Sources Pertaining To

RECONSTRUCTION OF MOSAIC SACRED CALENDAR

~~(Inseparably tied to barley, wheat, and vintage harvests)~~

I, Problem not Solvable by Modern Jewish Calendar

~~II Karaism Restored Original Mosaic Calendation~~

~~I~~II, True Mosaic First Month

~~III~~ Order of Ancient Hebrew Months

IV, Passover Followed Day of Full Moon in Jewry

~~VI Length of Ancient Hebrew Year~~

~~VII Translation Period of the Moon~~

V~~II~~ Principles Governing Moon's Phasis

~~IX Tables Employed~~

~~X The Two Arguments -- Full Moon and New Moon~~

VI, Ancient Hebrew Year

CITATIONS

RECONSTRUCTION OF MOSAIC AGRICULTURAL CALENDAR
(For Three Epochs of 2300-Year Prophecy)

1. Ezra-Nehemiah Period. OBSERVATION, supported by (monuments, papyrus, tablet, stone, and eclipse record).
2. Crucifixion Full Moon of 1st Century. OBSERVATION and CALCULATION blended (since Maccabean times in 2nd century).*
3. 1844 New Moons. CALCULATION, supported by OBSERVATION of moon's position, available in standard almanacs of modern times.

I Modern Jewish Calendar of Little Use to Problem

(1) Months out of Agreement with Mosaic Feasts
"For those feasts which Moses commanded to be celebrated in the first, third, and seventh month, do not agree with March, May, and September, in the climate of Palestine."-- Michaelis, Joanne Davide, "Commentationes De Mensibus Hebraeorum," p. 17. Bremae, 1764.

(2) Rabbinical Calculation Excludes Friday Passovers
"Therefore passover frequently falls two complete days later than the real opposition -- one day in consequence of the Equations, another day in consequence of their postponing passover from a Dies illicita [Monday, Wednesday and Friday] to a Dies licita."-- Albîrûnî, "The Chronology of Ancient Nations," p. 144. Tr. by Sachau. London, 1879.

(3) Rabbinical "Postponements" Not in Use in First Century
"From numerous passages of the Mishna, the Babylonian Talmud, and Jerusalem Talmud, it is evident that prior to the destruction of Jerusalem in 70 A.D., no day of the week was excluded from the calendar for the fixation of the 1st of Tisri."-- Sidersky, David, "Etude sur l'origine astronomique de la chronologie juive," in "Mémoires présentes par divers savants à l'Académie des Inscriptions et belles-lettres de l'Institut de France," p. 660. Paris, 1913.

(4) Modern Jewish Year Has Greater Variations in Length than 1st Century (Years
"In the modern Jewish calendar greater variations are found in the lengths of the ordinary and embolismic years, respectively, especially the ordinary short year of 353 days, and the abundant embolismic year of 385 days, issues of the system of postponements [dehiyoth], inaugurated later by the Jewish doctors of Babylon, but which did not yet exist in the first century."-- Sidersky, Idem, p. 633.

II True Mosaic First Month

(1) Moses Gave Israel a "Agricultural" Year in Place of Sacred
"Now this is precisely what Moses did. He had it not in his power to adopt a strictly astronomical solar year, and thereby to correct the irregularities of the lunar year; but he availed himself of the aid of an economical solar year, which never admitted an error of a whole month without correcting it, and which every husbandman could easily comprehend."-- Michaelis, "Commentaries on the Laws of Moses," p. 206. Tr. by Smith. London, 1814.

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* "The mathematicians, therefore, computed for them [the Jews] the cycles, and taught them how to find, by calculation, the conjunctions and the appearance of new moon. . . This reform was brought about nearly 200 years after Alexander (c. 112 B.C.). Before that time they used to observe the Tekûfôth (תקופות), i.e. the year-quarters."-- Albîrûnî, "Chronology of Ancient Nations," p. 68.

(2) Agreement of Lunar and Solar Year Secured by Barley Sheaf

"Now, while the Israelites continued in the land of Canaan, the agreement of the lunar and solar years was thus secured:--On the second day of the Passover, which was the 16th of the first month, (Abib or Nissan) an omer of the first fruits of the ripe grain was required to be offered to the Lord (Lev. 23:10, 11). When the last month of the ecclesiastical year, i.e., Adar, had arrived, therefore, and it was discovered from the backwardness of the season, dependent upon the revolution of time, that the grain was not sufficiently ripened for the offering, an extra month called Adar Sheni or Veadar, i.e., the second Adar, was introduced, and the Passover thus observed 'in its proper season.' This intercalary month would be required to be employed sometimes every second, and sometimes every third year. There were other causes besides the one already stated for the intercalation at the Passover period:--thus, the lambs must have grown sufficiently for the Passover sacrifices; and it became necessary to allow time for the ripening of the wheat, so that the two loaves offered as the first fruits of their wheat-harvest could be brought on the feast of Weeks; again, that the produce of the field might be gathered in, as required, before the arrival of the feast of Tabernacles. The 15th of Nissan, then, could not be observed as the first day of the Passover, if it occurred before the vernal equinox, but an intercalation was made by which its observance, and, consequently, that of the other festivals, would be deferred. Such was the system observed during the Israelites stay in Canaan."-- Jacques Lyons and Abraham De Sola, "A Jewish Calendar," p. 16. Montreal, 1854.

(3) Mosaic First Month Known as ~~the~~ Ear-Moon

"The first moon, which nearly corresponds to our April, Moses does not denominate Nisan, the name which it bears among other ~~among other~~ Oriental nations, and even in Hebrew, but he gives it a name which includes a definition, calling it Abib ( ), or the Ear-moon, declaring it to be the first month of the year."-- Michaelis, "Commentaries on the Laws of Moses," pp. 206, 207.

"The words hodesch ha-abib usually are translated by 'month of the new grain' or 'month of the ears,' because the Hebrew word abib is synonymous with 'maturity of the corn."-- Sidersky, "Etude sur l'origine astronomique de la chronologie juive," p. 614.

(4) ~~The~~ Sickle ~~Was~~ the Sign of ~~the~~ First Month

"For not in the twelfth month, when the time of winter still hangs on, as I have before said, is the month of new fruits located, since the new fruits are not yet ~~being~~ ripe, and since indeed they cannot put the sickles to the harvest. For especially has the divine Law constituted this as the sign of the first month."-- Bucherii,Aegidii, "Commentarius De Doctrina Temporum," p. 472. Antverpiae, 1634.

(5) Passover Month Follows March Rains

"The first of these festivals, the Passover, the feast of unleavened bread, occurred in Abib, the first month of the Jewish year, corresponding to the last of March and the beginning of April. The cold of winter was past, the latter rain had ended, and all nature rejoiced in the freshness and beauty of the springtime. The grass was green on the hills and valleys, and wild-flowers everywhere brightened the fields. The moon, now approaching the full, made the evenings delightful."-- White, Ellen G., "Patriarchs and Prophets," p. 537.

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III Order of ~~the~~ Ancient Hebrew Months

(1) Time from Conjunction to Conjunction = 29 1/2 days (29.530588).
"The month of the Jews was, as we have said, a lunar month, and extended from one appearing of the new moon to another. The time elapsing between one astronomical new moon and another consists of 29 1/2 days. [Always has 29 full days, but the hours and minutes vary.—G. Amadon.] But since the month consisted of entire days, they counted it with pretty regular alternation as 29 or 30 days. . . The Jewish month could never have more than 30 days, and never fewer than 29."-- Caspari, Ch. Ed., "Introduction to the Life of Christ," p. 5.

(2) Two Lunations Count 59 Days
"On which account they reckon a lunar month to be 29 1/2 days, but the time of two moons, 59 days; whence they alternately keep a deficient and full month, for the reason that a two-moon period is 59 days. Therefore, in a year there happen six full and six deficient months, and they amount to 354 days: so month after month, they keep full and deficient."-- Gemini, "Elementa Astronomiae," p. 35. Interprete Edone Hilderico. In "Uranologion," cura & studio Dionysii Petavii. Paris, 1630.

(3) Calendar Months Alternate 30 and 29 Days
"Her revolutions, too, will occupy thirty days one month, and twenty-nine the next, and so on alternately."-- Pliny, "Natural History," p. 112. Tr. by Bostock and Riley. London, 1855.

(4) Summer Months an Alternate 30 and 29 Days
"As the six summer months have 30 and 29 days alternately . . ."-- Sidersky, David, "Etude sur l'origine astronomique de la chronologie," p. 601.

(5) In actual Practice 29- and 30-Day Months Alternate
"Since the astronomical length of a month is equivalent to 29 days, 12 hours, 44 minutes, 3 seconds (Ideler, Handbuch der Chronologie, 1. 43), then it must follow that in actual practice months of 29 and months of 30 days must pretty regularly alternate with one another."-- Shürer, Emil, "History of the Jewish People," First Division, Vol. II, p. 365.

Note: Shürer also gives quotation from Mishna [Arachin ii.2], which he dates in second century, A.D., and from it concludes that lunar year might vary "from 352 to 356 days." This irregular length of the Jewish year might have been possible ~~in~~ during second-century period of Roman persecution against Jews, living in caves and desolate places, and not allowed to announce feast days. We have records of those times during which three successive intercalary years were ordered by Rabbi Adda ("Hastings Encyclopedia of Religion and Ethics," Vol. III, art. Jewish Calendar, p. 117). These instances are recorded in Talmud (Sanhedrin, 12a), and plainly show under what difficulties Jewish calendation had to operate in ~~the~~ period after ~~the~~ fall of ~~the~~ second temple. Albîrûnî also hands down ~~the~~ information that ~~the~~ Jews of this time told the Christians lies in order to lead them astray in regard to their calendar methods, ~~and that~~ they had two systems of reckoning the tekûfôth, one secret, and one commonly known ("Chronology of Ancient Nations," p. 302) ~~as also~~ (Sidersky, "Etude chronologie juive," p. 624). But these methods of abnormal times could not agree with ~~the~~ an ancient Hebrew system which had been established for 1500 years.

(6) Always a "Fixed Interval" Between Nisan and Tisri

"From Nisan to Tisri are 177 days. But not always from Tisri to Nisan are 177 days in a common year, and neither in an embolismic year are there always 207 days."-- Scaliger, Joseph, "De Emendatione Temporum," p. 85.

(7) Sequence of Months ~~Subject to~~ Motion of Sun and Moon -- not ~~to Circum-~~

"Three months which are perfect according to the appearance of the new moon, can follow each other, whilst of the imperfect months not more than two can follow each other. And their following each other is possible only in consequence of the variations of the motions of the two great luminaries (sun and moon), and of the variation of the setting of the zodiacal signs (i.e. the varying velocity with which the sun moves through the various signs of the Ecliptic)."-- Albîrûnî, "Chronology of Ancient Nations," p. 153.

"But not always on days of the same name does the moon make the same configurations, but on different days, according to the inequality of motion."-- Gemini, "Elementa Astronomiae," p. 40.

IV Passover Followed Day of Full Moon in Jewry

(1½) Evening of Passah Must Coincide with Full Moon

"Indeed, we know, that the evening of the Jewish Passah must coincide with the full moon (according to the texts quoted above from Josephus and from Philo). . . Sometimes it can happen that, due to certain circumstances, the new moon is fixed on the day after the next day of the conjunction, and that the Passover is celebrated 24 hours after the full moon, but the contrary is impossible."--Sidersky, David, "Etude sur l'origine astronomique de la chronologie juive," p. 636.

"And indeed we say that they err not a little who think that the Passover must be celebrated before this beginning of the new year, which he [Anatolius] adds by the authority of Philo and Josephus, and even of Agathobulus and Aristobulus, one of the 72 interpreters of the Bible, and from whom this noted statement is produced: 'Since there are two equinoxes, in spring and autumn, separated by equal distances, and since the passover was appointed on the 14th day of the first month after the evening when the moon is caught in the region opposite to the sun, as also the eyes may prove, surely the sun is found holding a part of the vernal equinox, but the moon, on the contrary, of the autumnal.'"-- Nancelii, Nicolai, "Analogia Microcosmi ad Macrosmon," Secunda Pars, Ad Lilios Fratres, Cols.1203, 1204. Lutetiae Parisiorum, 1611.

(3) Bucherius Quotes ~~from the~~ Canon of Anatolius in 1634

"Aristobulus also adds this: 'In the day of the Passover not only must it be observed that the sun crosses the vernal equinox, but also even the moon. For since there are two equinoxes, spring and autumn, separated by equal distances, and since the Passover was appointed on the 14th day of the first month, when the moon is caught in the region opposite to the sun, just as even it is ~~allowed for~~ permitted the eyes to see, the Sun is found holding a part of the vernal equinox, but the moon, on the contrary, of the autumnal.'"--Bucherii Aegidii, "De Doctrina Temporum," p. 442.

(4) Scot Heresy -- 7th Century -- Revives Ancient Command of Anatolius

"For he [Wilfrid] reproves the Scots that although they celebrate the

(5) Scot Heresy (7th Century) Recalls Anatolius re Paschal Moon on 13th
"For he [Wilfrid] reproves the Scots because, although they celebrate Easter on the 14th, yet they do not have the plan of the paschal 14th which Anatolius commanded. For he maintained the paschal 14th to be only that which the full moon would overtake in the evening, that is, before sunset, and would moreover be called the 13th, not the 14th."-- Petavii, Dionysii, "Animadversiones" in Epiphanii opus, p. 195. Heresy LI. [The main point of controversy at this time was the relation of Easter to the equinox. Hence we get an unadulterated conclusion as regards the position of the full moon on the 13th day of the lunar month.]

(6) Lunar Calendar Day Corresponds to Two Civil Days
"For, in lunar reckoning, each day is not ended at evening by the same number in which it is begun in the morning: since the day which in the morning is numbered 13 by the moon, that is to the sixth and a half hour, in the same evening is found to be 14."-- Bucherii, Aegidii, "De Doctrina Temporum," p. 444.

(7) Arabs Call 13th Day of Month "badr" *
"The 13th night is called sawâ', the 14th the night of 'badr,' because in it the moon is full, and her light complete."-- Albîrûnî, "Chronology of Ancient Nations," p. 75.

(8) Egyptians Had Special Name for 13th Day of Moon
The ancient Egyptians named each day of the month according to the course of the moon. The 13th day they called the "feast of the bright rising," and the "feast of throwing out light;" the 14th day was named "the majesty of the ram."-- Brugsch, Heinrich, "Inschriften altaegyptischer Denkmaeler," p. 50. Leipzig, 1883.

(9) Ancient Definition of Full Moon
"She becomes full exactly on the day when the sun sets in the west, and from the east she rises at night, and the moon shines the whole night through till the sun rises over against her and the moon is seen over against the sun."-- "Book of Enoch," tr. by Charles, R.H., "The Apocrypha and Pseudepigrapha of the Old Testament," p. 244, Oxford, 1913.

(10) Pliny's Definition of Full Moon
"But when the moon is seen to rise at sun-set and opposite to the sun, so that they are both perceptible at the same moment, she will be at full."-- Pliny, "Natural History," p. 112. Tr. by Bostock and Rily. London, 1855.

(11) Passover on Day that was Full of Light
"Again, the beginning of this festival [Tabernacles] is appointed for the fifteenth day of the month, on account of the reason which has already been mentioned, respecting the spring season [Passover], also that the world may be full, not by day only but also by night, of the most beautiful light, the sun and moon on their rising opposite to one another/ with uninterrupted light, without any darkness interposing itself between so as to divide them."-- Philo Judaeus, "The Life of Moses," Vol. III, p. 291. Tr. by Yonge. London, 1855.

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* With the Arabs, as with the Jews, "their night preceded their day."-- Albîrûnî, "Chronology of Ancient Nations," p. 5. They call the "14th" is the night between 13 and 14, for

(12) Lunar Eclipses at Time of Full Moon in "Middle of Month"*

a. "But these are the configurations, sickle-shape, half full, gibbous, and full. She becomes a crescent around the beginning of the month; half full, about the eighth day of the month; gibbous, about the twelfth; and full, about the middle of the month."-- Gemini, "Elementa Astronomiae," in "Uranologion," p. 39.

b. "But the eclipses of the moon happen in the night which reaches toward the middle of the month. For then, according to the diameter, the moon is placed opposite to the sun, and falls into the shadow of the earth."-- Idem, p. 33.

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Principles Governing Moon's Phasis

(1) Jewish Phasis Usually Larger, and therefore Older than Grecian

"But the Jewish, Arabic, and Samaritan new moon commonly exceeds the size of the [ordinary] phasis: so that the civil new moons are of a threefold kind: the Attic, from the conjunction; the Calippic, from the waxing moon [the earliest crescent]; and the Jewish, Samaritan and Arabic, from the shape of the moon from the third day, I say."-- Scaliger, Joseph, "De Emendatione Temporum," p. 6.

(2) Jews Commonly Begin Month from Horned Moon

"The new moon of the first Calippic Hecatomb begins on the 30th day of the Jewish month Sivan, since the Jews begin not only from the phasis, but also from the horned moon. . . as I said, the Calippic new moons are from the waxing crescent, not from the horned moon."-- Scaliger, "De Emendatione Temporum," p. 71.

(3) Moon's Horns Reveal Her Age

"Scan first the horns on either side the Moon. For with varying hue from time to time the evening paints her, and of different shape are her horns at different times as the Moon is waxing -- one form on the third day and other on the fourth. From them thou canst learn touching the month that is begun."-- Aratus, "Phaenomena," p. 441. Tr. by Mair. London, 1921.

(4) Definition of the Horned Moon

"But we call the horned moon that phasis, which to some of the ancients is the second moon for the reason that on the [illegible]

the moons revolution and not to a civil month.

(6) Names of the Signs of Long Settings

"For in the signs of long settings, namely in Pisces, Aries, and Taurus, it can happen that the first moon can be seen a little after conjunction."-- "Selenographia," p. 274.

But because she is not always able to be seen on the second day, all those causes can hinder which do not allow one to see the first moon on the first day after conjunction. For especially the reason is, that when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagitarius. For, although the moon may be in Perigee, and about the northern border [of the zodiac], yet if she does not approach a sign of long settings, in vain is the horned moon awaited on the second day."-- Idem, p. 281

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* Gemimus here means lunar month, not civil.

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VI. The Ancient Hebrew Year

(1) Jews Choose September for Their New Year

"The title ἀρχων is of very frequent occurrence in the Roman inscriptions. We have already met with it elsewhere, viz. in Antioch, Alexandria, and Berenice. It also occurs sometimes upon epitaphs found outside of Rome, and we may add that Tertullian classes the priest, Levite, and archon together as Jewish officials (Tertullian, "De coruna," chap. lx: Quis denique patriarches, quis prophetes, quis levites aut sacerdos aut archon, quis vel postea apostolus aut evangelizator aut episcopus invenitur coronatus?). According to all analogy elsewhere (comp. especially Alexandria and Berenice) it may be taken for granted, in case of the Roman communities as well, that each of them would have several ἄρχοντες who would act as the managing committee of the γερουσία. It would appear from the title δὶς ἄρχων, which is repeatedly met with, that the archons were appointed for a definite period; and in a Homilia in S. Johannis Natalem, ascribed to Chrysostom, and which has specially in view the state of matters in Italy during the imperial times, we are expressly informed that the archons were always elected in September, the beginning of the civil year of the Jews. The following are the ipssissima verba of this interesting passage (This homily (according to Wesseling, De Judaeorum archontibus, chap. x) is to be found in Chrystomi Opp. vol. ii. ed. Paris, 1687):

'Inter haec intuendae sunt temporum qualitates et gesta morum; et primum perfidia Judaeorum, qui semper in Deum et in Mosem contumaces exstiterunt, qui cum a Deo secundum Mosem initium anni mensem Martium acceperint, illi dictum pravitatis sive superbiae exercentes mensem Septembrem, ipsum novum annum nuncupant, quo et mense magistratus sibi designant, quos Archontas vocant.'

Translation: Among these things the state of the times and nature of ~~customs~~ laws must be looked into; and first the perfidy of the Jews, who always have stood out boldly against God and against Moses, who, although they received from God through Moses the month of March as the beginning of the year, exercising a command of perversity or pride, name the month of September as the new year itself, in which month they even appoint for themselves magistrates, whom they call archons. Tr. by Amadon. Schürer, Emil, "History of the Jewish People," Second Division, Vol. II, pp. 249, 250. New York.

(2) Ptolemaic Astronomical Time Begins 18 Hours Later than Jewish

"But the Ptolemaic astronomical time begins from the meridian, that is, 18 hours later than the Jews begin. Wherefore, to the Ptolemaic time of new moons must be added 18 hours, in order that it may agree with Jewish time, and indeed at the Alexandrian meridian itself of Egypt."-- Ugolino, Blasio, "Thesaurus Antiquitatum Sacrarum," Cols. LIII, LIV. Venice, 1755.

(3) Jewish Year Begins in Autumn

"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."-- Ugolino, Blasio, "Thesaurus Antiquitatum Sacrarum," Cols. XXI, XXII. Venice, 1755.

(4) By Julian Reckoning, Cycle Moons Periodically Earlier

Table of 19-year Cycle Limits of Tisri New Moons from Moses' Time [and earlier] to 1700 A.D. Moons in 1700, by Julian reckoning, are 10 days earlier than in the time of Moses. Ugolino, Blasio, "Thesaurus Antiquitatum Sacrarum," Cols. LXXV, LXXVI. Venice, 1755.

(5) Secret Calculations of the Jews

"Thus, the Jews earlier had two systems of the Tekûfôth: one approximate, known to all, the other exact, kept secret. This detail is told by Âl-Bîrûnî (1000 A.D.)."-- Sidersky, David, "Etude sur l'origine astronomique la chronologie juive," in "Mémoires présentés par divers savants à l'Académie des Inscriptions et belles-lettres de l'institut de France," p. 624.(Tr. from French by Erna Borm.) Paris, 1913.

(6) Intercalary Month Had no Special Name Anciently

"The intercalary month of the Jewish calendar, like the one of the Greek calendar, did not have a special name."-- Sidersky, Idem, p. 621.

(7) Jewish Reform in Second Century B.C.

"The mathematicians, therefore, computed for them [Jews] the cycles, and taught them how to find, by calculation, the conjunctions and the appearance of the new moon, viz. that between new moon and the conjunction the time of 24 hours must elapse.

"This reform was brought about nearly 200 years after Alexander [112 B.C.]. Before that time they used to observe the Tekufoth ( ), i.e. the year-quarters, on the computation of which we shall enlarge hereafter. . ."-- Albîrûnî, "The Chronology of Ancient Nations," p. 68. Tr. by Sachau. London, 1879.

(8) The "Jerusalem Era"

"As this Arab author of the Xth century has proved himself one of the best informed in the various systems of chronology in use with the ancient nations, and had particularly good documents with regard to the Jews, we are therefore authorized to depend upon the date he indicated, the year 200 of the Seleucid era, or 112-111 B.C. At this period the Jews had a new era established since about 30 years by the Maccabees, under the name of 'Jerusalem era.' It began with the year 170 of the Seleucid era (143-142 B.C.), the date of the recognition of the Jewish political independence by Demetrius, and beginning with said year, all public acts and official documents were marked: 'in the first year of Simon, the high-priest, the governor and prince of the Jews (I Mac. XIII.42).'"-- Sidersky, "Etude -- juive," p. 632.

(9) Macedonian Intercalary Month - Dioscorus

Letter of Lysias to Jews signed "The hundred and eight and fortieth year, the four and twentieth day of the month Dioscorinthius [Dioscorus]. II Mac. XI.21. [According to Browne, the Macedonian names of the months were used interchangeably with Jewish names. Browne, Henry, "Ordo Saeclorum," p. 461. London, 1844. The name Dioscorus would therefore correspond to Veadar.]

(10) Length of Lunar Year

"In the modern Jewish calendar greater variations are found in the lengths of ordinary and embolismic years, respectively, especially the ordinary short year of 353 days, and the abundant embolismic year of 385 days, issues of the system of postponements inaugurated later by the Jewish doctors of Babylon, but which did not yet exist in the 1st century."-- Sidersky, p. 633.

"On the other side it will be noticed in our synthetic calendar that the ordinary year counts 354 or 355 days, and the embolismic year 383 and 384 days, representing exactly -- expressed in whole days -- the average length of 12 and 13 synodical months."-- Idem.

(11) Days of Egyptian Month Viewed According to Moon

"During the Hebrew sojourn in Egypt under the rule of the Pharaohs it [the Jewish year] could take there the form of the solar year, still retaining the lunar months, in which the Egyptians, too, were interested, for the numerous hieroglyphic inscriptions reproduced by H. Brugsch in his "Thesaurus Inscriptionum Aegyptiacarum" (the astronomical and astrological part of it, p. 49 and on) contain the successive names of the 30 days of the lunar month."--Sidersky, p. 612.

(12) Postponements

"The very object of the 'postponements' was, according to Maimonides, 'Traite de la Sanctification des Neomenies,' chap. VII, 8 and 9, version latine de Blaise Ugolin dans son "Thesaurus," vol. XVII, Venise, 1755, to retard by one or two days the official new moons in such a way as to make them coincide as often as possible with the evenings of the appearance of the crescent in Palestine."-- Sidersky, p. 644.

(13) Intercalation Changed by Precession of Equinoxes.

"However, this computation [by Hillel II] has again undergone a slight modification, probably in the course of the VIth century. Following the precession of the equinoxes, the year of the enneadecaeterid cycle of the Maccabean era, until then embolismic, became a common year, the 16th day of the intercalary month going beyond the equinox (see chap. II) and the month thus becoming the first of the new year. Without changing the order of the embolismic years in the cycle, simply the starting-point of the latter was modified . . . the VIIIth year of the old cycle has become the XVIth of the new cycle."-- Sidersky, p. 651.

(6) Prayer and Fasting Appointed if Latter Rain is Insufficient
"In like manner if, in the time of the Passover, or near that time in the land of Israel (for in this time the trees are in flower in Judea), the rains have not issued forth, a fast is appointed, and cries are sent ~~out~~ forth until either the showers beneficial to the trees have fallen, or the time of rain has ceased."-- Maimonidae, Mosis, "De Jejunio," pp. 31, 32. Ex Hebraeo Latinè conversi à Ludovico De Compiegne. Parisiis, 1667.

(7) No Fasting After March -- Rain Should Then Be ~~Finished~~ Ended
"When the March period is over, indeed when the sun enters that sign which is called Taurus, then no fast is appointed: for rain at this time is for an evil omen, since it would not rain straight forward [continuously] from the beginning of the year."-- Idem, p. 43.

(8) Barley Quickly Ripens After Rains Are Over
"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 the middle of this month."-- Buhle, Johan Gotlieb, "Economical Calendar," p. Brunswick, 1785.

(9) ~~Importance of Celebrating~~ Passover ~~in Season~~ Sets All Subsequent Feasts
"If this feast of unleavened bread is not celebrated in its season, every successive festival is dislocated from its appropriate period, since the month Abib is laid down in the law of God, as the epoch from which every other is to follow."-- American Biblical Repository, April, 1840.

(10) Names of Macedonian Calendar Months in Josephus Identical with Jewish
a. "That the Macedonian lunar months corresponded with the Hebrew is proved by Josephus, who almost constantly designates the Jewish months by the Macedonian names current among the Syrian Greeks for whom he wrote. The month Xanthicus for instance, in Josephus, is absolutely commensurate with Nisan, Lous with Ab, Hyperberetaeus with Tisri."-- Browne, Henry, "Ordo Saeclorum," p. 461. London, 1844.

b. "Concerning the Months of the Greeks. But by them March is called Distrus; April, Xanthicus; May, Artemisius, etc."-- Venerabilis Bedae, "Opera quae supersunt omnia," p. 117. Edidit J.A. Giles. Vol. VI. Londini, 1843.

c. "Now let us hear Josephus.'But God commanded Moses to say to the people that they should have ready at hand a sacrifice, preparing it from the 10th day of Xanthicus on the 14th day of the month, which month among the Egyptians is indeed called Pharmuthi, and among the Hebrews, Nisan, but the Macedonians call Xanthicus'! (Josephus, l. III, c. X, par. 5). Therefore in the month Xanthicus, that is, April, etc."-- Michaelis, John David, "De Mensibus Hebraeorum," p. 37.

d. Scaliger gives a table making the Macedonian months identical with the Jewish (See "De Emendatione Temporum," p. 379. Francofurt, 1593).

e. "We give here the names of the months as they were current after the exile and during the age of Jesus, to which we add the Macedonian names employed by Josephus as the equivalents of the Jewish ones . . ."-- Table following Caspari, Ch. Ed., "Introduction to the Life of Christ," p. 5. Tr. by Evans. Edinburgh, 1876.

"GEMINI ELEMENTA ASTRONOMIAE"

ad codicum fidem recensuit germanica interpretatione et commentariis instruxit

CAROLUS MANITTUS

Translation from German
by
Erna Born

Lipsiae
In aedibus B. G. Teubneri
1898

Chapter VIII

About the Months

A month is the time from one conjunction to the next or from one full moon to the other. A conjunction takes place when sun and moon are in the same degree. This happens on the 30th of the month. It is full moon when the moon stands diametrically opposite the sun. This happens about the middle of the month. The time of a month amounts to 29½ + 1/33 days.[4] In the course of a month the moon passes not only through the Zodiac but also that part of the sun is covering (passing through) in the course of a month in the direction of the signs; this is approximately one sign. Thus the moon is passing through about 13 signs in the course of a month.

The exact time of the month, as stated, amounts to 29½ + 1/33 days, but for the civil compution the month is rounded off to 29½ days, so that a double month is equal to 59 days. For this reason, the civil months are counted alternately full (at 30 days) and hollow (at 29 days) for the double month has 59 days. From this, the lunar year of 354 days results: by multiplying 29½ days by 12, the result will be 354 days of the lunar year. A distinction must be made between the lunar and the solar year. The solar year covers the course of the sun through the 12 signs, or 365 1/4 days, while the lunar year covers a period of 12 lunar months, or 354 days.

Since neither the month nor the solar year consists of whole days, the astronomers searched for a period covering whole days, whole months and whole years. To reckon the month according to the moon and the years according to the sun was done with a purpose by the ancient peoples. The demand made by the law and the oracles to present the sacrifices "after the manner of the fathers" all the Greeks understood to mean, that they were to keep the years in agreement

with the sun, the days and the months in agreement with the moon. But to reckon the years after the sun means, to present the same sacrifices in the same seasons of the year (the spring sacrifice must always be presented in the spring). (the summer sacrifice always in the summer, likewise in the remaining seasons of the year, the same sacrifices had to be brought.) For they thought this to be pleasing and agreeable to the Gods. This is possible only in case the solstices and the equinoxes always come in the same months. To reckon the days according to the moon means , to keep the names of the days in agreement with the phases of the moon.

The names of the days are taken from the phases of the moon. The day, on which the new moon becomes visible was called because of this, "new moon"; the day the second appearance takes place was named the "second"; the appearance of the moon taking place about the middle of the moon was called after this "middle moon". So all days were named according to the phases of the moon. Therefore, the last day of the month, (the 30th), after the coinciding was named Trikade. In conformity here, Aratos expresses himself with regard to the names of the days as follows:

"Don't you see her? When she appears again as a tiny horn,
Luna on the western sky, of the new and growing month!
She teaches, as soon as the first glimmer of her is pouring out;
When she throws a shadow, she then goes to the fourth of the days;
Half on the eight, towards the middle of the month round as full moon,
Always from another place a different face, showing to us,
She announces to you what day of the month soon will be gone."

Thus, he plainly states that the names of the day were derived from the phases of the moon. As proof that the days are reckoned exactly after the moon serves the fact that the solar eclipses take place on the 30th--then the sun enters in conjunction with the moon and is in the same longitude--while the lunar eclipses occur in the night leading to the middle of the month--then the moon stands in opposition to the sun and enters into the shadow of the earth.

If, therefore, on one side, the years are reckoned exactly according to the sun, on the other side the months and the days according to the moon, then the Greek believed to bring their offerings "in the manner of the fathers" (the same sacrifices were offered at the same seasons of the year.)

The Egyptians had exactly the opposite understanding and intention than the Greek. For they neither reckon the years after the sun nor the months and days after the moon, but followed quite a peculiar principle. Because they did not that the sacrifices were brought at the same time of the year, but they should go through all seasons of the year,(the summer festival, at one time, is to become a winter festival, and the autumnal festival one day a spring festival). For they reckoned the year at 365 days, having 12 months at 30 days and 5 additional days. For the above given reason they do not count the 1/4 day so that their festivals would go backwards. In 4 years, they are one day behind as compared with the sun, in 40 years, they will be 10 days behind in relation to the solar year. Thus their festivals too, would keep behind in conformity with the purpose; not to have them in the same season of the year. In 120 years, the difference with the solar year, and with the seasons of the year too, will amount to a whole month.

This quite gradual increase can be considered as the reason why a common error, sanctioned by a tradition of many years standing, has been accepted in good faith with the Grecians. For the majority of the Greek are of the opinion that the winter solstice takes place simultaneously with the Isis festival according to the reckoning of the Egyptians as well as according to the calendar of Eudoxos. That is quite wrong; because the Isis festival differs with the winter solstice by a whole month.[16] The error crept in for the above stated reason. Once, (120 years ago) the Isis festival actually was celebrated exactly at the winter solstice; but only four years later the difference amounted to one day. That difference, it is true, was not noticeable in the season of the

year. After 40 years, the difference amounted to 10 days. But this, too, would not be so conspicuous. However, at present, when after 120 years, the difference amounts to a whole month, the supposition, that the festival of Isis came on winter solstice according to the reckoning of the Egyptians as well as after Eudoxos, does not lack in ignorance. A difference of one day or at most two can pass, but a difference of a whole month cannot remain unnoticed. For the length of the days can serve as a clue which show a big difference compared with the winter solstice. Besides, the sun-dials showed plainly the true entry into the solstice, especially with the Egyptians who were such good observers. Thus, once upon a time, the Isis festival coincided with the winter solstice and still earlier with the summer solstice--as mentioned also by Eratosthenes in his treatise about the eight-year period--and in future it will be celebrated in the fall, at the summer solstice, in spring and again at the winter solstice. Because in the course of the 1460 years,[17] each festival must pass through all seasons of the year and again return to the same point of time.

Thus the Egyptians undertook to solve according to this peculiar principle the problem we are now dealing with thile the Greek, pursuing the opposite view reckoned the years according to the sun, the months and the days, however, after the moon. As to the ancients, their months had 30 days, and the intercalary months they inserted one year after the other. But because the correctness of this procedure in view of the phenomenon in the heavens soon was questioned since the days and months did not remain in harmony with the moon, and the years did not hold pace with the sun, they were looking for a period which with regard to the years would remain in harmong with the sun, with regard to the months and days in harmony with the moon, and yet consist of whole months, whole days and whole years. The first period they set up was the eight-year period; it covers 99 months including 3 intercalary months, or 2922 days, (eight years). They arrived at it thus. As the solar year has 365 1/4 days but the lunar year only 354 days, they took the excess of the solar year over the lunar year. It amounts

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to 11 1/4 days. It we figure the months in the year according to the moon, we shall be behind as compared with the solar year, 11 1/4 days. Now, they searched for the number to multiply these days by in order to get whole days and whole months. You get this by multiplying by eight: 90 days or three months. Since we are behind 11 1/4 days in a solar year, it is clear that in eight years, compared with the sun, we shall be behind 90 days, or three months. Therefore, in each eight-year periods, three intercalary months are inserted, to make up for the annual shortage as compared with the sun, and the the festivals again come in the same season of the year. When this is done, the sacrifices are always presented in the same season of the year.

Now, the intercalary months had to be inserted as regularly as possible. One must neither wait until the difference, as compared with the phenomenon in the sky, amounts to one months, nor should a whole month be taken in advance, as compared with the course of the sun. For this reason, the instruction was given to insert the intercalary months in the third, fifth and eighth year, or two months after an interval of two years, one with but one year interval. It does not make any difference, however, should the corresponding order of the intercalary months be made in other years.

(The lunar year has 354 days. Therefore, the month according to the moon was reckoned at 29 1/2 days, the double month at 59 days. Thus, the months are full and hollow, alternately, because the double month has 59 days according to the moon. So the year has six full and six hollow months; the total of days amounts to 354.)

Were it merely the solar years we have to be in agreement with, we would remain in sufficient harmony with the phenomenon of the sky by applying to the phenomenon of the sky, the just described period. But inasmuch as not only the years are reckoned after the sun, but also the months and days after the moon, a method was searched in order to satisfy this demand, too. As the month, strictly speaking, amounts to $29\frac{1}{2} + 1/33$ days, while the eight-year period including the

intercalary months has 99 months, the total of the days of the months was multiplied by 99, the number of months, (29½ + 1/33 99). The result is 2923½ days, which means that in eight solar years, there are 2923½ days according to the moon. But the solar year has 365 ¼ days; eight years according to the sun, thus, cover 2922 days which result you get by multiplying the days of the years by eight. As the days according to the moon in eight years amounted to 2923½, we shall be 1½ days behind in relation to the moon in the course of eight year. Consequently, in 16 years, we shall be three days behind as compared with the moon. For this reason in each 16-year period in consideration of the course of the moon, three days are added so as to reckon the years according to the sun but the months and days according to the moon.

Making this correction has another mistake in its train. The three days added in 16 years in consideration of the moon cause in 160 years in relation to the sun to be 30 days or a month ahead. For this reason every 160 years an intercalary month is taken from the eight year periods (instead of the three months which should be inserted in the eight years, only two are inserted in the eight years, only two are inserted.) Thus after dropping this month again there is harmony as regards the months and days with the moon and with regard to the years with the sun.

After making this correction, still there is no harmony obtained with the phenomenon in the sky. For the whole eight-year period is wholly incorrect as regards the months, days and intercalary months. (For the time of the month is not counted exactly.[18] To be exact, the time of the month is 29 d. 31 m. 50 s. 8 t. 20 q. Therefore, in the course of 16 years, instead of three intercalary days, four will have to be added. Hence in none of the periods the same number of hollow months must be given as full months, the number of the full months must rather outweigh the hollow months. For if the month had only 29½ days, an equal number of full and deficient months would have to be taken. Now, there is

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in the monthly period a small noticeable fraction which grows to the length of one day. For this reason, the number of the full months must out number those of the hollow months.) There are not three intercalary months in eight years. For if the lunar year had 354 days, the difference with the solar year would be 11 1/4 days and this multipled by eight would certainly make three full intercalary months. But the lunar year has exactly 354 and 1/3 days. If we deduct 354 1/3 from 365 1/4 there remains 10 11/12 days. This multipled by eight amounts to 87 1/3 days (not three ful months). For this reason in eight years there must not be added three intercalary months. The same result you get with the help of the 19-year cycle. In 19 years seven intercalary months are inserted by which the 19-year cycle as regards the months will remain in harmony for a longer period. In eight 19-year cycles, there will be 56 intercalary months. In the eight-year period are three intercalary months, in 19 eight-year periods, (in 152 years), there will be 57 intercalary months. During that same time according to the 19-year cycle, which is in harmony with the phenomena in the heavens, there will be but 56 intercalary months. Thus, the eight-year period (in 152 years) has one intercalary month too many. Consequently, the eight-year period does not have three intercalary months, but is also quite faulty in this respect.

Because it has turned out that the eight-year period is incorrect in every respect, the astronomers of the school of Euktemon, Philippos and Kallippos[19] set up a new period in the 19-year cycle. For they had found through their observations that in 19 years, there are 6940 days or 235 months including the intercalary months. There are seven intercalary months in the 19 years. (Thus the year according to its reckoning has 365 5/19 days.) Of the 235 months, 110 were reckoned as deficient and 125 as full so that the full and hollow do not always alternate, but sometimes two full follow each other. This measure, not followed in the eight-year period results from the natural course of the

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phenomena of the heavens in view of the behavior of the moon. Of the 235 months 110 were counted as hollow months for the following reason. Since there are in 19 years, 235 months, these at first were reckoned at 30 days each, or in total, 7050 days. But in the 19-year cycle, there were 6940 days according to the moon. Now if you take all months at 30 days, it amounts to 7050 days as against 6940, and this plus amounts to 110 days. Consequently, they take 110 deficient months in order to make full the 6940 days of the 235 months in the 19-year cycle. In order to distribute these days as evenly as possible, they divided the 6940 days by 110; thus you get 63 days.[20] Hence, in the course of every 63 days in this cycle, one day is to be pointed to as to be eliminated. So, in no wise always the 30th of the month is left out but always the day following the 63-day interval.

In this cycle to all appearances, the months are given correctly and the intercalary months are arranged in conformity with the celestial phenomena. But the time of the year is not in harmony with the celestial phenomena. If the time of the year from within a longer period of years is determined by observation, the concurring result is 365 1/4 days while the value derived from the 19-year cycle amounts to 365 5/19. This latter value is by 1/76 days bigger than the first. Therefore, the astronomers of the school of Kallippos have done away with this excess by a correction and set up the 76-year cycle; it consists of four 19-year cycles with 940 months including 28 intercalary months, or 27759 days. The arrangement of the intercalary months was handled in exactly the same way. Experience has shown that this cycle agrees best with the celestial phenomena.

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Chapter IX

On the Phases of the Moon

The moon gets its light from the sun, for her illuminated part is always turned toward the sun. If she rises before the sun, her illuminated part is toward the east, and if she rises after the sun, her illuminated part is toward the west. Whether she sets before or after the sun, her illuminated part is turned toward the sun. On some days, an observation has been made which presents itself but seldom, namely, that the moon sets after the sun and her illuminated part is directed toward the west. But after having passed by the sun during the night and now having arisen before the sun, her illuminated part is seen directed toward the east.[21] From this, it is evident that the moon gets her light from the sun.

Then the following observation has been made. When the sun rises during the winter solstice, exactly the center of the illuminated part of the moon is directed toward the sun, so that the line which connects the horns of the moon is cut in half by a point to point line under a right angle. If then, the sun rises at the time of the summer solstice, again the center of the illuminated part is directed towards the sun, so that likewise the above named line is cut in half and under a right angle. The same thing happens at the settings of the sun. Thus, this sign, too, proves that the moon gets her light from the sun.

However, at all times an equally great part of her is illuminated, (a half-sphere), only this equally great illuminated part is not always visible to our field of vision on account of the different elongations from the sun. For when on the 30th of the month, the sun and the moon enter the same degree, then the hemisphere directed towards the sun, is illuminated which is turned

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from our field of vision; for the course of the moon is below the sun. But, if the moon--about the first of the moon--has passed by the sun, then she is seen in the form of a sickle; for of the illuminated hemisphere only a small part reaches our field of vision because of her moving sideways. But as the moon is distancing herself from the sun in the following days, the illuminated part is seen by us to an ever-increasing extent. If the distance amounts to a quarter of the Zodiac, the moon is seen half-full. For then exactly half of the hemisphere illuminated by the sun is turned toward us. If the distance of the moon from the sun becomes greater, then the illuminated part is becoming visible in greater measure. If it comes to stand diametrically opposite the sun, the illuminated hemisphere comes to our field of vision exactly opposite. The visibility of the size of the phases is always in relationship to the elongation. Finally, when the moon goes underneath the sun, she seems to us unilluminated. For her illuminated hemisphere is then turned upward to the sun wherefore the illuminated part of the moon naturally becomes invisible for us. From this is evident that the moon receives her light from the sun.

The moon passes through all her phases--four in number--in a period of one months, passing twice through each. The phases are as follows: crescent, half full, curved both sides, full. She has the form of a crescent at the beginning of the month, half full about the eighth of the month, both sides curved about the twelfth, full, the middle of the month; then again both sides curved, after the middle of the month, half full, about the twenty-third, the form of a sickle towards the end of the month.

However, the moon does not always take on the same form on the days named the same, but due to the irregularity of her movement, on different days.

The moon appears:

as a sickle at the earliest on 1st, latest on 3rd.
remains in form of sickle until 5th, or to 7th.
becomes half-full earliest on 6th, latest on 8th.
both sides curved earliest on 10th, latest on 13th.
full earliest on 13th, latest on 17th.
2nd time both sides curved earliest on 18th, latest on 22th.
2nd time half-full earliest on 21st, latest on 23rd.
2nd time sickle form earliest on 25th, latest on 26th.

