IMPORTANT PASSOVER TEXTS IN JOSEPHUS AND PHILO

In order that the passover statements by first century writers may be understood, it is essential that their festal terms be cataloged and interpreted. Generally speaking, these ritual words and phrases are an unknown language, and may be of quite different meaning from their English translations. For example, the Greek word πάσχα, or φάσκα, as sometimes occurs, is found about twelve times in Josephus. It is translated passover, and we commonly think of the paschal supper. But commonly, with Josephus, the word is interchangeable with the eight-day feast of unleavened bread, and only three times does it refer directly to the 14th day of Nisan, while only three times does it signify the paschal lamb. And apparently no place has as yet come to light where designates the supper alone, although it may refer to paschal sacrifice and supper together. In Josephus, there are about twenty-five references to this sacrificial ceremony.

Again, a writer is sometimes speaking of ceremonies throughout (καθ' ἣν) the feast of unleavened bread. Again not. But in any event, the analyst must carefully compare any one statement with all the other cognate records before valid conclusions can be drawn. Therefore every πάσχα sentence must be seriously examined, for the writer by no means invariably, as some conclude, thereby refers to a sacrificial supper on a specific date. Moreover, with Josephus, it is easy to overlook details. Consequently it seems worth while to analyze a few important passages from these authoritative witnesses in the time of Christ--statements which have provoked much discussion. For convenience, the most important texts will be recited.

I Wars II.I.1-3 and Ant. XVII.IX.1-3

The circumstances underlying these two Josephus texts appear to be as follows: The seven days of public mourning for Herod the Great ended at evening, apparently at the evening ineunte of 14 Nisan, at which time a sedition

arose among the Jews. The time is indicated in Section 3 of the first text: καὶ δὴ τῆς τῶν ἀζύμων ἑνστάσης, ἣ πάσχα παρὰ Ἰουδαίοις καλεῖται, πολύ τι θυμάτων πλῆθος ἐνδεχομένη, κάτεισι μὲν ἐκ τῆς χώρας λαὸς ἄπειρος ἐπὶ τὴν θρησκείαν, οἱ δὲ τοὺς σοφιστὰς πενθοῦντες ἐν τῷ ἱερῷ συνειστήκεσαν τροφὴν τῇ στάσει πορίζόμενοι..[1]

Translation (mine)--
And now that the feast of unleavened bread had already come, which is called pascha by the Jews, one that contributes such a large number of sacrifices, countless people, on the one hand, stream in from the country for the ceremony, while, on the other hand, those mourning for the doctors stood in the temple procuring recruits for their faction.

The foregoing sentence outlines the contrasting situation. Josephus adds that the clamors of the temple party were heard all over Jerusalem. At the same time the masses had lodged in the plain and were ready to offer their paschal lambs. Evening had come on, as indicated by the drunken rioting of Archelaus.[2] It was his conduct that caused the sedition. He countered at once by sending his general against the Jews, but they drove him away with stones. Then a tribune with a cohort of soldiers was sent. These were killed. After this the people "betook themselves to their sacrifices as if they had done no mischief." Finally Archelaus sent his whole army--the footmen into the city, and the horsemen into the plain, who fell upon the people as they were offering their lambs, and killed three thousand.

It is quite obvious that this series of episodes points to one evening only--that of the paschal sacrifice. Antipater identifies the sedition as occurring at this time.[3] In addition, he catalogs this sacrifice as a private offering (ἰδίαις θυσίαις). Similarly Philo.[4] We know from the sacrifice date--14 Nisan--that the moon had come to her full, and on this evening rose "full" in the east as the sun set in the west. The people actually made the assault with lambs in one hand and stones in the other, while the wailers in the temple urged them on.[5] The description is significant in showing (1) that the passover lambs were at this time being slain in the evening, and (2) that they

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1 Wars II.i.3.
2 Wars II.ii.5.
3 Ibid.
4 Philo, Vol. VII, De Decalogo XXX.159. Tr. by Colson. London, 1937. Loeb [Classical Lib.
5 Ant. XVII.ix.3.

were being offered in the outskirts of the city, "around the sanctuary," not in it.

Such was the temper of the age in which Jesus was born.

II Ant. II.XIV.6, III.X.5, and XI.IV.8

It seems inconsistent to make Josephus say in one place that the paschal lambs were being slain from 3:00 to 5:00 p.m., with the supper necessarily occurring on the subsequent evening, when in other passages he describes the whole passover ceremony--sacrifice, feast, and burning of the remnants--as taking place on one day only, the 14th of Nisan. Here is one of his descriptions of the 14th day:

ἐνστάσης δὲ τῆς τεσσαρεσκαιδεκάτης πάντες πρὸς ἄφ-οδον ἔχοντες ἔθυον, καὶ τῷ αἵματι τὰς οἰκίας ἥγνιζον ὑσσώπου κόμαις ἀναλαβόντες καὶ δειπνήσαντες τὰ λοιπὰ τῶν κρεῶν ἔκαυσαν ὡς ἐξελευσόμενοι. ὅθεν νῦν ἔτι κατὰ τὸ ἔθος οὕτως θύομεν τὴν ἑορτὴν πάσχα καλοῦντες... [6]

Translation (mine)--
But when the fourteenth day had come, all, in readiness to start, sacrificed, and purified the houses with blood, using bunches of hyssop for sprinkling, and after the repast burnt the remnants of the meat as people ready for departure.

In this passage three principal acts are tied to the 14th of Nisan--the sacrificing, the purifying, and the burning of the remnants after the supper. The ceremony is confined to one complete sentence with καὶ connectives. Consequently it is inconsistent that up to the word ἥγνιζον, it is 14 Nisan, but that from there on it is 15 Nisan. And please note that Josephus adds, "to this day we keep this sacrifice in the same customary manner." (Cf. English text.)

A text similar to the foregoing is found in Philo, for which the claim has also been made that it represents two dates. I quote Dr. Colson's translation of this passage:

On this day every dwelling-house is invested with the outward semblance and dignity of a temple. The victim is then slaughtered and dressed for the festal meal as befits the occasion. The guests assembled for the banquet

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[6] Ant. II.xiv.6. Tr. by Thackeray. Loeb Classical Library.

have been cleansed by purificatory lustrations, and are there not as in other festive gatherings, to indulge the belly with wine and viands, but to fulfil with prayers and hymns the custom handed down by their fathers. The day on which this national festivity (πανδήμου εὐωχίας) occurs may very properly be noted. It is the 14th of the month, etc.[7]

In this description both sacrifice and supper are featured. The word εὐωχίας means feast. And in addition, it is the national feast about which Philo is discoursing, and he says plainly that it was kept on the 14th of the month. There appears to be no place for any 15th-day supper in this text!

Josephus has altogether three descriptions of a 14th-day passover, the first of which we have cited. A second text is as follows:

τῷ δὲ μηνὶ τῷ Ξανθικῷ ὃς Νισὰν παρ' ἡμῖν καλεῖται καὶ τοῦ ἔτους ἐστὶν ἀρχή, τεσσαρεσκαιδεκάτῃ κατὰ σελήνην ἐν κριῷ τοῦ ἡλίου καθεστῶτος τούτῳ γὰρ τῷ μηνὶ τῆς ὑπ' Αἰγυπτίους δουλείας ἠλευθερώθημεν, καὶ τὴν θυσίαν ἣν τότ' ἐξιόντας ἀπ' Αἰγύπτου θῦσαι προεῖπον ἡμᾶς πάσχα λεγομένην, δι' ἔτους ἑκάστου θύειν ἐνόμισεν, καὶ δὴ τελοῦμεν αὐτὴν κατὰ φατρίας μηδενος τεθυμένων εἰς τὴν ἐπιοῦσαν τηρουμένου.[8]

Translation (mine)--
And we were commanded to offer every year the sacrifice called which I previously said we offered upon leaving Egypt, indeed in the month Xanthicus--which we call Nisan and it begins our year--on the 14th day according to the moon, the sun then standing in Aries, for in this month we were freed from Egyptian bondage, and so we do keep it in companies, nothing of the victim being left until the next day.

The principal verbs in this sentence are two-- ἐνόμισεν καὶ τελοῦμεν. There is no specific word here for paschal supper, but the one word θυσία is called πάσχα, and in this long sentence apparently represents the whole ceremony, and that taking place on the 14th of Nisan. For in the concluding clause, emphasis is made that no piece of the victim was kept until the next day. Thus it must have been eaten on the 14th. Josephus must therefore have had in mind not only the sacrifice, but also the eating of the same in the equation θυσία = πάσχα. Furthermore, in his subsequent sentence he goes on to describe the service of the 15th day, which he says succeeds the

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[7] Philo, Volume VII, Special Laws II.xxvii.148,149. Tr. by Colson. Loeb Classical Library.
[8] Ant. III.x.5. Loeb Classical Library.

How therefore could the supper have been part of the 15th? It surely would appear out of turn here to date the sacrifice and supper other than the 14th of Nisan.

The genitive absolute ἐν κριῷ τοῦ ἡλίου καθεστῶτος is not merely an aside in this interesting sentence, but shows that Josephus understood the relation of early astronomy and of the ancient agricultural seasons to his own time. For, although at the time of the exodus the vernal equinox, with reference to the stars, was nearly two weeks later than in the first century,[9] and the paschal season probably equally as late, yet in both paschal periods, the sun was in "Aries" during a common-year passover, but in Taurus during a leap-year passover. There was a contrasting difference, however, between the period of the exodus and that of the first century. In the time of Moses, the word Aries could refer only to the constellation, for the signs of the zodiac were not described until the Nabonassar era. But in the first century, the paschal season of a common year could occur only in the actual sign Aries, for already, due to precession, the vernal equinox, original position of the, had retrograded into the adjacent constellation Pisces.[10]

The fact that Josephus does not mention the sign, would indicate that he refers to the constellation, and hence to the time of Moses, whose passover he is describing. In addition too, Josephus is obviously depicting the passover of a common year, and his language appears to imply that such was the character of the year when Israel left Egypt. For under the seventh Egyptian plague, the barley was in ear and the flax bolled (Ex. 9:31). This must have been at least three months before the passover, and very early indeed for barley ears, even though the season in Egypt was earlier than that of Palestine.

A third 14th-day passover by Josephus relates to the time of Darius I, when the second temple had been completed. The text reads:

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[9] Edward Freiherrn von Haerdtl, "Astronomische Beitrage assyrischen Chronologie," Denkschriften der kaiserlichen Akademie der Wissenschaften mathematisch-naturwissenschaftliche Classe. 49. Band. Wien, 1885, 164.

[10] C.W.C. Barlow and G.H. Bryan, Elementary Mathematical Astronomy. London, 1934, 106.

καὶ τὴν ἑορτὴν ἦγαγον ἁγνεύοντες μετὰ γυναικῶν καὶ τέκνων τῷ πατρίῳ νόμῳ, καὶ τὴν πάσχα προσαγορευομένην θυσίαν τῇ τεταρτῃ καὶ δεκάτῃ τοῦ αὐτοῦ μηνὸς ἐπιτελέσαντες, κατευωχήθησαν ἐπὶ ἡμέρας ἑπτὰ, μηδεμίας φειδόμενοι πολυτελείας, ἀλλὰ καὶ τὰς ὁλοκαυτώσεις ἐπιφέροντες τῷ θεῷ καὶ χαριστηρίους θυσίας ἱερουργοῦντες . . . [11]

Translation (mine)--
And they kept the feast in a state of purity with women and children, according to the law of their fathers, and having fulfilled the sacrifice named πάσχα on the 14th day of the same month, they feasted for seven days, sparing no expense, but bringing whole burnt offerings to God, and offering sacrifices of thanksgiving . . .

In this text Josephus makes a difference between the seven-day feast of unleavened bread as a whole, with its distinctive offerings, and the sacrifice named πάσχα, which he says was completed on the 14th day. We should not therefore expect the πάσχα ceremony to extend over into the 15th day. The offerings called ὁλοκαυτώσεις and χαριστήριοι θυσίαι will be referred to later--the sacrifices pertaining to the seven-day feast.

Why then should we conclude that either Philo or Josephus would present a changed emphasis regarding the 14th-day passover hereto described? Apparently they do not do this, but their festal terms are not always understood.

III We wish to compare two more texts--one each from Josephus and Philo, and both of similar trend. With reference to these two passages, the claim has been made that the writers thereby place the paschal sacrifice on the afternoon of the 14th of Nisan, and the supper on the subsequent evening of the 15th. The text by Josephus reads:

οἱ δ', ἐνστάσης ἑορτῆς, πάσχα καλεῖται, καθ' ἣν θύουσιν μὲν ἀπὸ ἑνάτης ὥρας μέχρις ἑνδεκάτης, ὥσπερ δὲ φατρία περὶ ἑκάστην γίνεται θυσίαν οὐκ ἐλάσσων ἀνδρῶν δέκα, μόνον γὰρ οὐκ ἔξεστιν δαίνυσθαι πολλοὶ δὲ καὶ συνείκοσιν ἀθροίζονται, τῶν μὲν θυμάτων εἰκοσιπέντε μυριάδας ἠρίθμησαν, etc. [12]

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[11] Ant. XI.iv.8.
[12] Wars VI.ix.3.

Translation (mine)--
So, when the festival had come--it is called --during which, on the one hand [ ] they sacrifice from the ninth hour to the eleventh, but on the other hand [ ] as it were a little company of not less than ten gathers around the offering, for it is not permissible to dine alone, and often as many as twenty are numbered, these high priests counted as many as 250,000 of sacrifices, etc.

In this scene there are two contrasting sacrificial occasions: (1) The afternoon sacrifices, as indicated by the clause, and involving the whole feast, so often called by Josephus, as in this text; and (2) the paschal sacrifice and supper, represented by the clause, around whose tables the small groups of ten or twenty assembled. The afternoon offerings embraced the --burnt offerings, thank offerings, and the peace offerings.[13] These sacrifices began in the afternoon of the 14th of Nisan,[14] and continued throughout the festival. The peace offerings on the 14th day were also called passovers.[15] Not all the people necessarily took part in the afternoon sacrifices, at which time, obviously, no accurate count could have been made. The paschal companies, on the other hand, included the whole nation, and hence it was only at the time of this ceremony that a strict count could have been carried out. In this text Josephus does not state at what time of day the small group sacrifice customarily occurred; but in Wars II.i.2 and II.ii.5 he had already featured it as an evening episode,[16] and later, in Antiquities, he several times describes both sacrifice and supper as belonging to one and the same day--the 14th of Nisan. These texts have been discussed. Hence the paschal ceremony was obviously an evening event during the life of Josephus.

The foregoing incident took place in the time of Nero, whom Cestius Gallus wished to inform of the number of Jews in Jerusalem when the Jewish revolt was just beginning--probably about 65 A.D.[17]

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[13] Ant. XI.iv.8 and Wars IV.vii.2.
[14] Maimonides, De Sacrificiis Liber, cap. dec., sec. 12. Tr. by Compiegne de Veil. Londini, 1683.
[15] Deut. 16:2; 2 Chron. 30:16,17.
[16] It was the evening drunkenness of Archelaus that started the Jewish sedition which accompanied the paschal ceremony.
[17] Wars II.xiv.3. Loeb Classical Library (margin).

The companion text from Philo is equally significant:

Translation (mine)--
After the new moon festival is the fourth feast--the Crossing-feast--which the Hebrews call in their native tongue, in which all the people, old and young together, honored on that day with the dignity of the priesthood, sacrifice many myriads of victims from noon until evening.

This text introduces the feast called the Crossing-feast by Philo, but in native Hebrew. The writer is speaking of a specific day of the festival-- --a day on which old and young alike were honored with the office of priest. The day in point must have been 14 Nisan, when the paschal lambs were offered, but throughout the whole day, the people, also in connection with their peace offerings. if levitically clean, performed priestly services in the temple. The claim has been made that the "myriads of victims from noon until evening" included the paschal sacrifices. But this claim is inconsistent with chapter xxvii, in which this text is found; for at the end Philo declares with emphasis that both passover sacrifice and banquet were celebrated on the 14th day. He could not therefore have numbered the with the afternoon victims, for with this understanding, the banquet would necessarily have been served on the evening ineunte of the 15th!

Moreover, in De Vita Mosis Philo again states that the 14th day was clearly appointed for the paschal rite.[19] And he further marks the paschal day astronomically when he says--

(when sun and moon on that day appear upon [ ] and up [ ] to each other in undivided rays of light).

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[18] Philo, Volume VII, Special Laws II.xxvii.145. Tr. by Colson. Harvard University Press, 1937. Loeb Classical Library.
[19] Philo, Volume VI, De Vita Mosis XLI.224,228. Loeb Classical Library.

Now the "upon and up" appearance of the paschal sun and moon always occurs after the moon has fulled, and therefore at the very beginning of the 14th of Nisan, when at sunset the sun is lowering upon the western horizon, while in the east the moon, now full, is rising up simultaneously. The Babylonians said that the god was being seen with the god. But with the Hebrews, the presence of the paschal full moon in the eastern sky together with the westering sun, was an astronomical event that pointed to the slain lamb. And the people bowed their heads and worshiped[21]--not sun and moon--but the Lamb of God, of whom the bleeding sacrifice was at that very moment a figure. It seems most improbable that this solemn and impressive ceremony was ever changed by the Jews until forced by Roman persecution to do so.

In near eastern countries the Nisan moon regularly fulls on the 13th of the lunar month.[22] But not so in the seventh month, whose feast of Tabernacles in this text Philo is comparing with the paschal 14th. He states that the autumn feast came on the 15th for the same reason that the spring feast occurred on its date, namely, because the world was then full of light. The sun shone all day, and the moon shone all night.[23]

In the autumn, however, the astronomical conditions are quite different from those in the spring on account of the Harvest Moon, which, toward the middle of the Jewish seventh month, rises full about sunset for several evenings in succession.[24] But in the spring month Nisan, the moon rises full at sunset only once, and that at the beginning of the paschal 14th. Thereafter the moon appears about an hour later each consecutive night. Hence the feast of Tabernacles began in fullness of light even though the moon may have fulled several days earlier than the 15th.

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21 Ex. 12:27

22 Journal of Biblical Literature, Vol. LXIII, Part II, 1944, 183, 183.

23 Philo, Id., XXVIII.155. Loeb Classical Library.

24 In the season of Tabernacles, both setting sun and rising moon course so low against the horizon that for several evenings together the full moon rises with very little difference of time.

Our context shows that Philo definitely understood the astronomy of the Jewish feasts. It therefore seems very inconsistent to charge him with confused and contradictory statements as we shall have to do if we are to conclude that his afternoon sacrifices included the paschal lambs. He is in agreement with the OT when he assumes that on the paschal 14th throughout the whole day the nation was honored with the dignity of the priest's office. In 2 Chron. 30:16,17 this honor appears to be respected. Here, on account of levitical uncleanness, some of the people did not offer their passover peace offerings in the temple--a statement suggesting that there were some who did, as in 2 Chron. 35:11.

No confusion in any way arises in our Philonic text by the interpretation that the "myriads of victims" comprised the burnt offerings, thank offerings, and peace offerings, as we have explained for Wars VI.ix.3. With this understanding, the paschal ceremony had already been celebrated at the sunset beginning of the paschal 14th. And though all the rest of the day was still the 14th, yet it was not the time of the paschal sacrifice. This simple exposition implies that in the time of Philo and Josephus the ancient ceremonies were still in operation. If such were not the case, then why should Josephus say, several times over, that in his own day the people kept the paschal rite the same as in the time of the exodus.[25]

The difficulty which has arisen over these texts largely comes from the assumption that the word always refers to the paschal ceremony. On the contrary, as has been pointed out, this word commonly refers to the whole feast of unleavened bread. And no different meaning should be ascribed to it unless represented in the text.

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[25] Ant. II.xiv.6; III.x.5; Against Apion I.8.

After the destruction of the second temple in 70 A.D., when the lamb was no longer sacrificed among the scattered Jews, the expressions "passover" and "unleavened bread" came to be used interchangeably. In Josephus we find instances of such usage.[1] But in the OT sense, Greswell, for example, sees an important difference between these two feast terms:

"It is possible to distinguish between the Paschal sacrifice as such, and the feast of unleavened bread. The proper name of the former is to pascha--the proper name of the latter, ta azuma; the proper time of the former was the fourteenth of the month Nisan--the proper time of the latter, from the fifteenth to the twenty-first inclusive."[2]

And favoring these time limits, is the fact that Daniel fasted just twenty-one days in the first month of Cyrus' third year (Dan.10:1-13). Obviously, he must have counted the passover as the fourteenth, and that the additional seven-days' feast reached exactly to the twenty-first day inclusive. This problem was perplexing to early Christianity, and one frequently discussed.

Let us follow up the primitive history of this fourteenth day. "In the beginning of the Christian church, the Apostles and those who followed them for one hundred years after, kept the passover of the Jews on the fourteenth day of the first month." This statement is by Scaliger, and he based his deduction upon "Eusebius, ancient ecclesiastical history, and Nicephorus Callistus."[3] Luke's record shows conclusively that Paul kept the passover, as did also his churches (Acts 20:6).[4] Doubtless the other apostles did likewise. And two centuries later, in a letter to bishop Victor at Rome, the Christian priest Polycrates, after mentions Philip and his three daughters, John the Beloved, his disciple Polycarp, Thrasus, Saggaris,[5] Papirius, and Melito, and then adds:

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1 B.Jud.II.I.3; Ant.IX.XIII.2,3, etc.
2 Greswell, Edward, "Dissertations upon the Harmony of the Gospels," vol.I, p. 71. Oxford, 1830.
3 Scaliger, Joseph, "De Emendatione Temporum," p. 105. Francofurt, 1593.
4 White, E.G., "Acts of the Apostles," pp. 390, 391.
5 So spelled in the original Greek.

"These all observed the fourteenth day of the passover according to the gospel, desisting in no respect, but following the rule of faith." [6]

And hence these communicants of ~~eastern~~ we Asia were called Quartodecimans, or "fourteenth-day" people, and they strenuously contended for the paschal institution which the Apostle John had established. Bishop Victor condemned and excommunicated these Asian churches. In response, Irenaeus, Gallic bishop of Lugdun, wrote to Victor, charging him with impiety for his wicked deed.[7]

This fourteenth-day controversy continued even as late as the eighth century, especially among the Celtic churches of the north. [8] They claimed origin from the East, and insisted that their forefathers had been taught by the Beloved John with regard to a fourteenth-day paschal celebration. In regulating their feasts they adopted the lunar cycle of Anatolius, of Alexandria, which was based upon a fourteenth-day passover on any day of the week.[9] Rome protested, and eventually the Celts yielded to her missionaries, who taught the passover "of the resurrection", on Sunday, along with a "fifteenth-day" crucifixion. In fact, many presbyters in the West accepted the assumption as factual ~~a supposed Jewish teaching~~ that Jesus died on the fifteenth day of the first Jewish month.[10]

Thus the cycle of Anatolius ~~of Alexandria~~--one of the earliest--did not meet with favor at Rome. At this time nearly every church had its paschal cycle, and every bishop was necessarily a calculator! [11] The council of Nicaea did little more than to stipulate that the passover should occur on the Lord's day next after the ~~first~~ equinoctial full moon. ~~after the spring equinox.~~[12] Later on in Gaul, the cycle of Victorius flourished,[13] while Gallican churches under

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[6] Eusebius Pamphilus, "Ecclesiastical History," p. 223. Tr. Cruse. London, 1847.
[7] Nicephori Callisti, "Ecclesiasticae Historiae," lib. XII, p. 292. Paris, 1630.
[8] Migne, J.P., "Patrologiae," SL Cursus Completus, tom. LXVII, col. 470. 1848.
[9] Dionysii Petavii, "Animadversiones Epiphanii Opus," p. 195.
[10] For example, Theophilus and Ambrose. (Aegidii Bucherii, "De Doctrina Temporum," pp. 473, 477. Antverpiae, 1634.)
[11] Migne, tom. LXVII, col. 475 (a).
[12] Ibidem, col. 459. (First full moon after the vernal equinox.)
[13] Ibidem, col. 952.

Gregory of Tours followed Anatolius.[14] In the year 577, for example, Spain kept passover in March, France, in April.[15] But, amid all this confusion, the western church established her canons and missals upon the cycle of Dionysius Exiguus. The Dionysian cycle was built up upon Cyril's Alexandrian tables, which followed those of Theophilus. These were in Greek discourse, and had to be turned into Latin. The problem was further complicated because Cyril's cycle was based upon the Egyptian year, and hence all the new moons and lunar numbers had to be changed over into the Roman form of year. Nevertheless, no cycle was ever more renowned than that of Dionysius, who established a beginning for the Christian era, and a calendar for the church of Rome.[16]

This brief outline of the early history of the ecclesiastical cycle indicates how complicated a problem in ancient Jewish time may become, and accounts for the many assumptions by which it is today confronted, some of which are very old. While the Oriental churches, following John the Apostle, kept passover on the fourteenth, and the western church taught that Jesus died on the fifteenth, in the mean time, the Jewish rabbinical calendar, based upon the Talmud, and as later endorsed by Maimonides, also introduced a passover on the fifteenth, and changed all its months to a month-earlier season.[17] The exact date of each change is not known. The evidence, however, is unmistakable.

The question of the true paschal month was one of serious consequence to the early church; and a change in Jewish practice that resulted repeatedly in twelfth-month passovers in Adar--and sometimes even before the equinox, it seems, has left a long record of debate whether passover should occur before or after the vernal equinox. The Jews appear to have been chiefly respon-

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14 Ibidem, col. 952.
15 Ibidem, 467.
16 Ibidem, col. 466.
17 Michaelis, John David, "Dissertation on the Hebrew Months," London, 1773. (~~The question of the true lunar month in 1844 was one of the chief problems, and with regard to this,~~ The arguments of Michaelis were of exceptional importance to the leaders of the "seventh month" movement. He was one of the first to doubt that the modern Jewish months are correct as to their biblical seasons.)

sible for this agitation. But we should not forget that the Jews at this time were under severe pressure from persecution. However, the ancient biblical laws with respect to the passover season are simple and specific, and the Christian church commonly accepted the biblical view. This is nicely expressed in the following words of Theophilus:

"For the month of new fruits,[18] as I before said, is not in the twelfth month [Adar], when winter still hangs on, and when the new fruits are not yet ripe, and when indeed the sickle cannot be put to the harvests. For the divine law has in particular constituted this [the sickle] as the sign of the first month."[19]

Nevertheless, many other passover arguments, besides also the problem of the true paschal month, are the heritage of twentieth-century students of ancient Jewish time. These discussions for the most part arise (1) from the question as to what event marked the passover date--whether the lamb sacrifice or the paschal supper; and (2) from the problem of linking the true passover date with the right day of the week in the crucifixion period. And in addition, there is the question as to what day the short period ben ha-arbayim[20] belonged--whether to the ensuing day, or to the day before. With the Karaites and Samaritans, this Hebrew phrase represented the time between sunset and twilight; with the Rabbinists, it came before sunset, from about three o'clock and on.[21] This was the traditional hour of prayer (Acts 3:1; 10:3, 30; Dan. 9:21).

In any event, in this short period, the daily evening offering of the lamb, the annual slaying of the passover lamb, the lighting of the temple lamps, the offering of the evening incense, and the setting sun--all took place; for in connection with each one of the series, the phrase "between the two evenings" is written in Hebrew in the pentateuch.[22] ~~And in addition,~~ Philo, Josephus, and the Talmud are in full agreement as to the order of occurrence of the incidents as here listed.[23]

[is translated "new fruits."

18 The paschal month Abib signified "green ears," which in the Latin version

19 Aegidii Bucherii, "De Doctrina Temporum," p. 472. Antverpiae, 1634.

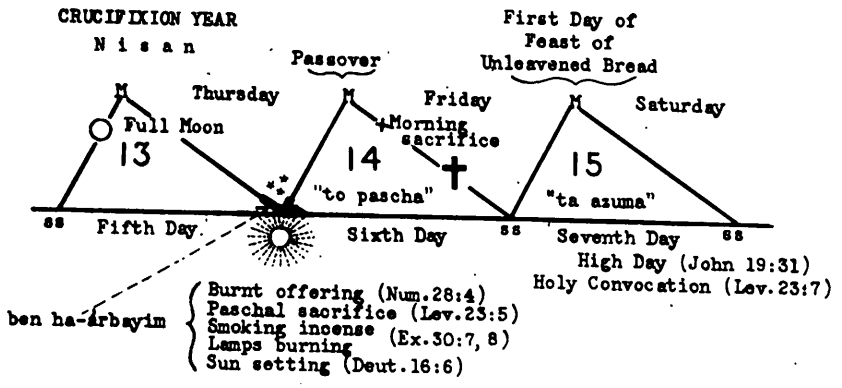
20 A dual Hebrew phrase meaning "between the two evenings."

21 Cf. Gesenius.

22 Cf. margin of Num.28:4, Ex.12:6, Deut.16:6, and Ex.30:7,8. In Deut.16:6, only "evening" is given in the Hebrew, but Ex.12:6 supplies the dual form.

23 Philo Judaeus, "Works," Vol.III, p. 213. Tr. Yonge. London, 1855. Cf. Josephus, Ant.III.VIII.3. The Talmudic references found in Edersheim, Alfred. "The Temple," p. 229, note. Hodder and Stoughton, New York.

