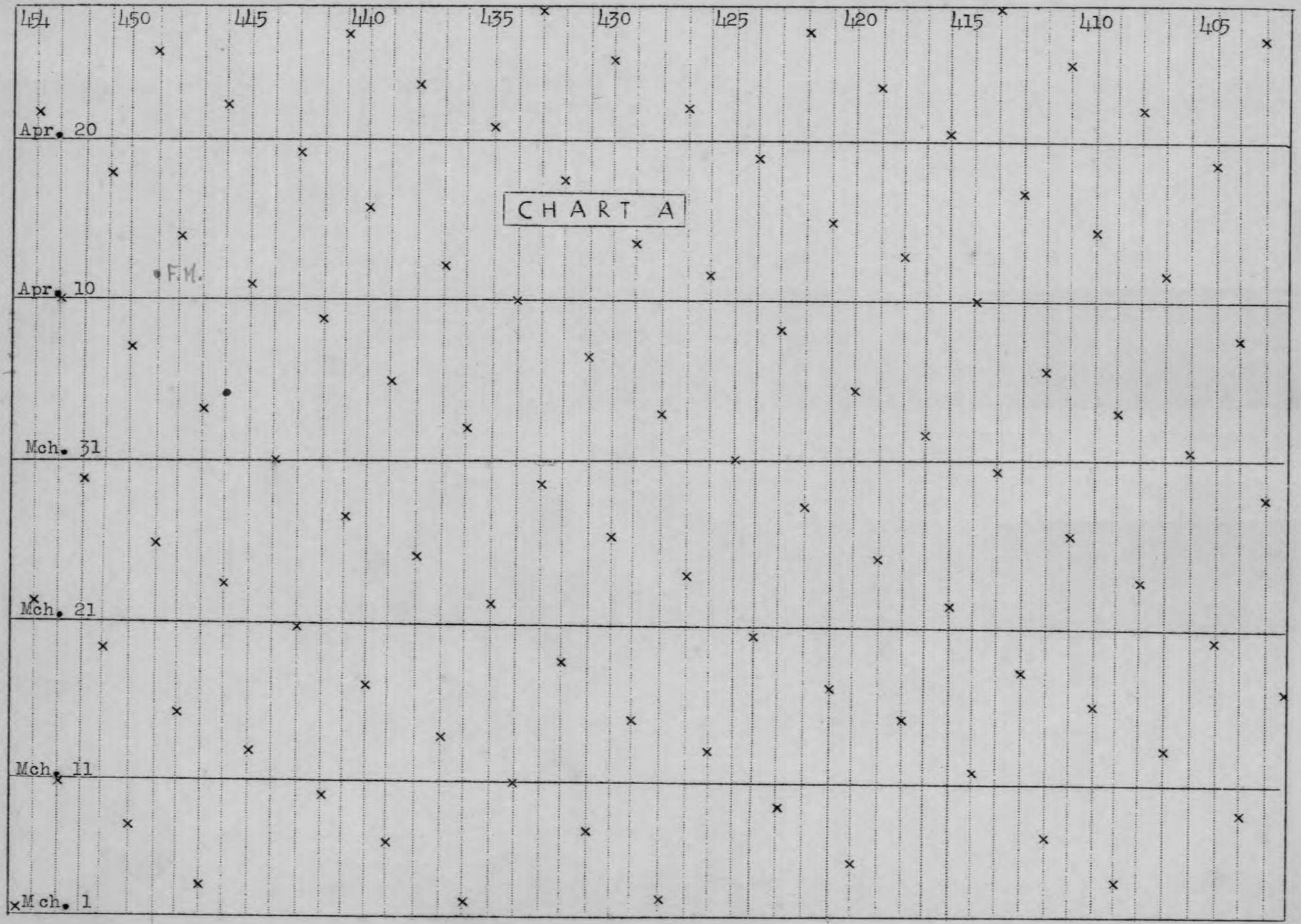
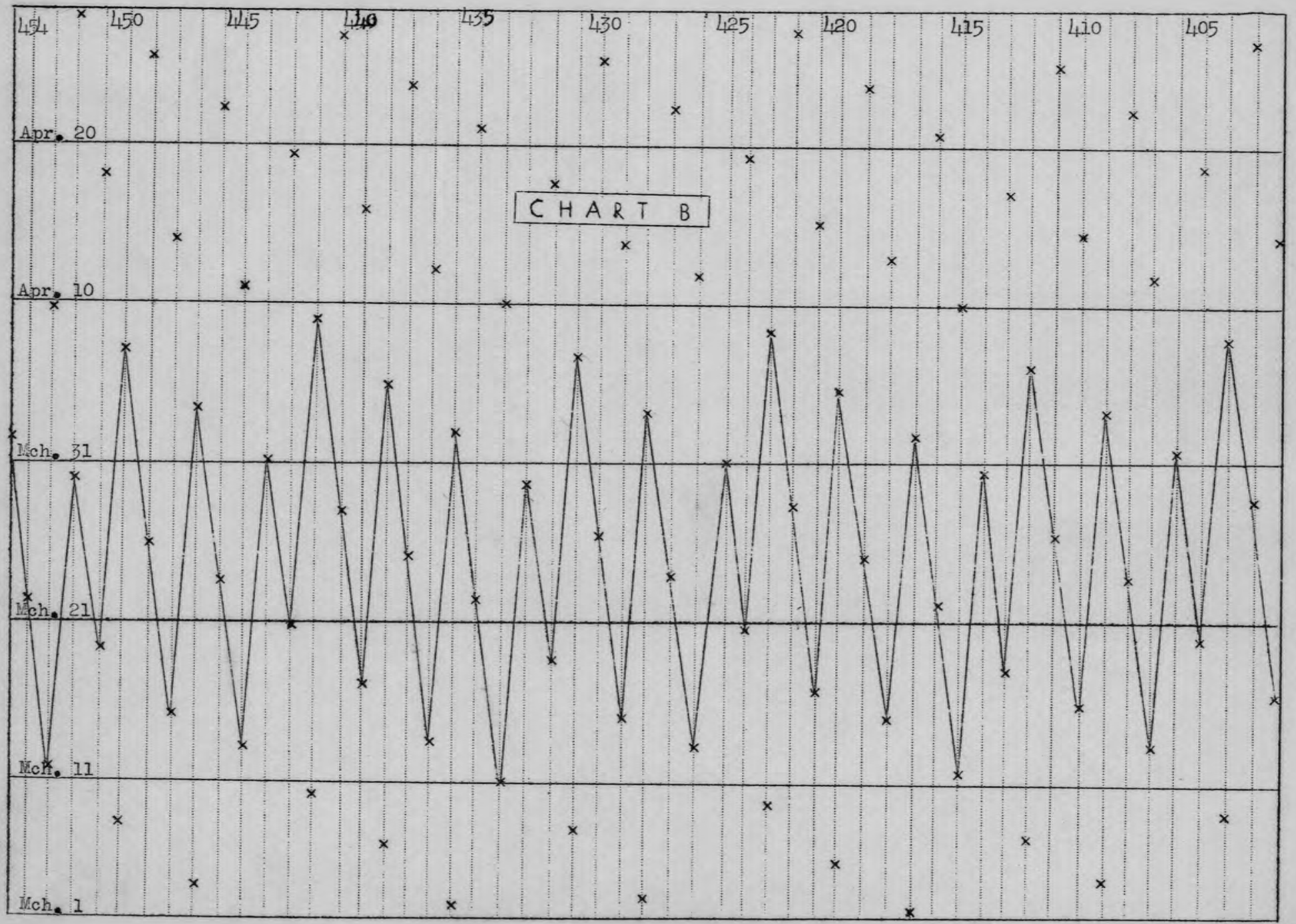
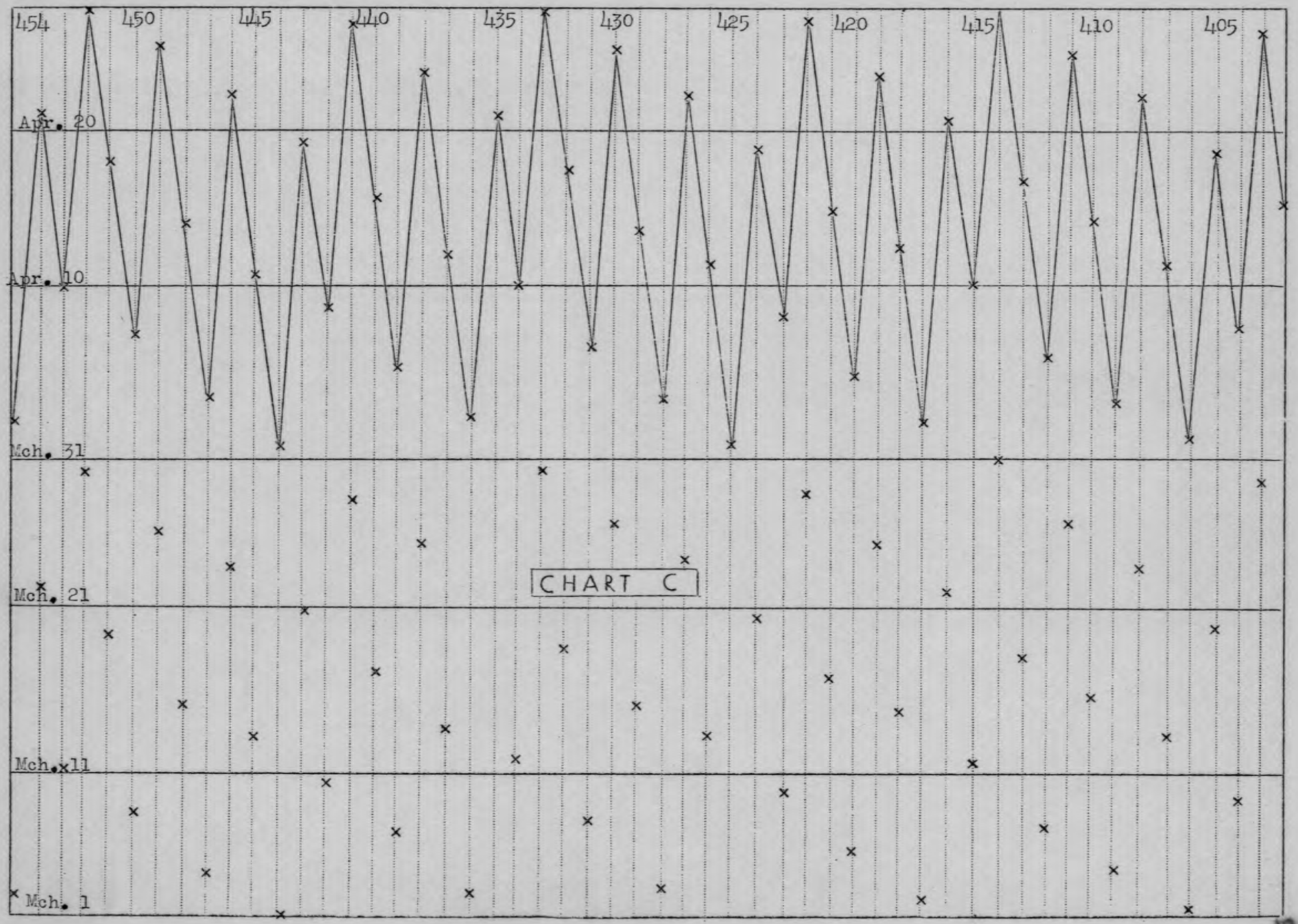
[10] F. K. Ginzel, Handbuch der Mathematische und Technische Chronologie, Vol. I, 547 ff.

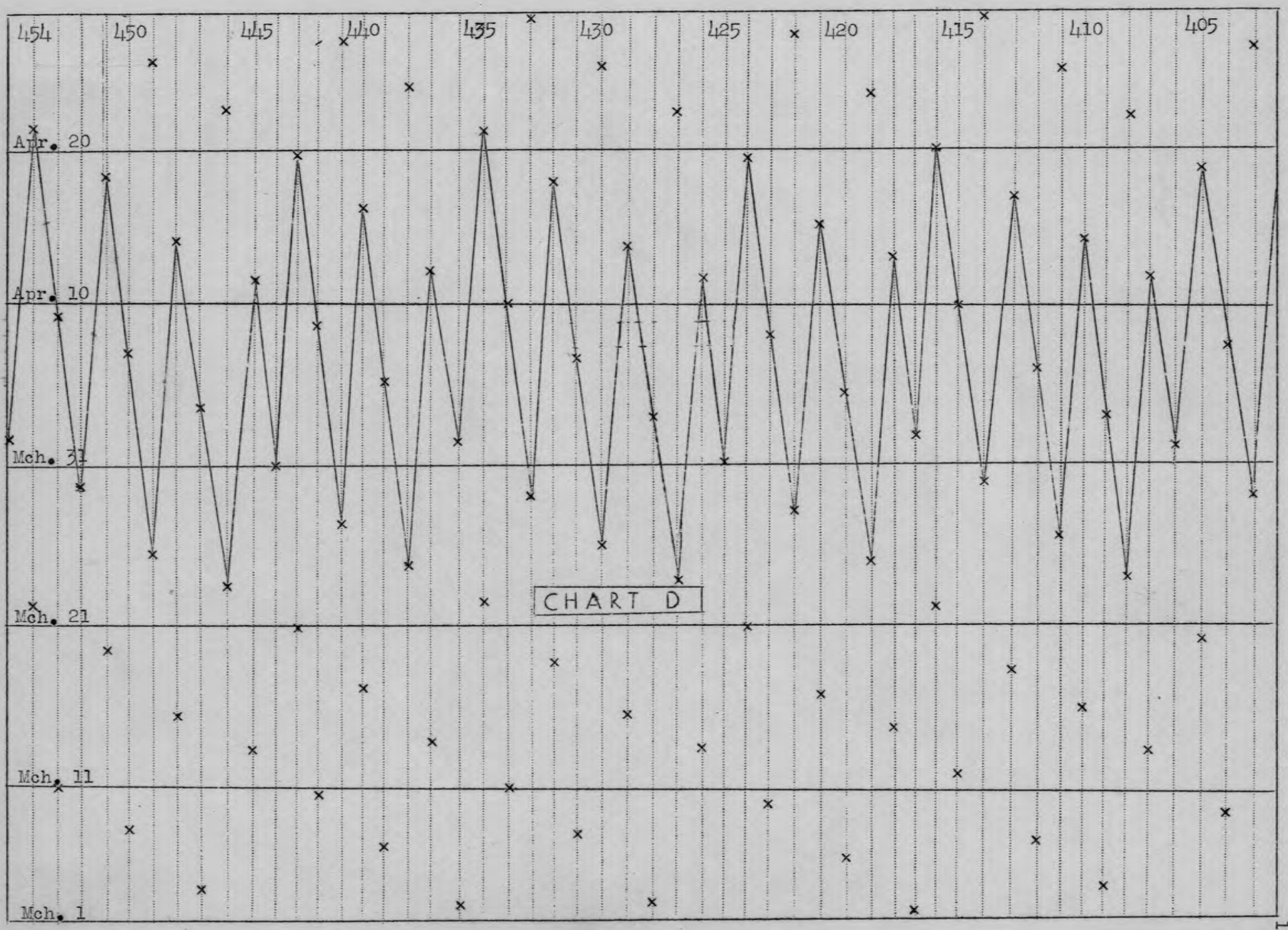
[11] Leviticus 23:10-20.

[12] John David Michaelis, De Mensibus Hebraeorum, Bremen, (1763) p. 17.









And again:

> "But this much we may with certainty affirm, that the first moon of the Israelitish year, must always have fallen within our April. It was that moon, in the course of which, in Palestine, ripe ears of corn could always be had, and hence it had the name of the Ear-Moon, (Abib). On the 16th day of it, which was the second day of the festival of the passover, the first fruits of the ripe ears of corn were to be presented to God. . . . For example, ripe ears may always be had about Jericho after the middle of our April; and consequently, the ear-moon must have always fallen within that month."[13]

Scaliger computes from both Dionysian and Jewish cycles that the passover limits in the times of the Messiah were from April 8 to May 6.[14] Buhle shows how agricultural and economical calendars make March the month of rain in Palestine and that barley quickly ripens about the middle of April after the rains are over.[15] Anatolius says that it would be impossible to keep the passover before the equinox or at the equinox because the moon of the fourteenth does not fill the whole night.[16] The Venerable Bede agrees with this when he says:

> "We are commanded to observe the full moon of the Paschal month after the vernal equinox, to the end, that the sun may just make the day longer than the night, and then the moon may afford the world her full orb of light."[17]

2.

Hypothesis: The first of Nisan was figured in such a way as to bring the passover on the day immediately following the full moon, Jewish time.

on the basis of this hypothesis, let be

In figuring the data for these Papyri, the 13th of Nisan ~~has been~~ placed from sunset to sunset of such a day that the astronomical full moon would take place some time during its hours. The next day would then be the 14th. Counting back from the sunset beginning the 14th, one is able to locate the sunset beginning the first of Nisan. From this date the time of astronomical conjunction is subtracted and the result gives the translation period for that month.

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[13] John David Michaelis, Commentaries on the Laws of Moses, London, (1814) pp. 182,183. Tr. by Alexander Smith.

[14] Joseph Scaliger, De Emendatione Temporum Francofurt, (1593) p. 265.