(The whole period of the month amounts to 29 1/2 + 1/33 days. The month is the time from one conjunction to the next or from one full moon to the other. Conjunction is the time when sun and moon enter the same degree which is the case on the 30th of the month.)

Chapter XVIII

On the Great Period of the Moon

The great period of the moon is the shortest interval which covers whole (synodic) months, whole days and whole (anomalistic) courses of the moon. For, after having found by observation the time of the synodic months, the value of approximately 29½ plus 1/33 days for the anomalistic course of the moon, the value of about 27½ plus 1/18 days, the shortest interval was looked for which covers whole days, whole synodic months and whole anomalistic courses of the moon. With these it is as follows:

The moon passes through the Zodiac seemingly in an irregular velocity. For instance, if she has passed through the small part of the ecliptic in her course, her movement on the next day is greater than this, and is still greater in the following days until the greatest part of the arc has been covered; then again always a smaller part than the preceding until she returns to the smallest part of the arc from which she started, thus covering one course. The time from the smallest movement back to the smallest again is called anomalistic.

It is found by observation that the great period of the moon covers 669 whole synodic months or 19756 days. In this time the moon makes 717 anomalistic courses in longitude (that is, with regard to the Apsides and 726 anomalistic courses in latitude; that is, with regard to the nodes,[32]) while in the time mentioned she passes 723 times the Zodiac and, in addition, 32°. Knowing these facts through observation of the sky since ancient times and as it was necessary to determine the daily anomali in longidtue, the question was raised:

1. How much is the smallest, the greates and the mean movement of the moon?

2. How much is the daily increase or decrease of her movement?

From the observation of the sky (for the solution) as a help served furthermore the fact that when passing through this smallest part of the arc in her course, she covers more than 11° but less than 12°, and when passing

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through this greatest part of the ecliptic, she covers more than 15° but less than 16°.

Since now it has been determined through observation that the moon passes in 19756 days 723 times the Zodiac and, in addition, 32° and as each circle has 360°, I have reduced the number of circles into degrees adding 32° to it. The total amounts to 260312°. So the moon passes through this number of degrees in 19756 days. By dividing the number of degrees by the number of days we shall find the average daily movement of the moon, for if you simply divide the number of degrees by the number of days, without consideration of the increase or decrease of the movement, you get as a result the so-called mean movement. It amounts to $13^{\circ}\ 10^{m}\ 35^{s}$. (The 60th part of a degree is called minute; the sixtieth part of a minute is called second. Likewise the second is divided into sixty parts and each sixtieth part is called tertie.)

With the help of the mathematical example here given, the Chaldeans have found the mean movement of the moon to be $13^{\circ}\ 10^{m}\ 35^{s}$. As the moon in 19756 days makes 717 anomalistic rounds, in order to know in how many days the moon is making one round we must divide the number of days by the number of courses. Then to one course come $27^{d}\ 33^{m}\ 20^{s}$. (= $27^{d}\ 33^{h}\ 20^{m}$). In so many days the moon gets from the smallest movement back again to the smallest.

As now in the whole course there are four even periods, I have taken the fourth part of $27^{d}\ 33^{m}\ 20^{s}$ which is 6 d. 53 m. 20 s.; thus the moon gets in so many days from the smallest movement to the mean and from the mean to the greatest; then again, likewise from the greatest to the mean and from the mean to the smallest. These four periods are equal.

Then we apply the theorem: In an arithmetical trinomial progression, the total of the first and third term is double that in the middle. In the movement of the moon there are three figures which form an arithmetical progression; the smallest, the mean and the greatest movement. If we now add the greatest and the smallest, their sum total will amount to double that of the mean movement. The mean movement amounted to 13° 10 m. 35 s.; I have doubled this value and

get 26° 21 m. 10 s. Consequently the greates and the smallest movement of the moon totals 26° 21m. 10s. But the greatest and the smallest movement as found by observation in the rough totals but 26°. Thus there remains a plus of 21 m. 10 s. which had slipped the observation made with the aid of instruments. This plus must be added to the smallest and the greatest movement so that the total of the two movements amounts to 26° 21m. 10s. One must, however, be careful in adding the excess that on one had the smallest movement will not become greater than 12° and on the other hand, the greatest not greater than 16°.

The exact division will have to be made in the following manner: As the moon gets from the smallest movement to the mean and from the mean to the greatest in 6d. 53m. 20s. and as the increase as well as decrease is a stationery quantity, a figure must be found which multiplied by the fourth part of the time of the course will result in a figure which added to the mean movement amounts to a value which lies between 15° and 16° but deducted from the mean movement leaves a value which lies between 11° and 12°, while the values to be added to 15° or 11° total 21 m. 10 s.

The figure with the looked for quality is found in the value 0° 18 m. For, if you multiply this value by the fourth part of the time of the course, that is, 6 d. 53 m. 20 s. the result is 2° 4 m. Now you get from the mean movement found above by addition or subtraction of this quantity:

13 d. 10 m. 35 s. + 2 d. 4 m. = 14 d. 14 m. 35 s.
13 d. 10 m. 35 s. - 2 d. 4 m. = 11 d. 6 m. 35 s.

Consequently, it is found the smallest movement of the moon equals 11 d. 6 m. 35 s.
the mean movement of the moon equals 13 d.10 m. 35 s.
the greatest movement of the moon equals 15 d.14 m. 35 s.
and the daily increase of the moon equals 0 d. 18 m.

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p. 237 Appendix I

On Geminos' Era, Fatherland and Writings

The starting point of the controversy on Geminos' Era and Fatherland forms the suppositions laid down by Petau, partly in the introduction and treatises on the Uranologium and partly in the comments on the Isagoge. In the first place (p. 8) he states briefly and plainly Geminos has lived at the times of Sullas and Cicero; that his fatherland was the Island of Rhodos is generally agreed but that he is supposed to have stayed in Rome and Italy and there written the Isagoge is based on a conclusion not to be easily dismissed, supported also by thename Geminus which indicates a man standing in the midst of Roman traffic, maybe the freed slave or client of a family by this name as, for instance, the servilian. The supposition for which the reason is given in detail in the treatises, p. 150, et seq. The supposition that Geminos has written the work preserved for us in Rome is based on something which cannot be considered authoritative to us due to fragmentary tradition. (See Note 10.) Thanks to a keen combination for his era, the year 77 B. C. is determined. The suppositions of later scholars, as Voss, Weidler, Hamberger, Ideler, Delambre, Grasse, et al, based more or less on Petaus' conclusions. Mas C. P. Schmidt (1884, p. 88) has carefully compiled. To this list Paul Tannery (1885 p. 285, et Seq.) should be added, who comes to the year 30 B. C. by a rather forced interpretation (See Note 16), thus making Geminos a cotemporary of Strabon.

Of the differing suppositions which give the era of Geminos considerably later or earlier (see Schmidt 1884, p. 85, et seq.), only one deserves to be mentioned because it has found adherence because of the detailed reasons given. It is a supposition of Brandes that Geminos had written his Isagoge about 140 B. C. Scaliger already in 1598 had understood the statement in Chapter VIII, pp. 2-24 concerning the time to mean that Geminos was 120 years

later than the astronomer Eudoxos of Knidos (about 380 B. C.), which is about 260 B. C., thus to be sure Geminos would be older than Hipparchos to whom he referred, which also caused Scalinger's well founded doubts. Proceeding from the same understanding of the difference in time, Brandes (1847 p. 219) tried to remove all doubts by distinguishing a younger Eudoxos of Rhodos from the older Eudoxos of Knidos whose paper Ges Periodus, written about 260 B. C., was taken by him as Geminos' source on the Egyptian Isis festival.

(Summary, p. 251)

Our final conclusion is that the Stoic philosopher Geminos, presumably a Greek from the Isle of Rhodos, the author of a voluminous work on the systematical division of mathematics, wrote about 73-67 B. C. a commentary not less voluminous to the meterological elementary text book of his teacher, Poseidonios of Rhodos. From an epitome of this commentary edited by himself and existing until the sixth century A. D., an unnamed author of the fourth to fifth century A. D., writing at latitude 41° (Canstantinople ?) under the original title, "---------greek----------(page 252)" made excerpts set off with all kinds of additions which have come down to our time as Geminos' Introduction to Astronomy.

Appendix II

(P. 13, 101, 201) The tropical month discovered by Hipparchos, that is, the time when the moon proceeding from the vernal equinox again returns to same, amounts to 27 days, 7 hours, 43 minutes, 4.7 seconds = 27.321582 days around 27-1/3 days. As the vernal equinox because of the precession of the equinox moves toward the moon, therefore the tropical month is by a few seconds shorter than the sideric month, by which term is understood the time when the moon proceeding from any fixed point again returns to the same point. This time amounts to 27 days, 7 hours, 43 minutes, 11.5 seconds = 27.321661 days.

Furthermore, two additional courses of the moon are to be considered.

(a) p. 101--The synodic month, that is, the time between the two nearest conjunctions of the moon with the sun, amounts to 29 days, 12 hours, 44 minutes, 2.9 seconds = 29.530589 days, or around 29½ days plus 3/100 - 29½ days plus 1/33.

(b) p. 201--The anomalistic month, that is, the time in which the moon from the perigee again returns to the same, amounts to 27 days, 13 hours, 18 minutes 37 seconds, or 27.554600 days, around 27½ days plus 55/1000 = 27½ days plus 1/18th.

"--if a ship going westward is approaching the 180th meridian near midnight of Saturday, August 2, for example, the navigator enters the new day in his log-book as Monday, August 4, thus losing Sunday out of the week; but if the ship is going eastward, and is approaching the meridian near midnight of Sunday, August 3, for example, he enters the new day in his log-book as Sunday, August 3, thus repeating the Sunday of that week.

Thus the calendar of the traveler in making the circuit of the world is kept in agreement with the calendar of any country he may visit, including that of his own home, when he returns to it.

Greenwich noon is then, the only instant at which the date can be the same all around the world.

Strictly the navigator should make the change at the instant of crossing the meridian; but all counting of time is a convention, to suit the convenience of the people concerned; and so navigators have agreed that when on the open sea, they will make the change at the midnight nearest to the time of actual crossing."--Flint, Albert S., "The Changing of the Date at the 180th Meridian." Popular Astronomy, Vol.XXVII (1919), Northfield, Minnesota.

(Albert Stowell Flint (1853-1923) was an astronomer and computer at the U.S. Naval Observatory).

"Krusenstern, in his 'Voyage around the World,' says: 'On the 29th April (1806) we had made three hundred and sixty degrees of the Greenwich meridian from east to west. I therefore altered my reckoning; and as we had lost a day, called the next the 1st of May.'"--Hinks, Arthur R., "Nautical Time and Civil Date." Geographical Journal, Vol. LXXXVI, 1935, p. 152.

"International Date Line," by Roscoe Lamont. Popular Astronomy, Vol. XXIX (1921), page 340.

Dutton, Captain Benjamin, "Navigation and Nautical Astronomy.

Because of the variance between the 180th meridian and the irregular international date-line, each day lasts for 25 hours and 12 minutes. For this reason, three different days exist at the same time. When it is 12:01 A.M., Wednesday, at Cape Deshnef, Siberia, it is 11:17 A.M., Tuesday, at Greenwich, England, and 10:49 P.M., Monday on Attu Island at the extreme west of the Aleutian group.

3
72
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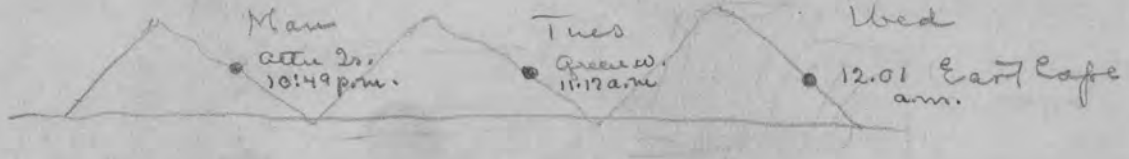

Compliments of
G.E.C.

Return To 8.62

"NEW MOON IN JANUARY, 1 B.C. BY OTTO KLATZ

"In making some computations last March about the occurrence of new moon, an error of statement was discovered in the ninth edition of the Encyclopedia Britannica, under 'Calendar,' Vol. IV, p. 594, and repeated in the eleventh edition, Vol. IV, p. 993. [Also in the fourteenth edition of 1929, Vol. IV, p. 570, upper right corner of page.] It is also given in Barlow & Bryan's mathematical astronomy, p. 215. The erroneous statement is that new moon occurred on January 1, in 1 B.C.

"New moon in January, 1 B.C., occurred on January 25d, 12h, 26m, Jerusalem civil time."

"Dominion Observatory, Ottawa, Canada. From Journal Royal Astronomical Society, Canada, XI, 1917, p. 258."

Copied from a note in the eleventh edition of the Encyclopedia Britannica, Vol. IV, p. 993, at the U. S. Naval Observatory.

Washington, D. C.

May 7, 1936 J. H. Wierts.

TRANSLATION from French
(EB/11-14-39)

"GAZETTE ASTRONOMIQUE" Decembre 1934, #252

Monthly Bulletin of the Astronomical Society of Antwerp (Belgium)
Publ. by La Prévoyance, dir. G.Van Staeijen. Marché aux Boeufs,25.

VISIBILITY OF THE LUNAR CRESCENT BEFORE AND AFTER THE NEW MOON
(Visibilité du croissant lunaire avant et après la Nouvelle Lune)

I have often commented on this phenomenon in the course of my astronomical observations; it interests the observers of the shining of the pale gray light and the shortening of the lunar crescent. The most favorable conditions to observe the moon in the evening present itself from March to June and for the observations in the morning, from September to October. According to my observations of September 30 and October 3, 1921 the interval between the last observation of the morning and the first observation of the evening is 3 days, 15 hours. The smallest age of the visibility of the young moon for the latitudes 48° to 49° is 28 hours (1).

(1) NOTE 1, p.159: In the observations of M. L. Andrenko (Gaz. astr. # 246, June 1934, p.77) there is a typographical error: the age of the moon should be 31 h 30m and not 21 h 30m.

It might be interesting to compare these results with those of the observations made in southern regions. Thus, according to observations made in South Africa (see Rize Hvezd, 1933, No. 4 and Cape Times of December 2, 1932), the lunar crescent was seen on November 28, 1932 only 17 h 31 m after the new moon and on Novembre 28, 1913 even at the age of 16h 39m. Analogous conditions present itself very rarely in our regions. For instance, L. Decroupet in Belgium has observed on Novembre 22, 1890 the lunar crescent 19h before the new moon (see E. Predtetshensky, L'Amateur astronome, p. 101).

Here are my observations:

1. Visibility after the new moon:

In March: 38h (March 27, 1933); 28h 22m (March 16, 1934). In April: 28h (April 9, 1921). In May: 32h (May 25, 1933); 28h 30m (May 14, 1934). In June: 38h 24m (June 13, 1934. In October: 51 h (Octobre 3, 1921).

2. Visibility before the new Moon:

In July: 63h (July 20, 1933). In August: 52h (August 19, 1933). In September: 35h (September 30, 1921). In October: 33h (Oct.19,1922).

Dneprostroi (Ukraine), October 3, 1934.

V. Tshernov.

"Thus until this day the Karaites in the Orient, and in the Crimea, are seen to have their religious festivals celebrated on different days by different communities."
Sidersky, p. 623.

"Thus 30 days are added, increasing by one day the preceding month, and giving the intercalary month a length of 29 days." Sidersky, p. 600.

"The whole computation as far as possible tends to make the beginning of the month coincide with the first physical appearance of the new moon." Sidersky, p. 603.

"Thus, in order to know the form of the year, it is necessary to calculate its Tisri Moled and the one of the following year in order to establish the interval."
Sidersky, p. 611.

"The words hodesch ha-abib usually are translated by "month of the new grain," or "month of the ears," because the Hebrew word abib is synonymous with "maturity of the corn; and, on the other hand . . . on the 16th of the month the first fruits of the barley harvest had to be offered in the temple of Jerusalem." Sidersky, p. 614.

"To determine the month of Abib, the more or less imminent maturity of the barley was being observed, the first fruits of which had to be offered in the temple the 16th day of the month." Sidersky, p. 615.

"The Sanhedrin . . . replaced the firs signals by sending messengers into various Jewish communities to let them know above all the new moons of Nisan and Tisri, in order to enable them to celebrate the festivals on the same days with their coreligionists of Jerusalem." Sidersky, p. 622.

"In the modern Jewish calendar greater variations are found in the lengths of the ordinary and embolismic years, resepectively, especially the ordinary short year of 353 days and the abundant embolismic year of 385 days, issues of the system of postponements inaugurated later by the Jewish doctors of Babylon, but which did not then exist in the first century." Sidersky, p. 633.

"Indeed we know, that the evening of the Jewish Passah must coincide with the full moon (according to the texts quoted above from Josephus and from Philo), and in no case could it precede the physical phenomenon. Note: Sometimes it can happen that due to certain circumstances the new moon is fixed on the day after the next day of the conjunction, and that the Passover is celebrated 24 hours after the full moon, but the contrary is impossible." Sidersky, p. 636.

"The story of the gospels cannot be placed other than between 30 and 33 A.D. . . . The year 33 is the only one in this short interval in which the first day of Passah coincided with a Saturday." Sidersky, p. 636.

The very object of the "postponements" was, according to Maimonides, "Traite de la Sanctification des Neomenies,"chap. VII, 8 and 9, version latine de Blaise Ugolin dans son Thesaurus, vol. XVII, Venise, 1755, to retard by one or two days the official new moons in such a way as to make them coincide as often as possible with the evenings of the appearance of the crescent in Palestine. Sidersky, p. 644.

"As a matter of fact, the system employed by the Sanhedrin in Palestine was based, as already stated, on the calculation of the true conjunction and the interval of time elapsing between this instant and the appearance of the first outlines of the crescent."
Sidersky, p. 643.

"The harvest falls out entirely according to the duration of the rainy season.--After the rains cease the Corn soon arrives at maturity."--Joannis Gottlieb Buhle, "Calendarium Palaestinae Oeconomicum," Gottingen, 1785, p. 705.

LEADING JEWISH WRITINGS OF THE PAST

1. MISHNAH (100-200 C.E.)--All in Hebrew. A codification of the traditional interpretation of the laws contained in the Old Testament, and the pronouncements of the prophets; and in addition, new laws to govern the new conditions which had arisen since the Old Testament was written.

Teachers of the Mishan: Tannaim.

2. TALMUD, or GEMARA [including the Mishnah] (compiled in its present form about 500 C.E.)--largely Hebrew, with some Aramaic.

(a) Jerusalem or Palestinian Talmud: Of inferior value in authority as compared to the Babylonian Talmud, for Palestine was then no longer the center of Jewry, due to the persecutions of the Jews in Palestine.

(b) Babylonian Talmud (Written by Jewish scholars in Babylonia; finally compiled c. 350 C.E.)--one-fourth Hebrew; the rest Aramaic. Legal and ethical commentary to the Mishnah, which is itself a legal commentary on, and codification of, the Old Testament. Thus the Babylonian Talmud interprets the laws of the Mishnah, and attempts to derive from the Mishnaic laws new laws to fit the changed conditions of the times, and also represents the codification of these laws.

3. TARGUMIM (100--900 C.E.; some authorities give 50 B.C.E.--500 C.E.)--all in Aramaic, hence called Chaldee paraphrase, representing both a translation, and at the same time often a paraphrase, of the Scripture. Originated in the synagogue with the reading of the Scriptures, and the necessity of translating the Hebrew of the Torah into Aramaic, which was then the vernacular of the Jews of the land. It was thus that the mass of traditional commentary was reduced to writing.

4. MIDRASHIM (100 B.C.E.--12th century C.E.; some give 100-900 C.E.)--four-fifths Hebrew, rest in Aramaic. Interpretations and homilies.

(a) Folkloristic Interpretations--ethical maxims and stories.

(b) Legal Interpretations--the legal Midrashim, or "Midrashe Halachah." According to Talmudic statement, Onkelos translated the Pentateuch, and Johathan ben Uzziel translated the prophets into Aramaic from Hebrew.

(usually assigned to the 4th cent. and including today only the Pentateuch)

The Targum Onkelos, the name applied to the Targum of the Pentateuch, is the Babylonian Targum, while the Targum Jonathan, existing only in fragments is the Palestinian. Its name, Targum Jonathan, may be a misreading for the Hebrew abbreviation t'y (for Targum Yerushalmi), the abbreviated form of the Targum Yerushalmi, or Jerusalem Targum), and it was then believed to have been written by Jonathan.

Beyond the Pentateuch, the Targum is generally regarded as anonymous, although originally both Jonathan and Onkelos wrote Targums to the whole Bible.

The Targum Johathan, originally covering the whole of the Old Testament, but now only the prophets, was put into its final form in the tenth century.

Transl. fr. German. (fr. Photostat)

"Zwanzigster Bericht über die
Lehranstalt f. d. Wissenschaft
d. Judentums in Berlin"
erstattet vom Curatorium.
mit einer wissenschaftlichen Beigabe v. Dr. E. Baneth:
Maimuni's Neumondsberechnung. Teil III.
Berlin 1902.

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p. 132 1. What we premised here merely served the purpose to introduce & prepare the finding of the phases. For if one wants to determine it, one must start by finding (by calculation) the true position of the sun as well as the true position of the moon & the position of the "head" ① [Note 1, p. 132: of the ascending knot (node); s. p. 106.] for the time of the phases. Then if one deducts the true position of the sun from the true position of the moon, the remainder is called "the first length" (longitude?)

Barieth - cont.

p. 132 - cont.

2. After having found the position of the "head" & the position of the moon, one also knows how great is the ~~width~~ latitude (2) of the moon,

[Note 2, p. 132: All editions compared by me here read מקום; naturally, it should be רוחב.] & whether it is a northern or a southern latitude. This is called "the first latitude". ~~Mark~~ Note carefully this first longitude & this (3) first latitude so that both are handy.

[Note 3, p. 132: הוה is missing in this place in the editions; comp. the ~~ff.~~ following. & note.]

p. 133

3. Now look closer at the first longitude (length) (4)

[Note 4, p. 133: The words added here in all editions . . . . Hebrew must be striked out, unless ~~-~~ one inserts in the following sentence . . . . . . - - -

the words . . . . . ;

presumably they are ~~erroneously~~ taken over from the preceding line.]

stet! ~~3. // One // should // now look more closely at // this // first longitude~~ (4)

If it is exactly nine degrees or still less, one can be sure that it is completely impossible ~~to see~~ that the moon, visible in the whole country of Israel & no further calculation is necessary; if the the first length (longitude?) amounts to more than 15* degrees (5)

[Note 5, p. 133: J. has . . . . .]

one can be sure that the moon will be visible in all the land of Israel & again there is no need of further calculation; but if the first calculation is between nine (6) & fifteen degrees, one must first examine with the help of the

Baineth – p. 133 cont.

phasis reckoning (?) & investigate in case one wants to be sure whether ~~it~~ she shall be visible or invisible.

4 This, however, is valid only ~~as~~ so long as the true position of the moon is found between the beginning of the "Capricorn" & the end of the "Twins"; if, on the contrary, the position of the moon is between the beginning of the "Cancer" & the end of the "Archer", the following applies: If the first length (longitude:) is 10 degrees or even less, one can be sure that the moon that night will be invisible in the whole country of Israel; if the first length (longitude:) ⑦ ~~amounts~~ is more than 24 degrees

Bäuerle - p 134.

she will doubtless be visible in the whole territory of Israel; but if the first longitude is between ten & twenty four degrees, one must first examine with the help of the phasis calculation & investigate whether she can be visible or not.

//

"In the beginnings of the Church, both the Apostles and those who followed after them for a hundred years, always celebrated the Jewish passover, as Eusebius testifies, and his ancient ecclesiastical history, and after all, Nicephorus Callistus. But under Commodus, those, who were celebrating the Jewish passover, were condemned of heresy by Victor, bishop of Rome, and by others whom he himself had called into the synod. But the difference in this celebration is two-fold, certainly either in the calculation of the moon or in the rite. Likewise in the calculation of the moon the difference is two-fold. For either in the new moon to what extent the new moons were employed by the ancients in a triple manner, as we have discussed in the Greek year; or in the embolism. For the new moons are either according to the conjunction, as of the ancient Attics; or according to the waxing, as the Calippics; or according to the shape of the moon, such as of the Jews, Arabs, ancient Chaldeans, and Damascenes. [In the first it was quite dark; in the second it did open itself to receive the sun-beams; in the last it did appear, corniculata, horned.'-- Godwyn, Thomas, "Moses and Aaron," London, 1685, p. 122.]

"Although we have touched in the chapter above something concerning the ancient rite of the Passover by the Christians, yet this place demands that we speak more fully concerning this thing. All the ancient Christians were regulating the Passover according to the lunar year, using the canon only for the thing, and thereby thinking that they trod in the footsteps of Moses and the Jews. But there was a two-fold difference. One is, that some sooner, others later, were intercalating the months. For the Asians, who were following the footsteps of John the Evangelist, and of others who were the equal of the Apostles, were using the pure Jewish year. But the Europeans were placing their cycle at the equinox, and were celebrating the Passover on the full moon next after the equinox. This was the difference in the months. Another difference was in the day: because some indeed were appointing the paschal festival on the Jewish 14th of Nisan, others, on the next Lord's day after the 14th of the moon."--Scaliger, "De Emendatione Temporum," pp. 105, 106. Tr. G. Amadon.

(The Astronomy of the Bible, 314 - 319)

The method employed in very early times in Assyria and Babylonia for determining the first month of the year was a simple and effective one, the principle of which may be explained thus: If we watch for the appearance of the new moon in spring time, and, as we see it seeting in the west, notice some bright star near it, then 12 months later we should see the two together again; but with this difference, that the moon and star would be seen together, not on the first, but on the second evening of the month. For since 12 lunar months fall short of a solar year by 11 days, the moon on the first evening would be about 11 degrees short of her former position. But as she moves about 13 degrees in 24 hours, the next evening she would practically be back in her old place. In the second year, therefore, moon and star would set together on the second evening of the first month; and in like manner they would set together on the third evening in the third year; and, roughly speaking, on the fourth evening of the fourth year. But this last conjunction would mean that they would also set together on the first evening of the next month, which would thus be indicated as the true first month of the year. Thus when moon and star set together on the third evening of a month, thirteen months later they would set together on the first evening of a month. Thus the setting together of moon and star would not only mark which was to be first month of the year, but if they set together on the first evening it would show that the year then beginning was to be an ordinary one of 12 months; if on the third evening, that the year ought to be a full one of 13 months.

This was precisely the method followed by the Akkadians some 4000 years ago. For Prof. Sayce and Mr. Bosanquet translate an old tablet in Akkadian as follows:--

"When on the first day of the month Nisan the star of stars (or Dilgan) and the moon are parallel, that year is normal. When on the third day of the month Nisan the star of stars and the moon are parallel, that year is full."

--Monthly Notices of the Royal Astronomical Society, Vol. XXXIX. p. 455.

The "star of stars" of this inscription is no doubt the bright star Capella, and the year thus determined by the setting together of the moon and Capella would begin on the average with the spring equinox about 2000 B.C.

When Capella thus marked the first month of the year, the "twin stars," Castor and Pollux, marked the second month of the year in just the same way. A reminiscence of this circumstance is found in the signs for the first two months; that for the first month being a crescent moon "lying on its back;" that for the second month a pair of stars.

The significance of the crescent being shown as lying on its back is seen at once when it is remembered that the new moon is differently inclined to the horizon according to the time of the year when it is seen. It is most nearly upright at the time of the autumn 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.

This method, by which the new moon was used as a kind of pointer for determining the return of the sun to the neighborhood of a particular star at the end of a solar year, is quite unlike anything that commentators on the astronomical methods of the ancients have supposed them to have used. But we know from the ancient inscription already quoted that it was actually used; it was eminently simple; it was bound to have suggested itself wherever a luni-solar year, starting from the observed new moon, was used. Further, it required no instruments or star-maps; it did not even require a knowledge of the constellations; only of one or two conspicuous stars. Though rough, it was perfectly efficient, and would give the mean length of the year with all the accuracy that was then required.

"For certain reasons the Jews used a kind of change, or translation of days; which translation, though it were of use in other months also, yet the greatest care was had in translating the beginning of their year, or their first day in their month Tisri; and he that shall diligently calculate these changes, shall find that all other translations depended on this first." Godwyn, Thomas, "Moses and Aaron," London, 1685, 12th Ed., p. 123.

"For even in the ancient law it is laid down that this is to be seen to, viz., that the Passover be not celebrated before the transit of the vernal equinox, at which the last of the autumnal (term) is overtaken (in quo autumnalis novissima pars vincitur), on the fourteenth day of the first month, which is one calculated not by the beginnings of the day, but by those of the moon (lunae orsibus). And as this has been sanctioned by the charge of the Lord, and is in all things accordant with the Catholic faith, it cannot be doubtful to any wise man that to anticipate it must be a thing unlawful and perilous." --Anatolius of Alexandria, "Ante-Nicene Christian Library," Edited by Roberts and Donaldson, Edinburgh, 1869, pp. 424,425.

"Moreover, the allegation which they sometimes make against us, that if we pass the moon's fourteenth we cannot celebrate the beginning of the Paschal feast in light (lucidum), neither moves or disturbs us." --Anatolius of Alexandria, "Ante-Nicene Christian Library," Edited by Roberts and Donaldson, Edinburgh, 1869, p. 420.

"Since there are two equinoxes, spring and autumn, separated by equal distances: and since the festival [passover] has been appointed on the fourteenth day of the first month after the evening [post vesperam] when the moon is caught from the region opposite to the sun, as even it is allowed the eyes to prove, certainly the sun is found holding a part of

the vernal equinox, but the moon, on the contrary, the autumnal." Ad Macrocosmon, Secunda Pars, Ad Lilios Fratres," Tr. by Grace Amadon, Lib. VII, col. 1204, Paris, 1611.

"Anatolius cites a commentary on the Pentateuch attributed to the two Agathobulos, disciples of Aristobulos, contemporary with Ptolemy [Claudius] Philadelphus. 'Aristobulos,' it is there said, '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.'" -- Caspari, ch. Ed., "Introduction to the Life of Christ," Tr. by M. T. Evans, Edinburgh, 1876, pp. 8,9.

"Accordingly, it is enjoined that that festival be kept after the equinox, because the moon of the fourteenth, if before the equinox or at the equinox, does not fill the whole night." Anatolius of Alexandria, "Ante-Nicene Christian Library," Ed. by Roberts and Donaldson, Edinburgh, 1869, p. 416.

"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." -- Venerable Bede, "Opera Omnia," B. V. ch. XXI, p. 273, London, 1843.

"Accordingly, in this month, [Nisan] about the fourteenth day of the month, when the orb of the moon is usually about to become full, the public universal feast of the passover is celebrated, which in the Chaldaic language is called pascha." Philo Judaens, "Works," Tr. by Yonge, London, 1855, Vol. III. p. 121.

"For there are two equinoxes every year, the vernal and the autumnal, which are each reckoned by periods of six months." Philo Judaens, "Works," Tr. by Yonge, London, 1855, Vol. III. p. 213.

"And this feast [Unleavened Bread] is begun on the fifteenth day of the month, in the middle of the month, on the day on which the moon is full of light, in consequence of the providence of God taking care that there shall be no darkness on that day." Philo Judaens, "Works," Tr. by Yonge, London, 1855, Vol. III. p. 284,285.

"This month [Nisan], being the seventh in number and order, according to the revolutions of the sun, is the first in power; on which account it is also called the first in the sacred scriptures." Philo Judaens, "Works," Tr. by Yonge, London, 1855, Vol. III. p. 284.

"Again, the beginning of this festival is appointed for the fifteenth day of the month [Tabernacles], on account of the reason which has already been mentioned respecting the spring season, also that the world may be full, not by day only but also by night, of the most beautiful light, the sun and moon on their rising opposite to one another with uninterrupted light, without any darkness interposing itself between so as to divide them." Philo Judaens, "Works," Tr. by Yonge, London, 1855, Vol. III. p. 291.

Arabic Names of Days. -- The Arabs did not, like the Persians, give special names to the single days of the month, but they had special names for each three nights of every month, which were derived from the state of the moon and her light during them. Beginning with the first of the month, they called --

The fifth three nights (13th-15th) bid, because they are white by the shining of the moon from the beginning of the night till 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 w as also called fahama on account of there being no light in it, and bara, 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 is called sawa, the 14th the night of "badr," because in it the moon is full, and her light complete. (An English version of the Arabic Text of the Athar-ul-bakiya of Albiruni) "The Chronology of Ancient Nations", Dr. C. Edward Sachau, Professor in the Royal University of Berlin. Published London, Wm H. Allen and Co. 1879. pp. 74, 75.

Likewise there is a difference between Jews and Christians regarding the leap year, as we shall explain in the chapter on the Christian Fast, if God permits. If, now, there is a difference between them, and they are willing to accept our decision, we shall consider the two opposition of their two passovers, and shall say, that that opposition at which the moon moves in the middle part of Spica (Virgo's "ear of corn") or of Cancer, or the sun is about to leave Aries, is to be rejected according to both systems, whilst the contrary is to be adopted. To the lover of truth, the correctness of these two assertions will be apparent, if the conditions we have

mentioned are observed. (An English version of the Arabic Text of the Athar-ul-bakiya of Albiruni) "The Chronology of Ancient Nations", Sachau, Dr. C. Edward, Professor in the Royal University of Berlin. Pub. London, Wm H. Allen and Co. 1879. p. 154.

'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 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.'
(Buhle, Johan Gotlieb, "Economical Calendar," page Brunswick, 1785.)

"During the months of November and December the 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.

(a) First Month Feast of Nisan Does Not Agree with March in Palestine.

"The feasts 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." -- Michaelis, John David, "De Mensibus Hebraeorum," Bremen, 1763, p. 17.

(b) Ripe Ears to be Had after the Middle of April.

"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 c on-sequently, the ear-moon must have always fallen within that month." --Michaelis, "Commentaries on the Laws of Moses," Tr. by Alexander Smith, London, 1814, pp. 182,183.

(c) Jewish Feasts Did Not Interrupt Harvests.

"A harvest-festival falling in the midst of harvest . . . and a feast of tabernacles in the midst of vintage, or before it, or still more, in the rainy season of November and December -- would have been such cry-ing absurdities, that they must have immediately shown and corrected them-

selves. -- Michaelis, "Commentaries on the Laws of Moses," Tr. by Alexander Smith, London, 1814, pp. 208.

Such authorities as Jahn, Horne, Faber, Buhle, Sidersky, and Scaliger, agree with Michaelis that Nisan coincides mostly with April and early May, and not with March. 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. (Scaliger, Joseph, "De Emendatione Temporum," Francofurt, 1593, p. 265.) Not until after the Council of Nicaea, did a fixed calendar with March passovers become permanent in Jewry. This eventually resulted in the well-known polemic among Jewish sects over the dates of their festivals -- a controversy that continued throughout the middle ages. This history offers conclusive testimony that early passovers did not obtain in the time of Christ.

Agricultural and economical calendars report that March is the month of rain in Palestine, and that barley ripens quickly, about the middle of April, after the rains are over. (Buhle, Johan Gotlieb, "Economical Calendar," Brunswick, 1785). In Canticles 2:11-13, the rain is over when the flowers appear, as at passover time; 1 Sam. 12:17 and Prov. 26:1 show that rain in harvest is unusual; Jer. 5:24, that the Lord gave rain in its season to His people, as promised in Deut. 11:14, and that He watched over the appointed weeks of harvest; Zech. 10:1, that the people were to pray for rain when in need of it. Hence, from this witness, it must be concluded, that the paschal harvest of Nisan, the month of green ears, or "ear-moon," could not coincide with March rains, and that it was protected in its subsequently appointed season by the promises of Jehovah.

Maimonides (Jewish rabbi, d. 1204) also supports the conclusion that the passover of early centuries, that is, before the change in the Jewish calendar, followed the spring rains in the land of Israel, and hence did not occur in March:

(a) Fast Day Appointed if Rain Failed in Pre-paschal Season.

"If likewise, in the paschal season, or near this time in the land of Israel, the showers have not yet run out (for in this time the trees bloom in Judea), a fast is appointed, and supplications are invoked until either beneficial showers for the trees have fallen, or the time of rain ceases." --Maimonides, "Tractatus De Jejunio," Ex Hebraeo Latine conversi a Ludovico de Compiegne, Paris 1667, pp. 31,32.

(b) No Fast After March -- Rain Unusual.

"With the March period over, indeed when the sun enters the sign called Taurus [about April 20], no fast is appointed, for rain in this time is for an evil omen, since it would not rain straight on from the beginning of the year." -- Maimonides, "Tractatus De Jejunio," Ex Hebraeo Latine conversi a Ludovico de Compiegne, Paris 1667, p. 43.

Consequently, according to the testimony of many witnesses, March was not the ancient passover month. It was, instead, an appointed time for rain. If the rain did not come in its season to prepare the harvest for the passover festival, and the people fasted and prayed, and were repentant, showers of mercy healed the land (II Chron. 7:14). If, on the other hand, the irregularities of the lunar year created discordance between the astronomical moon and harvest, then the following adjustment was made:

(a) A Moon Was Intercalated to Agree with the Harvest.

"But if, by the discordance of the moons with the solar year, the end of the twelve moons fell back so far within March, as that, by the middle of the next moon, ripe ears were not to be expected, and of course the feast of the passover could not be celebrated; then they were obliged to reckon this as the thirteenth moon of the preceding year, that is, in other words, to intercalate a moon, which the Jews in their calendar, now terminate Veaddar, or the second Adar. To ascertain when this intercalation was to take place, did not require astronomical observations of the heavenly bodies: it was a point which every husbandman could decide by merely looking at the corn-fields in the most southern part of Palestine." --Michaelis, "Com-

mentaries on the Laws of Moses," p. 207.

Therefore let us reconsider: Moses had it not in his power to adopt a strictly astronomical solar year by which to correct the lunar, for in his day the Egyptian year was extremely defective; "but," says Michaelis, "he availed himself of the aid of an economical solar year, which never admitted an error of a whole month without correcting it, and which every husbandman could easily comprehend." Hence, seeing that such was the basis of Jewish reckoning in early centuries, if one employs equinoctial moon dates with which to solve the crucifixion problem, looking for the death of Christ a moon too ea rly, as in March or early April, the true date will be entirely overlooked. This has been a characteristic cause of failure in research concerning the crucifixion date.

"It would appear from the title δὶς ἄρχων which is repeatedly met with, that the archons were appointed for a definite period; and in a Homilia in S. Johannis Natalem, ascribed to Chrysostom, and which has specially in view the state of matters in Italy during imperial times, we are expressly informed that the archons were always elected in September, the beginning of the civil year of the Jews. The following are the ipsissima verba of this interesting passage:[113] Inter haec intuendae sunt temporum qualitates et gesta morum; et primum perfidia Judaeorum, qui semper in Deum et in Mosem contumaces exstiterunt, qui cum a Deo secundum Mosem initium anni mensem Martium acceperint, illi dictum pravitatis sive superbiae exercentes mensem Septembrem, ipsum novum annum, nuncupant, quo et mense magistratus sibi designant, quos Archontas vocant."--Schurer, Emil, "History of the Jewish People," Second Division, Vol. II, p. 250. New York, Scribner's.

Translation: 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, accepted the month of March as the beginning of the year, exercising an act of perverseness or pride, they name the month of September as the new year itself, even in which month they appoint for themselves magistrates, whom they call Archons. Tr. Amador.

113 This homily (according to Wesseling, De Judaeorum archontibus, chap. x) is to be found in Chrystomi Opp. vol. ii. ed. Paris, 1687. As I have no means of consulting this edition, I quote from the passage as given by Wesseling.

SELENOGRAPHIA

CAPUT IX

Concerning the Phasis of the First and Newest Moon, and of some others, which, worthy of note, occur about the time of this observation.

After the moon remains hidden for a certain length of time, and nowhere appears in the sky; not only on account of the nearness of the Sun, but also because she turns the illuminated part of her hemisphere from us, finally it happens that she offers herself to us inhabiters of the earth to be seen in a most agreeable manner. And hence it comes to pass that the moon, after conjunction, appears either sooner or later. By me, indeed, intent upon the observation of the moon, between two months, she was seen immediately on the first day after conjunction with the sun: and for this reason I think that I would fix the price of the work, if I should begin from the first phasis and number in order all the others that follow. But since all those nations which used the lunar year, not only diligently paid attention to the first appearance of the moon, but also entered the number and beginning of every month from it, as is shown from the book of Geminus, concerning the Elements of Astronomy, ch. 6, about the Months, in which he says: Indeed it was proposed by the ancients to carry on the months according to the moon. And a little after: The names of the days were called by the illuminations of the moon. This enumeration of months and days, especially, was taken from the custom of the Jews, so that, although they had their own lunar computation, yet, nevertheless, influenced by the ancient usage of their elders, they solemnly celebrated their feast days and new moons, not from the true conjunction of the luminaries, but from the first and newest phasis, or appearance of the moon, when truly she is first perceived in sight in the sky after conjunction with the sun. But how this observation was administered, their Rabbis and their more recent chronologers abundantly report. But that the first rising of the moon happens not on the first day after the interlunary period, but at length on the second, often also on the third and fourth, is plain to all observing her. But whether this diverse appearance of the first moon, now slow, now fast, as with the Jews, so with other nations, can disturb the plan of the lunar year, which they begin from the first phasis or rising of the moon, and easily confound their feast days or not? this I leave to be discussed and disputed by chronologers. We only shall fan this question in reference to the first and newest phasis of the moon, thanks to lovers of the stars: why indeed, the first evening rising of the moon does not happen, in every month, soon, on the first day after conjunction with the sun; and whether it is possible, after some hours only, to observe and see, after New Moon, the first phasis of the moon. But the causes either retarding or advancing the first vision of the moon, are specially repeated in Astronomy as three. First is the obliquity of the sphere, leading to long or short settings: for in the signs of long settings, namely in Pisces, Aries, and Taurus, it can happen that the first phasis of the moon is seen a little after conjunction. A second cause is, the time of the conjunction of the moon with the sun, in reference to the northern limit. Finally the third is, whether the moon may be rapid in motion, such as around perigee. But the first appearance of the phasis of the moon can be retarded so that the moon is first seen in the evening, after the lapse of some days after the interlunary period, if the conjunction happens in the signs of short settings, such as are Virgo, Libra and Scorpio, in which the new moon holds around the autumnal equinox, and if she keeps above the southern latitude, or is turned around the southern border, and goes along tardy in motion, in apogee. Therefore, when the three causes before named, occur near to the conjunction of the sun and moon, it can altogether happen that the first phasis of the moon not only may be noticed on the day following after the New Moon [meaning conjunction], but also in the evening, on the very day itself, in which the syzygy of the sun and moon occurs before noon; as Erasmus Reinholdus in the Commentary on the Theories of Purbachius, page 155, has demonstrated this. Indeed, from these same principles it follows that it may be allowed to see the newest and first moon on one day, especially in the short twilights existing around the spring time, since they can advance this first appearance of the moon not a little. But if the causes now related that promote the quick rising of the moon do not always conspire together, but one only is wanting, then on the following day after the interlunary period, this first phasis at length offers itself; and with two requisites lacking, it can happen that finally on the third day the first phasis of the moon may fall in sight. But with all three conditions deficient, accelerating the rise of the moon, so that the moon is turned about in the signs of short settings, in the southern border, and in apogee, then this first appearance of the moon at last happens on the fourth day after conjunction with the sun; I will demonstrate and explain this variation, as indicated, not only in the current phasis, but also presently in others, by far the more.

Selenographia--pages 275, 276, 277

Even Theon Alexandrinus, Alfraganus, Albategnius, and Mesahala think that it was found in ancient times by constant and lasting observations that the new moon could be seen after the lapse of 12 equatorial times from conjunction, that is, forty-five parts of one hour. But I think that in every way these ancient astronomers are crazy over this thing: if perchance, the causes, which I have before touched upon, that delay the rise of the moon, are able to occur together, so that with difficulty it rushes in before the third or fourth day after the interlunium. Indeed, although all three causes already mentioned, that advance the early appearance of the moon, should at some time or other unite, yet I doubt whether the newest and first moon on one and the same day (especially in these northern places, where the elevation of the pole is boreal, and there are wanting the high tops of mountains, for catching the first vision of the moon) can be seen; as also the most rare examples are of the last and of the first phasis of the moon, seen on the same day on the plane horizon. Indeed the ancient astronomers report examples of this kind, and when they happened, on this account they called the day ἔνην καὶ νέαν old and new. In like manner Francisco Patritius, liber 20, Pancosm. page 114, similarly reports the case concerning Vespucii, who observed, on one and the same day, the old and the new moon, but, as he adds, past the equinox: when, also, he subjoins these words: But it seems that it could not otherwise have happened than in air free from vapors, by far more than with us. And this I also freely concede, and believe to be true.