The Spirit of prophecy unmistakably dates both the slaying and eating of the paschal lamb at the evening ineunte of the fourteenth day of Nisan.[24] This argument is apparently fully confirmed by the character of the events which occurred in the period "between the two evenings"--each one of which pointed toward a day just beginning and not ~~more then~~ at the day ending. The burnt offering represented consecration of the nation necessarily for the ensuing night;[25] the burning lamps offered light for the approaching darkness; the odour of the burning incense at sunset symbolized the merits of Jesus applied to the prayers then ascending, not to those of the previous day;[26] the sinking sun manifestly dated the new day, not the old. It was therefore an event of deep calendar significance when the paschal lamb was yearly sacrificed in the specific time designated by Moses as ben ha-arbayim. The offering unquestionably must have belonged to a new day, either just begun, or about to begin! And



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24 Cf. September number of The Ministry.
25 "Patriarchs and Prophets," p. 352. Conflict of the Ages Series.
26 Ibidem, p. 353.
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28 "Ancient Jewish Calendation," Journal of Biblical Literature, p. 251. Vol. LXI, Part IV. December, 1942.

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And it makes little difference to the involved crucifixion date whether the lamb was slain before or after sunset--whether the argument is rabbinical, or Karaitic.[27] In either case, the lamb was obviously slain as if on the dawning of a new day. Dawning

With reference to the fulfillment of the type, the death alone of the paschal lamb seems to have ~~xxx~~ priority over the supper in prefiguring the death of the Lamb of God (1 Cor.5:7). And therefore, the slaying of the typical lamb on the fourteenth--which all admit--could only be met by a crucifixion on the same date. Consequently, the symbolic meaning of the type necessarily nullifies the argument that assumes a crucifixion on the fifteenth.[27] Astronomy also lifts a warning finger against a "fifteenth" crucifixion Friday.[28] And Scaliger, with

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some, the father of chronology, and one who was readily familiar with all the cycles of early Christianity, reaches the following conclusion:

"For without any controversy, Christ ate the passover when the thirteenth of Nisan was ending, and the fourteenth beginning: that is, in the evening which the fourteenth of Nisan followed. Concerning this no one, even a little erudite doubts. For, after sunset of the fifth day of the week, the Jewish sixth day was entering, even to sunset of the day of Venus [Friday], after which the Sabbath came on, even the fifteenth of Nisan, the solemn feast. Hence the whole fourteenth of Nisan intervened between the Lord's supper and the beginning of the solemn paschale" [Feast of unleavened bread]. [29]

The OT offers other convincing proof that both lamb sacrifice and paschal supper belonged to one and the same Jewish day. There are altogether seven different passovers in the OT, and these are described as being either "killed," "eaten," or "kept"--in each case on the fourteenth day of the first month.[30] Now it should be clear that such a detailed description involves the whole passover service--not merely the offering of the lamb. To "keep" the passover, as outlined in Exodus 12, meant to slay the lamb, roast it, eat it, and burn the remnants of the feast, and these acts are all included in the seven texts--all on one date! Moreover, five of these passovers are mentioned as "kept" on the fourteenth.

In Num.9:11, the Hebrew text is very explicit: "In the fourteenth day of the second month "between the two evenings," they shall keep it, with unleavened bread and bitter herbs they shall eat." In other places, the command simply reads: "In the fourteenth day is the Lord's passover" (Lev.23:5; Num. 28:16). But in no text, in either the Bible, Philo, or Josephus, is it stated that the passover was "kept" or observed on any other date. In this respect the ancient cycle of Anatolius differed from those of the Latin juris-

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[31] In Bella Jud.VI.IX.3, Josephus speaks of the "ninth hour to the eleventh" as the time when "they sacrifice" (thuousin) at the feast called passover. This period was, of course, ben ha-arbayim; but in this text it has not been given a Jewish date. Those who try to find evidence for the afternoon of the Jewish "fourteenth," are opposed by the dated passover descriptions which Josephus wrote twenty years later in "Antiquities," as for example, Ant.II.XIV.6; III.X.5; XI.IV.8. The Greek construction in these citations makes it very plain that the passover lamb was slain, eaten, and the remnants burned--all on one day, the fourteenth of Nisan.

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And those who favor the slaying of the national paschal sacrifice "between the two evenings," late on crucifixion Friday, thus thinking to have the typ-

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[29] Scaliger, Joseph, "De Emendatione Temporum," p. 8 of preface. Francofurt, 1593.

[30] "Killed" = Ex.12:6, 2 Chron.30:15, and 2 Chron.35:1; "kept" and "eaten" = Num.9:11; "kept" = Num.9:3, Josh.5:10, and Ezra 6:19.

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Insert

ical lamb slain simultaneously with the death of Christ, not only thereby fail to fulfil the type, but the argument also fails of coinciding with the actual crucifixion date. For a paschal sacrifice during the hours of ben ha-arbayim on Friday afternoon, even two hours before sunset, would obviously have occurred after the death of Christ; and in addition, in harmony with the calendaric significance of this pentateuchal period, would indisputably have been dated on the next day as Sabbath the fifteenth. In other words, the typical lamb would have been slain too late to prefigure the death of the Lamb of God on the fourteenth of Nisan.

The detailed description of the temple service enacted at the very moment of the death of Jesus, as given in the "Desire of Ages," is indeed significant:

> "It was the hour of the evening sacrifice. The lamb representing Christ had been brought to be slain. . . With intense interest the people were looking on. But the earth trembles and quakes; for the Lord Himself draws near. .
> "All is terror and confusion. The priest is about to slay the victim; but the knife drops from his nerveless hand, and the lamb escapes." [52]

It is not the passover lamb that escapes when the true Lamb dies--but the sacrificial lamb of the evening burnt offering. The hour of the evening sacrifice has just begun, and the lamb was to have been slain by the temple priest. If it had been the paschal lamb, the hour would have been later, and the sacrifices would have been slain by the people.

A paschal sacrifice in the afternoon of crucifixion Friday is meaningless, for it offers chronology a point of time other than the OT predicts, and other than Jesus Himself pointed out according to His own paschal supper. The only way that the problem can be harmonized is the Spirit-of-prophecy way--a passover sacrifice and supper at the evening beginning of death Friday as the fourteenth of Nisan. By this plan, the ancient passover law and the astronomical laws governing both new and full moon are brought into agreement with

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[52] White, E.G., "Desire of Ages," p. 756. Conflict of the Ages Series.

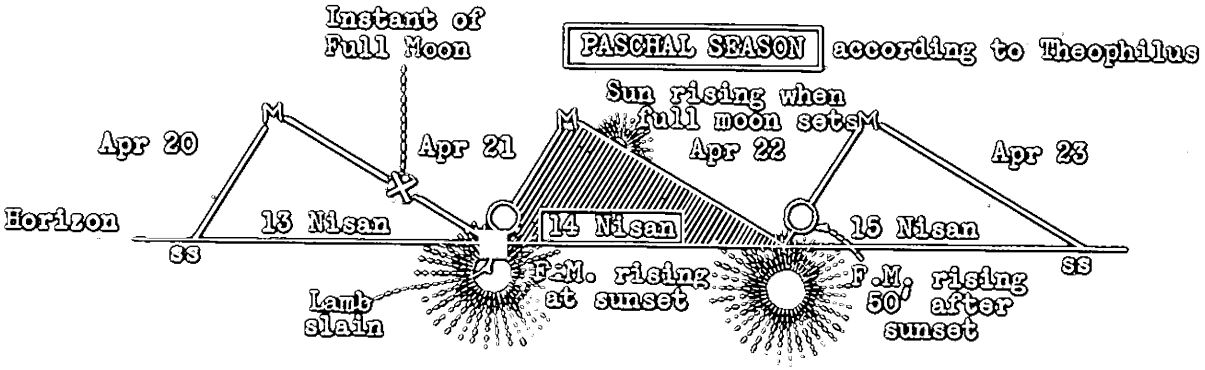
the little Hebrew period translated "between the two evenings."

C O N C L U S I O N

Moses mentions ben ha-arbayim in nine different texts. He marks its position by burning lamp, smoking incense, and setting sun. Within this diurnal landmark of timethe paschal lamb is slain, and the sacrifice obviously must be dated with the setting sun. On whatever Jewish date the sun sets, that day is past, and hence the ensuing day is therefore the passover date. The question has been asked from very early times, "Did Jesus anticipate the passover?" The answer is that not only Jesus and the disciples, but the whole Jewish nation kept that passover at the only possible ben ha-arbayim that could coincide with the date of His death.[33]

[33] Cf. Anglican Theological Review, Vol. XXV, No. 4. October, 1943.

Grace Amadon.
July 11, 1943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Full Moon
PASCHAL SEASON
according to Theophilus
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full moon sets
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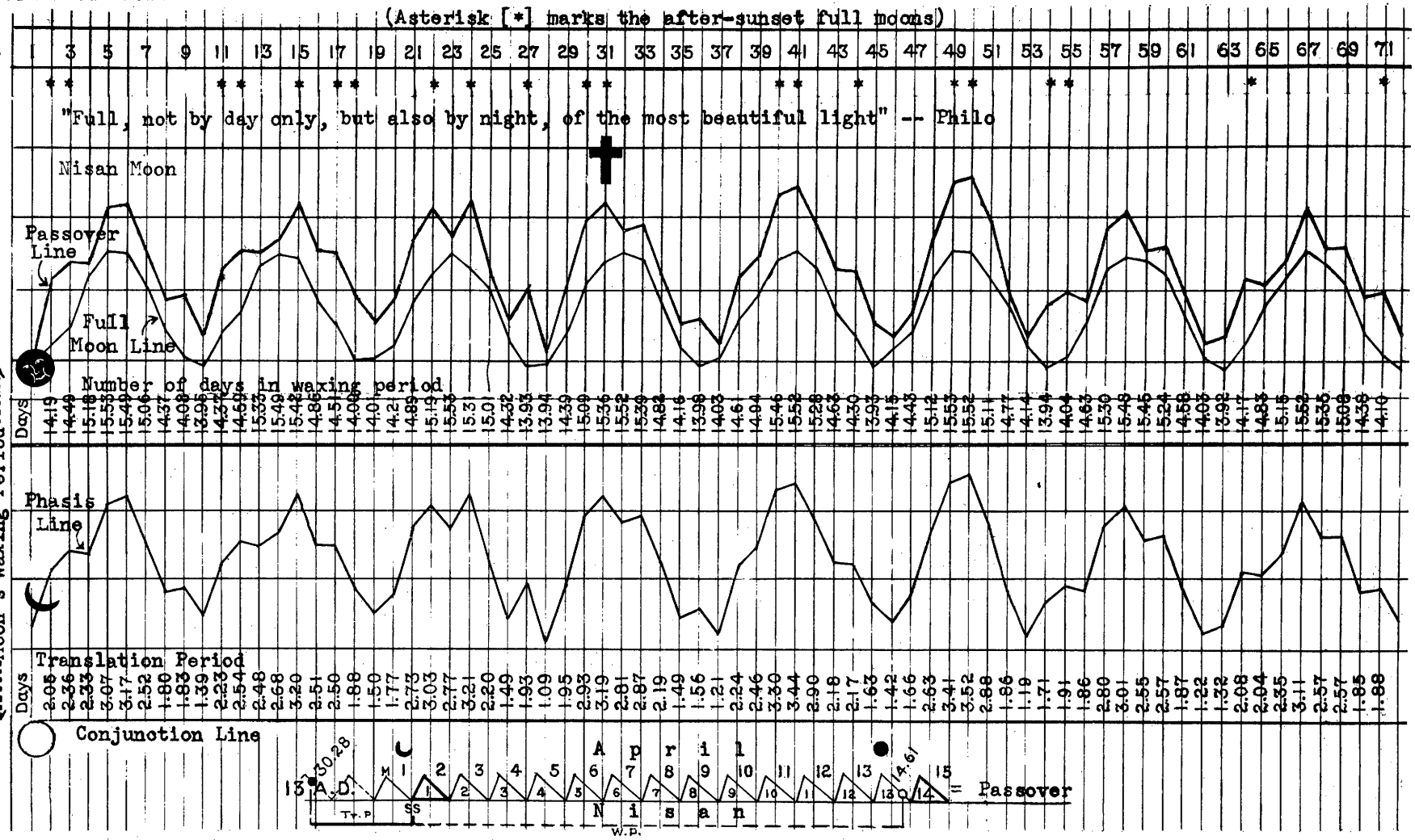
RELATION OF PASSOVER TO FULL MOON



If the passover be dated on the day of full moon, as some insist, discordance with the conjunction date results. For example: in case the phasis takes place at sunset of April 1, as in 13 A.D., then the civil date of 14 Nisan would be April 15, and the difference, as always, would be 14 days. In other words, the civil date of the passover is the 14th day after the civil date of the phasis. But frequently, as in the years 10 and 27, or 18 and 19, the waxing period of the moon is but little more or less than 14 days. Therefore, if a calendar places the passover on the day of full moon, the phasis would often occur on the same day as conjunction -- an astronomical event that practically never happens. Hence discord would result between the laws of astronomy and the calendar. Consequently, the misplacing of the passover on the day of full moon, instead of after it, interferes with the laws governing the moon's phasis.

G. A. July 22, 1941

THE CRUCIFIXION DATE

In this brief analysis of crucifixion chronology, the problem will be discussed in three parts:

I. Important Scripture Checks Relating to the Crucifixion Date.
II. The Lord's Passover--a National Feast.
III. 31 A. D.--the Only Possible Death Year of Christ according to Luni-Solar Calculation.

I. IMPORTANT SCRIPTURE CHECKS RELATING TO THE CRUCIFIXION DATE

The outline of the gospel narrative is obviously indispensable to the investigation of crucifixion reckoning. But even so, from Biblical sources alone, no generally accepted date for the death of Christ has as yet been demonstrated. No irrefutable calendar has been the answer to faithful research into the annals of early centuries. The principal reason for this outstanding lack of agreement among scholars of today seems primarily connected with the critical examination of the Bible text. Consequently, the crucifixion time argument here presented is largely based upon astronomical and calendrical analysis. Nevertheless, there are important Scripture landmarks relating to the problem, without the recognition of which no valid solution can possibly be evolved. A few of these outstanding features make up the following series:

1. The ancient barley-harvest law, and its relation to primitive Jewish time.
2. Four passovers in the three-year public ministry of Christ.
3. The series of events during passion week.
4. Crucifixion Passover--a late season feast.

1. <u>The Ancient Barley-Harvest Law</u>. The Mosaic law commanded Israel that a handful of the firstfruits of the land was to be presented to the priest for an offering at passover time before any bread, parched corn, or green ears should be eaten by the people. These limits were from April 8 to May 6 (Scaliger.) It was to be a statute forever throughout their generations in all their dwellings. (Lev. 23:10-14.) By this means the ancient

Jewish year was regulated, and the full moon of barley harvest marked the first month of the year. The original name for the Jewish first month of the year was Abib, signifying new fruits or "green ears." (Deut. 16:1.) Consequently, the sickle became the sign of the paschal season. (Bucherius.) Around Jerusalem, the earliest ripe barley occurs in April,[1] and the harvest itself lasts until about June 1.

From this ancient barley-harvest law, as set forth in Leviticus, it is conclusive that the original Jewish passover did not occur so early as March. And furthermore, it was not necessary for primitive Jewish reckoning to employ a cycle in determining the first month of the year so long as the passover could be governed by the moon of barley harvest. This is doubtless an important reason why the intercalary year as such is not mentioned in the Bible.[2] But after the fall of the second temple (70 A.D.), the scattered and persecuted Jews had ultimately to follow the dictates of the Roman state, and also of the Church, who (a) based her feasts upon the March-passover cycle of Dionysius Exigius,[3] and (b) insisted that Jews and Christians alike should not keep the paschal feast at the same time.[4]

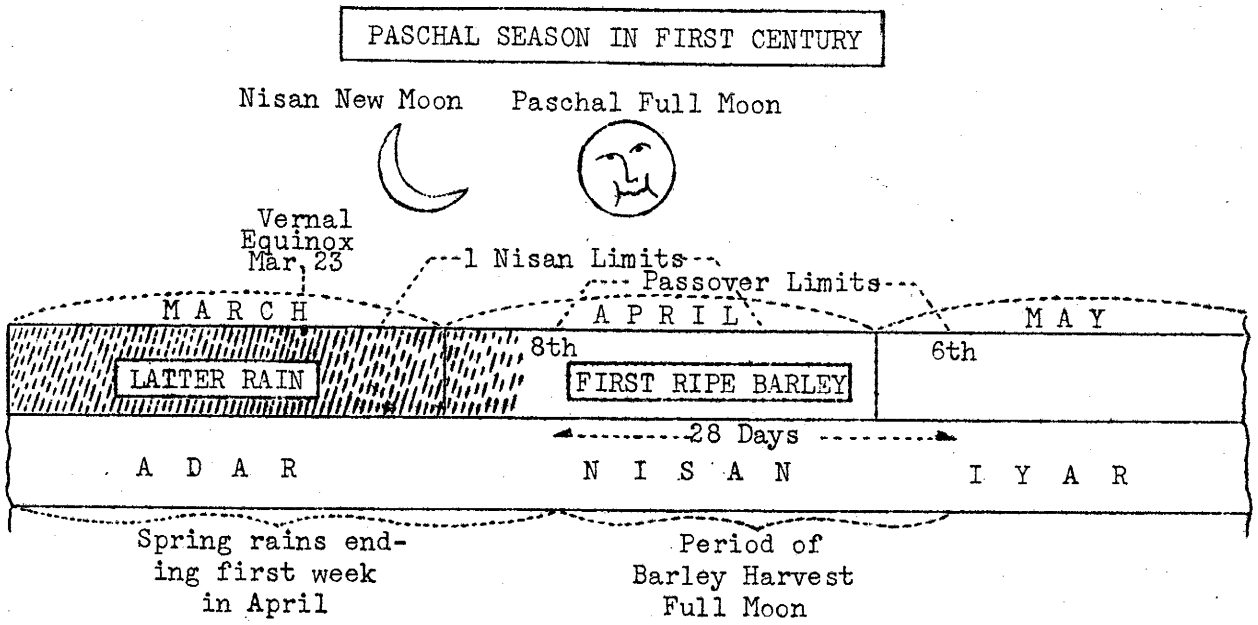
Inasmuch as the apostatizing Church chose the passover of the resurrection as a basis for her feasts, placing Easter on the first Sunday following the equinoctial full moon, the Jews had no alternative but to take the first full moon after the vernal equinox as their paschal season. As a result, the Jewish constant calendar, from the fourth century onward, had many March passovers. The passover of the modern Jewish calendar occurs less frequently in March because its moons fall five or six days later than did the corresponding moons of early century cycles. This is caused by the fact that about every 300 years the moon advances a whole day ahead of the Julian calendar. The accompanying diagram outlines the limits of the paschal full

[1]Michaelis, Joanne Davide, "De Mensibus Hebraeorum Commentatio," Sections II and III. Bremae, 1763.

[2]Note: Inasmuch as Ezra numbers his months, the month Adar mentioned in ch. 6: 15 is suggestive of intercalation--in other words signifying Adar Sheni.

[3]Scaliger, Joseph, "De Emendatione Temporum," p. 107. Francofurt, 1593. He says: "Yet those ancients, when they used this cycle [that of Dionysius] thought that they were celebrating the passover in Nisan, which was Adar [March] in the years 2,3,4,7,10,12,13,15,16,18, as the table shows. . ."

moon date according to the ancient Mosaic law, and the law governing the modern Rabbinical calendar.



Mosaic Passover Full Moon = Full Moon during barley harvest, or the first full moon after equinoctial new moon.

Rabbinical Passover Moon = First Full Moon after the vernal equinox.

Scaliger Passover Limits = April 8 to May 6 -- De Emendatione Temporum, p. 265. Francofurt, 1593.

The barley-harvest law, when applied to a continuous series of years, works the same as the law of the 19-year cycle. The moon dates repeat within a day every 19 years. The embolismic years follow the same cycle number indefinitely, and the cycle years can begin from any point in the series. In TABLE I, the Veadar years are marked with an asterisk, and the remaining years are common (c). If these symbols be set down in order, they will run as follows:

* c c * c c * c c * c * c c * c c * c

19 years

This order of common and Veadar years never changes in Jewish time, and the embolismic month is always in the spring. In ancient Babylonian reckoning, according to the cuneiform tables, the embolismic month alternates between spring and fall.

4 Migne, J. P., "Patrologiae Cursus Completus," S. L. t. LXVII, col. 953, can. 69; col. 959, canons 185, 186. (Ferrandi, "Breviatio Canonum".) Paris, 1848.

2a. The Four Passovers. There are two vital features that are set forth in this analysis as essential to the outline of Christ's public ministry: (a) that it involved four passovers, though not of course a period of four full years;[5] and (b) that the four passovers are checked off by epochs in the life of John the Baptist. These two particular marks of distinction not only tie together the whole ministry of Christ, but they also bring harmony between the records of the Synoptists and that of the Fourth Evangelist.

FEAST OUTLINE OF THE PUBLIC MINISTRY OF CHRIST

Years	
0.5	From autumn to the first Passover (spring).
	FIRST YEAR
	Spring -- First Passover[6] --John baptizing near Jordan.[7]
1.0	Fall -- Tabernacles--"a feast of the Jews."[8] Healing of the paralytic on the Sabbath. Attempt to slay Jesus.[9] John Baptist not yet in prison.
	SECOND YEAR
1.0	Spring -- Synoptists' "ears-of-corn" season.[10] Second Passover -- John in prison.[11] Jesus begins public preaching in Galilee
	THIRD YEAR
	Spring -- Third Passover[12] --"a feast of the Jews."[13]
1.0	Associated feeding of 5000--after John's death.
	Fall -- Feast of Tabernacles.[14] Attempt to stone Jesus.
	Winter -- Feast of Dedication--another attempt to stone Jesus[15]
	FOURTH YEAR (beginning)
	Spring -- Crucifixion Passover
3.5 years	Total

The argument upon which the foregoing passover outline is based is as

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[5] "Hence, the whole time of our Saviour's ministry is proved not to embrace four entire years, there being four high priests for four years, from Annas to the appointment of Caiaphas, each of which held the office a year respectively."--Eusebius, "Ecclesiastical History," p. 60. Cruse. London, 1847.

[6] John 2:13 [7] John 3:23 [8] John 5:1. [9] John 5:32. A living witness!

[10] Matt. 12:1; Mark 2:23; Luke 6:1 [11] Matt. 4:12,17; Mark 1:14

[12] John 6:4 [13] Matt. 14:13-21.

[14] John 7 [15] John 10:31

follows:

The chronology that singles out in the Synoptic gospels an additional barley harvest season, not belonging to any of John's passovers, is based upon one event -- the imprisonment of John the Baptist. Consequently, inasmuch as the first passover occurred before John was put into prison,[16] in 28 A.D., and Jesus did not begin public teaching in Galilee until after the imprisonment of John,[17] the ears-of-corn Sabbath, mentioned by all the Synoptists, and introduced into the Synoptic outline soon after the return of Jesus into Galilee, must have marked a passover during the imprisonment of John the Baptist. Therefore, this incident of the barley harvest, which each of the Synoptists mentions, could not have belonged either to the first passover, while John was baptizing near Jordan, nor to the passover in John 6, which came after John's death,[18] at the time of the feeding of the five thousand. Hence it must have been coincident with a paschal season during the period while John was in prison. In this manner, Matthew, Mark, and Luke introduce another passover, not referred to by the Fourth Evangelist, making altogether four passovers belonging to the public ministry of Christ. This Synoptic passover must therefore have occurred in the spring of 29 A.D. It can be designated the second passover.

2b. Passover Near Time of Feeding the Five Thousand. Jesus did not attend this, His third public passover. He was in Galilee at the time. There are those who read only "feast of the Jews," in John 6:4, because of a possible original relation of the Fourth Gospel to Aramaic, which omits the word

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[16] John 3:24

[17] Matt. 4:12

[18] Matt. 14:13

"passover" in this text.[19] But this interpretation drops out a whole year from the public ministry of Christ. However, all three of the Synoptists describe the feeding of the five thousand, which is strictly associated with this "feast of the Jews," and by comparing their records, the chronology of the passover feasts can be established. In the authorized version, and in the American Revised, John's words are direct to the point that "the passover, the feast of the Jews was nigh." And, as if in further confirmation of this circumstance, he states that there "was much grass in the place," where the people sat down to eat (verse 10). Mark adds that the grass was green.[20] This descriptive detail of that desert in Galilee is not only significant, but highly so because it was a desert place.[21]

In Palestine, during the summer, "the plains are parched with drought, and every green herb is dried up . . . no green thing remains but the foliage of the scattered fruit trees, and occasional vineyards and fields of millet." But following the rainy season, there are "rich and juicy pasturages."[22] The very fact that the grass was green, and that there was much of it is indicative of the season that had preceded John's narrative. It had rained sufficiently for the grass to spring up abundantly. The passover always followed just such a period of rain -- designated the "latter rain."[23]

But in marked contrast to the time of the feeding of the five thousand, which followed a period of rain, the feeding of the four thousand, the context shows, came a little later in the same year during the customary summer drought.

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19 Dalman, Gustaf Hermann, "Jesus-Jeshua," pp. 88,92. Tr. by Levertoff. N. Y. 1929

20 Mark 6:39

21 Matt. 14:13-21

22 Kitto, John, "Palestine," pp. 24,43

23 Canticles 2:11

This miracle also took place in a desert, or wilderness, near a mountain in Galilee,[24] like the first feeding. But in this second instance, the people had to "sit down on the ground" to eat their supper of bread and fish. Mark does not speak of any "green" grass, as he mentioned in the case of the five thousand -- he simply calls it ground, from the Greek gē, meaning earth or land.[25] Evidently, this later feeding came during the summer, when every where in Syria the grass dries up. And that this incident occurred during the summer dry weather, can also be concluded from the fact that these heathen people had been with Jesus for three days, and must therefore have slept out on the heath for at least two nights in succession.[26]

These two feeding miracles--the one of five thousand Galilean Jews, after the rainy season, and the other later one of four thousand Galilean heathen from around Decapolis, during the summer dry season -- precisely locate John's "feast of the Jews" in his sixth chapter, even if we allow that the Aramaic omits the word "passover" from the text. For it could not have been other than the paschal season when the five thousand were fed, because of the abundant green grass in a desert place; and the feeding of the four thousand that followed later had to occur during the warm, dry weather of summer, when people and children could sleep out of doors. These two miracles could not be consistently related to any other seasons of the Jewish year. There is, accordingly, no alternative but to conclude that John's third-mentioned feast is the third passover in the public ministry of Christ. The fourth is, of course, that of the crucifixion.

These four passovers signify that the actual public ministry of Christ

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[24] Matt. 16:4

[25] Mark 8:6

[26] White, Ellen G., "Desire of Ages," p. 404. (Con. Series, ed.)

involved a period of about three years, and this fact is implied in the parable, where Jesus said to the dresser of His vineyard, "Behold, these three years I come seeking fruit on this fig tree."[27]

3. The Events of Passion Week. They all point toward the sunset beginning of a 14-Nisan passover day.

PASSION WEEK

Friday (7 Nisan) sunset -- Jesus came to Bethany six days before the Passover.[28]

Sabbath (8 Nisan) -- There they made Him a supper--necessarily the evening after the Sabbath.[29]

Sunday (9 Nisan) -- On the next day--triumphant entry into Jerusalem.[30]
Jesus enters the temple--it is evening already.[31]
He went out unto Bethany with the twelve.[32]

Monday (10 Nisan) -- And on the morrow, when they were come from Bethany--
the fig tree in full leaf.[33]
Moneychangers overthrown.[34]
Hosannas repeated by the children.[35]
Blind and lame healed.[36]
And when even was come, He went out of the city.[37]
On the 10th, the paschal lamb selected.[38]

"After six days"

Tuesday (11 Nisan) -- And in the morning, as they passed by--the dried up fig tree.[39]
Teaching all day in the temple.[40]
Parable of the ten virgins--an evening scene.[41]
And at night He went out and abode in the mount.[42]
After two days was the passover and unleavened bread.[43]

"Two days after"

(12 Nisan) --

Wednesday (12 Nisan) -- And all the people came early in the morning to Him in the temple for to hear Him.[44]
The Greeks come to Philip (in the outer court).[45]
A voice from heaven.[46] Greeks heard the voice.[47]
Jesus departed, and did hide Himself from them.[48]

Thursday (13 Nisan) -- Now the feast of unleavened bread drew nigh--Passover.[49]
Judas seeks opportunity to betray Jesus.[50]

(14 Nisan) sunset -- Then came the day of unleavened bread, when the passover must be killed.[51]
Now the first day of the feast of unleavened bread the disciples came to Jesus.[52]
And the first day of unleavened bread, when they killed the passover, His disciples said unto Him, Where wilt thou that we go and prepare that thou mayest eat the passover?[53]
Now before the feast of the passover, Jesus knowing that His hour was come.[54]

Friday (14 Nisan) morning -- Day of the crucifixion.[55]

When John said, "Then Jesus six days before the passover came to Bethany;"

FOOTNOTES

[27] Luke 13:7

[28] John 12:1

[29] John 12:2

[30] John 12:12; Mark 11:2-7

[31] Mark 11:11

[32] Ibid.