[15] J. C. Buhle, Economical Calendar, Brunswick, (1785), p.

[16] Anatolius of Alexandria, Ante-Nicene Christian Library, (Ed. by Roberts and Donaldson), Edinburgh, (1869), p. 116.

[17] Venerable Bede, Opera Omnia, B.V. ch. XII, p. 273, London, (1843).

As is noticed of Chart E and Tables I and II, this translation period never exceeds four days and the mean would be under two days. By computing each year on this basis, the moon determines for itself the actual length of the year whether 354 or 355 days; or in the embolysmic years, 383 or 384 days. Not until the modern calendar was constructed with its "postponements" were there years having 353 or 385 days. The year was then computed with alternating 30, 29 day sequence for the first six months and an adjustment of the calendar for the latter half of the year according as the moon demanded a longer or shorter period for the twelve or thirteen lunations. A study of the synchronisms as shown on page 17 will convince anyone of the accuracy of this method. Aristabulus according to two of his disciples, "maintained that at the paschal festival the sun as well as the moon must necessarily have passed the equinoctial point; that the day of the paschal festival began on the 14th of Nisan after the evening, when the moon stands diametrically opposed to the sun, as anyone can see at the time of the full moon."[18]

Albîrûnî states that it is an Arabic custom to give special names for each three nights of the month -- names that are derived from the state of the moon and her light.

> "The fifth three nights (13th-15th) bid, because they are white by the shining of the moon from the beginning of the night until the end. . . .
> "Besides, they distinguished certain nights of the month by special names, e.g., the last night of the month was called sirar, because in it the moon hides herself; it was also called fahama on account of there being no light in it, and barn, because the sun has nothing to do with it. Likewise the last day of the month was called nahir, because it is in the nahr (throat) of the month. The 13th night was called sawa, the 14th, the night of "badr", because in it the moon is full, and her light complete."[19]

Many scholars have placed the passover in March-April depending on Josephus' statement[20] that it came "when the sun is in Aries". The Venerable Bede quotes "one of the ancients" as the author of the following verse:

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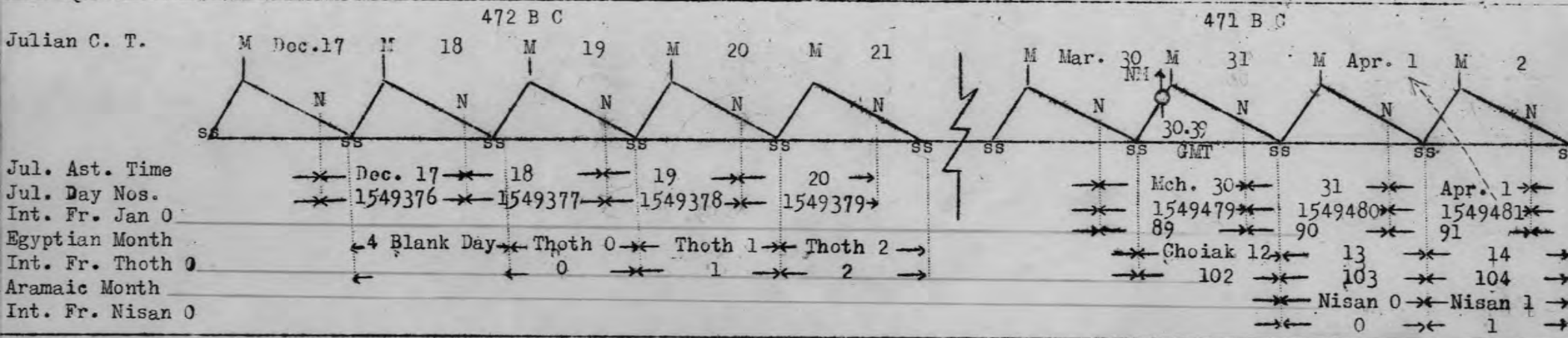
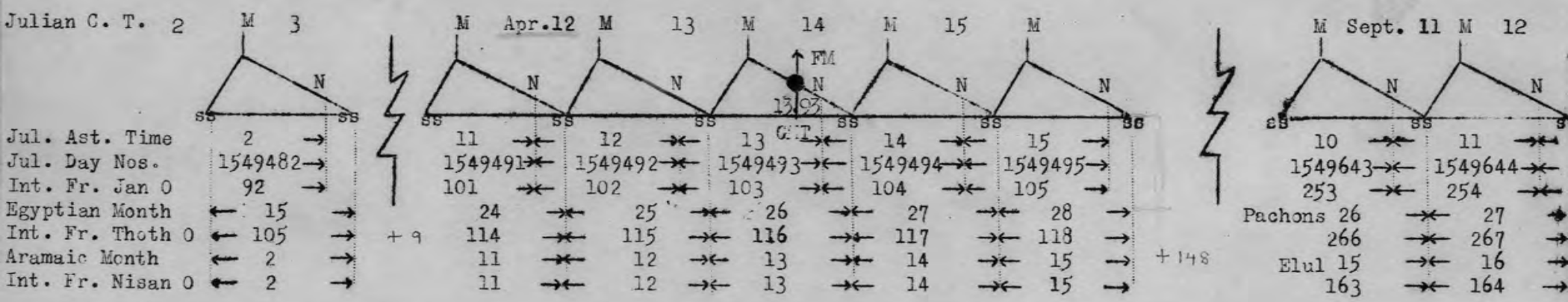
[18] Caspari, Ch. Ed., Introduction to the Life of Christ, Edinburgh, (1876), pp. 8,9. (Tr. by M. T. Evans). Same Translation by Nouvel.

[19] Dr. C. Edward Sachau, The Chronology of Ancient Nations, (An English Version of the Arabic Text of the Athar-ul-bakiya of Albirumi), London, Allen & Co. (1879) pp. 74,75.

[20] Josephus, Works, III-10-5. Antiquities Loeb





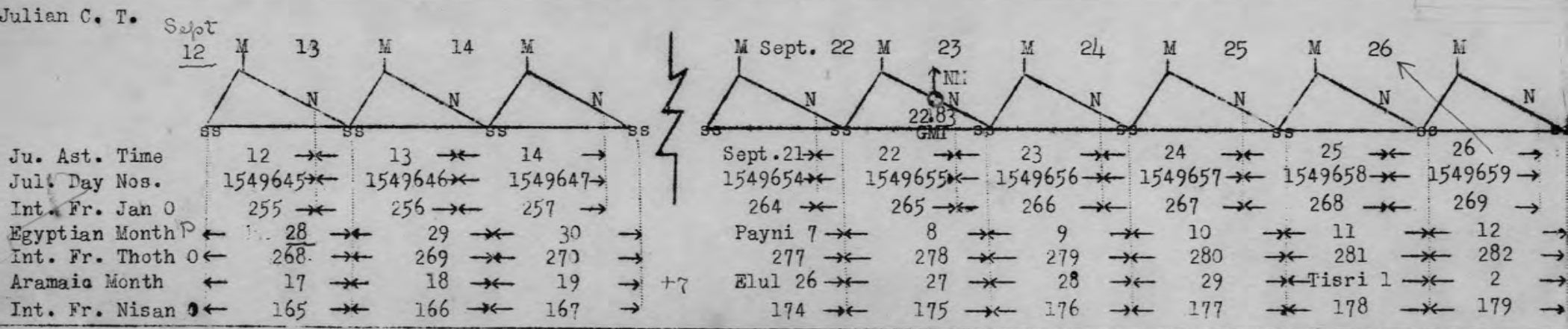


CHART E

TABLE I
LUNAR STATISTICS FOR THE MONTHS OF NISAN & TISHRI
500 B.C. -- 400 B.C.

YEAR	DATE OF MOON'S CONJUNCTION GMT (N-N) JULIAN CALENDAR ACCORDING TO GUINNESS	LANGDON	GINZEL	NISAN FULL MOON GMT GINZEL	14TH OF NISAN BEGINS JERUSALEM SUNSET	1ST OF NISAN BEGINS JERUSALEM SUNSET	TRANSLATION PERIOD	LENGTH OF JEWISH YEAR	COMPUTED 1ST OF TISHRI BEGINS JERUSALEM SUNSET*	TISHRI CONJUNCTION GMT GINZEL	TRANSLATION PERIOD	JULIAN DAY-NO. FOR DAY BEGINNING 1ST NISAN AT SUNSET
500	A 18.877	18.852	18.86	May 4.37	My 5	Apr. 22	3.292	354	Oct. 16	13.61	2.54	1538910
499	A 8.338	8.372	8.37	A 23.76	A 24	Apr. 11	2.78	354	" 5	2.72	2.43	1539264
498	M 29.009	29.067	29.06	A 12.84	A 13	Mch. 31	2.09	384	Sept. 24	21.72	2.43	1539618
497	A 16.030	16.096	16.09	A 30.51	M 1	Apr. 18	2.06	354	Oct. 12	9.50	2.65	1540002
496	A 5.672	5.700	5.68	A 19.65	A 20	Apr. 7	1.47	354	" 1	S.28.81	2.34	1540356
495	M 26.065	26.031	26.02	A 9.07	A 9	Mch. 27	1.13	384	Sept. 20	18.38	1.77	1540710
494	A 13.820	13.747	13.74	A 28.02	A 28	Apr. 15	1.41	355	Oct. 9	7.47	1.68	1541094
493	A 1.847	1.760	1.75	A 16.73	A 17	Apr. 4	2.40	384	Sept. 28	25.56	2.59	1541449
492	A 20.591	20.764	20.48	My 5.74	My 6	Apr. 23	2.67	355	Oct. 17	15.12	2.03	1541833
491	A 9.782	9.775	9.79	A 25.33	A 26	Apr. 13	3.36	1 354	" 7	4.45	2.70	1542188
490	M 30.318	30.357	30.36	A 14.61	A 15	Apr. 2	2.79	-2 384	Sept. 26	23.27	2.88	1542542
489	A 17.322	17.378	17.39	My 2.32	My 3	Apr. 20	2.76	3 354	Oct. 14	11.25	2.90	1542926
488	A 7.032	7.091	7.09	A 21.34	A 22	Apr. 9	2.06	4 354	Oct. 3	S.30.34	2.81	1543280
487	M 27.617	27.628	27.61	A 10.54	A 11	Mch. 29	1.54	-5 384	Sept. 22	19.26	2.89	1543634
486	A 15.481	15.454	15.44	A 29.41	A 30	Apr. 17	1.71	6 354	Oct. 11	8.77	2.38	1544018
485	A 3.642	3.565	3.55	A 18.03	A 18	Apr. 5	1.60	-7 355	Sept. 29	27.42	1.73	1544372
484	M 23.655	23.584	23.58	A 7.74	A 8	Mch. 26	2.57	8 384	Sept. 19	16.52	2.63	1544727
483	A 11.384	11.328	11.33	A 26.73	A 27	Apr. 14	2.82	9 355	Oct. 8	6.03	2.12	1545111
482	M 31.711	31.681	31.73	A 16.23	A 17	Apr. 4	3.42	-10 383 -1	Sept. 28	25.26	2.89	1545466
481	A 18.650	18.698	18.69	My 4.04	My 4	Apr. 21	2.46	11 354	Oct. 15	13.04	2.11	1545849
480	A 8.331	8.390	8.40	A 23.12	A 23	Apr. 10	1.75	12 355	Oct. 4	2.03	2.12	1546203
479	M 29.022	29.063	29.05	A 12.16	A 13	Mch. 31	2.10	-13 383	Sept. 24	21.21	2.94	1546558
478	A 16.981	17.005	16.99	A 30.93	My 1	Apr. 18	1.16	14 355 +1	Oct. 12	10.15	2.00	1546941
477	A 5.359	5.313	5.31	A 19.38	A 20	Apr. 7	1.84	15 354	Oct. 1	S.28.72	2.43	1547296
476	M 25.447	25.630	25.36	A 9.03	A 9	Mch. 27	1.79	-16 384	Sept. 20	18.41	1.74	1547650
475	A 13.127	13.041	13.05	A 28.04	A 28	Apr. 15	2.10	17 355	Oct. 9	7.47	1.68	1548034
474	A 2.247	2.214	2.21	A 17.71	A 18	Apr. 5	2.94	-18 384	Sept. 29	26.91	2.24	1548389
473	A 20.082	20.076	20.09	My 5.62	My 6	Apr. 23	3.06	19 354 6939	Oct. 17	14.78	2.37	1548773
472	A 10.136	9.677	9.68	A 24.89	A 25	Apr. 12	2.47	1 354	Oct. 6	3.81	2.34	1549127
471	M 30.337	30.390	30.39	A 13.93	A 14	Apr. 1	1.76	-2 384	Sept. 25 26	22.83	2.32	1549481
470	A 18.348	18.408	18.40	My 2.61	My 3	Apr. 20	1.75	3 354	Oct. 14	11.67	2.48	1549865
469	A 6.925	6.932	6.92	A 20.83	A 21	Apr. 8	1.23	4 355	Oct. 2	S.30.08	2.07	1550219
468	M 27.210	27.158	27.14	A 10.35	A 11	Mch. 29	2.01	-5 384	Sept. 22	19.71	2.44	1550574
467	A 14.922	14.843	14.83	A 29.34	A 30	Apr. 17	2.32	6 354	Oct. 11	8.78	2.37	1550958
466	A 3.941	3.874	3.86	A 19.06	A 19	Apr. 6	2.29	-7 355	Sept. 30	28.40	1.75	1551312
465	M 23.121	23.125	23.12 A21.62	A 7.65 M 7.04	A 8 M 7	Mch. 26 Apr. 24	3.03 2.53	384 8 384	Sept. 19	16.77	2.38	1551667
464	A 11.020	11.031	11.04	A 26.52	A 27	Apr. 14	3.11	355	Oct. 8 9	5.59	2.56	1552051
463	M 31.631	31.676	31.70	A 15.73	A 16	Apr. 3	2.45	9 354 -10 384	Sept. 27	24.59	2.56	1552405
462	A 19.648	19.729	19.71	My 4.40	M 5	Apr. 22	2.44	11 354	Oct. 16	13.35	2.80	1552789
461	A 8.329	8.391	8.37	A 22.45	A 23	Apr. 10	1.78	12 354	Oct. 4	1.54	2.61	1553143
460	M 28.841	28.827	28.81	A 11.75	A 12	Mch. 30	1.34	-13 384	Sept. 23	21.02	2.13	1553497
459	A 16.649	16.607	16.59	A 30.68	My 1	Apr. 18	1.56	14 355	Oct. 12	10.09	2.06	1553881
458	A 5.730	5.682	5.64	A 20.36	A 21	Apr. 8	2.51	15 354	Oct. 2	29.76	2.39	1554236
457	M 24.767	24.722	24.72	A 9.05	A 9	Mch. 27	2.43	-16 384	Sept. 20	18.33	1.82	1554590
456	A 12.552	12.513	12.53	A 28.02	A 28	Apr. 15	2.62	17 355	Oct. 9	7.25	1.90	1554974
455	A 1.976	2.003	2.02	A 17.44	A 18	Apr. 5	3.12	-18 384	Sept. 29	26.39	2.76	1555329
454	A 20.951	20.998	21.00	My 6.18	M 7	Apr. 24	3.15	19 354	Oct. 18	15.15	3.00	1555713
453	A 9.659	9.712	9.72	A 24.22	A 25	Apr. 12	2.43	1 354	Oct. 6	3.15	3.00	1556067
452	M 30.312	30.334	30.33	A 13.32	A 14	Apr. 1	1.82	-2 383	Sept. 25	22.40	2.75	1556421
451	A 18.227	18.231	18.23	My 2.14	M 2	Apr. 19 21	.92	3 355	Oct. 13	11.44	1.71	1556804