But it is of importance that the first phasis of the moon was observed by me, truly on the following day, immediately after the conjunction of the luminaries, without doubt, in the year 1644, on the 8th day of April, S.N., the 6th day of the week, which happened the day before, indeed not in the evening, but in the morning, about the fourth hour: an observation of this kind, in our place, is a rare happening, as they know who give attention to the work of observation. Indeed, seeing that the new moon very rarely is wont to be seen before the third day after conjunction. But because this first phasis was seen so quickly after conjunction, for this reason it happened, since two conditions, already mentioned, and causes of the more rapid appearance of the moon were here present. For first, it was the time of the vernal conjunction in either about the 18th degree of Aries, and the moon in the time of her appearance stood forth in the 13th degree of Taurus, surely in the signs of long settings, and indeed, after Pisces, especially even in Aries and Taurus. Then also, the moon was rapid, around perigee. From that cause, therefore, it happened that after the lapse of 40 hours, the moon could be seen after the true conjunction of the moon; and indeed, she was, up to this time, sufficiently elevated above the horizon. Yes really, although she had stood to three or four degrees nearer to the sun, nevertheless she would have been seen: that is, although the true conjunction had happened the day before, not before, but after noon, this first phasis would have appeared on the next day. Besides, if the moon, at this time, had held, not around the southern limit; (her latitude indeed was almost 4½ degrees austral) but around the northern border, the first phasis of the moon could have been seen within 24 hours after conjunction. In truth, these three requisites together (as now it has been spoken of) so that the moon may be in the signs of long settings, in perigee, and in the northern border, clearly in the time of conjunction, or of the appearance, very rarely concur: if perchance, only one or another may be wanting, that delays and impedes its attendance, by which the moon can the less be seen on the first day after interlunium, although in that time (which is not impossible) the sky may be serene, and diligence of observation may not be wanting. Yet, within a period of nine years, these three requisites with difficulty break in together, even though all the new moons are examined, except around the year of Christ 1654, in the month of April and May, when the first phasis of the moon could be seen so quick, and indeed on the very day after the conjunction with the sun, if only a cloudless sky appeared in heaven. Certainly two requisites often are able to meet at the same time in the coitus of the moon, as also happened in the observation just now related, so that the moon in the ascending signs, and in perigee, either also around the northern border, and is turned around in the ascending signs, from whence the moon is seen earlier, after 24 hours, or even more, elevated above the horizon, according as the conjunction of the luminaries happens; although even this rarely happens, and certainly not in every year. But this could have happened in the year 1646 about the time of the vernal equinox, if then the air were clear; since also in the year 1652, in the month of March and April, the first phasis of the moon takes place earlier, for two requirements are retained as being present in the time of the intermenstrual moon, as also it happened here. But yet in the preceding years, the conjunction of the moon and sun does not take place around perigee, nor yet around the northern boundary, although it happened in the ascending signs; this, which is necessary to be performed annually.

Selenographia--pages 277, 278, 279

From which things it can be concluded that a phasis of this kind, such as was observed here, is more rare in vision. For although it may happen that two requisites are present, yet the evening may not always be given clear, and therefore the aspect of the moon is impeded by clouds rushing between, as I have frequently found it.

But in order, therefore, that the things may be more established, which I have brought into the heart of the matter concerning the causes of a more rapid or more tardy first appearance, or of the sensible showing of the light of the moon, in reference to this in this place let me set forth the various observations, in which time I have indeed sought this first phasis of the moon, immediately on the following day after conjunction with the sun, when the sky was clear, but, with the exception of one village, up to the present time, I could not yet notice it. For hereupon the causes will sufficiently appear which have delayed the more rapid first rising of the moon at one time [or another]. In fact, from the 8th day of April, of the year 1644, when I saw the first phasis of the moon, on the following day, soon after coitus, repeatedly I raised my watching eyes, and have been aroused at the aspect of the sky, whether I could see the form of the most recent moon, also at one time, or another day after the new moon. But, with what success? Listen: first of all, on the 5th day of June, of the year 1644, I could not at all see the horns of the moon in the evening, since indeed she was in Gemini, but besides, was being delayed in the southern border, and beyond perigee. So also on the 5th day of July of the same year, I could not catch the first phasis of the moon on the next day after conjunction. And neither is this wonderful, for indeed, there was plainly present no requisite of an early appearance of the moon. And whence neither on the following day of the 6th of July was it permitted to descry the first horns of the moon, so that not before the third day after conjunction, intruth on the seventh day of July, did it then happen to see the first moon, and indeed the one nearest to the western horizon. Yes, also, in vain have I sought the first moon on the following day in the rest of the intermenstrual moons of this year (as anyone not unskilled in the celestial calculations easily knows) since the conjunction of the luminaries happens in the signs of short settings.

Similarly, in the year 1645, on the 28th day of March, third day of the week, after the lapse of 24 hours following the conjunction of the luminaries, indeed, in the evening, I diligently sought the first moon, but she was not found; since, in fact, there was present only one requisite, namely, the course of the moon in Aries, in a sign of long settings: on the contrary, she was obtaining a southern latitude, above 4 degrees, and besides, was going along in apogee, that is, was most remote from the earth. But if indeed, those two impediments had not hindered, certainly I could have easily perceived in sight the phasis itself at this time.

In the year 1645, on the 27th day of April, the 5th day of the week, again in the eighth hour of evening, I gave attention to the first appearance of the moon, which finally did not deceive my hope; since I caught it, immediately on the next day after conjunction, in the form pointed out in which it is discerned here, and was observed in the year that is past. In fact, the cause of that earlier rising is twofold. For one reason, because the moon stood in Taurus, in a sign of long settings; for another, because she was in perigee. And moreover, because the true conjunction of the sun and moon, on the 26th day of April, broke in sufficiently early, so that at this time in which she was seen by me, already 42 hours had passed from the conjunction of the luminaries. For verily this was not able to happen more quickly, for the moon was established in the greatest southern latitude.

In the place of conclusion I will advise one thing thus far, in reference to the mountains of the moon, which are the ground-work of the course of the presiding phasis of the moon, of which mention also has been made in the sixth chapter above; since those also become plainly visible in definite times in the periphery itself of the moon, in order that the Peritetics may finally know both the force of our demonstrations by which we defend the serious thing, and on the other hand, the foolishness of their arguments by which they oppose our opinion.

SELENOGRAPHIA

CAPUT X

Concerning the Phasis of the Horned Crescent of the Moon

Because now I think that sufficient has been said before in the preceding chapter concerning the nascent and first moon, and some causes of its more tardy appearance, it may be permissible to affirm also that, in its own way, concerning the horned phasis of the moon. For we call the horned moon that phasis which to some of the ancients is the second moon, for the reason that on the second day after the conjunction of all luminaries, she is seen very early, and follows the first moon. But because she is not always able to be seen on the second day, all those causes can hinder, which do not allow [one] to see the first moon on the first day after conjunction. But the chief cause is when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius. For although the moon may be in perigee, and around the northern border, yet if she does not approach a sign of long settings, in vain the horned moon may be expected on the second day. For an example to us can be the 2nd day of October, in the year 1644, when the horned moon on the second day after conjunction, by no means could be seen, since she was in the sign of short settings, about the beginning of Scorpio, and at the same time was in apogee; and although she obtained the greatest northern latitude, yet, the primary requisite being deficient, she was nowhere then showing up in the sky. And it is not necessary to explain the thing by many examples, since the thing is clear in itself, and not otherwise to be understood than by this stipulation: the first and second phasis of the moon in vain is sought after the first and second day of the accomplished new moon unless the three requisites reviewed in the chapter above were present at the time of conjunction, or of the appearance of the moon, especially in the evening a little after the setting of the sun.

But, on the other hand, if the day is cloudless, and the sun shining very bright, it is not impossible to see this second moon on the next day after conjunction, although no requisite may be given; for this can be accomplished either by the use of the renowned Opticle Tube, and by the brightness alone of the luminaries, animated and uninjured, such as I myself in distinct times have so seen the moon, and also have shown the same to others. And indeed, in the year 1644, on the 6th day of July, I could well discern the second, or horned moon, in the clear light of the shining sun, in the afternoon hours, when, nevertheless, on the following evening after the setting sun, not yet was given the faculty of her being seen--as let me be silent in reference to other examples. From these [illustrations] brought together it may be permitted to decide with sufficient certainty that often, nay, almost always, phases of this kind are better able to be seen in the day light than in the evening after the setting of the sun. Nevertheless this distinction remains, foremost, between the moon seen by day, and by night, that we cannot so accurately delineate the phases of the moon by day, or in bright vision, or those seen in the Opticle Tube, on account of the greater light, indeed, surrounding, and the nearness of the sun, because the less light of the moon reflects somewhat more obscurely; since also here is the place in this well-known saying: "The greater light shines less."

Laws were established that Rosh Hashanah could not be on Su. Wed. or Fr. The first day of Passover could not be on Mo. Wed or Fr. . The first day of Shavoth could not be on Tu. Thu. or Fr. Purim could not be on Sat. Mo. or Wed. Yom Kippur could not be on Su. Tu. or Fr.

#2 Passover is observed in the month of Nissan in the spring. The "ebor" (leap year) is formed by adding one month if the season of spring hasn't come yet before the month of Nissan. In the Talmud there

are additional reasons for the "else" such as 1) fruit trees not becoming ripe 2) roads being spoiled because of rain 3) bridges being broken 4) Passover stoves being broken because of rain 5) Jewish exile making it hard for those who are far to come to Jerusalem 6) sheep that weren't born yet to bring the Pascal lambs. 7) Pigeons that weren't born yet to be bought for sacrifices.

#3. ~~Un~~leavened bread is to be destroyed and not be seen throughout Passover. In accordance with the

Talmudic Rabbis the unleavened bread can be sold before Pasover to a non-Jew, and after Pasover it is bought again from the non-Jew

והעמיד קדוש החדש על פי החישבון האמצעי שאין החשבון הזה אפי' לא על פי דרכי התכונה המדוייקת. וקבעו חכמים לא א'ד'ו ראש ולא ב'ד'ו פסח לא ג'ה'ז עצרת לא ו'ב'ד פור ולא א'ג'ו יום כפור ודחו כל המועדים מזמנם ומפני זה התלמודיים לפעמים מקדשים החדש ועדיין הישן נראה ולפעמים הורח החדש בבר נראה והם עדין אינם מקדשים ובכן דחו עדות החדש מזמנו אבל אנחנו שומרים גם היום מנהג הקדמון ע"כ מועדינו לפעמים עמהם ביום אחד ולפעמים מתאחר ביום אחד.

ב בסדר י"ג צונו הש"ית שנשמור את חדש האביב דוקא לעשות בו חג הפסח וכן זו המצוה נכפלה בם' כ"ג ונשלשה בם' ל"ד ונרבעה בספר חמישי סדר י"ז וע"כ אם לא היה נמצא האביב בחדש ניסן היו עושין אותו עבור. ומצות התורה שלבד מפני העדר האביב יעשה העבור ולא מסבה אחרת אבל התלמודיים הוסיפו שמונה דברים אצל האביב ואמרו מפני ט' דברים מעברין את השנה, על האביב ועל התקופה ועל פירות האילן ומפני קלקול הדרכים מפני הגשמים ומפני הגשרים שנהרסו ואין הולכי רגלים יכולין לעבור ומפני תנורי פסחים שנהרסו מן המטר ואין מקום לצלות הפסחים ומפני גלויות ישראל שנעקרו ממקומם ומפני הטלאים שלא נולדו עדין להקריב מהם פסחים ומפני הגזולות שלא פרחו עדיין שיהיו ראיון במי שנתחייב קרבן עוף ובכן עברו מצות לא הוסיף.

ג בסדר י"ב כתיב בחג המצות שבעת ימים שאור לא ימצא בבתיכם וכן בס' י"ג כתיב ולא יראה לך חמץ ולא יראה לך שאור בכל גבולך שבעת ימים וכן בספר חמישי סדר י"ז כתיב ולא יראה לך שאור בכל גבולך שבעת ימים וכפי זה חייב כל ישראל לבער החמץ מגבולו שלא ימצא בגבולו לא גלוי ולא טמון והתלמודיים המציאו ערמנות ומוכרים בתיהם ויקביהם לנוצרים ואחר שבעת ימי מצה עוד שבים ולוקחים בתיהם ויקביהם עם כל חמציהם.

ד עוד בסדר י"ב קבע הכתוב זמן שחיטת הפסח בין הערבים ורצון הכתוב בזה אחר בוא גוף השמש אחר האופק כמו שכן כתוב גם בזמן הקטרת בם' שמות סי' ל' ובהעלות אהרן את הנרות ב"ב יקטירנה וידוע כי אין זמן העלאת הנרות אלא אחר עריבת השמש מעצם הצהרים עד שיבוא גוף השמש אחר האופק וכבר חכמינו

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Page from the book "Lebosch Malchoth"

Published in 1866 by Prof. Adolph Neubauer from MSS found in the Imperial Library, St. Petersburg.

Mordecai Bar Nisan is quoted as authority for the fixing of the Paschal feast by the barley harvest.

See lines 11 & 12 from top for the statement that the "ebor" is made if the harvest is seen not to be ripe.

BOOK OF ENOCH -- EXCERPT

LXXVIII. The Sun and Moon: the Waxing and Waning of the Moon.

And the names of the sun are the following: the first Orjârês, and the second Tômâs. And the moon has four names: the first is Asônjâ, the second Eblâ, the third Benâsê, and the fourth Erâe. These are the two great luminaries: their circumference is like the circumference of the heaven, and the size of the circumference of both is alike. In the circumference of the sun there are seven portions of light which are added to it more than to the moon, and in definite measures it is transferred till the seventh portion of the sun is exhausted. and they set and enter the portals of the west, and make their revolution by the north, and come forth through the eastern portals on the face of the heaven. And when the moon rises one-fourteenth part appears in the heaven: [the light becomes full in her]: on the fourteenth day she accomplishes her light. And fifteen parts of light are transferred to her ~~un~~till the fifteenth day (when) her light is accomplished, according to the sign of the year, and she becomes fifteen parts, and the moon grows by (the addition of) fourteenth parts. And in her waning (the moon) decreases on the first day to fourteen parts of her light, on the second to thirteen parts of light, on the third to twelve, on the fourth to eleven, on the fifth to ten, on the sixth to nine, on the seventh to eight, on the eighth to seven, on the ninth to six, on the tenth to five, on the eleventh to four, on the twelfth to three, on the thirteenth to two, on the fourteenth to the half of a seventh, and all her remaining light disappears wholly on the fifteenth. And in certain months the moon has twenty-nine days and once twenty-eight. And Uriel showed me another law: when light is transferred to the moon, and on which side it is transferred to her by the sun. During all the period during which the moon is growing in her light, she is transferring it to herself when opposite to the sun during fourteen days [her light is accomplished in the heaven], and when she is illumined throughout, her light is accomplished full in the heaven. And on the first day she is called the new moon, for on that day the light rises upon her. She becomes full moon exactly on the day when the sun sets in the west, and from the east she rises at night, and the moon shines the whole night through till the sun rises over against her and the moon is seen over against the sun. On the side whence the light of the moon comes forth, there again she wanes till all the light vanishes and all the days of the month are at an end, and her circumference is empty, void of light. And three months she makes of thirty days, and at her time she makes three months of twenty-nine days each, in which she accomplishes her waning in the first period of time, and in the first portal for one hundred and seventy-seven days. And in the time of her going out she appears for three months (of) thirty days each, and for three months she appears (of) twenty-nine each. At night she appears like a man for twenty days each time, and by day she appears like the heaven, and there is nothing else in her save her

Charles, R.H., "The Apocrypha and Pseudepigrapha of the Old Testament," pp. 243, 244. Oxford, 1913.

"Nearly all the writers of the New Testament were familiar with it, and were more or less influenced by it in thought and diction. It is quoted as a genuine production of Enoch by St. Jude, and as Scripture by St. Barnabas. The authors of the Book of Jubilees, the Apocalypse of Baruch, and 4 Ezra, laid it under contribution. With the earlier Fathers and Apologists it had all the weight of a canonical book."--Note to INTRODUCTION, page 163.

every 225 years the cycle moves advance one day ahead of the moons of the previous per. 100, due to the fact that the moon is 2 hrs. 4 m. slower than the sun at the end of each cycle.

"By means of the lunar cycle the new moons of the calendar were indicated before the Reformation (that of Gregory XIII). As the cycle restores these phenomena to the same days of the civil month, they will fall on the same days in any two years which occupy the same place in the cycle."
"Encyclopedia Britannica," Article Calendar (Lunar Cycle).

"The cycle is supposed to commence with the year in which the new moon falls on the 1st of January, which took place the year preceding the commencement of our era. . . The new moons determined in this manner, may differ from the astronomical new moons sometimes as much as two days, because the sum of the solar and lunar inequalities, which are compensated in the whole period, may amount in certain cases, to 10 degrees, and thereby cause the new moon to arrive on the second day before or after its mean time."
"Encyclopedia Britannica," Article Calendar (Lunar Cycle).

"The new moons indicated by the epacts also differ from the astronomical new moons, and even from the mean new moons, in general by one or two days. In imitation of the Jews, who counted the time of the new moon, not from the moment of the actual phase, but from the time the moon first became visible after the conjunction, the fourteenth day of the moon is regarded as the day of full moon. But the moon is in opposition generally on the 16th day; therefore, when the new moons of the calendar nearly concur with the true new moons, the full moons are considerably in error. The epacts are also placed so as to indicate the full moons generally one or two days after the true full moons; but this was done to avoid the chance of concurring with the Jewish passover, which the framers of the calendar seem to have considered a greater evil than that of celebrating Easter a week too late."
"Encyclopedia Britannica," Article Calendar (Dominical Letter).

Don't forget that Clavius reports that one of the Nicaean rules demanded that the calendar must use

"Anatolius cites a commentary on the Pentateuch attributed to the two Agathabuli, disciples of Aristobulos, contemporary with Ptolemy Philadelphus. 'Aristobulos,' it is there said, 'maintained . . . that the day of the paschal festival began on the 14th Nisan after the evening, when the moon stands diametrically opposed to the sun, as anyone can see at the time of full moon.'"--Caspari, C.E., "Introduction to the Life of Christ," page 8.

"Quum duo sint aequinoctia, veris & autumni, aequis spatiis dirempta: & 14 die mensis primi sit statuta solemnitas post vesperam, quando Luna Soli opposita e regione deprehenditur, sicut etiam oculis probare licet: invenitur utique vernalis aequinoctii partem Sol obtinens; Luna vero e contrario autumnalis. . . Quartamdecimam enim Theophilus oportere censuit videri, cum pleno orbis sui circulo, eodem momento oritur, quo Sol occidit."--Nancel, Nic., Analogia, Secunda Pars . . . De Correctione anni Gregoriani, Ad Lilios Fratres," Col. 1176. Paris, 1611.

Translation: Since there are two equinoxes, of the spring and autumn, separated by equal spaces, and since the festival was appointed on the 14th day of the first month, after the evening at which time the moon is caught in the region opposite to the sun, as even it is permitted for the eyes to prove: the Sun certainly is found holding a segment of the vernal equinox, but the moon, on the contrary, of the autumnal. . . For Theophilus decreed that the fourteenth ought to be seen when the disk in its circuit rises in full at the same moment in which the sun sets.--Nancel, Nicolaus, "The Analogue, Second Part, concerning the correction of the Gregorian Year, According to the brothers Lilius." Col. ~~1176~~ 1204. Paris, 1611.

"The Prutenic Tables were made the basis, and the epacts were all diminished by unity, in other words, Luna XIV was put one day later, to remove all danger of Easter ever being celebrated on the day of the astronomical full moon, as was forbidden by the old canons."--Hagen, J.G., (Vatican Observatory), "Catholic Encyclopedia, art. "Lilius." Vol. IX, p. 251. New York, 1910.

"Würm, finally, expresses his opinion that we should not go far wrong if, in order to find the first day of the month, according to the old Jewish style, by the moon's phase, we add 24 to 48 hours to the true new moon astronomically calculated; and on page 279 he lays down the rule that we have on an average to add 1 1/2 days. This principle has been accepted and carried out by Ideler, Wieseler, and most chronologists."--Caspari. Ch. Ed., "Introduction to the Life of Christ," page 15.

[It is evident that others, besides Scaliger, consider that the Jews used an older moon than the first crescent by which to begin their months.]

"Sed neomenia Judaica, Arabica, & Samaritana excedit modum φάσεως ut plurimum. ita ut civiles neomeniae mensium Lunarium sint triplicis generis: Atticae ἀπὸ τῆς συνόδου Calippicae ἀπὸ τῆς ἀποκρύσεως Judaicae, Samaritanae, & Arabicae ἀπὸ τοῦ μηνοειδοῖς χήματος a tertia, inquam, die."--Scaliger, Joseph, "De Emendatione Temporum," page 6. Francfurt, 1593.

Translation: But the Jewish, Arabic and Samaritan new moons commonly exceed the size of the phasis, so that the civil new moon of the Lunar months are of three kinds: the Attic new moons are from the conjunction; the Calippic, from the waning of the moon; the Jewish, Samaritan and Arabic, from the shape of the moon, from the third day, I say.

"Neomeniae enim aut κατὰ σύνοδον quales priscorum Atticorum, aut κτ' ἐξαυγασμὸν quales Calippicae, aut κτ' χῆμα μηνοειδὲς putantur, quales sunt Judaeorum, & Arabum, & veterum Chaldaeorum, & Damascenorum."--Scaliger, "De Emendatione Temporum," page 105.

Translation: For the new moons are according to the conjunction, as of the ancient Attics, or according to the light, as the Calippic, or according to the shape of the moon, such as are the Jewish, Arabic, and ancient Chaldaeans and Damascenes.

Plan of third day delay = 108
Phasis of light

Scaliger

8. For always the Olympiad was in full moon, and was celebrated on the 15th of the month.

108-

For those who wish to correct the Passover with astronomical tables, although they are very learned, yet they do not know what it is to set in order the lunar year, even whose lengths and times of mean syzygies they know to the finger's breadth. But they should know that it is one thing to collect mean lunar conjunctions from the abacus, and it is another to plant the intervals of the moon's advance upon the calendar. For the order of the days of the week rules this thing, not the astronomical abacus.

77- In speaking of the Chaldeans, Scaliger adds this:

"And next, because their new moons were not the same as with the Calipprico. For they [the Chaldeans] were beginning [their year] from the horned moon, as all the eastern nations in ancient times, and even to this day." [Scaliger always classes the Jews, Arabs, Chaldaeans, and Damascenes as using the same kind of new moon in starting their months.]

281- Hevelius · Gedanum, 1647.

"But we call the horned moon that phasis, which to some of the ancients is the second moon, because on the second day after the conjunction of all luminaries it is earliest seen.

281- Hevelius then offers this rule -

"It is not necessary to explain the thing by many examples, since it should be plain in itself, nor otherwise to be understood than by this agreement: the first and second [or horned] phases of the moon in vain is sought on the first and second day after the conjunction unless the three requisites, recounted in the foregoing chapter, are present in the time of conjunction, or of the visible moon, moon, especially in the evening, a little after sunset.

Fragment from Canon Paschalis, of bishop Anatolius of Laodicea, 3rd century = Euseb. Hist. Eccl. VII. p. 322, 323. Samuel Bagster, London, 1847

"Anatolius cites a commentary on the Pentateuch attributed to the two Agathobulos, disciples of Aristobulos, contemporary with Ptolemy Philadelphus. 'Aristobulus,' it is there said, 'maintained ... that the day of the paschal festival began on the 14th Nisan after the evening, when the moon stands diametrically opposed to the sun, as anyone can see at the time of full moon.'" – Caspari, p. 8.

1 Kings 4:7 = no intercalation
Num. 20 = ab
Ezek. 26:1 29:17 31:1 32:1
46:4-6 = n.m. offerings

Anatolius – concerning paschal festival = festival was always observed after the Equinox; and "that on the 14th Nisan the moon was necessarily full, and in opposition with the sun; from which follows with equal necessity, that the 1st of Nisan, and consequently the first day of each month, coincided with the new moon." – Caspari, p. 9.

"Galen, born at Pergamus in Asia Minor, about a.D. 131, says, 'With those in Palestine the twelve months together number 354 days. But since the time from one conjunction to another requires the addition of another half-day to the 29 days, the two months together number 59 days, which they divide into two unequal parts, and assign to the one month 30 days, and to the other 29. Since they arrange the months in this manner, they are compelled to make an intercalary month, when the deficiency of the previous years, counted together, makes up the time of a month!'" [1] – Caspari, pp. 9, 10.

[1] Comment. I. in Hippocratis epidem., ed. Kühn, t. XVII. p. 23.

4. THE WIERTS TRANSLATION OF THE MOON FOR TISRI 1, 1 8 4 4.--

"The Prutenic Tables were made the basis, and the epacts were all diminished by unity, in other words, Luna XIV was put one day later, to remove all danger of Easter ever being celebrated on the day of the astronomical full moon, as was forbidden by the old Canons."

J. G. Hagen, Vatican Observatory

Catholic Encyclopedia –
Article "Eclipse" Vol. IX, p. 251.
New York, 1910.

Erasmus Reinhold (Wittenberg, 1554). Copernicus' immortal work = "De Revolutionibus Orbium Coelestium." enabled Erasmus Reinhold to compute his Prutenic Tables, which were made the basis of the Gregorian reform.

Same Reference.

Beginning with Esarhaddon, we can trace in the letters the actual evolution of a more scientific attitude and the progress of discovery, due to known men whose very words we possess (Leroy Waterman, Royal Correspondence of the Assyrian Empire 1930-36). The simplest form of report is represented by the letters of Nabua, of unknown date, who informs the king whether or not he saw the moon on the 29th of the month; obviously the beginning of the next month is still determined by the actual appearance of the moon, while calculation of the astronomical new moon is still in the future. He also reports whether on the 13th, 14th, and even 15th, sun and moon have been seen together--another proof that the new month was fixed by actual observation (Ibid., Nos. 817 ff). . .

An important discovery had been made--that solar eclipses were to be expected at the beginning of the month, lunar eclipses in the middle--though the inability to calculate the astronomical new moon left the exact time uncertain within the three-day limit of error. . .

About the beginning of the fifth century there appeared the first great Babylonian astronomer whose name has survived, Nabu-rimanni, son of Balatsu, "descendant" of the priest of the moon-god Sin, who witnessed important documents in 491 and 490. His system is explained in a textbook, written or copied in early Seleucid days, which gives directions for the construction of such lunar computation tables as are preserved from late Seleucid and early Parthian days, and also in eclipse tables from the same periods. Strabo of Amaseia remembered him as Naburianus and gave him the deserved title of "mathematician," for, while all the tables are based on observations, the details are the result of most elaborate calculation. Olmstead, A.T., JAOS, XLVI (1926), 87; Kugler, Die babylonische Mondrechnung (1900), pp. 55ff., 115 ff. (with)

The problem set by Nabu-rimanni was the true date of the new or full moon, which was connected the determination of lunar or solar eclipses. Thus we have two sets of somewhat similar tables, those dealing with the moon' positions and those with the title "of day 14," when at full moon lunar eclipses are visible.

Olmstead, A.T...Babylonian Astronomy in The American Journal of Semitic Languages and Literature, p. 113ff. University of Chicago Press.

Scaliger, Prolog, C -

But if we follow the Europeans the passover was often wandering from Xanthicos, or our April in the times of Christ. For in the 2-4-5-7-10-13-15-16-18 year of the Jewish cycle the Pascha was falling altogether in the month Dystrus, even in our March. But the plan which I offer

For without any controversy Christ ate the passover at the end of the 13th of Nisan, the 14th being imminent. That is on the evening which the 14th follows. (Of this no one a little learned doubts.) For on the sunset of the fifth day of the week the sixth Jewish week day was coming on, even to sunset of the day of Venus, after which the Sabbath entered, even Nisan 15, that is, the Solemn Paschal. Therefore the whole of Nisan 14 intervened between the end of the Lord's supper and the beginning of the Solemn Paschal.

The following reference taken direct from the Mishna--

R. Sh.2.6. How do they examine the witnesses? The pair which comes first they examine first. They bring in the elder of the two and say to him, "Tell us how thou sawest the moon: facing the sun, or turned away from it? (Note: Before the sun or after the sun?) to the north or to the south? how high was it? to which side was it leaning? and how broad was it? If he said, "Facing the sun," he said naught (Note: It was either the old moon that he had seen, or nothing at all. Erub.4.2). Afterward they bring in the second witness and examine him. If their words are found to agree their evidence holds good.

R. Sh.3.1. (Note: This Paragraph logically follows 2.7.). If the court itself and all Israel had seen the new moon and the witnesses had been examined, yet night fell before they could proclaim "It is hallowed," then it is an intercalated month. (Note: That day, although manifestly the first of the new month, is treated as the 30th day of the preceding month). If the court alone saw it, two (of them) should stand up and bear witness before them, and then they may say, "It is hallowed, it is hallowed."

Erub.4.2. Once they did not enter into the harbour until nightfall (on Friday). They said to Rabban Gamaliel, "Is it permissable for us to land?" He answered, "It is permitted; for I have already made observation, and we are within the Sabbath limit before nightfall." (Note: With some simple telescopic device (Gem.43-b) for the calculation of distances. He was noted for his astronomical knowledge.)

JUDAISM IN THE FIRST CENTURIES OF THE CHRISTIAN ERA -- The Age of Tannaim, by George Foot Moore (Harvard), Vols. I and II.

Vol.II,page 22. In old Israel the new moon--the day after the crescent was first sighted in the sky--was celebrated by sacrifice and feasting (1 Sam.20:18-34) and, as may be inferred from 2 Kings 4:23, by the suspension of every-day occupations. The prophets couple it with the Sabbath, regularly naming it in the first place ("new moon and Sabbath"). Cf. Col.2:16. Amos 8:5 shows that trading was prohibited on both. In Hos.1:13 and Is.1:13 it stands at the head of the list, preceding the seasonal festivals, and was, like the Sabbath and those festivals, the occasion of a consecration, as in Is.1:14 (A.V. 'solemn assembly'), a proclamation calling the people to observe the day. The offerings appointed for the new moon (Num.28:11-15; Ezek.46:4-7) exceed those on the Sabbath, and in post-exilic sources (Chron. Ezra, Neh.) it maintains its precedence in the order of enumeration. No express prohibition of labor on the new moon is found in the Law(Num.28:11-15 has to do so solely with the offerings for the day), nor is a holy convocation appointed for it, but this is true in the passage cited of the Sabbath also. In later times at least labor was not suspended on the new moon. (Note: After the adoption of an astronomically fixed calendar, about the middle of the fourth century, the coming new moon was announced in the synagogue on the preceding Sabbath after the reading of the lessons). The new moon retained its prime importance for the fixing of the calendar with the dates of all the annual festivals, but the religious observance of the day outside the ritual of the temple seems to have early declined.

Sanhedrin 18b. When the early seed and the late seed blossom simultaneously, then it is Adar, and if not, it is not Adar" (Note: but still Sebat). As a result of this, we read further on the same page, the Rabbis proclaimed the year a leap-year. As the seeds were not ripening yet, they inserted a second Adar. The first Adar could not be regarded as Adar proper, on agricultural grounds. We see from this that the time of the sprouting of the לקיש (as well as the בכיר) was the month of Adar. Cf. also Jerushalmi Sanhedrin, I,2, and Rosh haShanah, 2.5. Quotes from Quart. State., Pal. Ex. Fund, April, 1909.

Jewish Dating – Luke 15:1; 1 Mac. 13:42

all public acts dated since 143 B.C. – about this same time, 200 years after time of Alexander, mathematicians computed for the Jews their conjunctions and phases. Geminus, Hipparchus, = math.

Dating Year – Called "Jerusalem Era." begun by Maccabean period.
This era engraved on coins dated the fifth year of Simon's reign. Luke shows the date.

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rules older than cyclic system.

Month – Epacts ☾ ** – Intercalated by the barley-harvest. This was a good rule – merely determined the location of the month of Nisan – Set off the Feast year.

Day – The day was "observed" and also calculated.
Sanhedrin and priests.

Evidences of Jewish astronomy before Christ; Issachar, David, Solomon
Evidences since – Mar. Samuel, Hillel, Saadia, Karaites, Maimuni

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Julian Calendar

No records of datings until very late.
Kalends and Nones – 1582

This method, by which the new moon was used as a kind of pointer for determining the return of the sun to the neighborhood of a particular star at the end of the solar year, is quite unlike anything that commentators of the ancients have supposed them to have used. But we know from the ancient inscription already quoted that it was actually used; it was eminently simple; it was bound to have suggested itself wherever a luni-solar year, starting from the observed new moon, was used ... Though rough it was perfectly efficient ...

But it had one drawback, which the ancients could not have been expected to foresee. The effect of "precession," ... would be to throw the beginning of the year, as thus determined, gradually later and later in the seasons, - roughly speaking by a day in every seventy years, - and the time came, no doubt, when it was noticed that the terrestrial seasons no longer bore their traditional relation to the year. ...

There is a set of symbols repeated over and over again on Babylonian monuments, and always given a position of eminence; - it is the so-called "Triad of Stars," a crescent lying on its back and two stars near it. They are seen very distinctly on the boundary stone from the Louvre, - the picture on page 318, and also immediately above the head of the Sun-god in the tablet from Sippar, on page 322. Their significance is now clear ... The "triad of three stars," then, is simply a picture of what men said, year after year, in the sunset sky at the beginning of the first month, six thousand years ago. It is the earliest record of an observation that has come down to us." Pages 322, 323

Maunder, Walter Edward. F.R.A.S. Astronomy of the Bible. T. Sealey Clark & Co. London. 1908.
Call No. QB 19. M3.

The Hebrews used three words in their references to the moon, the first of which, chodesh, derived from a root meaning 'to be new,' indicates the fact that the new moon, as actually observed, governed their calendar.

Generally speaking, chodesh is employed where either reference is made to the shape or newness of the crescent moon, or where "month" is used in any precise way. This is the word for "month" employed throughout by the prophet Ezekiel, who is so precise in the dating of his prophecies. Pages 82, 83.

95

213 308
213
95 cycles 1805

27 1834
27
1807 years

12

1 2 3

1582 1600 1700 1800 1900

2

Gregori

30th = 4 - 5d = Eg. 1:1
6th = 6 - 5d = Eg. 8:1
7th = 5 - 10d = Eg. 20:1
9th = 10 - 10d = Eg. 24:1
11th = 1 - 1d = Eg. 26:1
10th = 10 - 12d = Eg. 29:1
27th = 1 - 1d = Eg. 29:17
11th = 3 - 1d = Eg. 31:1
12th = 12 - 1d = Eg. 32:1
12th = 10 - 6d = Eg. 33:21
25th = 1 - 10d = Eg. 40:1

1 Mac. 4:52 = 25 Caslev
1 Mac. 7:43 = 13 Adar
1 Mac. 9:3 = First month
1 Mac. 9:54 = Second month
1 Mac. 13:51 = Second month
1 Mac. 14:27 = 18 Elul
1 Mac. 16:14 = Shebat
2 Mac. 1:9, 18 and 10:5 = Month Caslev
2 Mac. XI:21 = 24 Dioscorus Letter of Lysias
2 Mac. XI:30 = 30 Xanthicus See Index to Josephus.
" :33, 38 = 15 Xanthicus (59 -
2 Mac. XV:36 = 13 Adar

Apocrypha - Charles - Vol. II - page 244.
"Full moon exactly on the day," etc

Copy

See Casparii, p. 10 f and Idelor, I, p. 512, ff
Intercalary year = Sanhedrin 1.2 and Rosh hashana 2.9, and 3.1.

"In the six hundredth year of Noah's life, in the second month, the seventeenth day of the month, the same day were all the fountains of the great deep broken up, and the windows of heaven were opened." Gen. 7:11

"And it came to pass in the six hundredth and first year, . . . and in the second month, on the seven and twentieth day of the month, was the earth dried. And God spake unto Noah, saying, "Go forth of the ark, etc. Gen. 8:13-16.

More than two millenniums after the world was created, Moses wrote the account of the flood as given in Genesis 7 and 8. Throughout the books of Moses the months are always mentioned by numbers, with the exception of the first month of the year, sometimes called Abib. In the 7th and 8th of Genesis, almost a complete accounting is made of both the lunar and solar years. If a complete tabulation is made for the various periods mentioned, it will be found that seven or eight different months are provided out by number, but not by name. The story of the flood is a story of one year of Noah's life. He went into the ark in the 600th year, second month, 17th day, and came out in the second month of his 601st year, the 27th day. If this year be counted off month by months, according to the moon, which is the calculation of the Pentateuch, it will be found to tally as follows:

Second	17th day,	(29)	13	Noah enters the ark on the
Third	(Sivan)		30	17th instant and leaves on the
Fourth	(Tammuz)		29	27th. This fact alone should
Fifth	(Ab)		30	call attention that the
Sixth	(Elul)		29	virtual event here described
Seventh	(Tisri)		30	is dealing with the lunar
Eighth	(Heshvan)		29	month and the solar year.
Ninth	(Kisleu)		30	Consequently, when the
Tenth	(Tebet)		29	lunar months between the
Eleventh	(Shebat)		30	dates given are found (including)
Twelfth	(Adar)		29	to embrace exactly 365
First	(Nisan)		30	days,
Second	(Iyar)		27	
			365	

From this table it will be seen that a tropical year of 365 days marked the length of one year of Noah's life, and that it corresponded to the time between Iyar 17 of Noah's year 600, and Iyar 27 of Noah's year 601. Moses reckoned this period as exactly one year, for in Gen. 7: he says that Noah was 600 years old when the flood came, and in Gen. 9:28,29 he says that Noah lived 350 years after the flood and 950 years altogether. Therefore the ~~first year~~ flood year, or first year of the 350-year period was a 365-day year. That Moses counted the period of the flood to be just a year in length may be concluded from his language in Genesis where he specifically speaks of Noah entering the ark in his 600th year, and leaving in the 601st year in the same month. In as much as there are just 10 days difference (+ a few hours) between a common lunar year and a common solar year, it is at once significant that

Other basis of calculation would bring total up to 365-day year.

ANNUAL METEREOLOGICAL REPORT OF THE RAINFALL IN PALESTINE*

Driest months from April to October.

	Year	Inches	Days	Year	Inches	Days	Year	Inches	Days	Year	Inches	Days	Year	Inches	Days
January	1899	6.46		1904	8.85		1909	7.11	11						
February		3.30			1.31			3.06	7						
March		3.21			5.67			0.47	6						
April		1.29			.98			5.15	11						
October								1.69	4						
November								0.91	5						
December		6.35			14.02			2.03	3						
	1900			1905			1910								
January		2.50			4.17			6.57	8						
February		10.72			7.58			1.94	9						
March		1.85			6.51			10.54	19						
April		0.14			1.39			1.5	5						
October								.29	1						
November								2.07	6						
December		5.32			13.72			1.48	7						
	1901			1906			1911								
January		7.42			7.02										
February		0.15			7.95										
March		1.24			2.70										
April		0.23			5.71										
October															
November															
December		5.42			1.94										
	1902			1907			1912								
January		8.28			7.27	14		9.10	14						
February		1.49			3.93	11		2.02	10						
March		1.66			4.59	12		2.13	5						
April		1.21			1.14	7		0.95	6						
October								3.	5						
November								0.56	7						
December		5.55			5.00			5.07	12						
	1903			1908			1913								
January		7.34			8.03	17		6.27	19						
February		2.74			7.11	10		5.95	13						
March		3.38			2.26	6		2.24	6						
April		0.35			2.10	7		2.34	6						
October								.40	2						
November								1.21	10						
December		2.66			8.32	10		6.82	15						

* Taken from Quarterly Statements of Palestinean Exploration Fund. Years 1899 to 1920.

"The former and latter rains are usually in November and March." Quarterly Statement of Palestine Exploration Fund. 1913, page 45.

(2) The title is of very frequent occurrence in the Roman inscriptions. (Mommsen, Inscr. Regni Neap. n. 2555 = Corp. Insc. Lat. vol. x. n. 1893 at Murano, near Naples: Ti. Claudius Philippus dia viu et gerusiarches). We have already met with it elsewhere, viz. in Antioch, Alexandria, and Berenice. It also occurs sometimes upon epitaphs found outside of Rome,[110] and we may add that Tertullian classes the priest, Levite, and archon together as Jewish officials.[111] According to all analogy elsewhere (comp. especially Alexandria and Berenice) it may be taken for granted, in the case of the Roman communities as well, that each of them would have several who would act as the managing committee of the . It would appear from the title which is repeatedly met with, that the archons were appointed for a definite period; and in a Homilia in S. Johannis Natalem, ascribed to Chrysostom, and which has especially in view the state of matters in Italy during the imperial times, we are expressly informed that the archons were always elected in September, the beginning of the civil year of the Jews. The following are the ipsissima verba of this interesting passage: Inter haec intuendae sunt temporum qualitates et gesta morum; et primum perfidia Judaeorum, qui ~~in~~ semper in Deum et in Mosem contumaces exstiterunt, qui cum a Deo secundum Mosem initium anni mensem Martium acceperint, illi dictum pravitatis sive superbiae exercentes mensem Septembrem, ipsum novum annum nuncupant, quo et mense magistratus sibi designant, quos Archontas vocant.[118] [This homily (according to Wesseling, De Judaeorum archontibus, chap. x.) is to be found in Chrysostomi Opp. vol. ii. ed. Paris 1687. As I have no means of consulting this edition, I quote the passage as given by Wesseling.] Schürer, Emil, "History of the Jewish People," Second Division, part II, p. 250. Scribner's, New York.

Translation: "Among these things the nature and business of the times and customs are to be looked into; and first of all the perfidy of the Jews, who always stood up boldly against God and Moses, who, although they received from God according to Moses the month of March as the beginning of the year, exercising a command of perverseness and pride, named the month of September as the new year itself, even in which month, they appointed for themselves magistrates, whom they call archons."

[111] Tertu

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[111] Tertu

Translation from French – EB-7.18.40.

Dec. 20, 1939
Excerpt made by: New York Public Library
Fifth Ave & 42nd St.

From: Geminus of Rhodes, "Introduction aux phénomènes célestes", transl. by Abbé Halma
Paris, 1819.

pp. 50-51. "The moon does not show the same phases always on the same days but rather the days change from month to month due to the irregularity of her movement. For she appears as a crescent at the earliest in the ~~the~~ neomenia and at the latest as from the third day; she remains in this state sometimes until the fifth day or at the most until the seventh. She becomes dichotomous at the earliest on the sixth day & at the latest towards the eighth; she becomes gibbous (protuberant?) or ~~biconvex~~ double convex at the earliest on the tenth day, and at the latest on the thirteenth. The full moon arrives at the earliest the 13th and at the latest

on the 17th of the month. She again becomes double convex at the earliest when she rises on the 18th day, and at the latest towards (about!) the 22th. ~~Sch~~ She again becomes dichotomous at the earliest towards (about!) the 21st, and at the latest towards (about!) the 23rd. Finally, she again appears as a crescent at the earliest on the 25th, and at the latest on the 26th. So the time of a month lasts is 29 1/2 1/3 days. For one month is the time which passes as from one conjunction to the next, or from one full moon to the next. The conjunction takes place when sun & moon meet at the same point which happens in the triacade (thirtieth day)."