[33] Mark 11:12-14

[34] Mark 11:15-18

[35] Matt. 21:15

[36] Matt. 21:14

[37] Mark 11:19

[38] Ex. 12:3

[39] Mark 11:20

[40] Matt. 22-24; Mark 12,13; Luke 20,21

[41] Matt. 25:1-13

[42] Luke 21:37

[43] Matt. 26:2; Mark 14:1

[44] Luke 21:38

[45] John 12:21

[46] John 12:28

[47] John 12:29,30

[48] John 12:36

[49] Luke 22:1

[50] Matt. 26:16; Mark 14:11; Luke 22:6

[51] Luke 22:7

[52] Matt. 26:17

[53] Mark 14:12

[54] John 13:1

[55] Note: Should the Jewish passover be made to coincide with 15 Nisan, then the calendar phasis would frequently occur before the moon could possibly be seen.

and on Tuesday evening, while sitting on the Mount of Olives, Jesus Himself said, "Ye know that after two days the passover cometh" (Matt. 26:2 A.R.V.), these two statements go into the Bible record concerning the same point of time--the sunset beginning of the passover day. When this instant arrived in Jewry, Thursday had ended and Friday had begun. The portion of time between the Thursday evening sunset and the subsequent midnight was called the sixth day of the week by the Jews, and would be thus dated on their public documents. When the sun set, a new day had begun for the Jew. And when Luke says, "Then came the day of unleavened bread, when the passover must be killed" (Luke 22:7), the context shows that he referred to the Thursday evening beginning of the new Jewish day. Obviously the point of time was sunset, when the new day began in Jewish communities. Consequently, Luke must have had Friday in mind as the day "when the passover must be killed."

Similarly, John, in his description of the Lord's Supper, says, "Now before the feast of the passover, when Jesus knew that His hour was come" (John 13:1). These words refer to the same occasion as those of Luke -- the passover supper that was to be observed at the evening beginning of the sixth Jewish day, after the Thursday sun had set. By this order of feast observance, the harmony between John and the Synoptists is preserved.

4. Crucifixion Passover--a Late Season Feast. The outline of Christ's public ministry (page 4) is based upon seven specific Jewish feasts. These concur with various seasons in the four years indicated, and they tie together the ministry of Christ and the ministry of John the Baptist. But of importance also to our chronology is the fact that certain scripture references to these seasons intimate whether the corresponding years were common or intercalary. Necessarily, the year of greatest import is that of the crucifixion. If its Passover was unusually late, it is reasonable to expect some evidence in the Bible of the presence of the embolismic month Veadar. And there are several suggestive allusions to that effect: (a) the closed fishing season in John 21; and (b)

the state of vegetation at the time of the crucifixion Passover.

a. We have uniform testimony that the Galilean fishing season is from mid-December or January to mid-April.[56] Twice during the ministry of Christ, He performed a miracle in order to fill the disciples' nets with fish. The first occasion was in Galilee, after the Synoptic Passover. The Bible does not appear to state just how long after, but it is manifest that the season was late. In the very early spring before the crucifixion, Peter could readily hook up a fish off the shore of Galilee, "where the shallows swarm with small fish-fry."[57] The instance of the second miracle was in the year of the crucifixion, after the resurrection. Peter and his comrades had fished all night on the sea of Galilee, but had caught nothing. Then came the early morning catch at the command of their Master. If the crucifixion had been early in April, then fishing would still have been good for a week or two. But the fact that it was not good in water that in season teems with large fish a few yards out from shore,[58] is indicative that the Passover was late--that is, after the fishing season had ended. Hence a Veadar spring.

b. In the highlands about Jerusalem at the time of the death of Christ, the "time of figs was not yet."[59] And still, there was in this particular orchard to which the Synoptists refer, an isolated tree in full leaf, but without any figs. Nevertheless, in other orchards at this time, trees were

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[56] Dunkel, P. Franz, "Die Fischerei am See Gennesareth," p. 381. Biblica, Vol. 5, 1924. Rome; Masterman, Ernest W. Gurney,"Studies in Galilee," p. 38. Chicago, 1909; Rohricht, Reinhold, "Regesta Regni Hierosolymitani," p. 38. Libraria Academica Wagneriana. 1893.

[57] Masterman, E. W.G., Idem.

[58] Idem.

[59] Mark 11:13

in leaf.[60] But this special tree was barren, and it had been left from year to year with the expectation that it would, after more culture, bear fruit.[61] However, it bore only pretentious foliage. But its green covering was so "luxuriant in appearance, and beautiful to the eye,"[62] that Jesus endowed the tree with a symbol, and to it likened the hypocrisy of the Jewish nation.

But in the crucifixion year, the paschal season was cold.[63] The figs around Jerusalem had not yet matured, though leaves had. If the Passover had been in early April, it would still have been cold about Jerusalem, but the fig trees would not have been in leaf. From this very fact Jesus drew a spiritual lesson:

"Behold the fig tree, and all the trees. When they now shoot forth, ye see and know of your own selves that summer is nowigh at hand."[64]

Hence, the fig tree, with such abundant foliage, and the leafing out of other trees also, are witnesses to the lateness of the crucifixion Passover, and the nearness of summer. In early April, the fig trees of Southern Palestime have little green figs only--no leaves.

The Bible gives the following character to the Passover of the crucifixion:

1. It was the 14th day of Nisan, as shown by all the Bible passovers.
2. It was also called the first day of unleavened bread.
3. It was the day on which the lamb had to be slain and eaten.
4. It was a one-day Passover.
5. It began at sundown on Thursday.
6. It was the fourth Passover of Christ's ministry.
7. It was a late season Passover.

It yet remains to demonstrate the nature and character of the Lord's supper in relation to the national feast.

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[60] Luke 21:30

[61] Luke 13:9

[62] "Desire of Ages," p. 583.

[63] John 18:18

[64] Luke 21:30

II. THE LORD'S PASSOVER--THE NATIONAL FEAST

At the time of the Egyptian passover, each Israelite home was invested, as it were, "with the character and dignity of a temple,"[65] where the passover lamb was slain, and the blood sprinkled upon the entrance door. These lambs were not slain by a temple priest at a temple altar. But Philo (20 B.C. to 54 A.D.--a contemporary of Christ and the Apostles), makes revealing comment regarding the passover feast inthe time of Christ:

". . . on which festival not only do private individuals bring victims to the altar, and the priests sacrifice them, but also, by a particular ordinance of this law, the whole nation is consecrated and officiates in offering sacrifices; every separate individual on this occasion bringing forward and offering up with his own hands the sacrifice due on his own behalf." 66

Then again:

". . . on which pascha the whole nation sacrifices, each individual among them not waiting for the priests, since on this occasion, the law has given, for one especial day in every year, a priesthood to the whole nation, so that each private individual slays his own victim on this day." 67

Philo's words, "not waiting for the priests," are significant. They are highly suggestive that not every paschal lamb was sacrificed in the temple, and therefore, not all at the same time. That some "private individuals" did bring their lambs to the temple altar, according to Philo, is evident. The occasion of the first passover after the dedication of the second temple,[68] and also Hezekiah's passover,[69] are precedents. But, in the time of Christ, some lambs must certainly have been slain "without the gate" as a symbol of Him who "suffered without the gate."[70] And as a type of this was also the very first passover, when the lambs were slain at Israel's doors in Egypt.

Maimonides (12th century) casts more light on the whole question of "private altars." He admits that private altars had been permissible in early times, but that there had been an "edict" forbidding such. This is his com-

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65 Philo, "Life of Moses," book III, p. 284. Tr. by Yonge. London, 1855.
66 Idem, p. 121.
67 Idem, p. 171 (Italics mine.)
68 Ezra 6:20
69 2 Chron. 30:17
70 Heb. 13:12

plete statement:

"Thus the paschal victim, like the rest of the sacrifices, was never slain, except in the court of the temple. But then, it was permitted that individual altars be kindled with individual sacrifices, although there was an edict that no paschal victim should be slain, upon a private altar. Whoever, therefore, had slain a paschal lamb upon a private altar, was compelled with stripes: because we see written in the law, 'Thou shalt not slay the pascha in any of your towns.' Deut. 16:5. For this doctrine has been handed down to us that, in this place, it is warned lest anyone should slay the passover lamb upon a private altar, even though private altars were conceded."[71]

The first day of unleavened bread had already come when Jesus said to Peter and John, "Go and prepare us the passover that we may eat."[72] They were outside of Jerusalem when Jesus said this. Possibly the lamb had even then been slain when the disciples asked, "Where wilt thou that we go and prepare that thou mayest eat the passover,"[73] And, following in detail the Lord's instructions, the "disciples went forth, and came into the city, and found as He had said unto them: and they made ready the passover."[74] Jesus had said, "And he will show you a large upper room furnished and prepared: there make ready for us." And there the disciples did make ready. "And when the hour was come, He sat down, and the twelve apostles with Him."

In none of the evangelistic records is there any suggestion that Peter and John went up to the temple to slay the lamb. In the first place, sunset time was not the customary hour of the day for the temple passovers to be slain, at least according to the Mishna, which Maimonides cites. Secondly if it had been customary with Jesus to have their paschal lamb slain at the temple altar, Judas could have turned over this information to the priests, thus giving them opportunity to trail the disciples and arrest Jesus.

Josephus also supports the idea of private passover altars as a common practice at the time of Christ's birth. Both "Antiquities" and "Wars" give

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[71] Maimonides, Moses, "Tractatus Primus de Sacrificio Paschali," cap. I. p. 4. Tr. de Compiegne de veil. London, 1683.

[72] Luke 22:8

[73] Mark 14:12

[74] Mark 14:16

a record of a sedition that occurred among the Jews during the passover feast, shortly after the death of Herod the Great. Archelaus had assumed the throne in Judaea, although he had not yet been appointed by Augustus. The Jews lamented the death of Matthias, and those whom Herod had slain with him. An "innumerable multitude" had come up out of the country to keep the feast--one seditious group resorting to the temple for protection, while the masses were without the city in their tents, whom Josephus describes as offering sacrifices "with great alacrity."[75]

Against them, Archelaus sent a regiment of armed men, whom the Jews, with sacrifices in hand, stoned and wounded. "After which they betook themselves to their sacrifices, as if they had done no mischief."[76] Finally, Archelaus "sent his whole army upon them, the footmen in great multitudes by way of the city [Jerusalem], 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."[77]

In this season, the moon was full, and in that piercingly clear moonlight of the holy land, it was as easy for the army to attack by night as by day. But the important feature is that the Romans surprised the Jews, who were in the very act of offering their paschal lambs. Certainly this was not a temple service, and it is easy to see how,by this method, many lambs could be offered in a very short time!

The position taken in this argument is therefore that the gospel account supports a national Passover only--one that for the most part, in the crucifixion year, was observed on Thursday evening about sunset in the private homes and tents of the Jews. In further confirmation of this interpretation of the crucifixion Passover, attention is called to certain facts in the case:

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[75] Josephus, "Antiquities," xvii.9.3.

[76] Josephus,"Wars," II. 2.3.

[77] Idem.

a. The original Passover was a night ceremony only. It was a one-day service even in Josiah's time.[78] Consequently, the national sacrifice had always to be commemorative of that particular night in Egypt, when the destroying angel passed over the doors upon which had been sprinkled the blood. Therefore, to observe the sacrifice on parts of two days instead of in one night, would obviously destroy its spiritual significance. And, if a two-day ceremony had ever been possible, then the law in Numbers 9 would never need to have been given. [79]

b. At the crucifixion Passover, both the typical lamb and the Antitypical Lamb were to be sacrificed. It is consistent that the calendar should date both events on one and the same day only--but not necessarily at the same hour. For it would be as reasonable to insist that the barley sheaf had to be waved in the temple at the same time Christ arose, as to maintain that the typical passover lamb must be slain at the same hour the True Lamb died. It seems sufficient that the two were sacrificed on the same day. But it annuls the meaning if the symbolic lamb is represented as being slain on one day, and the real Lamb on the day following.

c. On the occasion of the Egyptian Passover, the lamb was slain by the individual for the family group. But in later years, sometimes the Levites substituted for people who were unclean.[80] Nevertheless, this was a substitute service only, for the king prayed, "The good Lord pardon every one."[81] In the time of Christ, we read that many--not all--went up before the Passover "to purify themselves."[82] These were manifestly the heads of companies upon whom fell the office of slaying the lamb. It is therefore a logical conclusion that priest or Levite did not commonly slay the paschal lamb in the time of Christ.

d. It has been argued that, even though private passover altars be granted, the disciples would necessarily have to go to the temple sometime on Thursday, either to obtain their lamb, or to have the one selected examined by the priest. But it should be borne in mind that the paschal lambs had already been chosen since the 10th--on Monday--so that there was no necessity of waiting until the last few hours before the ceremony in order that the sacrificial lamb should be passed upon by the priest. Furthermore, it should be remembered that on that particular Thursday, Jesus and the disciples were in hiding outside of the city because of the activity of Judas in seeking to betray his Lord.

e. But perhaps the most valuable witness to the view that John himself is describing the national festival, and not a private supper, is his own testimony that "before the feast of the passover," Jesus knew that His hour had come. Jesus knew from the prophecy in Daniel nine that the fourth Passover in His public ministry would be His last.[83] But, if He anticipated the national feast upon which the prophecy was based, and subverted the time by a private paschal meal, not coincident with national observance, He could not possibly have insisted to His disciples that His "hour had come!"

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[78] 2 Chron. 35:16

[79] Num. 9:10,11

[80] 2 Chron. 30:17

[81] 2 Chron. 30:18

[82] John 11:55

[83] Dan. 9:26,27

John's important words are also repeated by Luke,[84] and in harmony with their deep significance, it is a self-evident conclusion that all the Evangelists must have had only one Passover in view--the national feast.

III. THE ONLY POSSIBLE DEATH YEAR OF CHRIST ACCORDING TO LUNI-SOLAR CALCULATION

1. The Astronomical Principles Governing the Calendar Moon.

Surprising as it may seem, the foregoing Biblical principles, as discussed in Sections I and II, provide a calendar basis for crucifixion chronology. When Moses said that the Passover should be on the 14th day of Nisan, he thereby exactly measured the paschal interval as 13 days between the moon's phasis and the sunset beginning of the Passover. And when astronomers, by actual observation, and by numerous uniform testimonies, covering a period of many centuries, report that the moon makes her first appearance in from one to four days after the conjunction date--which is the same as one to three days after the day itself of conjunction--they also measure the same paschal period to be 13 days long, in agreement with Moses. And these figures signify that on the meridian of Jerusalem, the paschal moon always fulled on the 13th day of Nisan, or on the day before the Passover.[85] To this, Philo bore witness when he significantly described the Passover day "as full not by day only, but also by night of the most beautiful light!"[86]

This coincidence between the full moon and the first month of the Jewish year in Jerusalem, does not necessarily occur in other months, nor on other meridians, when the moon may full earlier or later. And it makes all the more significant the synthesis that testifies to the Hand that controlled the order of the ancient Jewish feast period. In modern times, the question is asked:

"Who is guiding the stars in their courses with such exactitude and with such scrupulous orderliness? Jupiter's oppositions to the sun occur once in 399 days. He never fails to be on time. . . Mercury's orbit is so inclined to that of the earth that his transits across the sun are relatively rare, but

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[84] Luke 22:14

[85] Note: Table III illustrates how the Passover keeps away from the day of the full moon.

[86] Philo Judaeus, "Life of Moses," III, p. 291. Tr. by Yonge. London, 1855.

on the average they number thirteen every hundred years, and they always occur in either May or November." 87

The same writer continues:

"Of all the arguments for the existence of God, there is none better than the one based upon the orderliness of the universe. It is shot through and through with the principles of mathematics. The science of numbers dominates everything that the world's Creator has done and is doing." 88

And furthermore, by the one simple command that marked out the 14th of the first month as the passover day, Moses not only determined (1) the relation between the Passover and the full moon; but also (2) the timing of the ancient Jewish phasis; (3) the length of the ancient year; and (4) the length of the months that followed the Jewish feast period. These calendar details being fixed, it is obvious that the whole ancient system of time keeping was founded upon a calculation that agreed best with the observation of the moon. In other words, it was neither calculation alone, nor observation alone, but both together.

The Egyptian calendar was a sufficiently accurate measuring-stick of time for its age; nevertheless, it had not the exactness of the luni-solar system which Moses ordained. Moreover, the agricultural year of Moses had not the variations which would have characterized a calendar based wholly upon observation of the new moon. The Mosaic festivals appointed on certain days of the moon, all had a reference to the harvests of barley, wheat, and wine, respectively. It was field and land that determined Israel's calendar moon. To ascertain when intercalation was due, did not require observation of the "lesser light." This every farmer could decide by looking at the corn (grain) fields in southern Palestine.

And there were always just as many years as there were harvests; and one harvest could not fall over a month earlier or later than another similar

87 Zion's Herald, August 27, 1941. Page 764. [Italics mine]

88 Idem.

harvest. By dividing the number of days in a period of lunar years by the number of harvests, the essential length of the solar year could be obtained; and the more numerous the harvests and the longer the period, the more exact the solar constant (Michaelis).

No single Jewish year taken by itself is a solar year, but is either from 10 to 11 days shorter, or on account of an intercalated moon, 18 to 19 days longer than the solar year. Moreover, there is no calendar cycle that precisely corresponds to the celestial motions of the moon. And Scaliger testifies that "long before the times of the Messiah, the Hebrews had in books the designated form of the year."[89] He cites the Talmud for the statement that the ancients had a figure of the moon, or lunar cycle to which they resorted whenever "the clouds begrudged the eyes the vision of the new moon."[90] Saadia Gaon, Albiruni, Maimonides, and Piniles make similar statements.

The outstanding astronomical principles governing the calendar moon are:

a. From a modern standard almanac can be obtained an important calendar relation of the moon, that of course is as old as the earth and her parasite--the moon's perigee relation in the paschal month Nisan. Its importance never fails to be mentioned by those investigating the new moon. This lunar ratio, so useful in determining the position of the lunar phasis, can be nicely demonstrated from the ample figures of a modern standard almanac describing the moon's place in the sky. But, although we do not have such records for early centuries, yet our standard almanacs point out this perigee relation to the Nisan phasis, and reveal how the ratio can be applied to the ancient luni-solar calendar.

The ratio can be defined as an average relation between the moon's perigee, the translation period, and the waxing period. It is the perigee that

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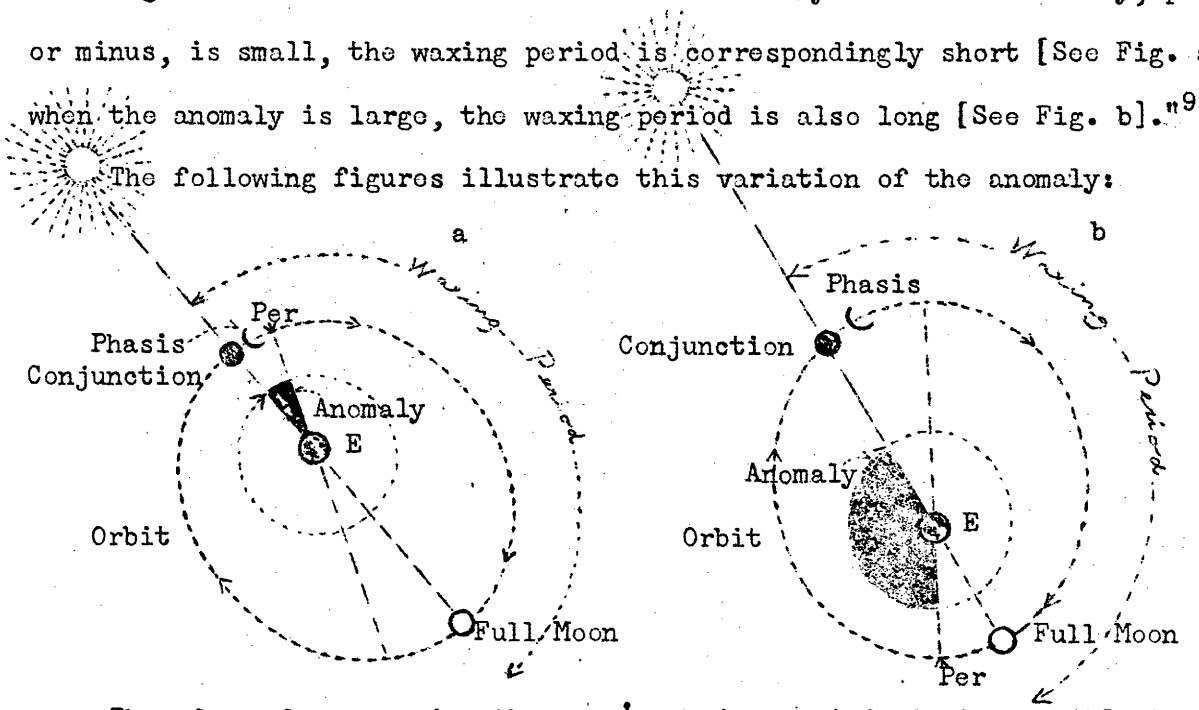
[89] Bucherii Aegidii, "De Doctrina Temporum," p. 374. Antverpiae, 1634.

[90] Idem.

causes the varying relation between these portions of the moon's orbit, and back of that is Newton's law of gravitation between the earth and moon. The actual working of the perigee law is stated as follows:

"The time required for the moon to reach a given distance east of the sun depends upon her distance from perigee at the time of conjunction. This angular distance is called the moon's anomaly. When the anomaly, plus or minus, is small, the waxing period is correspondingly short [See Fig. a]; when the anomaly is large, the waxing period is also long [See Fig. b]."[91]

The following figures illustrate this variation of the anomaly:



Therefore, by comparing the moon's waxing period, it is possible to determine how long the translation period should be. Tables II and III definitely show that the one varies approximately as the other--that when the waxing period is long or short, the translation period must similarly be long or short. (Factor a)

Other factors governing the Nisan new moon are the following:

b. The moon's phasis never occurs on the civil date of conjunction.

c. The position of the phasis must be such as not to distort the length of the lunar year, making it too long, as 385 days, or too short, as 353 days.

d. There must always be 13 days between the civil date of the phasis, and the sunset beginning of the passover on the Jerusalem meridian.

e. No two successive years should begin on the same day of the week, as would be the case if the occasional fixed Jewish year of 385 days were em-

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91 Glenn H. Draper, Associate Astronomer, U.S. Naval Observatory, Washington, D.C.

ployed.

f. Paschal full moon--the first full moon after the equinoctial new moon.

g. Passover always on the day after the Jewish day of full moon--never on or before.

h. Tisri 1 counted as the 177th day after the Nisan new year.

The foregoing rules harmonize with the synchronizing dates of the Bible and related literature, as for example, the synchronism in the Sabbath feast of John 5:1, in which the year being known, and the day of the week, the feast is proven to be that of Tabernacles.[92]

2. Analysis of the Crucifixion Date

There are two rival dates set forth for the date of the death of Christ --30 and 31 A.D. All of the other years of Daniel's "seventieth-week" period fall out either because their passovers occur on some other day of the week than Friday, or else because the year is wholly out of season with the public ministry of Christ, as 34 A.D. And those who wish to make the crucifixion day coincide with the civil day of full moon, should pause to consider the following series:

PASCHAL FULL MOONS
(Jerusalem Civil Time)

A.D.	Full Moon	Day of Week	A.D.	Full Moon	Day of Week
23*	Apr 24.53	Friday	32	Apr 14.47	Monday
24	Apr 12.86	Wednesday-	33*	May 3.29	Sunday
25*	May 1.58	Tuesday	34	Apr 22.40	Thursday -
26	Apr 20.60	Saturday	35	Apr 11.43	Monday
27	Apr 9.76	Wednesday	36*	Apr 29.19	Sunday
28*	Apr 27.62	Tuesday	37	Apr 18.59	Thursday -
29	Apr 17.21	Sunday	38	Apr 8.23	Tuesday
30	Apr 6.93	Thursday	39*	Apr 27.25	Monday
31*	Apr 25.94	Wednesday -	40	Apr 15.92	Friday

Years marked with an asterisk (*) have a Veadar spring.

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[92] The year in John 5 is known because Christ had shortly before attended His first passover, passing through Samaria about four months before the autumn harvest. Jer. 41:1-8 shows that sometimes in Palestine the grain was sown in the spring, to be harvested later in the fall. The feast in John 5 could not have occurred in 29 A.D., for the Baptist was then in prison, while in this chapter, Jesus refers to him as a current witness.

Calendar Proof: 1 Nisan in 28 A.D. equals April 15, Thursday (Cf. Table I) Hence 1 or 15 Tisri equals two days later in the week, or Sabbath. Therefore the Sabbath healing of the impotent man must have coincided either with the Feast of Trumpets on the Tisri new year, or with the Feast of Tabernacles on 15 Tisri.

In the foregoing series of years from 24 A.D. to 39 A.D. inclusive, no Julian civil date of full moon occurs on Friday. In the year 33 A.D., the full moon next earlier than May 3.29 was Friday, April 3.71, J.C.T. But this date was altogether too early for ripe barley in the vicinity of Jerusalem, and consequently, equally too early for this Passover in this year. And yet this is the popular date for those following the lead of the Rabbinical calendar. But, May 3.29 was the true paschal full moon in 33 A.D., as the 19-year cycle shows. Now obviously, if the ancient passover occurred on the civil day itself of full moon, as many insist, then in this 16-year period, in which it is certain that Christ died, some one of these paschal full moon civil dates must of necessity have coincided with Friday. But in no year belonging to this period is there a synchronism between Friday and the civil date of full moon.

However, in this series, the Jewish days of full moon are the same as the civil except in the years 24,27,30,31, and 40, when they are advanced one day because their full moons fall after sunset. Such a change results in a Jewish Friday full moon day in the year 30 A.D. But the year 30 A.D. could not have had a Friday passover for the following reasons:

a. A Friday passover in 30 A.D., on the basis of the date being 14 Nisan, would signify that the Jews in that year observed their passover before the moon actually fulled--contrary to the Mosaic plan. (Moon fulled on April 6, 10:30 p.m.)

b. A Friday passover on April 7, 30 A.D., makes the year 30-31 A.D. to be 385 days long, and causes both lunar years to begin on the same day of the week--Saturday.

c. The year 30 A.D. was a common lunar year, as shown by the position of its full moon. Therefore this year as a crucifixion date, would not harmonize with the Bible demand for a Veadar year.

d. If 30 A.D. had been the crucifixion year, then the moons of the year 29 A.D. would have to govern the Feast of Tabernacles in John 7, and the Sabbath healing of the blind man four days after the end of the feast. But the year 29 A.D. has no synchronism at all with the Feast of Tabernacles in the pre-crucifixion year, its moons coming on the wrong days of the week.

e. And finally, the Nisan conjunction in 30 A.D. was in the region of apogee, as has also been recognized by Fotheringham and Schaumberger. There-

fore its translation period should be as long as possible, and not made shorter by one day. The actual passover in 30 A.D. was consequently on the Sabbath, April 8.

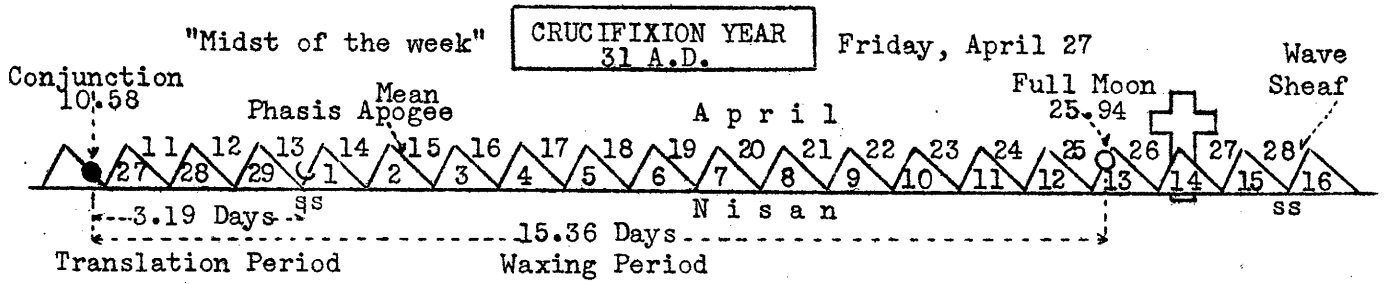
3. 31 A.D.--The True Crucifixion Year

W "SEVENTIETH WEEK" (Daniel 9:24-27) *

A.D.	Full Moon	13 Nisan	14 Nisan		
28	Apr 27.62 Tues	27 Tues	28 Wed		Veadar
29	Apr 17.21 Sun	17 Sun	18 Mon		
30	Apr 6.93 Thurs	7 Fri	8 Sat		
31	Apr 25.94 Wed	26 Thurs	27 FRIDAY	"Midst of the week"	Veadar
32	Apr 14.47 Mon	14 Mon	15 Tues		
33	May 3.29 Sun	3 Sun	4 Mon		Veadar
34	Apr 22.40 Thurs	22 Thurs	23 Fri	End of "week"	

* Called the "Week" prophecy.