YEAR	DATE OF MOON'S CONJUNCTION GMT (N-N) JULIAN CALENDAR ACCORDING TO GUINNESS	LANGDON	GINZEL	NISAN FULL MOON GMT GINZEL	14TH OF NISAN BEGINS JERUSALEM SUNSET	1ST OF NISAN BEGINS JERUSALEM SUNSET	TRANSLATION PERIOD	LENGTH OF JEWISH YEAR	COMPUTED 1ST OF TISHRI BEGINS JERUSALEM SUNSET *	TISHRI CONJUNCTION GMT GINZEL	TRANSLATION PERIOD	JULIAN DAY-NO. FOR DAY BEGINNING 1ST NISAN AT SUNSET
450	A 7.498	7.443	7.43	A 21.67	A 22	Apr. 9	1.72	4 355	Oct. 3	1.08	2.07	1557159
449	M 26.530	26.463	26.46	A 10.36	A 11	Mch. 29	2.69	-5 384	Sept. 22	19.72	2.43	1557514
448	A 14.222	14.158	14.17	A 29.38	A 30	Apr. 17	2.98	6 354	Oct. 11	8.75	2.40	1557898
447	A 3.437	3.434	3.43	A 18.97	A 19	Apr. 6	2.72	-7 355	Sept. 30	28.11	2.04	1558252
446	M 23.949	23.990	24.00	A 8.30	A 9	Mch. 27	3.15	8 383	Sept. 20	17.18	2.97	1558607
445	A 10.958	11.002	11.02	A 26.02	A 26	Apr. 13	2.13	9 354	Oct. 7	4.91	2.24	1558990
444	M 31.662	31.705	31.72	A 15.04	A 15	Apr. 2	1.43	-10 384	Sept. 26	23.99	2.16	1559344
443	A 19.653	19.691	19.69	My 3.74	M 4	Apr. 21	1.46	11 354	Oct. 15	12.89	2.26	1559728
442	A 9.142	9.117	9.12	A 23.07	A 23	Apr. 10	1.03	12 355	Oct. 4	2.38	1.77	1560082
441	M 28.323	28.257	28.25	A 11.67	A 12	Mch. 30	1.90	-13 384	Sept. 23	21.04	2.11	1560437
440	A 16.007	15.932	15.93	A 30.69	My 1	Apr. 18	2.22	14 355	Oct. 12	10.12	2.03	1560821
439	A 5.058	5.016	5.01	A 20.37	A 21	Apr. 8	3.14	15 354	Oct. 2	29.66	2.49	1561176
438	M 25.347	25.375	25.38	A 9.90	A 10	Mch. 28	2.77	-16 384	Sept. 21	18.93	2.22	1561530
437	A 12.289	12.320	12.33	A 27.72	A 28	Apr. 15	2.82	17 354	Oct. 9	6.72	2.43	1561814
436	A 1.957	2.010	2.02	A 16.83	A 17	Apr. 4	2.13	-18 384	Sept. 28	25.70	2.45	1562268
435	A 20.977	21.030	21.03	My 5.50	My 6	Apr. 23	2.12	19 354	Oct. 17	14.49	2.66	1562652
434	A 10.625	10.645	10.65	A 24.61	A 25	Apr. 12	1.50	1 354	Oct. 6	3.78	2.37	1563006
433	M 30.026	29.987	29.99	A 13.02	A 13	Mch. 31	1.16	-2 384	Sept. 24	22.35	1.80	1563360
432	A 17.781	17.724	17.71	My 1.97	M 2	Apr. 19	1.44	3 355	Oct. 13	0. 11.44	1.71	1563744
431	A 6.812	6.745	6.74	A 21.68	A 22	Apr. 9	2.41	4 355	Oct. 3	1.07	2.08	1564099
430	M 26.911	26.895	26.89	A 11.36	A 12	Mch. 30	3.26	-5 384	Sept. 23	20.55	2.60	1564454
429	A 13.738	13.739	13.75	A 29.27	A 30	Apr. 17	3.40	6 354	Oct. 11	8.43	2.72	1564838
428	A 3.269	3.314	3.32	A 18.57	A 19	Apr. 6	2.83	-7 354	Sept. 30	27.48	2.67	1565192
427	M 23.728	24.014	24.02	A 7.63	A 8	Mch. 26	2.13	8 384	Sept. 19	16.48	2.67	1565546
426	A 11.982	12.025	12.04	A 28.31	A 27	Apr. 14	2.11	9 354	Oct. 8	5.31	2.84	1565930
425	M 31.573	31.571	31.57	A 14.50	A 15	Apr. 2	1.58	-10 384	Sept. 26	23.70	2.45	1566284
424	A 19.437	19.416	19.40	My 3.37	M 4	Apr. 21	1.75	11 354	Oct. 15	12.74	2.41	1566668
423	A 8.606	8.538	8.52	A 22.98	A 23	Apr. 10	1.63	12 355	Oct. 4	2.39	1.76	1567022
422	M 28.621	28.564	28.55	A 12.70	A 13	Mch. 31	2.60	-13 384	Sept. 24	22.03	2.12	1567377
421	A 15.344	15.305	15.30	A 30.69	M 1	Apr. 18	2.85	14 355	Oct. 12	10.01	2.14	1567761
420	A 4.666	4.689	4.69	A 20.20	A 21	Apr. 8	3.46	15 354	Oct. 2	29.24	2.91	1568116
419	M 25.261	25.317	25.32	A 9.41	A 10	Mch. 28	2.83	-16 383	Sept. 21	18.28	2.89	1568470
418	A 13.278	13.332	13.34	A 28.09	A 28	Apr. 15	1.81	17 354	Oct. 9	7.02	2.13	1568853
417	A 1.973	2.006	2.02	A 16.14	A 16	Apr. 3	1.12	-18 384	Sept. 27	25.18	1.97	1569207
416	A 20.933	20.950	20.95	My 4.90	M 5	Apr. 22	1.20	19 355	Oct. 16	14.12	2.03	1569591
415	A 10.320	10.279	10.27	A 24.34	A 25	Apr. 12	1.88	1 354	Oct. 6	3.70	2.45	1569946
414	M 30.414	30.339	30.33	A 13.98	A 14	Apr. 1	1.82	-2 384	Sept. 25	23.38	1.77	1570300
413	A 17.090	17.025	17.01	My 2.00	M 2	Apr. 19	2.14	3 355	Oct. 13	11.43	1.72	1570684
412	A 6.207	6.193	6.19	A 21.67	A 22	Apr. 9	2.96	4 354	Oct. 3	30.89	2.26	1571039
411	M 26.624	26.656	26.65	A 11.09	A 11	Mch. 29	2.50	-5 384	Sept. 22	20.05	2.10	1571393
410	A 14.586	14.633	14.64	A 29.86	A 30	Apr. 17	2.51	6 354	Oct. 11	8.81	2.34	1571777
409	A 3.287	3.338	3.34	A 17.90	A 18	Apr. 5	1.81	-7 354	Sept. 29	26.80	2.35	1572131
408	M 23.948	23.809	23.97	A 7.00	A 7	Mar. 25	1.18	8 384	Sept. 18	16.07	2.08	1572485
407	A 11.879	11.876	11.87	A 25.80	A 26	Apr. 13	1.28	9 355	Oct. 7	5.04	2.11	1572869
406	A 1.173	1.112	1.11	A 15.30	A 16	Apr. 3	2.04	-10 384	Sept. 27	24.67	2.48	1573224
405	A 18.885	18.815	18.81	My 3.29	M 4	Apr. 21	2.34	11 354	Oct. 15	12.75	2.40	1573608
404	A 7.904	7.851	7.85	A 23.01	A 23	Apr. 10	2.30	355	Oct. 4	2.37	1.78	1573962
403	M 28.092	28.099	28.09	A 12.62	A 13	Mch. 31	3.06	384	Sept. 24	21.75	2.40	1574317
402	A 15.972	16.000	15.99	My 1.49	M 2	Apr. 19	3.16	354	Oct. 13	10.57	2.58	1574701
401	A 4.582	4.640	4.64	A 19.70	A 20	Apr. 7	2.51	354	Oct. 1	28.58	2.57	1575055
400	M 25.289	25.322	25.34	A 8.71	A 9	Mch. 27	1.81		Sept. 20	17.63	2.52	1575409

* Fotheringham, R.A.S. Monthly Notices, LXIX (1908), p. 20, says all Tishris (Aramaic) he has dated fall "not earlier than September 17, nor later than October 16.

TABLE II

SEQUENTIAL DAY NUMBERS FOR THE FOUR STYLES OF JEWISH YEARS

MONTH	SEQUENCE	MONTH	SEQUENCE	MONTH	SEQUENCE	MONTH	REG. 354	ABUN. 355	DEF. 383	REG. 384	MONTH	354	355	383	384
Nisan 1	1	Sivan 19	78	Elul 7	155	Mar- 25	232	232	232	232	She- 13	308	309	307	308
2	2	20	79	8	56	ches- 26	233	33	33	33	bat 14	09	310	08	09
3	3	21	80	9	57	van 27	234	34	34	34	15	310	311	09	310
4	4	22	81	10	58	28	235	35	35	35	16	311	12	310	311
5	5	23	82	11	59	29	236	36	36	36	17	12	13	11	12
6	6	24	83	12	160	30		37			18	13	14	12	13
7	7	25	84	13	161	Chis- 1	237	38	37	37	19	14	15	13	14
8	8	26	85	14	62	leu 2	238	39	38	38	20	15	16	14	15
9	9	27	86	15	63	3	239	240	39	39	21	16	17	15	16
10	10	28	87	16	64	4	240	241	240	240	22	17	18	16	17
11	11	29	88	17	65	5	241	42	41	241	23	18	19	17	18
12	12	30	89	18	66	6	42	43	42	42	24	19	320	18	19
13	13	Tammuz 1	90	19	67	7	43	44	43	43	25	320	321	19	320
14	14	2	91	20	68	8	44	45	44	44	26	321	22	320	321
15	15	3	92	21	69	9	45	46	45	45	27	22	23	321	22
16	16	4	93	22	170	10	46	47	46	46	28	23	24	22	23
17	17	5	94	23	171	11	47	48	47	47	29	24	25	23	24
18	18	6	95	24	72	12	48	49	48	48	30	25	26	24	25
19	19	7	96	25	73	13	49	250	49	49	Adar 1	26	27	25	26
20	20	8	97	26	74	14	250	251	250	250	2	27	28	26	27
21	21	9	98	27	75	15	251	52	251	251	3	28	29	27	28
22	22	10	99	28	76	16	52	53	52	52	4	29	330	28	29
23	23	11	100	29	177	17	53	54	53	53	5	330	331	29	330
24	24	12	101	Tishri 1	178	18	54	55	54	54	6	331	32	330	331
25	25	13	02	2	179	19	55	56	55	55	7	32	33	331	32
26	26	14	03	3	180	20	56	57	56	56	8	33	34	32	33
27	27	15	04	4	181	21	57	58	57	57	9	34	35	33	34
28	28	16	05	5	82	22	58	59	58	58	10	35	36	34	35
29	29	17	06	6	83	23	59	260	59	59	11	36	37	35	36
30	30	18	07	7	84	24	260	261	260	260	12	37	38	36	37
Iyyar 1	31	19	08	8	85	25	261	62	261	261	13	38	39	37	38
2	32	20	09	9	86	26	62	63	62	62	14	39	340	38	39
3	33	21	110	10	87	27	63	64	63	63	15	340	341	39	340
4	34	22	111	11	88	28	64	65	64	64	16	341	42	340	341
5	35	23	12	12	89	29	65	66	65	65	17	42	43	341	42
6	36	24	13	13	190	30	66	67		66	18	43	44	42	43
7	37	25	14	14	191	Te- 1	67	68	66	67	19	44	45	43	44
8	38	26	15	15	92	beth 2	68	69	67	68	20	45	46	44	45
9	39	27	16	16	93	3	69	270	68	69	21	46	47	45	46
10	40	28	17	17	94	4	270	271	69	270	22	47	48	46	47
11	41	29	18	18	95	5	271	72	270	271	23	48	49	47	48
12	42	Ab 1	19	19	96	6	72	73	271	72	24	49	350	48	49
13	43	2	120	20	97	7	73	74	72	73	25	350	51	49	350
14	44	3	121	21	98	8	74	75	73	74	26	351	52	350	351
15	45	4	22	22	99	9	75	76	74	75	27	52	53	351	52
16	46	5	23	23	200	10	76	77	75	76	28	53	54	52	53
17	47	6	24	24	201	11	77	78	76	77	29	354	355	53	54
18	48	7	25	25	02	12	78	79	77	78	30			54	55
19	49	8	26	26	03	13	79	280	78	79	Adar 1			55	56
20	50	9	27	27	04	14	280	281	79	280	II 2			56	57
21	51	10	28	28	05	15	281	282	280	281	3			57	58
22	52	11	29	29	06	16	82	83	281	82	4			58	59
23	53	12	130	30	07	17	83	84	82	83	5			59	360
24	54	13	131	Mar- 1	08	18	84	85	83	84	6			360	361
25	55	14	32	ches- 2	09	19	85	86	84	85	7			361	62
26	56	15	33	van 3	210	20	86	87	85	86	8			62	63
27	57	16	34	4	211	21	87	88	86	87	9			63	64
28	58	17	35	5	12	22	88	89	87	88	10			64	65
29	59	18	36	6	13	23	89	290	88	89	11			65	66
Sivan 1	60	19	37	7	14	24	290	291	89	290	12			66	67
2	61	20	38	8	15	25	291	92	290	291	13			67	68
3	62	21	39	9	16	26	92	93	291	92	14			68	69
4	63	22	140	10	17	27	93	94	92	93	15			69	370
5	64	23	141	11	18	28	94	95	93	94	16			370	371
6	65	24	42	12	19	29	95	96	94	95	17			371	72
7	66	25	43	13	220	She- 1	96	97	95	96	18			72	73
8	67	26	44	14	221	bat 2	97	98	96	97	19			73	74
9	68	27	45	15	22	3	98	99	97	98	20			74	75
10	69	28	46	16	23	4	99	300	98	99	21			75	76
11	70	29	47	17	24	5	300	301	99	300	22			76	77
12	71	30	48	18	25	6	301	02	300	301	23			77	78
13	72	Elul 1	49	19	26	7	302	03	301	02	24			78	79
14	73	2	150	20	27	8	03	04	02	03	25			79	380
15	74	3	151	21	28	9	04	05	03	04	26			380	381
16	75	4	52	22	29	10	05	06	04	05	27			81	82
17	76	5	53	23	230	11	06	07	05	06	28			82	83
18	77	6	54	24	231	12	07	08	06	07	29			383	384

See F. K. Ginzel, Mathematische und Technische Chronologie, Vol. II, p. 86.

DATE SYNCHRONISMS OF THE ASSUAN PAPYRI[1]

Papyrus No	Regnal Year	Solar Year	Egyptian Date	Julian Calendar	Jul. Day Number	Aramaic Date	0 Nisan for Jul. Day No.	Jul. Day No. for 0 Nisan	Add Increment	Jul. Day Number	Difference
A	15th of Xerxes	471	28th of Pachons	Sept. 12, 471	1549645	18th of Elul	Mch. 31	1549480	166	1549646 Sept 13	+1
B	21 Xerxes 1 Artax.	(464) 465	17th of[2] Thoth	Jan. 2, 464	1551949	18th of Chisleu	Apr. 23 (355)	1551695	254 (255)	1551949 Jan 2	0
C	-			PAPYRUS		DAMAGED					
D			DATE UNCERTAIN: - 1st Mesore ≠21st Chisleu unless 1st Nisan were the last of Feb.								
E	19th of Artax.	446	10th of Mesore	Nov. 17, 446	1558842	2d Chisleu	Mch. 26 (383)	1558606	238	1558844 Nov 19	+2
F	25th of Artax.	440	19th of Pachons	Aug. 26, 440	1560951	13th of Ab 14	Apr. 17 (365)	1560820	131 (132)	1550951 Aug 26	0
G[3]	(No year)	446	6th of Epiphi	Oct. 14, 446	1558808	25th of Tisri	Mar. 26	1558606	202	1558808 Oct 14	0
H	4th of Darius	420	Payni	Sept. 2 - Oct.1, 420	1568263 to 1568292	Elul	Apr. 7	1568115	149 to 177	1568264 to 1568292	0
J	8th, 9th Darius	416	12th of Thoth	Dec. 16, 416	1569829	3d of Chisleu	Apr. 21 (384)	1569590	240	1569830 Dec 17	+1[4]
K	13th, 14th Darius	410 (411)	9th of Athyr	Feb. 10, 410	1571711	24th of Shebat	Mch. 28	1571392 Mar 28	319	1571711 Feb 10	0

[1]D. Sidersky, Etude sur la chronologie assyro-babylonienne (1916): "Contribution a l' etude de la chronologie neo-babylonienne" R A XXX (1933), 53f, has shown that the nineteen-year cycle of intercalation, employed to bring together at its end the solar and lunar years, was introduced in 747 by Nabu-nasir. A. T. Olmstead - A J S L, LV (1938), 123, places the responsibility on Nabu-rimanni for Babylonian computation of true date of new and full moon early in the fifth century.

[2]Part of the date of Thoth is missing. It could be 7th, 14th, 17th, 24th. Cowley Aramaic Papyri, p. 17, thinks there is not room enough for 17 but Gutesmann and Hontheim compute it thus, and it is the only one that synchronizes.

[3]The year is omitted. It would give equally satisfactory results for the year 460 B. C. The papyrus has a break in the first line but because of the material dealt with, Cowley wants to date it 441. Gutesmann dates it 447 - 449.

[4]This difference becomes zero if Chisleu could be given an extra day instead of Marchesvan, as might be possible before the system of intercalation was completed.

Aries	"O Phrixean Ram, thou lookest to the April Calends.	Nisan	latter Rain
Taurus	May admires the horns of the Bull of Agenoreus.	Iyar	Harvest (Barley)
Gemini	June sees the twin Spartans running in the sky.	Sivan	(Wheat)
Cancer	In the summer solstice July carries the constellation of hot Cancer.	Tammuz	
Leo	Leo, fervid with fire, burns up the month of August.	Ab	
Virgo	September, enriches Bacchus by thy star, O Virgo.	Elul	(Vintage)
Libra	And October compares to Libra in time of sowing.	Tisri	Seedtime
Scorpio	Scorpio in haste commands November to hibernate.	Hesvan	Early Rain
Sagittarius	The Archer ends his signs in the middle of December.	Kislou	
Capricorn	Capricorn, turning back, sanctifies the beginning of the month of January.	Tebeth	
Aquarius	In the month of Numa, the constellation of Aquarius stands entire in the midst.	Shebat	
Pisces	The two Fishes come forth in March times."[21]	Adar	latter Rain

Four three
~~Five~~ of the eight Papyri studied synchronize exactly on this plan; ~~two~~ vary by one day, while the ~~third~~ fourth from all the translations which are available, seems to vary two days; but these will be considered later. If the hypothesis stated above was not the exact method of calculation, whatever method was used, ~~seemed to~~ fit so closely the computations offered in this discussion that they synchronize admirably.