"La lune ne montre pas les mêmes phases dans tous les mêmes jours, mais dans des jours qui changent de mois en mois, par suite de l'irrégularité de son mouvement. Car elle paroît en faucille au plus tôt dans la néoménie, et au plus tard dès le troisième jour; elle demeure dans cet état quelquefois jusqu'au cinquième, ou tout au plus jusqu'au septième. Elle devient dichotome au plus tôt le sixième jour, et au plus tard vers le huitième; elle paroît gibbeuse ou biconvexe au plus tôt le dixième jour, et au plus tard le treizième. La pleine-lune arrive au plus tôt le 13, et au plus tard le 17 du mois. Elle redevient biconvexe au plus tôt quand elle se lève le dix-huitième jour, et au plus tard vers le vingt-deuxième. Elle redevient dichotome au plus tôt vers le 21, et au plus tard vers le 23. Enfin elle reparoît en faucille au plus tôt le 25, et au plus tard le 26. Or tout le temps de la durée d'un mois est de 29 $\frac{1}{2}$ $\frac{1}{3}$ jours. Car un mois est le temps qui s'écoule d'une conjonction à la suivante, ou d'une pleine-lune à la suivante. Or la conjonction se fait dans le temps où lé soleil et la lune répondent au même point, ce qui arrive dans le triacade (au trentième jour.)"

From: Geminus, of Rhodes.
Introduction aux phénomènes célestes, traduite par l'abbe Halma. [Paris, 1819.] Pages 50-51.

December 20, 1939

"--if a ship going westward is approaching the 180th meridian near midnight of Saturday, August 2, for example, the navigator enters the new day in his log-book as Monday, August 4, thus losing Sunday out of the week; but if the ship is going eastward, and is approaching the meridian near midnight of Sunday, August 3, for example, he enters the new day in his log-book as Sunday, August 3, thus repeating the Sunday of that week.

Thus the calendar of the traveler in making the circuit of the world is kept in agreement with the calendar of any country he may visit, including that of his own home, when he returns to it.

Greenwich noon is then, the only instant at which the date can be the same all around the world.

Strictly the navigator should make the change at the instant of crossing the meridian; but all counting of time is a convention, to suit the convenience of the people concerned; and so navigators have agreed that when on the open sea, they will make the change at the midnight nearest to the time of actual crossing."--Flint, Albert S., "The Changing of the Date at the 180th Meridian." Popular Astronomy, Vol.XXVII (1919), Northfield, Minnesota.

(Albert Stowell Flint (1853-1923) was an astronomer and computer at the U.S. Naval Observatory).

"Krusenstern, in his 'Voyage around the World,' says: 'On the 29th April (1806) we had made three hundred and sixty degrees of the Greenwich meridian from east to west. I therefore altered my reckoning; and as we had lost a day, called the next the 1st of May.'"--Hinks, Arthur R., "Nautical Time and Civil Date." Geographical Journal, Vol. LXXXVl, 1935, p. 152.

"International Date Line," by Roscoe Lamont. Popular Astronomy, Vol. XXlX (1921), page 340.

Dutton, Captain Benjamin, "Navigation and Nautical Astronomy.

Because of the variance between the 180th meridian and the irregular international date-line, each day lasts for 25 hours and 12 minutes. For this reason, three different days exist at the same time. When it is 12:01 A.M., Wednesday, at Cape Deshnef, Siberia, it is 11:17 A.M., Tuesday, at Greenwich, England, and 10:49 P.M., Monday on Attu Island at the extreme west of the Aleutian group.

EXTRA COPY

"PRIDEAUX'S CONNECTION," Oxford, at the University Press. MDCCCLI. Vol. 1.

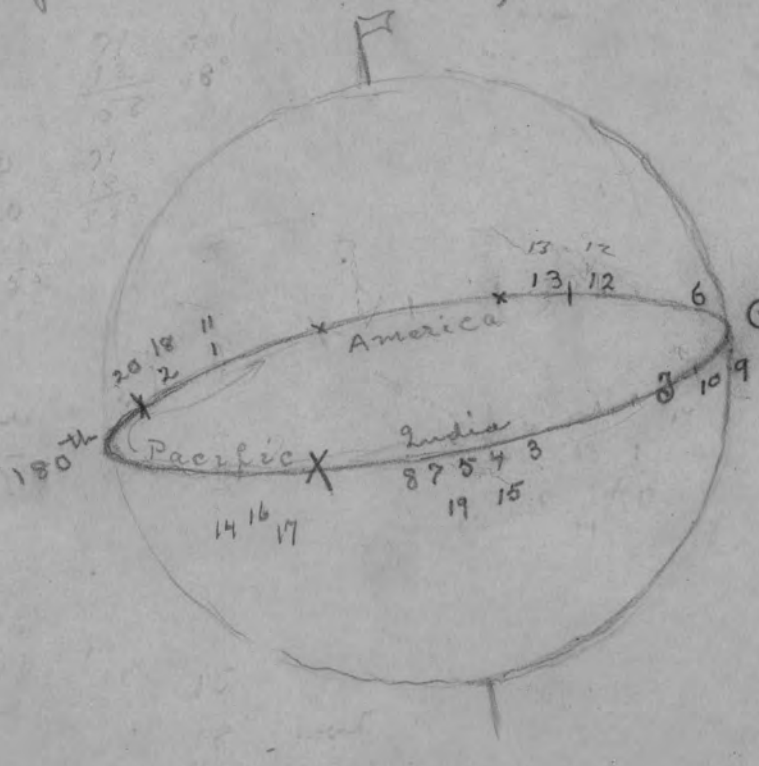
Quoted from the 24-page Preface of Aug. 1, 1715:--"The year I compute by in the annals is the Julian year, which begins from the first of January; and to this I reduce all the actions I treat of, though they were originally reckoned by other forms. . . . The Syrians and Phoenecians begun their year from the autumnal equinox, and so did also the Hebrews, till their coming up out of the land of Egypt. But that happening in the konth of Nisan, in commemoration of this deliverance they afterwards begun their year from the beginning of that month, which usually happened about the time of the vernal equinox. And this form they ever after made use of in the calculating of the times of their fasts and festivals, and all other ecclesiastical times and concerns. . . . Anciently the form of the year which they made use of was wholly inartificial: for it was not settled by any astronomical rules or calculations, but was made up of lunar months set out by the phasis or appearance of the moon. When they saw the new moon, then they began their months, which sometimes consisted of twenty-nine days, and sometimes of thirty, according as the new moon did sooner or later appear. . . . So that their months consister of twenty-nine days and thirty days alternately. None of them had fewer than twenty-nine days, and therefore they never looked for the new moon before the night following the twenty-ninth day, and if they saw it, the next day was the first day of the following month. Neither had any of their months more than thirty days, and therefore they never looked for the new moon after the night following the thirtieth day; but then, if they saw it not, the concluded that the appearance was obstructed by the clouds, and made the next day the first of the following month, without expecting any longer; and of twelve of these months their common year consisted. But twelve lunar months falling eleven days short of a solar year, every one of these common years began eleven days sooner than the former; which in thirty-three years' time would carry back the beginning of the year through all the four seasons to the same point again, and get a whole year from the solar reckoning; (as is now done in Turkey, where this sort of year is in use;) for the remedying of which their usage was sometimes in the third year, and sometimes in the second, to cast in another month, and make their year then consist of thirteen months; whereby they constantly reduced their lunar year, as far as such an intercalation could effect it, to that of the sun, and never suffered the one, for any more than a month, at any time to vary from the other. And this they were forced to do for the sake of their festivals: for their feast of the passover, (the first day of which was always fixed to the middle of their month Nisan,) being to be celebrated by their eating of the paschal lamb, and the offering up of the wave shear, as the first-fruits of their barley harvest; . . . The passover could not be observed, till the lambs were grown fit to be eaten, and the barley fit to be reaped; not the Pentecost till the wheat was ripe: nor the feast of tabernacles, till the ingatherings of the vineyard and olive-yard were over. And therefore these festivals being fixed to these set seasons of the year, the making of the intercalation above mentioned was necessary for the keeping them within a month sooner or later always to them. . . . But in their intercalated years there was another month added after Adar, which they called Veadar, or the second Adar; and then their year consisted of thirteen months. . . . And after their Adar added their Veadar, which sometimes consisted of twenty-nine days, and sometimes of thirty, according as it happened. . . . When they were dispersed through all nations, they were forced to make use of cycles and astronomical calculations, for the fixing of their new moons and intercalations, and the times of their feasts, fasts, and other observances. . . . These having been the forms of the Jewish year, that is, the inartificial form used by the ancients in the land of Canaan, and the artificial and astronomical form now in use among the moderns throughout all their dispersions; according to neither of them can the days of the Jewish months be fixed to any certain days of the months in the Julian year. . . . We cannot, when we find the day of any Jewish month mentioned either in the Scriptures or in Josephus, reduce it exactly to its time in the Julian year, or there fix it any nearer, than within the compass of a month sooner or later."

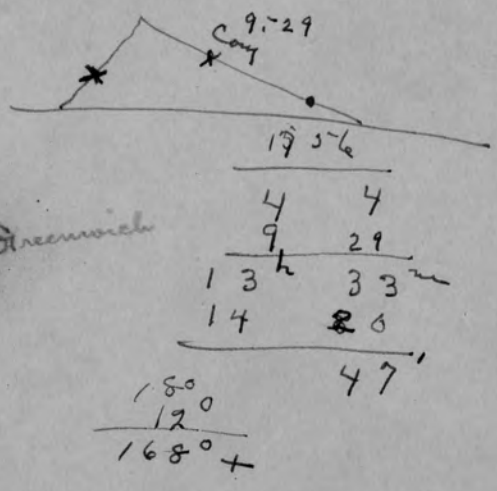
Visual observation

* = Leviticus

Tisri Conjunctions J.C.T. 22 hr: limit

				17 – 23
* 1832 = Sept.	24-9-29 (SS = 5:56)	= +168°	Pacific	1
1833 = Oct.	13-9-28 (SS = 5:32)	= +171°	Pacific	2
+ 1834 = Oct.	3-17-12 (SS = 5:44)	= − 73°	India	3
1835 = Oct.	22-16-47 (SS = 5:22)	= − 73°	India	4
1836 = Oct.	10-15-49 (SS = 5:36)	= − 84°	India	5
1837 = Oct.	29-22-21 (SS = 5:15)	= + 36°	Great Britain	6
1838 = Oct.	18-16-46 (SS = 5:26)	= − 75°	India	7
1839 = Oct.	7-16-34 (SS = 5:40)	= − 75°	India	8
* 1840 = Sept.	25-20-47 (SS = 5:54)	= − 22°	Turkey	9
1841 = Oct.	14-18-47 (SS = 5:31)	= − 46°	Arabia	10
1842 = Oct.	4-8-44 (SS = 5:43)	= +160°	Pacific	11
1843 = Oct.	24-1-13 (SS = 5:21)	= + 50 53	Atlantic	12 America
< 1844 = Oct.	12-1-45 (SS = 5:(80)33)	= + 58°	Atlantic	13
+ 1845 = Oct.	1-13-19 (SS = 5:47)	= − 132	Australia, Japan	14
+ 1846 = Sept.	20-17-54 (SS = 6:00)	= − 67°	Persia, Turkestan, Russia	15
1847 = Oct.	9-11-27 (SS = 5:37)	= − 158°	Pacific Islands	16
+ 1848 = Sept.	27-11-56 (SS = 5:52)	= − 165°	Pacific "	17
1849 = Oct.	16-7-34 (SS = 5:28)	= + 144°	Pacific	18
1850 = Oct.	5-17-16 (SS = 5:42)	= − 71°	India	19
* 1851 = Sept.	25-8-32 (SS = 5:54)	= +161°	Pacific Islands	20





DAY AND DATE OF DAY OF ATONEMENT FOR MORE THAN ONE HUNDRED YEARS

1824 - Sabbath, October 2
1825 - Thursday, September 22
1826 - Wednesday, October 11
1827 - Monday, October 1
1828 - Thursday, September 18
1829 - Wednesday, October 7
1830 - Monday, September 27
1831 - Sabbath, September 17
1832 - Thursday, October 4
1833 - Monday, September 23
1834 - Monday, October 13
1835 - Sabbath, October 3
1836 - Wednesday, September 21
1837 - Monday, October 9
1838 - Sabbath, September 29
1839 - Wednesday, September 18
1840 - Wednesday, October 7
1841 - Sabbath, September 25
1842 - Wednesday, September 14
1843 - Wednesday, October 4
1844 - Monday, September 23
1845 - Sabbath, October 11
1846 - Wednesday, September 30
1847 - Monday, September 20
1848 - Sabbath, October 7
1849 - Wednesday, September 26
1850 - Monday, September 16
1851 - Monday, October 6
1852 - Thursday, September 23
1853 - Wednesday, October 12
1854 - Monday, October 2
1855 - Sabbath, September 22
1856 - Thursday, October 9
1857 - Monday, September 28
1858 - Sabbath, September 18
1859 - Sabbath, October 8
1860 - Wednesday, September 26
1861 - Sabbath, September 14
1862 - Sabbath, October 4
1863 - Wednesday, September 23
1864 - Monday, October 10
1865 - Sabbath, September 30
1866 - Wednesday, September 19
1867 - Wednesday, October 9
1868 - Sabbath, September 26
1869 - Wednesday, September 15
1870 - Wednesday, October 5
1871 - Monday, September 25
1872 - Sabbath, October 12
1873 - Wednesday, October 1
1874 - Monday, September 21
1875 - Sabbath, October 9
1876 - Thursday, September 28
1877 - Monday, September 17
1878 - Monday, October 7
1879 - Sabbath, September 27
1880 - Wednesday, September 15
1881 - Monday, October 3
1882 - Sabbath, September 23
1883 - Thursday, October 11
1884 - Monday, September 29
1885 - Sabbath, September 19
1886 - Sabbath, October 9
1887 - Wednesday, September 28
1888 - Sabbath, September 15
1889 - Sabbath, October 5
1890 - Wednesday, September 24
1891 - Monday, October 12
1892 - Sabbath, October 1
1893 - Wednesday, September 20
1894 - Wednesday, October 10
1895 - Sabbath, September 28
1896 - Thursday, September 17
1897 - Wednesday, October 6
1898 - Monday, September 26
1899 - Thursday, September 14
1900 - Wednesday, October 3
1901 - Monday, September 23
1902 - Sabbath, October 11
1903 - Thursday, October 1
1904 - Monday, September 19
1905 - Monday, October 9
1906 - Sabbath, September 29
1907 - Wednesday, September 18
1908 - Monday, October 5
1909 - Sabbath, September 25
1910 - Thursday, October 13
1911 - Monday, October 2
1912 - Sabbath, September 21
1913 - Sabbath, October 11
1914 - Wednesday, September 30
1915 - Sabbath, September 18
1916 - Sabbath, October 7
1917 - Wednesday, September 26
1918 - Monday, September 16
1919 - Sabbath, October 4
1920 - Wednesday, September 22
1921 - Wednesday, October 12
1922 - Monday, October 2
1923 - Thursday, September 20
1924 - October 8
1925 - Monday, September 28
1926 - Sabbath, September 18
1927 - Thursday, October 6
1928 - Monday, September 24
1929 - Monday, October 14
1930 - Thursday, October 2
1931 - Monday, September 21
1932 - Monday, October 10
1933 - Sabbath, September 30
1934 - Wednesday, September 19
1935 - Monday, October 7
1936 - Sabbath, September 28
1937 - Wednesday, September 15
1938 - Wednesday, October 5
1939 - Sabbath, September 23

From Jewish Year Book.

Boston Civil Time, 1844.

May	Nisan	June	Iyyar	July	Sivan	Aug	Tammuz	Sept.	Ab	Oct	Elul
1		1	14	1	15	1	16	1	18	1	18
2	14	2	15	2	16	2	17	2	19	2	19
3	15	3	16	3	17	3	18	3	20	3	20
4	16	4	17	4	18	4	19	4	21	4	21
5	17	5	18	5	19	5	20	5	22	5	22
6	18	6	19	6	20	6	21	6	23	6	23
7	19	7	20	7	21	7	22	7	24	7	24
8	20	8	21	8	22	8	23	8	25	8	25
9	21	9	22	9	23	9	24	9	26	9	26
10	22	10	23	10	24	10	25	10	27	10	27
11	23	11	24	11	25	11	26	11	28	11	28
12	24	12	25	12	26	12	27	12	29	12	29
13	25	13	26	13	27	13	28	13	30	13	Tishri 1
14	26	14	27	14	28	14	29	14	Elul 1	14	2
15	27	15	28	15	29	15	Ab 1	15	2	15	3
16	28	16	29	16	30	16	2	16	3	16	4
17	29	17	Sivan 1	17	Tamuz 1	17	3	17	4	17	5
18	30	18	2	18	2	18	4	18	5	18	6
19	Iyyar 1	19	3	19	3	19	5	19	6	19	7
20	2	20	4	20	4	20	6	20	7	20	8
21	3	21	5	21	5	21	7	21	8	21	9
22	4	22	6	22	6	22	8	22	9	22	10
23	5	23	7	23	7	23	9	23	10		
24	6	24	8	24	8	24	10	24	11		
25	7	25	9	25	9	25	11	25	12		
26	8	26	10	26	10	26	12	26	13		
27	9	27	11	27	11	27	13	27	14		
28	10	28	12	28	12	28	14	28	15		
29	11	29	13	29	13	29	15	29	16		
30	12	30	14	30	14	30	16	30	17		
31	13			31	15	31	17				

Contributed by Dr. Wood on July 27, 1939 and presented to Committee.

PASSOVER
FIRST CENTURY LUNATIONS
27 A.D. to 37 A.D.

The date April 13-16-51, 28 A.D. was from the
Naval Observatory, Washington, by Glenn H. Draper.
The Lunations are from New Moon to New Moon. Jer. CT.

"27-M 26-19-19	J[E] 11-18-19	A 28-17-19	N 14-16-19	J 31-15-19	33-A 18-14-19	J[Y] 5-13-19	S 21-12-19	D 7-11-19
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44
A 25- 8- 3	J[Y] 11- 7- 3	S 27- 6- 3	D 14- 5- 3	M 1- 4- 3	M 18- 3- 3	A 4- 2- 3	O 21- 1- 3	37-J[M] 6- 0- 3
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44
M[Y] 24-20-47	A 9-19-47	O 26-18-47	31-J[M] 12-17-47	32-M 30-16-47	J[E] 16-15-47	S 2-14-47	N 19-13-47	F 4-12-47
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44
J[E] 23- 9-31	S 8- 8-31	N 25- 7-31	F 11- 6-31	A 29- 5-31	J[Y] 16- 4-31	O 2- 3-31	D 19- 2-31	M 6- 1-31
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44
J[Y] 22-22-15	O 7-21-15	D 24-20-15	M 12-19-15	M 28-18-15	A 14-17-15	O 31-16-15	36-J[M] 17-15-15	37-A 4-14-15
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44
A 21-10-59	N 6- 9-59	30-J[M] 23- 8-59	31-A 11- 7-59*	J[E] 27- 6-59	S 13- 5-59	N 30- 4-59	F 16- 3-59	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
S 19-23-43	D 5-22-43	F 21-21-43	M 10-20-43	J[Y] 26-19-43	O 12-18-43	D 29-17-43	M 16-16-43	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
O 19-12-27	29-J[Y] 4-11-27	M-23-10-27	J[E] 9- 9-27	A 25- 8-27	N 11- 7-27	35-J[M] 28- 6-27	36-A 15- 5-27	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
N 18- 1-11	F 3- 0-11	30-A 21-23-11	J[Y] 8-22-11	S 23-21-11	D 10-20-11	F 26-19-11	M 14-18-11	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
D 17-13-55	M 4-12-55	M 21-11-55	A 7-10-55	O 23- 9-55	34-J[M] 9- 8-55	35-M 28- 7-55	J[E] 13- 6-55	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
28-J[M] 16- 2-39	29-A 3- 1-39	J[E] 20- 0-39	S 5-23-39	N 21-22-39	F 7-21-39	A 26-20-39	J[Y] 12-19-39	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
F 14-15-23	M 2-14-23	J[Y] 19-13-23	O 5-12-23	D 21-11-23	M 9-10-23	M 26- 9-23	A 11- 8-23	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
M 15- 4- 7	J[E] 1- 3- 7	A 18- 2- 7	N 4- 1- 7	33-J[M] 20- 0- 7	34-A 7-23- 7	J[E] 24-22- 7	S 9-21- 7	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
X 28-A 13-16-51	J[E] 30-15-51	S 16-14-51	D 3-13-51	F 18-12-51	M 7-11-51	J[Y] 24-10-51	O 9- 9-51	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
M 13- 5-35	J[Y] 30- 4-35	O 16- 3-35	32-J[M] 2- 2-35	M 20- 1-35	J[E] 6- 0-35	A 22-23-35	N 7-22-35	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
J[E] 11-18-19	A 28-17-19	N 14-16-19	J 31-15-19	33-A 18-14-19	J[Y] 5-13-19	S 21-12-19	D 7-11-19	
29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	29-12-44	
J[Y] 11- 7- 3	S 27- 6- 3	D 14- 5- 3	M 1- 4- 3	M 18- 3- 3-	A 4- 2- 3	O 21- 1- 3	37-J[M] 6- 0- 3	

PASSOVER
NEW MOON DATES - J.C.T.
(Draper)

A.D.		d h m
27	Mar.	26-19-41
28	Ap.	13-16-51
29	Ap.	2-21-15
30	Ap.	21-13-41
31	Ap.	10-14-51
32	Mar.	29-21-58
33	Ap.	17-20-20
34	Ap.	7-12-22

The 3 bottom lines are repeated at the top. *If this new moon in A.D. 31 should be April 10, as Draper gives it in his list, that would make the Passover Moon come in on Wednesday in that year.

" The New Moons for the year 27 A.D. were reckoned back from the date April 13-16-51, 28 A.D.

Amadon.

JULIAN CALENDAR

VARIOUS RECKONINGS OF THE PASSOVER - MOON DATES DURING THE MINISTRY OF CHRIST

ECLIPSES	DRAPER Naval Observatory J.C.T.		LUNATIONS* J.C.T.	METONIC CYCLE As reckoned back from 1927 - 1934 Passover Moons J.C.T.	GOODENOW Passover Moon Dates as reckoned from 1855, New Moon Jan. 18-6-3 G.C.T.
	Mar. 26-19-41 N.M. 14-18-22	A. D. 27	Mar. 26-19-19 N.M. 14-18-22		
	Apr. 10-14- 3 F.M.		Apr. 10-13-41 F.M.	Apr. 10-12-33	
	Apr. 13-16-51 N.M. 14-18-22	28	Apr. 13-16-51 N.M. 14-18-22		
	Mar. 29-22-29 F.M.		Mar. 29-22-29 F.M.	Mar. 29-21-21	
	Apr. 2-21-15 N.M. 14-18-22	29	Apr. 3- 1-39 N.M. 14-18-22		
	Apr. 17-15-37 F.M.		Apr. 17-20- 1 F.M.	Apr. 17-18-53	Apr. 17-3-30
	Apr. 21-13-41 N.M. 14-18-22	30	Apr. 21-23-11 N.M. 14-18-22		
Apr. 25-21- 7 G.C.T. 2-20.89	Apr. 6-19-19 F.M.		Apr. 7- 4-49 F.M.	Apr. 7- 3-41	Apr. 6-21- 0
Apr. 25-23-27.89 29-12-44	Apr. 10-14-51 N.M. 14-18-22	31	Apr. 11- 7-59 N.M. 14-18-22		
Mar. 27-10-43 at Jerusalem C.T. Full Moon	Mar. 26-20-29 F.M.		Mar. 27-13-37 F.M.¤	Mar. 27-12-29	Mar. 27-11-45
	Mar. 29-21-58 N.M. 14-18-22	32	Mar. 30-16-47 N.M. 14-18-22		
Apr. 14-13-24	Apr. 13-16-20 F.M.		Apr. 14-11- 9 F.M.	Apr. 14-10- 1	Apr. 14-10-30
	Apr. 17-20-20 N.M. 14-18-22	33	Apr. 18-14-19 N.M. 14-18-22		
Apr. 3-20-24	Apr. 3- 1-58 F.M.		Apr. 3-19-57 F.M.	Apr. 3-18-49	Apr. 3-16-25
	Apr. 7-12-22 N.M. 14-18-22	34	Apr. 7-23- 7 N.M. 14-18-22		
	Apr. 22- 6-44 F.M.		Apr. 22-17-29 F.M.	Apr. 22-16-21	Apr. 22- 8-30

¤ Usher also agrees with Hales that this Passover Moon was Mar. 27

*Lunations were computed backward and forward from Mar. 29, 28, A.D.

All of the DATES given in these columns were obtained by entirely different methods, which are subject to discussion. But it is of importance to note how nearly they all agree.

Amadon

y observe only one day of the festivals (with the exception
.) while the latter observe two days" (Palestine Exploration
"Branksome," Keswick Road, Fetcham, Leatherhead, Surrey, Eng
the date October 22 or 23, appearing a few times in 1844
harmony with Jewish custom, and may be accounted

he Argument

No. 2881 page 116

⊙ eclipse Dec 26

2 B.C.

No. 1860 page 343

☾ eclipse

Jan 9, 1 B.C.

$23^h\ 14^m$ U.T.

Midnight Cry, June 20, 1844.

P. 389, col. 2

Midnight Cry, August 22, 1844

April Beers Connecticut Almanac Fair Haven
astronom. Calculations corrected by Yale College.

April 17 (Wed) Sun sets 6:37 Moon sets
18 (Thur) Sun sets 6:38 Moon sets 7:48

United States Almanac 1844
Boston
Gives many States South

Beers Connecticut Almanac
Goodrich

David Young. Phelon.

Miscellaneous

AC901.M5 Almanac for 1846

AY420.B7B7 Brockville (Canadian) Almanac 1844

AY420.M7M7 Montreal Pocket Al. 1844

AY256.N5H8 Hutchins Improved Almanac 1844 By David Young Phelon.
Newark N. J. 1834
1836
Published by 1837
Ben. Olds. 1839

Oct. 11
Montreal Sun sets 5:21
Oct. 12 " " 5:19
" " Moon sets 5:28.

Montreal
April 17 Sun sets 6:49
" 18 " " 6:50
" " Moon sets 8:11

שָׁמוֹר Kal infin. abso. שָׁמַר "Observe"

שָׁמַרְתָּ Kal perf. 2nd per. s. m עָשָׂה to do

לַעֲשׂוֹת Kal infin. const. "

מִשְׁפָּטִים N. m. pl. "observances"

24 2800

UNION THEOLOGICAL SEMINARY
BROADWAY AT 120TH STREET
NEW YORK

Sept. 19, 1939.

Dear Mr. Loasby:-

In Dt. 16' "observe" is preferable, in the sense of take good care. שמר might be = שקד as elsewhere in such connections in Deut.

Ex. 12[42] appears to mean: "a night of vigils was this for Yahweh to lead forth... That means, this night is to be (or shall be) one of vigils for Yahweh on the part of [or by] all the Israelites...

There is no consensus of opinion on this text, but the foregoing seems to me to be the most reasonable interpretation.

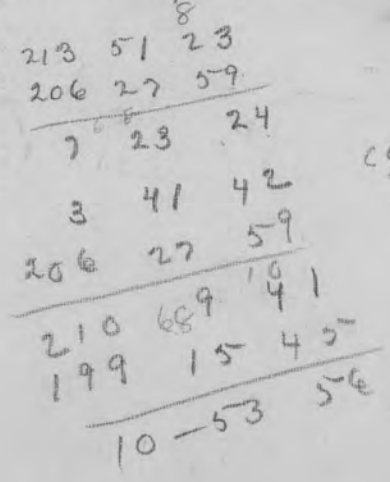
With kindest regards and good wishes,

I am sincerely yours,

Julius A. Bewer.

The moment when three stars of the second magnitude become visible = zet ha-kokabim.

In places of the same latitude the time of zet ha-kokabim varies according to their longitude. Like any other point of time, it travels at the rate of one degree in four minutes from meridian along any of the parallel circles, and arrives again at the starting-point in twenty-four hours. The question now arises which is to be considered the first meridian. At which point of the circle do the 24 hours begin? The problem has been discussed by R. Judah ha-Levi in his "Cuzari" (ii. 11,) and although he seems inclined to take the meridian of Sinai or of Jerusalem as the first, the meridian 90 degrees east of Jerusalem was accepted as the starting-point



JEWISH CALENDAR BASED ON POSTULATE 1

1838 Nis	April	Siv	June	Ab	Aug	Tis	Oct	Kis	Dec	She	Feb	Vea	Apr	Iyar	June	Tam	Aug
13	10	14	9	15	8	16	7	16	6	18	4	18	5	19	4	20	3
14	11	15	10	16	9	17	8	17	7	19	5	19	6	20	5	21	4
15	12	16	11	17	10	18	9	18	8	20	6	20	7	21	6	22	5
16	13	17	12	18	11	19	10	19	9	21	7	21	8	22	7	23	6
17	14	18	13	19	12	20	11	20	10	22	8	22	9	23	8	24	7
18	15	19	14	20	13	21	12	21	11	23	9	23	10	24	9	25	8
19	16	20	15	21	14	22	13	22	12	24	10	24	11	25	10	26	9-11
20	17	21	16	22	15	23	14	23	13	25	11	25	12	26	11-17	27	10
21	18	22	17	23	16	24	15	24	14	26	12	26	13	27	12	28	11
22	19	23	18	24	17	25	16	25	15	27	13	27	14-1	28	13	29	12
23	20	24	19	25	18	26	17	26	16	28	14-5	28	15	29	14	A 1	13
24	21	25	20	26	19	27	18-16	27	17-2	29	15	29	16	S 1	15	B 2	14
25	22	26	21	27	20-6	28	19	28	18	30	16	N 1	1 17	I 2	16	3	15
26	23	27	22-4	28	21	29	20	29	19	A 1	17	I 2	9 18	V 3	17	4	16
27	24-9	28	23	29	22	30	21	T 1	20	D 2	18	S 3	3 19	A 4	18	5	17
28	25	29	24	30	23	H 1	22	E 2	21	A 3	19	A 4	9 20	N 5	19	6	18
29	26	30	25	E 1	24	E 2	23	B 3	22	R 4	20	N 5	21	6	20	7	19
30	27	T 1	26	L 2	25	S 3	24	E 4	23	5	21	6	22	7	21	8	20
I 1	28	A 2	27	U 3	26	V 4	25	T 5	24	6	22	7	23	8	22	9	21
Y 2	29	M 3	28	L 4	27	A 5	26	6	25	7	23	8	24	9	23	10	22
A 3	30	M 4	29	5	28	N 6	27	7	26	8	24	9	25	10	24	11	23
R 4	1 M	U 5	30	6	29	7	28	8	27	9	25	10	26	11	25	12	24-23
5	2 A	Z 6	1 J	7	30	8	29	9	28	10	26	11	27	12	26	13	25
6	3 Y	7	2 U	8	31	9	30 N	10	29	11	27	12	28-21	13	27-2	14	26
7	4	8	3 L	9	1 S	10	31 O	11	30	12	28-10	13	29	14	28	15	27
8	5	9	4 Y	10	2 E	11	1 V	12	31-2	13	1 M	14	30	15	29	16	28
9	6	10	5	11	3 P	12	2-2	13	1 J	14	2 A	15	1 M	16	30	17	29
10	7	11	6	12	4-T8	13	3	14	2 A	15	3 R	16	2 A	17	1 J	18	30
11	8	12	7-16	13	5	14	4	15	3 N	16	4	17	3 Y	18	2 U	19	31
12	9-19	13	8	14	6	15	5	16	4	17	5	18	4	19	3 L	20	1 S
13	10	14	9	15	7	16	6	17	5	18	6	19	5	20	4 Y	21	2 E
14	11	15	10	16	8	17	7	18	6	19	7	20	6	21	5	22	3 P
15	12	16	11	17	9	18	8	19	7	20	8	21	7	22	6	23	4 T
16	13	17	12	18	10	19	9	20	8	21	9	22	8	23	7	24	5
17	14	18	13	19	11	20	10	21	9	22	10	23	9	24	8	25	6
18	15	19	14	20	12	21	11	22	10	23	11	24	10	25	9	26	7
19	16	20	15	21	13	22	12	23	11	24	12	25	11	26	10	27	8-0
20	17	21	16	22	14	23	13	24	12	25	13	26	12	27	11-1	28	9
21	18	22	17	23	15	24	14	25	13	26	14	27	13-1	28	12	29	10
22	19	23	18	24	16	25	15	26	14	27	15-16	28	14	29	13	30	11
23	20	24	19	25	17	26	16	27	15-17	28	16	29	15	30	14	E 1	12
24	21	25	20	26	18-23	27	17-10	28	16	29	17	30	16	T 1	15	L 2	13
25	22	26	21-16	27	19	28	18	29	17	30	18	I 1	17	A 2	16	U 3	14
26	23-18-	27	22	28	20	29	19	1	18	V 1	19	Y 2	18	M 3	17	L 4	15
27	24	28	23	29	21	30	20	S 2	19	E 2	20	A 3	19	M 4	18	5	16
28	25	29	24	T 1	22	K 1	21	H 3	20	A 3	21	R 4	20	U 5	19	6	17
29	26	A 1	25	I 2	23	I 2	22	E 4	21	D 4	22	5	21	Z 6	20	7	18
S 1	27	B 2	26	S 3	24	S 3	23	B 5	22	A 5	23	6	22	7	21	8	19
I 2	28	3	27	R 4	25	L 4	24	A 6	23	R 6	24	7	23	8	22	9	20
V 3	29	4	28	I 5	26	E 5	25	T 7	24	7	25	8	24	9	23	10	21
A 4	30	5	29	6	27	U 6	26	8	25	8	26	9	25	10	24	11	22
N 5	31	6	30	7	28	7	27	9	26	9	27	10	26	11	25	12	23-9
6	1 J	7	31	8	29	8	28	10	27	10	28	11	27	12	26-13	13	24
7	2 U	8	1 A	9	30 O	9	29	11	28	11	29	12	28-21	13	27	14	25
8	3 N	9	2 U	10	1 C	10	30	12	29-18-	12	30-4	13	29	14	28	15	26
9	4 E	10	3 G	11	2 T	11	1-13	13	30	13	31	14	30	15	29	16	27
10	5	11	4	12	3-17	12	2 D	14	31	14	1 A	15	31	16	30	17	28
11	6	12	5	13	4	13	3 E	15	1 F	15	2 P	16	1 J	17	31	18	29
12	7	13	6-0	14	5	14	4 C	16	2 E	16	3 R	17	2 U	18	1 A	19	30
13	8-7	14	7	15	6	15	5	17	3 B	17	4	18	3 N	19	2 U	20	1 O
													E		G		C
																	T

Year 1939 (spring)--Embolismic

1839 JEWISH CALENDAR BASED ON POSTULATE I

Elul	Oct	Hes	Nov	Teb	Jan	Adar	Mar	Iyar	May	Tam	July	Elul	Sept	Hes	Nov	Teb	Jan
21	2	20	29	19	26	18	24	17	21	16	18	15	14	14	11	13	8
22	3	21	30	20	27	19	25	18	22	17	19	16	15	15	12	14	9
23	4	22	1 D	21	28	20	26	19	23	18	20	17	16	16	13	15	10
24	5	23	2 E	22	29	21	27	20	24	19	21	18	17	17	14	16	11
25	6	24	3 C	23	30	22	28	21	25	20	22	19	18	18	15	17	12
26	7-16	25	4	24	31 F	23	29	22	26	21	23	20	19	19	16	18	13
27	8	26	5	25	1 E	24	30 A	23	27	22	24	21	20	20	17	19	14
28	9	27	6-5	26	2 B	25	31 P	24	28	23	25	22	21	21	18	20	15
29	10	28	7	27	3-16	26	1 R	25	29	24	26	23	22	22	19	21	16
T 1	11	29	8	28	4	27	2-17	26	30	25	27	24	23	23	20	22	17
I 2	12	K 1	9	29	5	28	3	27	31-9	26	28-23	25	24	24	21	23	18
S 3	13	I 2	10	S 1	6	29	4	28	1 J	27	29	26	25-20	25	22	24	19
R 4	14	S 3	11	H 2	7	N 1	1 5	29	2 U	28	30	27	26	26	23	25	20
I 5	15	L 4	12	E 3	8	I 2	8 6	S 1	3 N	29	31	28	27	27	24-4	26	21
6	16	E 5	13	B 4	9	S 3	4 7	I 2	4 E	A 1	1 A	29	28	28	25	27	22-19
7	17	U 6	14	A 5	10	A 4	0 8	V 3	5	B 2	2 U	T 1	29	29	26	28	23
8	18	7	15	T 6	11	N 5	9	A 4	6	3	3 G	I 2	30	30	27	29	24
9	19	8	16	7	12	6	10	N 5	7	4	4	S 3	1 O	K 1	28	S 1	25
10	20	9	17	8	13	7	11	6	8	5	5	R 4	2 C	I 2	29	H 2	26
11	21	10	18	9	14	8	12	7	9	6	6	I 5	3 T	S 3	30	E 3	27
12	22-18	11	19	10	15	9	13	8	10	7	7	6	4	L 4	1 D	B 4	28
13	23	12	20-15	11	16	10	14	9	11	8	8	7	5	E 5	2 E	A 5	29
14	24	13	21	12	17-16	11	15	10	12	9	9	8	6	U 6	3 C	T 6	30
15	25	14	22	13	18	12	16-22	11	13	10	10	9	7	7	4	7	31
16	26	15	23	14	19	13	17	12	14	11	11	10	8	8	5	8	1 F
17	27	16	24	15	20	14	18	13	15-5	12	12	11	9	9	6	9	2 E
18	28	17	25	16	21	15	19	14	16	13	13-9	12	10	10	7	10	3 B
19	29	18	26	17	22	16	20	15	17	14	14	13	11-9	11	8	11	4
20	30	19	27	18	23	17	21	16	18	15	15	14	12	12	9-6	12	5
21	31	20	28	19	24	18	22	17	19	16	16	15	13	13	10	13	6-4
22	1 N	21	29	20	25	19	23	18	20	17	17	16	14	14	11	14	7
23	2 O	22	30	21	26	20	24	19	21	18	18	17	15	15	12	15	8
24	3 V	23	31	22	27	21	25	20	22	19	19	18	16	16	13	16	9
25	4	24	1 J	23	28	22	26	21	23	20	20	19	17	17	14	17	10
26	5	25	2 A	24	29	23	27	22	24	21	21	20	18	18	15	18	11
27	6-10	26	3 N	25	1 M	24	28	23	25	22	22	21	19	19	16	19	12
28	7	27	4-23	26	2 A	25	29 M	24	26	23	23	22	20	20	17	20	13
29	8	28	5	27	3 R	26	30 A	25	27	24	24	23	21	21	18	21	14
30	9	29	6	28	4-6	27	1 Y	26	28	25	25	24	22	22	19	22	15
H 1	10	30	7	29	5	28	2-2	27	29-16	26	26	25	23	23	20	23	16
E 2	11	T 1	8	30	6	29	3	28	30	27	27-9	26	24	24	21	24	17
S 3	12	E 2	9	A 1	7	30	4	29	1 J	28	28	27	25-11	25	22	25	18
V 4	13	B 3	10	D 2	8	I 1	5	30	2 U	29	29	28	26	26	23-23	26	19
A 5	14	E 4	11	A 3	9	Y 2	6	T 1	3 L	30	30	29	27	27	24	27	20
N 6	15	T 5	12	R 4	10	A 3	7	A 2	4 Y	1	31	30	28	28	25	28	21-13
7	16	6	13	5	11	R 4	8	M 3	5	E 2	1 S	H 1	29	29	26	29	22
8	17	7	14	6	12	5	9	M 4	6	L 3	2 E	E 2	30	T 1	27	30	23
9	18	8	15	7	13	6	10	U 5	7	U 4	3 P	S 3	31	E 2	28	A 1	24
10	19	9	16	8	14	7	11	Z 6	8	L 5	4 T	V 4	1 N	B 3	29	D 2	25
11	20	10	17	9	15	8	12	7	9	6	5	A 5	2 O	E 4	30	A 3	26
12	21-4	11	18	10	16	9	13	8	10	7	6	N 6	3 V	T 5	31	R 4	27
13	22	12	19-2	11	17	10	14	9	11	8	7	7	4	6	1 J	5	28
14	23	13	20	12	18-6	11	15	10	12	9	8	8	5	7	2 A	6	1 M
15	24	14	21	13	19	12	16-13	11	13	10	9	9	6	8	3 N	7	2 A
16	25	15	22	14	20	13	17	12	14-19	11	10	10	7	9	4	8	3 R
17	26	16	23	15	21	14	18	13	15	12	11	11	8	10	5	9	4
18	27	17	24	16	22	15	19	14	16	13	12	12	9-20	11	6	10	5
19	28	18	25	17	23	16	20	15	17	14	13	13	10	12	7-17	11	6

Full Moons--Blue New Moons--Red This period not Embolismic

JEWISH CALENDAR BASED ON POSTULATE I

1841 Adar	Mar	Iyar	May	Tam	July	Elul	Aug	Hes	Oct	1842 Teb	Dec	She Adar	Feb	Nis	Apr	Siv	June
12	7-15	11	4	10	1	9	28	8	25	7	22	6	18	5	17	4	14
13	8	12	5-16	11	2	10	29	9	26	8	23	7	19	6	18	5	15
14	9	13	6	12	3-20	11	30	10	27	9	24	8	20	7	19	6	16
15	10	14	7	13	4	12	31	11	28	10	25	9	21	8	20	7	17
16	11	15	8	14	5	13	1-3	12	29	11	26	10	22	9	21	8	18
17	12	16	9	15	6	14	2 S	13	30-8	12	27	11	23	10	22	9	19
18	13	17	10	16	7	15	3 E	14	31	13	28-8	12	24	11	23	10	20
19	14	18	11	17	8	16	4 P	15	1 N	14	29	13	25-6	12	24	11	21
20	15	19	12	18	9	17	5 T	16	2 O	15	30	14	26	13	25-1	12	22-23
21	16	20	13	19	10	18	6	17	3 V	16	31	15	27	14	26	13	23
22	17	21	14	20	11	19	7	18	4	17	1 J	16	28	15	27	14	24
23	18	22	15	21	12	20	8	19	5	18	2 A	17	29 M	16	28	15	25
24	19	23	16	22	13	21	9	20	6	19	3 N	18	30 A	17	29	16	26
25	20	24	17	23	14	22	10	21	7	20	4	19	31 R	18	30	17	27
26	21	25	18	24	15	23	11	22	8	21	5	20	4	19	1 M	18	28
27	22	26	19	25	16	24	12	23	9	22	6	21	5	20	2 A	19	29
28	23-4	27	20	26	17	25	13	24	10	23	7	22	6	21	3 Y	20	30
29	24	28	21-2	27	18-16	26	14	25	11	24	8	23	7	22	4	21	1 J
N 30	25	29	22	28	19	27	15-8	26	12	25	9	24	8	23	5	22	2 U
V 2	26	S 1	23	29	20	28	16	27	13-8	26	10	25	9	24	6	23	3 L
E 3	27	I 2	24	A 1	21	29	17	28	14	27	11-18	26	10	25	7	24	4 Y
A 4	28	V 3	25	B 2	22	T 1	18	29	15	28	12	27	11	26	8	25	5
D 5	29	A 4	26	3	23	I 2	19	K 1	16	29	13	28	12-8	27	9	26	6
A 6	30	N 5	27	4	24	S 3	20	I 2	17	S 1	14	29	13	28	10-13	27	7
R 7	31	6	28	5	25	R 4	21	S 3	18	R 2	15	30	14	29	11	28	8-9
8	1 A	7	29	6	26	I 5	22	L 4	19	E 3	16	Y 1	15	30	12	29	9
9	2 P	8	30	7	27	6	23	E 5	20	B 4	17	2	16	I 1	13	30	10
10	3 R	9	31 J	8	28	7	24	U 6	21	A 5	18	A 3	17	Y 2	14	T 1	11
11	4 I	10	1 U	9	29	8	25	7	22	T 6	19	D 4	18	A 3	15	A 2	12
12	5 L	11	2 N	10	30	9	26	8	23	7	20	A 5	19	R 4	16	M 3	13
13	6-3	12	3 E	11	31	10	27	9	24	8	21	R 6	20	5	17	M 4	14
14	7	13	4-6	12	1	11	28	10	25	9	22	7	21	6	18	U 5	15
15	8	14	5	13	2-12	12	29	11	26	10	23	8	22	7	19	Z 6	16
16	9	15	6	14	3 A	13	30-18	12	27	11	24	9	23	8	20	7	17
17	10	16	7	15	4 U	14	1 O	13	28-22	12	25	10	24	9	21	8	18
18	11	17	8	16	5 G	15	2 C	14	29	13	26-20	11	25	10	22	9	19
19	12	18	9	17	6 U	16	3 T	15	30	14	27	12	26-16	11	23	10	20
20	13	19	10	18	7 S	17	4	16	1 D	15	28	13	27	12	24-11	11	21
21	14	20	11	19	8 T	18	5	17	2 E	16	29	14	28	13	25	12	22-13
22	15	21	12	20	9	19	6	18	3 C	17	30	15	29	14	26	13	23
23	16	22	13	21	10	20	7	19	4	18	31	16	30	15	27	14	24
24	17	23	14	22	11	21	8	20	5	19	1 F	17	31	16	28	15	25
25	18	24	15	23	12	22	9	21	6	20	2 E	18	1 A	17	29	16	26
26	19	25	16	24	13	23	10	22	7	21	3 B	19	2 P	18	30	17	27
27	20	26	17	25	14	24	11	23	8	22	4	20	3 R	19	31	18	28
28	21-16	27	18	26	15	25	12	24	9	23	5	21	4 I	20	1 J	19	29
29	22	28	19-9	27	16-23	26	13	25	10	24	6	22	5 L	21	2 U	20	30
M 29	23	29	20	28	17	27	14	26	11	25	7	23	6	22	3 N	21	31
N 1	24	30	21	29	18	28	15-8	27	12-23	26	8	24	7	23	4 E	22	1 A
I 2	25	T 1	22	30	19	29	16	28	13	27	9	25	8	24	5	23	2 U
S 3	26	A 2	23	E 1	20	30	17	29	14	28	10-14	26	9	25	6	24	3 G
A 4	27	M 3	24	L 2	21	M 1	18	30	15	29	11	27	10	26	7	25	4
N 5	28	M 4	25	M 3	22	E 2	19	T 1	16	30	12	28	11-0	27	8	26	5
6	29	N 5	26	L 4	23	S 3	20	E 2	17	A 1	13	29	12	28	9-0	27	6-17
7	30	E 6	27	5	24	V 4	21	B 3	18	2	14	N 1	13	29	10	28	7
8	1 M	7	28	6	25	A 5	22	E 4	19	A 3	15	I 2	14	S 1	11	29	8
9	2 A	8	29	7	26	N 6	23	T 5	20	R 4	16	S 3	15	I 2	12	A 1	9
10	3 Y	9	30	8	27	7	24	6	21	5	17	A 4	16	V 3	13	B 2	10
												N		A N			