Table "W" represents the seven-year period of Daniel's "seventieth week"--the period in the midst of which the sacrifice of Christ was to be made. All of these years fail of coinciding with a Friday passover except 31 and 34 A.D. But the year 34 A.D., because it came at the end of the period, does not therefore belong to the prophetic "midst;" and it was also a common Jewish year. Thus 31 A.D. is the only year left to conform to the Biblical and astronomical demands with respect to the crucifixion. Its Nisan translation is according to the following diagram:



SUMMARY OF ARGUMENT FOR 31 A.D. CRUCIFIXION

Demand	Fulfilment
1. Daniel's prophetic "midst of the week" -- first "week" of the prophecy being established by eclipses, Assuan synchronisms, and others in Ezra and Nehemiah.	-- Year 31 A.D. is in exact middle of the "seventieth week" period
2. Biblical demand for a Veadar year	-- 31 A.D. is embolismic.[93]
3. Nisan conjunction in 31 A.D. was in region of apogee, calling for long translation period.[94]	-- In 31 A.D., Tr. Period = 3.19 days Wax. Period=15.36 days (About the longest periods)
4. Moons of 30 A.D. must therefore agree with Feast of Tabernacles in pre-crucifixion year	-- In 30 A.D., 1 Nisan = Sunday, March 25 Hence 15 and 22 Tisri = Tuesday Blind man was therefore healed on Sabbath, on the fourth day after the end of the feast, in harmony with context in John 8 and 9

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[93] Note: From history also comes the confirmation that 31 A.D. was a Veadar year. In the year 1722, Thomas Shaw (Oxford) was travelling through the Holy Land. He noted that "barley, all over the Holy Land, was in full ear in the beginning of April [Julian Calendar, Old Style]; and about the middle of the month [last of the month, New Style. England did not change her calendarbefore 1752.] It began to turn yellow, particularly in the southern districts." Dr. Shaw also made note that the Boccores, or first ripe figs were hard, and no bigger than common plums. He makes valuable comment upon these facts:

"According therefore to the quality of the season, in the year 1722, the first fruits could not have been offered at the time appointed; and would therefore have required the intercalating of Ve-adar, and the postponing thereby the passover for at least a month."--"Observations of Barbary and the Levant," p. 137. Edinburgh, 1808.

Dr. Shaw is therefore an eye-witness that the year 1722 demanded a Veadar month in Palestine. But between 1722 and 31 A.D. are 1691 years, or exactly 89 19-year cycles. Therefore, according to the law of embolism, since the year 1722 was embolismic, the year 31 A.D. must have been embolismic also. Thus we have the double witness of history and even nature herself to the barley-harvest law in its relation to the law of the 19-year cycle. This significant historical testimony is a telling argument with reference to the efficiency and accuracy of the Mosaic barley-harvest law. The principles of this regulation of the Jewish year were as potential in Palestine after three thousand years and more as when Moses ordained them. They are a faithful lead to one of the vital features governing the crucifixion date.

[94] The apogee positions of the moon in the years 30 and 31 A.D. were computed by Glen H. Draper, U. S. Naval Observatory, Washington, D. C.
(Photostat of this computation in the Advent Source Collection)

FIRST CENTURY MOONS AND INTERVALS TABLE I

(Jerusalem Civil Time)

A.D.	Conjunction	1 Nisan	Day of Week	Tr. Period (Days)	Full Moon	14 Nisan	From Con. to F.M. (Days)	Year Length (Days)
1*	Apr.12.49	Apr 14	Thur	1.28	Apr 26.40	Apr 27	13.91	355
2	Apr 1.72	Apr 4	Tues	2.05	Apr 15.91	Apr 17	14.19	384
3*	Apr 20.41	Apr 23	Mon	2.36	May 4.90	May 6	14.49	354
4	Apr 8.44	Apr 11	Fri	2.33	Apr 23.62	Apr 24	15.18	355
5	Mar 28.69	Apr 1	Wed	3.07	Apr 13.22	Apr 14	15.53	384
6*	Apr 16.60	Apr 20	Tues	3.17	May 2.09	May 3	15.49	354
7	Apr 6.25	Apr 9	Sat	2.52	Apr 21.31	Apr 22	15.06	354
8	Mar 25.96	Mar 28	Wed	1.80	Apr 9.33	Apr 10	14.37	384
9*	Apr 13.94	Apr 16	Tues	1.83	Apr 28.02	Apr 29	14.08	354
10	Apr 3.38	Apr 5	Sat	1.39	Apr 17.33	Apr 18	13.95	355
11	Mar 23.53	Mar 26	Thur	2.23	Apr 6.90	Apr 8	14.37	384
12*	Apr 10.23	Apr 13	Wed	2.54	Apr 24.92	Apr 26	14.69	354
13	Mar 30.28	Apr 2	Sun	2.48	Apr 14.61	Apr 15	15.33	384
14*	Apr 18.09	Apr 21	Sat	2.68	May 3.58	May 4	15.49	355
15	Apr 7.57	Apr 11	Thur	3.20	Apr 22.99	Apr 24	15.42	354
16	Mar 27.25	Mar 30	Mon	2.51	Apr 11.11	Apr 12	14.86	384
17*	Apr 15.27	Apr 18	Sun	2.50	Apr 29.78	May 1	14.51	354
18	Apr 4.89	Apr 7	Thur	1.88	Apr 18.89	Apr 20	14.00	354
19	Mar 25.26	Mar 27	Mon	1.50	Apr 8.27	Apr 9	14.01	384
20*	Apr 12.00	Apr 14	Sun	1.77	Apr. 26.21	Apr 27	14.21	355
21	Apr 1.03	Apr 4	Fri	2.73	Apr 15.92	Apr 17	14.89	384
22*	Apr 19.74	Apr 23	Thur	3.03	May 4.93	May 6	15.19	354
23	Apr 9.00	Apr 12	Mon	2.77	Apr 24.53	Apr 25	15.53	355
24	Mar 28.55	Apr 1	Sat	3.21	Apr 12.86	Apr 14	15.31	383
25*	Apr 16.57	Apr 19	Thur	2.20	May 1.58	May 2	15.01	354
26	Apr 6.28	Apr 8	Mon	1.49	Apr 20.60	Apr 21	14.32	355
27	Mar 26.83	Mar 29	Sat	1.93	Apr 9.76	Apr 11	13.93	383
28*	Apr 13.68	Apr 15	Thur	1.09	Apr 27.62	Apr 28	13.94	355
29	Apr 2.82	Apr 5	Tues	1.95	Apr 17.21	Apr 18	14.39	355
30	Mar 22.84	Mar 26	Sun	2.93	Apr 6.93	Apr 8	15.09	384
31*	Apr 10.58	Apr 14	Sat	3.19	Apr 25.94	Apr 27	15.36	354
32	Mar 29.95	Apr 2	Wed	2.81	Apr 14.47	Apr 15	15.52	384
33*	Apr 17.90	Apr 21	Tues	2.87	May 3.29	May 4	15.39	354
34	Apr 7.58	Apr 10	Sat	2.19	Apr 22.40	Apr 23	14.82	354
35	Mar 28.27	Mar 30	Wed	1.49	Apr 11.43	Apr 12	14.16	384
36*	Apr 15.21	Apr 17	Tues	1.56	Apr 29.19	Apr 30	13.98	354
37	Apr 4.56	Apr 6	Sat	1.21	Apr 18.59	Apr 19	14.03	355
38	Mar 24.62	Mar 27	Thur	2.24	Apr 8.23	Apr 9	14.61	384
39*	Apr 12.31	Apr 15	Wed	2.46	Apr 27.25	Apr 28	14.94	355
40	Mar 31.46	Apr 4	Mon	3.30	Apr 15.92	Apr 17	15.46	384
41*	Apr 19.33	Apr 23	Sun	3.44	May 4.85	May 6	15.52	354
42	Apr 8.87	Apr 12	Thur	2.90	Apr 24.15	Apr 25	15.28	354
43	Mar 29.58	Apr 1	Mon	2.18	Apr 13.21	Apr 14	14.63	384
44*	Apr 16.60	Apr 19	Sun	2.17	Apr 30.90	May 2	14.30	354
45	Apr 6.14	Apr 8	Thur	1.63	Apr 20.07	Apr 21	13.93	354
46	Mar 26.40	Mar 28	Mon	1.42	Apr 9.55	Apr 10	14.15	384
47*	Apr 14.11	Apr 16	Sun	1.66	Apr 28.54	Apr 29	14.43	355
48	Apr 2.14	Apr 5	Fri	2.63	Apr 17.26	Apr 18	15.12	355
49	Mar 22.35	Mar 26	Wed	3.41	Apr 6.88	Apr 8	15.53	384
50*	Apr 10.25	Apr 14	Tues	3.52	Apr 25.77	Apr 27	15.52	354

*The asterisk marks the years having a Veadar spring.

Conjunction and Full Moon dates taken from Ginzel's "Chronologie."

Nisan	Iyar	Sivan	Tammuz	Ab	Elul	Tisri	Hesvan	Kisleu	Tebet	Shebat	Adar	Veadar
1-	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2-	2	2	2	2	2	2	2	2
3	3	3	3-	3	3	3	3	3-	3	3	3	3
4	4	4	4	4	4	4	4-	4	4	4	4	4-
5	5	5-	5	5	5	5	5	5	5	5	5-	5
6	6-	6	6	6	6	6-	6	6	6	6	6	6
7	7	7	7	7	7-	7	7	7	7	7-	7	7
8-	8	8	8	8	8	8	8	8	8-	8	8	8
9	9	9	9	9-	9	9	9	9	9	9	9	9
10	10	10	10-	10	10	10	10	10-	10	10	10	10
11	11	11	11	11	11	11	11-	11	11	11	11	11-
12	12	12-	12	12	12	12	12	12	12	12	12-	12
13	13-	13	13	13	13	13-	13	13	13	13	13	13
14	14	14	14	14	14-	14	14	14	14	14-	14	14
15-	15	15	15	15	15	15	15	15	15-	15	15	15
16	16	16	16	16-	16	16	16	16	16	16	16	16
17	17	17	17-	17	17	17	17	17-	17	17	17	17
18	18	18	18	18	18	18	18-	18	18	18	18	18-
19	19	19-	19	19	19	19	19	19	19	19	19-	19
20	20-	20	20	20	20	20-	20	20	20	20	20	20
21	21	21	21	21	21-	21	21	21	21	21-	21	21
22-	22	22	22	22	22	22	22	22	22-	22	22	22
23	23	23	23	23-	23	23	23	23	23	23	23	23
24	24	24	24-	24	24	24	24	24-	24	24	24	24
25	25	25	25	25	25	25	25-	25	25	25	25	25-
26	26	26-	26	26	26	26	26	26	26	26	26-	26
27	27-	27	27	27	27	27-	27	27	27	27	27	27
28	28	28	28	28	28-	28	28	28	28	28-	28	28
29-	29	29	29	29	29	29	29	29	29-	29	29	29
30		30		30-		30	(30)	(30)		30	(30)	

From Table II, the day of the week is determined for any Jewish date. Hyphens mark the beginning of the week from the first day of Nisan. The first 235 days of the Jewish year -- to the end of Hesvan -- are always reckoned the same. In this period, the weeks never change their beginning day. Hence, upon whatever day of the week 1 Nisan falls, all the succeeding weeks to the last of Hesvan begin on the same week day. The 15th day of each month, throughout the whole year, is always the same day of the week as the new moon day. These permanent calendar features make it possible easily to compute intervening dates between the marked weeks. If, for example, 1 Nisan is Tuesday, then every hyphened date for the first eight months is Tuesday; and 24 Elul, counting from Tuesday, 21 Elul, would be Friday.

1. In a 355-day year, the weeks following Hesvan, which gains a day, begin a day later.

2. In embolismic years, the weeks in Veadar begin a day later than the weeks in Adar, to which has been added a day.

3. In a 383-day year, the weeks after Kisleu, which loses a day, and on to the end of Adar, begin a day earlier.

4. In a 354-day year, the weeks begin on the same day of the week throughout.

The characteristic chronological period to which the crucifixion year must conform is set forth by the prophecy of Daniel, and is confirmed by well authenticated eclipses and synchronisms. The new moon's place in the heavens in the spring of two consecutive years--30 and 31 A.D. has been calculated according to the perigee formula of Brown's lunar tables, and the calendar moon found to be in harmony with her calculated position. The embolismic spring of 31 A.D. in Jerusalem is confirmed by observation at the end of 89 cycles from that point of time on the same meridian. All of these witnesses--prophecy, eclipse, papyrus roll, lunar calculation, and history--bear testimony that April 27, 31 A.D., and this date alone, fully meets all the demands with reference to the death year of Christ.

Prepared for the Class in the History
of Prophetic Interpretation by
Grace E. Amadon
March 11, 1942

E. Translation of New Moon for Nisan.

1. The Moon's Motion. In order to understand any astronomical argument which may pertain to the crucifixion date, it is necessary to review the relation of the moon to the sun and earth.[1] The path of the sun in the heavens is a great circle called the ecliptic. A belt 8° wide on each side of the ecliptic is known as the zodiac. This particular width was chosen by the ancients because the paths of the moon and all the principal planets keep within this belt, and it is therefore a very convenient circle of reference. And in reference to this, the longitude and latitude of a star is reckoned in degrees, minutes, and seconds.

About 800 years before Christ, the zodiac was divided into 12 parts called signs, at which time the signs were separated from the primitive constellations of the same name. Each sign is 30° in length. The signs kept the same names as the original constellations, all being named after some animal, with the exception of Libra. The ones frequently referred to in this discussion are Pisces, Aries, and Taurus in the spring, and Virgo, Libra, and Scorpio in the autumn.

Another great circle in the heavens is the celestial equator, which is an imaginary projection on the sky of the equator of the earth. At two points 180° apart--known as the equinoxes--the path of the sun crosses the celestial equator. At those times day and night are equal. When the earth is nearest the sun, as at perihelion (about December 31), her orbital motion is most rapid; and at aphelion, the opposite point of the ecliptic (about June 30), her motion is slowest. Any motion of the earth of course influences the moon's motion.

The moon travels around the earth every 29 1/2 days, and in that same time passes up and down in its path through the zodiac belt. Sometimes she is north of the sun, sometimes south. Her rate of travel through the zodiac is irregular, sometimes fast, sometimes slow, because of her distance from the sun and earth. When the moon is between the sun and earth, this position is called "conjunction," and the moon is new. At this time the moon cannot usually be seen for a period of

[1] The astronomical facts appearing here are found in any standard text on astronomy.

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from 1 to about 4 days.[2] When the earth is between the sun and moon, this relation is called "opposition," and the moon is full.

All of these facts and figures have a direct bearing upon the time it takes the moon to come into sight after conjunction, and they therefore take on a definite relation to the moon's changing rate of motion. From new moon to full moon, i.e. from conjunction to opposition, the moon travels through the first half of her monthly circuit around the earth. This first half of the moon's circuit was of great importance to the Jews, because of (1) their "new moon" feasts which were gauged by the conjunction and its attendant phasis; (2) the passover sacrifice right after the opposition or full moon of Nisan; and (3) the three special days in the fall--the New Moon Day of Tisri or Rosh Hashanah, the Day of Atonement, and the Feast of Tabernacles--which were connected with the new and full moon of Tisri. The true time of the moon in this period from conjunction to opposition runs in a cycle of 14 moons as follows:[3]

TABLE IV MOON'S CHANGING RATE OF MOTION
(In a 14 Moon Cycle)

Years in Cycle	Calendar Year	(1) New Moon		(2) Full Moon		(3) Period from New to Full Moon		(4) Period from Conjunction to Phasis[4]	
						d h m		d h m	
1.	1930	Apr. 28	19h 8m	to May 12	17h 29m	--13 22 21	--	1 0 8	
2.		May 28	5 36	June 11	6 11	--14 0 35	--	1 14 24	
3.		June 26	13 46	July 10	20 1	--14 6 15	--	2 6 32	
4.		July 25	20 41	Aug. 9	10 57	--14 14 16	--	1 23 14	
5.		Aug. 24	3 36	Sept. 8	2 47	--14 23 11	--	2 15 29	
6.		Sept. 22	11 41	Oct. 7	18 55	--15 7 14	--	3 6 13	
7.		Oct. 21	21 47	Nov. 6	10 28	--15 12 41	--	2 19 4	
8.		Nov. 20	10 21	Dec. 6	0 39	--15 14 18	--	3 5 43	
9.		Dec. 20	1 23	Jan. 4	13 14	--15 11 51	--	2 14 32	
10.	1931	Jan. 18	18 35	Feb. 3	0 25	--15 5 50	--	2 21 55	
11.		Feb. 17	13 10	Mar. 4	10 36	--14 21 26	--	2 4 12	
12.		Mar. 19	7 50	Apr. 2	20 5	--14 12 15	--	2 10 23	
13.		Apr. 18	0 59	May 2	5 14	--14 4 15	--	1 18 1	
14.		May 17	15 27	May 31	14 33	--13 23 6	--	1 4 17	

[2] Hevelius, "Selenographia," p. 273; Note: Very seldom, according to Hevelius, does the phasis occur on the same day as conjunction. This research found two times in which phasis and conjunction coincided on the same day: Oct. 13, 1844 (Boston); Sept. 19, 1933 (Greenwich).

[3] The moon phases were taken from "American Ephemeris," 1930-31.

[4] The full moon cycle was computed by subtracting each new moon date from the next full moon date.

In a cycle of 14 lunar months, in Table IV, the period of time in days, hours, and minutes in column 3--"Period from New to Full Moon"--represents the actual time it takes the moon to go from new moon to full moon. In this cycle, she travels her half circuit around the earth from high accelerated velocity ($13^d\ 22^h\ 21^m$), to slow ($15^d\ 14^h\ 18^m$), and back again to high. In 14 rounds she completes her cycle, which represents the moon's varying motion.[5] From age to age, in saecula saeclorum, she has kept up this 14-moon cycle, the periods varying slightly each moon, or month.

The Translation Cycle, under column 4, represents the actual time in days, hours, and minutes it takes the moon to go from conjunction, when she cannot be seen, to her phasis, or first appearance. The phasis always marked the sunset beginning of each new month for the nations using the luni-solar year. These translation periods also run in a 14-moon cycle, which follows fairly closely the longer waves of the moon from conjunction to opposition. When the moon is slow, then the translation period is long--over 3 days; when the moon is fast, her translation is short, usually a little over 1 day. The following Diagram C shows how closely these two cycles correspond:

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[5] Diagram C represents but a small portion of a large lunar sine curve covering over 20 years, in which the Translation Cycle was figured according to Postulate I, Table V, and the full moon cycle as in Table IV. Both curves keep the same defined relation throughout, showing the influence of the same lunar motion upon each curve.

DIAGRAM C

THE MOON'S VARYING MOTION
(Controlling the Jewish Feasts)

In the phasis curve, we see the combined result of all the causes which conspire to hasten or retard the visibility of the nascent moon. Fotheringham names three causes as affecting the first appearance of the new moon:[6] (1) Longitude; (2) Latitude; (3) Anomaly, or the moon's angular distance from perigee. The longitude refers to the moon's distance from the vernal equinox, as measured on the ecliptic, and the latitude to her position in the zodiac, north or south of the ecliptic. Maimonides also gives these same three factors, summing them up into one conclusion--that "knowing the positions of the sun, the moon, and the moon's node, respectively, you have all necessary elements to establish by calculation whether the new moon will be visible or not."[7]

Hevelius has also left on record a complete description of the new moon and her phasis. He likewise presents the same three causes, though differently described, which result in the moon's visibility, early or late: (1) The obliquity of the

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[6] Fotheringham, "Date of the Crucifixion," Journal of Philology, (XXIX), 57. London, 1903, p. 105.

[7] Maimonides, quoted by Sidersky, "Chronology of the Jews," p. 668.

sphere leading to long or short settings; (2) the position of the conjunction, whether it is near the northern part of the zodiac or not; and (3) the relation of the moon to perigee; that is, her anomaly.[8] He names Pisces, Aries, and Taurus as being signs of long settings, and Virgo, Libra, and Scorpio as signs of short settings. Ferguson also testified the same when he said that the "ecliptic sets slowest in Aries, and fastest in Libra,"[9] a similar statement from Ferguson being printed in the Midnight Cry.[10] (We shall see this contrasting relation of the moon to these opposing signs of Aries and Libra work out exactly as specified by astronomy in the event of the crucifixion and the October 22 date in 1844.) Hevelius further shows how these various causes or factors conform to the moon's motion:

> "But if the causes mentioned as advancing the quick coming forth of the moon, do not always conspire, but even one is lacking, then on the next day after the interlunary period, this first phasis at length appears: but with two requisite causes absent, it can happen that finally the first phasis of the moon may fall in sight on the third day. But with all three conditions deficient, accelerating the rising of the moon. . . then this first appearance of the moon finally happens on the fourth day after conjunction with the sun."[11] [Italics mine.]

Then Hevelius adds the important observation that the "three requisite causes [for a quick phasis], as now told, commonly very rarely appear, so that the moon is in the signs of long settings [as in Aries], in perigee, and in the northern border, plainly in the time of conjunction or phasis."[12] Equally important is still another citation from the same paragraph that "the same rising of the moon does not commonly happen on the first day after the interlunary period [or. translation], but at length, on the second, often also on the third and fourth; this is plain to all observing her."

In harmony with this last statement, Scaliger shows that the Jews took a later moment for the moon's phasis:

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8 Hevelius, op. cit., pp. 274, 275.
9 Ferguson, op. cit., p. 244.
10 Midnight Cry, Apr. 20, 1844, p. 19.
11 Hevelius, op. cit., pp. 274, 275.
12 Hevelius, op. cit., p. 276.

"But the Jewish, Arabic, and Samaritan new moons usually exceed the size of the phasis [that is, the first slender streak of the moon] so that the civil new moons of the lunar months are of a triple kind: the Attic, as from conjunction; the Calippic from the waning of the moon; and the Jews, Samaritans, and Arabs from the 'shape' of the moon, from the third day, I say."[13]

With these two authorities on the moon's phasis, both Geminus in the first century B.C., and Hales in the 19th century, agree.[14]

The three causes of an early or late phasis, as given in the foregoing citations, have all entered into the visibility test for the first appearance of the moon after conjunction as outlined by those recently studying the computation of time in the first century.[15] But it is noticeable that in the results given, though many moons have been observed, a translation period extending to the 3rd or 4th day after conjunction is seldom seen. Usually the results are from 1 to 2 days--and thus are contrary to the testimony of Hevelius, Geminus, Scaliger, and Hales. The phasis often appears in the modern Jewish calendar even on the day of conjunction.[16] Questions have already arisen as to the validity of these visibility tests.[17]

One question yet remains to be answered: "On what day of Nisan shall we place the full moon dates belonging to the years of Christ's ministry?" The following table represents the new and full moons of the years 28 to 33 A.D., which embrace all the years within which the ministry of Christ is usually located.[18]

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[13] Scaliger, "De Emendatione Temporum," pp. 6, 105. Scaliger also emphasizes the "horned moon" as characteristic of the Hebrew phasis (p.). Hevelius devotes a whole chapter to the "horned moon"--an older crescent shape--and shows how such a phasis is identified (pp. 281-284).

[14] Hales quotes as follows from Geminus: "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.'" ("New Analysis of Chronology," Vol. 1, London, 1830, p. 67.)

[15] Fotheringham, Schoch, Neugebauer, Gerhardt, and Schaumberger, among others.

[16] See American Jewish Yearbook. Note: According to Sidersky, the Jewish calendar has an interval of 48 hours, or more, between conjunction and phasis, and provides for one or two days additional by its system of postponements, "the purpose of which is to retard by one or two days the official new moons." (Sidersky, op. cit., p. 64.) Thus the Jewish reckoning recognizes the full translation period as demanded by astronomy and history.

[17] Dittrich, E., "The Death of Jesus of Nazareth," Astronomical News, Vol. 241, May, 1931. Note: Dittrich observes that the calendar and the position of of the moon do not agree in these tests.

[18] The spring of 27 A.D. does not come into this list, because the baptism took place in the fall of the year. The dates in Diagram D were computed from Schram's tables by Associate Astronomer Glen Draper of the U.S. Naval Observatory, Washington, D.C., leading computer of the "American Ephemeris and Nautical Almanac."

DIAGRAM D

A.D.	New Moons	Feria	Full Moons	Feria	Jewish Time
28	Apr. 13 16^h 51^m	Tuesday	Apr. 27 12^h 23^m	Tuesday	Tuesday
29	Apr. 2 21 15	Sabbath	Apr. 17 12 1	Sunday	Sunday
30	Mar. 22 20 12	Wednesday	Apr. 6 20 9	Thursday	Friday
31	Apr. 10 14 51	Tuesday	Apr. 25 22 45	Wednesday	Thursday
32	Mar. 29 21 58	Sabbath	Apr. 14 11 39	Monday	Monday
33	Mar. 19 13 14	Thursday	Apr. 3 17 27	Friday	Friday

As shown in Part V. Sec. A, it makes a fundamental difference on what day of Nisan the full moon is placed. Throughout early patristic writings, the passover day is repeatedly called Luna 14, that is, the 14th day of the moon,[19] and it is clear from Moses[20] that this was also Abib (or Nisan) 14. Therefore, inasmuch as the extreme limits of the full moon cycle, in Table IV, extend from 13^d 22^h 21^m to 15^d 14^h 18^m,[21] and because the translation period itself, according to history, uses up from 1 to 3 full days, and some over, it would be impossible for the full moon to fall on any other than Nisan 13, and harmonize with these periods. If 1 day is taken from 13^d 22^h 21^m (the shortest period), the remainder coincides with Nisan 13; in like manner if 3 days are taken from the longest period, Nisan 13 is again proven.

In harmony with this, we have the testimony of Geminus, who definitely states that the earliest full moon comes on the 13th of the lunar month.[22] Aristobulos also maintained 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 everyone can see at the time of full moon."[23]

The Arabs had special names for each series of three nights of every month, which were derived from the state of the moon and her light. The fifth three nights

19 Clavius, "Romani Calendarii Restituti Explicatio," p. 63.
20 Ex. 12:2.
21 Table IV.
22 Geminus, op. cit., p. 129.
23 Caspari, C.E., "Introduction to the Life of Christ" (trans. by Evans), Edinburgh, 1876, p. 9; Eusebius, "Ecclesiastical History," bk. VII, ch.XXXII.

(13-15) were called bid, because they were white by the light of the moon. The night between 13 and 14 is called badr, because in it the moon is full, and her light complete.[24]

2. Calculation of Moon's Phasis. According to ancient practice, and in harmony also with later testimony, the full moon is marked on the day of Nisan 13, as in Table IV, and the days are numbered back to Nisan 1. If the moon fulls between sunset and midnight, the full moon dates are placed early on the 13th of Nisan, between sunset and midnight.[7] Now notice the year 33 A.D., in connection with the Table V, Postulate I. The full moon time was April 3, $17^h\ 27^m$ J.C.T. (Jerusalem Civil Time), on Friday. This means 5:27 P.M., Friday, April 3. The place of the moon is therefore marked near the sunset on that day, calling it Nisan 13. Then count back by common calendar days to Thursday, March 19, on the 13th hour of which is conjunction. Number the days forward to Nisan 1, which is Sunday. From the 13th hour on March 19 to the sunset beginning of Nisan 1 is the period from conjunction to phasis, known as the "translation period."[25] A glance shows this to be two whole days and a few hours over.

From the Nautical Almanac, the sunset time for March 21 is found, which coincides with the beginning of Nisan 1. This is 6:10 P.M.[26] From the 13th hour on March 19 to sunset at 6:10, beginning Nisan 1, are $2^d\ 4^h\ 56^m$ for the translation period of Nisan 1, in the year 33 A.D. This means that the full moon date in the year 33 A.D. was on Friday, Nisan 13, and that the passover day fell on Nisan 14, Saturday, April 4. Fotheringham also agrees with April 4, Saturday, as being the passover in 33 A.D.[27] The real error in Fotheringham's Table consists in the fact that his passovers in the years 28, 29, 31, and 33 are a month too early. On the other hand, a full moon as

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[24] Albîrûnî, op. cit., pp. 6, 75.
[25] Op. cit., p. 144.
[26] The same sunset table for every year can be used because the longitude of the sun is marked from a fixed point on the ecliptic--the vernal equinox--which does not change.
[27] Op. cit., p. 107.

early as April 3 could not be a barley-harvest moon in Judaea, and is therefore too early for the passover feast. A moon later places the passover in 33 A.D. on Sunday.

The same manner of figuring is operative for 30 A.D. The full moon date is after sunset of April 6, which in Jewish time is Friday, and which we must call Nisan 13 according to Poltulate 1. Saturday then becomes the Passover, on Nisan 14. So then the year 30 A.D. falls out, because Friday is Nisan 13 and not 14.[28] in that year. The years 32, 29 and 28 likewise fall out, because their passovers are on Tuesday, Monday, and Wednesday, respectively. And the year 33 A.D. is out, because Friday is Nisan 13.[29] This then leaves 31 A.D. as the only year within the period of Christ's public ministry with a passover on Friday. It came on April 27, Nisan 14--meeting all the requisite factors.

The translation period of the moon has been described again and again all through the Christian era, especially by the Jewish chronologists. Hevelius puts it this way:

"Quomodo vero haec observatio fuerit instituta, Rabbini eorum, & ex iis recentiores chronologi, abunde tradunt." (How this phasis [or observation] should be established, their Rabbins and their more recent chronologers abundantly report.)[30] [Italics mine.]

Possibly Hevelius was referring particularly to Maimonides, who lived in the early 13th century,[31] and worked out by spherical trigonometry the translation period of the moon.[32] This is not only based on higher mathematics, but also on the complex astronomy of the moon to which modern research testifies as the "deep things of astronomy." Nearly all the recent articles on the date of the crucifixion include a discussion of a simple form of Maimonides' complex figures, known as the "visibility test."

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[28] According to Neugebauer, the moon at this time in 30 A.D. was over 2 days old, in harmony with Table V. (Neugebauer, P.V., "Tafeln der Mondphasen," Leipzig, First Century.)

[29] Both Schoch and Fotheringham (op. cit., p. 107) place Friday, April 3, 33 A.D. on Nisan 13 by their tests for "visibility."