(See comparisons, p. 20)

Hypothesis 3.

confirmed

Hypothesis: The year was computed by a monthly sequence of 30, 29 days during the first six months, subject to constant ~~check~~ by observation and adjusted during the last six months by the addition or deduction of a day in some month, ~~perhaps Marcheswan or perhaps Chislou,~~ or Shebat as demanded by the moon in giving the lunar year 354, 355, 383, or 384 days in 12 or 13 lunations.

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[21] Venerabilis Bedae, Opuscula Scientifica, De Temporum Ratione, Edidit J. A. Giles, London, (1843), (Tr. by C. Amadon).

Notice the graph showing the position of the date given in Papyrus "K". The date is given very clearly in the record -- "on the 24th of Shebat in the year 13; that is, the 9th day of Athyr, year 14 of Darius." The first of Thoth, year 14 of Darius, according to Ptolemy's reckoning, was Dec. 4, 411 B. C. By using the method outlined on page 12for determining the first day of Nisan, 411 and 410, it is found that the moon demands a 384-day year in order to properly synchronize with the barley harvest. Applying the regular 30, 29 sequence for the first six months and making all the required adjustments in the last six months as shown in the table of day numbers for the Jewish calendar, (see page 20), the 24th of Shebat synchronizes exactly with the 9th of Athyr; but the Papyrus says this is the 13th year of Darius according to Jewish reckoning. It is, therefore, marked 13th on the graph. The Jewish civil year is reckoned from the first of Tishri as will be demonstrated a little later.

Look now at the graph showing the location of the date given in Papyrus "J" which verifies the sequence of years shown in "K". Again the double year date is very carefully given: "in the 3d of Chisley of the 8th year; that is, the 12th day of Thoth of the 9th year of Darius." According to the proper method of calculation as shown in the table of day numbers for the Jewish year, the adjustment of the calendar is made in Marchesvan, and there is a difference of one day in the synchronism as given in the Papyrus. However, if the adjustment of the calendar should be made in Chisleu instead of Marchesvan, the synchronism would be exact. Because of the dates in Chisleu that synchronize exactly with the other Egyptian dates, it seems to have been demonstrated as a general thing that the adjustment of the calendar was made in Marchesvan. But it is quite easy to conceive of an uncertainty at this early date as to whether the year adjustment is made in Marchesvan or Chisleu. As is readily seen from the two graphs, the yearly sequence, as shown in both Papyri, is clear. However, it does not always seem necessary to give the double year date, even though it existed. This is shown by a Papyrus[22] describing

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[21] See Sachau, Drei Aramaische Papyrusurkunden, Berlin, (1908), Pls. 28,29; Ungnad, No. 30; Cowley, Aramaic Papyri of the Fifth Century, London, (1923), No. 10, pp. 29-32.

COMPARATIVE TRANSLATIONS OF THE ASSUAN PAPYRI

Papyrus	A. E. Cowley				E. B. Knobel				J. K. Fotheringham			
	Jew. Date	Eg. Date	Reign	Yr.	Jew. Date	Eg. Date	Reign	Yr.	Jew. Date	Eg. Date	Reign	Yr.
A	18 Elul	28 Pachons	15 Xerxes	471	18 Elul	28 Pachons	15th of Xerxes	471	17, (18) Elul	27, (28) Pachons	14, (15) Xerxes	471
B	18 Chisleu	7 Thoth	21; Begin. of Artax.	465	18 Chisleu	6 Thoth	1st of Artax.	464	18 Chisleu	6, (7)(8)? Thoth	20, (21) Xerxes	464
D	21 Chisleu	1 Mesore	6th of Artax.	459	Cannot be harmonized				21 Chisleu	1 Mesore	6, (5) Artax.	460
E	3 Chisleu	10 Mesore	19th of Artax.	447	3 Chisleu	10 Mesore	19th of Artax.	446	3 Chisleu	10 Mesore	19th of Artax.	446
F	14 Ab	19 Pachons	25th of Artax.	441	14 Ab	19 Pachons	25th of Artax.	440	13, (14) Ab.	19 Pachons	25th of Artax.	440
G	25 Tishri	6 Epiphi	- - - - -	441	×	Suggests	Year	446	26 Tishri	6 Epiphi	- - - - -	446
H	Elul	Payni	4th of Darius	420		Suggests	Year	420		Suggests	Year	420
J	3 Chisleu Yr. 8	12 Thoth Yr. 9	8, 9th of Darius	416	3 Chisleu	12 Thoth	8th of Darius	416	3 Chisleu	11, (12) Thoth	7, (8)(9) Darius	416
K	24 Shebat Yr. 13	9 Athyr Yr. 14	13, 14 of Darius	410	24 Shebat	9 Athyr	4th of Darius	410	23, (24) Shebat	8, (9) Athyr	13, (14) Darius	410

A. E. Cowley
Aramaic Papyri of the 5th Century, B. C.
Oxford Clarendon Press (1923)

E. B. Knobel
"Suggested Explanation of the Ancient Jewish Calendar Dates on the Aramaic Papyri."
Monthly Notices R.A.S. LXVIII, (1908)
London R.A.S. (1908)
pp. 334 - 345.

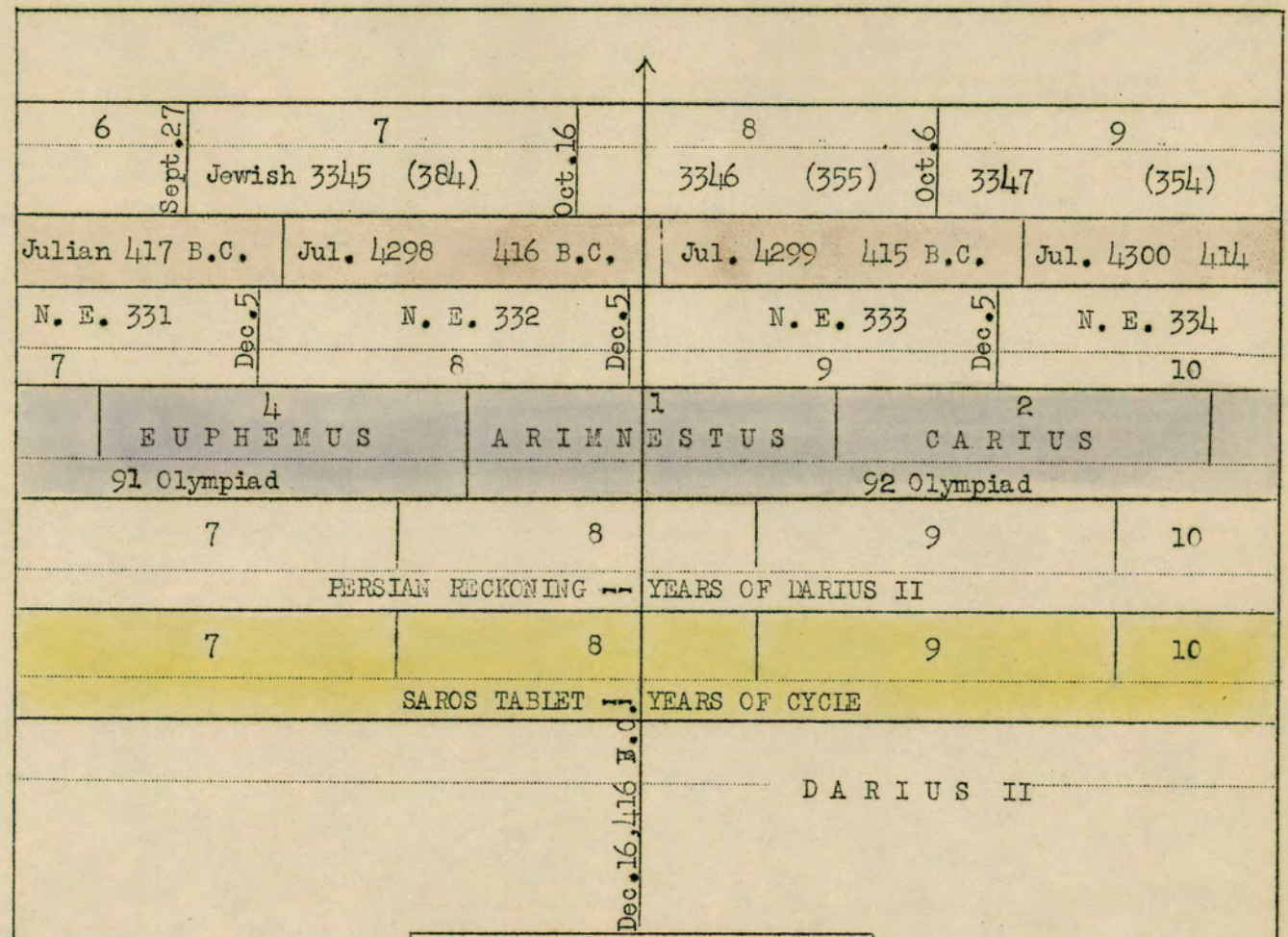
J. K. Fotheringham
"Calendar Dates in the Aramaic Papyri from Assuan."
Monthly Notices R.A.S., LXIX (1908)
London, R.A.S., (1909)
pp. 12 - 20.

11	12	13	14
Oct. 3	Sept. 22	Oct. 11	Sept. 29
Jewish 3350 (354)	3351 (384)	3352 (354)	
Julian 412 B.C.	Jul. 4303 411 B.C.	Jul. 4304 410 B.C.	Jul. 4305 409 B.C.
N. E. 336	N. E. 337	N. E. 338	N. E. 339
Dec. 4	Dec. 4	Dec. 4	
12	13	14	15
1 CALLIAS	2 SXAMBONIDES	3 GLAUCIPPUS	
92 Olympiad			
12	13	14	15
PERSIAN RECKONING — YEARS OF DARIUS II			
12	13	14	15
SAROS TABLET — YEARS OF CYCLE			

DARIUS II

Feb. 10, 410 B.C.

"Papyrus K"
Dated 13th yr. Darius
24th of Shebat
= 14th yr. Darius
9th of Athyr
Sayce & Cowley: - Aramaic Papyri Discovered at Assuan



"Papyrus J"
Dated: 8th year Darius
3d Chisleu
= 9th year Darius
12th Thoth
Sayce & Cowley: -- Aramaic
Papyri Discovered at Assuan

Ungnad No. 30, "beginning on 7th of Kislev, that is, 4th Thothe, 9th year of Artaxerxes"

a contract made in the same season of the year in the 9th year of Artaxerxes. Though dated in the same season of the year as both "J" and "K", it gives the year in terms of the Egyptian calendar only, taking it for granted that the parties concerned will know that at this time of the year the 9th year of Artaxerxes in the Egyptian calendar was the 8th year of Artaxerxes according to the Jewish calendar.

Papyrus "B" (see graph, page 24) clarifies again the yearly sequence established by "K". The date of the Egyptian month is damaged, only the last four strokes of the sign showing. By careful study of the space given in the line for the date, it has been determined by several scholars that this date should be the 17th of Thoth.[23] Though Cowley thinks there is hardly room for the signs for 17, Gutesmann and Honteim disagree with him. The sequence of the "21st of Xerxes; that is, the 1st of Artaxerxes," agrees exactly with Papyri "J" and "K".

While Papyrus "H" (see graph, page 25) gives only the 4th year of Darius, in the actual dating, it is quite evident that this Elul is the last month of the 3d year (Hebrew reckoning), while it is the 10th month of the 4th year according to the Egyptian reckoning. In no other way could the yearly sequence as proven by Papyri "B", "J", and "K" be maintained. As will be shown a little later, the Jewish year began with the first of Tishri. In Papyrus "H" the dates are calculated according to the suggested scheme, and the synchronism between the Jewish and Egyptian calendar proves as exact as could be possible between a 30-day month, Elul beginning one day later than Payni and both closing on the same day.

In Papyrus "F" (see graph, page 26) the 13th of Ab synchronizes exactly with the 19th of Pachons in 440 B. C. According to the yearly sequence established by "B", "J", and "K" and proven by Ungnad No. 30 referred to above, it is inferred that the regnal year of the Jewish date is omitted, the date becoming definitely secure by the enumeration of the Egyptian year.

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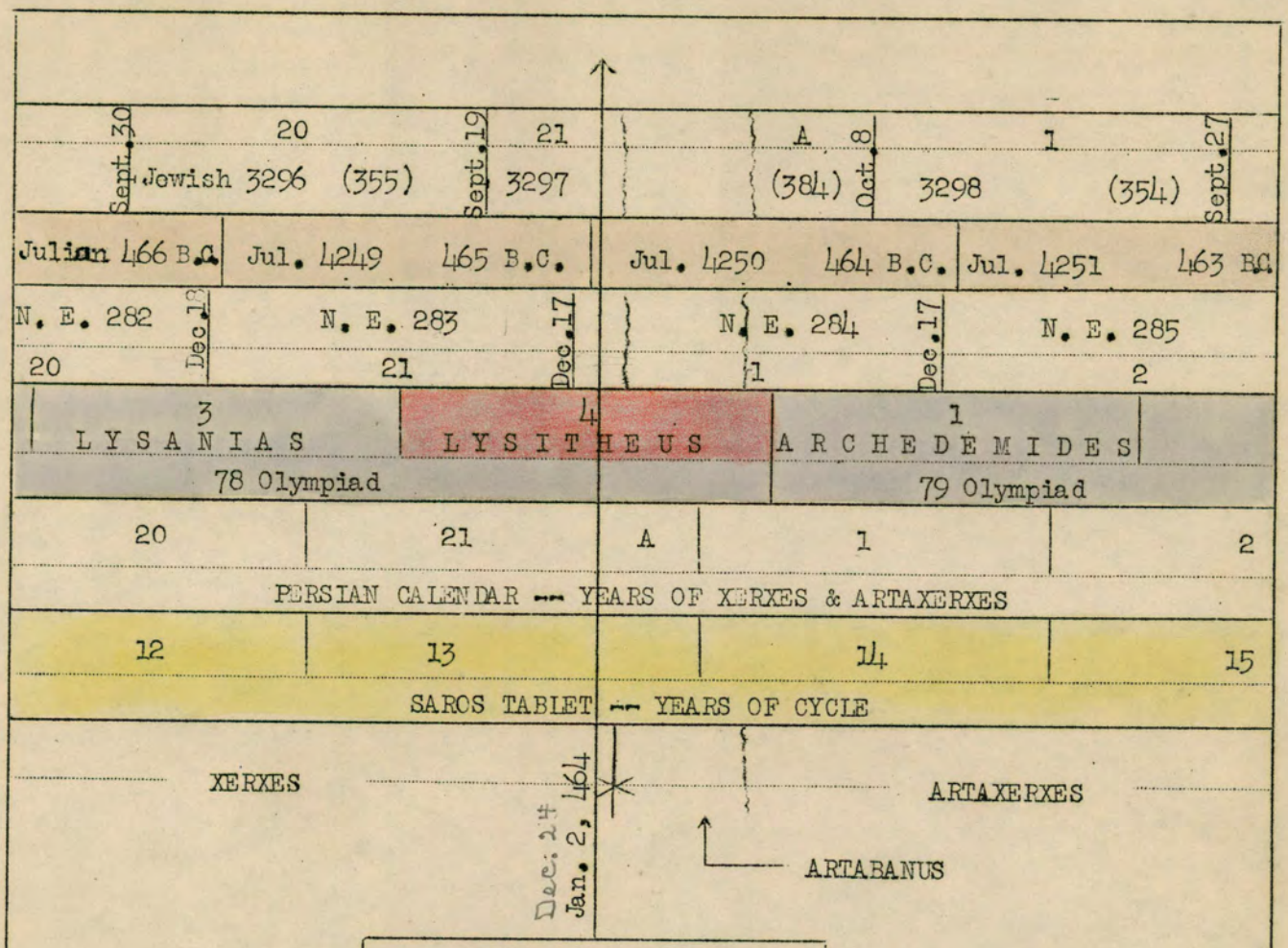
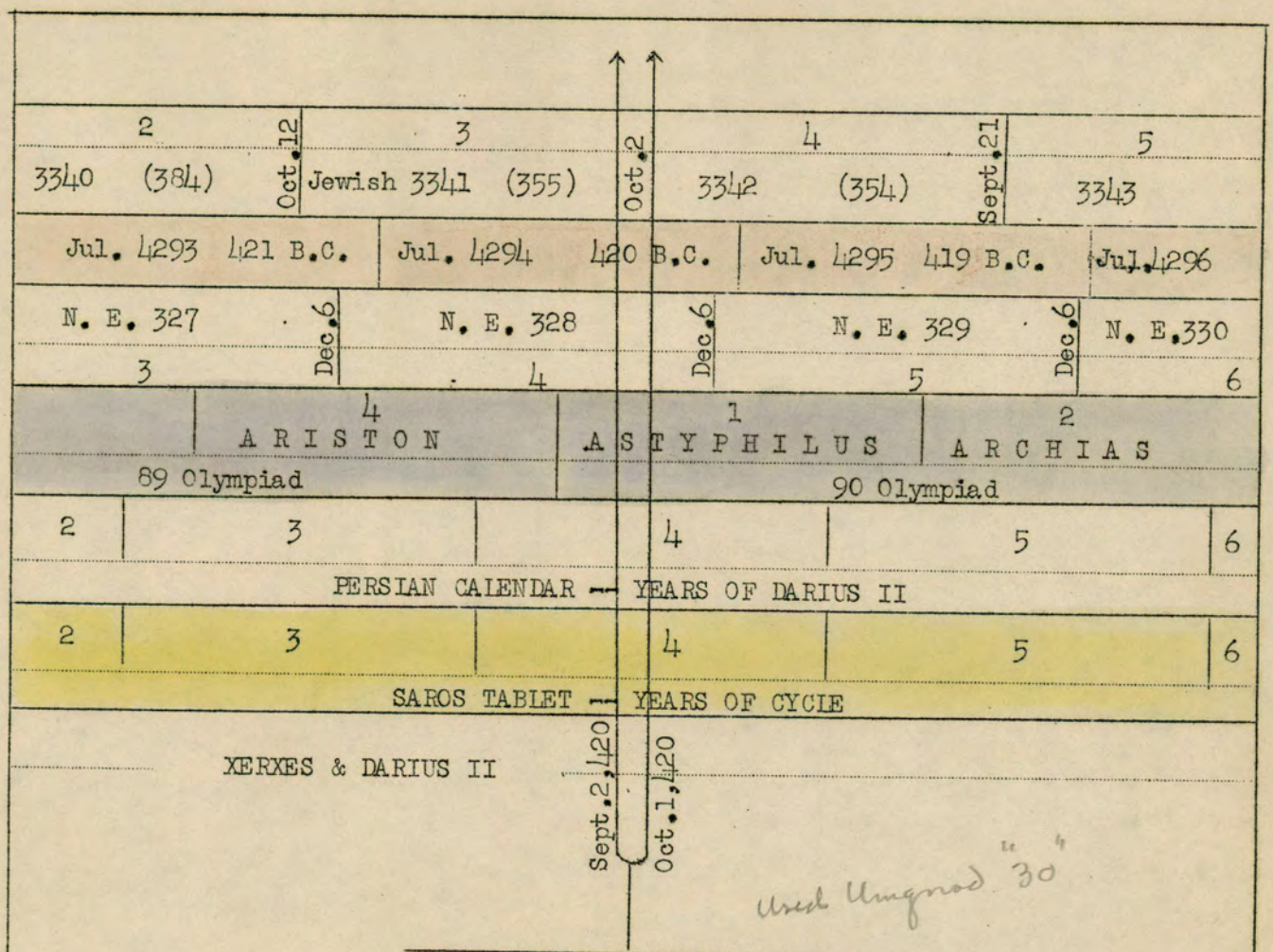
[23] A. E. Cowley, Aramaic Papyri of the Fifth Century, B. C., (1923), p. 17.