1841

Full Moons--Blue New Moons--Red Year 1842 (spring)

Embolismic

1842-43=354 1843 4

JEWISH CALENDAR BASED ON POSTULATE I

Ab	Aug	Tis	Oct	Hes	Dec	Teb	Feb	Adar	Mar	9 Iyar	May	Tam	July	Elul	Sept	Hes	Nov
3	11	2	8	~~30~~	5	29	1 5:34	28	31-2-	27	28 15	26	25	25	21	24	18
4	12	3	9	K 1	6	S 1	2	29	1 A	28	29-9-	27	26	26	22	25	19
5	13	4	10	I 2	7	H 2	3	N 1	2 P	29	30	28	27-8-3	27	23 13	26	20
6	14	5	11	S 3	8	E 3	4	I 2	3 RS	1	31	29	28	28	24-1-	27	21-19-54
7	15	6	12	L 4	9	B 4	5	S 3	4 II	2	1 JA	1	29	29	25	28	22
8	16	7	13	E 5	10	A 5	6	A 4	5 LV	3	2 UB	2	30	T 1	26	29	23
9	17	8	14	U 6	11	T 6	7	N 5	6 A	4	3 N	3	31	I 2	27	21	24
10	18	9	15	7	12	7	8	6	7 N	5	4 E	4	1	A S 3	28	K 1	25
11	19	10	16	8	13	8	9	7	8	6	5	5	2	U R 4	29	I 2	26
12	20 34	11	17	9	14	9	10	8	9	7	6	6	3	G I 5	30	S 3	27
13	21-4-	12	18 33	10	15	10	11	9	10	8	7	7	4	6	1	O L 4	28
14	22	13	19-13-	11	16 7	11	12	10	11	9	8	8	5	7	2	C E 5	29
15	23	14	20	12	17-21-	12	13 30	11	12	10	9	9	6	8	3	T U 6	30
16	24	15	21	13	18	13	14-22-	12	13 50	11	10	10	7	9	4	7	1 D
17	25	16	22	14	19	14	15	13	14-16-	12	11 31	11	8	10	5	8	2 E
18	26	17	23	15	20	15	16	14	15	13	12-9-	12	9 15	11	6	9	3 C
19	27	18	24	16	21	16	17	15	16	14	13	13	10-7-	12	7 37	10	4
20	28	19	25	17	22	17	18	16	17	15	14	14	11	13	8-13-	11	5
21	29	20	26	18	23	18	19	17	18	16	15	15	12	14	9	12	6
22	30	21	27	19	24	19	20	18	19	17	16	16	13	15	10	13	7-2-21
23	31	22	28	20	25	20	21	19	20	18	17	17	14	16	11	14	8
24	1 S	23	29	21	26	21	22	20	21	19	18	18	15	17	12	15	9
25	2 E	24	30 N	22	27	22	23	21	22	20	19	19	16	18	13	16	10
26	3 P	25	31 O	23	28	23	24	22	23	21	20	20	17	19	14	17	11
27	4 T 26		1 V 28	24	29	24	25	23	24	22	21	21	18	20	15	18	12
28	5-0-	27	2-18-	25	30 23	25	26	24	25	23	22	22	19	21	16	19	13
29	6	28	3	26	31-21-	26	27	25	26	24	23	23	20	22	17	20	14
30	7 6:17	29	4	27	1 J	27	28 23	26	27	25	24	24	21	23	18	21	15
E 1	8	30	5 5:09	28	2 A	28	1-8-	27	28 39	26	25	25	22	24	19	22	16
L 2	9	H 1	6 30	29	3 N	29	2 M	28	29-18-	27	26 41	26	23	25	20	23	17
U 3	10	E 2	7	T 1	4 5:10	30	3 A	29	30	28	27-21-	27	24 56	26	21	24	18
L 4	11	S 3	8	E 2	5	A 1	4 R	30	1 M	29	28	28	25-16-	27	22 56	25	19
5	12	V 4	9	B 3	6	D 2	5	I 1	2 A	30	29	29	26	28	23-9-	26	20
6	13	A 5	10	E 4	7	A 3	6 5:54	Y 2	3 Y	1	30	30	27	29	24	27	21-7-29
7	14	6	11	T 5	8	R 4	7	A 3	4 T	2	1 JE	1	28	30	25	28	22
8	15	7	12	6	9	5	8	R 4	5 A	3	2 UL	2	29	H 1	26 30	29	23
9	16	8	13	7	10	6	9	5	6 M	4	3 LU	3	30	E 2	27	T 1	24
10	17	9	14	8	11	7	10	6	7 M	5	4 YL	4	31	S 3	28	E 2	25
11	18 54	10	15	9	12	8	11	7	8 U	6	5	5	1	S V 4	29	B 3	26
12	19-20-	11	16	10	13	9	12	8	9 Z	7	6	6	2	E A 5	30	E 4	27
13	20	12	17 50	11	14	10	13	9	10	8	7	7	3	P N 6	31	T 5	28
14	21	13	18-5-	12	15 48	11	14	10	11	9	8	8	4	T 7	1	N 6	29
15	22	14	19	13	16-10-	12	15 19	11	12	10	9	9	5	8	2	O 7	30
16	23	15	20	14	17	13	16-8-	12	13 55	11	10 26	10	6	9	3	V 8	31
17	24	16	21	15	18	14	17	13	14-0-	12	11-19-	11	7 18	10	4	9	1 J
18	25	17	22	16	19	15	18	14	15	13	12	12	8-21-	11	5	10	2 A
19	26	18	23	17	20	16	19	15	16	14	13	13	9	12	6 42	11	3 N
20	27	19	24	18	21	17	20	16	17	15	14	14	10	13	7-7-	12	4 55
21	28	20	25	19	22	18	21	17	18	16	15	15	11	14	8	13	5-19-
22	29	21	26	20	23	19	22	18	19	17	16	16	12	15	9	14	6
23	30	22	27	21	24	20	23	19	20	18	17	17	13	16	10	15	7
24	1 O	23	28	22	25	21	24	20	21	19	18	18	14	17	11	16	8
25	2 C	24	29	23	26	22	25	21	22	20	19	19	15	18	12	17	9
26	3 T 25		30	24	27	23	26	22	23	21	20	20	16	19	13	18	10
27	4-8-	26	1 35	25	28	24	27	23	24	22	21	21	17	20	14	19	11
28	5	27	2-6-	26	29 22	25	28	24	25	23	22	22	18	21	15	20	12
29	6 5:40	28	3 D	27	30-14-	26	29	25	26	24	23	23	19	22	16	21	13
T 1	7	29	4 E	28	31	27	30	26	27	25	24	24	20	23	17	22	14

C 5:00

1 8 4 4

Full Moons--Blue New Moons--Red

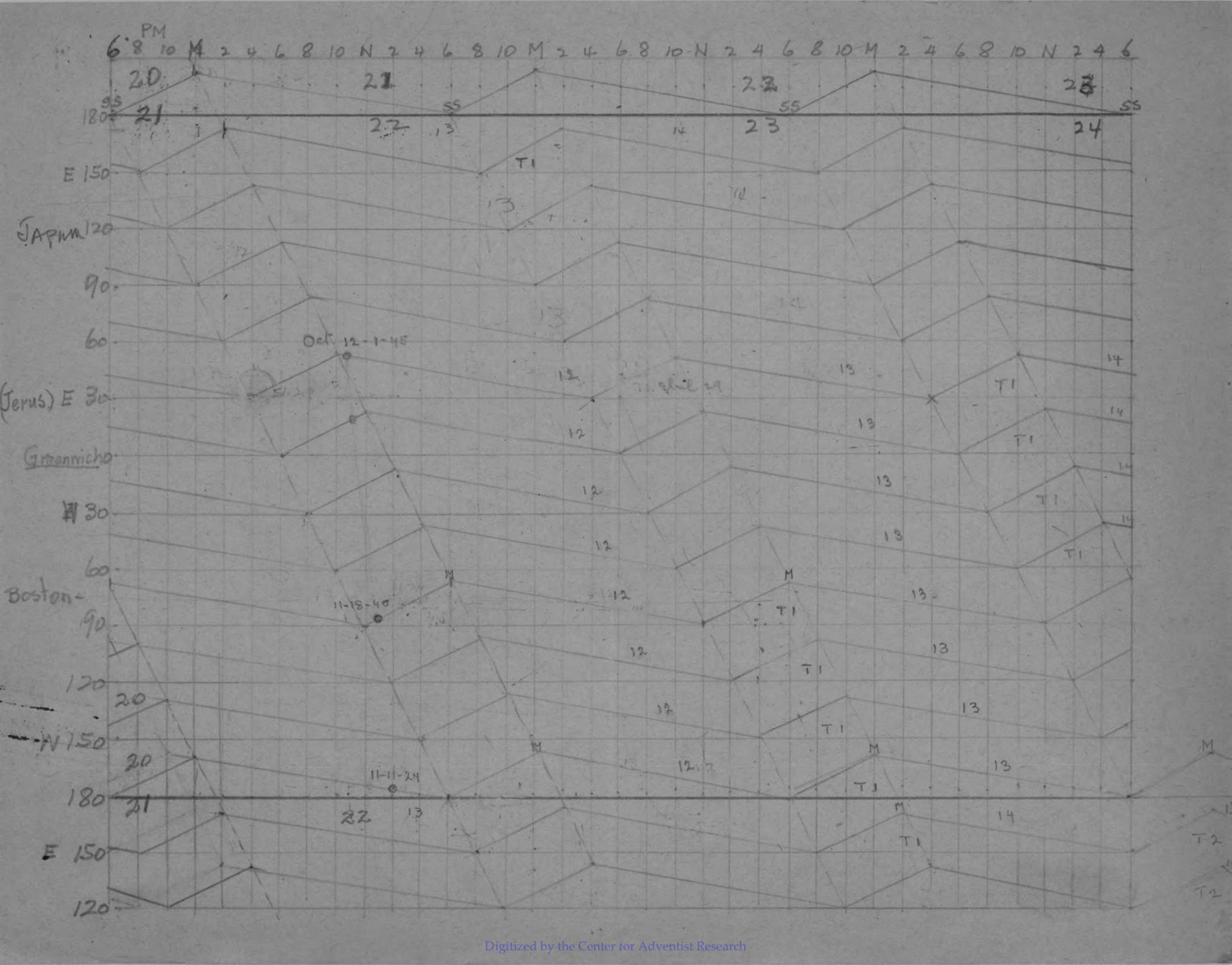
No Embolism in this period

1844-45 = 355 days

1844 JEWISH CALENDAR BASED ON POSTULATE I

Teb	Jan	Adar	Mar	Nisan	May	Siv	July	Ab	Sept	Tis	Nov	Kis	Jan
23	15	23	14	23	12	23	10	23	7	23	5	22	3
24	16	24	15	24	13	24	11	24	8	24	6	23	4
25	17	25	16	25	14	25	12	25	9	25	7	24	5
26	18 39	26	17	26	15	26	13	26	10	26	8	25	6
27	19-20-	27	18 38	27	16 14	27	14 44	27	11	27	9 57	26	7
28	20	28	19-2-	28	17-11-	28	15-16-	28	12-15	28	10-11-	27	8-9-33
29	21 5:25	29	20	29	18	29	16	29	13	29	11	28	9
S 1	22	30	21 6:11	30	19 6:50	30	17 7:04	30	14 6:08	30	12 5:04	29	10
H 2	23	V 1	22	I 1	20	T 1	18	E 1	15	H 1	13	30	11ss=5:16
E 3	24	E 2	23	Y 2	21	A 2	19	L 2	16	E 2	14	T 1	12=3-7-43
B 4	25	A 3	24	A 3	22	M 3	20	U 3	17	S 3	15	E 2	13
A 5	26	D 4	25	R 4	23	M 4	21	L 4	18	V 4	16	B 3	14
T 6	27	A 5	26	5	24	U 5	22	5	19	A 5	17	E 4	15
7	28	R 6	27	6	25	Z 6	23	6	20	6	18	T 5	16
8	29	7	28	7	26	7	24	7	21	7	19	6	17
9	30	8	29	8	27	8	25	8	22	8	20	7	18
10	31	9	30	9	28	9	26	9	23	9	21	8	19
11	1 F	10	31	10	29	10	27	10	24	10	22	9	20
X12	2 E	11	1 A	11	30	11	28	11	25	11	23	10	21
13	3 B	12	2 P	12	31	12	29-16	12	26-15	12	24	11	22
14	4-11	13	3-R9	13	1-1	13	30	13	27	13	25-2	12	23-16-41
15	5	14	4 I	14	2 J	14	31	14	28	14	26	13	24
16	6	15	5 L	15	3 U	15	1 A	15	29	15	27	14	25
17	7	16	6	16	4 N	16	2 U	16	30	16	28	15	26
18	8	17	7	17	5 E	17	3 G	17	1 O	17	29	16	27
19	9	18	8	18	6	18	4	18	2 C	18	30	17	28
20	10	19	9	19	7	19	5	19	3 T	19	1 D	18	29
21	11	20	10	20	8	20	6	20	4	20	2 E	19	30
22	12	21	11	21	9	21	7	21	5	21	3 C	20	31
23	13	22	12	22	10	22	8	22	6	22	4	21	1 F
24	14	23	13	23	11	23	9	23	7	23	5	22	2 E
25	15	24	14	24	12	24	10	24	8	24	6	23	3 B
26	16	25	15	25	13	25	11	25	9	25	7	24	4 R
27	17 6	26	16 58	26	14	26	12	26	10	26	8	25	5 U
28	18-11-	27	17-18-	27	15 47	27	13 52	27	11	27	9-22-33	26	6 A-20-56
29	19	28	18	28	16-2-	28	14-4-	28	12-1	28	10	27	7 R
30	20 5:51	29	19 6:31	29	17 7:05	29	15 6:45	29	13 5:32	29	11	28	8
A 1	21	N 1	20	S 1	18	A 1	16	T 1	14	30	12 ss 4:52	29	9 ss=5:42
D 2	22	I 2	21	I 2	19	B 2	17	I 2	15	K 1	13	S 1	10=2-20-46
A 3	23	S 3	22	V 3	20	3	18	S 3	16	I 2	14	H 2	11
R 4	24	A 4	23	A 4	21	4	19	R 4	17	S 3	15	E 3	12
5	25	N 5	24	N 5	22	5	20	I 5	18	L 4	16	B 4	13
6	26	6	25	6	23	6	21	1 6	19	E 5	17	A 5	14
7	27	7	26	7	24	7	22	8 7	20	U 6	18	T 6	15
8	28	8	27	8	25	8	23	4 8	21	7	19		
9	29	9	28	9	26	9	24	4 9	22	8	20		
10	1 M	10	29	10	27	10	25	10	23	9	21		
11	2 A	11	30	11	28	11	26	11	24	10	22		
12	3 R	12	1	12	29	12	27	12	25	11	23		
13	4-23	13	2-17	13	30-8	13	28-2	13	26-7	12	24-21		
14	5	14	3 M	14	1 J	14	29	14	27	13	25		
15	6	15	4 A	15	2 U	15	30	15	28	14	26		
16	7	16	5 Y	16	3 L	16	31	16	29	15	27		
17	8	17	6	17	4 Y	17	1 S	17	30	16	28		
18	9	18	7	18	5	18	2 E	18	31	17	29		
19	10	19	8	19	6	19	3 P	19	1 N	18	30		
20	11	20	9	20	7	20	4 T	20	2 O	19	31		
21	12	21	10	21	8	21	5	21	3 V	20	1 J 1 8 4 5		
22	13	22	11	22	9	22	6	22	4	21	2 A		

(2-18-24)



"The significance of the crescent being shown as lying on its back is seen at once when it is remembered that the new moon is differently inclined to the horizon according to the time of year when it is seen. It is most nearly upright at the time of the autumn 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." Page 316.

The method employed in very early times in Assyria and Babylonia for determining the first month of the year was a simple and effective one, the principle of which may be explained thus: If we watch for the appearance of the new moon in spring time, and, as we see it setting in the west, notice some bright star near it, then 12 months later we should see the two together again; but with this difference, that the moon and star would be seen together, not on the first, but on the second evening of the month. For since 12 lunar months fall short of a solar year by 11 days, the moon on the first evening would be about 11 degrees short of her former position. But as she moves about 13 degrees in 24 hours, the next evening she would be practically back in her old place. In the second year, therefore, moon and star would set together on the second evening of the first month; and in like manner they would set together on the third evening in the third year; and, roughly speaking, on the fourth evening of the fourth year. But this last conjunction would mean that they would also set together on the first evening of the next month, which would thus be indicated as the true first month of the year. Thus when moon and star set together on the third evening of a month, thirteen months later they would set together on the first evening of a month. Thus the setting together of moon and star would not only mark which was to be the first month of the year, but if they set together on the first evening it would show that the year then beginning was to be an ordinary one of 12 months; if on the third evening, that the year ought to be a full one of 13 (over)

DATES ON WHICH PASCHAL FULL MOONS OCCUR, by Lieut.-General Sir Charles Warren, K.C.B., F.R.S. Quarterly Statement Pales. Ex. Fund, April, 1900. P. 158.

The Gregorian calendar coincides with the Julian calendar during the period 200 A.D. to 300 A.D. That is to say, 10 da ys were taken off for the years A.D. 1100, 1000, 900, 700, 600, 500, 300, so that in adjusting the dates of the first century found in the Gregorian style to the Julian style, "two days must be subtracted for the years 200 and 100 A.D."

THE DATE OF THE CRUCIFIXION, by James Simpson, Esq. Q.S. Pal. Ex. Fund, Jan., 1907, page 52.

Caspari shows that it is quite unsafe to be guided by the Calendar of the modern Jews introduced by the Sanhedrim of Tiberias about A.D. 200, as it in many respects differs from that described in tradition; for according to tradition the 15th of Nisan, and consequently also the 1st, could fall on any day of the week. Cf. Chron. and Geog. Introduction to the Life of Christ (1868) by Ch. Ed. Caspari.

He also gives from Eusebius a quotation from Anatolius of Laodicea (3rd century) which cites from an ancient Jewish commentary written in the time of Ptolemy Philadelphus the rule that at the Paschal festival the sun as well as the moon must necessarily have passed the equinoctial point. It would therefore be interesting to know the exact hour, as well as day, of the Vernal Equinox, not only in the year 34, but in every other year which could possibly have been that of the Passion.

BABYLONIAN ASTRONOMY--HISTORICAL SKETCH, by A.T. Olmstead, in The American Journal of Semitic Languages and Literatures. April, 1938.

Despite constant assertions to the contrary, astronomy was not a science at a fabulously early time; its beginnings as a science date back only to the late Assyrian period, its best-known devotees lived under the Achaemenid Persians, its greatest triumphs were under Seleucid or even Parthian rule. . . Scientific astronomy was primarily developed from practical considerations and, in particular, from the need of adjusting the calendar. . . At a very early date the Egyptians had expanded a year of twelve months, 360 days, by five "additional days" not reckoned to any month, and thus produced a year of 365 days, very close to the true length of the year. But having made this great discovery, their innate conservatism prohibited further change, and thus, because of the nearly one-quarter day left out of the reckoning, the calendar slipped back approximately one day every four years until in 1460 years New Year's Day had made its appearance in every day of the solar year and was back again at its beginning. (Cf. J.H.Breasted, "The Beginnings of Time Measurement and the Origins of our Calendar," Scientific Monthly, LXI (1935), 289 ff.)

Nearly accurate as this Egyptian calendar was, the results did not appeal to the more practical Babylonians, who had no desire to see their seasons shifting through all the months. Their own solution of the problem was far less "scientific" and immensely more complicated, but it did bring the months approximately to their proper seasons; and the very complexity demanded a more highly developed skill which was directly responsible for the impressive discoveries of Babylonian astronomy. If the Egyptian calendar was the direct ancestor of our own, the Babylonian calendar brought about scientific astronomy.

The Babylonians operated with a year of twelve months, about 354 days. When it was discovered that a given month, say the "month in which cattle prospered," was some 30 days off from the seasonal calendar, a thirteenth month was added at the end of the year, which was then approximately 384 days in length. Henceforth, this system of intercalation was followed not only in Babylonia but in surrounding countries; it was the basis of the Hebrew calendar, as well as that of the Greeks and Romans before the reform of Caesar, and it still determines our church feasts.

Refinement of this system quickly followed, and by the third dynasty of Ur (2290-2183) there were rough cycles by which the intercalated month was inserted at a definite year in the cycle. So far as we can make out, the cycle was of eight years--a cycle too long followed by the Greeks.

1838 Nis April			Siv June			Ab Aug			Tis Oct			Kis Dec			1939 She Jan		
13	10-4-27		13	8-7-11		13	6-0-46		13	4		13	2		14	30	FULL MOONS
14	11		14	9		14	7		14	5		14	3		15	31	
15	12		15	10		15	8		15	6		15	4		16	1 F	
16	13		16	11		16	9		16	7		16	5		17	2 E	
17	14		17	12		17	10		17	8		17	6		18	3 B	
18	15		18	13		18	11		18	9		18	7		19	4 R	
19	16		19	14		19	12		19	10		19	8		20	5 U	
20	17		20	15		20	13		20	11		20	9		21	6 A	
21	18		21	16		21	14		21	12		21	10		22	7 R	
22	19		22	17		22	15		22	13		22	11		23	8 Y	
23	20		23	18		23	16		23	14		23	12		24	9	
24	21		24	19		24	17		24	15		24	13		25	10	
25	22		25	20		25	18		25	16		25	14		26	11	
26	23		26	21		26	19		26	17		26	15		27	12	
27	24-9-21		27	22-4-54		27	20-6-47		27	18-16-46		27	16		28	13	
28	25		28	23		28	21		28	19		28	17-2-43		29	14-5-49	NEW MOONS
29	26		29	24		29	22		29	20		29	18 5:00		30	15 5:47	
30	27 6:35		30	25 7:07		30	23 6:35		30	21 5:23		T 1	19		A 1	16	
I 1	28		T 1	26		E 1	24		H 1	22		E 2	20		D 2	17	
Y 2	29		A 2	27		L 2	25		E 2	23		B 3	21		A 3	18	
A 3	30		M 3	28		U 3	26		S 3	24		E 4	22		R 4	19	
R 4	1 M		M 4	29		L 4	27		V 4	25		T 5	23		5	20	
5	2 A		U 5	30		5	28		A 5	26		6	24		6	21	
6	3 Y		Z 6	1 J		6	29		N 6	27		7	25		7	22	
7	4		7	2 U		7	30		7	28		8	26		8	23	
8	5		8	3 L		8	31 S		8	29		9	27		9	24	
9	6		9	4 Y		9	1 E		9	30		10	28		10	25	
10	7		10	5		10	2 P		10	31		11	29		11	26	
11	8		11	6		11	3 T		11	1		12	30		12	27	
12	9-19-18		12	7-16-39		12	4-8-38		12	2-2-46		13	31-2-56		13	28-10-56	FULL MOONS
13	10		13	8		13	5		13	3 N		14	1 J		14	1 M	
14	11		14	9		14	6		14	4 O		15	2 A		15	2 A	
15	12		15	10		15	7		15	5 V		16	3 N		16	3 R	
16	13		16	11		16	8		16	6 E		17	4 U		17	4 C	
17	14		17	12		17	9		17	7 M		18	5 A		18	5 H	
18	15		18	13		18	10		18	8 B		19	6 R		19	6	
19	16		19	14		19	11		19	9 E		20	7 Y		20	7	
20	17		20	15		20	12		20	10 R		21	8		21	8	
21	18		21	16		21	13		21	11		22	9		22	9	
22	19		22	17		22	14		22	12		23	10		23	10	
23	20		23	18		23	15		23	13		24	11		24	11	
24	21		24	19		24	16		24	14		25	12		25	12	
25	22		25	20		25	17		25	15		26	13		26	13	
26	23-18-44		26	21-16-43		26	18-23-5		26	16		27	14		27	14	
27	24		27	22		27	19		27	17-10-23		28	15-17-14		28	15-16-33	NEW MOONS
28	25		28	23		28	20		28	18		29	16 5:21		29	16	
29	26 6:54		29	24 7:01		29	21 5:59		29	19 6:02		S 1	17		30	17 6:09	
S 1	27		A 1	25		T 1	22		K 1	20		H 2	18		V 1	18	
I 2	28		B 2	26		I 2	23		I 2	21		E 3	19		E 2	19	
V 3	29		3	27		S 3	24		S 3	22		B 4	20		A 3	20	
A 4	30		4	28		R 4	25		L 4	23		A 5	21		D 4	21	
N 5	31		5	29		I 5	26		E 5	24		T 6	22		A 5	22	
6	1 J		6	30		6	27		U 6	25		7	23		6	23	
7	2 U		7	31		7	28		7	26		8	24		7	24	
8	3 N		8	1 A		8	29		8	27		9	25		8	25	
9	4 E		9	2 U		9	30		9	28		10	26		9	26	
10	5		10	3 G		10	1 O		10	29		11	27		10	27	
11	6		11	4		11	2 C		11	30		12	28		11	28	
12	7		12	5		12	3 -17-7		12	1-13-55		13	29-18-1		12	29	FULL MOONS

Spring of 1939 = Embolismic.

Ve Mar	Iyar May	Tam July	Elul Sept	Hes Nov	Teb Jan	
13 30-4-39	13 28-13-6	13 26-13-46	13 23-9-30	13 21-4-34	13 19-2-54	FULL MOONS
14 31	14 29	14 27	14 24	14 22	14 20	
15 1 A	15 30	15 28	15 25	15 23	15 21	
16 2 P	16 31	16 29	16 26	16 24	16 22	
17 3 R	17 1 J	17 30	17 27	17 25	17 23	
18 4 I	18 2 U	18 31	18 28	18 26	18 24	
19 5 L	19 3 N	19 1 A	19 29	19 27	19 25	
20 6	20 4 E	20 2 U	20 30	20 28	20 26	
21 7	21 5	21 3 G	21 1 O	21 29	21 27	
22 8	22 6	22 4 U	22 2 C	22 30	22 28	
23 9	23 7	23 5 S	23 3 T	23 1 D	23 29	
24 10	24 8	24 6 T	24 4 O	24 2 E	24 30	
25 11	25 9	25 7	25 5 B	25 3 C	25 31	
26 12	26 10	26 8	26 6	26 4 E	26 1 F	
27 13	27 11-17-3	27 9-11-39	27 7-16-34	27 5 M	27 2 E	
28 14-1-38	28 12	28 10	28 8	28 6-4-21	28 3-16-19	NEW MOONS
29 15 6:27	29 13 7:03	29 11 6:48	29 9 5:37	29 7 5:00	29 4 5:38	
N 1 16	S 1 14	A 1 12	T 1 10	K 1 8	S 1 5 U	
I 2 17	I 2 15	B 2 13	I 2 11	I 2 9	H 2 6 A	
S 3 18	V 3 16	3 14	S 3 12	S 3 10	E 3 7 R	
A 4 19	A 4 17	4 15	R 4 13	L 4 11	B 4 8 Y	
N 5 20	N 5 18	5 16	I 5 14	E 5 12	A 5 9	
6 21	6 19	6 17	6 15	U 6 13	T 6 10	
7 22	7 20	7 18	7 16	7 14	7 11	
8 23	8 21	8 19	8 17	8 15	8 12	
9 24	9 22	9 20	9 18	9 16	9 13	
10 25	10 23	10 21	10 19	10 17	10 14	
11 26	11 24	11 22	11 20	11 18	11 15	
12 27 12th	12 25	12 23	12 21	12 19	12 16	
13 28-21-45	13 26	13 24-23-58	13 22-18-52	13 20-14-25	13 17-16-14	FULL MOONS
14 29	14 27-2-21	14 25	14 23	14 21	14 18	
15 30	15 28	15 26	15 24	15 22	15 19	
16 1 M	16 29	16 27	16 25	16 23	16 20	
17 2 A	17 30	17 28	17 26	17 24	17 21	
18 3 Y	18 1 J	18 29	18 27	18 25	18 22	
19 4	19 2 U	19 30	19 28	19 26	19 23	
20 5	20 3 L	20 31	20 29	20 27	20 24	
21 6	21 4 Y	21 1 S	21 30	21 28	21 25	
22 7	22 5	22 2 E	22 31	22 29	22 26	
23 8	23 6	23 3 P	23 1 N	23 30	23 27	
24 9	24 7	24 4 T	24 2 O	24 31	24 28	
25 10	25 8	25 5 E	25 3 V	25 1 J	25 29	
26 11	26 9	26 6 M	26 4 E	26 2 A	26 1 M	
27 12	27 10	27 7	27 5 M	27 3 N	27 2 A	
28 13-9-31	28 11-1-22	28 8-0-42	28 6 -10-32	28 4 -23-41	28 3 R	
29 14	29 12	29 9	29 7	29 5	29 4-6-26	NEW MOONS
30 15 6:48	30 13 7:05	30 10 6:13	30 8 5:07	30 6 5:12	30 5	
I 1 16	T 1 14	E 1 11	H 1 9	T 1 7	A 1 6	
Y 2 17	A 2 15	L 2 12	E 2 10	E 2 8	D 2 7	
A 3 18	M 3 16	U 3 13	S 3 11	B 3 9	A 3 8	
R 4 19	M 4 17	L 4 14	V 4 12	E 4 10	R 4 9	
5 20	U 5 18	5 15	A 5 13	T 5 11	5 10	
6 21	Z 6 19	6 16	N 6 14	6 12	6 11	
7 22	7 20	7 17	7 15	7 13	7 12	
8 23	8 21	8 18	8 16	8 14	8 13	
9 24	9 22	9 19	9 17	9 15	9 14	
10 25	10 23	10 20	10 18	10 16	10 15	
11 26	11 24	11 21	11 19	11 17	11 16	
12 27	12 25	12 22	12 20	12 18	12 17	

1840 Adar	Mar	Iyar	May	Tam	July	Elul	Sept	Hes	Nov	1841 Teb	Jan	
13	18-6-52	13	16-13-51	13	14-19-51	13	11-22-8	13	9-20-12	13	7-17-19	FULL MOONS
14	19	14	17	14	15	14	12	14	10	14	8	
15	20	15	18	15	16	15	13	15	11	15	9	
16	21	16	19	16	17	16	14	16	12	16	10	
17	22	17	20	17	18	17	15	17	13	17	11	
18	23	18	21	18	19	18	16	18	14	18	12	
19	24	19	22	19	20	19	17	19	15	19	13	
20	25	20	23	20	21	20	18	20	16	20	14	
21	26	21	24	21	22	21	19	21	17	21	15	
22	27	22	25	22	23	22	20	22	18	22	16	
23	28	23	26	23	24	23	21	23	19	23	17	
24	29	24	27	24	25	24	22	24	20	24	18	
25	30	25	28	25	26	25	23	25	21	25	19	
26	31	26	29	26	27	26	24	26	22	26	20	
27	1 A	27	30	27	28-23-49	27	25-20-47	27	23	27	21	
28	2-17-41	28	31-9-35	28	29	28	26	28	24-4-32	28	22-19-27	NEW MOONS
29	3 6:20	29	1 6:58	29	30 6:57	29	27 5:52	29	25 4:59	29	23 5:27	
N 1	4 A	S 1	2 J	A 1	31	T 1	28	K 1	26	S 1	24	
I 2	5 P	I 2	3 U	B 2	1 A	I 2	29	I 2	27	H 2	25	
S 3	6 R	V 3	4 N	3	2 U	S 3	30	S 3	28	E 3	26	
A 4	7 I	A 4	5 E	4	3 G	R 4	1 O	L 4	29	B 4	27	
N 5	8 L	N 5	6	5	4 U	I 5	2 C	E 5	30	A 5	28	
6	9	6	7	6	5 S	6	3 T	U 6	1 D	T 6	29	
7	10	7	8	7	6 T	7	4 O	7	2 E	7	30	
8	11	8	9	8	7	8	5 B	8	3 C	8	31	
9	12	9	10	9	8	9	6 E	9	4 E	9	1 F	
10	13	10	11	10	9	10	7 R	10	5 M	10	2 E	
11	14	11	12	11	10	11	8	11	6 B	11	3 B	
12	15	12	13	12	11	12	9	12	7 E	12	4 R	
13	16-22-16	13	14	13	12	13	10	13	8 R	13	5 U	
14	17	14	15-5-10	14	13-9-36	14	11-9-35	14	9-6-37	14	6 -4-26	FULL MOONS
15	18	15	16	15	14	15	12	15	10	15	7 R	
16	19	16	17	16	15	16	13	16	11	16	8 Y	
17	20	17	18	17	16	17	14	17	12	17	9	
18	21	18	19	18	17	18	15	18	13	18	10	
19	22	19	20	19	18	19	16	19	14	19	11	
20	23	20	21	20	19	20	17	20	15	20	12	
21	24	21	22	21	20	21	18	21	16	21	13	
22	25	22	23	22	21	22	19	22	17	22	14	
23	26	23	24	23	22	23	20	23	18	23	15	
24	27	24	25	24	23	24	21	24	19	24	16	
25	28	25	26	25	24	25	22	25	20	25	17	
26	29	26	27	26	25	26	23	26	21	26	18	
27	30	27	28	27	26	27	24	27	22	27	19	
28	1	28	29-16-19	28	27-9-4	28	25-11-19	28	23-23-45	28	20	
29	2-2-26	29	30	29	28	29	26	29	24	29	21-13-41	NEW MOONS
30	3 6:39	30	1 7:07	30	29 6:28	30	27 5:17	30	25 5:04	30	22 5:52	
I 1	4 M	T 1	2 J	E 1	30	H 1	28	T 1	26	A 1	23	
Y 2	5 A	A 2	3 U	L 2	31	E 2	29	E 2	27	D 2	24	
A 3	6 Y	M 3	4 L	U 3	1 S	S 3	30	B 3	28	A 3	25	
R 4	7	M 4	5 Y	L 4	2 E	V 4	31	E 4	29	R 4	26	
5	8	U 5	6	5	3 P	A 5	1 N	T 5	30	5	27	
6	9	Z 6	7	6	4 T	N 6	2 O	6	31	6	28	
7	10	7	8	7	5 E	7	3 V	7	1 J	7	1 M	
8	11	8	9	8	6 M	8	4 E	8	2 A	8	2 A	
9	12	9	10	9	7 B	9	5 M	9	3 N	9	3 R	
10	13	10	11	10	8 E	10	6 B	10	4 U	10	4 C	
11	14	11	12	11	9 R	11	7 E	11	5 A	11	5 H	
12	15	12	13	12	10	12	8 R	12	6 R	12	6	
									Y			

1841 Adar	Mar	Nis	May	Siv	July	Ab	Aug	Tis	Oct	1842 Kis	Dec	
13	7-15-57	13	5-16-26	13	3-20-49	13	31	13	29	12	27	
14	8	14	6	14	4	14	1-3-52	14	30-8-18	13	28-8-52	FULL MOONS
15	9	15	7	15	5	15	2 S	15	31	14	29	
16	10	16	8	16	6	16	3 E	16	1 N	15	30	
17	11	17	9	17	7	17	4 P	17	2 O	16	31	
18	12	18	10	18	8	18	5 T	18	3 V	17	1 J	
19	13	19	11	19	9	19	6 E	19	4 E	18	2 A	
20	14	20	12	20	10	20	7 M	20	5 M	19	3 N	
21	15	21	13	21	11	21	8 B	21	6 B	20	4 U	
22	16	22	14	22	12	22	9 E	22	7 E	21	5 A	
23	17	23	15	23	13	23	10 R	23	8 R	22	6 R	
24	18	24	16	24	14	24	11	24	9	23	7 Y	
25	19	25	17	25	15	25	12	25	10	24	8	
26	20	26	18	26	16	26	13	26	11	25	9	
27	21	27	19	27	17	27	14	27	12	26	10	
28	22	28	20	28	18-16-23	28	15	28	13-7-50	27	11-18-36	
29	23-4-57	29	21-2-4	29	19	29	16-23-53	29	14	28	12	NEW MOONS
30	24 6:13	30	22 6:51	30	20 7:03	30	17 6:04	30	15 5:02	29	13	
V 1	25	I 1	23	T 1	21	E 1	18	H 1	16	30	14 5:19	
E 2	26	Y 2	24	A 2	22	L 2	19	E 2	17	T 1	15	
A 3	27	A 3	25	M 3	23	U 3	20	S 3	18	E 2	16	
D 4	28	R 4	26	M 4	24	L 4	21	V 4	19	B 3	17	
A 5	29	5	27	U 5	25	5	22	A 5	20	E 4	18	
R 6	30	6	28	Z 6	26	6	23	N 6	21	T 5	19	
7	31	7	29	7	27	7	24	7	22	6	20	
8	1 A	8	30	8	28	8	25	8	23	7	21	
9	2 P	9	31	9	29	9	26	9	24	8	22	
10	3 R	10	1 J	10	30	10	27	10	25	9	23	
11	4 I	11	2 U	11	31	11	28	11	26	10	24	
12	5 L	12	3 N	12	1 A	12	29	12	27	11	25	
13	6-3-52	13	4-6-3	13	2-12-22	13	30-18-39	13	28-20-58	12	26-20-10	FULL MOONS
14	7	14	5	14	3 G	14	1 O	14	29	13	27	
15	8	15	6	15	4 U	15	2 C	15	30	14	28	
16	9	16	7	16	5 S	16	3 T	16	1 D	15	29	
17	10	17	8	17	6 T	17	4 O	17	2 E	16	30	
18	11	18	9	18	7	18	5 B	18	3 C	17	31	
19	12	19	10	19	8	19	6 E	19	4 E	18	1 F	
20	13	20	11	20	9	20	7 R	20	5 M	19	2 E	
21	14	21	12	21	10	21	8	21	6 B	20	3 B	
22	15	22	13	22	11	22	9	22	7 E	21	4 R	
23	16	23	14	23	12	23	10	23	8 R	22	5 U	
24	17	24	15	24	13	24	11	24	9	23	6 A	
25	18	25	16	25	14	25	12	25	10	24	7 R	
26	19	26	17	26	15	26	13	26	11	25	8 Y	
27	20	27	18	27	16-23-53	27	14-18-47	27	12-23-55	26	9	
28	21-16-52	28	19-9-35	28	17	28	15	28	13	27	10-14-15	NEW MOONS
29	22 6:32	29	20 7:07	29	18 6:40	29	16 5:28	29	14	28	11	
N 1	23	S 1	21	A 1	19	T 1	17	30	15 5:00	29	12 5:45	
I 2	24	I 2	22	B 2	20	I 2	18	K 1	16	S 1	13	
S 3	25	V 3	23	3	21	S 3	19	I 2	17	H 2	14	
A 4	26	A 4	24	4	22	R 4	20	S 3	18	E 3	15	
N 5	27	N 5	25	5	23	I 5	21	L 4	19	B 4	16	
6	28	6	26	6	24	6	22	E 5	20	A 5	17	
7	29	7	27	7	25	7	23	U 6	21	T 6	18	
8	30	8	28	8	26	8	24	7	22	7	19	
9	1 M	9	29	9	27	9	25	8	23	8	20	
10	2 A	10	30	10	28	10	26	9	24	9	21	
11	3 Y	11	1 J	11	29	11	27	10	25	10	22	
12	4	12	2 U	12	30	12	28	11	26	11	23	
			L									
			Y									

Embolism = 1841

October 12 1^h 45^m (Perigee Oct. 13 $\wedge$ 14° south equator) SS on Elul 29 = 5:32

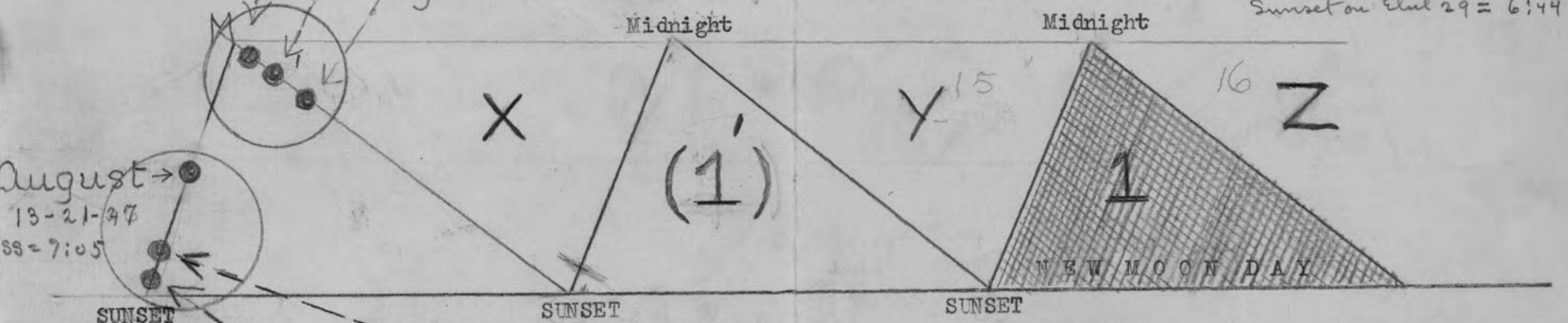
JERUSALEM

June 16 2^h 23^m (Perigee = June 13 6^h = 21° N Declination and Long. 1° 2° S)