[30] Hevelius, Johannes, "Selenographia," Gedanum, 1647, p. 273.

[31] Maimuni's (Maimonides') "Neumondsberechnung," Teil III (trans. by Baneth), Berlin, 1902.

[32] His complicated problem has been translated into German by Baneth. Fotheringha J.K., Journal of Philology, (XXIX) 57, London, 1903, p. 107.

It would consequently seem as if the modern application of this Jewish secret makes the translation period in general too short. On this basis--that is, if we should shorten the translation periods say by one day--all the full moon dates on Table V would be thrust forward by one day, to Nisan 14; and, as Fotheringham complained in his application of the problem, there would be no Fridays in the series.[33] But this same plan of the full moon on Nisan 14 throws out the years 28 and 29, because in the case of 28 A.D., the translation period would be only about 1 1/2 hours; and for 29 A.D., 21 hours--both too short. Therefore such a hypothesis falls out--that is, that the full moon occurs on the passover day itself.

The postulate itself--that the full moon date must be placed on Nisan 13, in harmony with history--is thus its own proof; for it is the only position of the full moon providing sufficient time for a translation period of from 1 to 4 days. On the basis of this Postulate alone, astronomy can tie Jewish time to the Julian Calendar.

The translation period of the moon leading to Nisan 1, in the year 31 A.D., was $3^d\ 3^h\ 33^m$. This was one of the moon's long interlunary intervals. Not being the longest, it came well within the realm of historical testimony, which allows the moon from 1 to 4 days in which to appear after conjunction, and that "often also on the third and fourth day." This period of a little more than 3 days was but one of a cycle in which the moon's motion swings interminably fast and slow between her limits of acceleration. To the astronomer, the phasis of the moon on April 14, 31 A.D., was just an ordinary first appearance, more ordinary than as if her showing had been quick and rapid. But on April 25, Julian day number 1732495, toward midnight, the moon was in eclipse;[34] and on Friday, April 27, at noonday, the unaccountable darkness of the sun occurred, marking the approaching death of the Son of God.

The following vital facts in reference to the passover of the crucifixion are made known by this simple astronomical method of translating the moon of Nisan, as illustrated on Table V:

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[33] Fotheringham, op. cit., p. 107.
[34] Oppolzer, Th., Tables in "Denkschriften der kaiserlichen Akademie der Wissenschaften." Wien, 1887, p. 344, No. 1910.

1. Nisan 14 was Luna 14, the Passover Day.
2. Nisan 14 was the day after the fulling of the moon.
3. Nisan 14 was the crucifixion-Friday.
4. Therefore, according to Table V, the only day of the entire series that answered to all these stipulations was April 27, 31 A.D.

F. Translation of the New Moon for Tisri.

Early in the spring of 1843, as shown in Part II, the Millerites began to study the problem of the translation of the moon in relation to the calculation of the Jewish month and year. Finding in Ferguson's "Astronomy" a table of lunar conjunctions and phases for the time of Christ,[1] they printed it in the Midnight Cry of April 20, 1843, together with his description of the moon's position. In another edition of his "Astronomy," Ferguson makes the statement that the 14th day of the Jewish month answers to the 15th day of the moon,[2] and that consequently, the passover was always kept on the day of full moon. But in the table given in the Midnight Cry, the full moons were placed in various positions--on the 12th, 13th, and 14th of the Jewish month Nisan. On such a basis, all his translation periods could not but be irregular, and they would by no means correspond to the motion of the moon, which, if slow, requires more time for her phasis than when fast.

In the quotation given, Ferguson mentions the large angle which the ecliptic makes with the horizon in the spring (See Diagram D), and figures that at such a time, and in such a position, the moon would in 24 hours set about one hour later than the sun. Consequently--perhaps following the suggestion of Albîrûnî for a 24-hour translation constant (or mean period), as consistent with the Jewish computation--Ferguson's table was not very helpful to the Millerites in regard to the true translation period of the new moon, whose phasis was to mark the first day of a new month. Yet accuracy here was imperative if they were rightly to calculate Tisri 1, the 7th month for 1844.

Ferguson's table of the first-century spring moons was striking in that all the translation periods were short. It made all the new moons, but one, visible on the next day after conjunction.[3] In the paragraphs quoted from his "Astronomy,"

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1 Ferguson, "Astronomy," Vol. 1, par. 352. (Old Edition.)

2 Op. cit., (Edinburgh ed., 1811), p. 464. Note: This is contrary to Postulate 1, Table V, and to patristic testimony, which always called the paschal day, or Nisan 14, the 14th of the moon, i.e., "Luna 14."

3 Certain other computers, as Würm, Ideler, and Turner, use a constant period for translation, as suggested by Albîrûnî, on p. 68 of his "Chronology."

no mention was made of other important factors which control the translation of the moon, aside from her inclination and position in reference to the Zodiac. He gave the slowest moon of the series, as in the year 32 A.D., almost the same time for translation ($1^d\ 18^h\ 41^m$) as for the fastest moon, as in 28 A.D., for which his table allows $1^d\ 16^h\ 56^m.4$ His exact table follows:[5]

"True time of conjunction at Jerusalem	d.	h.	m.		Moon visible at Jerusalem	Jewish full moon
"A.D. 28 Mar.	15	1	4	Morn.	Mar. 16.	Mar. 31. Wed.
29 Apr.	2	7	30	After.	Apr. 3.	Apr. 17. Sun.
30 Mar.	22	8	45	After.	Mar. 23.	Apr. 6. Thur.
31 Mar.	12	1	51	Morn.	Mar. 13	Mar. 27. Tues.
32 Mar.	29	11	19	After.	Mar. 31	Apr. 14. Mon.
33 Mar.	19	1	12	After.	Mar. 20	Apr. 3. Fri.
34 Mar.	9	5	12	Morn.	Mar. 10	Mar. 24. Wed."

As a matter of fact, Ferguson's first-century table--embracing the years of the 70th week--represents the very extremes of the moon's motion from new moon to full moon; that is, her fastest and slowest gait. Consequently, her translation periods should also correspond. Table V, on p.38a, shows the limits of translation in the years of Christ's ministry actually to be from $1^d\ 1^h\ 35^m$ for a fast moon, to $3^d\ 3^h\ 33^m$ for a slow one.

It was William Hales[6] who directed the Adventists to a source of authority on the phasis of the moon--to the "Isagogue" of the astronomer Geminus in the first century before Christ. Geminus taught that the earliest phasis of the moon is on the first day after conjunction, and the latest on the third or fourth. Scaliger also emphasized the third, as mentioned in Section E,[7] and Hevelius two to four days.[8] The error concerning the time of translation on the part of Ferguson, and the fact that he placed some of his passovers in March, too early for the barley-harvest, resulted in the ultimate rejection of his table by the Millerites, together

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4 Cf. table V on page 38a for the length of the moon's course.
5 Midnight Cry, April 20, 1843, p. 20.
6 Hales, "New Analysis of Chronology," London, 1830, Vol. 1, p. 67.
7 p. 37
8 p. 36

with his argument on the date of the crucifixion.[9]

In the early part of the 1844 movement, the leaders had started the year which they counted to be the last one of the 2300-year period, with the vernal equinox. This was the "Jewish sacred year 1843." But even before the vernal equinox of 1844 had passed, which they believed would close the Jewish year 1843, the Karaite teaching regarding the ancient Jewish mode of computing the moon's phasis, directed them to a closer study of the Jewish year, and its relation to the 2300-year prophecy, as noted in Part II, Sec. VI. Almost at the same time their attention was called to an autumnal ending for the prophetic year, as suggested by the 10th day of the 7th month--the Jewish day of Atonement and the Jubilee.[10] For this reason there does not seem to have been any attempt on their part to compute the translation period for the new moon of Nisan in 1844, although the Nisan conjunction was given in the Almanac as April 17^{d} 11^{h} 31^{m}.

The Jewish date for starting another new month was also mentioned--this to correspond with the Karaite reckoning, the Rabbanite Nisan having been a month earlier, or in March. The whole attention was ultimately centered on the translation of the new moon of Tisri, upon a scientific basis, and upon one that would harmonize with the prophecy. The following statement from an editorial in the Midnight Cry, shows how closely the Adventists of that time reasoned in regard to the identity of the day, October 22:

"The new moon being probably seen in Judea on the second evening from its change, when it would be one day and 17 hours old, and which corresponded with 11 A.M. in Boston--strengthened us in our opinion that this must be the month."[11]

Before attempting to analyze the exact meaning of the quotation here given, it is essential to bear in mind just what is involved, astronomically, by the every-day language, "change of the moon." Though everyone uses this expression, it has direct application to certain astronomical events known as the four phases

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[9] See Part II, Secs. VI, IX, and XII.
[10] Lev. 23:27; 25:9.
[11] Oct. 31, 1844, p. 141.

of the moon, which mark off her performance every 29 and 1/2 days. The new moon phase mentioned in the foregoing Midnight Cry editorial is, as noted, technically defined as conjunction, and represents that instant of time when the geocentric longitude of the sun and moon are equal, as measured from the center of the earth, the moon being between the earth and the sun.[12]

As has been stated, when the moon in her elliptical circuit is nearest the earth, she is said to be in perigee. Then her motion is rapid. When she is farthest away, as in apogee, then her motion is slow in relation to the earth. Her manner of travel, fast or slow, is most important as concerns calculation. In ancient times, this phenomenon was a guide in the starting of the Hebrew month,[13] and also came to the attention of the Millerites as an important factor to the translation of the moon as they were coming to their fundamental conclusions on the prophetic dates of the 2300-year period. As regards the real significance of conjunction, we should likewise understand that, being reckoned as from the center of the earth, this phase of the moon therefore represents that instant of time which would have a different local time designation for each longitude on the surface of the earth.

The quoted expression, "11 A.M. in Boston," in the foregoing reference, was obviously based on the difference in time between Boston and Jerusalem, which is 7 hours and 5 minutes.[14] No mention is made in the Midnight Cry or Advent Herald of an almanac for Jerusalem. In fact, it was said, "we have no certain means of knowing," when the Karaite passover month really commences there,[15] but the sunset time at Jerusalem on October 13 could well be considered near 6:00 P.M. If from this point of time, 7 hours are subtracted for the coincident time of Boston, the hour would be 11 A.M. To be exact, it would be 10:27 A.M.--if the true difference

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12 See "Conjunction," in Webster's International Dictionary.

13 Hales, ("Analysis of Sacred Chronology," Vol. 1, London, 1830, p. 67), includes a quotation from Geminus on the phasis of fast and slow moons.

14 The difference in hours between Boston and Jerusalem is the sum of $4^h\ 44^m\ 19^s$ (time of Boston, west from Greenwich) and $2^h\ 20^m\ 53^s$ (time of Jerusalem, east of Greenwich), or $7^h\ 5^m\ 12^s$.

15 Advent Herald, Sept. 11, 1844, p. 45.

in time, or $7^h\ 5^m$, be subtracted from the exact sunset hour in Jerusalem, on Oct. 13, which, for 31 degrees north latitude, is authoritatively given as 5:32 P.M.[16] In either case, the argument and conclusion would be the same--the beginning of Tisri 1, in Jerusalem was on October 13, and the corresponding time in Boston was still the 13th.

In Boston, the new moon of October, 1844, in conjunction, occurred October 11, $18^h\ 40^m$, reckoned from midnight, or 6:40 P.M.[17] Being a fast moon--her time from conjunction to opposition (or full moon) took $14^d\ 5^h\ 30^m$, or less than the mean--and her motion increasing, for she was nearing perigee, she could be visible on October 12, right after sunset. To quote from Fotheringham, who has summed up the factors which come into play as regards an early or late phasis of the moon:

"If again, the moon is near perigee it will move quickly; its right ascension [or longitude] and time of setting will advance rapidly, and there will be a tendency towards an early phasis; if it is near apogee, it will move slowly, and there will be a tendency toward a late phasis."[18]

Fotheringham followed the rules of Hevelius, as may be seen from a scanning of the "Selenographia." He found that under favorable circumstances--as when the moon is fast and in perigee, and new early in the evening--she could be visible the following evening.[19] The conditions all conspired for a quick phasis of the new moon in October, 1844, so that in Boston she could be seen within 24 hours after conjunction. But because of the difference in time between Boston and Jerusalem, her crescent was not seen in Jerusalem until the following evening. (Diagrams E & F.) The quick phasis in Boston was an unusual translation. Hevelius declares that the causes for such a rapid lunar translation seldom occur together.[20]

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16 "American Nautical Almanac for 1939," p. 239.
17 Standard Almanacs for Britain, Germany, and France in 1844, as U.S. Nautical Almanac goes back only to 1858.
18 Fotheringham, J.K., Journal of Philology (XXIX) 57, 1903, p. 106.
19 Hevelius, "Selenographia," Gedanum, 1647, pp. 274, 275. (novennium haec tria)
20 Op. cit., p. 275. Note: Hevelius' exact words are (p. 276): "Etenim intra requisita vix una ingruent." (For within a period of nine years these three requisite [causes] with difficulty coincide.)

The Adventists understood at least some of the factors controlling a rapid phasis of the moon, hence the sunset of October 12--marking the beginning of October 13, Jewish time--was rightly fixed upon, in New England, as the proper instant for the first appearance of the new moon. The sunset on that day was at 5:26, in Boston,[21] and there were yet 10 minutes in which the young moon, nearly 24 hours old, could be seen, for she did not sink beneath the horizon until 5:36 P.M.[22]

A check was also made by the Millerites on this same conjunction in Jerusalem which was dated Oct. 12, $1^h\ 45^m$, or 7 hours and 5 minutes later. But there the moon could not be seen in so short a time as the first sunset after conjunction, which would be a period of only 15 hours and 48 minutes.[23] Therefore, the Adventists reasoned, the Jerusalem new moon would certainly be seen at the second sunset, which was nearly "one day and 17 hours" later than conjunction.[24]

The moon herself was scheduled to set soon after the hour of 6. Subtracting from this point of time the approximate difference in time between Boston and Jerusalem--that is, 7 hours--they arrived at 11 A.M. on the same October 13, as the coincident time of Boston. Diagrams E and F, which follow on p. 49, show this October conjunction in 1844, in its relation to these two cities:

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21 "American Nautical Almanac of 1939," p. 239. (Boston is 42° N. Latitude.)

22 "American Almanac," Boston, 1844.

23 Time from 1:45 A.M. on Oct. 12 to 5:33 P.M. at following sunset, Jerusalem.

24 Time from conjunction at 1:45 A.M. on Oct. 12 to moonset at 6:25 P.M. on Oct. 13, Jerusalem civil time. Moonset was computed from "British Nautical Almanac," 1844.

Had it been possible, in 1844, for one to telephone from Boston to the Patriarch in Jerusalem at sunset, on October 11, asking the time of day, he would have answered, "Yes, this is October 12, 1:45 A.M., and the moon is just now new; she is in conjunction"--except of course that the date would have been given in Jewish time. Let us therefore place, as in Diagrams E & F, the Boston P.M. clock along side the one in Jerusalem which is an A.M. clock, so that October 11, $18^h\ 40^m$ coincides with October 12, $1^h\ 45^m$, as the same instant of time.

From this point, mark off the days and sunsets for Boston and Jerusalem. Then note that every point of time in Jerusalem--as for instance midnight, ending Oct. 12--occurs 7 hours and 5 minutes earlier than the midnight ending Oct. 12, in Boston. Consequently, at sunset of October 12, in Jerusalem, because the new moon is too young to be seen, being only about 16 hours old, Tisri 1 begins the second sunset after conjunction. In contrast, Tisri 1 in Boston began the first sunset after the change. Therefore we see these first days of Tisri--the one in New England, and the other in Palestine--overlap each other for a period of nearly 7 hours. Diagrams E & F show the common instant of the two conjunction dates, the relation of the clock events of our civil time, and the position of the Jewish month Tisri in these two wide-apart places of the earth. This was understood and declared by the Millerites.

The translation of the moon was, in this instance of October 11 to 13, 1844, dependent upon the simplest of the principles which govern the moon's performance relative to the starting of the Jewish month. But the position of the moon was unusual in that her phasis in Boston occurred within 24 hours after conjunction. The scene at Jerusalem was carefully reconstructed by the Millerites, evidently to acquaint themselves with the inequalities of the moon in the land where God had said, "Observe the new moon,"[25] for the marking of their year and its holy feasts. It was right that they should do this, for Jerusalem is the prime meridian of ancient Jewish time, and of prophetic time. On October 13, in Jerusalem, the sun

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[25] Deut. 16:1.

set at 5:32, and at about 6:25 P.M. the moon also dipped below the horizon. So she was at least "one day and 17 hours old," as intimated in the reference from the Midnight Cry.

One more bit of evidence from this date offers itself to prove that in 1844 the right time was chosen for the phasis of the new moon of Tisri. In October, Jerusalem civil time, the full moon occurred on Oct. $26^{d}\ 7^{h}\ 26^{m}$. By placing this full moon date on Tisri 13, on the basis of the same postulate as for the Nisan moon, (See Part V, Sec. E), and marking off the calendar days, both Jewish and Gregorian, back to the beginning of Tisri--it can be noted that Tisri 1 began on sunset of October 13 in Jerusalem, which phasis, we have shown, corresponded to the phasis of October 12 in Boston. This check works both ways, so that the translation of the moon in 1844, for the meridian of Jerusalem confirms Postulate 1, which places the full moon on the 13th of the Jewish month.

Such was the problem that the earnest truth-seekers in 1844 faced and mastered. It was the harmonious conclusions of such precision in applied calendar science that "strengthened" them in their opinion that October 22 would be indeed the very 10th day of the 7th Jewish month Tisri. No other day could have answered the joint demands of the Scriptural law of the appointed feasts, the irregularities of the moon, the factors governing her translation, the undeviating course of the earth and sun, and the illusive geographical problem introduced by the difference in longitude between Boston and Jerusalem.

G. Summary of Conclusions.

1. Only by the true dating of the beginning and ending of Christ's public ministry is it possible to determine the correct chronology of the full 2300-year prophecy, and the related events of history.

2. The Jewish calendar of today--man's most complex system of computing time, and described by Joseph Scaliger as the "most ingenious and beautiful of all

systems"--is evidence of early Jewish development of a dependable method of reckoning time, in harmony with known and fundamental principles of astronomy and chronology.

3. Through the principles of astronomy and calendrical science, we are able to tie Hebrew time reckoning in the first century to the current Julian calendar of the Romans.

4. By a correlation of astronomical science, Biblical specification, and historical record, the disputed date of the crucifixion has been determined.

5. By means of this correlation, (a) the true placement of the paschal month Nisan, and (b) the date of the true paschal day (Nisan 14) have been shown.

6. Friday, April 27,, 31 A.D., Julian time, has been demonstrated to be the only date during the public ministry of Christ which satisfies (a) the Bible requirement for a Friday-passover crucifixion and (b) the definite demands of astronomy for the corresponding coincident positions of sun, moon, and earth.

7. The complementary relation between the crucifixion on April 27, 31 A.D. and the great antitypical Day of Atonement ushered in on October 22, 1844, at which time the 2300-year period ended, has likewise been demonstrated.

Grace Edith Amadon

Insert, Part V, p. 15, as footnote.

47 At this time, the Hebrews had been calculating the conjunctions and phases for at least a century (Albiruni says "nearly 200 years after Alexander,"--op. cit., p. 68), and perhaps longer. (Sidersky, "Chronology of the Jews," p. 615). They had divided the hour into 1080 scruples, a value which was very old, which had originated with the ancient sexigesimal (or fractional) system of the Chaldeans about 400 B.C., and which agreed with the "Almageste" of Ptolemy (Sidersky, op. cit., p. 639). With the important feature of the moon's fast and slow motion, the Beth-Din must have been indeed familiar, for all the questions asked the Hebrew witnesses, though directly referring to the moon's position in the sky, thereby had specific relation to her rate of motion. In the century before Christ, Geminus wrote in the "Isagogue," "the sixtieth part of a degree is called a minute; the sixtieth part of a minute is called a second. Likewise the second is divided into sixty parts, and each sixtieth part is called a tertie." [Italics mine.] ("Elementa Astronomiae," p. 205) He further showed that with this table in hand, the Chaldeans had recorded the angular distance the moon travels in compassing the zodiac belt; that they had actually observed that in 19756 days she had gone around the zodiac 723 times and 32 degrees over. (Op. cit., pp. 203,205) And so the least and maximum daily movement of the moon had become known facts before Jesus was born. They had been computed by the scientists of Babylon, the "home of astronomy." (Hoffman, "Mar-Samuel," p. 17.) It is said that the Jews learned from the Babylonians much of the science of astronomy in which they had "multiple knowledge." Also, "among them the study of this science was declared a religious duty." (Op. cit.)

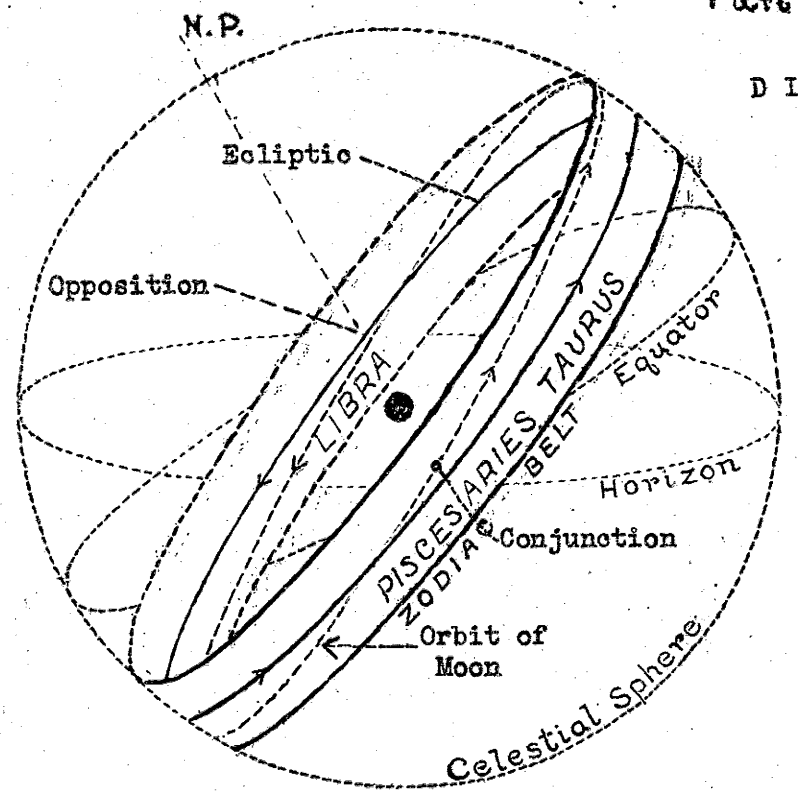
Insert, Part V, p. 21, as footnote.

48 The real meaning of Josephus' well-known statement about the passover, "when the Sun is in Aries" ("Works," p. 75), seemingly rests on a Pharisee interpretation of the paschal moon as the equinoctial moon of Aries--a definition in no sense in accordance with the Mosaic rule, nor in accordance with the Sadducean position which was dominant in the time of Christ's ministry. If Moses had appointed the passover to be in the ancient constellation of Aries, then another constellation, due to precession, would have marked the time of the feast in the first century A.D. (Ferguson, "Astronomy," p. 189.) On the other hand, if Josephus referred to the zodiacal sign Aries, as is probable, and not to the actual constellation itself, then on another count Moses can in no way be held responsible for the inference of Josephus, for it was not until seven or eight centuries after Moses' time that the "ecliptic was divided into twelve equal divisions, not associated with the actual stars," and the constellations were replaced by the signs. (Maunder, op. cit., p. 319.) These signs have never changed. The ecliptic is a circle of reference; and on it, from its first point of Aries, every celestial longitude is reckoned. (Young, Charles A., "General Astronomy," New York, 1898, pp. 11, 142.) Cf. Scaliger, op. cit., p. 169.

Insert, Part II, Sec. IX, p. 15, close of ¶ on '43 chart.

It is to be noted that the '43 chart makes no mention of the date of the end-year of the 70-week section of the 2300 years, or of the placement of the cross in the 70th week--whether at its close, or in the midst. It was prepared in that transition period when, virtually persuaded of the inaccuracy of a 33 A.D. crucifixion-ending of the 70th week, the Millerites had not yet come to agreement on the 31 crucifixion in the "midst" of the last "week," and the 34 terminus of the 490 years, with the corresponding 1844 ending for the full period.

DIAGRAM B



MOON'S APPARENT MONTHLY COURSE IN ZODIAC BELT

Through the center of the ZODIAC BELT runs the ECLIPTIC, or Sun's apparent path in the sky, as seen from the earth. The Moon's apparent path is also projected by the eye upon the Zodiac, around which she appears to travel every month. Though millions of miles apart, the paths of both Sun and Moon seem to be traced upon the same celestial belt. In one month's time the Sun has advanced one sign only, while the Moon has accomplished nearly the whole Zodiac. Her orbit is inclined to the Ecliptic with an angle of about 5 degrees, and upon this small inclination all her phases depend.[1] She passes through the Zodiac in an irregular velocity, causing her to move north and south of the Sun each month. Her smallest daily movement amounts to $11^{\circ}\ 6^{m}\ 35^{s}$, and her largest, $15^{\circ}\ 14^{m}\ 35^{s}$.[2] The Sun requires 6 months to go from Aries to Libra, that is, from the Vernal Equinox to the Autumnal. The Moon apparently travels this distance in about 2 weeks, as from new moon to full moon. In her daily revolution the Earth turns from Aries to Libra in 12 hours.

[1] Young, "Astronomy," p. 155.
[2] Geminus, "Elementa Astronomiae," p. 211.

DOCUMENTATION 1. Cf. Jewish Encyclopedia, art. Intercalation.

1 Martin P. Nilsson, Primitive Time-Keeping, p. 273. London, 1920.
2 Jotham Johnson, Dura Studies, p. 5. Philadelphia, 1932.
3 Literally, thy floor and thy wine-press. (Margin.)
4 Ex.12:6; Num.9:3,11; 28:16; 33:3; Josh.5:10; 2 Chron.30:15; 35:1; Ezra 6:19; Ezek.45:21. (They kept, held, killed, and ate the passover on the "fourteenth.") The law of moon is explicit. cf.!
5 Desire of Ages, p. 77; Ant.III.X.5.
6 The ancient Jewish calendar was fixed in two points: (1) by tying the Passover on 14 Nisan to the day after full moon; and (2) the beginning of the Jewish day to the sunset point. This regulated every sacrifice to the limit of the calendar, in harmony with Pentateuchal and astronomical law.
7 Since the time of Ezra, the month Elul is said never to have had more than 29 days. Cf. Adolf Schwarz, Der Jüdische Kalender, p. 16; Rosh Ha-shanah 19b, 32a; Beza 6b. The Talmud seems to carry the idea that Elul had always been incomplete. So also the astronomers of Nehardea, the home town of Mar-Samuel (Schwarz, p. 45).
8 In Leviticus 23, Pentecost is computed as fifty days inclusive from the day of offering the wave sheaf. Hence the feast was full fifty days after the feast of unleavened bread, which always followed the Passover fourteenth.
9 The first day of Nisan and the feast of unleavened bread on the fifteenth were always the same day of the week.
10 According to Maimonides and Jewish chronologers generally, the modern Jewish calendar is based upon the "mean motions of the sun and moon, the true having been ~~laid~~ set aside."--Maimonides, Kiddusch Ha-hodesch, cap. VIII, sec. 7,8. Tr. Mahler. Wien, 1889. (This calculation is not involved by the inequalities of the moon.)
11 Albîrûnî, The Chronology of Ancient Nations, p. 66. Tr. Sachau. London, 1879. calculation
12 Emil Schürer: "Just this fragment [February Ministry, p. 35, end of second column] shows that Aristobulus . . . really gave a description and explanation of the Jewish law."--The Jewish People in the Time of Christ, Div. II, Part III, p. 241. Scribner's, New York.
13 G. Schiaparelli, Astronomy in the Old Testament, p. 177. Oxford, 1905.
14 Similar to the Babylonian months.
16 Dedication of the first temple; Ezekiel 40:1; Nehemiah 8: John 5; John 7,8; Wars II.XIX.1,2.
15 E.W. Maunder, Astronomy of the Bible, p. 298. Sec. Ed., London.
17 Richard A. Parker and Waldo H. Dubberstein, Babylonian Chronology, p. 30. University of Chicago Press. 1942. (Papyrus E of the Assuan Papyri also supports this date.)

18 Nehemiah has no change in the regnal year of Artaxerxes from Chisleu (Neh. 1:1) to a point of time past the first of Nisan (Neh.2:1). Hence the king's regnal year must have been counted from the autumn.
19 For the computation of Jubilee years, see G. Schiaparelli, Astronomy in the Old Testament, pp. 144, 145. ~~Oxford, 1905.~~
20 All the Gospels recount the Feeding of the Five Thousand, ~~and~~ Matt.14:12-21 shows that this miracle occurred after the death of John the Baptist, and John 6 and 7, that it occurred before the year of the crucifixion.
21 See February Ministry.
~~22 Albîrûnî, The Chronology of Ancient Nations, Preface, p. vi. Tr. Sachau. London, 1879.~~

12-1 The ancient Egyptian calendar had its 13th day ~~of the month~~ named after the full moon and the sign of Aries, the ram — Ramsches and its ninth day, after

Table II

A.D.	Jerusalem Civil Time Conjunction 1 Nisan	Day of Week	Tr. Period (Days)	Full Moon	Day of Week	14 Nisan
28*	Apr 13.68--Apr 15 =	Thur	1.09	Apr 27.62 =	Tues	Apr 28
29	Apr 2.82--Apr 5 =	Tues	1.95	Apr 17.21 =	Sun	Apr 18
30	Mar 22.84--Mar 26 =	Sun	2.92	Apr 6.93 =	Fri**	Apr 8
31*	Apr 10.58--Apr 14 =	Sat	3.19	Apr 25.94 =	Thur**	Apr 27

* The asterisk marks years having an intercalary ~~Nisan~~ Veader [illegible] Nisan

** Jewish reckoning of the days of the week. The decimals .93 and .94 correspond to about 10:30 p.m., and hence ~~mark~~ [illegible] a new day that had begun in Jewry.