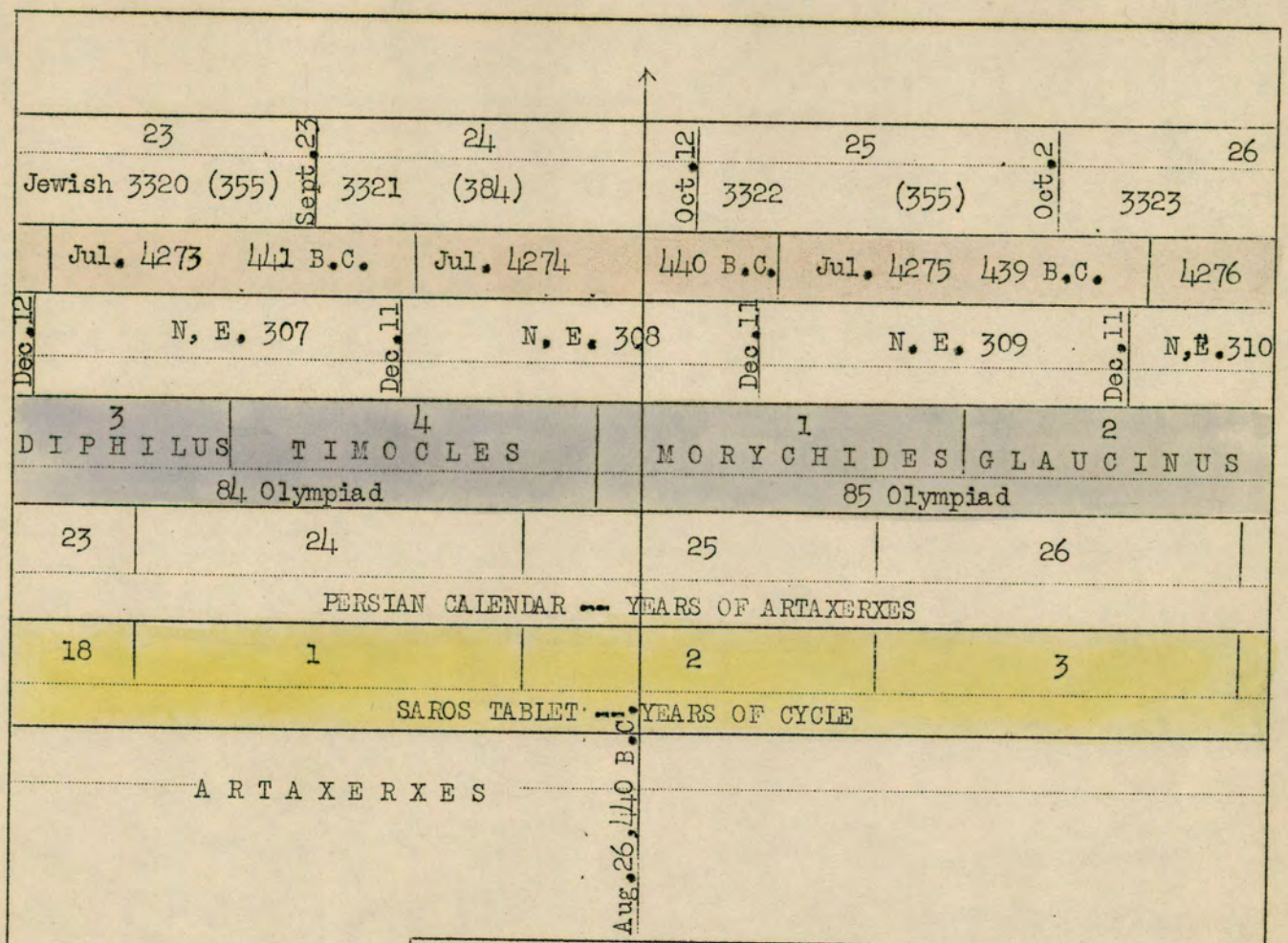
"Papyrus B"
Dated 21 Year Xerxes
18 Chisleu
= 17 (?) Thoth
1 Year Artaxerxes
Sayce & Cowley - Aramaic
Papyri Discovered at Assuan

464-63
463-62
462-61
461-60
460-59
459-58
458-57



Used Ungnad "30"

"Papyrus H"
Dated: — [3d year Darius]
Month of Elul
4th year Darius
Month of Payni
Sayce & Cowley:— Aramaic Papyri Discovered at Assuan



"Papyrus F"
Dated: [24th year Artaxerxes]
~~13th Ab~~ 14th Ab
= 25th year Artaxerxes
19th Pachons
Sayce & Cowley: -- Aramaic Papyri Discovered at Assuan

Papyrus "B" of all the Assuan Papyri, comes out the poorest so far as synchronism is concerned. Those who have seen the originals are not united in deciphering the Hebrew date. A study of these Papyri seems to definitely indicate that the date is the 2d of Chisleu rather than the 3d. Because the contract is dated in the middle of November (Julian calendar), the year 19 applies with equal force to both Egyptian and Jewish time.

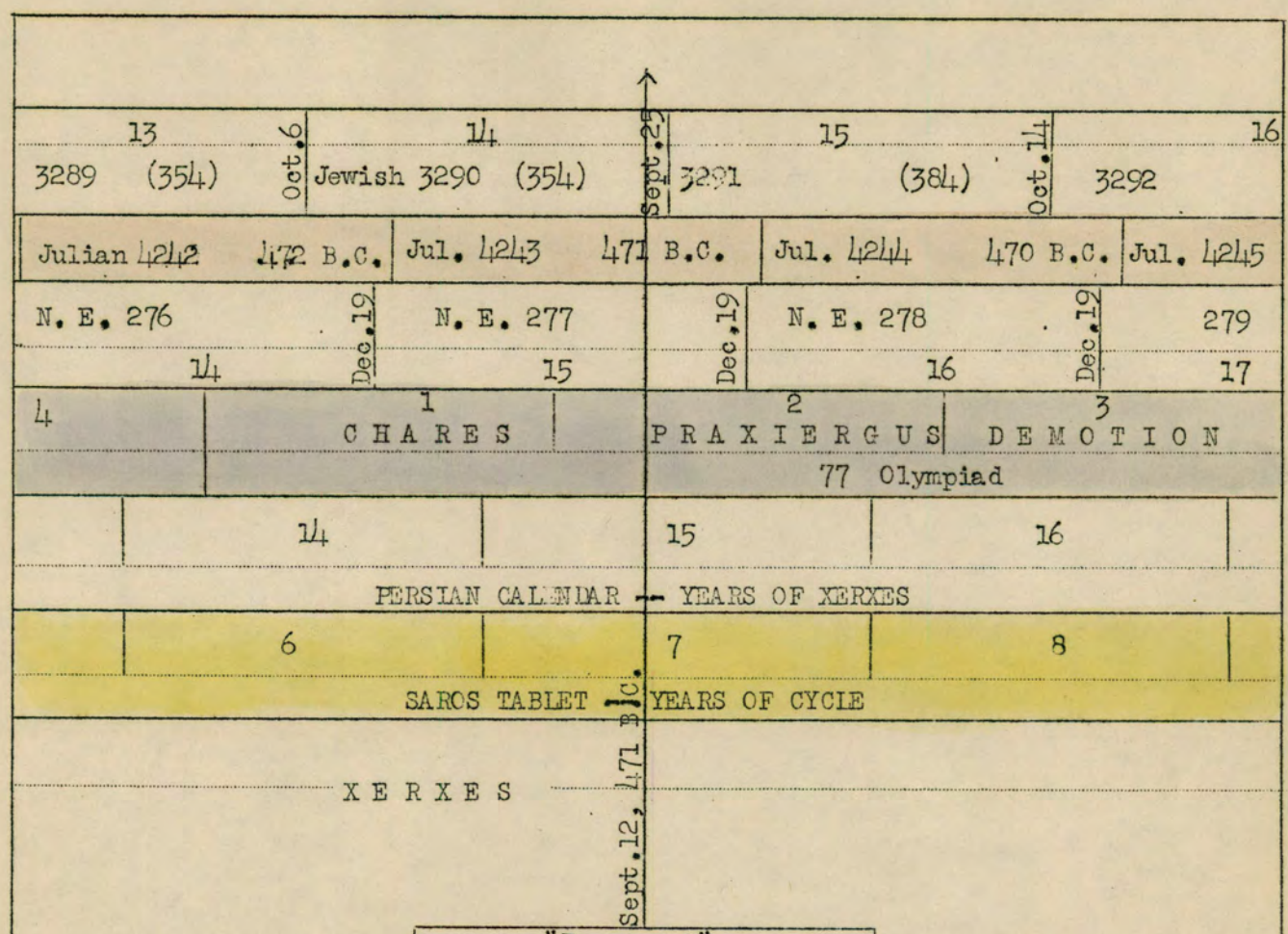
Papyrus "A" seems to read very clearly the 18th of Elul and the 28th of Pachons, and the year "the 15th year of Xerxes" is very plain. As the graph shows, however, the 15th year of Xerxes according to Egyptian reckoning would be the 14th year according to Jewish reckoning; and it is so marked on the graph. (See page 29).

Papyri "C", "D", and "G" are not included in this study. "C" is damaged to such an extent that it is impossible to determine the correct date. While Papyrus "D" is almost perfectly preserved, there must be some mistake in the dating, for the only way the 21st of Chisleu could be synchronized with the 1st of Mesore in the 6th year of Artaxerxes would be to have Nisan begin in February.

Papyrus "G" has been damaged so that the year can not be determined. The following chart shows the Julian dates for the 6th of Epiphi and their corresponding dates in Tishri from 464 to 441 B. C. From this table, it is noted that the 6th of Epiphi would synchronize with the 25th of Tishri only in the years of 460 and 446 B. C. See p 98 Because of the uncertainty of the date, however, very little weight has been given to the Papyrus in dealing with the various hypotheses.

17	Sept. 30	18		Sept. 20 (21)	19	Oct. 7	20
Jewish		3315 (355)			3316 (383)		3317 (354)
Jul. 4267	447 B.C.	Jul. 4268	446 B.C.		Jul. 4269	445 B.C.	Jul. 4270
N. E. 301	Dec. 13 Dec. 15	N. E. 302			N. E. 303	Dec. 13	N. E. 304
18		19			20		21
2 TIMARCHIDES		CALL			3 TIMACHUS		4 LYSIMACHIDES
83 Olympiad							
18		19			20		
PERSIAN CALENDAR --					YEARS OF ARTAXERXES		
13		14			15		
SAROS TABLET --					YEARS OF CYCLE		
					ARTAXERXES		
Nov. 17, 446							

"Papyrus E"
Dated: - 19th yr. Artaxerxes
3d Chisleu - 10th Mesore
Sayce & Cowley: -- Aramaic Papyri Discovered at Assuan
446



"Papyrus A"
Dated: 14-15 Year Xerxes
18th Elul = 28th Pachons
Sayce & Cowley: – Aramaic Papyri Discovered at Assuan

"Moon itself determines whether it would be a 354 or 355 day" 31. July 16

Inasmuch as the Israelites were given definite instruction concerning their passover (a festival falling at the time of the Nisan full moon), and its connection with the waving of the first fruits of the barley harvest, it is not at all hazardous to suspect them of adopting the Eastern method of intercalating the year so as to be more sure of synchronizing the two events and of more accurately predicting the beginning of their ritualistic year. The eight Papyri already studied (if "G" is counted) fall within the period 471 to 410 B. C. (see graph, page 17 on the Papyri Synchronisms). From Elul, 471, to Elul, 420, is a period of 51 Jewish years or 18, 635 days. When dealing with the lunar year as a measuring stick, 51 such years can be made to contain this number of days only by the use of 32 common years and 19 leap years as shown by the graph on page 32.

by subtracting Julian day number for Egyptian dates.

In the same way Knobel has pointed out how that from Chisleu, 466, to Chisleu, 416, (see Papyri "B" and "J") is a period of 10,987 days or 30 Jewish years demanding 12 leap years and 18 common years.[25]

As it so happens, all of the Papyri except one, fall on the points marking the upper or lower of the mnemonic. That this mnemonic, however, was used in conjunction with observation is very clearly shown by Papyrus "B" which demands an intercalary month in 465 instead of 464. (See dotted line on the graph, page 32). But 19 years later, 446, instead of conforming to this mnemonic, drops back to the standard form putting an intercalary month in 445 and not in 446 as one might be led to expect. These slight variations from the standard form tend to confirm the reliability of the dates in general and demonstrate the reasonableness of the statement that observation assisted calculation in determining the method of intercalation. It might be possible to arrange a mnemonic between the years 471 and 410 such as is shown on Charts B and C which would have 19 leap years, but in either case the dates of the Papyri would not synchronize. Because (1) of the close synchronism of the Papyri with the barley harvest time mnemonic shown on Chart D, and because (2) of their positions showing the upper and lower limits of this mnemonic, and because (3) of the two intervals of 51 years and 30 years demanding each its own

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[25] E. B. Knobel, "A Suggestive Explanation of the Ancient Jewish Calendar Dates on the Aramaic Papyri," R A S, Monthly Notices, LXVIII, (1908), pp. 334-345.

Yr.	Julian Date for 6th of Epiphi	Days of the Year, No.	Day No. 0 Nisan	Day No. 29th Elul	Corres. Date in Tishri
464	Oct. 18	291	103	289**	11
463	18	291	92	269	22
462	18	291	111	288	3
461*	Oct. 17	291	100	277	14
460	17	290	88	265	25
459	17	290	107	284	6
458	17	290	97	274	16
457*	Oct. 16	290	86	263	27
456	16	289	104	281	8
455	16	289	94	271	18
454	16	289	113	290	--
453*	Oct. 15	289	102	279	10
452	15	288	90	267	21
451	15	288	108	285	3
450	15	288	98	275	13
449*	Oct. 14	288	88	265	23
448	14	287	107	284	3
447	14	287	96	273	14
446	14	287	85	262	25
445*	Oct. 13	287	103	280	7
444	13	286	91	268	18
443	13	286	110	287	--
442	13	286	99	276	10
441*	Oct. 12	286	89	266	20

In view of these Papyrus dates coming from a range of six months in the calendar year and covering a range of more than half a century in the Persian period, it becomes increasingly evident that the Jewish calendar at this time had just as definite a method of calculation as had the Egyptian and that if the ~~above~~ Hypothesis[3] does not represent the actual methodology used by the Hebrews, it approaches it so nearly as to be synchronous with it.

4.