Sunset = 7:04

August 14 4^h 31^m (Perigee = Aug 21 = 7° N Declination and Long 4° 59' 9

Sunset on Elul 29 = 6:44



August →
13-21-47
SS = 7:05

June 15 19^h 42^m SS = 7:36

Phasis

October 11 18^h 40^m
SS = 5:26

BOSTON

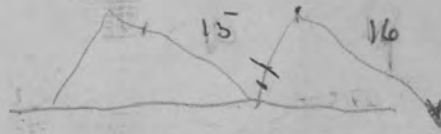
2-13
29- 5
21 -18

4 -18
18
25 36
1-23 -54

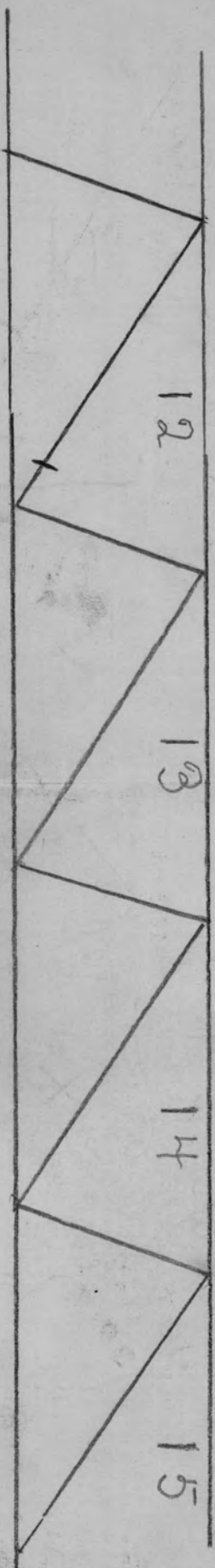
4 ?
3 4

2-13
19 5

4 -14
19 36
23 -50



Apr.	15	Nis. 16	Nisan 17
May	29	178	Iyar 29
June	30	172	Sivan 30
July	31		Tam 29
Aug	31	173	Ab 30
Sept.	30	172	Elul 29
Oct.	31	2	Tisri 30
Nov.	30		Hesvan 30
Dec.	31		Kislev 29
Jan	31		Tebet 29
Feb	29		Shebat 30
Mar	31		Adar 30
Apr			Veadar 29
May			Nisan 12
			393

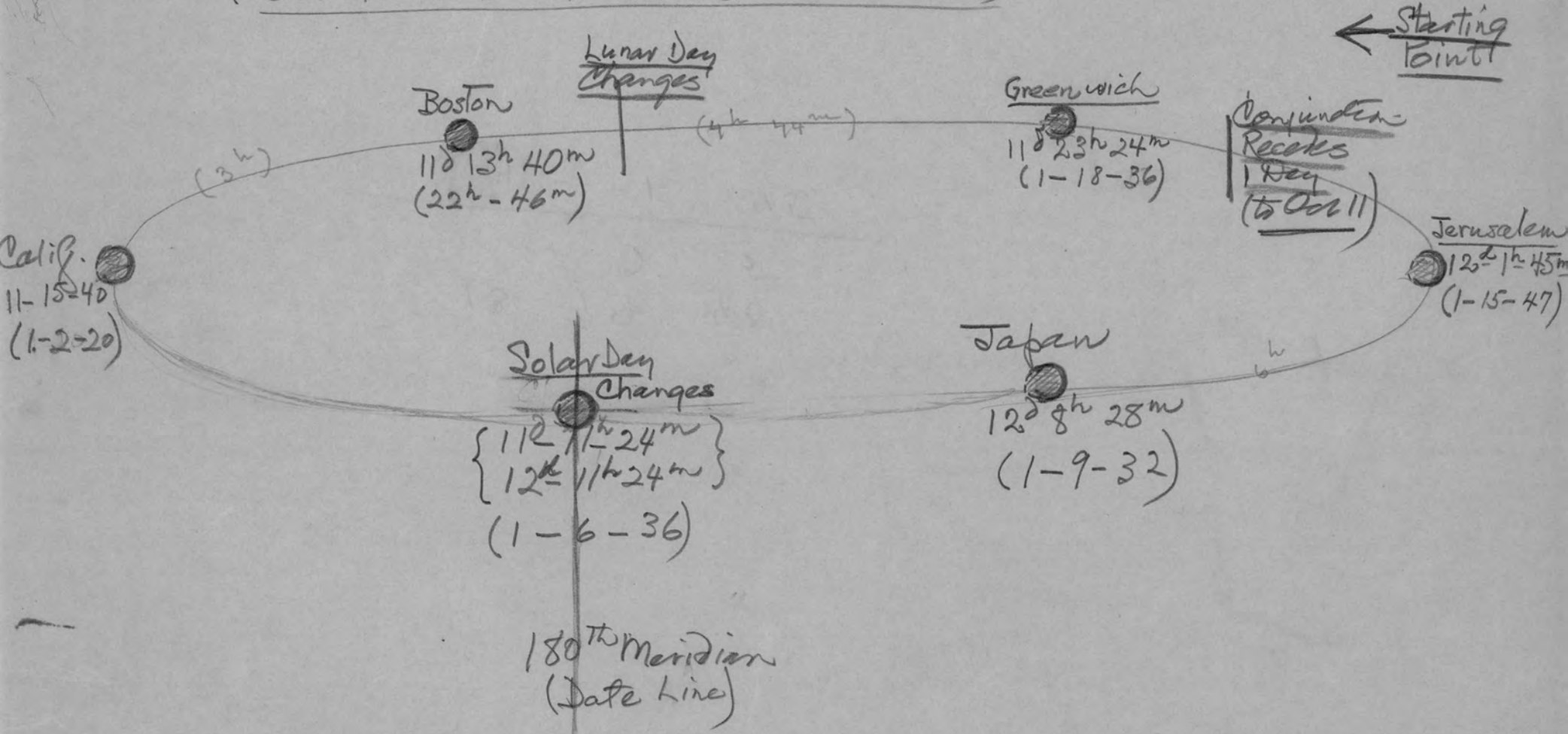


Jerusalem

	Years	Full Moon to Full Moon		
A.D.	27-28	383 days		
1	28-29	354 "		
2	29-30	354 "		
3	30-31	384 "	— 3	
4	31-32	355 "		
5	32-33	384 "	5	
6	33-34	354 "		
7	34-35	354 "		
8	35-36	384 "	8	
9	36-37	354 "		
10	37-38	355 "		
11	38-39	384 "	11	
12	39-40	354 "		
13	40-41	384 "	13	
14	41-42	355 "		
15	42-43	354 "		
16	43-44	383 "	16	
17	44-45	354 "		
18	45-46	355 "		
19	46-47	384 "	equals 6940 days	
1	47-48	355 "		
2	48-49	355 "		
3	49-50	384 "		
4	50-51	354 "		
5	51-52	384 "		
6	52-53	354 "		
7	53-54	354 "		
8	54-55	384 "		
9	55-56	355 "		
10	56-57	355 "		
11	57-58	384 "		
12	58-59	354 "		
13	59-60	384 "	equals 6941 days	
14	60-61	354 "		
15	61-62	354 "		
16	62-63	384 "		
17	63-64	354 "		
18	64-65	355 "		
19	65-66	384 "	equals 6941 days	20819
1	66-67	355 "		
2	67-68	354 "		
3	68-69	384 "		
4	69-70	354 "		
5	70-71	384 "		
6	71-72	355 "		
7	72-73	354 "		
8	73-74	384 "		
9	74-75	355 "		
10	75-76	355 "		
11	76-77	384 "		
12	77-78	355 "		
13	78-79	384 "		
14	79-80	354 "		
15	80-81	355 "		
16	81-82	384 "		
17	82-83	354 "		
18	83-84	355 "		
19	84-85	384 "	equals 6939 days	

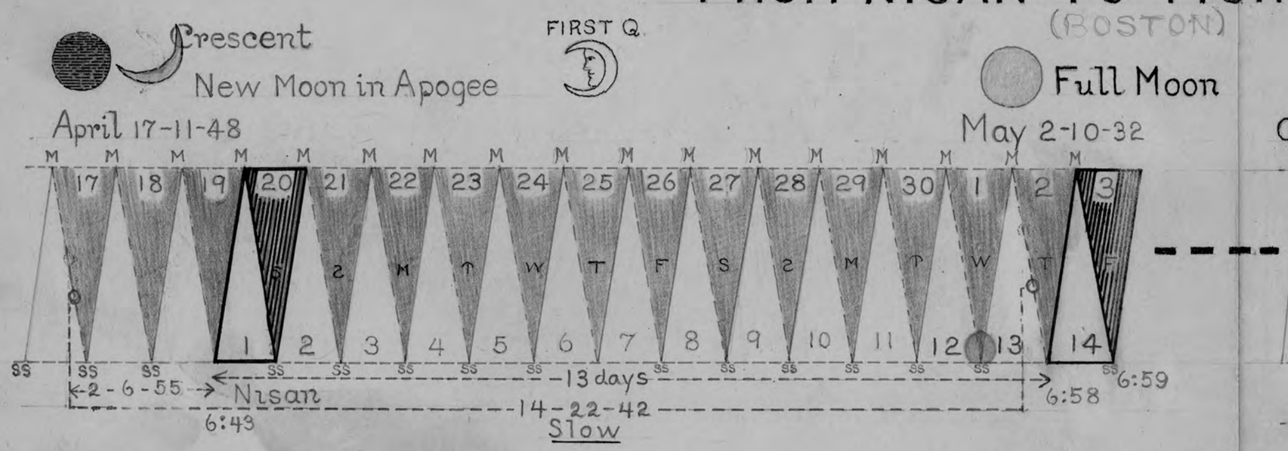
Checking Tishri 1, 1844, Around the World

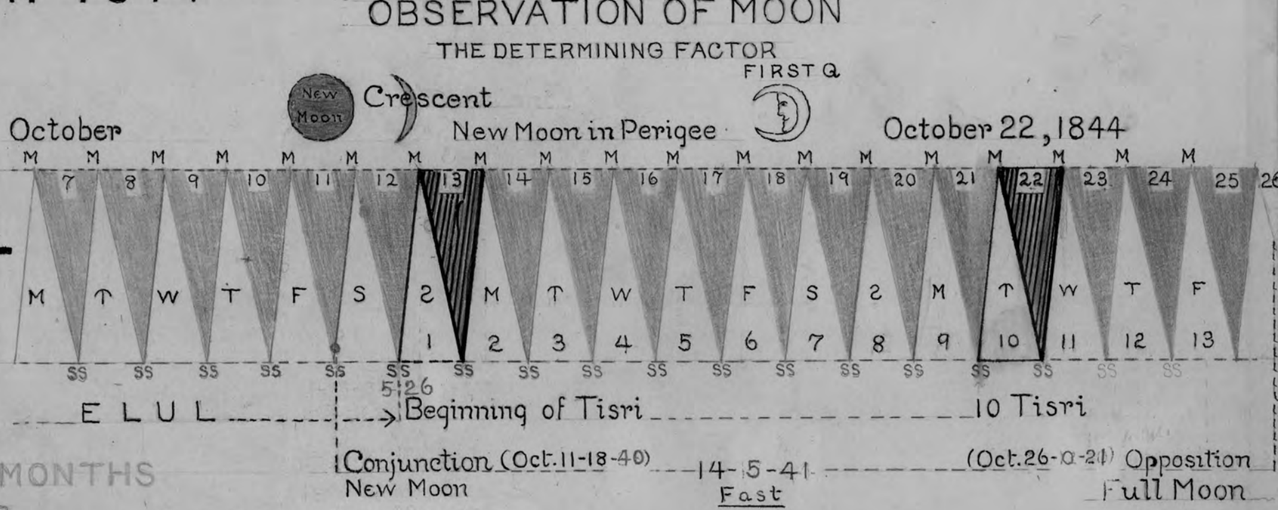
(Solar and Lunar Date Lines)



The Lunar Day starts at Jerusalem; the Solar Day starts at the 180th Meridian

FROM NISAN TO TISRI 1844



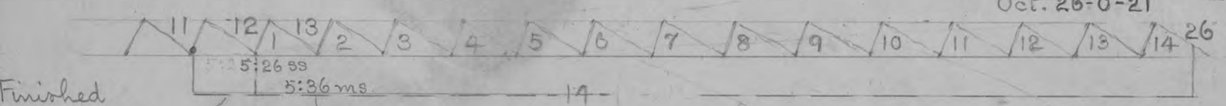


SIX HEBREW MONTHS

DAYS

Oct. 11-18-40 B.C.T.

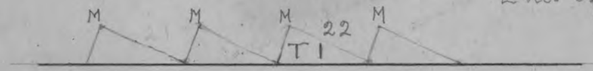
Oct. 26-0-21



Finished Apr. 7, 1939

0-22-55

End of Passover on May 3 =



Balance May	= 28	To beginning of Tisri 1 ss
June	= 30	
July	= 31	
15-0+5+1 Aug.	= 31	
Sept.	= 30	
Oct.	= 22	
	172 days	

The course of the Moon from Conjunction to Opposition runs in a cycle – seven times fast, or in periods less than mean time, and seven times slow in periods more than the mean. Her mean is 14d-18h-22m from New Moon to Full Moon.

The fact that the Adventists identified the Crescent with the 13th of October shows their adherence both to the "definitions" of Astronomy and to the ancient Jewish teaching.

The Jewish day runs from sunset to sunset; the calendar day from midnight to midnight. From midnight to the following sunset they both coincide. It is this 18-hour stretch that identifies the calendar day to which the Jewish day belongs.

The earliest, and consequently the most important, evidence in favour of the lunar month is found in a fragment from the Canon Paschalis of the learned Anatolius, bishop of Laodicea in the third century, which is handed down to us by Eusebius. Anatolius cites a commentary on the Pentateuch attributed to the two Agathobuli, disciples of Aristobulos, contemporary with Ptolemy Philadelphus. "Aristobulos," it is there said, "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 fourteenth of Nisan after the evening, when the moon stands diametrically opposed to the sun, as any one can see at the time of the full moon." The sun then stands in the sign of the vernal equinox. Caspari, p 8.
Eusebius, Eccl. Hist. VII. 32.

Chronological and Geographical
Introduction
to the
Life of Christ
by
Ch. Ed. Caspari
Translated by Maurice J Evans, B.A.
Edinburgh, T & T Clark, 38 George St.
1876.

On Anais reform
J. Trigland ii, Nolitia Karaeorum
Hamburg, 1714 p. 46, etc

Two Beginnings.
Lazarus Bendavid
§11.

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Some celebrated Pasch on 14th Nisan, some on next Lord's day after 14th. 106

These contention arose with Victor 106

Pasch of the law – Pasch of the Jews 106

Heresy of the 14th day 106

Christ's nativity from 29th of Autumn 106

In time of Christ new moon was antedating Dionysian epoch by day and a half. 107

10 times in Dionysian cycle Pasch occurs in Adar 107

And that intercalation of moon happens as of the Sun 107

Jewish epilogues – most elegant 108

In this table we have not held to the plan of delaying to the third day – 108 but only physical and lunar in excess of 18 hours.

Both Jews and Dionysius claimed to limit new moons from "ἀπὸ φάσεως φεγγαρίου" 108

Must admit that Jewish new moons are anticipated by Dionysian 108

For that Adar --- is placed on March 13 from Julians. But Chaldean Calculus extends it even to night which follows day 14. But if, etc. 108

If those ancients had been willing to learn from the Jews, the new moons would not have preceded the ancient epochs by a whole four days. 108

Very length and time of mean syzygies of the moon holds to the finger's breadth 108

Plan of the days which rule 108

Nearest and latest Nisan 108

Time of Exodus 153

Moses year began April 15 168

To each Tekupha they ascribe, etc. 168

Why Jews object to death of Christ 265, 266

But it is found the John is acquainted with the same number of journeys to Jerusalem as Luke. On this account we deem ourselves justified in the inference that the narratives in Luke are given in the order of their occurrence; while in the oral accounts the various journeys to Jerusalem are not duly distinguished the one from the other, and to the second visit is attached the fatal import which properly belongs exclusively to the last. Page XXVI

The Jewish Festivals
by
Hayyim Schauss.
Cincinnati - Union of American Hebrew Congregations. 1938.

Actually, the Samaritans of today are a small and poor remnant of an old and great Jewish sect that appeared in Palestine about the beginning of the Greek period. They form the oldest Jewish sect in existence. . . The Samaritans and the Jews became blood-enemies, who hated and despised each other, just as in later years the Karaites and the Rabbinic Jews hated each other. Page 61 ff. There follows description of Samaritan Passover - observed (sacrifice) on 14th Nisan - all night feast.

Black Jews - the Falashas of Abyssinia - sacrifice on the 14th Nisan.

"We know that the Samaritans and the Karaites always used these materials in that way." Page 204.
(note the comparison)

Throughout all Jewish history the great lead in calendar development always was the objective to assure unity of the Jews by celebrating their festivals on the same day. (20)

In regard to intercalation the Sanhedrin did not content itself to observe the state of the barley, but added to it the calculation of the equinox, - called the Tekuphia. (21) This art they surrounded in mystery, - always with the greatest mystery (29)

As a matter of fact, in the year 33 A.D., the mean conjunction of Nisan (the Molad of the modern Jewish calendar comes on Thursday, Mar. 19 - $13^h - 5^m$ or 5d - 19h - 95 sec. according to Jewish calculation. . . . Thus Friday, April 3, the supposed day of Christi death, becomes the 14 Nisan of the Pharisees, in accordance with the list of St. John, while it should have been 15 Nisan for those who do not accept the rules for the postponing (as Passover not to come on Monday, Wednesday or Friday). (30)

[Sidersky tries to show "irrefutably" that Friday, April 3 in A.D. 33 was Nisan 14, but he does so on the hypothesis that the day of Full Moon and Passover coincide (31) He admits that sometimes Passah is celebrated (~~many~~ 24 hours after Full Moon! Quotes Philo, Josephus, and all. ~~GEN~~

(he means Nisan Molad)

Therefore the day of 1st Nisan will always precede the one of 1st Tishri by 2 days because 177 days = 25 weeks and 2 days (8)

Claims - 55 = References on Church law concerning the Paschal feast.

Persecution of Jews under Commodus and Victor. Scaliger, p 105

Passover of Resurrection = Europeans
Passover of Crucifixion = 14th day observers or Asians id + 106

Asians and others used pure year of Jews
Europeans began their year at the equinox and celebrated Passover first full moon after equinox Scaliger, 106.

Because the festival season in 1582 had

Church wished to free herself from controversy which had arisen over the moon question.

Since never by that paschal rule is the Catholic Church the true way, but always has observed Sun and Moon, that is, computation.

Ambrose - page 56 in Claims (For Froom) -
177 In addition to Pridaux, and Scaliger + (607+612) + (85)

Supplement proof for Oct. 13
163 days from end of Passover to initial sunset of Tishri 1

The Jews did not recognize the phasis, which was marked by a narrow crescent
Scaliger,
A. Schwarz has shown from the Mishna that the interval could be at least 18 hours.

Very irregular conclusions follow the question of visibility. Gerhardt, p 19.

A fluctuating interval of 18-36 hours enters an uncertain quantity into our problem. Gerhardt, p 19.

Fotheringham was followed by Maunder, Schoch and Neugebauer. id.

The tasks to reconstruct the Jewish calendar has 4 uncertain quantities -

1. Meteorological conditions
2. A postponed sanctification
3. Fluctuating interval from new moon to new light
4. Theoretically worked out height and distance of the moon,

[Gerhardt has given valuable and important testimony from Schoch and Neugebauer as to the height of the moon when first seen. But if the Jews looked for an older moon, as testified by Scaliger and Hevelius, then all these tables marking out the OER]

A new moon in the beginning of March can only introduce Adar or Veador.
Gamaliel, teacher of Paul. id-17. Gerhardt-15
Treatates show calculation of the months
id-17.

New moons of first century = Ginzel. Ger.-18.
Calendar council was making use of observation and calculation alternately.
Quotes Maimonides. Ger.-18.
Phasis after 24 hours and less. Ger.-18, 19.
Ginzel's Table of phases = 2 to 3 days only Ger.-21
Friday of crucifixion must fall on
15 Nisan. Ger.-80.

Mommert, Carl, Dr. theol. in
"Zur Chronologie des Lebens Jesu"
(Leipzig, 1909), pp 138, 139
says:

"As father of the teaching
doctrin ... that ~~Christ's~~ Jesus
ministry lasted about 3 yrs
is considered .... bishop
Eusebius of Caesarea (born about
260). In his 'Demonstratio Evangelica'
(VIII, 2) he finds, expressed, the duration
of Christ's public ministry
in the first half of the last
year week of Daniel "in
accordance with the gospel
of John." "The whole time of
preaching" miracle performing
by our Saviour is given as
3 1/2 years, which equals one
half (year) week." p. 138 & 139.

This statement of Josephus, therefore, is indeed revealing. It shows first of all, that Moses himself ~~had made no such~~ could not have made such a rule for the passover, for ~~the~~ his days the people of his day ~~had not as yet~~

If Moses, therefore, had appointed the passover to be in the ancient constellation of Aries, in the time of Christ, the feast would have occurred in Pisces,

y.

On the other hand, Josephus ~~probably~~ (itself) referred to the Zodiacal Sign Aries, and not to the constellation; then ~~much~~ ~~see the more~~ ~~much~~ much less can ~~Moses~~ his statement be charged back to Moses, ~~for~~

Midnight Cry, April 25, 1844.

"The new moon in April being passed, we are consequently beyond 1843 not only Gentile but Jewish, civil and ecclesiastical time."

Geminus a Grecian astronomer, says, "that when the moon is in perigee, and her motion quickest, she does not usually appear until the second day, nor in apogee when slowest until the fourth."

Hales, William, Vol. 1, p. 67. London, 1830.

Mommert, Carl, in "Zur Chronologie des Lebens Jesu", Leipzig, 1909 says on p. 142:

"Bebber in "Zur Chronologie des Lebens Jesu" (Münster i. W. 1898) pp. 88 et sequa summarizes the result of his studies regarding the date of Christ's birth as follows:

"As to the date of birth (Dec 25) it has just as little claim to apostolic tradition as the one just discussed. Dec. 25 first came up in the occident, and that only about the middle of the 4th cent. but spread quickly over the territory of the Latin church, and beginning with 376 also in the orient. Earlier, in the 3rd cent., the birth of Christ mostly was placed in the spring. For the oldest we have to thank Clemens Alex. and Hippolyt.

So that with respect to the fixed stars, the sun and equinoctial points fall back (as it were) 30 degrees in 2160 years, which will make the stars appear to have gone 30 degrees forward with respects to the signs of the ecliptic in that time, for the same signs always keep in the same points of the ecliptic, without regard to the constellations.

Ferguson p 186.

So that with regard to the fixed stars, the equinoctial points in the heavens have receded 2° 20' 2' 30" since creation; which is as much as the sun moves in 81 d +. Ferguson 189

From the shifting of the equinoctial points, and with them all the signs of the ecliptic, it follows that those stars, which in the infancy of astronomy were in Aries, are now in Taurus, those of Taurus in Gemini, etc. 189

"One half of the moon's orbit is above the ecliptic, and the other half below it."

Moon moves in orbit nearly Ferguson, 31.
circular. The moon must therefore be acted upon by two powers or forces; one of which would cause her to move in a right line, another bending her course into a curve. Ferg. p. 53.

Uranian Council. Ferguson, p 190

Between the third quarter and change, the moon is frequently visible in the forenoon when the Sun shines. Ferguson 227

Sometimes the moon stands as it were upright on her lower horn. She is then at the highest point of the ecliptic above the horizon at that time, and is 90° from both sides of the horizon where it is then cut by the ecliptic. Ferguson, p 227.

The inclination of that part of the ecliptic to the horizon in which the moon is at any time when horned, may be known by the position of her horns; for a right line touching their points is perpendicular to the ecliptic. Ferguson, p 228.

Moon's solar day = From sun to sun 29½ days
" Sidereal " = Star to star = 27d 8h
" Lunation = Orbital rev = 27d +

p. 229.

But because the earth goes forward in its orbit, while the moon goes round the earth in her orbit, the moon must go as much more than round her orbit from change to change in completing a solar day, as the earth has gone forward in its orbit at that time. Ferguson, p 229.

Illumination of hour and minute hand. 230.

Moon's real path in the heavens is very different from her visible path around the earth: the latter being in a progressive circle, and the former in a curve with different degrees of concavity. Ferguson, 231.

The moon's absolute motion is slower than the earth's from her third quarter to her first; and swifter than the earth's from her first quarter to her third. Ferguson, 235

The moon's path being concave to the sun throughout, demonstrates that her gravity towards the sun, at her conjunction, exceeds her gravity toward the earth. 235

608 The new moon is the festival of the first day of the months, often coinciding with the next day after the physical appearance of the new moon.

612 Therefore the day of the 1st Nisan will precede the one of 1st Tisri by two days.

613 Babylonian Jews started year with Tisri 1
Palestinian Jews " " " Nisan 1

613 Passah festival was to be celebrated at evening of the fourteenth day of the lunar month.

" Hebrew word "abib" is synonymous with "maturity of the corn."

614 Always the same month [abib] which coincides with the vernal equinox (♈) which terminates with maturity of the fruits.

615 Thus the Nisan command regulated the months according to the course of the moon, and the whole year in accordance with the course of the sun by assigning as a starting point the lunar month coinciding with the beginning of a certain solar season.

615 So determine the month Abib the more or less imminent maturity of the barley was being observed, the first fruits of which had to be offered in the Temple.

661 Epping and Strassmaier, "Astronomisches aus Babylon," Freiberg, 1889, where are found the ephemerides of the 3rd and 4th centuries B.C. indicating separately the true conjunctions and the visibilities of the new moons.

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Add 189 days to Jewish epoch = Epoch of the world. 414
The sign in Scaliger's day preceded Tebaufka of Moses by more than 35 days. 169
Augustus and Actium 238
Herod 239
Nearest and latest Passover in time of Christ { April 8 to May 6 / 265
Five years = Christ's ministry = 255
Political translations - on testimony of Josephus - 130 years before Christ as explained in Books II 265.
Scaliger explains the True and typical lamb as slain on the same day. 266
Sacrifice was on night of 14th and of 15th 267.
Catholic "Times" 294
Year of the Exodus Prolog - 4
In time of Christ if we follow European Jews, Nisan was wandering from Xanthicos, our April.
Ancient Jews observed their Tebaufkas with anxiety Prolog - 5
March Passovers (29 plus) Prolog - 5
Passion in XIX th Tiberius See also, p 108 Prolog - 8
Ought not to seem wonderful if the eleventh from the thirteenth to fourteenth Nisan should be taken for slaying the Passover Prolog - 9
Jews reckon from "phasis" from the third day, I say! "over step length by phasis" from the Phase Page 6
All months of ancient Hebrews were 30 days, and all
Dionysius speaks of full "Sallum Sunae." Page 10. Page 6
Syzygy - Page 12

Epilogue of the moon begins from the Meridian, but Attic civil day from sunset, Page 61
By plan of moon Tisri is first, but by plan of Sun Nisan Page 76. Also Sunar epilogues from Tisri besides epilogues from Nisan are as much Chaldaean as Jewish.
Calippus, first of all, started the epilogues of the moon from the meridian. Page 76
Dioscorus (2 Mac. 11) Embolismic months

Page 76

Jews today think their year started with Adam.
Months are Chaldean in name.   Page 79
The conquered accepted the laws from the victors   "
Meaning of Tekoufoha   Page 79,
Jewish cycle lasts 10 lunar cycles — 80
Oct. 27, first new moon of Tisri.   id
Autumnal equinox versus Nisan   80
281 cycles from Anno Mundi 80
"Haec pulcherrima" res.
Sunset of Day of Venus } 85
"Translation of moon" }
All oriental nations determined moon from
    the meridian Important   85
Hebrews consider new month from "phasis"   85
18th hour from meridian = sunrise, and beginning
  of bolad. This can't be Ereb which is past, ∴ it is
  transferred to following "ereb."   85
177 days = 85
Adu and Badu   86. Also translation of moon 86
"Tah" = 18 hours   87
Intercalation   93
Persecution of those who celebrated
  Jewish pascha by Commodus & Victor. 105
New months κατὰ shape of moon   105
1st Jewish cycle is 4th in Tisri and 5th in Nisan
Paschal month of Christians was often   105
    in Jewish Adar   105
Passover of Crucifixion
Passover of resurrection } 105
Condemned the 14th day heresy 105
Epiphanius - calls it 14th day heresy 105
Nearest Moon April 2 — Jewish phasis April 4.
Europeans were placing their cycle   105
  at the Equinox and celebrating their
  pascha next after the equinox,   106

Fri
S
2
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Thursday, June 27, 1844, Midnight Cry.
Secondly, we could not show that the period would not end in the spring of 1844, and therefore we did not wish to take up time and room by discussions, which might have been worse than useless.

p 397

Midnight Cry, Thursday, June 27, 1844.

Turkey - Thursday, August 8, 1844.
"The changing of the moon early or late in the day, would make one day's difference in the time of its appearance; and therefore the astronomical full of the moon would not within one day determine the Jewish 14th of the moon.

Signs of the Times, Dec. 5, 1843
pp. 134-5.

Agricultural Seasons and Feasts - Barley & Lambs, Wheat - Vine.

Same page.

Geminus Quotation +
Lunar 14 = Hales 67, Vol. 1.

Signs of the Times, Dec. 5, 1843.

p 135

"This, therefore must be the civil year commencing in October 1842 and the ecclesiastical year ending April 1844, nine months of each being included in A.D. 1843 the new moon in April being passed, we are consequently beyond 1843, not only Gentile, but Jewish, civil and ecclesiastical time, and are now in the year 1844, according to our chronology."

Midnight City, April 25, 1844.

Thursday, May 2, 1844 = Article by Snow on how he reckons crucifixion from reign of Tiberius.

If the 490 years (or 70 weeks) expired at the crucifixion and ascension – the season of which corresponds with our month of May – why do we not look to about this period, for the termination of the 1810 and 1843 years? To my mind we have infinitely more reason for this, than for having looked to the termination of the Jewish year. Accordingly, to me, we are entering upon a period of five or six weeks "big with hopes of "immortality."

Midnight Cry, Thursday, May 2, 1844 –

George Sterling.

In Menachoth X. 3, the cutting of the paschal sheaf on the 16th Nisan is described. The deputies of the Sanhedrim repaired, at the close of the 15th Nisan, to the field previously indicated, and waited until the reaper said, "the sun is gone down." The others repeated these words; only then was it permitted to put in the sickle, because with the setting of the sun the 15th Nisan was brought to an end, and the 16th began. The Karaite Elia ben Mosheh says that the month, and thus, of course, the day too, began with the third evening, when the sun had set.

Chron. & Geog. Intro. to Life of Christ. Ch. Ed. Caspari, p. 3
Un. of Chi. Lib.

"The Jews, we are told, commenced their months with the first appearance of the moon, which in that climate was usually the second evening after the change. And they commenced their year with the appearance of the new moon nearest the ripening of the barley harvest. Their years consisted sometimes of twelve and sometimes of thirteen moons, an intercalary moon being added about once in three years. If, on the appearance of the moon at the end of Adar, the 12th moon of the preceding year, there was a probability that the barley would be ripe by the fourteenth day of the month, they made that moon the first month of their year; but if the barley would not probably be ripe till after the 14th day, they added the whole of that moon to the old year, calling it Ve-Adar, or the second Adar. If, therefore, we can ascertain the time in the year of the ripening of the barley harvest in Judea, we may know very nearly the commencement of the Jewish sacred year."

Advent Shield, p. 294 - Jan. 1845

In this instance of the harvest-moon, ... the wisdom and beneficence of the Deity is conspicuous, who really ordered the course of the moon so, as to bestow more or less light on all parts of the earth, as their several services and seasons render it more or less serviceable ... In considerable distances from the equator, where the weather and seasons are more uncertain, the autumnal full moons rise very soon after sun-set for several evenings together.

Ferguson, p 242.

It is soon said that all these phenomena are owing to the different angles made by the horizon and different parts of the moon's orbit; and that the moon can be full but once or twice in a year, in those parts of her orbit which rise with the least angles.

Ferguson, 242.

Now the different parts of the ecliptic, on account of its obliquity to the earth's axis, make very different angles with the horizon as they rise or set. Those parts or signs which rise with the smallest angles, set with the greatest, and vice versa. &c. Consequently when the moon is in those signs which rise or set with the smallest angles, she rises or sets with the least difference of time; and with the greatest difference in those signs which rise or set with the greatest angles. Ferguson, 243.

In northern latitudes, the smallest angle made by the ecliptic and horizon is when Aries (fastest) rises, at which time Libra sets: the greatest when Libra rises, at which time Aries sets. (slowest) From the rising of Aries to the rising of Libra (which is 12 sidereal hours) the angle increases; and from the rising of Libra to the rising of Aries it decreases in the same proportion. By this article and the preceding, it appears that the ecliptic rises fastest about Aries, and slowest about Libra [But, vice versa, ecliptic sets slowest about Aries, and fastest about Libra].

Ferguson, p 244.

Comp. Midnight Sky.
April 20, 1843.
P. 19.

Jerusalem 1844

29-10-8 | 1°15'47 | 2°2h 8m | 1°15'47
29 29

Elul = 29 = T.P. = 1d 15h 47m

Sept. 12-15-37 to Oct. 12-1-45 = 29-10-8 = 10h 8m = cal.−

Tisri = 30

Oct. 12-1-45 to Nov. 10-11-57 = 29-10-12 = 18h 48m = cal. + = 3h 40m +

Hesvan = 30

Nov. 10-11-57 to Dec. 9-22-33 = 29-10-86 = 13h 24m = cal + = 17h 4m +

Kislev = 30 1845

Dec. 9-22-33 to Jan. 8-9-33 = 29-11-0 = 19h 0m = cal. + = 30h 4m +

Tebet = 29

Jan. 8-9-33 to Feb. 6-20-56 = 29-11-28 = 11h 23m = cal− = 18h 41m+

Shebat = 30

Feb. 6-20-56 to Mar. 8-8-57 = 29-12-1 = 11h 59m = cal + = 30h 40m+

Adar = 29

Mar. 8-8-57 to Apr. 6-22-1 = 29-13-4 = 13h 4m = cal− = 17h 36m+

Nisan = 30

Apr. 6-22-1 to May 6-12-18 = 29-14-17 = 9h 43m = cal + = 27h 19m+

Iyar = 29

May 6-12-18 to June 5-3-28 = 29-15-10 = 15h 10m = cal− = 12h 9m +

Sivan = 30

June 5-3-28 to July 4-18-50 = 29-15-22 = 8h 38m = cal+ = 20h 47m+

Tammuz = 29

July 4-18-50 to Aug. 3-9-45 = 29-14-55 = 14h 55m = cal− = 5h 52m+

Ab = 30

Aug. 3-9-45 − Sept. 1-23-55 = 29-14-10 = 9h 50m = cal + = 15h 42m+

Elul = 29

Sept. 1-23-55 to Oct. 1-13-19 = 29-13-24 = 13h 24m = cal− = 2h 18m+

Tisri = 30

Oct. 1-13-19 to Oct. 31-2-2 = 29-12-43 = 11h 17m = cal+ = 13h 35m+

Hesvan = 30

Oct. 31-2-2 to Nov. 29-14-2 = 29-12-0 = 12h 0m = cal + = 25h 35m +

Kisleu = 30

Nov. 29-14-2 to Dec. 29-1-14 = 29-11-12 = 12h 48m = cal + = 38h 23m +

Tebet = 29

Quotations from Chronological and Geographical Introduction to the Life of Christ by Ch. Ed. Caspari - Tr. by Maurice J. Evans, B.A. 1876

Ancient Jewish tradition (Bab. Baba Kama, fol. 80.2) teaches that one of the privileges of the Israelite, when dwelling in the land of Israel, was, that each one had the right of catching fish in the sea of Gennesareth, with the single restriction of not interfering by his net with the navigation of the lake. . . Zebedee and his sons were among those inhabitants of Jerusalem who were fishermen, and who were wont at this season to ply their craft, in company with Simon and Andrew, upon the lake. Hence it is we always find John at the Sea of Galilee before the Passover (John 1:37; VI:1; XI:1 ff.), but only at this season... (as above, for the million guests who would require provisions)

Page XXII.

All the outworks, it is thought, may be dispensed with, if only the spirit, nature, and doctrine of Jesus is seized. Yet this is a great and ruinous mistake. If Jesus Christ is thus spiritualized, and severed from the relations of time and space, such false spiritualization receives its punishment in the result that the whole objectively historical character of the person of Jesus becomes eventually doubtful, and is subtilized into the ideal. It belongs to the very nature of history to have its roots in time and space; the reality of the historical person is conditionated by the fact that place, relations, and time are clearly ascertained....

So, too, do we frequently read that the Synoptists teach that Jesus was crucified on the 15th Nisan; but that the fourth Gospel, on the other hand, places this event on the preparation-day, and is thus in contradiction not only with the Synoptists, but also with the veritable Apostle John, who, according to the tradition of Asia Minor, taught that Jesus was crucified on the 15th Nisan. From this it is concluded that the Saint John could not be the author of that Gospel which declares precisely the opposite. This objection, however, disappears so soon as it is shown that not only the author of the fourth Gospel, but also the Synoptists and the tradition of Asia Minor give the 14th Nisan as the day of the crucifixion.

Page XIX

Meg.1.4. If they had read the Scroll in the First Adar, and the year was intercalated, they must read it again in the Second Adar. First Adar differs from the Second Adar only in the reading of the Scroll and in giving gifts to the poor. (Note: If a man did these in First and not in Second Adar, he has not fulfilled his obligation.)

Yeba.16.7. R. Akiba said: "When I went down to Nehardea to ordain a leap-year, etc.

Ned.8.5. . . . (If he said) "until the rains are over, (it is binding) until Nisan is over (Note: March-April). So R. Meir. But R. Judah says: "Until Passover is over."

Eduy.7.7. They testified that the year could be declared a leap-year any time during Adar; whereas it had been taught: only until Purim.

Sheb.9.7. In like manner if a man hired a house to his fellow "until the rains," (this signifies) "until the second rainfall." (Note: Usually falls during November).

Taan.1.1. Until what time should they pray for rain? R. Judah says: Until the Passover is over. R. Meir says: Until the end of Nisan, for it is written,

> 'Be glad then, ye children of Zion, and rejoice in the Lord your God: for he hath given you the former rain moderately, and he will cause to come down for you the rain, the former rain, and the latter rain in the first month.' Joel 2:23.

(Note: Since by that time (Nisan 21), about the middle of April, no more rain normally falls before the following feast of Tabernacles).

Taan.1.3-7. On the 3rd of Marchesvan they pray for rain. Rabban Gamaliel says: On the 7th, fifteen days after the Feast of Tabernacles, to give time for the last of the Israelites to reach the Euphrates.

Single persons continue to fast until the end of Nisan. If Nisan ended, and then the rain fell, it is a sign of (God's) curse, for it is written, "Is it not wheat harvest today?" (Note: Late in May, when rain is a misfortune). Cf. 1 Sam.12:17. See also Prov.26:1.

Sanhedrin 1.2. The intercalating of the month and the intercalating of the year (are decided upon) by three. So R. Meir. But Rabban Simeon b. Gamaliel says: The matter is begun by three, discussed by five, and decided upon by seven; but if it is decided upon by three, the intercalation is valid.

R. Sh.2.5-7. There was a great courtyard in Jerusalem named Beth-Jazek where the witnesses assembled, and there the Beth-Din examined them in the following manner: The first pair to arrive were questioned first. The more important of the two was brought in and asked, "Say, in what position did you see the moon, in front of the sun (i.e. to the east of it) or behind it? To the north of it or the south? What was its elevation on the horizon? To which side was its inclination? What was the width of the disk? If he answers that it was in front of the sun, his evidence is worthless. Then the second is brought in and questioned similarly. If their replies tally, their testimony stands. The remaining witnesses are only examined cursorily, not because they are required, but that they should not depart disappointed (at not having been heard) and that they should form the habit of coming (to give evidence). The President of the Beth-Din declares, "The new moon is consecrated," and all the people respond with "Consecrated, Consecrated."

R.Sh.8. Rabban Gamaliel had pictures of the moon on a tablet and on the wall of his upper chamber. These he used to show to the unskilled and say, "Didst thou see it on this wise or on that?" It once happened that two came and said, "We saw it in the east in the morning, and in the west in the evening." R. Johanan b. Nuri said, "They are false witnesses." But when they came to Jabneh Rabban Gamaliel accepted their evidence. And two others came and said, "We saw it at its expected time, yet in the night of the added day (Note: A 30th day added to the usual 29 days of the month, when the new moon failed to be seen at the expected time. Cf. Arak.2.2) it did not appear;" and Rabban Gamaliel accepted their evidence.

THE SAMARITAN PASSOVER, by John E.H.Thomson, D.D. Quarterly Statement of the Palestine Exploration Fund. Jan., 1902.

As it was now considerably past midnight we had to think of returning to Nablus. In gratitude for his kindness we each contributed medjeedie to the high priest, and with many salaams took our departure. The moonlight, as always in Syria when it is near full moon, was piercingly clear, so we had small difficulty in riding down the rocky pathway to Nablus.

JERUSALEM CHRISTIAN TREATISE ON ASTRONOMY, by Gladys Dickson, Jerusalem. Her notes are taken from an old manuscript found in the house of an Arab in Jerusalem.

If the year commence on Monday there will be disturbance among kings, and excessive cold and great winds, and snows in January and February.

In April an eclipse of the moon indicates snows and strong winds. Corruption and contentions will increase in the land, and lying will prosper among people.

Miss Dickson's story was taken from the Q.S. of the Palestine Exploration Fund, Oct., 1908, page 317.

AN OLD HEBREW CALENDAR-INSCRIPTION FROM GEZER, described by Prof. Mark Lidzbarski, Greifswald. Quarterly Statement of the Pal. Ex. Fund., 1909. Page 29.

I do not know in what strata the tablet was found. Mr. Macalister placed the date in the sixth century B.C., but I take the inscription to be much older. In the preliminary notice it was remarked that the stone contained "some kind of calendar." This is correct. The tablet presents a collection of months, not according to adopted terms, but it is the attempt of someone, probably a peasant, to group and name the months according to their agricultural importance.

The inscription runs, therefore:--

(1) Month of the fruit-harvest.--Month of
(2) the sowing.--Month of the after-grass.
(3) Month of the flax-harvest.
(4) Month of the barley-harvest.
(5) Month of the harvest of all (the rest).
(6) Month of the pruning of vine-plants.
(7) Month of the fig-harvest (?).
(8) . . . . . .

Comments on the Gezer Calendar by Dr. Samuel Daiches-- Ibid. p. 116

It is worthy of note that we find in the Babylonian Talmud that one of the reasons for proclaiming a leap-year was the delay in the ripening of the ears of barley. When Adar passed away and the barley was not yet ripe for reaping, the year was made a leap-year (see Sanhedrin 11b). And the old Babylonians, too, called Adar II ^{arah}DIR-SE-KI-KUD for the same reason.

It would clearly show that the Gezer tablet contains a generally recognized calendar. The difference between the two calendars would be this: while the Babylonian calendar contains all the twelve or thirteen months of the year and only six or eight of the names are agricultural, the Gezer calendar has only those months which are of agricultural importance. It is therefore, a purely agricultural calendar, but one that was generally recognized.

Agricultural names of the months are no doubt the earliest. The Gezer calendar is most probably much older than the inscription itself.

Comments on the Gezer Calendar by Prof. Gustaf Dalman-- Ibid.

The month of the barley-harvest, without doubt, is here April.

The "harvest of all" may mean the time when, in all parts of the country, harvest is going on. This is true for May.

DATES ON [illegible] PASCHAL [illegible]

"From a full and careful review and examination of the questions, we are still convinced that the true Jewish seventh month could only synchronize with our October,- commencing with the first appearance of the new moon on the 13th of that month, and ending with the appearance of the new moon on the 11th of November. Advent Shield, p. 273.

At the present time the Rabbinical Jews commence their year with the new moon nearest the vernal equinox, irrespective of the barley harvest; so that their first month synchronizes with our March, and their seventh with our September; but it is evident that as they disregard the ordinances of Moses and substitute for them their traditions, they are therefore of no authority as to the true time for the commencement of the Jewish year. According to the Caraite Jews, the true year cannot commence until the appearance of the new moon in April. Advent Shield, p. 276-

Observation itself partially anticipated, and to some extent entirely avoided. p. 17, line 9.

"If the true conjunction, that is, the appearance of the moon had always been the standard, there would have been no place whatever for computations; thus it is clear how the characteristics of the months could be predetermined with accuracy." p. 17, lines 12.

Adjustment for 129 B.C. cf. p. 18, 19.

Actual length of synodic month p. 19, line 17.