Proof.- In the foregoing Table II, there are three Sabbath-day feasts:

A.D. 28 Feast of Tabernacles--two days later in the week than 1 Nisan.
30 Passover fourteenth--day after full moon, Jewish reckoning.
31 Feast of unleavened bread--same week day as 1 Nisan.

The years 30 and 31 could not possibly check with John 5, for they belong to the gospel narrative after the death of John the Baptist (Matt.14:12-21).[20] Therefore the Sabbath feast of Tabernacles in 28 A.D. must be the one required. On this occasion the Jews tried to kill Jesus, and He had to leave Judea, where He had been ministering for several months. Two years later He returns again to another feast of Tabernacles, and in His teaching refers to the earlier healing of the impotent man at Bethesda. John 7:21-23.

The chronological tables here submitted as proof of ~~certain~~ Biblical synchronisms are based (1) upon the ancient Jewish ruling that the Passover followed the Jewish day of full moon, Jerusalem civil time, and (2) upon the relation of the feast of Tabernacles to ~~the seven-day week~~. The synchronism in Acts 20, is of a different character; ~~because~~ the ~~date~~ given by Luke, ~~can be~~ identified with a known ~~figure~~ of full moon ~~phase~~, and its corresponding day of the week, independently of calendar theory. On the contrary, the two synchronisms outlined ~~in this study~~ ~~are dependent upon~~ have been presented on the basis of principles governing the ancient Jewish calendar. From an astronomical standpoint, more evidence is available regarding the validity of these postulates than there is space to demonstrate in this ~~number of The Ministry~~.

for this particular date.[19]

The context in Nehemiah 8 also tells the day of the week on which this devotional conclave occurred. Three times the people were reminded by their leaders that the day was holy, holy unto the Lord their God (verses 9, 10, 11). Such language is not used of the ancient holy convocations, although that day was a convocation sabbath on which Ezra read the law (Num.29:1). But it was more than that--even the seventh day ~~of the week~~ Sabbath, as the description implies. And so likewise was the ensuing feast of Tabernacles. The calendar also is witness--as demonstrated in Table I, by Ginzel's Chronologue.

In the year 443 B.C., the paschal moon fulled on Tuesday, the paschal fourteenth was on Wednesday, and the feast of unleavened bread, on Thursday--the same day of the week as the first day of Nisan. But the first day of the seventh month in this year, and the subsequent feast of Tabernacles both occurred on the seventh day of the week, according to Nehemiah 8. Therefore these dates were each two days later in the ~~week~~ hebdomad than the first day of Nisan, which was on Thursday.

Table I

B.C.	Jerusalem Civil Time Conjunction	1 Nisan	Day of Week	Tr. Period (Days)	Full Moon	Day of Week	14 Nisan
445*	Apr 11.61	Apr 14	Mon	2.16	Apr 26.61	Sat	Apr 27 (Sun)
444	Apr 1.31	Apr 3	Fri	1.46	Apr 15.63	Wed	Apr 16 (Thurs)
443*	Apr 20.28	Apr 22	Thur	1.49	May 4.33	Tues	May 5 (Wed)
442	Apr 9.71	Apr 11	Mon	1.06	Apr 23.66	Sat	Apr 24 (Thurs.)
441	Mar 28.84	Mar 31	Sat	1.92	Apr 12.26	Thur	Apr 13 (Fri)
440*	Apr 16.52	Apr 19	Fri	2.25	May 1.28	Wed	May 2 (Sat.)

* The asterisk marks the years having an intercalary Nisan, as indicated by the late Passovers.

The feast of Tabernacles on the fifteenth occurred two days later in the week than 1 Nisan, or its companion date, feast of unleavened bread.

From the year B.C. 449 to B.C. 430, only one Jewish year began on Thursday, thus bringing the first of Tishri on the Sabbath day, namely, the year B.C. 443. This year fully agrees with the historical narrative in Nehemiah and with the calendar reckoning according to the Passover.

The Sabbath-day Feast in John 5:1

~~March~~ a difference of opinion exists as to the year and feast in John 5, but the crucifixion calendar points them both out. We know that this festival must have been early in the public ministry of Jesus, for John the Baptist was still living (John 5:32-36), ~~and may even have been still baptizing.~~ though the context seems to imply that he had been cast into prison. However, the language is such as to ~~imply~~ indicate at least a recent event. (Cf. John 5:33) The following calendar outline of the four years of Christ's public ministry ~~will~~ demonstrates the ~~arguments~~ Sabbath-day feasts of the period:

indispensable computation a
But ~~connected~~ to this problem is ~~the~~ methods of
identifying ~~the~~ calendar dates with their concurrent days of the weeks
Either. This can be accomplished by means of ~~the Julian day~~
~~numbers, or by~~ a calendar table ~~or almanac. The~~
~~Jewish almanac always gives the day of the week for~~
~~its own religious calendar dates,~~ such as the Jewish
~~for example.~~ almanac, for example ~~which almanac~~
~~includes the~~ the day of the week can be ascertained for periods for
which no almanacs exist the Julian day numbers
~~are needed~~ a table of which is found in every current
National Almanac. ~~If that~~ this ~~named~~ is issued by the
Almanac Office of the U. S. Naval Observatory, and can be
obtained from the Government Printing Office in Washington, D.C.).

Every Biblical date illustrates some phase of these
calendar principles, which are as important as eclipses
in establishing ~~the~~ chronological outline ~~whenever they~~
~~appear~~ in whatever period of ~~Bible~~ history they
appear. If ~~the day of~~ an event is marked in terms
of the day of the week and its corresponding date —
either lunar or solar — then the year can be ~~computed~~
computed in any ~~approximate~~ period. ~~If in the contract,~~
~~the year is known, the Jewish first date and the~~
~~contract~~ every student of chronology needs to ~~be~~ If history —
ancient or modern — records the ~~day~~ calendrical
a synchronism — ~~day of week~~ — then the most necessary
means of establishing the year, ~~or day of the~~ is the simple method
of multiplying the

synchronisms

1. Mr. Wood derives the date of the New Moon in March 31 A. D. by using as a starting value the actual date of the New Moon of Thursday, March 19.33 (G.C.T.),1931. It should be kept in mind that periodic inequalities in the Moon's orbit may retard or advance the actual date of New (or Full) Moon by as much as a half a day. Thus, the date of the New Moon found by this method may be in error by this amount. It would require a much more elaborate calculation to eliminate this uncertainty.

2. The date of the Vernal equinox for the year 1931 is Saturday, March 21.59 (G.C.T.),1931. This is $1^d.40$ earlier than the date used by Mr. Wood. (See American Ephemeris for year 1931,p.678)

21-14-7

3. The length of the synodic month and of the tropical year as used by Mr. Wood are sufficiently accurate for the purpose. It would be more accurate to use for the interval of 1900 years from 31 A.D. to 1931 A.D.

the average length of the synodic month: $\times 23500$ $29^d.53058846 = 693968.8288$

" " " " " tropical year: $\times 1900$ $365^d.242304 = 693960.3776$

$8.4512 =$

$8^d - 10^h - 49^m.7$

4. For dealing with so long intervals of time it is advisable to make use of the Julian Day numbers, given in the American Ephemeris for the year 1931,p.759. As it is customary to begin the Julian Day at Greenwich Mean Noon, whereas the G.C.T. is counted from Greenwich Mean Midnight, it is necessary to subtract $0^d.5$ from a date given in G.C.T. before finding its Julian Day number. And in order to convert a Julian Day number to G.C.T. $0^d.5$ should first be added.

5. Making use of the data given above I find:

Vernal equinox, Saturday,March.21,59,1931(G.C.T.)= J.D.2426422.09
1900 tropical years=99137 weeks +1.38 693960.38
vernal equinox 31 J.D.1732461.71

2380.
81.71

The Julian Day number for Jan. 0.5 (G.C.T.) of A.D.31 is (American Ephemeris,1931,p.759) 1732380

Date of vernal equinox 31 A.D.Jan. 0.5 + $81^{d}.71$

= 31 A.D., Friday March $23^{d}.21$

New Moon 1931, Thursday, March 19.33 (G.C.T.) = J.D. 2426419.83

23500 Synodic Months = 99138 weeks + $2^{d}.83$ 693968.83

New Moon = J.D. 1732451.00

Julian Day number of Jan. 0.5 (G.C.T.) for A.D.31 1732380.00

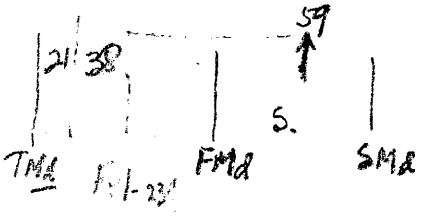
New Moon 31 A.D. Jan. 0.5 + $71^{d}.00$

= 31 A.D.Monday March $12^{d}.50$

add $14^{d}.77$

Full Moon 31 A.D. Tuesday March $27^{d}.27$

DIRK BROUWER



YALE UNIVERSITY

ERNEST W. BROWN
116 EVERIT STREET
NEW HAVEN, CONN.

February 5, 1932

President L. H. Wood
Emmanuel Missionary College
Berrien Springs, Michigan

My dear President Wood:

In reply to your letter of January 28 I must say that I cannot answer your question until I know how accurately you desire the position of the moon. The figure you give will serve for rough accuracy and possibly for what you need but more definite information is required to answer your question.

Very truly yours,

Ernest W. Brown

ps

February 10, 1932.

Dr. Ernest W. Brown
116 Everit Street
New Haven
Connecticut

My dear Dr. Brown:

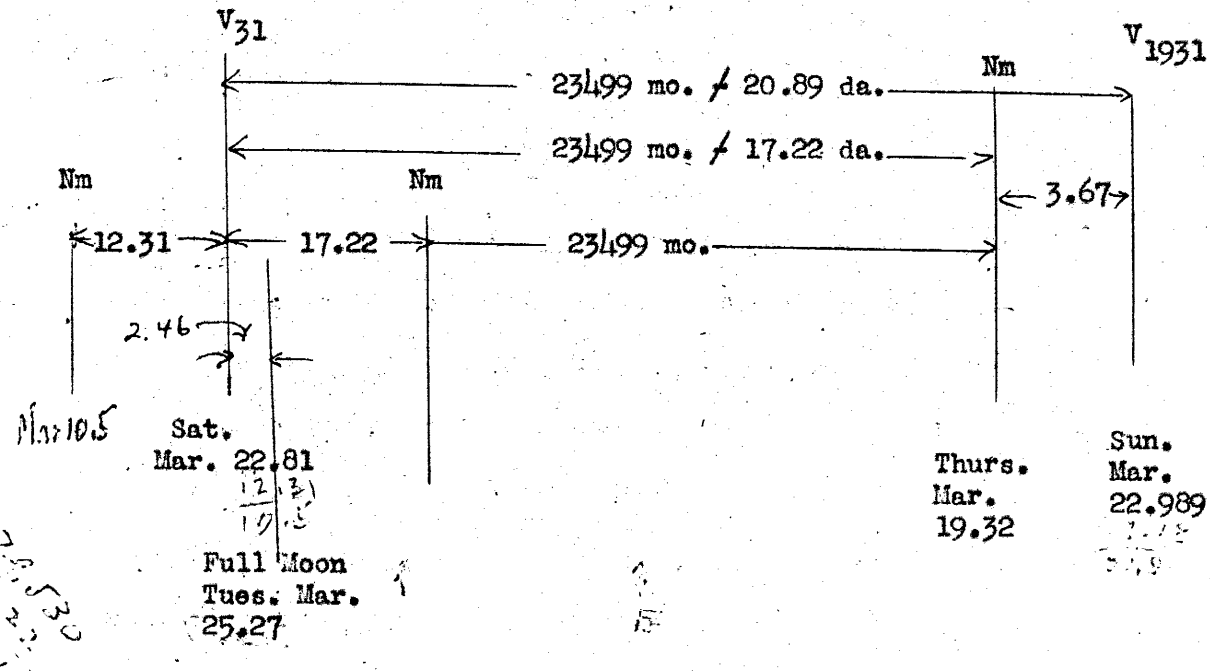
Yours of the 5th is just at hand.

In checking up the date of the crucifixion I find authorities differing as to the date and day of the week for the astronomical full moon during the years A. D. 28-32. Therefore I figured back from Vernal Equinox 1931 as follows:

V 1931 = Mar. 22.989 Sunday
N moon = Mar. 19.32 Thursday
1900 x 365.242198 = 693960.17620 days
1 synodic mo. = 29.530588 days

$\frac{693960.17620}{29.530588}$ = 23499 lunar mo. + 20.89 days

$\frac{693960.17620}{7}$ = 99137 wks. + 1.18 da.



My question is: is the value

1 synodic month = 29.530588 days

sufficiently accurate to be sure of results 1900 years ago?

Enclosed is a self-addressed envelope for your convenience. Thanking you heartily for your help, I remain

Very truly yours,

President.

LHW-eh

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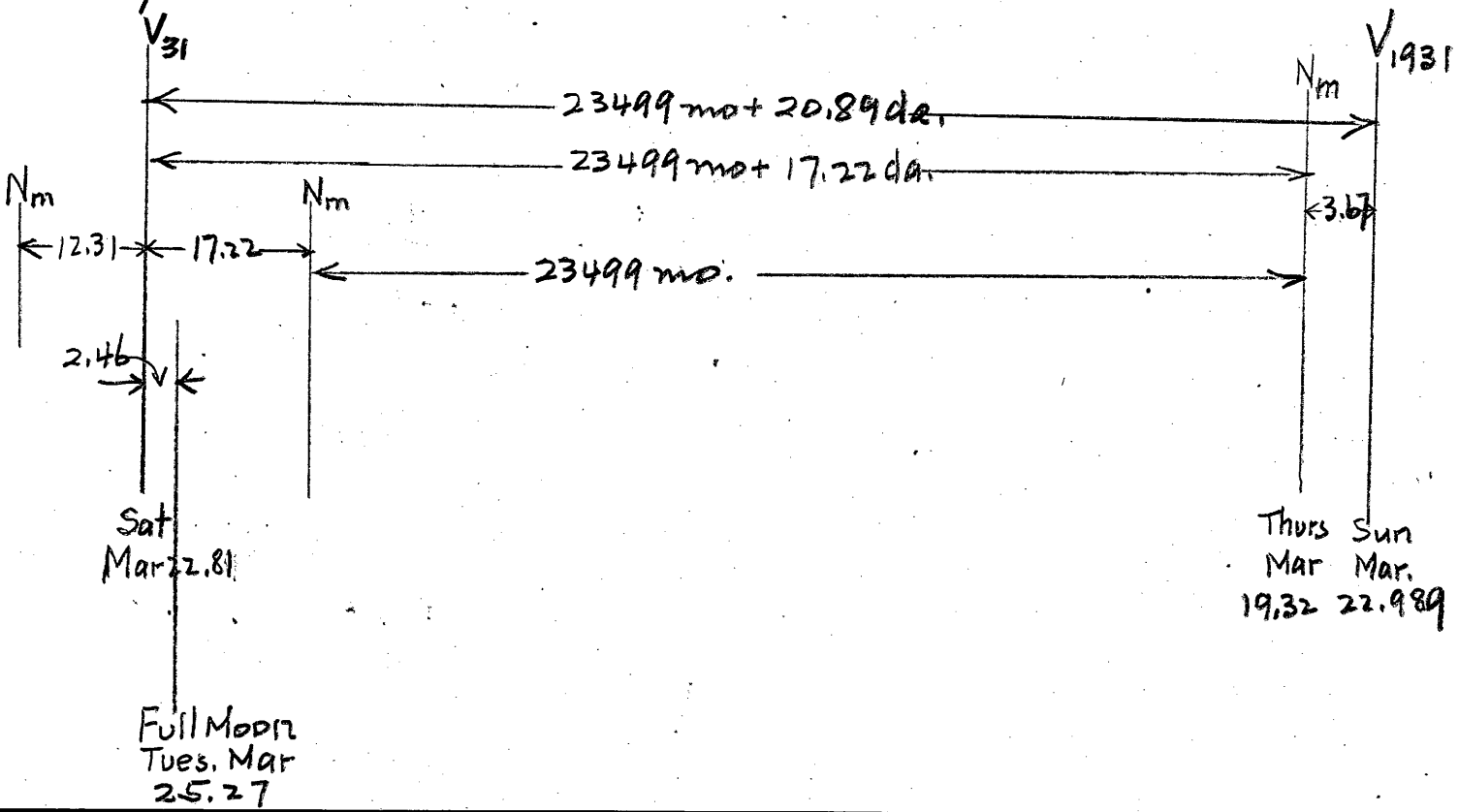

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Enclosed is a self addressed envelope for your convenience. Thanking you heartily for your help I remain.

Very truly yours.

Ency Brit Vol 3/890-
Christian Controversialists
from Apollinis of Laodicea
(AD 277) onwards accused the Jews
of disregarding the (Christian)
Equinoctial limit, and of sometimes
placing the Paschal full-moon
before it & it is possible that
in the time of Christ the 14th of
Nisan might have fallen as far
back as Mar 17

1st Sabb. 14th Paschal moon Ch. Cal.
2d " 14th " " Astron new m.
3. 14 " " first appearance
Sunset

AD 28 -	Sat	Mar 27	28	29
29	Thurs	Mar 17	Mar 17	19
	Fri	Apr 15	Apr 16	18
30	Thurs	Apr 4	Apr 5	7
31	Sat	Mar 24	25	27
32	Sat	Apr 12	12	14
33	W	Apr 1	1-2	3-4

Astron. Chronologie P.V. Neugebauer CE.71.N48

Reckoning of New light & Old light.

pp 79, 80, 81.

The visibility of the lunar crescent in new & old light might be defined in the following manner:—

In the ~~establishment~~ position of the middle pt of the sun in the horizon (without refraction) The center pt of the moon must have a definite azimuth distance Δ from the sun a definite ~~minimum altitude~~ h_0 (h_0 likewise without refraction).

These conditions were given in Table Chron. III Table 14. It has been proved that two columns h_1 & h_2 are not correct: here in table E 21 a better table after Schoch has been given.

The positions of the sun & moon at the instant of sunset for the foundation for the reckoning. It is sufficiently accurate to known this time within 6 min. because during this time the position of the moon changes only 0.5°. The tables given in Table Chron II for reckoning of sunset are also sufficiently

accurate for this.

The hour angle of the moon is decisive. The hour angle of the moon is

R.A. of the sun + ½ diurnal arc (without refraction) − R.A. of moon.

The places of sun + moon must also be reckoned with tables which guarantie an accuracy in the finalresult of .1°.

In # 3 a method is given which avoids all Besseldifferentiens which goes entirely around the reckoning of the hour angle. The method is good for all distances up to 60°.

c = Distance sun-moon

e = inclination of ecliptic to Declination ○

m = angle bet ecliptic + great circle sun-M,

90 − φ = e + m: reclination of distance ○ bet. sun + m to the horizontal.

φ = lat. λ = long.

R.J. 3/21 p. 23.

(See also Laughton Nothingham School Nautical Tables of Cunningadaya)

— Newlight +33 March — Jer —

Jer. $\lambda = 35.2$ E. $\varphi = 31.8$ N.

Determination of time of new moon —

+33 Mar 19 - 12.5 hr. Jer. G.T. (midday).

Newlight is visible 17 hours after new moon. The reckoning would therefore apply to the following evening. The new moon takes place right after midnight - so it is perfectly favourable position (large northerly moon distance) that the newlight may be seen on the evening of this day. This possibility is in the Gemini case to be proved.

Find T time sunset. Mar 20 - 18.18 hr. G.T.

For this time det. Long of ☉ and Long λ and dist. β of the moon

$$\odot = 358.1$$
$$\lambda = 15.0$$
$$\beta = +0.9$$

$\Delta\lambda = \lambda - \odot =$

See also.

"Hilfstafeln Berechnung von Himmels Erscheinungen"

Tafeln Zur Ast. Chron III.

P. V. Neugebauer. QB12.N5

Tafeln zur ast. Chron II

Tafeln für Sonne Planeten + Mond.

Tafeln der Mondphasen.

P. V. N. —— QB12N5.

"The three calendars of Ancient Israel"
Julian Morgenstern.

"Hebrew Union College Annual" Vol I pp 13-79.

Cal. I - The Canaanite Cal. in making the Canaanites and Phoenicians noted by the names of the months.

Abib - 6 times Ex 13/4 23/15 34/18 Deut 16/1
Ziv - 1 Kings 6/1, 37
Ethanim - 1 Kings 8/2
Bul 1 Kings 6/38

Possibly a solar year based on the two Equinoxes.

Cal II. Has certain affinities to Bab. Cal. Uses only numbers for the months.

Calendar III - uses Bab month names

Nisan - Neh 2/1, Est. 3/7
Sivan - Est 8/9
Elul - Neh 6/15, 1 Macc 14/27
Kislev - Zach 7/1, Neh 1/1
Tebeth Est 2/16
Shebat Zach 1/7
Adar Ezr. 6/15 Est 3/7, 13 8/12 9/1, 15 17, 19
21.

"Cal III ~~is~~ still employed by the Jewish people for all religious purposes is of course lunar in character apparently it differs from Cal II in two principal characteristics. (1 in its use of the Bab. names of the months instead of indicating them by numbers and (2) in a more exact system of intercalation by the insertion of an extra month of 29 days at regular

intervals, viz 7 times in a cycle of 19 years." # 73. 74.

"According to Ed. Mahler (ZA XXXIV (1922) p 69) this nineteen year cycle system of intercalation was employed in Babylonia already in the 6th Cent BC." p 74.

Possible that before the erection of the temple with local shrines & festival celebrations that there was some confusion as to the exact dates of the various festivals. "The institution of a central sanctuary would very quickly have necessitated the fixing of official dates for the observance of the festivals by all the people, when they might gather from all parts of the country to Jerusalem at one and the same time." Hebrew Cal. Annual Vol III p 81.

Gutesmann maintains (R.E.J. 53 (1907) p195) that the Elephantine Jews reckoned the year from the 1st of Nisan. Being in a foreign land they would naturally adopt the calendar in use. During 5th Cent BC Eg. was likely a Persian province and therefore introduced the Bab. Calendar with the introduction of New Years day on Nisan 1.

(Cf Jewish Ency. III 501 f. with Babylonian Calendar)

The moon in Astrology.

BL 1620 .J36

From "Rel. in Bab. & Assyria. Jastrow. p. 211—
Putnams 1911.

Moon designated as Sin "the lord of wisdom" and had the general name of Sin. In astrological texts Sin always took precedence over Shamash the sun-god The chief phenomena to which attention was directed were new moon, full moon the time of disappearance at the end of the month, halos, atmospheric obscurations and eclipses.

The lunar cycle of 19 yrs was not introduced until the 3d century B.C. actual observation was the sole method of determining the time of appearance of the new moon whether in the morning of the 29 or 30th day. In cases the heavens were obscured by clouds on the night when the new moon was expected to appear, it was considered a bad omen.

This uncertainty regarding the new moon involved an even greater uncertainty regarding time of full moon. The astrological lists offer a margin of no less than five days as a possible time of full moon from a premature appearance on the 12th or 13th day to a belated appearance on the 15th or 16th day, with the 14th regarded as the normal period. The too early & too late were regarded as unfavorable omens, because of the element of abnormality, but the exact nature of the unfavorable omen varied with the months of the year. It prognosticated bad crops if it occurred in one month, pestilence if in another; internal

disturbances of the country, [illegible] a third. Thus also a premature disappearance of the moon at the end of the month or an absence of the moon for more than the normal three days was viewed with dismay, and indeed, even its disappearance at the normal time occasioned anxiety — a survival of earlier beliefs which regard this disappearance as the capture of the moon by hostile powers in the heavens. Solemn expiatory rites were prescribed primarily for the rulers, who had to exercise official precautions not to provoke the gods to anger during these anxious days.

The god Sin was especially the city god of Ur. p 271

"To this day the Arabs greet the new moon with shouts of joy and the Jewish ritual prescribes a special service for the occasion which includes the recital of hymns of joy. This joy on the reappearance of the moon is most expressed in various Sumerian hymns originating with the moon cult at Ur. They have all the earmarks of having been chanted by the priests when the first Crescent was seen in the sky."
Jastrow Religion Bab + Assyria p 336.
Doughty Arabia Deserta Vol 1 p 386 Vol 2 p 305
See Recalled Exiles Ps. (113-118) as portions of them

PJ.3921.fL.3

The Venus Tablet of Ammizaduga.

Langdon & Tolbert Fotheringham -

"Both the Babylonians and the ancient Jews in determining the beginning of the month were interested only in observations made in the evening which closed the 29th day of the month. If the crescent was not seen, the day beginning at sunset was regarded as the 30th of the old month; if it was seen, that day was the first of the new month. The observation at the close of the 30th day had astronomical interest only; it had no bearing on the calendar." p 98.

"although proof that the beginning of the month was fixed by observation is to be found in the success with which Schoch has represented the attested dates of the beginning of the month by an astronomical formula .... As Schoch's tables appear to satisfy the attested first days of the month at all epochs the inference is that the attested beginnings of the month must have been determined originally by actual observation of the crescent."

pp 45, 46.

(On back of book Schoch's tables for the moon are listed).

The code of Hammurabi gives evidence that the plan of an intercalary month was used in Babylon in his reign.

PA 1-J55.

The Date of the Crucifixion

J. K. Fotheringham

In "Journal of Philology" XXIX (1904) 100-118.

2 questions:-

1. At what point in the sun's course did the cal. month begin and what rule determined the intercalation of a 30th day.

(2) At what exact point in the sun's course did the calendar year begin, and what rule determined the intercalation of a 13th month.

① All documentary evidence shows that 1st Century Jews had not abandoned empirical methods for calculating the beg. of the month. (See Schürer - Jewish People in Time of Christ" Eng. Tr. I, 2, pp 363-371 and whole treat "Rosh Hashana")

No month was to have more than 30 nor less than 29 new moons nor less than 4, 30 days in 1 yr. (Arachin ii. 2) Cloudy weather could not postpone the beginning of a new month by more than 1 day.

Nisan was one of the six months, the commencement of which was still announced by messengers from Jamnia after the fall of Jer. (Rosh Hashana i. 3, 4)

Even When the Mishna was completed it was one of the two months in which the witnesses coming with news of the new moon were allowed to profane the Sabbath. Some times beacons were used to inform more Jews of the inauguration of the new month. (Rosh Hashana II. 4)

No intercalation could be made down to time of Rabbi Joshua & Rabbi Papias in 2nd Cent. unless ordered by Sanhedrin before the feast of Purim (Adar or Ve Adar 14) so the day of the passover would be known with possible error of 1 day, at least a mo before hand (Edujoth VII. 7)

There are references in Mishna and Josephus to deliberations in Sanhedrin as to whether an

intercalation should be made, and even a provisional rule for an intercalation, because Rabbi Gamaliel could not be present when it was necessary to come to a decision.

In (Slavonic Enoch XVI, 5-8) is a description of the lunar year and of the sixteen year cycle. How infer that the Jews of this period knew of this cycle as astronomically valid, in which case it is highly probable that it was claimed to influence the actual calendar.

There is no evidence in favor of Baron von Bothmer's view that there was ever any intercalation in a Babylonian

---

J. K. Bethingham also has an art. on Julian Cal. "Journ Phil. XVIX #37 ??

Callippus is famous for his 76 years' lunisolar cycle - each year of which has an average of 365 day 6 hrs.

"There is a question, which we have not sufficient evidence to answer whether the Julian Calendar was introduced on the 1st of January or on the 1st of March 45 BC. In either case the date selected for the new year may have been governed by the moon. There was a new moon on the 2nd of Jan. 45 BC which Caesar may have calculated for the 1st, and there was another new moon on March 1."

J C Pittenger.

"Formation of the Julian Calendar" p 99.
"Journal of Philology" Vol XXIX - 1904.

1. Mr. Wood derives the date of the New Moon in March 31 A. D. by using as a starting value the actual date of the New Moon of Thursday, March 19.33 (G.C.T.),1931. It should be kept in mind that periodic inequalities in the Moon's orbit may retard or advance the actual date of New (or Full) Moon by as much as a half a day. Thus, the date of the New Moon found by this method may be in error by this amount. It would require a much more elaborate calculation to eliminate this uncertainty.