Hypothesis: An extra month was intercalated according to a mnemonic for the 19-year cycle (perhaps not so definitely adhered to at this early date as later, but closely enough to establish the fact of its use).

In the fifth century, B. C., as has been shown above, the Babylonians and Persians used a definite nineteen-year cycle to keep the calendar in line with the seasons and date harvests.[24]

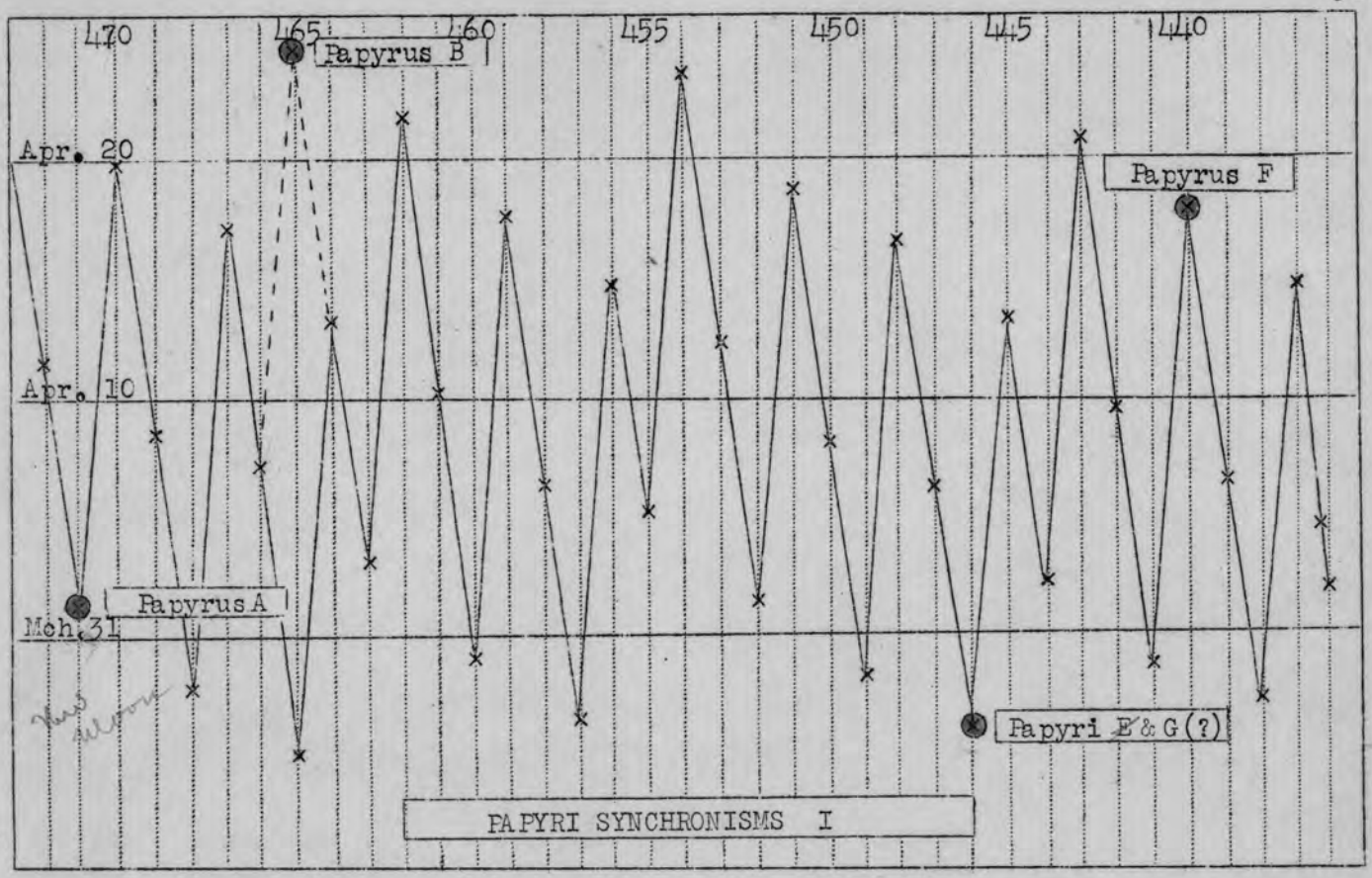
in such a way as to maintain the beginning of the year in its right relation to barley harvest

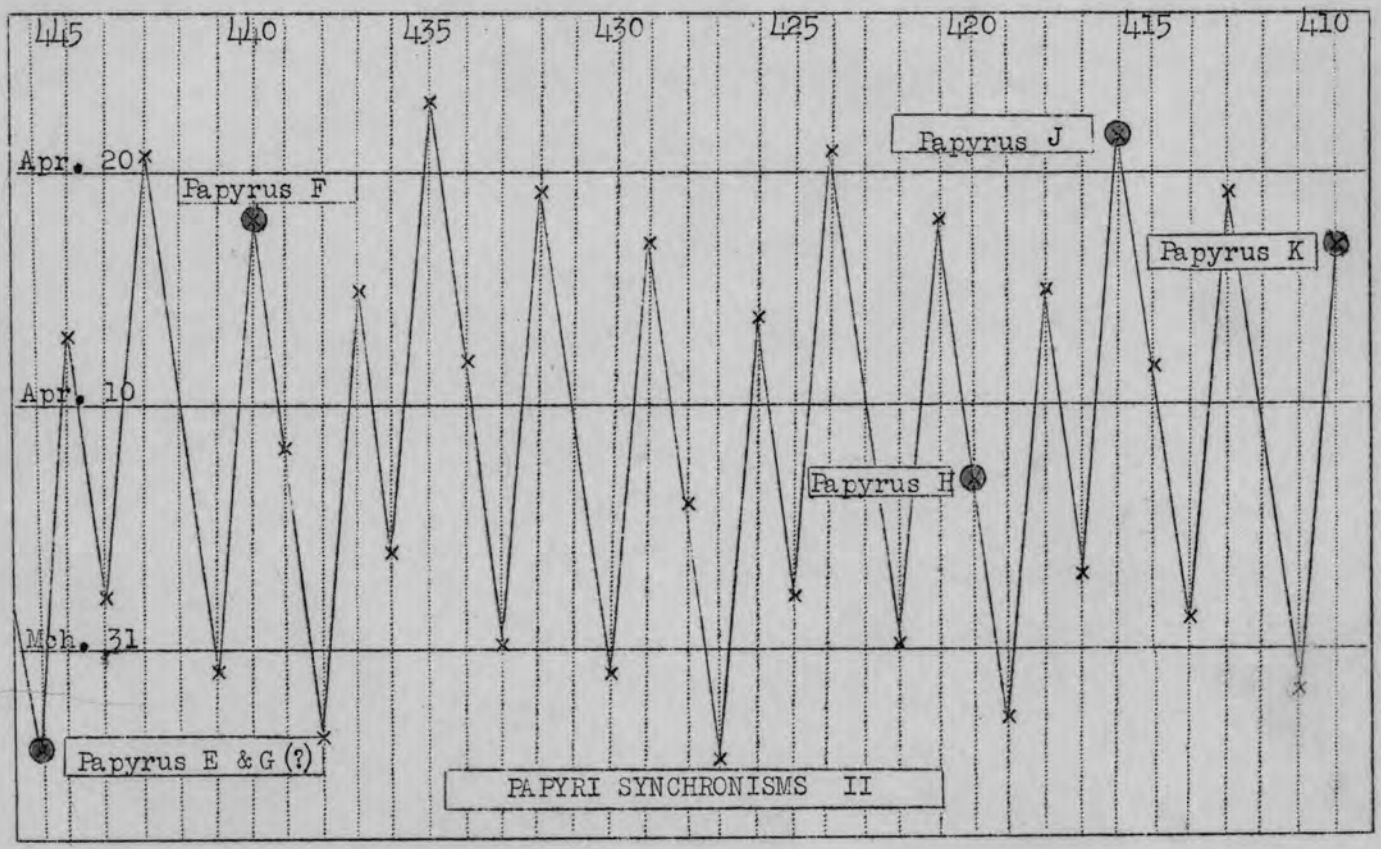
*Leap Year

**To get the day number of 29 Elul, add 177 to 0 Nisan.

24S. H. Langdon, Babylonian Menologies and the Semetic Calendar, pp. 10-20.
A. T. Olmstead, A J S L, LV. (1938), pp. 113-129.

Can establish mnemonic by relation of dates.





percentage of leap years and common years, one can not help being convinced that the Jews very definitely combined observation and computation at this early date and that in all probability, they followed fairly closely the barley harvest mnemonic regulating the beginning of the year in harmony with the Babylonian and Persian custom.

5.

Hypothesis: The Jewish civil year used in the reckoning of the reigns of kings began in Tishri, not Nisan.

Israel was given definite instruction that the sabbatical year as well as the year of jubilee should begin with Tishri, the 7th month of the ritualistic year.[26] The feast of Ingathering was set at the end of the year ( )[27] and at a definite season of the year ( ).[28] Indirectly, the use of ( ) in 2 Samuel 11:1, 1 Chron. 20:1, 1 Kings 20:26, and 2 Chron. 36:10 for the spring as the goal from which the year returns, or retraces its steps, to the point where it began, confirms the thought that the fall represented the beginning of the year for Israel's economic calendar.[29] In the first chapter of Nehemiah, the reformer speaks of events taking place in Shushan in the month of Chisleu in the 20th year of the reign of Artaxerxes, while in the second chapter he relates events taking place a few months later as happening in the month of Nisan "in the 20th year of Artaxerxes." If in the sequence of months of the 20th year, Chisleu precedes Nisan, the same sequence will be true of any year in the king's reign. In Ezra 7:9 the sequence of months; Nisan--Ab, might be ~~thought of~~ at first, be considered in terms of the ~~ritualistic~~ economic being parallel to ritualistic year, yet in the light of Nehemiah where it speaks of Nisan as already being in a definite sequence of another order, Ezra's sequence of Nisan--Ab would harmonize only when thought of as in a year beginning some time before Chisleu. Inasmuch as there is a definite sequence established of Chisleu--Nisan--Ab and inasmuch as Israel was told to begin their sabbatical and jubillee years with Tishri, it may safely be assumed that the Jews of the fifth century

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[26] Leviticus 25:8-10.

[27] Exodus 23:16.

[28] Exodus 34:22.

[29] W. J. Beecher, Dated Events of the Old Testament, page 12.

began their civil year by reckoning from the first of Tishri the same as now. Sayce agrees with this thought that the Jewish economic year began in the fall,[30] and Josephus also is quite clear in maintaining that his people had two systems of calendrical reckoning--one to control the setting of the religious feasts, another for dating their civil affairs. He says:

> "Moses appointed that Nisan, which is the same as Xanthicus should be the first month for their festivals because he brought them out of Egypt in that month so that this month began the year as do all the solemnities they observered to the honor of God, although he preserved the original order of the months as to selling and buying and other ordinary affairs."[31]

All of the Papyri fit admirably into this scheme of beginning the Jewish year at the first of Tishri, and by means of the three Papyri, "B", "J", and "K", giving the definite sequence between the two calendars, one is not left in the dark as to just how this sequence was worked. Inasmuch as both the Jewish and Persian reckoning took into account the accession year of any king being the same as the death year of the previous king, this sequence of years is very important, for as mentioned above, the Egyptians had no such method. By the observations of this sequence, the information obtained in the various sources, such as, the Canons of Ptolemy, the "Saros Tablet," the Papyri now under study, and the Biblical references, can all be made to harmonize exactly. By interpreting these various calendars in terms of the Julian calendar, the existing synchronisms are very plainly seen as demonstrated in the various graphs already given in this paper.

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[30] A. H. Sayce, Early History of the Hebrews, II-126.

[31] Josephus, Antiquities, I-3-3.

6.

Hypothesis: The numbers as well as the names of the months were according to their position in the ritualistic calendar, regardless of which method of reckoning was used.

No where is there any reference to Nisan as other than the first month or to Chisleu, for instance, as other than the ninth month. Evidently this was because the Babylonian calendar, using the same names of months as that used by the Jews, began in the spring. This Babylonian calendar influenced the Persian calendar and while the Persians had different names for their months, yet these months corresponded exactly with the Babylonian. Poebel has pointed out that their year began in the spring, the same as the Babylonian year and that the year was of a luni-solar nature.[32] The Babylonian-Persian calendar, having been reckoned according to the nineteen-year cycle, it would be quite easy for the Jews to fit their ritualistic year in with this method of calculation. This is why the Bible can speak of the sabbatical year as beginning with Tishri, the 7th month.[33] Thus while the Jews used the calendar then in use in the land of their captivity for determining the fests of their ritualistic year, they reverted to their old custom of reckoning their economic calendar as beginning from the first of Tishri, as at present.

All of these six hypotheses are developed as the result of a study of the Assuan Papyri, comparing the chronological data given there with other primary sources. They became of great assistance in determining accurately the beginning of the Jewish economic year and the proper sequence of the years in the various calendars in use early in the fifth century. By interpreting these various calendars in terms of the Julian calendar, it becomes very easy to locate any date given in history concerning this period.

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[32] Arno Poebel, A J S L, Vol. LV, (1938(, pp. 130-141.

[33] Leviticus 25:8-10; Exodus 23:16.

THE ASSYRIAN EPONYM LIST

The Assyrian Eponym List is similar to the Greek Archon List, being a record where each year is assigned to some prominent public official, and where the events specially to be remembered are placed under the name of such official. For publication of such Eponym Lists, see R. W. Rogers, Cuneiform Parallels to the Old Testament, pp. 219-238; with translations of tablets, pp. 293-357; D. D. Luckenbill, Ancient Records of Assyria and Babylonia, Vol. II, pp. 427-439.

These lists were probably compiled in the days of Ashur-bani-apal (668-626) from earlier records. The synchronization with the Julian calendar was made possible by the record of the eponymy of Bur-(Ishdi)-Sagale, "Governor of Guzana--revolt in city of Ashur. In the month of Simanu (Sivan) an eclipse of the sun took place." Scholars are quite uniformly agreed on the total eclipse of June 15, 763, as the eclipse mentioned here, and think of it as the one mentioned by Amos 8:9 "I will cause the sun to go down at noon, and I will darken the earth in the clear day." (See A.T.O., Hist. Ass. 171-172; Hist. Pal. & Syria, 430; Cam. Anc. Hist. Vol. III, 379; Int. Stan. Bib. Enc. 301).

During the century 830-730 however, there were three eclipses visible in the Near East (See map), one total and two partial, which so far as the eclipses went would fulfil the specifications; 809, 791, and 763, all taking place in June. (See Fred. K. Ginzel, Spezieller Kanon der Sonnen-und Mondfinsternisse, Pls. I,II) Computing the new moon conjunctions, London Civil Time, according to Langdon's Tables, (Venus Tables of Ammizaduga, Pls. II-V), and applying the rule of the barley harvest to determine the beginning of Nisan--for the Assyrian and Babylonian governments used the same kind of a nineteen year cycle the Jews did, we have the following: (The month of the eclipse is marked with an *)

New Moon Conjunctions, 809 BC –

	G.C.T.	
Mar.	17.218	Too early for the 1st of Nisan
Apr.	15.574	1st Nisan Apr. 17
May	14.979	1st Iyyar May 17
*Jun.	13.468	1st Sivan Jun. 15