Karaites think R. Gamaliel was founder of new calendar and also of Dehiyoth. p. 19, note 3.

Sons of Issachar p. 21

At Succoth the sun must be in Libra p. 25 - line 16.

Beginning of month sacred by law p. 30, line 14

Year - Samuel p. 30.

Variations - p. 31.

De Rossi - the first to investigate 2

"For what does it profit to know and understand the calendar system — how it was perfected genetically if you do not have the guarantee that this calendar agrees most minutely with the sky?" p. 4.

"In the time of the Sanhedrin it was the rule to make the true conjunction the starting point of the computation." p. 39

Origin of meridian p. 39

Rabbinical calculators chose mean motion of the moon because inequalities were too hard to compute; and accepted the solar equation as constant. p. 43

Jewish intercalations differs from Metonic p. 43

1512 years ago Tebaptha Nisan occurred much earlier than today p. 44.

The Dehiyoth favor absolutely that the Calendar was introduced by Hillel II p. 45.

Weekday of the date of the month can never be fixed once and for all. p. 45

Elul never complete according to Maharsha Note 1, p. 45.

The Dehiyoth were added to bring the new calendar closer to the old chronology. p. 46.

In 2nd epoch, the beginning of the month regarded as a judicial act. p. 14

Instead of stellar day, the natural day from one sunrise or sunset to the next was chosen. p. 1

Used a measuring rod. p. 1, line 5

Mean duration of synodic months depends upon the position of the ecliptic p. 15.

Gamaliel made it a fixed length p. 16

Since time of Ezra, Elul never has been complete (who apparently did not always follow true conjunction) p. 16, line 22.

Other references p. 16, note 3.

Both ancient Jews and Babylonians paid respect to the time of full moon. In general, the heathen nations alleged that ominous things were wont to happen when the moon fulled;[1] even the day itself of full moon was counted unlucky.[2] ~~But,~~ On the contrary, an ancient command from Jehovah ~~had~~ instructed the Jewish nation to keep a special feast in the full moon period — on the fourteenth day of — of the first month ~~on the 14th day~~. This festival was to be known as פסח, or passover, while the first month itself was named אביב, signifying green corn. Since barley corn is the earliest harvest in Syria, the paschal season has been commonly referred to in both Jewish and Christian literature as the "month of new fruits." It is the primary purpose of this study to describe (1) the Babylonian worship of the full moon; (2) to demonstrate just what spiritual or chronological relation the "mid-month" passover sustained (to the date of full moon;) and (3) to show whether the Jews in the time of Christ still observed the ~~idealistic~~ agricultural festival laws of the Pentateuch, or whether they had already capitulated to the Babylonian trend of calendaric law as later established by Hillel II. There are students of ancient Jewish history who maintain that this change had evolved at the time of the crucifixion.

1. Babylonian Worship of the Full Moon

71	12.6	115.6
33	6.5	34
72	1.1	48
73	8.5	69.7
74	1.5	29
76	9.5	51.9
77	4.5	16.9

Embolismic Year

7 days after 14th
5 days sailing
7 days residence at Troas
1 day = 1st day of week

20th after 14th = Sunday
∴ 1st after 14th = Tuesday
Hence 14th = Monday
But F.M. in 60 A.D. = Sunday

1 = T	8 = T
2 = W	9 = W
3 = T	10 = T
4 = F	11 = F
5 = S	12 = S
6 = S	13 = S
7 = M	14 = M
	15 = T
	16 = W
	17 = T
	18 = F
	19 = S
	20 = S

If you make time one day less, then passover would come 2nd day after F.M., which is inconsistent. There is no reason for making time one day more.

This coincidence between the day of the week and the lunar 14th does not in any way harmonize with 58 A.D. Those who insist that 59 was the year, fail to recognize that over six years by Luke's reckoning, lay between Acts 18.1 and 20.6.

3 7 mos
Ephesus
1 6 mos. Cor
1 elsewhere

3
14
2
6
25
35
60

Over 25 years lay between Paul's conversion in 35 A.D. and Acts 20.6

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1 Joseph Scaliger, De Emendatione Temporum,
2 S. Langdon, Babylonian Menologies

Emmerson, 0582. = Emma
the "full"
Dehijoth
Calmes to moons

From letter of F. Doerner, Feb. 14, 1940.

and studied in detail
Trust you have received/the positivs (photostats?) sent recently:

Giblehr (2300 Evening Mornings)
Bengel (The 70 Yearweeks)

On the papal crown I found further material. In the work of the evangel. theologian Supt. D. Christian Gotthild Blumberg (Zwickau i.Sa.) Exercitio Anti Bossuetico, there are valuable statements which prove that the tiara had the word Mysterium on a golden plate. These statements caused quite a controversy. A catholic theologian published a refutation: D. Johannes Ludwig Hannemann (Kiel), Mysterion Papali coronae inscriptum Non-Eris, Hamburg 1698.
Supt. D. Christian Gotthild Blumberg replied in a second paperstating the case more clearly: Mysterium Papali coronae inscriptum, Zwickau, 1702.

I had found some details on this controversy in an old theolog. periodical and was about to look for the works mentioned when the State Library was closed in order to save coal....
Should it be possible for you, try to find above mentioned works in London or somewhere else. Present conditions make research work outside the library here very difficult. In any case, we must look up above works!

I am still looking for the material you sent with regard to cardinal Cajetan, as well as on Daniel 11 and 12.

Principles Governing Observation of the Moon

"But this idea [observation only] permits no small difficulties. For how, as Scaliger rightly says above, could so many thousands of Jews fix the new moon from its appearance, or await the messenger from Judaea, when they were scattered by such long distances, in low valleys, in northern sites, in which tempests and familiar clouds often begrudged the eyes of man the vision of the nascent moon? With regard to this, the moon could be seen in a very few hours after conjunction, although very rarely. Then, again and again, the phasis of the accompanying new moon day will appear on the second day after conjunction. Thus the month to be appointed might be thirty-one days, which is absurd in a lunar year. Again, the same Scaliger, in Canons of the Isagogue, lib. 3. cap. 6. pag. 266: Very frequently, the moon effects no power of her being seen for a whole three days from conjunction; and it can happen that straightway from conjunction, she can be seen on the following new moon day. In this way, the civil month would often be only 27 days. Indeed, it happens that the moon can be hidden and seen on the same day, but certainly, this very rarely occurs; and it does not happen except, as Pliny says, when the sun is in Aries. Therefore, it is in the power of no mortal to begin the new moon days from the appearance of the moon, because the time of the vision may be altogether unequal and uncertain. Furthermore, even if at the same time the new moon could be seen, yet she might not, because of overhanging clouds. Therefore, it is most foolish, what certain Jews, ancient as also recent, write, that when each temple was standing, it was the custom to appoint the new moons from the vision of the moon. The Mohammedans, who begin the new moon of Muharram three days or two days, after the conjunction of the luminaries, could not execute this. For not in every moon, not even in a cloudless sky, could they see the moon. Thus Scaliger. And with these things I seem to be in conformity -- that which is said in the cited Talmud -- that sometimes it happened a certain appearance and likeness of the moon would occur on the 27th day of the month; and all the people would shout, Mekudasch, mekudasch, Sanctificata est, sanctificata est. But by Rabbi Simeon, advisor, son of Gamaliel, it was decreed that by the calculation of the Synagogue, the new moon would be appointed on the next day.

"Certainly experience teaches that the moon runs upon the eyes sometimes quickly, sometimes slowly. Whence, if the month is to be commenced by a look at her, how can it be begun everywhere by all of the earth on the same day? how can the same feasts be kept everywhere on the same day? Indeed, although no cycle can be constructed to exactly answer to the celestial motions of the moon, yet, by it, the new moons are determined with less evil, less inconvenience than from vision."--Ducherii, Aegidii, "Tractatus De Paschali Judaeorum Cyclo," p. 373. Antverpiae, 1634.

Pliny Rè a Visible Old and New Moon on the Same Day

"The Moon makes her double conjunction with the sun in no other sign except Gemini, while Sagittarius is the only sign in which she has no conjunction. The old and the new moon are visible on the same day or night in no other sign except Aries, and indeed it has happened very seldom to any one to have witnessed it."--Pliny, "Natural History," Tr. by Bostock and Riley, Vol. I, p. 49. London, 1855.

Hevelius Rè the Appearance of the First and Second Moon

"But we call the horned moon that phasis, which to some of the ancients is the second moon, because, on the second day after the conjunction of all luminaries, she may be earliest seen, and follows the first moon. But, because on the second day, she cannot always appear in sight, all those causes can hinder which do not allow the first moon to be seen on the first day after conjunction. And the particular hindrance is when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius. For although the moon may be in perigee, and around the northern border, yet if she does not approach a sign of long setting, in vain is the horned moon expected on the second day."--Hevelius, "Selenographia," p. 281. Gedanum, 1647.

"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 'Ahashwērōsh corresponds to the Babylonian and Aramaic spelling of the Persian Khshayārshā, Xerxes." "New Standard Bible Dictionary," p. 229: Funk and Wagnalls Company. 1936.

Esther 3:8 = Diaspora of ? period.

"The 13th of [Adar] this month is known to have been unlucky, and the 14th and 15th lucky." Idem, p. 231.

In late Judaism, "Esther is inserted with the Law in the synagog rolls and is treated with the highest reverence." Idem, p. 231

Latin - 2 Chron. 29:3: He himself, in the first year and month of his reign, opened the doors, etc.

German - 2 Chron. 29:3; "in the first month of the first year of his reign."

Greek - "Καὶ ἐγένετο ὡς ἔστη, ἐπὶ τῆς βασιλείας αὐτοῦ, ἐν τῷ μηνὶ τῷ πρώτῳ ἀνέωξε τὰς θύρας, etc.,

Biblia Hexaglotta (Funk and Wagnalls, 1901)

Septuagint (Vatican text) "And it came to pass, when he was established over his kingdom, (Gr. blood) in the first month, he opened the doors of the house of the Lord and repaired them.

"He in the first year of his reign, in the first month, opened the doors of the house of the Lord, and repaired them," Howells Bible, 1903.

Septuagint, Bagster Edition

"And it came to pass, when he was established over his kingdom (Gr. blood), in the first month, he opened the doors of the house of the Lord, and repaired them.

[9] In the time of Christ the time-keeping system of the Jews was based upon the true conjunction (Sidersky, p. 643); but Maimonides asserts that when the time came for the calendar to be regulated according to the mean motions of sun and [period of Hillel II] moon, the true having been set aside, then the rejection from the calendar of certain days of the week was given birth. — Kiddusch ha-hodesch, cap. VIII, sec. 7, 8. Tr. Mahler,

38-37

443
37
406
58

443
163
280
40

10 Postponements = ?

~~"For he who would rightly know these mean courses, would easily perceive those plans by which it is clearly known when the new moon would show herself. For from that night of the month in which the new moon first appears to that night of the next month in which the new moon appears again, twenty-nine whole days intervene.~~

10 "But why is it that by this plan of computation [modern rabbinical], we never appoint the calends of Tishri either on the first day of the week, or on the fourth, or on the sixth? Without doubt because this computation is governed, as we have reported above, not according to the exact conjunction of sun and moon, but according to the mean. Whence it happens . . . that sometimes the calends occur upon the exact conjunction itself of sun and moon." — Moses Maimonides, *De Sacrificiis Liber*, p. 374. Tr. de Compiegne de Veil. London, 1683. Cf. also Alberuni's, the *Chronology of Ancient Nations*, p. 66. Tr. Sachau, London, 1879.

"The moon, first visible on one evening at Jerusalem, might be seen the evening before, according to the reckoning of places west of Jerusalem, or might be invisible until the following evening, according to the reckoning of places east of it." — E. W. Maunder, "The Astronomy of the Bible, p. 298. Sec. Ed., London.

12 "Just this fragment shows, that Aristobulus by no means occupied himself with only philosophically explaining away the text of the Pentateuch, but that he really gave a description and explanation of the Jewish law." — Emil Schürer, *The Jewish People in the Time of Christ*, Div. II, Part III, p. 241.

"God has made manifest his will in reference to the Marchesvan and Kislev and (consequently) the whole year by this, that he made the number of days of the week an uneven number, and fixed for every (week?) that which we mentioned already. Through this the months . . . reciprocally, and they follow each other as they should." — Samuel Poznanski, "Anti-Karaite Writings of Saadiah Gaon", *Jewish Quarterly Review*, Vol. X, p. 269. 1897.

11 Stephen Herbert Langdon to the contrary. Cf. *Babylonian Menologies and the Semitic Calendars*, pp. 89, 96. London, 1935.

15-a For the computation of Jubilee years, see G. Schiaparelli, *Astronomy in the Old Testament*, pp 144, 145. Oxford, 1905.

MAR-SAMUEL

Chapter II

While in Palestine, the depressed position of the Jews often barely managing to make a scanty livelihood inflicted upon the disciples of the sages, the duty to marry only at an advanced age after having completely finished their studies so as not to be hindered in their brain work by worrying cares o subsistence, with the Babylonian Jews living in luxury, it was generally the custom to enter into marriage before the 20th year, and it was not a rare case when a Babylonian studying law left his home country as a husband, father of a family, to go to Palestine, there to complete his studies. Soon after his return from Palestine, Samuel too was given a faithful life companion. However, he was not willing to leave her and go far away, but intended to continue, with his scientific studies, in his homeland. Aside from practicing medicine and law, he applied himself mainly to astronomy, that science which is to bring about the most stimulative impression of the sublime upon the human imagination carrying the mortal human off his feet in admiration of the greatness and omnipotence of the creator of the universe.

Already in ancient time, Babylon was the home of astronomy. No other country than this afforded the observing investigator a wide unhindered view over expended plains and in a clear sky not darkened by clouds which extraordinarily favored the cultivation of this science. The inhabitants of these regions actually have occupied themselves with astronomical observations more than other nations and stood in high esteem on account of their knowledge in this sphere. Especially about the city of Nehardea, the place of Samuel's residence. Plimius reports that it was the seat of the Hippaxenians, a famous sect of the Chaldean wise men.

In these regions, probably also the Jews became friends with the science of astronomy and acquired multiple knowledge which seems especially significant with the house of the Patriarch in Palestine which came from this country. Here Samuel too, cultivated with habitual zeal this sublime science.

But while with the Chaldeans--as on the whole with most of the nations of antiquity--astronomy was closely tied to astrology--that delusive science which pretends to be able to predict the fate of man from the consellation of the stars, in fact, thanks to this latter, it had received its proper significance--with the Jews, it received a much higher meaning.

The study of this science was declared a religious duty because it leads to the knowledge of divine omnipotence and omniscience. Bar Kappara, one of the most excellent students of R. Juda ha- Nasi, taught: Who knows how to figure out the courses of the stars and omits to practice it, to him the words of the prophet applies: "they regard not the work of the Lord, neither consider the operation of his hands." Isa. 5:12. In the same sense, also other teachers of the law taught that it was meritorious to make astronomical observations. Heeding the words of these teachers, Samuel too occupied himself with astronomy chiefly for the sublime purpose of cultivating merely the scientific side of it. Though he associated with heathen astrologists in order to increase his knowledge, he even had an astrologist by the name of Ablat, as his intimate friend. However, he censured those of his coreligionists who pursued the pseudo-science of astrology, saying: With the astrologists who are constantly looking to the sky you will not fine knowledge of the law. He also decidedly opposed the view of the astrologists that the fate of all men is determined unalterably by the constellation of the stars. He taught, in the contrary, that it is within the might of man by good and God plaasing deeds to be spared of the misfortune the astrologists pretend to have read from the constellations. He further tried to convince his friend Ablat of this, his Jewish view by produced facts.

It is not possible exactly to determine the extent of Samuel's knowledge in the astronomical science, for aside from the numerous teachings and sentences in the two Talmuds--of which only a few come under the province of astrology--no written works of his have come down to us. We do not even have reliable information of the fact that he has been literary active in the sphere of astronomy. Although,

two works are credited to him but as to the Baraïlha de-Samuel insight into which was made possible to us a few years ago, It has proved to be of much later origin. It can be assumed with certainty that as to the other works bearing Samuel's name, we also have to do with pseudo epigraphs.

From the following words, spoken by him, it is evident however, that he especially distinguished himself in the knowledge of the heavenly bodies and their movements: "The heavenly courses are so well known to me as the streets of Nehardea; yet I cannot get to the bottom of the nature of the comets and their movements; only that much I know for certain, that a comet never crosses the Orion, for it that would happen, the world would be destroyed. It is an optical illusion if sometimes we see one cross it; the light emanating from the comet appears to us as being the star itself." Many more of his doctrines and statements testify that he tried to explain the phenomena of the sky with a scientific mind, and from this, it must be concluded with certainty that in astronomy, he kept pace with his time, or even was ahead of it.

The special merit of Samuel was that he especially cultivated the branch of practical astronomy representing the calendar science, spreading the knowledge of it in Babylon.

This branch, so important for the religious as well as civil life at that time, however, could find paractical application only in Palestine, the only place where the determination of the beginning of the months and the intercalations were permissible.[4] In spite of this, upon the suggestion of Samuel, soon it became the subject of eager study with the Babylonian teachers of law.

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[4] Note 4, p. 19. Sanhedrin 11B, Jerusch. Nedarim VII, 8. Only in an emergency case those qualified abroad were allowed to make calendar determinations. The proceedings of Chanania, nephew of R. Joshua, who in Babylon determined beginnings of the month and intercalary years, was severely censured from all sides.

In those days, when the Patriarch had his seat still in Palestine, the determination of the beginning of the month on which also depended the festival days, always took place on that day, on which the new moon became visible in the sky for the first time after new moon in form of a narrow crescent. This had to be announced by witnesses to the Patriarch and his council, who had to be very well experienced in the reckoning of every new moon i.e. the time when the moon comes in conjunction with the sun, as well as in the knowledge of the time when the visibility of the moon becomes possible for the first time after the conjunction--firstly in order to be able to examine the statements of the witnesses and on the other hand, in order to avoid irregularity in the calendar system in case the moon would have been seen by witnesses not at the proper time.

As soon as the beginning of a new moon was appointed, all Jewish communities were informed of it by messengers. Those communities, however, who were so far away from Palestine that a messenger could not reach them before the beginning of the day of festival, remained in doubt as toethe true time of the festival and had to celebrate two days instead of one. The rules followed by the Sanhedrin in all calendar determinations, as well as the astronomical reckonings connected with it, were trusted under the name of Sod ha-Ibbur (Calendar secret) only to ordained teachers of the law. Besides, they were recorded in short, dark suggestions in a Baraïtha.

Note, p. 20: cf. Maimonides, Jod ha-Chasakah h. Kiddusch ha-Chodesch cap. 1 and 18. Although in figuring out the time when the new moon starts to become visible, witnesses were completely superfluous, a traditional law wanted to see applied if possible the statements of witnesses, and allowed only in case of an emergency, the determination of the beginning of the month on the basis of mere calculation. But this calculation, however, differs from the calendar rule introduced later by Hillel II, which figured the interval from one new moon to the other according to the mean length of the synodic month.

Note: Bezah and many others, Kethuboth 112a. The reason for keeping this information secret is given by R. Serachjah ha-Levi, maor, Rosch ha-Schanah par. 1 and by R. Mordecai Jafah, Lebusch ha-Chur S. 427.

Through his astronomical studies, Samule had now gained the necessary knowledge on the movements of the moon and could make the statement before his colleagues that he was able to announce to the Jews in the Diaspora the beginning of the month each time as it is set in Palestine thus saving the double festival days.*

Although he was not able to unriddle the sentences from the Baraïtha de Sod ha-Ibbur on this placed before him by Abba, father of the famous Agadist R. Simlaï, and had to hear of the latter the remark that life this he does not understand much more of the Sod ha-Ibbur; still he knew how to make up a calendar for 60 years. Later he sent this to the head of the Palestine teachers, R. Jochanan, to show him his superiority**.

He did, however, never think of making public this calendar because as long as there existed in Palestine a chief religious government, he did not wish to sever the only bond which still knit the Jews to their former homeland***.

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* Note: The same according to the explanation of Raschi; differently R. Abraham ha-Nasi in Sefer ha-Ibbur Th. II porta 5; cf. Asarjah de Rossi, Meor Enajim, Appendix.

** Note 5, p. 21: The dark sentences asked by Aba were later explained by R. Seira who had gone to Babylon from Palestine. Yet this explanation to be foundin the Talmud (Rosch ha-Schanah 20b) is still so dark that the commentaries differ on it in many interpretations. cf. Raschi and Maor, same Kosari II, 20, Ibu Esra, Iggereth ha-Schabbath porta II; but especially R. Isaac Israeli in the Jesod Olam IV, 8.

This calendar very liekly contained the order of the festivals as they then usually were set by the Palestine Sanhedrin, which in determining the beginning of the month as is known was ruled by the visibility of the new moon. Therefore it was not arranged like the one institude later by Hillel II. This, however, needs yet a thorough investigation since much can be said against it. Cf. Maimonides Fad ha-Chasakah h. Kiddusch ha-Chadesch cap. 18.

*** Note 1 p. 22 The fact that Samuel whished to have the 2nd festival day to be observed as holy as the first and that he stronly animadverted on its desecration (Pesachin 52a) proves that his statement. . . . . Hebrew. . . had nothing to do with an intention to remove the second festival with a fixed calendar. Cf. Israëli 1, c.

Nevertheless, he did not care to teach colleagues and students in the calendar science, and the Babylonian Jews received their first knowledge in this science through him.* Among other thins, they learned of him also how to determine the duration of the solar year at 365 days and six hours.** Therefore, this determination of the length of the year, although ever before in use with the Sanhedrin in Palestine, carried the name Tekufah de Mar Samuel with the Babylonian as well as later with the western Jews.***

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* Note 2, p. 22: Due to Samuel's excellent knowledge in the calendar science which even revealed to him the secret of determining the beginnings of the month, he was given the name Jarchina ah. (cf. Baba mezia 856.)

** Note 3, p. 22: Erubin 56 a.

*** Note 5, p. 22: Though this Tekufah even according to the Jewish calendar is not worked out quite exactly--for according to it 19 solar years, which in Hillel's calendar should correspond to 235 months were 1 485/1080 hours in excess. But this in no wise was a secret to Samuel. He merely wanted to accept a more convenient figure because in his time it still was fit for use (cf. Abraham Ibu Esra, Commentary to Exod. 12, 2 and Iggereth haschabbath portal). A certain Rab Adda later divided this excess in 19 parst and deducted one such part from the 365 days and six hours, thus reducing the length of the solar year to 365 days, 5 hours, 55 145/342 minutes. So that 19 solar years amount to exactly the same as 235 months at 29 days 12 hours 44 1/18 minutes. This length of the year is named Tekufah de Rab Adda. Yet the Tekufah de Mar Samuel was not completely displaced by it. Some regulations with regard to lithurgy still are based on it. Cf. Tur and Schulchan aruch. Orach Chajim S. 117 and S. 229.

Position of the Passover, According to Josephus

"Again, Josephus, the most honest and most faithful writer, says that Passover was always celebrated in the month Xanthicus [Nisan, or April]. But, if we follow the Europeans, Passover was often wandering from Xanthicus, or our April, in the times of Christ. For, in the second, fourth, fifth, seventh, tenth, thirteenth, fifteenth, sixteenth, and eighteenth year of the Jewish cycle, Passover was altogether falling in the month Dystrus, even our March."-- Scaliger, Joseph, "De Emendatione Temporum," p. III [Preface]. Francofurt, 1593.

Moon Precedes Her Ancient Position in Julian Year By One Day in 304 Years

"Accordingly, the first and most ancient observation of Hyparchus connected the new moon with the equinox, even the or, in order that I may use a better word, he thought to be the same. Thence, in 304 years, he proclaimed that not only the moon, but also the equinoxes anticipated by one day their former positions in the Julian year."-- Scaliger, Joseph, "De Emendatione Temporum," p. II [Preface]. Francofurt, 1593.

The Greek Tetraeteris

"Whence there were two principle kinds of year among the ancients, neither lunar, nor solar, but uncertain between each kind. The first form resides in Greece, the other in the Orient. But the Greeks did not in any way undertake a correction of their form. It was difficult to exact all full months, according to the plans of the moon, and yet, in certain civil ordinances, they were holding the work by the moon's motion. For always the Olympiad was celebrated on full moon, and on the 15th of the month. In order therefore, that the equal Greek year should catch the Olympiad on the 15th of the month, this was not difficult. But in order that the 15th of the month should fall upon the 15th of the moon in the equal months, this could not be done unless, in every four years, a single two days were added to each year, which they were calling ἀνάρχεις ἡμέρας. This Tetraeteris was called by the Elidensians, Olympias, by the Delphians, Pythias, and its first month only was lunar."-- Scaliger, Joseph, "De Emendatione Temporum," p. 8. Francofurt, 1593.

Nature of the Greek Year

"And certainly, those ancients erroneously set forth , and after them, writers of a later age, Macrobius and Solinus, that the Greek year was purely lunar from the beginning. For, although in their panegyrics, and better known sacred festivals, which were repeating in a certain period of years, they were holding a plan of the moon, yet, let me say in a word, the form of their year was not lunar. For the Olympic game was celebrated on the full moon itself. Besides, the Laconians had a law to begin something new before full moon, or before new moon. And whence we have mentioned the Laconian moons, repeatedly set forth in a common proverb, and, on the contrary, that the interposition of the law was scorned by the Arcadians in a proverbial shout. For since frequently before new moon and full moon wars and other business were arising, on account of this thing, they were calling it 'προσελήνους,' or, before the new moon, although we know that the cause of the shout was mollified in interpretation by the Arcadians themselves, and by those reporting that the shame had been changed into praise, according to the age of its origin, and by those constantly discussing their ancestry from a more ancient star. Because, therefore, they were choosing the times of new moon and full moon for their sacred panegyrics, consequently, the holy festivals were appointed every three years, of which kind were the orgies of Bacchus, the greater Mysteries -- the Nemean and Isthmian games. For this is the form of the Greek year. If, for example, the new moon occurs on the Kalends of Gamelion, the full moon will fall upon the same Kalends in the third returning year. Therefore, since, in the Attic Tetraeteride, two greater mysteries were being celebrated, which were repeating in the third year, these were recurring upon that position of the moon, which was opposite to the site of the former Mysteries."--Scaliger, "De Emendatione Temporum," Preface, p. 6.

The Great Period of Hipparchus

"For the great period of Hipparchus is 304 years. Its first year agrees with the Nabonassar year 586, according to the limit of the passing year, in which Hipparchus noted the equinox on the thirtieth day of Mesore, third day of the week, the fourth following at sunset, in the year 17 of the third Calippic period, year 4552 of the great Julian period, cycle of the sun 16, September 27. It was the year of the Jewish period, 3600, as the Europaean Jews reckon, Tisri 4.2.6. in the same night."--Scaliger, "De Emendatione Temporum," preface, p. 7.

Description of the End of Passion Week

"For Christ, without any controversy, ate the Passover at the end of the thirteenth of Nisan, the fourteenth being imminent: that is, in the evening, which the fourteenth followed. Concerning this, no one a little erudite doubts. For after sunset of the fifth day, the sixth Jewish day of the week was entering, even to sunset of the day of Venus, after which the Sabbath came in, and the 15th of Nisan, that is, the solemn Paschal; therefore the whole 14th of Nisan intervened between the end of the Lord's supper and the beginning of the solemn Paschal. Yet the Evangelists call that day on which He ate the Passover, the 'first day of unleavened bread,' although it was only the thirteenth."--Scaliger, "De Emendatione Temporum," Preface, p. 8.

Beginning of Jewish New Moon Days

"But the Jewish, Arabic, and Samaritan new moons commonly exceed the size of the phasis, so that the civil new moons of the lunar months are of a three-fold kind: the Attic from the conjunction, the Calippic, from the waning of the moon, and the Jewish, Samaritan, and Arabic, from the shape of the moon on the third day, I say. The solar month is natural, which is limited by the natural segments of the celestial circle, such as is the passage of the sun from sign to sign. These and the lunar are the true celestial months. The civil month of the sun is that which has been divided, not by a natural length, but equally: as, in the Egyptian year, and Greek, all the months are equally 30 days in length: and in the lunar, alternately full and hollow. For the computations of the moon do not always suffer that the months should be continually hollow and full in alternation, but this has been established according to the method of civil time. There are also some months produced by the superfluity of days, which are called embolismic: and these are either natural or civil: but both are ruled according to the equation of the sun. The natural are embolismic, which, collected from the excess of the sun in comparison with the distances of the moon to be completed, are ~~are~~ brought together, of which kind is the Jewish and Samaritan Adar prior; and this month is always thirty days long. The civil embolismic, which, arising from an excess of Solar days, is added for the support of a hollow year. Of this kind was Mercedonius of the ancient Roman year, alternately twenty-two, likewise twenty-three days. Of this kind also is the Attic Posideon. For neither could Posideon be natural, although thirty days in length, since it was indeed not lunar, since its neomenia was a long way off from the moon; and not solar, because it was a part of that year not described according to the course of the sun."--Scaliger, "De Emendatione Temporum," p. 7.

"For he claims that the Jews begin the new moon day, not from the conjunction of the luminaries, but from the horned form, that is, on the third day after the conjunction."--Petavius Dionysius, "Animadversiones in Epiphanii opus," p. 177.

let me

"I would not have said this, nor define that in that time the political translation of the more recent Computation was employed by the ancient Jews in the time of Christ. For this even the Jews themselves deny. Since Rabbi Moses ben Maimuni Cap. VII Kiddusch hahodesch, sec. 7 & 8, thinks that the rejection of days of the week was given birth in that time when they began to direct their computation according to the mean motions, the true having been set aside."-- Petavius, p. 182.

"But why is it that by this plan of computation [constant Jewish] we never appoint the calends of Tisri either on the first day of the week, or on the fourth, or on the sixth? Without doubt because this computation is governed, as we have reported above, not according to the exact conjunction of the sun and moon, but according to the mean. Whence it happens that on alternate days of the nascent moon the calends are celebrated and postponed so that sometimes they occur upon the exact conjunction itself of the sun and moon."--Maimonides, Moses, "De Sacrificiis Liber," p. 374. Tr. Ludovicus de Compiegne de Veil. Published London, 1683.

The following should continue from the foregoing:

"For this is their plan and manner when they are celebrated at the same time with the nascent moon on the third day of the week, they would be rejected on the fourth, and celebrated on the fifth; they would be rejected on the sixth, and observed on the Sabbath, or seventh day; they would be rejected on the first, and celebrated on the second."--Reference as above.

"But that with the exception even of the four it happens that the calends of Tisri are postponed, the cause is altogether the same that today's plan of reckoning is referred to the mean conjunction of the sun and moon. And this is regarded to be the true when, the new moon falling upon the third night of the week, the calends of Tisri are thrown upon the fifth day: for often it happens that the new moon does not yet appear on the fifth night of the week, nor indeed upon the sixth. From which it is easily understood that the exact conjunction of sun and moon is not accomplished except at length on the fifth day of the week."--Idem.

"Again, by this plan of the tables, the months are thus disposed full and hollow, so that Tisri is continuously full, and Tebet, always hollow. But those who follow this through, change in order. Tebet is hollow, Shebat full, Adar hollow, Nisan full, Ijar hollow, Sivan full, Tammuz hollow, Ab full, Elul hollow. But in the intercalary year, since there are numbered two Adars, the first of these is full, the second, hollow."--Maimonides, Moses, "De Sacrificiis Liber," p. 376. Tr. Compiegne de Veil. Pub. London, 1683.

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"But this plan of the fasti, which is now in use, although no senate which rules the times according to the motions of the stars, even boys from play learn in three or four days."--Maimonides, Moses, "De Sacrificiis Liber," p. 385. Tr. Compeigne de Veil. Pub. London, 1683.

"But it is fitting to have in mind that which is known and recognized why that mean motion of the sun ranges through an interval of twenty-nine days, why over three hundred and fifty-four days by which that lunar year is accomplished, whose months have been disposed in order, which thus far is called the ordered year. For he who would rightly know these mean courses, would easily perceive those plans by which it is clearly known when the new moon would show herself. For from that night of the month in which the new moon first appears to that night of the next month in which the new moon appears again, twenty-nine whole days intervene.

"And neither does it ever happen that more or less whole days intervene. But this is the only thing which we seek by these plans, when, plainly, the nascent moon first appears. Then, from this year in which a certain new moon should actually appear ~~cure~~, even until in the returning year the same new moon appears, the time, which we have called the ordained year, will either wholly pass away, or by one day more."--Maimonides, Moses, "De Sacrificiis Liber," p. 390. Tr. Compiegne de Veil. London, 1683. And the same is the plan of all the years

Rosh Hashanah 21 a: "When you see the Tekoufa de Tebeth (the winter solstice) is prolonged until 16 Nisan, pronounce this year, without hesitation, as embolismic because it is said (Deut. 16:1): 'Observe the month Abib,' which means observe whether the Tekoufa of Abib falls in the month Nisan."-- Cited by Sidersky, David, "Etude sur l'origine astronomique de la chronologie juive," Appendix, sec. VII.

"From numerous passages of the Mishnah, the Babylonian and Jerushalmi Talmud, it is evident that prior to the destruction of Jerusalem in 70 A.D., no day of the week was excluded from the calendar for the fixation of the 1st of Tisri. The Mishnah (Sabbath 19.5) speaks of the 1st Tisri falling on a Sunday, and another Mishnah (Menachot 11.7), deals with the Day of Atonement falling on a Friday [or the 1st and 15th of Nisan and 1st Tisri on a Wednesday]. The Jerushalmi (Rosh hashanah 2.1) deals with the 1st Tisri falling on a Friday. (For the details, see Zuckermann, "Materialien," etc. pp. 49, 50, 60. Breslau, 1882.) [Thus, when the 1st Tisri was on Sunday, then the 1st Nisan was Friday, contrary to Adu; and when the 1st Tisri was on Monday, then the 1st Nisan was Sabbath, and the 14th Nisan, Friday, contrary to Badu.] Sidersky, David, "Etude sur l'origine astronomique de la chronologie juive," Appendix, sec. VIII.

"The Talmud passes over Hillel's reform with silence, and does not mention with one word the great difference between our present and the former calendar."--Schwarz, Adolf, "The Jewish Calendar," p. 37.

"Pinîles claims that the fact that the calendar and its principles are not mentioned in the Talmud is explained by the circumstance that our ancients who regulated the calendar 34 years after the Nicaean council saw to it that no stranger and outsider should be initiated into its principles."--Schwarz, Adolf, "The Jewish Calendar," p. 42.

"The founders of the calendar thought that they ought to retain the previous secrecy, in order to protect the declared advantage Judaism had over Christianity as a result of the regulated order of the festivals (Note 3)."--Schwarz, Adolf, "The Jewish Calendar," p. 42.

"The order of intercalation of our cycle deviates from that of Meton, which is archaic -- cannot be accidental."--Schwarz, Adolf, "The Jewish Calendar," p. 43.

"In Erachin 9.b, Rabbi Adda bar Ahaba expresses the bold view that the calendar need not absolutely be based upon observation (Note 1)."--Schwarz, Adolf, "The Jewish Calendar," p. 43.

"Already Maimonides seems to have been of the opinion that our calendar is not established on the Jerusalem meridian. For if you compute the astronomical conjunction with the help of the epoch stated in Kid. hach. c. 11 ff., you will find that already in Maimonides' time it was $1^h\ 17^m$ before the Molad. This difference, not mentioned with one word by Maimonides, he could explain to himself only by the change of the meridian$."--Schwarz, Adolf, "The Jewish Calendar," p. 40 Note 1.

"The mean principles of the calendar based on Samuel's tekupha have been borrowed from the Almagest -- both the average length of the month, and the epochs of our Moledoth and the Tekuphoth are nothing more than data taken from the Ptolemaean astronomical tables reduced to the meridian of Jerusalem."--Schwarz, Adolf, "The Jewish Calendar," p. 40

"To be sure, the form of the year is not expressly given anywhere, yet in spite of this it is an established fact that Moses introduced the limits of the lunar year. The circumstance that the feasts of the Israelites had to agree with the seasons of the year makes this an unshakable evidence. With a vague lunar year, the Passah feast, which comes in the month of ears, as well as the harvest feast, which comes in the autumn month, would make the round through all seasons of the year."--Schwarz, Adolf, "The Jewish Calendar," p. 20.

No Lunar Year, By Nature, Consists of 353 Days

"For therefore Kisleu, which is full by nature, may, by arrangement, become hollow; or, by nature, for the reason that in the 19th year of the paschal cycle, Dionysius cut off one day, which he called the "leap" of the moon, but which the Greek computers called the "cutting off" of the moon, although it foolishly constitutes the last year of the 19-year cycle as only 353 days, when there is no such year in nature."-- Scaliger, Joseph, "De Emendatione Temporum," p. 10. Francofurt, 1593.

How the Jews Count and Date Their Day

"Furthermore, it must be understood that when I say that Tisri begins from the 10th of October, I mean from the night which followed sunset of the 9th day, from which sunset the Jews count the beginning of the 10th. Thus, the evening of the sixth day itself is the beginning of the Sabbath. When, therefore, I speak of the beginning of the Sabbath, I mean sunset of the day of Venus."-- Scaliger, Joseph, "De Emendatione Temporum," p. 85. Francofurt, 1593. [Friday]

Relation of Moon's Motion to the Tropical and Julian Suns

"For the tropical [astronomical] 19-year cycle is faster than that of the moon by more than two hours. On the contrary, the Julian 19-year cycle is longer than the moon's by one hour, and more than 27 scruples. But since in each plan, tropical and Julian, there is error, the moon, with plans midway between those two, cannot regard the limits of her epoch, so that in the paschal cycle of Dionysius it happens -- whose plans are not assembled with reference to the moon's 19-year cycle, nor its epoch corrected according to the motion of the sun, but its form rather wholly a pure Calippic -- that after 300 years it is neccessary to vary its position."-- Scaliger, Joseph, "De Emendatione Temporum," p. 12. Francofurt, 1593.

Jews Said to Use Chaldean Year in Their Contracts

"To the king of Egypt, Jehoiakim, king of the Jews, was paying taxes. But he changed lords, and became subject to tribute to Nabopollassar, upon whose death, he revolted from the Chaldeans in the fourth year of his reign, which is the first of Nebuchadnezzar. And again, he that is conquered by Nebuchadnezzar, comes under his power. From those times, I say, they began to use the Chaldean year in their contracts, and therefore, from the beginning of Nabopollassar, which arose from the 123rd year of Nabonassar, 4th cycle of the moon, as we have learned from Ptolemy."-- Scaliger, Joseph, "De Emendatione Temporum," p. 79. Francofurt, 1593.

Jews Used Chaldean Months in Their Contracts to Time of Seleucus Nicanor

"But the Chaldean months are the same as the Jews, for the Jews had them from the times of Nabopollassar, father of Nebuchadnezzar, as will be shown below. They used these months even to the times of Seleucus Nicanor, by whom they were compelled to sign their months with Macedonian names in their contracts and public documents, which also the Jews have done. . . Wherefore, how the Chaldean months agree with the Macedonian, below we have submitted an example, with our great wonder how Hyperberetaeus was transferred to an earlier epoch than was appointed by the Macedonians. For the Macedonian Hyperberetaeus was altogether agreeing with our October, and the Jewish Tisri. But nay, the Chaldean even precedes the beginning of September. Even Lysias, prefect of Syria, in a letter to the Jews, 2 Mac.XI:21, sent in the Chaldean year 148, in the month Dioscuros, Jewish year 3597, Jewish cycle VI, is witness that in place of Theboch, they had brought Dioscuros into use. Therefore it was embolismic. For in every respect, the Chaldean cycle was the same as the Jewish. Since the Jews, as we have said, received it from the Chaldeans. But further, Dioscuros is outside the regular 12 months; therefore, the month is embolismic. But even the account of the name is most fitting, for the embolismic month is twin-born, like the twins of Castor. In short, the embolismic month was a leaper among the Chaldeans, never remaining in the same position."-- Scaliger, Joseph, "De Emendatione Temporum," p. 76. Francofurt, 1593.

After the death of Herod the Great, at the time Archelaus was about to take over the kingdom of Syria, a great sedition arose among the Jews because of Herod's killing of Matthias, and the appointment of another high priest, "not agreeable to the law." At the time of the passover, the Jews had worked themselves into a frensy. It was a time, Josephus says "when they offer sacrifices with great alacrity; and when they are required to slay more sacrifices in number than at any other festival, and when an innumerable multitude came thither out of the country, nay, from beyond its limits also, in order to worship God."

One company of the seditious resorted to the temple, and Archelaus sent a regiment of a thousand to quell the disturbance before "the whole multitude should be infected with like madness." But the seditious in the temple "irritated the people by the noise and clamors to encourage the people in their designs, so they made an assault upon the soldiers," stoned them, and then "returned to the sacrifices which were already in their hands."

Archelaus then thought to cut off those who had made an attempt against the government, and sent out the "whole army upon them" -- the horsemen to prevent those that had their tents without the temple, from assisting those that were within the temple. Josephus, "Antiquities," bk. XVII, ch. IX, sec. 3. Whiston, 1844.

The seditious also from within the temple threw stones at the force which Archelaus sent. "At these the whole multitude were irritated, and threw stones at many of the soldiers and killed them," but the tribune fled away wounded. "After which they betook themselves to their sacrifices, as if they had done no mischief." So Archelaus sent his whole army upon them, "the footmen into the city, and the horsemen by way of the plain, who, falling upon them on a sudden, as they were offering their sacrifices, destroyed about three thousand of them." Josephus, "Wars of the Jews," bk. II, ch. II, sec. 3.

From these two sources, it seems quite clear that the greatest part of the multitude were "in the plain" offering their sacrifices when the horsemen whom Archelaus sent, came upon them and killed about three thousand. This scene took place about the time Jesus was born. This testimony of Josephus, together with that of Philo ("Life of Moses," Book III, pp. 121, 171, 284) and Maimonides ("De Sacrificiis Liber," p. 4) are important sources favoring "individual paschal sacrifices upon private altars," in the time of Christ.

"That not 10 or 11 days were inserted after each year can be concluded for the simple reason that by it the character of the lunar month would be annulled."--Schwarz, Adolf, "The Jewish Calendar," p. 9, Note 1.

"It appears however, from 1 Sam. 20:27, that already in the most ancient time, as often as on the evening of the 30th day no moon was visible, two days were celebrated as new moon feast, so that as with us, between two new moons there were always 28 days."--Schwarz, Adolf, "The Jewish Calendar," p. 10.

"Gatterer, in his zeal, goes too far (l. c. 145) when he asserts that the Jewish months months at all times had 29 and 30 days alternately, for since the visibility of the new moon depends on the position of the ecliptic as against the horizon, it cannot be determined in advance that one or the other month shall be full or deficient. It is just as possible to have two full months follow each other as for two deficient."--Schwarz, Adolf, "The Jewish Calendar," p. 10, Note 2.

men knew beforehand

"In the Mishnah several cases are mentioned which do not fit into the present holiday regulation of the Jewish calendar.

Pesachim 7.10 -- the Mishnah gives rules about the passover lamb: 'The bones and the sinews and the leftovers are burned on the 16th Nisan. If this happens to be on a Sabbath, then they are burned on the 17th because they do not take precedence over a Sabbath or a holiday.' Here it is taken for granted that the 16th Nisan could happen on a Sabbath and therefore, the 15th, contrary to the Badu rule, on a Friday.

In the controversy between the Pharisees with the Boethosaer about the Pentecost time, which we are going to discuss later, the fact that the 16th Nisan came on a Sabbath, therefore the 15th on a Friday, played an important role.

The Babylonish Gemara (Sukka 54 b) says: 'If the first day of the feast of the tabernacles coincides with the day of preparation for the Sabbath, the Day of Atonement would have to come on a Sunday; that is why it is shifted.' (By lengthening the preceding month Elul to 30 days.) In another place, the Talmud reports (Rosch Haschana 20 a): 'When Ulla came, he told that in Palestine one had made the month of Elul to be a full month (30 days). Then he said:'the associates in Babylon recognize the service that has been rendered them by this.' Therefore, at the time of Ulla (300 A.D.), the calendar rules had not definitely been laid down."--"The 14th Nisan, and the Day of the Crucifixion and the Synoptics." Biblica,

"Already Ezra apparently did not seem to follow the true conjunction at all times; for the source informs us that since his time the month Elul never has been complete (Rosch Hashana 19 b, 32 a; Beza 6 b and parallel passages). However, the matter is represented in the Talmud as if Ezra had taken no steps in this regard; but that the month Elul had been incomplete during that entire period, as though it were established merely through tradition, or even historically."--Schwarz, Adolf, "The Jewish Calendar," p. 16, Note. Breslau, 1872.