2. The date of the Vernal equinox for the year 1931 is Saturday, March 21.59 (G.C.T.),1931. This is $1^d.40$ earlier than the date used by Mr. Wood. (See American Ephemeris for year 1931,p.678)

21-14-7

3. The length of the synodic month and of the tropical year as used by Mr. Wood are sufficiently accurate for the purpose. It would be more accurate to use for the interval of 1900 years from 31 A.D. to 1931 A.D.

the average length of the synodic month: $\times 23500$ $29^d.53058846 = 693969.8298$

" " " " " tropical year: $\times 1900$ $365^d.242304 = 693960.3796$

$8.4502 =$

$8^d - 10^h - 49.7^m$

4. For dealing with so long intervals of time it is advisable to make use of the Julian Day numbers, given in the American Ephemeris for the year 1931,p.759. As it is customary to begin the Julian Day at Greenwich Mean Noon, whereas the G.C.T. is counted from Greenwich Mean Midnight, it is necessary to subtract $0^d.5$ from a date given in G.C.T. before finding its Julian Day number. And in order to convert a Julian Day number to G.C.T. $0^d.5$ should first be added.

5. Making use of the data given above I find:

Vernal equinox, Saturday,March.21,59,1931(G.C.T.)=	J.D.2426422.09
1900 tropical years=99137 weeks +1.38	693960.38
vernal equinox 31	J.D.1732461.71

2380.

81.71

The Julian Day number for Jan. 0.5 (G.C.T.) of A.D.31 is (American Ephemeris,1931,p.759) 1732380

Date of vernal equinox 31 A.D.Jan. 0.5 + $81^{d}.71$

= 31 A.D., Friday March $23^{d}.21$

New Moon 1931, Thursday, March 19.33 (G.C.T.) = J.D. 2426419.83 ✓

23500 Synodic Months = 99138 weeks + $2^{d}.83$ 693968.83

New Moon = J.D. 1732451.00

Julian Day number of Jan. 0.5 (G.C.T.) for A.D.31 1732380.00

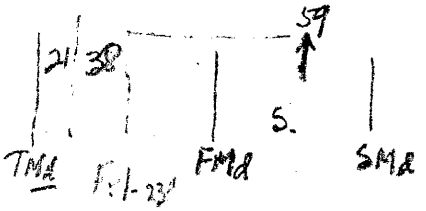
New Moon 31 A.D. Jan. 0.5 + $71^{d}.00$

= 31 A.D.Monday March $12^{d}.50$

add $14^{d}.77$

Full Moon 31 A.D. Tuesday March $27^{d}.27$

DIRK BROUWER



Ency Brit Vol 3/890-
Christian Controversialists
from Bp Felix of Lucifera
(AD 277) onwards accused the Jews
of disregarding the (Christian)
Equinoctial limit, and of sometimes
placing the Paschal full moon
before it & it is possible that
in the time of Christ the 14th of
Nisan might have fallen as far
back as Mar 17

1st Sabb. 14th Paschal moon Ch. Cal.
2d " 14" " " Astron. new m.
3 14 " " first appearance
Sunset

AD 28 -	Sat Mar 27	28	29	
29	Sun Mar 17	Mar 17	19	
	3 in Apr 15	Apr 16	18	
30	Thurs Apr 4	Apr 5	7	
31	Sat Mar 24	25	27	
32	Sat Apr 12	12	14	
33	W Apr 1	1-2	3-4	

1900 – Mar 20.33 ——— .25

1901 – Mar 20.58 ——— .25 Y. vernal equinox for

1902 – Mar 20.83 ——— .25 yrs 1900–1930.

1903 – " 21.08 ——— .25 – 1

1904 – " 20.33 ——— .25

05 – " 20.58 ——— .25

06 – " 20.83 ——— .25

07 – " 21.04 ——— .21 – 1

08 – " 20.29 ——— .25

09 – " 20.54 .25

10 – " 20.79 .25

11 – " 21.04 .25 – 1

12 – " 20-6-21 20.265 — .242

13 – " 20-12-10 20.507 — .245

14 – " 20-18-03 20.752 — .236

15 – " 20-23 43 20.988 — .461 — 1

16 – " 20-10-47 20.449 — 244

17 – " 20.16-38 20.693 — 242

18 – " 20-22-26 20.935 — 245

19 – " 21-4-19 21.180 — 236 – 1

20 – " 20-9-59 20.416 — 245

21 " 20-15-51 20.661 — 248

22 " 20-21-49 20.909 — 236

23 " 21-3-29 21.145 — 244 – 1

24 " 20-9-20 20.389 — 245

25 " 21-3-13 21.134 ← 20.634 — 243

26 " 21-9-02 21.377 – 20.21:02 20.877 — 247

27 " 21-14-59 21.624 – 21.2.59 – 21.124 — 240

28 " 20-20-45 20.864 – 20-8.45 – 20.364 — 243

29 " 21-2-35 21.107 – 20-14-35 – 20.607 — 247

30 " 21-8-30 21.354 – 20-20-30 – 20.854

22
8
6
4
2
21.0
8
6
4
2

1931

— Cst. Data —

Calculated from Ephs. 1931 p. 117.

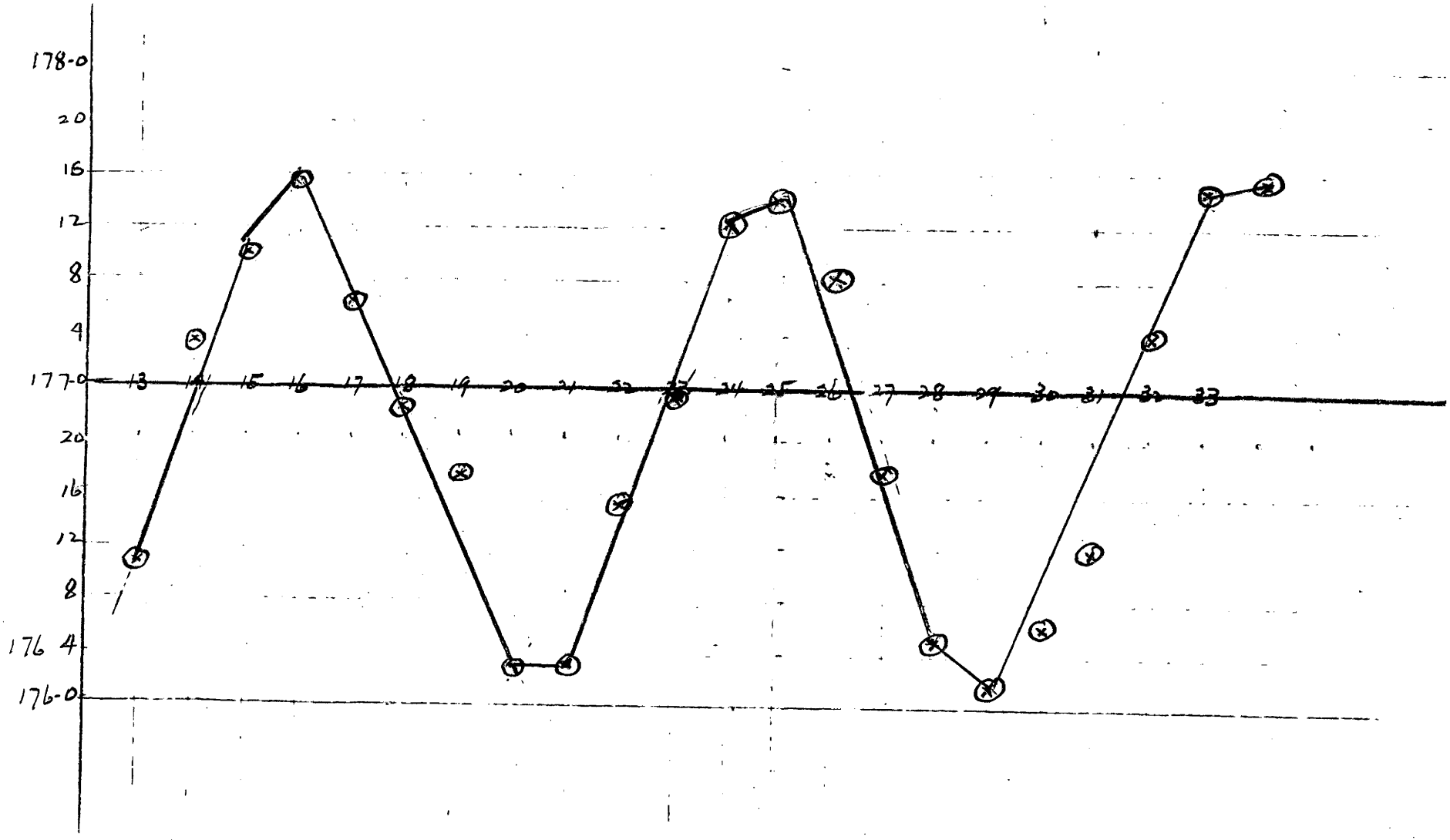
Month.	Time of New Moon	Length of Lunar Mth.		Time of Full Moon	Days betw. new & full Moon.
Dec. 1930.			Jan 31	4.552	
Jan. 1931.	18.775	29.775	Feb 3rd	3.018	15.233
Feb	17.550	29.776	Mar	4.443	14.893
Mar	19.326	29.715	Apr.	2.837	14.511
Apr.	18.041	29.603	May	2.218	14.177
May.	17.644	29.482		31.606	13.962
June.	16.126	29.388		30.033	13.907
July	15.514	29.339		29.523	14.009
August	13.853	29.332		28.131	14.278
Sept.	12.185	29.398		26.823	14.638
Oct.	11.583	29.372		26.565	14.982
Nov.	9.955	29.472		25.298	15.343
Dec.	9.427			24.974.	15.547

Greenwich Mean Time

Date	Conjunction / Nisan New Moon	Conjunction / 1st Tisri
1913	(96) Apr 6-5-48.2	(272) Sept 29-16-56.8
1914	(85) Mch 26-6-9.1	(262) 19-9-33.3
1915	(103) Apr 13-23-35.7	Oct 8 (281) 9-42.1
1916	(93) Apr 2-4-21.2	Sept 26 (270) 19-34.1
1917	(81) Mch 22-16-5.10	Oct N (288) 14-4.0 (258) Sept 15 22-27.5
1918	(100) Apr 10-16-34.3	Oct 4 (277) 15-5.2
1919	(90) Mch 31-9-4.9	Sept 23 (266) 16-33.9
1920	(109) Apr 18-9-43.1 (79) Mch 19.22-55.8	Oct 11-12-50.4 285
1921	(97) Apr 7-21-5.2	Oct 1-0-26.4 (274)
1922	(87) Mch 28-1-3.4	(263) Sept 20-16-38.3 (283) Oct 20-1-40.2
1923	(105) Apr 15-18-28.4	Oct 9-18-5.5 (282)
1924	(94) Apr 3-9-17.3	Sept 28 (272) 8-15.9
1925	Mch 24-2-2.9 (234)	Sept 17 (411) 16-12.4 Oct 17-6-5.7 (441)

Period from Nisan Conjunction to Tisri C

Date	Nisan Conj.	Day of year	Tisri Conj.	Day of year	Interval
1913	Apr 6-5-48.2	96	Sep. 29-16-56.8	272	176-11-08.6
1914	Mch 26-6-9.1	85	Sep. 19-9-33.3	262	177-3-24.2
1915	Apr 13-23-35.7	103	Oct 8-9-42.1	281	177-10-06.4
1916	Apr 2-4-21.2	93	Sep 26-19-34.1	270	177-15-12.9
1917	Mch 22-16-5.10	81	Sep 15-22-27.5	258	177-06-22.5
1918	Apr 10-16-34.3	100	Oct 4-15-5.2	277	176-22-30.9
1919	Mch 31-9-4.9	90	Sep 23-16-33.4	266	176-17-29.0
1920	Apr 18-9-43.1	109	Oct 11-12-50.4	285	176-03-07.3
1921	Apr 7-21-5.2	97	Oct 1-0-26.4	274	176-03-21.2
1922	Mch 28-1-3.4	87	Sep 20-16-38.3	263	176-15-34.9
1923	Apr 15-18-28.4	105	Oct 9-18-5.5	282	176-23-37.1
1924	Apr 3-19-17.3	94	Sep 28-8-15.9	272	177-12-58.6
1925	Mch 24-2-2.9	83	Sep 17-16-12.4	260	177-14-09.5
1926	Apr 12-12-56.4	102	Oct 6-22-13.3	279	177-09-16.9
1927	Apr 2-4-24.2	92	Sep 25-22-10.8	268	176-17-46.6
1928	Mch 21-20-29.3	81	Sep 14-1-20.7	258	176-04-51.4
1929	Apr 9-20-32.6	99	Oct 2-22-19.3	275	176-1-46.7
1930	Mch 30-5-46.4	89	Sep 22-11-41.6	265	176-5-55.2
1931	Apr 18-0-59.7	108	Oct 11-13-05.9	284	176-12-06.2
1932	Apr 6-1-21.1	97	Sep 30-5-29.8	274	177-04-08.7
1933	Mch 26-3-20.3	85	Sep 19-18-20.9	262	177-15-00.6
1934	Apr 13-23-57.0	103	Oct 8-15-4.9	281	177-15-07.9



See Sunday p 6.12

Yr.	Mon.	Ast. N. Moon Greenwich Schram Civil Time	Ast. N. Moon Schram C. Time	Jerusalem Schoch C. Time	Hrs to visibility	1st Day of Month.	No days in Month.	Heb. Month.
29	Apr	Apr 2.74	2.832	2.835	23.6	Apr 4-5	30	Adar
	May	May 2.36	2.452	2.456	23.2	May 3-4	29	Nisan
	June	June 1.00	1.092	0.996	22.0	June 2-3	30	Yiar
	June	June 30.35	30.442	30.462	20.0	July 1-2	29	Sivan
	July	July 29.76	29.852	29.864	18.6	July 30-31	29	Tamuz
	Aug	Aug 28.12	28.212	28.233	19.2	Aug 29-30	30	Ab
	Sept	Sept 26.51	26.602	26.605	21.5	Sept 27-28	29	Elul
	Oct	Oct 25.92	26.012	26.017	24.3	Oct 27-28	30	Tisri
	Nov	Nov 24.38	24.472	24.488	26.7	Nov 25-26	29	Hesvan
	Dec	Dec 23.90	23.992	24.016	26.8	Dec 25-26	30	Kislev
30	Jan	Jan 22.47	22.562	22.580	25.5	Jan 23-24	28	Tebet
	Feb	Feb 21.10	21.192	21.201	24.6	~~Feb~~ 22-23	30	Sebat
	Mar	Mar 22.75	22.842	22.843	23.4	Mar 24-25	30	Adar
	Apr	Apr 21.42	21.512	21.504	23.8	Apr 22-23	29.	Nisan
	May	May 21.06	21.152	21.155	23.8	May 22-23	30	Yiar
	June	June 19.66	19.752	19.759	21.4	June 20-21	29.	Sivan
	July	July 19.20	19.292	19.305	20.1	July 20-21	30	Tamuz
	Aug	Aug 17.69	17.782	17.791	20.2	Aug 18-19	29	Ab
	Sept	Sept 16.11	16.202	16.237	22.4	Sept 17-18	30	Elul
	Oct	Oct 15.58	15.672	15.682	25.3	Oct 16-17	29	Tisri
	Nov	Nov 14.03	14.122	14.132	27.4	Nov 15-16	30	Hesvan
	Dec	Dec 13.48	13.572	13.592	26.2	Dec 14-15	29	Kislev
31	Jan	Jan 11.96	12.052	12.066	24.3	Jan 13-14	30	Tebet
	Feb	Feb 10.44	10.532	10.531	22.8	Feb 12-13	29.	Sebat
	Mar	Mar 8.97	12.042	12.033	22.1	Mar 13-14	30	Adar
	Apr	Apr 10.49	10.582	10.585	22.4	Apr 11-12	29.	Veadar
	May	May 10.09	10.182	10.184	22.8	May 11-12	30	Nisan
	June	June 8.72	8.812	8.816	24.3	June 10-11	30	Yiar
24	Mar	Mar 4.03	4.122	4.146	24.9	Mar 5-6		

(1)

(29) Mar. 29.25 / 29.17 / .92 / 27.25

	I	II	T	L	Θ
	311	005	703.601	250.05	109.4
	167	246	1185.816	88.48	167.0
	478	251			

G {D / u} — 21.4

A {I / II} — .378 — .75

H {D / u / I} — +3.0 — 24.9

B {II / yr.} — .377 — 2.00 — 341.8

1890.172 · 341.78 ⊙ — 6182 / 360 / 258.2 u

1886

4.172 / .026 / 4.146

(29 may) 27.41 / 27.33 / 1.92 / 27.41

	I	II	T	L	Θ
	311	005	703.601	250.05	109.4
	311	408	1244.862	147.18	170.1
	622	413			

G {D / u} — 21.4

A {I / II} — .731 — 1.00

H {D / u / I} — +1.8 — 23.2

B {II / yr} — .288 — 1.102 — 39.2

1949.482 — 399.25 — 318.7 u.

1947 — 39.250 ⊙

2.482 / -.026 / 2.456

(29 June) 1.92 / 27.49

	I	II	T	L	Θ
	311	005	703.601	250.05	109.4
	382	488	1274.399	176.29	171.7
	693	493			

G {D / u} — 21.5

A {I / II} — .818 — .98

H {D / u / I} — +.5 — +22.0

B {II / yr} — .204 — 00 — 67.3

1979.022 — 2732 — 348.4 u

1978 — 360

1.022 / -.026 / 0.996 — 67.32 ⊙

(29 June) 1.92 / 27.57

	I	II	T	L	Θ
	311	005	703.601	250.05	109.4
	454	569	1303.940	205.41	173.3
	765	574			

G {D / u} — 20.4

A {I / II} — .830 — .92

H {D / u / I} — -.4 — 20.0

B {II / yr} — .117 — .88 — 16.3

2008.488 — 4526 — 379.0

1978 — 96.26 ⊙ — 19.0 u

30.488 / .026 / .462

29 July

		I	II	T	L	Θ	
	1.92	311	005	703.601	250.05	109.4	
	27.65	526	650	1333.474	234.52	174.8	
		837	655				
G {Θ / U	— 20.2		A {I/II	— .766	— .79		7.146 / 20 4/7
H {Θ / U / I	— -1.6		B {II/yr	— .049	— 1.63		
	18.6			2037.890	486.99	127.0	
				2008	126.99 Θ	411.2	
				29.890		51.2 U	
				.026			
				29.864			

29 Aug

		I	II	T	L	Θ	
	1.92	311	005	703.601	250.05	109.4	
	27.73	597	731	1362.998	263.62	176.4	
		908	736				
G {Θ / U	— 21.3		A {I/II	— .644	— .64		
H {Θ / U / I	— -2.1		B {II/yr	— .016	— 1.99	156.3	
	19.2			2067.259	516.30	442.1	
				2039	360	82.1 U	
				28.259	156.30 Θ		
				.026			
				28.233			

29 Sept

		I	II	T	L	Θ	
	1.92	311	005	703.601	250.05	109.4	26.602
	27.81	669	812	1392.518	292.71	178.0	.092
		980	817				694
G {Θ / U	— 24.0		A {I/II	— .483	— .49		
H {Θ / U / I	— -2.5		B {II/yr	— .029	— 1.86		
	21.5			2096.631	545.18	185.1	
				2070	360	72.5	
				26.631	185.11 Θ	112.5 U	
				-.026			
				26.605			

29 Oct

		I	II	T	L	Θ		
	1.92	311	005	703.601	250.05	109.4	1.1	
	27.89	741	893	1422.046	321.82	179.5	26.3	
		1052	898				1.4	
G {Θ / U	— 26.7		A {I/II	— .311	— .37		26.7	
H {Θ / U / I	— -2.4		B {II/yr	— .085	— 1.22	213.5	2.5	
	24.3			2126.043	573.46	502.4	1.4	
				2100	360	142.4 U		
				26.043	213.46 Θ			
				.026				
				26.017				

28.6
27.5 "

29 Nov

I	II	T	L	θ
1.92	.005	703.601	250.05	109.4
27.97	.973	1457.584	350.93	181.1
311	978			
813				
1124				

G {D / U — 28.5

H {D / U / I — −1.8 — 26.7

A {I / II — .158 — .22

B {II / yr — .171 — .28

2155.514
−.026
2155.488
2131
24.488

601.48
360
241.50

241.5
532.0
360
172.0 U

29 Dec

I	II	T	L	θ
1.92	.005	703.601	250.05	109.4
28.06	54	20.124	20.05	182.7
884	59			
1195				

G {D / U — 27.2

H {D / U / I — −.4 — 26.8

A {1/2 — .053 — .30

B {2 / yr — .264 — .75

724.042
700
24.042
−.026
24016

271.150

271.1
563.2 U
360
203.2 U

30 Jan

I	II	T	L	θ
1.92	.005	703.601	250.05	109.4
28.14	135	49.658	49.16	184.2
956	140			
1267				

G {D / U — 24.6

H {D / U / I — +.9 — 25.5

A {1/2 — .019 — .36

B {2 / yr — .338 — 1.56

753.606
731
22.606
−.026
22.580

391.130

301.1
594.7
360
234.7 U

30 Jul

I	II	T	L	θ
1.92	.005	703.601	250.05	109.4
28.22	216	79.180	78.26	185.8
28	221			
339				

G {D / U — 22.6

H {D / U / I — +2.0 — 24.6

A {1/2 — .072 — .44

B {2 / yr — .374 — 1.97

783.227
−.026
783.201
762
21.201

330.720

330.7
625.9
360
265.9 U

30 mm

	I	II	T	L	Θ
1.92	311	005	703.601	250.05	109.4
28.30	99	297	108.701	107.35	187.3
	410	302			

A {I/II — .202 — .57

B {II/yr — .365 — 1.88 — 360.0

812.869 — 359.85 — 656.7

790. — 360

22.869 — 299.7

.026

22.843

---

30 blip

	I	II	T	L	Θ
1.92	311	005	703.601	250.05	109.4
28.38	171	378	138.230	136.46	188.9
	482	383			

G {D/u — 20.8

H {D/u/I — +3.0 — 23.8

A {1/2 — .384 — .69

B {2/yr — .31 — 1.32

842.538 — 388.52 — 28.5

.026 — 360

842.504 — 28.520 — 326.8 m

8 1

21.504

---

30 mm

1.92	311	005	703.601	250.05	109.4
28.46	243	459	167.769	165.57	190.5
	554	464			

G {D/u — 20.8

H {D/u/I — +3.0 — 23.8

A {1/2 — .575 — .181

B {2/yr — .236 — .44 — 55.9

872.181 — 415.87 — 355.8

−.026 — 55.870

872.155

851

21.155

---

30 mm

1.92	311	005	703.601	250.05	109.4
28.54	314	539	197.309	194.69	192.0
	625	544			

G {D/u — 19.9

H {D/u/I — 1.5 — 21.4

A {1/2 — .727 — .85

B {2/yr — .148 — .54

901.785 — 446.13 — 86.1

882.026 — 360 — 387.5

19.759 — 86.130 — 360

27.5 m.

30 Jul

1.92 | 311 | .005 | 703.601 | 250.05 | 109.4
28.62 | 386 | 620 | 226.841 | 233.80 | 193.6
697 | 625 | A ½ — .819 — .87

G { D / U — 19.7

H { D / U — +.4 / I — 20.1

B { Z / yr — .070 — 1.38

931.331 | 486.10 | 126.0
912.026 | 360 | 429.0
19.305 | 126.100 | 360
69.0 U.

---

30 Aug

1.92 | 311 | .005 | 703.601 | 250.05 | 109.4
28.70 | 458 | 701 | 256.363 | 252.90 | 195.2
769 | 706 | A ½ — .828 — .82

G { D / U — 20.9

H { D / U — -.7 / I — 20.2

B { Z / yr — .024 — 1.89

960.817 | 505.66 | 145.4
943.026 | 360 | 450.3
17.791 | 145.660 D | 360
90.3 U

---

30 Sept

1.92 | 311 | .005 | 703.601 | 250.05 | 109.4
28.78 | 530 | 782 | 285.884 | 281.99 | 196.7
841 | 787 | A ½ — .760 — .76

G { D / U — 24.3

H { D / U — -1.9 / I — 22.4

B { Z / yr — .018 — 1.71

990.263 | 534.51 | 174.5
974.026 | 360 | 480.6
16.239 | 174.510 D | 360
120.6 U

---

30 Oct

1.92 | 311 | .005 | 703.601 | 250.05 | 109.4
28.86 | 601 | 863 | 315.414 | 311.10 | 198.3
912 | 868 | A ½ — .633 — .67

G { D / U — 28.0

H { D / U — -2.7 / I — 25.3

B { Z / yr — .060 — 1.48

1019.708 | 563.30 | 203.3
1004.026 | 360 | 511.0
15.682 | 203.30 D | 360
151.0 U

30 NW

30.87
30.87

984

949

1048.553 — 230.26 — 309.2

A{1/2 — 466 — .59

B{Z/H — 139 — .63

1049.158 — 231.480 — 231.5

1035.026

14.132

5407
360
180.7 W

G{O/U — 30.6

H{O/U/I — -3.2

27.4

---

30 DG

30.87
08

984
72
1056

949
81
103 A{1/2

1048.553
29.540

230.26
29.12

309.2
1.6

G{O/U — 28.9

— .294 — .52

B{Z/Yr — .231 — .38

1078.618 — 260.280 — 260.3

1065.026

13.592

571.1
360
211.1 W

H{O/U/I — -2.7
36.2

2.9
2.3

---

31 SW

30.87
.16

984
143
1127

949
162
1111

A{1/2

1048.553
59.070

230.26
58.22

309.2
3.1

G{O/U — 25.9

— .145 — .45

B{Z/Yr — .314 — 1.30

1108.082 — 290.230 — 290.2

1096.026

12.056

6025
360
5665 W

H{O/U/I — -1.6
24.3

---

31 DG

30.87
.24

984
215
1199

949
243
1192

A{1/2

1048.553
88.571

230.26
87.32

309.2
4.7

G{O/U — 23.2

— .044 — .42

B{Z/Yr — .369 — 1.91

1137.557 — 317.110 — 314.9

1127.026

10.531

633.8
360
273.8 W

H{O/U/I — -.4
22.8

31 mar

30.87
.32

G{D 21.2
  U

H{D +9
  U
  I
22.1

984
287
1271

949
323
1272

A{1/2

B{2/yr

1048.553
118.113
.018
.375
1167.059
1155.026
12.033

230.26
116.42
.40
1.98
349.06

309.2
6.3

(4)

349.1
6646
360
304.6

---

31 may

30.87
.49

G{D 20.2
  U

H{D 2.6
  U
  I
22.8

984
430
1414

949
485
1434

A{1/2

B{2/yr

1048.553
177.185
.205
.269
1226.210
1216.026
10.184

230.26
174.64
.48
.79
406.17
360
46.170

309.2
9.4

46.2
3648
4.8 w

---

31 june

30.87
.57

G{D 19.2
  U

H{D +3.1
  U
  I
24.3

984
502
1486

949
566
1515

A{1/2

B{2/yr

1048.553
206.724
.385
.180
1255.842
1247.026
8.816

230.26
203.76
.58
.18
434.78
360
74.80

309.2
10.9

74.8
3949
360
34.9

7 30 pm - 8
8 — 9
10-11

AD 27 Jan 25.24 / 27.16

1.92 — 311 — 005 — 703.601 — 250.05 — 109.4

26.23 — 374 — 225 — 447.555 — 81.31 — 127.9

685 230

G{O 22.0 / U

H{O +9 / U / I 22.9

A{1/2 — .814 — 1.19

B{2/yr — .376 — 1.99

1252.346 / 1227.026 / 25.320 J. — 334.540 — 334.5 / 571.8 / 360 / 211.8 u

1st Day mo. — Feb 26-27 14th Mar 12

AD 28 Mar.