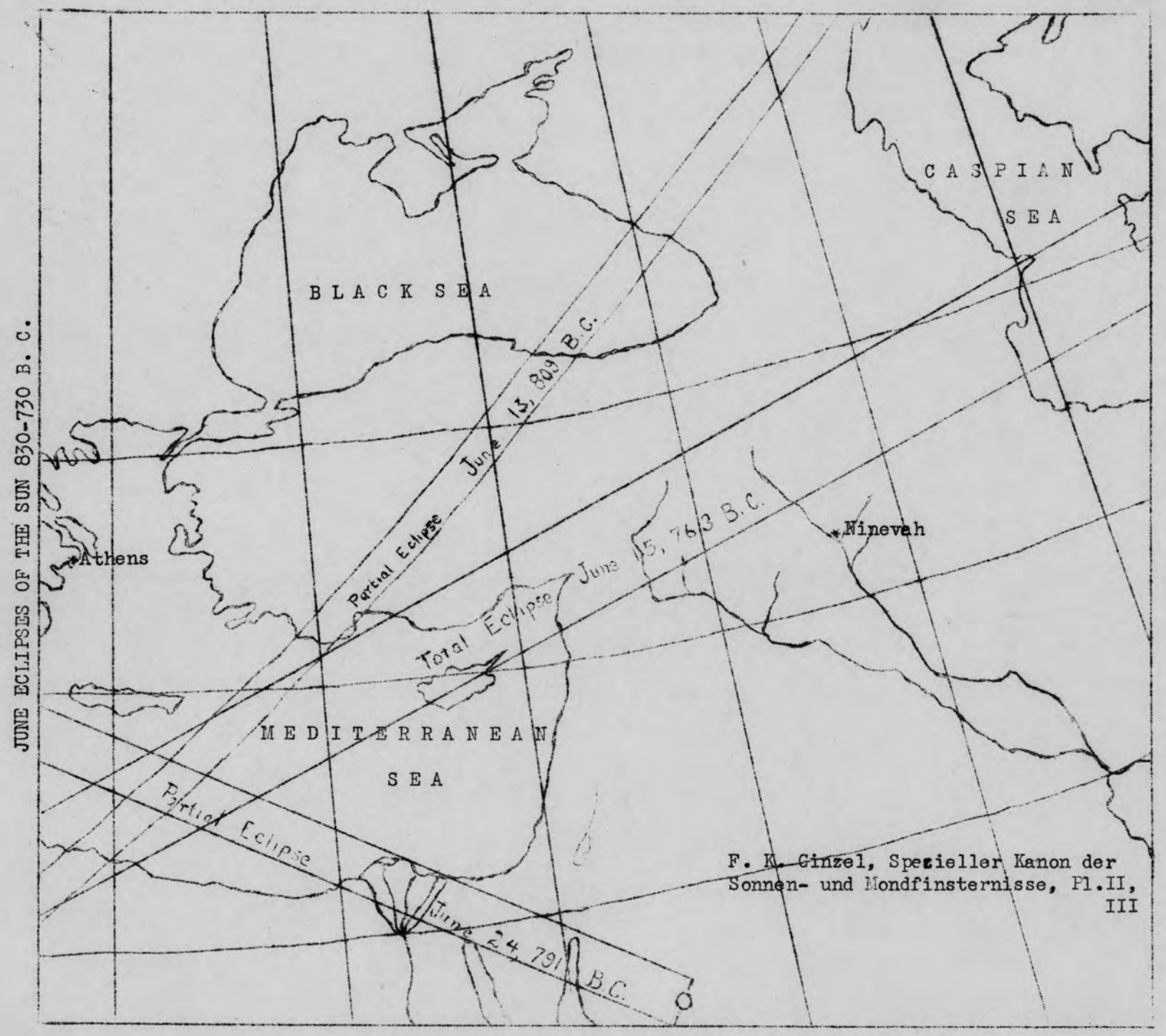
New Moon Conjunctions, 791 BC

	G.C.T.	
Mar.	28.542	1st Nisan Mar. 30
Apr.	26.884	1st Iyyar Apr. 29
May	26.272	1st Sivan May 28
*Jun.	24.744	1st Tammuz Jun. 27

New Moon Conjunctions, 763 BC –

	G.C.T.	
Mar.	19.572	Too early for Nisan
Apr.	17.875	1st Nisan Apr. 19
May	16.161	1st Iyyar May 19
*Jun.	15.468	1st Sivan Jun. 17

From these tables it is seen that the solar eclipse must come at the very end of the month. If the Assyrians observed the same intercalendation that the Jews did, it would make the two eclipses of 809 and 763 come in Iyyar and not Sivan, as required in the Eponym List. Inasmuch as only one eclipse is mentioned during this century, it is not sure which one of the three is meant, unless comparison is made with some other independent king-list. Such is in the Bible.

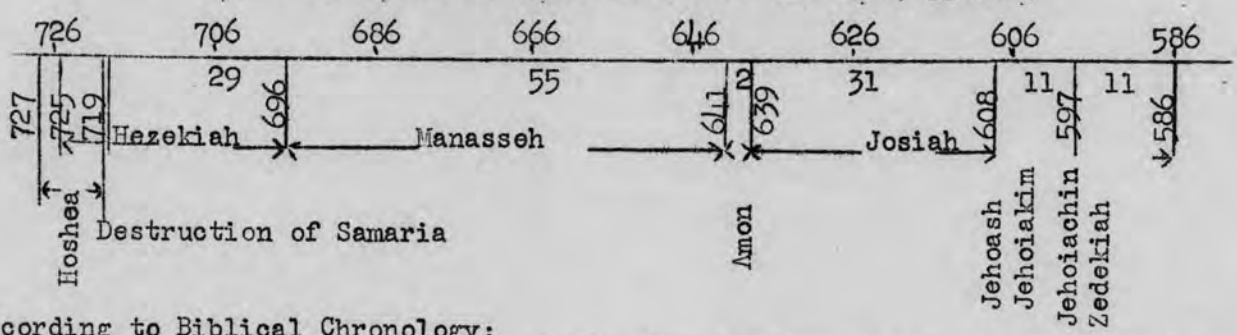


F. K. Ginzel, Spezieller Kanon der Sonnen- und Mondfinsternisse, Pl.II, III

(5)

DISCREPANCIES BETWEEN ASSYRIAN AND BIBLICAL DATES

(See W.J.Beecher: Dated Events of the O.T., pp.18f)

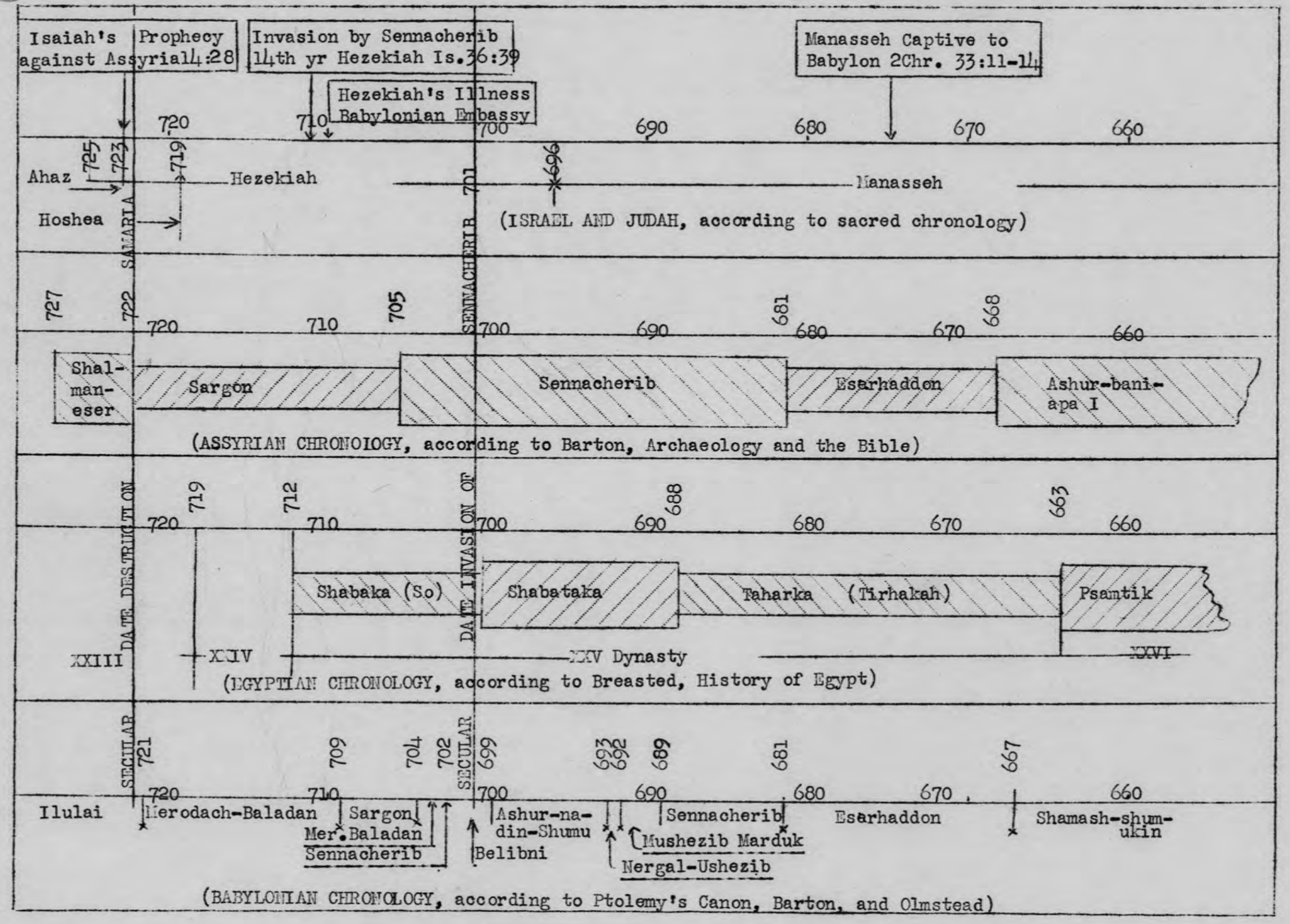


According to Biblical Chronology:
Hoshea began to reign in 12th Ahaz (727) (2Kg. 17:1). Ahaz reigned alone 14 yrs., (738-725) and 2 yrs. jointly with Hezekiah (724,723) (2Kg. 18:1,2).
Soon after Shalmaneser came against Samaria and Hoshea paid tribute. (2Kg. 17:3).
Ahaz makes Hezekiah co-ruler in 3rd Hoshea (2Kg. 18:1).
In the 5th yr. Hoshea, death-year Ahaz, and 2nd yr. Hezekiah (723), Isaiah prophesied breaking of Assyrian yoke (Is. 14:24-28). Hoshea conspired against Assyria and contacted So of Egypt. (2 Kg. 17: 4).
In 6th Hoshea, 3rd Hezekiah, (1st of his sole reign), Hezekiah introduced reforms, restored the Temple service, invited Israel to participate in Passover to be held in the second month--an invitation scorned by them--, and lengthened the Passover to two weeks. People returned to break down idolatrous altars, brought tithes and offerings to Jerusalem. (2 Chr. 29:3-31:21; 2 Kg. 18:4-6). Shalmaneser imprisons Hoshea for not paying tribute. (2 Kg. 17:4)
In the 7th Hoshea, 4th Hezekiah, Shalmaneser started to besiege Samaria for three years. (2 Kg. 17:5; 18:9,10).
In the 9th Hoshea, 6th of Hezekiah, the "King of Assyria,"--now Sargon--captured Samaria. (2 Kg. 17:6; 18:11)

THIS MAKES SHALMANESER, SARGON, HEZEKIAH, HOSHEA, and SHABAKA (SO) CONTEMPORANEOUS

Assyria re-settles Israel with immigrants from Babylon, Assyria, and Syria; taught by Israelitish priests. (2 Kg. 17:33)
In the 14th yr. Hezekiah (711) Sennacherib invaded Judah, especially Lachish and Jerusalem (2 Kg. 18:13-15; 2 Chr. 32:1; Is. 36:1). Hezekiah took gold from the Temple and paid tribute to Sennacherib; changed the watercourses, and fortified the city (2 Kg. 18:16,20; 2 Chr. 32:2-8,30).
In the 15th year (Hezekiah reigned 29, and his life was extended 15 years), Hezekiah fell sick. In answer to his plea, God extended his life 15 years. (2 Kg. 20:1-19; 2 Chr. 32:24-26; Is. 38:1-39:8; See also Micah 3:1-12). An embassy was sent to Hezekiah by Merodach Baladan.
In the 18th year Manasseh was born (2 Chr. 33:1; 2 Kg. 21:1)
16th-24th years passed over with statement that Hezekiah rebelled against Assyria, and God prospered him in his wars (2 Kg. 18:7,8).
In the 25th year of Hezekiah (700 B.C.; Sidney Smith, C.A.H. Vol. III, 70-75, Sennacherib besieged Jerusalem and Lachish; heard rumor from Tirhakah of Egypt; lost 185,000 men in one night, and retired from the field. (2 Kg. 18:17-19:37; 2 Chr. 32:9-22; Is. 36:2-37:38)
Remaining four years of Hezekiah's life uneventful. (2 Chr. 32:23-33)

THIS MAKES SENNACHERIB, HEZEKIAH, TIRHAKAH, AND MERODACH BALADAN CONTEMPORANEOUS



(7)

IS SO SHABAKA?

A. T. Olmstead, History of Palestine and Syria, (1931), p. 454.

"Tiglath Pileser died and his son came home from Smyrna to reign as Shalmaneser V (728-722); his absence from Syria allowed new revolts to be stirred up by Sibu or So, perhaps one of the Egyptian Delta kings and Tyre, Sidon, and Accho rebelled."

On p. 481 after Sennacherib's seige of Lachish and the destruction of his army, Olmstead speaks of his treaty with Shabaka. This he can do for he places the one invasion of Sennacherib in 701.

J. H. Breasted, A History of Egypt, (1912), p. 549.

"In the short reign of Shalmaneser IV, who followed Tiglath Pileser III, Israel with others was encouraged to revolt by Sewa or So, (2 Kgs. 17:4) who was either an otherwise unknown Delta Dynast or ruler of Musri, a kingdom of North Arabia, the name of which is so like that of Egypt as to cause confusion in our understanding of the documents of the time, a confusion which perhaps already existed in the minds of the cuneiform scribes."

H. R. Hall, The Ancient History of the Near East, (1935), p. 471.

"In 726 Hoshea of Israel and the king of Tyre relying, as we read in the Book of Kings, (2 Kgs. 17:4) on the promised help of "Seve (So), king of Egypt," refused his yearly tribute. Now that the theory of the existence of a hitherto unknown land, bearing the same name as Egypt, (Musri), in North Arabia, to whom this Seve, the Sib'u of the Assyrians, and the "Pir'u of Musri," also mentioned in the Assyrian inscriptions, were assigned, is generally discredited, we have returned to the original and perfectly natural identifications of Seve or Sib'u with Shabaka (the Sebichos of the Greeks) and of "Pir'u of Musri" with Pharaoh of Egypt. It is very probable that the Biblical mention of "king" Seve in connection with Hoshea in 725 is a misplacement from the year of Sargon's victory at Raphia in 720, when "Sib'u, the commander-in-chief (turtan) of Pir'u," is mentioned as defeated by the Assyrians (he is not mentioned in 725). We must suppose that Sib'u and Seve are the same person, in which case the contemporary Assyrian record must be followed, and Seve transferred to 720. And then the probability of the identity of Sib'u-Seve with Shabaka is evident."

In a note, same page, Hall says: "The identification of So or Seve with Sib'u is generally accepted, but not the further identification with Shabaka (Greek Sabakon or Sebichos), although the earlier writers, like Rawlinson and Oppert, did not doubt it. Nowadays W. M. Muller, Encycl. Bibl., s.v. So; Steindorff, Beiträge zur Assyriologie, I, pp. 339ff.; Alt, Israel und Ägypten, pp. 56ff.; Rogers, Hist. Bab. Assyr. II, p. 306; Peet, Egypt and the Old Testament, p. 171; and Olmstead, Hist. Assyr., pp. 204,207, all reject it. I am, however, by no means convinced by the gregarious unanimity, and since no other Egyptian candidate for identification with Sib'u-Seve exists, continue to consider it probable that he is Shabaka."

REIGN OF SHISHAK (SHESHONK)
First Pharaoh of the Twenty-second Dynasty

Both Breasted (History of Egypt, 529), and Olmstead (History of Palestine and Syria, 340, give the reign of Shishak as 945-924. Breasted places the invasion of Palestine in the fifth year of Rehoboam in 926 (Hist. Egypt, 529) while Olmstead puts it in 931 (Hist. Pal., 354).

Breasted makes Shishak the Pharaoh who captured Gezer and gave it to his daughter, Solomon's wife (1 Kg. 9:15-17), and also the harbourer of Jeroboam (1 Kg. 11:40), as well as the invader of Palestine in days of Rehoboam. (Hist. Egypt, 529) (1 Kg. 14:25-28)
Solomon began the temple in his 4th year and finished in the 11th--being 7 years in building. (1 Kg. 6:38) Then he was 13 yrs. building his own house. (1 Kg. 7:1) Both together lasting 20 yrs. (1 Kgs. 9:10) Established a levy to build cities including Gezer (1 Kg. 9:15) which Pharaoh had given his daughter. She stayed in the city of David some time before the house was built. (1 Kg. 9:24)

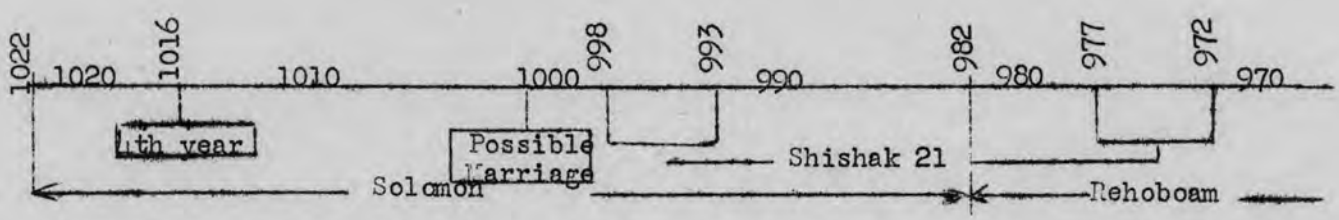
W. J. Beecher: The Dated Events of the O. T., pp. 18ff.
"For checking the Assyrian against Biblical dates, a good point of reference is in Shishak's invasion in days of Rehoboam. Shishak was contemporary with Solomon (1 Kg. 11:40) and invaded Judah the fifth year of Rehoboam (1 Kg. 14:25). According to Eg. records this was not later than 20th year of Shishak. According to Assyrian records supported by Biblical (2 Kgs. 11 = 1-6) Shabaka the So of the Bible, the first king of the 25th Dyn. was on the throne when Sargon invaded Palestine in B.C. 720. It is not known what year of his reign this was. Call it 720 + x . Add to this the number of years of each Dynasty back to Shishak. (According to Breasted)

Accession of Shabaka	720 + x
24th Dyn.	6
23d "	37 + 3x
22d "	230 + 6x
Accession of Shishak	993 +10x

Tirhakah the second king after Shabaka was on the throne (2 Kg. 19:9) at the time of Sennacherib's invasion 701.