"According to his [Maimonides] opinion, the testimony of dependable witnesses should take precedence over astronomical calculations (Kid. Hach. III). But this opinion must seen strange, and more so, since, according to Maimuni himself, the subsequent testimony [of the witnesses] is no longer valid on the 31st day; and since the whole debate was brought up in the Talmud on account of the question how Elul could be made full in favor of the Babylonians. Cf J.Landau, Commentary on Beza, p. 16."--Schwarz, Adolf, "The Jewish Calendar," p. 34. Breslau, 1872.

"In the Jerusalem Gemara on the pamphlet Sukka 4.1 (2), Rabbi Simon (3rd cent. A.D.) orders the calendar makers to see to it that the ceremony of the willow twigs (7th day of the feast of tabernacles) does not come on a Sabbath. Before that, it had been insisted that the willow twigs took precedence over the Sabbath, that is, the ceremony could be performed on Sabbath, but the Boethosaens contradicted this (4). The Adu regulation ended this controversy."-- "The 14th Nisan, and the Day of the Crucifixion and the Synoptists," Biblica,

"It has been proven by the Karaite Eliah Hadassi (Eschkol hakofer sec. 185), and by Asarjah de Rossi (Mazref lekesef p. 69) that in the biblical epoch the Dechijoth [postponements] were not known."--Schwarz, Adolf, p. 38. [In Ezra 7:9, the people are said to have arrived in Jerusalem on the first of Ab; they "abode there three days," and then on "the fourth day," not the fourth day of the month, as de Rossi takes it, but the fourth day after the arrival, the priests weighed out the silver and the gold, and turned it over. This was Sunday, not Sabbath, and signifies that Ezra left Babylon on Thursday, and Ahava on Monday. This is contrary to de Rossi, who argues that 1 Nisan could not have been Thursday.]

MONTHS OF JEWISH SACRED YEAR

(Names and Order in Josephus and Machabees)

" Table of the Jewish Months

In Josephus and others, with the Syro-Macedonian names Josephus gives them, and the names of the Julian or Roman Months Corresponding to them.

Hebrew Names.			Syro-Macedonian Names. (Identical)	Roman Names.
(1.)	Nisan	30 days	Xanthicus	March and April
(2.)	Jyar	29 "	Artemisius	April and May
(3.)	Sivan	30 "	Daesius	May and June
(4.)	Tamuz	29 "	Panemus	June and July
(5.)	Ab	30 "	Lous	July and August
(6.)	Elul	29 "	Gorpiaeus	August and September
(7.)	Tisri	30 "	Hyperberetaeus	September and October
(8.)	Marchesvan	29 or 30 "	Dius	October and November
(9.)	Casleu	30 or 29 "	Apellaeus	November and December
(10.)	Tebeth	29 "	Audynaeus	December and January
(11.)	Shebat	30 "	Peritius	January and February
(12.)	Adar	29 or 30 "	Dystrus	February and March
(13.)	Veadar, or ~~the~~ Second Adar,	29 "	~~intercalated.~~	

~~Whiston's Josephus, "Ant." 856, (London 1864)~~

1. Abib or Nisan (Esther 3:7)

"In the month of Xanthicus, which is by us called Nisan, and is the beginning of our year, on the fourteenth day of the lunar month, when the sun is in Aries (for in this month it was that we were delivered from bondage under the Egyptians), the law ordained that we should every year slay that sacrifice which I before told you we slew when we came out of Egypt, and which was called the Passover; and so we do celebrate this passover in companies, leaving nothing of what we sacrifice until the day following. . . . But on the second day of unleavened bread, which is the sixteenth day of the month, they first partake of the fruits of the earth, for before that day they do not touch them. And while they suppose it proper to honour God, from whom they obtain this plentiful provision, in the first place, they offer the first-fruits of their barley."--Ant. 111.10.5

"But Moses appointed that Nisan, which is the same with 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."--Ant. 1.3.3

"We grant therefore a safe conduct to all that come and go, until the thirtieth day of the month of Xanthicus. Fare ye well. In the year one hundred and forty-eight, the fifteenth day of the month of Xanthicus."--2 Mac. 11:30,38.

2. Ziv, or Iyar (1 Kings 6:1)

"Solomon began to build the temple in the fourth year of his reign, on the second month, which the Macedonians call Artemisus, and the Hebrews Jur." --Ant. viii.3.1

3. Sivan (Esther 8:9)

4. Tammuz (Eze 8:14)

5. Ab

6. Elul (Neh. 6:15)

7. Ethanim, or Tisri (1 Kings 8:2)

"It was the seventh month before they came together; which month is, by our countrymen, called Thisri; but by the Macedonians Hyperberetaeus. The Feast of Tabernacles happened to fall at the same time, which was kept by the Hebrews as a most holy and most eminent feast. So they carried the ark and the tabernacle which Moses had pitched, and all the vessels that were for ministration to the sacrifices of God, and removed them to the temple."--Ant. viii.4.1

"But on the seventh month, which the Macedonians call Hyperberetaeus, they make an addition to those already mentioned, and sacrifice a bull, a ram, and seven lambs, and a kid of the goats, for sins.

"On the tenth day of the same lunar month, they fast till the evening; and this day they sacrifice a bull, and two rams, and seven lambs, and a kid of the goats, for sins. And besides these, they bring two kids of the goats; the one of which is sent alive out of the limits of the camp into the wilderness for the scape goat, and to be an expiation for the sins of the whole multitude."--Ant. 111.10.2,3

8. Bul, or Marchesvan (1 Kings 6:38)

"This calamity happened in the six hundredth year of Noah's government [age], in the second month, called by the Macedonians Dius, but by the Hebrews Marchesuan; for so did they order their year in Egypt."--Ant. 1.3.3

9. Chisleu (Zech. 7:1)

"Now it came to pass, after two years, in the hundred and forty-fifth year, on the twenty-fifth day of that month which is by us called Chasleu, and by the Macedonians Appeleus, in the hundred and fifty-third olympiad, that the king came up to Jerusalem."--Ant. X11.5.4

10. Tebet (Esther 2:16)

"On the twentieth day of the ninth month, which, according to the Hebrews, is called Tebeth, and according to the Macedonians, Appleius."--Ant. x1.5.4

11. Shebat (Zech. 1:7)

"In the year one hundred and seventy-seven, the eleventh month: the same is the month Sabath."--1 Mac. xvi.14

12. Adar (Esther 3:7)

"Now Moses lived in all one hundred and twenty years; a third part of which time, abating one month, he was the people's ruler; and he died on the last month of the year, which is called by the Macedonians Dystrus, but by us Adar, on the first day of the month."--Ant. 14.8.49.

"But to celebrate the thirteenth day of the month of Adar, called, in the Syrian language, the day before Mardochias' day."--2 Mac. 15:37.

13. Veadar (13th month)

"Fare ye well. In the year one hundred and forty-eight, the four and twentieth day of the month of Dioscorus."--2 Mac. 11:21.

INSTANCES OF SHORT TRANSLATION PERIODS

(Citations from Astronomical Authorities)

1. "If the conjunction happens in the signs of short settings, such as are Virgo, Libra, Scorpius, in which the new moon holds around the autumnal equinox, or turns about around the Austral border, and advances in slow motion in Apogee, the first phasis or appearance of the moon can be retarded so that the moon is first seen in the evening after the lapse of some days after the interlunary period. Therefore, when the three causes before named, meet together around the conjunction of the sun and moon, it can altogether happen that the first phasis of the moon can be noticed not only on the subsequent day after the new moon (conjunction), but also in the evening, on the very day itself in which the syzygy of the sun and moon happens before the meridian; even as Erasmus Reinholdus in the commentary on the Theories of Purbachius, p. 155 demonstrated this. Indeed, from the same principles it follows that it may be allowed to see the newest and first moon on one day especially in the short twilights existing about spring time, namely which can advance this appearance of the moon not a little."--Hevelius, Johannes, "Selenographia," Gedandium, 1647, p. 274.

2. "Likewise Franciscus (Patritius, book 20, Pancosm, p. 114, similarly reports an example concerning Vespucius, who observed on one and the same day, the old and new moon, when he spurred on beyond the equator, where he also subjoins these words: 'but this could not otherwise be seen than in clear air, as with us, and one free from clouds.' This I freely concede, and believe to be true." --Hevelius, "Selenographia," p. 275.

3. The visibility of the new light, that is, the necessary age of the crescent, depends:

On the geographical latitude of the observer on the earth;

On the season of the year; also on the sun length (distance of the sun from the vernal point of the ecliptic);

On the geocentric latitude of the moon;

On the average irregularity (g) of the moon in its course.

Therefore the determination of the new light was one of the most complicated things in ancient astronomy because all four quantities always work together so the new light is a function of the four variable quantities. Fortunately we can eliminate here two quantities, that is, the geographical latitude which is not variable but the constant in Jerusalem = 31.8°; also the sun length is constant - since it concerns merely the new lights of March and April - the sun length = 350° until about 15°.

Thus the visibility depends only on two factors:

1. On the geocentric latitude of the moon which determines how many degrees she stands above (+) or below (-) the ecliptic.

2. On the average irregularity (g) of the moon which determines at which point of the ellipse formed course of the moon around the earth she stands. If "g" is at about 0°, then she is in the perigee and moves very quickly to the left or east away from the sun; if "g" is at about 180°, then she is in the apogee and moves very slowly.

Now we have two simple astronomical rules:

1. If, as here, in the spring the latitude of the moon ( ) = + 5°, perigee = "g" at 0°; then the crescent can be visible in Jerusalem after 17 hours. Example: The new light on March 13, 1918, mentioned by Gerhardt on page 121, which was visible in Syria after 20 hours. There it would have been visible as early as after 17 hours. In Germany I have observed it, latitude 51°, after 22 hours. Here most favorable conditions prevail. Latitude = +5°. (3)

2. If, as here, in the spring the latitude equals - 5, "g" at 180°, then the crescent is visible after 23.4 hours at the earliest. Example: The new light of the year 30 A.D. became visible not on March 23 but only March 24, because only 21.6 hours had actually passed.

It is especially worthy of note that in the spring the necessary age depends much more on the average irregularity of the moon, "g", than on her geocentric latitude; that is, it is much more important that the moon is distancing itself as quickly as possible from the sun so as to reach a certain elongation. The latter she reaches at the perigee in 17 1/2 hours; at the apogee, however, only in 23 hours. Contrary to this, in the spring a great positive latitude is less important, for then the ecliptic is already so suddenly arising in the evening against the horizon that the positive latitude only slightly increases the heighth of the moon above the horizon. (In the fall, August-September), on the contrary, the latitude is so important that a negative latitude of -5° raises the necessary age of the new light to about 41 hours.) --Schoch, Karl, "The Crucifixion of Christ on 14 Nisan," Biblica, Jan. 31, 1928, pp. 49,50.

4. The parchments of the 5th century B.C., found in Assuan, contain Jewish dates of months, which Ginzel has examined. In two cases, the new light had appeared after 24 hours. In two other cases, after less time. Ginzel succeeded in making a similar find from three equations of dates in Ptolemaus' Almagest. The new light had appeared after 22 hours.--Epping found in texts in cuneiform characters an interval of 19 and 18.8 hours.--In the months of February, March, April and May, 1918, I had my oldest sons and their fellow-soldiers carry out a number of observations in Northern Palestine, Syria and Northern Arabia. The result was that in 23 successful cases, the crescent was seen 29 1/2, 27, 26 and on March 13, as early as 20 hours after the conjunction. This latter result was reported to me by three observers of Aleppo and vicinity. On March 22, 1938 in the territory of the Carmel and near Kubebe-Emmaus, the six observers saw the new light when the moon was 19.1 hours old. (Biblica, 1928). J.K. Fotheringham published (in Observatory, Oct. 1921), the results of 14 places of observation--14.5--26.1 hours interval. The first (14.5) from Equatorial territories--Sir G.B. Airy figured out the minimum for Jerusalem 18 hours (See Observatory, 1911). This was confirmed by Dr. Downing. Ideler, Wurm, Wieseler, Caspan, and Ginzel take 36 hours as the maximum.--Gerhardt, Oswald, "Astromische Nachrichten," Band 240, pp. 150,151.

THE KARAITE RULES FOR TRANSLATION

5. After determining the true new moon (conjunction) and the hour of sunset for the day of the new moon, in case the age of the moon as from new moon to the hour of sunset is between 8 and 22 hours then the 1st (of the month?) cannot be determined by the age of the new moon because at the age of this many hours the moon can or can not be seen on the first evening. Therefore, in such a case they must resort to another method of determining, i. e., first of all from the tables it must be figured out (1) the degree of the distance between the moon and the sun to the east at the moment of sunset on the first evening; (2) It is necessary to determine the degree of the height above the horizon the moon will be at the moment of sunset, and further whether the total of the moon's distance from the sun and the moon's height above the horizon together amounts to 13 degrees, then the first of the month is reckoned from the first evening of the new moon (conjunction) but in case the total is less than 13 degrees, then the first is postponed until the following evening.

After determining the true new moon and the hour of sunset for the day of new moon (conjunction) in case the age of the moon as from the new moon until the hour of sunset is over 22 hours, then the first of the month always is counted the first evening - on the grounds that the moon at an age of over 22 hours from the new moon (conjunction) receives a great share of its light from the sun, so that it can be seen even simultaneously with the sun on the horizon at sunset on the first evening.

The foregoing is the main basis of the Karaite calendar. As is evident from this, the determining of the months of the Karaite calendar represents a colossal task. Besides, there is this inconvenience that the moon which will show herself the first night after new moon in the Crimea, cannot appear the same evening everywhere, therefore not all Karaite scientists share the opinion of determining the months of the calendar by this method. Thus in the near future is to be expected a simplified Karaite calendar in the sense that out of three rules only one will be made, i.e., the first of the month will always be the first evening following the true new moon, for much already has been written about this in the past and present centuries and until 1780 (Christian era) the Karaites used still another method to determine the months of the Karaite calendar. --Kokisoff, Jehuda, "Brief Information on the Karaite Calendar," 1880, pp. 38-40.

"-during the governorships of Festus, who succeeded Felix about 60" - Cambridge Ancient History, Vol. X, p. 854.

Cestius Gallus 1.1, 368 ff

Felix 1 11 182

Festus 1 11 183-187, 196.

Lastly, the extract from Anatolius, given in Euseb. Hist. eccl. VII. 32. 17-18, is occupied with the Passover, which is celebrated, when both the sun and moon are in the equinox, viz. the sun in the vernal, and the moon opposite him in the autumnal equinox. Just this fragment shows that Aristobulus by no means occupied himself with only philosophically explaining away the text of the Pentateuch but that he really gave a description and explanation of the Mosaic law." - Schürer, Emil, "The Jewish People in the Time of Christ," Div. II III, p 241.

First Council of Nicaea

Canon 7

Text. Since custom and ancient tradition show that the bishop of Aelia (Jerusalem) ought to be honored, he shall have precedence, without, however, infringing on the rights of the metropolis. (Schroeder, H. J. Schroeder, "Disciplinary Decrees of the General Councils," p. 33. St. Louis, 1937.

Basil (b. 330 A.D.) - "Was born in Cappadocia ... speaks of the severity of climate and heavy snowfalls, which kept them in their houses for months at a time." - Farrar, F. W., "Lives of the Fathers," p. 2. London, 1907.

Intercalation

"But an alternation of full and hollow months sometimes varies: and this may be either natural or civil. The natural variety is set on foot on account of the embolism, either of the month or the day. For in each kind, two months are continued full. As in the Jewish year, when the month Adar is intercalated, then Shebat and Adar embolismic are both full. . . The civil variety happens only in the Jewish year by increasing the month Marchesvan one day: and Marchesvan, from hollow, becomes full. Again also, in the embolism of months, there is a difference in position and time. In position, if either in the middle or the end intercalation happens, as in the Attic year, the last month was intercalated, which was called Posideon the first. In Jewry, the sixth month [as counted from Tisri] is intercalated, and is called Adar the first. In the Chaldaic and Syro-Greek year, the embolismic month was a leaper, which was running through all the months of the year in 228 years, which equal 12 19-year cycles. The Chaldaic embolismic month is called Theboch, by the Macedonians, Dioscurus, which intercalation, in memory of our ancestors, the Cilician Turks were using, until they began to substitute the simple Mohammedan year of the Hegira."--Scaliger, "De Emendatione Temporum," p. 9.

Roman Intercalation

"But in the ancient Roman year, the position of the embolism was far different from the others; for this was not thrown in between two months, as otherwise was the custom: but into the month itself, just as the young sprout was cut into the trunk. For between the 23rd or 24th, or between the 22nd and 23rd of February, it was being inserted, and indeed not without cause. For this they were always observing that the month next to March should always consist of 28 days, and it was the ordinary February: but the interval between the end of January and the Kalends of February was counted to Mercedonius, and the Kalends of the common February were occurring in an embolismic year now in Regi-fugium [24th of February] and now upon the Terminalia [23rd of February]. But indeed it was not always intercalated between the Terminalia and the Regi-fugium, as Censorinus thought, since, by this agreement, the common February would have been now 28 days, now 29 days."--Scaliger, "De Emendatione Temporum," p. 9.

Plan of the Greek Year

"Not only recent men have written, but I think it has been found that not a few of the ancients have reported the same in their literature that the Greek year of antiquity was lunar, since there was no other description of times and months in Greece than that which would agree with the computations of the moon, all of which the plan of the Tetraeteride as discussed by us in the last book proves that they think falsely. Furthermore, from our same argument, it sufficiently remains that the natural beginning of the year was not wont to be led off from Hecatombaeon, but from Gamelion and the days of winter. Therefore, as long as the Atheniens had Gamelion as the month of first rank for the beginning of the times and the acts of business, then always, for electing magistrates, the Comitia were driving back upon the end of Posideon, where there were the two days without head, which were outside of the series of the thirty days, so that the year not only should be 360 days because of the 30-day months, but also 362 days, on account of those additional days beyond measure, which were called the "days without head," since, throughout that two days, all the magistrates of the past year had abdicated, and besides, because in them, the Comitia for electing the new magistrates was held, even the ἀρχαιρεσίαι, they were being called. And this was indeed called the two days for electing magistrates, until the Astronomers of those times published the form of lunar year. Then the common people began to establish the beginning of the year, in place of winter, as the soltice; in place of Gamelion, Hecatombaeon: in place of the periods, in which severally the Comitia three each were being conducted, which they were calling the appointed assemblies, lunar months; and in place of whole months, alternately hollow were begun to be used."--Scaliger, "De Emendatione Temporum," p. 48.

The Octaeteris

"Besides, if, for example, we should reduce the Jewish cycles into 19 octaeterides, indeed, the first year of the first and second octaeterides will begin from Tisri, but the new moon of Marchesvan will be the beginning of all the rest. For, although in the cycle there are nineteen years, only that one octaeteris consists of three embolisms which is included from the beginning of the first year to the end of the eighth. The following octaeteris, from the beginning of the ninth to the end, is provided with only two embolisms. Again, from the beginning of the 17th to the end of the 5th year of the following cycle, the octaeteris has only two embolisms. But if the third should be directed to the sight, like the Attic octaeteris, for Tisri, as we have said, Marchesvan will begin the year."--Scaliger, "De Emendatione Temporum," p. 52.

Jews Began From the Horned Moon

"The new moon of the first Calippic Hecatombaeon began on the thirtieth day of the Jewish month Sivan, since the Jews not only begin from the phasis, but also from the horned moon. This was the running Jewish year 3430; Tisri was 5.5.927, fifth day of the week. Therefore the tenth month began also on the fifth day of the week, since Calippus antedated that Hecatombaeon by one day, because, as I have said, the Calippic new moons were from the "waning of the moon," not from the horned moon; and the Calippic new moons were midway between the ancient Attic and Jewish."--Scaliger, "De Emendatione Temporum," p. 71.

Beginning of the Jewish Year

"The manifest cause of this beginning must be sought even from nature. Accordingly, by the ~~plan~~ computation of the moon, Tisri is first; but, by the plan of the sun, Nisan. Wherefore, from Tisri are the lunar epilogues, from Nisan, the bisextile, Chaldaic as also Jewish, as will be discussed more fully in the Jewish year. The Greeks, in turn, were extending the epilogues of the moon, immediately from their civil day, that is, from the entering night, whence the reckoning of the new moons was defective, since the beginning of the night for the time of year is sometimes one way, sometimes another. But Calippus first of all began the lunar epilogues from noon, but the civil day, from the entering night. So were the Chaldaeans doing. Whensoever the reckoning arrived at the 18th hour, the night was complete, and astronomically, the day of the week had to be transferred to the following, since the lunar calculation pertains to hours reckoned from noon, the civil day, according to those which are counted from the beginning night to the rising of the sun. Wherefore, between the beginning of noon and night is an interval -- a quarter of a day, which is added to the computations of the moon, in order that the day of the week may not begin from noon, but from night."--Scaliger, "De Emendatione Temporum," p. 76.

The Horned Moon

""But it does not seem so for two reasons, first, since they [the Chaldaeans] already had another cycle, and were using the lunar year for some centuries before Calippus; and second, because their new moons were not the same as the Calippic. For they were beginning from the horned moon, as all the oriental nations of antiquity, even today."--Scaliger, "De Emendatione Temporum," p. 77.

Passover Limits

In like manner the earliest passover today is on the 3rd of April; but in the times of the Messiah it was occurring upon the eighth, in the first Dionysian cycle, in the 16th Jewish. The latest passover of today is upon the calends of May, in the time of the Messiah, upon the sixth, in the 15th Dionysian cycle, and Jewish 12th. . . Therefore, in that whole five-year period [Newton also counted it as five years] which extended from the baptism to the resurrection, no Nisan began on the 7th day of the week except that one in which the Lord suffered, and to which the twentieth year of Tiberius agreed, whose Nisan new moon was 6.19.95."--Scaliger, "De Emendatione Temporum," p. 265.

Observation Versus Computation

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Translation Period of Two Days

"And they do not err less who bind up the Jewish Passover on Luna 14, from accurate computations of the mean motions, since sometimes the phasis could happen in a political year two days after the mean conjunction: concerning which afterward."--Petavius, Dionysius, "Animadversiones Epiphanius," p. 152.

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The Scot Heresy and the Paschal Fourteenth

"Certainly Bede wrote that the Scots themselves celebrated from the 14th of the moon to the 20th, although the Catholics observed it from the 15th to the 21st, so that there was a difference of one day. Since therefore to the Catholics, the 15th of the Paschal is that which ends upon the 16th, and yet is the 15th; so, to the fourteenth-day people, in like manner, the 14th day ought to be truly the 15th by night. For if the 13th by day precedes the Passover, not by one day, but by two they would differ from the Catholics. But from those things to which the same Wilfrid objects, it can be surmised what either he himself thought, or deemed that Anatolius had in mind, when he says that the Scots commonly celebrated the Passover on the 13th of the moon before the full moon. For this even was the opinion of Theophilus, Cyrill, and of Bede himself, that no moon is called new, which does not lighten up before sunset: so that even if after sunset only she should be lit up, that is, with the sun in conjunction, although for 23 hours afterward she should shine, she would retain that name which she had at the setting sun. As if on the Sabbath, after sunset, the conjunction should take place, not on the following Lord's day, but on the second day of the week must the new moon day be established, which was reported by Bede in the book "Concerning the Plan of the Times," chap. 41, from the teachings of the late Alexandrians. Next, from the fact, that the new moon is sometimes retarded by a whole day, it is necessary that the rest of the days of the moon should follow up more slowly; and so, if, for example, on the Sabbath, immediately after sunset, the full moon should be begun, nevertheless, that whole day will be called the 14th of the moon, not the full moon; whence also the day before will be counted the 13th, not the 14th. This was, as has been said, the opinion of the Alexandrians, which even certain Hebrews embraced. For in Glossa, ch. 7, Tract. Kiddusch Hahodesch Tomo 1, Jad Maimonidae, various opinions of the Doctors are related concerning this thing. Book III, Part II adds to many that the same was defended by Bede, and refuted by Forosemprius, and also Petrius Pitatus Veronius explains, ch. IV & XV, Can. Pasch. But the Catholic Church by no means follows that which is the plan of the paschal feast according to civil use and a similar cycle; she does not tie together according to the observations of mean motions. Moreover, she follows in this very opinion that Luna 14th sometimes falls upon the full moon; and that on this account, the full moon is called by certain writers the 14th. And this also happens, on account of the lunar προηγησιν after the Nicaean council, after about three centuries. For then, by the days keeping to the same golden numbers, the 14th Nicaean moon was made full moon, and this, by chance, on account of the anomaly of the star: since otherwise the full moon was never the paschal limit by the order of the Church, nor was the Pasch delayed to the 22nd of the moon, which is a hallucination of Scaliger most strongly refuted by our Clavius, and very recently by Guldinus of the same society. But according to the first idea that argument of Wilfrid pertains. For he reproaches the Scots because, although they were celebrating the Pasch on the 14th, yet they had not the plan of the Paschal 14th which Anatolius commanded. For he had maintained the Paschal 14th to be only that which the full moon would await at evening, that is, before sunset, yet besides, would be named 13th, not 14th. But the Scots, by no selection of that kind, were consecrating that 14th for paschal celebration which would fall on the day after the beginning of which only in the subsequent night the full moon was commenced; and, on that account, would be called, not the 15th of the moon, but the 14th, and it was actually the 13th on which the Pasch had been carried on."--Petavius, Dionysius, "Animadversiones in Epiphanii opus," pp. 195, 196.

The Horned Moon

"But they who are of the opinion that Christ suffered in the year 33 on April 3, think that this happened on Luna 15. But Paul, on Luna 14; neither on the Passover itself, or on the first day of unleavened bread, but on the day before, evidently, on March 30. But Lucas Gauricus and Onufrius who followed him affirm the passion to be in the year 34, not indeed on Luna 15, but on the 18th March; since they consider that the Jews began the new moons, not from the interval of the new moon, but from the form of the horned moon, which opinion we shall presently examine."--Petavius, Dionysius, "Animadversiones Epiphanii," p. 150.

Principles Governing Observation of the Moon

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Pliny Re a Visible Old and New Moon on the Same Day

"The Moon makes her double conjunction with the sun in no other sign except Gemini, while Sagittarius is the only sign in which she has no conjunction. The old and the new moon are visible on the same day or night in no other sign except Aries, and indeed it has happened very seldom to any one to have witnessed it."--Pliny, "Natural History," Tr. by Bostock and Riley, Vol. I, p. 49. London, 1855.

Hevelius Re the Appearance of the First and Second Moon

"But we call the horned moon that phasis, which to some of the ancients is the second moon, because, on the second day after the conjunction of all luminaries, she may be earliest seen, and follows the first moon. But, because on the second day, she cannot always appear in sight, all those causes can hinder which do not allow the first moon to be seen on the first day after conjunction. And the particular hindrance is when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius. For although the moon may be in perigee, and around the northern border, yet if she does not approach a sign of long setting, in vain is the horned moon expected on the second day."--Hevelius, "Selenographia," p. 281. Gedanum, 1647.

Principles Governing Observation of the Moon

"But this idea [observation only] permits no small difficulties. For how, as Scaliger rightly says above, could so many thousands of Jews fix the new moon from its appearance, or await the messenger from Judaea, when they were scattered by such long distances, in low valleys, in northern sites, in which tempests and familiar clouds often begrudged the eyes of man the vision of the nascent moon? With regard to this, the moon could be seen in a very few hours after conjunction, although very rarely. Then, again and again, the phasis of the accompanying new moon day will appear on the second day after conjunction. Thus the month to be appointed might be thirty-one days, which is absurd in a lunar year. Again, the same Scaliger, in Canons of the Isagogue, lib. 3. cap. 6. pag. 266: Very frequently, the moon effects no power of her being seen for a whole three days from conjunction; and it can happen that straightway from conjunction, she can be seen on the following new moon day. In this way, the civil month would often be only 27 days. Indeed, it happens that the moon can be hidden and seen on the same day, but certainly, this very rarely occurs; and it does not happen except, as Pliny says, when the sun is in Aries. Wherefore, it is in the power of no mortal to begin the new moon days from the appearance of the moon, because the time of the vision may be altogether unequal and uncertain. Furthermore, even if at the same time the new moon could be seen, yet she might not, because of overhanging clouds. Therefore, it is most foolish, what certain Jews, ancient as also recent, write, that when each temple was standing, it was the custom to appoint the new moons from the vision of the moon. The Mohammedans, who begin the new moon of Muharram three days or two days, after the conjunction of the luminaries, could not execute this. For not in every moon, not even in a cloudless sky, could they see the moon. Thus Scaliger. And with these things I seem to be in conformity -- that which is said in the cited Talmud -- that sometimes it happened a certain appearance and likeness of the moon would occur on the 27th day of the month; and all the people would shout, Mekudasch, mekudasch, Sanctificata est, sanctificata est. But by Rabbi Simeon, advisor, son of Gamaliel, it was decreed that by the calculation of the Synagogue, the new moon would be appointed on the next day.

"Certainly experience teaches that the moon runs upon the eyes sometimes quickly, sometimes slowly. Whence, if the month is to be commenced by a look at her, how can it be begun everywhere by all of the earth on the same day? how can the same feasts be kept everywhere on the same day? Indeed, although no cycle can be constructed to exactly answer to the celestial motions of the moon, yet, by it, the new moons are determined with less evil, less inconvenience than from vision."--Bucherii, Aegidii, "Tractatus De Paschali Judaeorum Cyclo," p. 373. Antverpiae, 1634.

Pliny Rè a Visible Old and New Moon on the Same Day

"The Moon makes her double conjunction with the sun in no other sign except Gemini, while Sagittarius is the only sign in which she has no conjunction. The old and the new moon are visible on the same day or night in no other sign except Aries, and indeed it has happened very seldom to any one to have witnessed it."--Pliny, "Natural History," Tr. by Bostock and Riley, Vol. I, p. 49. London, 1855.

Hevelius Rè the Appearance of the First and Second Moon

"But we call the horned moon that phasis, which to some of the ancients is the second moon, because, on the second day after the conjunction of all luminaries, she may be earliest seen, and follows the first moon. But, because on the second day, she cannot always appear in sight, all those causes can hinder which do not allow the first moon to be seen on the first day after conjunction. And the particular hindrance is when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius. For although the moon may be in perigee, and around the northern border, yet if she does not approach a sign of long setting, in vain is the horned moon expected on the second day."--Hevelius, "Selenographia," p. 281. Gedanum, 1647.

An Imaginary "Moon," the Substitute for Meridian Observation

"The dispersion of the Jews had therefore presented them with an additional difficulty in fixing the beginning of their months. The problem is much more intricate to-day, seeing that the Jews are dispersed over the whole world, and the moon, first visible on one evening at Jerusalem, might be seen the evening before, according to the reckoning of places west of Jerusalem, or might be invisible until the following evening, according to the reckoning of places east of it. . .

"But the "moon" we choose for the ecclesiastical calendar is an imaginary body, which is so controlled by specially constructed tables as to be "full" on a day not differing by more than two or three days at most from the date on which the actual moon is full. This may seem, at first sight, a very clumsy arrangement, but it has the advantage of defining the date of Easter precisely, without introducing any question as to the special meridian where the moon might be supposed to be observed."--Maunder, E.W., "The Astronomy of the Bible," p. 298. Sec. ed., London.

An Acknowledgment That a Festival May be Earlier in the West than in the East

"Thus, in 1905, the moon was full at 4^h 56^m Greenwich mean time on the morning of March 21. But Easter Day was not fixed for March 26, the next Sunday following that full moon, but a month later, for April 23. For the calendar moon, the imaginary moon, was full on March 20; and it may be added that the actual moon, though full on March 21 for European time, was full on March 20 for American time. There would have been an ambiguity, therefore, if the actual moon had been taken, according to the country in which it was observed, an ambiguity which is got rid of by adopting a technical or imaginary moon."--Maunder, E.W., "The Astronomy of the Bible," pp. 298, 299. Sec. ed., London.

Schism in 11th Century over Festivals on Different Meridians

"Elias of Nisibis (obiit post 1046) tells us that the year of the Hegira 309 began on Saturday, the 22nd of Ijar, in the year 1232 of the Greek era; and that, in this year, a schism broke out between the Eastern and Western Jews in reference to the dates of the Feasts. The Western Hebrews began their year on a Tuesday, the Eastern on a Thursday. Here we have clear evidence that the Eastern Jews, i.e. those of Babylon, celebrated the New Year's day in 1233 on a Thursday, and consequently the preceding Passover must have been on a Tuesday. . . We see also that the Western Jews, i.e. those in Palestine, followed the head of their school and kept Passover -- and consequently all the other feasts -- two days earlier than their Eastern co-religionists. . .

"The events here related we have also rediscovered in a Hebrew source, viz. in Sahl b. Mazliach's polemic against Jacob b. Samuel, Saadiah's pupil. The former, a Karaite zealot, says that in the time of the Fajjumite (Saadiah) a dispute broke out concerning the Feasts which the Palestinians kept on different days to the Babylonians. The two parties indulged in mutual recriminations and excommunications, and even went so far as to charge one another with fraud and deception."--Poznanski, Samuel, "Jewish Quarterly Review," Vol. X, 1897, pp. 153, 154.

Rabbanites Tolerated Open Unbelief Rather than a Change in Festival Dates

"The consciousness, however, that the Calendar was of comparatively late origin induced not only the Karaites, but also the other sects to reject and denounce it. Characteristic is the following narrative of al-Qirqisani, one of Saadiah's contemporaries: 'I once said to the Palestinian, Jacob b. Ephraim, "You have intercourse with the Isawites (i.e. followers of Isa or Obadiah al Isfahani), you even intermarry with them. But they acknowledge as prophets those whom you do not recognize." The reply was "They have not seceded from us (the Rabbanites) in regard to the Feasts." This shows that the Rabbanites tolerated open unbelief rather than a schism in the dates of the Feasts which they themselves permantly fixed."--Poznanski, Samuel, "Jewish Quarterly Review," Vol. X, 1897, p. 159.

Importance of the Months Marchesvan and Kisleu (Writings of Saadiah Gaon)

Irregular Motion of the Moon Accounts for an Irregularity in Appearance

"However, astronomers and all those who consider the subject attentively, are well aware that the appearance of new-moon does not proceed regularly according to one and the same rule for several reasons: the motion of the moon varies, being sometimes slower, sometimes faster; she is sometimes near the earth, sometimes far distant; she ascends in north and south, and descends in them; and each single one of these occurrences may take place on every point of the ecliptic. And besides, some sections of the ecliptic sink faster, others slower. And all this varies according to the different latitudes of the countries and according to the difference of the atmosphere. . . For these reasons the month Ramadan is sometimes incomplete, sometimes complete, and all this varies according to the greater or less latitude of the countries, and vice versa. Further, also, these differences in the various countries do not follow one and the same rule; on the contrary, one identical circumstance may happen to one month several consecutive times or with interruptions.

"But even supposing that the use which they make of those tables and calculations were correct, and their computation agreed with the appearance of the new-moon, or preceded it by one day, which they have made a fundamental principle, they would require special computations for each degree of longitude, because the variation in the appearance of new-moon does not depend alone upon the latitudes, but to a great extent also upon the longitudes of the countries. For, frequently, new-moon is not seen in some place, whilst she is seen in another place not far to the west; and frequently she is seen in both places at once. This is one of the reasons for which it would be necessary to have special calculations and tables for every single degree of longitude. Therefore, now, their theory is quite utopian, viz. that the month of Ramadan should always be complete, and that both its beginning and end should be identical in the whole inhabited world, as would follow from that table which they use."--Albiruni, "Chronology of Ancient Nations," pp. 77, 78. London, 1879.

Irregularity of Moon's First Appearance

"With regard to this, the moon could be seen in a very few hours after conjunction, although very rarely. Then again and again, the phasis of the following new moon day will appear on the second day after conjunction. . . [quoting from Scaliger again] Very frequently, the moon effects no power of her being seen for a whole three days from conjunction; and it can happen that straightway from conjunction, she can be seen on the following new moon day. . .Indeed, it happens that the moon can be hidden and seen on the same day, but certainly this very rarely occurs; and it does not happen except, as Pliny says, when the sun is in Aries. . The Mohammedans, who begin the new moon of Muharram three days, or two days, after the conjunction of the luminaries, could not execute this [i.e. always starting from the phasis]. For not in every moon, not even in a cloudless sky, could they see the moon. Thus Scaliger. [Bucherius continues] And with these things I seem to be in conformity -- what is said in the cited Talmud -- that sometimes it happened a certain appearance and likeness of the moon would occur on the 27th day of the month; and all the people would shout, Mekudasch, mekudasch, Sanctificata est, sanctificata est. But by the advisor, Rabbi Simeon, son of Gamaliel, it was decreed that by the Calculation of the Synagogue, the moon would be appointed on the next day."--Bucherius, Aegidius, "Tractatus De Paschali Judaeorum Cyclo," p. 373. Antverpiae, 1634.

Pliny's Oft-quoted Statement Re Observance of Moon in Aries

"The moon makes her double conjunction with the sun in no other sign except Gemini, while Sagittarius is the only sign in which she has no conjunction. The old and the new moon are visible on the same day or night in no other sign except Aries, and indeed it has happened very seldom to any one to have witnessed it."--Pliny, "Natural History," Tr. by Bostock and Riley, Vol. I, p. 49. London, 1855.

Hevelius Re the Appearance of the First and Second Moon

"But we call the horned moon that phasis, which to some of the ancients is the second moon, because, on the second day after the conjunction of all luminaries, she may be earliest seen, and follows the first moon. But, because on the second day, she cannot always appear in sight, all those causes can hinder which do not allow the first moon to be seen on the first day after conjunction. And the particular hindrance is, when she is turned about in the signs of short settings, of which kind are: Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius. For although the moon may be in perigee, and around the northern border, yet if she does not approach a sign of long setting, in vain is the horned moon expected on the second day."--Hevelius, Johannes, "Selenographia," p. 281. Gedanum, 1647.

Passover Limits

"In like manner the earliest passover today is on the 3rd of April; but in the times of the Messiah it was occurring upon the eighth, in the first Dionysian cycle, in the 16th Jewish. The latest passover of today is upon the calends of May; in the time of the Messiah, upon the sixth, in the 15th Dionysian cycle, and Jewish 12th. . . Therefore, in that whole five-year period [Newton also counted it as five years] which extended from the baptism to the resurrection, no Nisan began on the 7th day of the week except that one in which the Lord suffered, and to which the twentieth year of Tiberius agreed, whose Nisan new moon was 6.19.95."--Scaliger, "De Emendatione Temporum," p. 265.

Schürer Re the Position of the Passover

"Lastly, the extract from Anatolius, given in Euseb. Hist. Eccl. VII. 32. 17-18, is occupied with the Passover, which is celebrated, when both the sun and moon are in the equinox, viz. the sun in the vernal, and the moon opposite him in the autumnal equinox. Just this fragment shows, that Aristobulus by no means occupied himself with only philosophically explaining away the text of the Pentateuch, but that he really gave a description and explanation of the Mosaic law."--Schurer, Emil, "The Jewish People in the Time of Christ," Div. II, iii, p. 241.

At Bottom, Passover Regulates Jewish Calendar

"The Jewish year, however, is a threefold one. For they have made an arrangement among themselves, that New Year shall not fall on a Sunday, Wednesday, or Friday, i.e. on the days of the sun and his two stars (Mercury and Venus); and that Passover, by which the beginning of Nisan is regulated, shall not fall on the days of the inferior stars, i.e. on Monday, Wednesday and Friday, for reasons on which we shall enlarge hereafter as much as possible. Thereby they were compelled either to postpone or to advance New Year and Passover, when they happened to fall on one of the days mentioned."--Albiruni, "Chronology of Ancient Nations," p. 66. London, 1879.

Marchesvan and Kisleu Fix the Whole Calendar

"God has made manifest his will in reference to the Marchesvan and Kisleu and (consequently) the whole year by this, that he made the number of days of the week an uneven number, and fixed for every (week?) that which we mentioned already. Through this the months . . . reciprocally, and they follow each other as they should (?). Namely, once something was fixed in regard to these two months by the fixed norm (of the Calendar?), there is no possibility either to add or to detract anything from the other months, for by it the other ten are already fixed."--Poznanski, Samuel, Anti-Karaite Writings of Saadiah Gaon, "Jewish Quarterly Review," Vol. X, 1897, p. 269.

New Moon Limits -- Scaliger

"Rightly Scaliger says, lib. 3. Can. Isagog. pag. 264: The Hebrews call the limits of the new moons in the same manner as the Greeks the Latins, old, new; and since, as the oldest masters of the Jews say, the moon advances sometimes for a long period, sometimes for a short one, therefore they so had in the full months the triakade [the thirtieth day] just like the sacred new moon. . . since it was uncertain whether the new moon would be renewed in triakade or in the civil new moon. Since therefore therefore the triakade and New Moon were being connected because of a doubtful moon, therefore both were made sacred. Thus Scaliger. . . The Jews, therefore, in order to depart as little as possible from the celestial new moon, thought it safest to allow two feast days for it."--Bucherius, Aegidius, "Tractatus De Paschali Judaeorum Cyclo," p. 382.

Triakade Also Called Tricesima Sabbath

"There is a celebrated song of the post Horace, from his first book of Sermons, Satire 9, in which he introduces Fuscus Aristius his friend, thus talking with him:

> Horace [B.C. 65-8]. Certainly, I do not know why you were saying that you wish to speak secretly with me. Fuscus. I recollect well, but in a better time let me speak; today is the thirtieth Sabbath, do you wish to offend the circumcized Jews? Horace. I say, I have no law. Fuscus. As for me, I am a little more infirm, one of many; please pardon, at another time let me speak. Horace. Have I thus raised up against me the black sun [an eclipse]? The reprobate flees, and leaves me in danger.

"Where the ancient interpreter Acron says: The thirtieth Sabbath the Jews call new moons: since during the sabbath, the Jews pronounce the lunar numbers. Lo this also, from the opinion of a Gentile observer: The thirtieth Sabbaths are new moons, not in any other sense than what we have taken here, that indeed Luna 30, or the last day of the vanishing civil month, in which often it happens the moon is renewed, would be equally a feast, and a civil new moon itself, on account of the uncertain hour of the new moon, which the Jews were superstitiously observing."--Bucherius, Aegidius, "Tractatus De Paschali Judaeorum Cyclo," pp. 384, 385. Antverpiae, 1634.

How the Jews Count and Date their Day

"Furthermore, it must be understood that when I say that Tisri begins from the 10th of October, I mean from the night which followed sunset of the 9th day, from which sunset the Jews count the beginning of the 10th. Thus, the evening of the sixth day itself is the beginning of the Sabbath. When, therefore, I speak of the beginning of the Sabbath, I mean sunset of the day of Venus."--Scaliger, "De Emendatione Temporum," p. 85. Francofurt, 1593.

No Lunar Year By Nature Consists of 353 Days

"For therefore Kisleu, which is full by nature, may, by arrangement, become hollow; or, by nature, for the reason that in the 19th year of the paschal cycle, Dionysius cut off one day, which he called the "leap" of the moon, but which the Greek computers called the "cutting off" of the moon, although it foolishly constitutes the last year of the 19-year cycle as only 354 days, when there is no such year in nature."--Scaliger, "De Emendatione Temporum," p. 10. Francofurt, 1593.

Bucherius Re Calculation

"Certainly experience teaches that the moon runs upon the eyes, sometimes quickly, sometimes slowly. Whence, if the month is to be commenced by a look at her, how can it be begun by all of the earth everywhere on the same day? how can the same feasts be kept everywhere on the same day? Indeed, although no cycle at all is able to be constructed to exactly answer to the celestial motions of the moon, yet, by it, the new moons are determined with less evil, less inconvenience than from vision."--Bucherius, Aegidius, "Tractatus De Paschali Judaeorum Cyclo," p. 373. Antverpiae, 1634.

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