Accession of Tirhakah	701 + x
Years of Previous kings	24
Accession of Shebaka	725 x which put in place of

720 + x makes the accession of Shishak 998 + 10x. The years of overlapping reigns would about balance the 10x and thus the date 993-998 as the time of accession of Shishak is better than 947. (See Breasted analysis of this problem by estimating Eg. co-reigns and overlaps at 30 yrs., canceling all x values by assuming the last date found on the monuments indicates the last year of the reign; thus in contradiction to Assyrian records the first year of Shabaka is set at 712 and Tirhakah at 688. Then he arbitrarily drops 10 years from the minimum dates of the 23d Dyn. (Anc. Record Vol. I, pp. 23-48)"



(Synchronization of the reigns of Shishak and Solomon according to the Bible)

(9)

CONTEMPORANEOUS KINGS OF THE ASSYRIAN AND ISRAELITISH KINGDOMS

Biblical chronology ties on to Babylonian chronology by means of eight synchronisms during the reigns of Nabopolassar and Nebuchadnezzar, and thus makes the final destruction of Jerusalem in the nineteenth year (586-586) of Nebuchadnezzar (2 Kg. 25:8). This harmonizes with the Assyrian record and thus it can be said that at the destruction of Jerusalem the Assyrian and Biblical chronologies are synchronous.

Both records make Esarhaddon (681-668) and Manasseh contemporaneous. According to Biblical chronology Manasseh reigned 696-641. Esarhaddon was encouraged in his western trip because of good news from his astrologer on account of an eclipse of the sun in January, (See A.T.O., Hist. Pal., 486). There are two possible eclipses by which to date this event, Jan. 11, 689, and Jan. 12, 662 (See F. K. Ginzel, Spezieller Kanon, pp. 48,49). Olmstead wants to make the latter the eclipse mentioned in the record, but it seems to fall a bit too late for Esarhaddon's reign. The earlier date would fit into Manasseh's reign, but would be too early for the Assyrian date given to Esarhaddon. This is a good problem for someone to work out. That Manasseh was spoken of as contemporaneous with Esarhaddon in the Assyrian records, see R. W. Rogers, Cuneiform Parallels, p. 356.

The invasion of Sennacherib against Jerusalem is placed by Assyrian records at 701-700 (See Rogers, 342-343). There seems to be no record of an earlier invasion by the Assyrian king, but the Bible is clear that this record is distinct from the one in the 13th, 14th year of Hezekiah. There is practically no difficulty in synchronizing these two kings.

Sargon and Hezekiah are recognized in both records as being contemporaneous. According to Biblical Chronology Hezekiah reigned from 725 to 696. Sargon according to the Assyrian record reigned from 722 to 705. He is assigned to the Assyrian Eponym List for 719 (See Rogers, 224). For the campaign of Sargon against Ashdod (Is. 20:1), the Assyrian record places it at 711 (Rogers, 328), which would fall well within Hezekiah's reign and Sargon specially emphasizes that he captured Samaria (Rogers, 331).

The Assyrian record synchronizes the reigns of Tiglath-pileser, Pekah of Israel, and Rezon of Damascus; therefore of Ahaz of Judah. The Biblical record says that Hoshea slew Pekah (2 Kg. 15:30) and the Assyrian record practically agrees by saying "As Pekah their king they had deposed, Hosea I established as king over them." (Rogers, 321) Rezon was slain by Tiglath-pileser (2 Kg. 16:9). Olmstead places his death in the same year as Pekah, 732 (Hist. Pal. & Syr., 451, 453). According to the Biblical chronology, Pekah was slain 736. Thus there seems to be a small difference of 4-5 years in the chronologies.

The tribute of Menahem of Israel to Pul, King of Assyria (Compare 2 Kg. 15:19 with 1 Chr. 5:25,26) indicates that Menahem and Tiglath-pileser was contemporaneous. Olmstead places the date of the tribute as 739-738 (Hist. Ass. 181, 189), but according to Biblical chronology Menahem ruled 768-759. This shows a difference in the chronologies of 21-29 years.

According to Biblical chronology Jehu reigned 892-865. No reference is made to his paying tribute to Assyria but the black obelisk of Shalmaneser III records it, thus making the two kingscontemporaneous. The date generally given for the payment of this tribute is 842 (See Rogers, 303,304; A.T.O., Hist. Pal. and Syr., 398). Some authorities put it 841 (C.A.H., Vol. III, 262). There is therefore a discrepancy here of 30-50 years as the payment of this tribute might have happened near the beginning of the reign of Jehu.

Ahab's reign, according to Biblical chronology is 925-904. Shalmaneser III records the battle of Qarqar in which Ahab and Ben Hadad took part (Rogers, 294-297). Olmstead puts the battle of Qarqar at 854; Cam. Anc. Hist., Vol. III, 262, makes it 853. There is no reference to this in Scripture, but probably it took place toward the latter part of Ahab's reign. Thus the difference between the two chronologies is roughly 50 years.

Tabulating the results it is noted that the discrepancy grows:

Esarhaddon--Manasseh	Synchronous
Sennacherib--Hezekiah	"
Sargon--Samaria	"
Tiglath-pileser--Hoshea	4-6 years off
Tiglath-pileser-Menahem	21-29 years off
Shalmaneser III--Jehu	30-50 years off
Shalmaneser III--Ahab	cir. 50 years off

From Shalmaneser III to Tiglath-pileser III, the period of Assyrian decline, there is no mention of this power on the part of the Biblical writers.

Ashur-Uballit 1370-1335
Takulti-Urta 1250-1215
Tiglath-Pileser I 1109-1082

A S S Y R I A

Eclipse — One Dynasty — Babylon

Home — Expansion Abroad — Decline

1012 Ashur-rabi II
995 Ashur-resh-ishi II
966 Tiglath-Pileser II
933 Ashur-dan
911 Adad-nirari II
890 Takulti-Urta II
885 Ashur-nasir-apal
860 Shalmaneser III
825 Shamsi-Adad V
812 Adad-nirari III (Semiramis)
782 Shalmaneser IV
772 Ashur-dan III
754 Ashur-nirari V
746 Tiglath-Pileser III
728 Shalmaneser V
722 Sargon II
705 Sennacherib
681 Esarhaddon
668 Ashur-bani-apal
626 Decline
612 Destruction Nineveh
586 Destruction Jerusalem

1000 1000 900 800 700 600

(Assyrian Chronology according to A. T. Olmstead, History of Assyria)

1000 Solomon
935
Kingdom of Israel
722
Kingdom of Judah
586

1000 900 800 700 600

(Chronology of the Kingdoms of Israel and Judah according to A. T. Olmstead, History of Palestine and Syria)

1022 Solomon
982
Kingdom of Israel
719
Kingdom of Judah
586

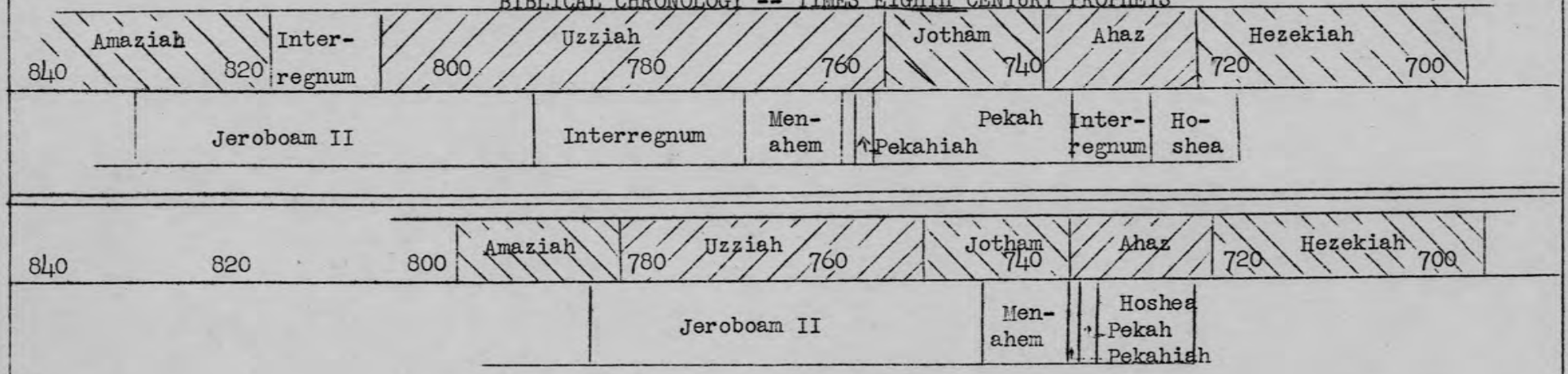
1000 900 800 700 600

1st Group Prophets
Interim
2nd Group Prophets
Interim
3rd Group Prophets

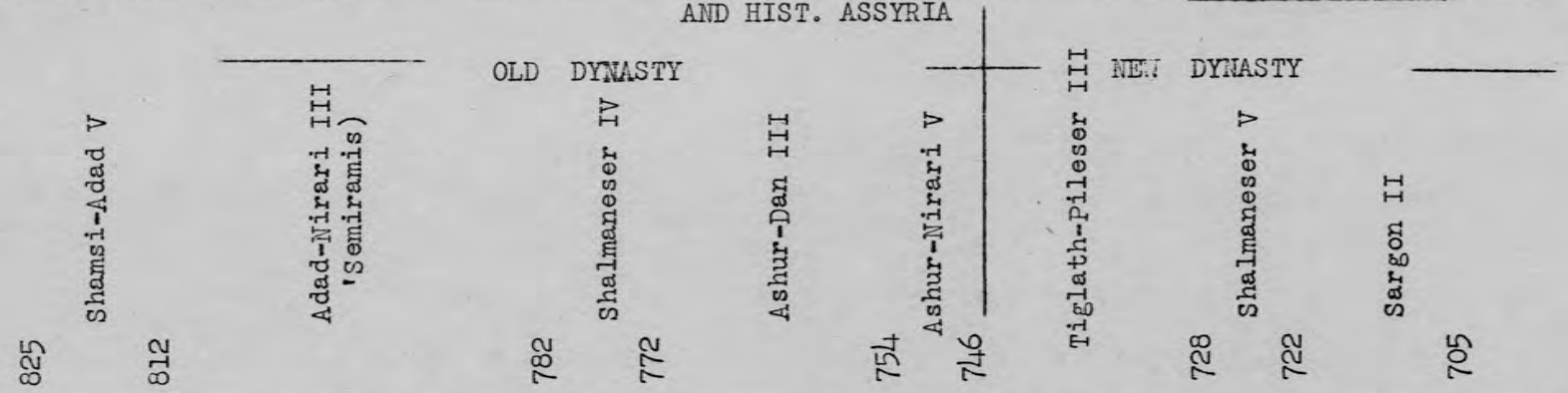
(Scriptural Chronology of the Kingdoms of Israel and Judah)

(12)

BIBLICAL CHRONOLOGY -- TIMES EIGHTH CENTURY PROPHETS



SYNCHRONOUS ISRAELITE AND ASSYRIAN CHRONOLOGY ACCORDING TO A.T. OLMSTEAD, HIST.PAL. & SYRIA, 415-462 AND HIST. ASSYRIA



840	820		800		780		760	740		720		700	
	ATO	H.P.	Yrs.	BIBLE	Yrs.			ATO	H.P.	Yrs.	BIBLE	Yrs.	
Jeroboam	785-745	420	40	832-791	41		Amaziah	799-782	415	17	847-818	29	
Interregnum	745-744	---	1	791-769	22		Interregnum	-------	---	--	818-807	11	
Menahem	744-735	439	9	769-759	10		Uzziah	782-751	417	31	807-755	52	
Interregnum	-------	---	-	759-758	1		Jotham	751-736	442	15	755-739	16	
Pekahiah	735-734	446	1	758-756	2		Ahaz	736-721	442	15	739-723	16	
Pekah	734-732	---	2	756-736	20		Hezekiah	721-693	462	28	725-696	29(2 yrs. Co-Rex)	
Interregnum	-------	---	-	736-728	8								
Hoshea	732-723	454	9	728-719	9								

For Issing

Early and Latter Rain

"The following items respecting the seasons in Palestine, are taken from an 'Economical Calendar' of that country, by John Gotlieb Buhle, Fellow of the Philologic Seminary, at Brunswick, 1785. The Calendar was compiled from the researches of travellers of acknowledged authenticity, at the request of the Directors of the royal college of Gottingen, and may be found in full in 'Calmet's Dictionary.'"—(Advent Shield, January, 1845, p. 275):

'March. The inundation of the river Jordan, caused by the melting of the snow on the mountains, is about the end of this month, at which time, barley is often ripe at Jericho, when it is about fourteen days earlier than at Jerusalem. In this month every tree is in full leaf. The fig blossoms about the middle, and the Jericho plume, toward the end of it. The latter rains commence in this month, and continue into April; after which, none are observed until summer.

'April. In April, the heat begins to be extreme. The harvest falls out entirely according to the rainy season. After the rains cease, the corn soon arrives at maturity; but it usually remains in the fields a long time after it is ripe. Barley is ripe in the beginning of April, in the plain of Jericho, according to Mariti, l.c. In all other parts of Palestine, it is in ear at this time, and the ears turn yellow about about the middle of this month. (Shaw, l.c.)

'May. In the month of May, the summer season commences, when the excessive heat of the sun renders the earth barren. Wheat is cut down in May, in Galilee, but it is often not gathered till the first of June. Frequently, barley is not all cut down until this month commences.' (Bühle, Johan Gotlieb, "Economical Calendar," page Brunswick, 1875.)

"During the months of November and December tha rains continue to fall heavily; afterward they return at longer intervals, and are not so heavy; but at no period during the winter do they entirely cease to occur. Rain continues to fall more or less during the month of March, but is afterwards very rare. Morning mists occur as late as May, but rain almost never. Rain in the time of harvest was as incomprehensible to an ancient Jew as snow in summer (Prov. 26:1; 1 Sam. 12:17; Amos 4:7). The 'early' and the 'latter' rains, for which the Jewish husbandman awaited with longing (Prov. 16:15; James 5:7), seem to have been the first showers of autumn, which revived the parched and thirsty soil, and prepared it for the seed; and the later showers of spring which continued to refresh and forward the ripening crops and the vernal products of the fields."--Kitto, John, "Palestine," p. 23. New York, 1900.

THE ARGUMENT

The Spirit of Prophecy likens the outpouring of the Holy Spirit in the days of Pentecost to the beginning of the early rain. It is also called the "former rain." The "sowing" had been in process ever since Adam fell, and Christ finished the seeding in His generation. The disciples were the "reapers," and they gathered, in large measure a harvest which they had not sown. Acts of Apostles, page 54.

The Holy Spirit, in the time of Christ, "was not limited to any age or to any

race" (Acts of Apostles, p. 49). The same spiritual manifestation was given to Cornelius and his Italian friends, and to the Ephesians, as to the disciples at Pentecost in the summer of 31 A.D. These seasons of refreshing were not all on the occasion of Pentecost, but it was the same blessing (Acts 11:15 and 19:6). Consequently, though the beginning of the spiritual "early rain" was at Pentecost, and indeed, over two months after the spring latter rain of that year, this first refreshing of the kind from heaven was given at any time or season throughout the ministry of the apostles, and therefore, it symbolized both rains of Palestine, and not just one. The prophecy of Joel, which Peter quoted, bears this out.

And just as Pentecost, and the Italian and Ephesian bestowals of spiritual grace represented both the literal "early"and "latter" rains of seedtime and harvest, so it will be in the final harvest at the end of the world. Unless the "former" has possessed the heart, to the extent that all sin is confessed and forgiven, then the "latter" rain cannot finish the harvest, and souls are destitute, as in the parable in Matthew 25. This condition is fully described in Test. to Ministers, p. 506. The blessing required for this generation is the "double rendering" described in Zech 9:12, and fully explained in Vol. 8, p. 21, and involves an experience based on both "seedtime" and "harvest" rains. One is not enough.

C O N C L U S I O N --

(1) The outpouring fulness of the Holy Spirit the Scriptures liken to the rains of seedtime and harvest in Palestine, the "early" rain of autumn, and the "latter" rain of spring. The spiritual figure is based upon both rains.

(2) The Pentecostal administration of the Spirit is called by the Spirit of Prophecy the Beginning of the Early Rain (Acts of Apostles, p. 54), which continued throughout the apostolic ministry, and onward. The Waldensians , "in their lonely retreats often met their Redeemer and conversed with Him (Historical Sketches, p. 243), and thus prepared the way for the Reformation (Acts of Apostles, p. 53).

(3) The bestowal of the Holy Spirit in the final harvest is the same kind as in apostolic times, only more of it. A double measure of both "early" and "latter" rain, that is, both confession and forgiveness, and the blotting out of sin and victory over sin (Zech. 9:12; Vol. 8, p. 21), and the perfection of character.

(4) Consequently, the administration of the Holy Spirit in apostolic times, was the "former" or "early" rain, not in the sense that it corresponded to the rain of seedtime only, butthat it was the beginning of the outpouring of the Holy Spirit, such as had never before been given.

G. Amadon.