1.92 — 311 — 005 — 703.601 — 250.05 — 109.4

26.28 — 307 — 276 — 831.451 — 99.70 — 148.2

618 281

G{O 21.4 / U

#{O +1.8 / U / I 23.2

A{1/2 — 726 — 1.09

B{2/yr — 373 — 1.95

1536.151 / 1521.026 / 15.125 — 352.790 — 352.8 / 610.4 / 360 / 250.4

1st Day Mar 16-17 14th Mar 30

AD 31. Mar

1.92 — 311 — 005 — 703.601 — 250.05 — 109.4

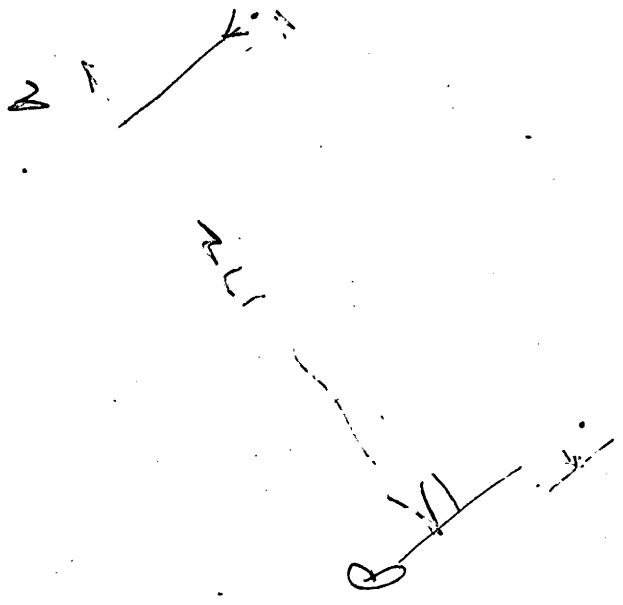
30.87 984 9

Year A.D.	Date of new moon after ♈	Hours to visibility	First Crescent	1st of Nisan	14th Nisan	Act. Date Full Moon	Diff.	(D) Days bet. new + full moon
		hrs.						
21	Mar 31.94 32.032 Mon. 32.031	22.5	Apr 2 Wed	Apr 3 Thurs.	Apr. 16 Wed	Apr 15.83 Tues	+1	14.89
22	Mar 21.06 21.152 Sat. 21.151	21.2	Mar 22 Sun	Mar 23 Mon.	~~Apr~~ Apr 5 Sun.	Apr 5.51 Sun	Sameday	15.45
23	Apr 8.91 9.002 Fri. 9.008	26.5	Ap 10 Sat.	Apr 11 Sun.	Apr 24 Sat.	Apr 24.47 Sat.	Same day	15.56
24	Mar 28.46 .552 Tues .561	19.0	Mar 29 Wed	Mar 30 Thurs.	Apr 12 Wed.	Apr 12.80 Wed	Sameday	15.34
25	Mar 18.15 .242 Sun .259	18.4	Ma. 19 Mon	Mar 20 Tues	Apr 2 Mon.	Apr 1.82 Sun	+1	14.67
26	Apr 6.18 .272 Sat. .291	19.0	Ap 7 Sun.	Ap. 8 Mon	Ap. 21 Sun.	Apr 20.51 Sat.	+1	14.33
* 27	Mar 26.74 .832 Thurs .852	20.7	Mar 27 Fri	Mar 28 Sat.	Apr 10 Fri	Apr 9.68 Thurs Wed	+1	13.94
28	Apr 13.59 .682 Tues .724	21.9	Ap 14 Wed	Ap 15 Thurs	Apr 28 Wed.	Apr 27.53 Tues	+1	13.94
29	Ap 2.74 2.832 Sat. 2.835	23.6	Ap. 4 Mon.	Ap 5 Tues	Ap. 18 Mon.	Apr 17.12 Sun	+1	14.38
30	Mch 22.75 .842 Wed .843	23.4	Mch 24 Fri	Mar 25 Sat	Ap 7 Fri	Apr 6.84 Thurs	+1	15.09
31	Apr 10.49 .582 Tues .585	22.4	Ap 11. Wed	Apr 12 Thurs	Apr 25 Wed	Apr 25.85 (Wed *)	Sameday	15.36
32	Mar 29.86 .952 Sat .947	19.9	Mch 31 Mon.	Ap 1 Tues	Ap 14 Mon.	Apr 14.38 Mon	Sameday	15.52
33	Mar 19.46 .552 Thurs .542	18.2	Mar 20 Fri	Mar 21 Sat.	Ap 3 Fri	Apr 3.62 Fri	Sameday	15.16
34	Apr 7.49 .582 Wed .589	17.2	Ap 8 Thurs	Ap. 9 Fri	Ap 22 Thur	Apr 22.32 Thurs	Sameday	14.83
35	Mar 28.17 .262 Mon .271	17.8	Mar 29 Tues	Mar 30 Wed.	Apr 11 Tues	Apr 11.34 Tues	Sameday	14.17
x 36	Mar 16.66 .752 Fri .702	19.6	Mar 17 Sat	Mar 18 Sun	Mar 31 Sat	Mar 30.59 Fri	+1	13.93
37	Apr 4.47 .562 Thurs .573	20.5	Apr 5 Fri	Apr 6 Sat	Apr 19 Fri	Apr 18.50 Thurs	+1	14.03
38	Mar 24.53 .622 Mon .641	21.1	Mar 25 Tues	Mar 26 Wed	Apr 8 Tues	Apr 8.15 Tues	Sameday	14.62
39	Apr 12.22 .312 Sun .313	18.6	Apr 13 Mon	Ap 14 Tues	Ap 27 Mon.	Apr 27.16 Mon	Sameday	14.94
40	Mar 31.37 .442 Thur .453	21.1	Apr 1 Fri	Apr 2 Sat.	Ap 15 Fri	Apr 15.83 Fri.	Sameday	15.46
20	Apr 11.91 Fri 12.002 Thurs .013	21.5	Apr 13 Sat	Apr 14 Sun	Apr 27 Sat.	Apr 26.12 Fri.	+1	14.21
19	Mar 25.17 .262 Sat. .274	20.6	Mar 26 Sun	Mar 27 Mon	Apr 9 Sun.	Apr 8.18 Sat.	+1	14.01

Time given for Greenwich Civil Time -
Correction to be added Table E 4, p 4 Ast. Chronologie Dr. R.V.N.
-9 min.
Longitude Jerusalem - ( )° — 2 hrs 21 min
-9

Corr. for 2 min + 2 hr 12 min -
= .092 days.

First figure Schram's new Mean G.C.T. without corr. of -9 min
Second " " " " Jer C T with " " "
Third " Schuh's " " "
Comm Tables -



A.D. 29. Mar. N.M.

	a	b
1721760.49	125	2
9981.81	67	98
.38	192	100
.35		
1731713.03		

1731713.03 Mar 4.03. G.C.T.
.092
122

1721760.49	125	2
9981.34	96	131
.58	221	133
.33		
1731742.74		

1731742.74 Apr 2.74.

1721760.49	125	2
10010.87	124	163
.74	249	165
.26		
1731772.36		

1731772.36 May 2.36

1721760.49	125	2
10040.40	153	195
.83	278	197
.18		
1731802.00		

1731802.00 June 1.00

1721760.49	125	2
10069.93	182	228
.83	307	230
.10		
1731831.35		

1731831.35 June 30.35.

1721760.49	125	2
10099.46	210	260
.77	335	262
.04		
1731860.76		

1731860.76 July 29.76

1721760.49	125	2
10128.99	239	292
.64	364	294
.00		
1731890.12		

1731890.12 Aug 28.12

1721760.49	125	2
10158.52	268	325
.48	393	327
.02		
1731919.51		

1731919.51 Sept 26.51.

1721760.49	125	2
10188.05	296	357
.31	421	359
.07		
1731948.92		

1731948.92 Oct 25.92

1721760.49	125	2	
10217.58	325	389	
.16	450	391	
.15			
1731978.38			1731978.38 Nov. 24.38
1721760.49	125	2	
10247.11	354	22	
.06	479	24	
.24			
1732007.90			1732007.90 Dec 23.90.
1721760.49	125	2	
10276.64	383	54	
.03	508	56	
.31			
1732037.47			1732037.47 Jan 22.47
1721760.49	125	2	
10306.18	11	86	
.08	136	88	
.35			
1732067.10			1732066.80 Feb 20.80.
1721760.49	125	2	
10335.71	40	119	
.21	165	121	
.34			
1732096.75			1732096.75 Mar 22.75.
1721760.49	125	2	
10365.24	69	152	
.49	294	153	
.29			
1732126.42			1732126.42 Apr 21.42
1721760.49	125	2	
10394.77	97	183	
.58	222	185	
.22			
1732156.06			1732156.06 May 21.06.
1721760.49	125	2	
10424.30	126	216	
.24	251	218	
.13			
1732185.66			1732185.66 June 19.66.
1721760.49	125	2	
10453.83	155	248	
.83	280	250	
.01			
1732215.20			1732215.20 July 19.20.
1721760.49	125	2	
10483.36	183	280	
.83	308	282	
.01			
1732244.69			1732244.69 Aug 17.69.

(3)

1721760.49 — 125 — 2
10512.89 — 212 — 213
.72 — 337 — 315
.06
1732274.11

1732274.11 Sept 16.11

1721760.49 — 125 — 2
10242.42 — 241 — 345
.63 — 366 — 347
.04
1732303.58

1732303.58 Oct 15.48

1721760.49 — 125 — 2
10571.95 — 269 — 377
.47 — 394 — 379
.12
1732333.03

1732333.03 Nov 14.03

1721760.49 — 125 — 2
10601.48 — 298 — 10
.30 — 423 — 12
.21
1732362.48

1732362.48 Dec 13.48

1732332.45 — 394 — 379
29.03 — 29 — 32
.30 — 423 — 411
.20
1732362.48

1732332.45 — 394 — 379
59.06 — 57 — 65
.16 — 451 — 444
.29
1732397.96

1732397.96 Jan 17.96

1732332.45 — 394 — 379
88.59 — 86 — 97
.06 — 480 — 476
.34
1732421.44

1732421.44 Feb 10.44

1732332.45 — 394 — 379
118.12 — 115 — 129
.03 — 509 — 508
.35
450.95

— 450.95 Mar 11.95

332.45 — 394 — 379
147.65 — 143 — 162
.68 — 537 — 541
.31
480.49

— 480.49 Apr 10.49

(c)

16733.42 - 4 - 27√
9922.28 - 38 - 66
.20 42 341
.04
655.92
46
9.92
24
376
188
22.56
33.6

16733.42
9922.28
15.54
.06
67130
46
27.7-120

16733.42 - 4 - 27√
9951.81 67 98
.08 71 373
.10
685.41
76
9.41
24
164
82
984
6
50.4

76.0
50.4
27.6

16733.42
9951.81
15.60
.15
700 98
76
2498
24
392
196
23.√2 60
31.20

16733.42 - 4 - 27√
9656.50 - 180 - 175
33 184 450
.3
0.55

— 332.45	394	379	
177.18	172	194	
.22	566	573	
.24			
— 510.09			

— 332.45	394	379	
206.71	201	226	
.40	595	605	
.16			
— 539.72			

— 332.45	394	379	
236.24	229	259	
.59	623	638	
.08			
— 569.36			

— 332.45	394	379	
265.78	258	291	
.75	652	670	
.02			
— 599.00			

— 332.45	394	379	
295.31	287	323	
.83	681	702	
.00			
— 628.59			

— 332.45	394	379	
324.84	316	356	
.83	710	735	
.025			
— 658.14			

— 332.45	394	379	
354.37	344	388	
.76	738	767	
.084			
— 687.66			

— 332.45	394	379	
383.90	373	20	
.625	767	399	
.17			
— 717.14			

172105
474
531

④

— 510.09 May 10.09

— 539.72 June 9.72
531

— 569.36 July 8.36

— 599.00 Aug 7.00

— 628.59 Sept 5.59

— 658.14 Oct 5.14

— 687.66 Nov. 3.66

— 717.14 Dec 3.14

(b)

29.1

16733.42 — 4 = 275
9745.09 — 266 272
.81 270 547
.30
2547962
62
17.62
24
248
24
1498
60
588
12

16733.42
9745.09
14,81
.27
493.59
62
31.54
24
236
118
14.16
60
9.60

16733.42
9774.62
14.80
.18
523.02
93
30.02
24
148
60
28.80

16733.42
9804.16
14.86
.10
552.54
23
29.54
24
216
108
12.96
60
57.60

16733.42 - 4 - 275
9833.69 - 324 - 337
.79 338-612
.14
568.04
54
14.04
24
96
60
57.60

16733.42
9833.69
15.00
.03
582.14
28.14
24
56
28
334
60
20.40

16.3

16733.42 - 4 - 275
9833.69 - 352 369
.68 356 644
.06
567.85
54
13.85
24
340
170
20.40
60
24.

16733.42 - 4 - 275
9863.22 - 381 1
.52 385 276
.10
597.18
85
12.18
24
172
34
412
60
7.2

16733.42 - 4 - 275
9863.22
15.195
.00
611.835
85
26.83
24
3320
1660
20.04
60
8.40

1.2

16733.42 - 4 - 275
9892.75 10 - 34
136 14 309
.00
626.53
615
11.53
24
212
106
12.72
6
43.2

19733.42
9892.75
15.39
04
641.57
615
26.57
24
228
114
13.68

20.8

65.9
43.2
22.7

5

Lab 32

−332.45	394	379		
413.43	2	53		
.46	396	432		
.26				
−746.60			−746.60	Jan 1.60
−332.45	394	379		
442.96	30	85		
.20	424	464		
.31				
−776.02			−776.02	Jan 30.02
−332.45	394	379		
472.49	59	117		
.15	453	496		
.31				
−805.44			−805.44	Feb 28.44
				28.532
−332.45	394	379		
502.02	88	150		
.06	482	529		
.33				
−834.86			−834.86	Mar 29.86
−332.45	394	379		
531.55	116	182		
.03	510	551		
.30				
−864.33			−864.33	Apr 28.33

N. M. Jan 31

	A	B
2426342		
16733.42	4	27
9608.58		
9626.97	151	143
.15	155	418
23		
2426360.77		
24		
308		
154		
18.48		
60		
28.80		

Jan 18-18-28.8

2426311
16733.42 - 4 - 27
9577.58
9597.44 123 110
15.53 127 385
.17
34656
311
35.56
124
224
112
1344
60
26.40

2426342
16733.42
9608.58
9626.97 151 143
15.37 155 418
.27
2426376.03
42
34.03
24
.72
60
43.30

A 27

4 - 27

151 143
155 418

.24
6
14.40

2426373
16733.42 - 4 - 27
9639.58
9656.50 - 180 - 175
.33 184 440
.30
390.55
373
17.55
24
220
110
13.20
60
12.00

16733.42
9656.50
15.21
.33
2426405.46
373.
32.46
24
184
92
11.04
60
2.40

62.4
36.1
25.3

16733.42 - 4 - 27
9686.03 - 209 - 207
.52 213 482
.34
420.31
01
19.31
24
124
62
744
60
26.40

16733.42
9686.03
15.04
.35
434.84
01
33.84
24
336
168
20.16
60
9.60

16733.42 - 4 - 27
9715.56 238 240
.70 242 515
.385
450035
32
18.035
24
100
50
6 3.6

72
60
43.20

16733.42
9715.56
14.40
.33
464.21
32
32.21
24
84
42
5.04
60
2.40

LUNAR TRANSLATION FOR NISAN I

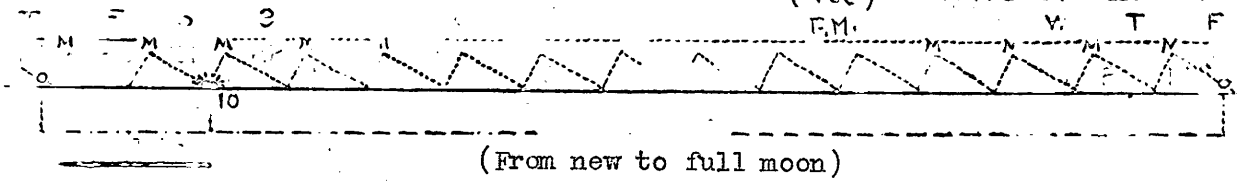
POSTULATE I

CONJUNCTION — PASCHAL MOON ON NISAN 13 — OPPOSITION

JERUSALEM CIVIL TIME

NEW MOONS

ar. 19 13h 14m Th



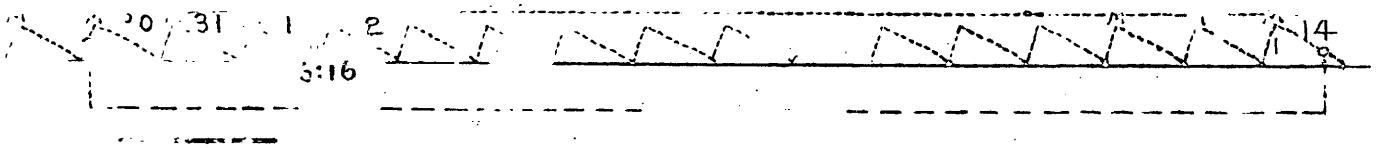
(From new to full moon)

FULL MOONS

(1st) Apr. 3 17h 27m F

lar 29 2h 58m Sa

(1st) Apr. 14 11h 39m M



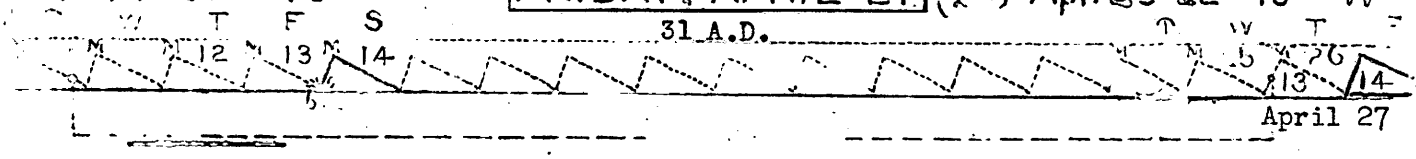
CRUCIFIXION

FRIDAY, APRIL 27

31 A.D.

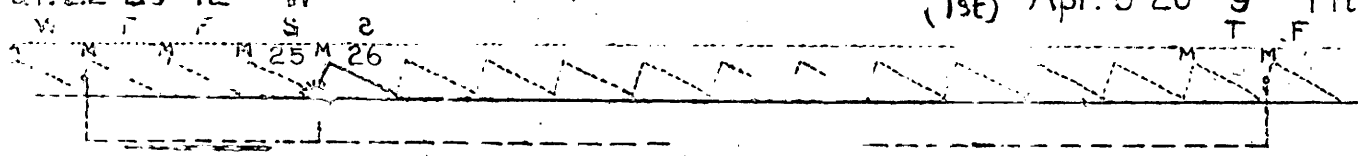
pr. 10 14h 51m Tu

(2nd) Apr. 25 22h 45m W



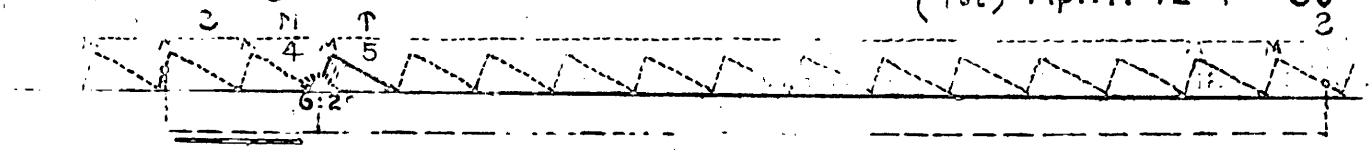
ar. 22 20h 12m W

(1st) Apr. 6 20h 9m Th



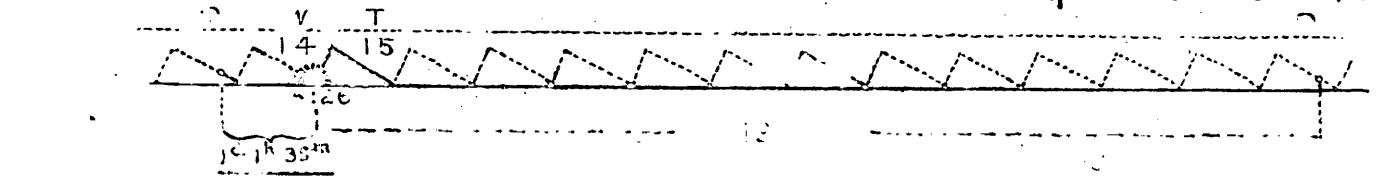
ar. 2 21h 15m S

(1st) Apr. 17 12h 1m Su



ar. 13 16h 51m Tu

Apr. 27 12h 23m Tu



The new and full moons were computed from Schram's Tables by Glenn Draper, Associate Astronomer, U.S. Naval Observatory.

FIFTH CENTURY B.C. MOONS AND INTERVALS -- TABLE VII

(Jerusalem Civil Time)

	B.C.	Conjunction	1 Nisan	Day of Week	Tr. Period (Days)	Full Moon	14 Nisan	Waxing Period (Days)	Year Length (Days)
	500	Apr 19.45	Apr 23	Thur	3.32	May 4.96	May 6	15.51	----354
	499	Apr 8.96	Apr 12	Mon	2.81	Apr 24.35	Apr 25	15.39	----354
	498	Mar 29.65	Apr 1	Fri	2.10	Apr 13.43	Apr 14	14.78	----384
	497*	Apr 16.68	Apr 19	Thur	2.09	Apr 31.10	May 2	14.42	----354
	496	Apr 6.27	Apr 8	Mon	1.50	Apr 20.24	Apr 21	13.97	----354
	495	Mar 26.61	Mar 28	Fri	1.14	Apr 9.66	Apr 10	14.05	----384
	494*	Apr 14.33	Apr 16	Thur	1.44	Apr 28.61	Apr 29	14.28	----355
	493	Apr 2.34	Apr 5	Tues	2.43	Apr 17.32	Apr 18	14.98	----384
	492*	Apr 21.07	Apr 24	Mon	2.71	May 6.33	May 7	15.26	----355
	491	Apr 10.38	Apr 14	Sat	3.39	Apr 25.92	Apr 27	15.54	----354
	490	Mar 30.95	Apr 3	Wed	2.82	Apr 15.20	Apr 16	15.25	----384
	489*	Apr 17.98	Apr 21	Tues	2.79	May 2.91	May 4	14.93	----354
	488	Apr 7.68	Apr 10	Sat	2.09	Apr 21.93	Apr 23	14.25	----354
	487	Mar 28.20	Mar 30	Wed	1.56	Apr 11.13	Apr 12	13.93	----384
	486*	Apr 16.03	Apr 18	Tues	1.74	Apr 30.00	May 1	13.97	----354
	485	Apr 4.14	Apr 6	Sat	1.63	Apr 18.62	Apr 19	14.48	----355
	484	Mar 24.17	Mar 27	Thur	2.59	Apr 8.33	Apr 9	15.16	----384
	483*	Apr 11.92	Apr 15	Wed	2.85	Apr 27.32	Apr 28	15.40	----355
	482	Apr 1.32	Apr 5	Mon	3.45	Apr 16.82	Apr 18	15.50	----383
	481*	Apr 19.28	Apr 22	Sat	2.49	May 4.63	May 5	15.35	----354
	480	Apr 8.99	Apr 11	Wed	1.78	Apr 23.71	Apr 24	14.72	----355
	479	Mar 29.64	Apr 1	Mon	2.12	Apr 12.75	Apr 14	14.11	----383
	478*	Apr 17.58	Apr 19	Sat	1.19	May 1.52	May 2	13.94	----355
	477	Apr 5.90	Apr 8	Thur	1.87	Apr 19.97	Apr 21	14.07	----354
	476	Mar 25.95	Mar 28	Mon	1.81	Apr 9.62	Apr 10	14.67	----384
	475*	Apr 13.64	Apr 16	Sun	2.13	Apr 28.63	Apr 29	14.99	----355
	474	Apr 2.80	Apr 6	Fri	2.97	Apr 18.30	Apr 19	15.50	----384
	473*	Apr 20.68	Apr 24	Thur	3.10	May 6.21	May 7	15.53	----354
	472	Apr 10.27	Apr 13	Mon	2.50	Apr 25.48	Apr 26	15.21	----354
A	471	Mar 30.98	Apr 2	Fri	1.78	Apr 14.52	Apr 15	14.54	----384
	470*	Apr 18.99	Apr 21	Thur	1.78	May 3.20	May 4	14.21	----354
	469	Apr 7.51	Apr 9	Mon	1.26	Apr 21.42	Apr 22	13.91	----355
	468	Mar 27.73	Mar 30	Sat	2.03	Apr 10.94	Apr 12	14.21	----384
	467*	Apr 15.42	Apr 18	Fri	2.35	Apr 29.93	May 1	14.51	----354
	466	Apr 4.45	Apr 7	Tues	2.32	Apr 19.65	Apr 20	15.20	----384
	465	Apr 22.21	Apr 25	Mon	2.57	May 7.63	May 8	15.42	----355
	464*	Apr 11.63	Apr 15	Sat	3.14	Apr 27.11	Apr 28	15.48	----354
	463	Apr 1.29	Apr 4	Wed	2.48	Apr 16.32	Apr 17	15.03	----384
	462*	Apr 20.30	Apr 23	Tues	2.47	May 4.99	May 6	14.69	----354
	461	Apr 8.96	Apr 11	Sat	1.81	Apr 23.04	Apr 24	14.08	----354
	460	Mar 29.40	Mar 31	Wed	1.36	Apr 12.34	Apr 13	13.94	----384
	459*	Apr 17.18	Apr 19	Tues	1.59	Apr 31.27	May 2	14.09	----355
	458	Apr 6.23	Apr 9	Sun	2.54	Apr 20.95	Apr 22	14.72	----354
	457	Mar 25.31	Mar 28	Thur	2.45	Apr 9.64	Apr 10	15.33	----384
	456*	Apr 13.12	Apr 16	Wed	2.65	Apr 28.61	Apr 29	15.49	----355
	455	Apr 2.61	Apr 6	Mon	3.16	Apr 18.03	Apr 19	15.42	----384
	454*	Apr 21.59	Apr 25	Sun	3.19	May 6.77	May 8	15.18	----354
	453	Apr 10.31	Apr 13	Thur	2.46	Apr 24.81	Apr 26	14.50	----354
	452	Mar 30.92	Apr 2	Mon	1.85	Apr 13.91	Apr 15	13.99	----384
	451*	Apr 18.82	Apr 21	Sun	1.95	May 2.73	May 4	13.91	----354

The asterisk (*) marks the years with a leap month.

FIFTH CENTURY B.C. MOONS AND INTERVALS -- TABLE III
(Jerusalem Civil Time)

	B.C.	Conjunction 1 Nisan	Day of Week	Tr. Period (Days)	Full Moon	14 Nisan	Waxing Period (Days)	Year Length (Days)
	450	Apr 8.02--Apr 10	Thur	1.75	Apr 22.26	Apr 23	14.24	355
	449	Mar 27.05--Mar 30	Tues	2.71	Apr 10.95	Apr 12	14.90	384
	448*	Apr 14.76--Apr 18	Mon	3.01	Apr 29.97	May 1	15.21	354
	447	Apr 4.02--Apr 7	Fri	2.75	Apr 19.56	Apr 20	15.54	355
G & E	446	Mar 24.59--Mar 28	Wed	3.17	Apr 8.89	Apr 10	15.30	383
	445*	Apr 11.61--Apr 14	Mon	2.16	Apr 26.61 ☽	Apr 27	15.00	354
	444	Apr 1.31--Apr 3	Fri	1.46	Apr 15.63 ☿	Apr 16	14.32	384
	443*	Apr 20.28--Apr 22	Thur	1.49	May 4.33 ♉	May 5	14.05	354
	442	Apr 9.71--Apr 11	Mon	1.06	Apr 23.66 ☽	Apr 24	13.95	355
	441	Mar 28.84--Mar 31	Sat	1.92	Apr 12.26 ♈	Apr 13	14.42	384
F	440*	Apr 16.52--Apr 19	Fri	2.25	May 1.28 ♉	May 2	14.76	355
	439	Apr 5.60--Apr 9	Wed	3.17	Apr 20.96	Apr 22	15.36	354
	438	Mar 25.97--Mar 29	Sun	2.79	Apr 10.49	Apr 11	15.52	384
	437*	Apr 12.92--Apr 16	Sat	2.85	Apr 28.31	Apr 29	15.39	354
	436	Apr 2.61--Apr 5	Wed	2.16	Apr 17.42	Apr 18	14.81	384
	435*	Apr 21.62--Apr 24	Tues	2.16	May 6.09	May 7	14.47	354
	434	Apr 11.24--Apr 13	Sat	1.53	Apr 25.20	Apr 26	13.96	354
	433	Mar 30.58--Apr 1	Wed	1.19	Apr 13.61	Apr 14	14.03	384
	432*	Apr 18.30--Apr 20	Tues	1.47	May 2.56	May 3	14.26	355
	431	Apr 7.33--Apr 10	Sun	2.44	Apr 22.27	Apr 23	14.94	355
	430	Mar 27.48--Mar 31	Fri	3.28	Apr 11.95	Apr 13	15.47	384
	429*	Apr 14.34--Apr 18	Thur	3.43	Apr 29.86	May 1	15.52	354
	428	Apr 3.91--Apr 7	Mon	2.86	Apr 19.16	Apr 20	15.25	354
	427	Mar 24.61--Mar 27	Fri	2.15	Apr 8.22	Apr 9	14.61	384
	426*	Apr 12.63--Apr 15	Thur	2.14	Apr 26.90	Apr 28	14.27	354
	425	Apr 1.16--Apr 3	Mon	1.61	Apr 15.09	Apr 16	13.93	384
	424*	Apr 19.99--Apr 22	Sun	1.78	May 3.96	May 5	13.97	354
	423	Apr 9.11--Apr 11	Thur	1.66	Apr 23.57	Apr 24	14.46	355
	422	Mar 29.14--Apr 1	Tues	2.63	Apr 13.29	Apr 14	15.15	384
H	421*	Apr 15.89--Apr 19	Mon	2.88	Apr 31.28	May 2	15.39	355
	420	Apr 5.28--Apr 9	Sat	3.49	Apr 20.79	Apr 22	15.51	354
	419	Mar 25.91--Mar 29	Wed	2.85	Apr 10.00	Apr 11	15.09	383
	418*	Apr 13.93--Apr 16	Mon	1.84	Apr 28.68	Apr 29	14.75	354
	417	Apr 2.61--Apr 4	Fri	1.16	Apr 16.73	Apr 17	14.12	384
J	416*	Apr 21.54--Apr 23	Thur	1.23	May 5.49	May 6	13.95	355
	415	Apr 10.86--Apr 13	Tues	1.91	Apr 24.93	Apr 26	14.07	354
	414	Mar 30.92--Apr 2	Sat	1.85	Apr 14.57	Apr 15	14.65	384
	413*	Apr 17.60--Apr 20	Fri	2.17	May 2.59	May 3	14.99	355
	412	Apr 6.78--Apr 10	Wed	2.99	Apr 22.26	Apr 23	15.48	354
K	411	Mar 27.24--Mar 30	Sun	2.52	Apr 11.68	Apr 12	15.44	384
	410*	Apr 15.23--Apr 18	Sat	2.54	Apr 30.45	May 1	15.22	354
	409	Apr 3.93--Apr 6	Wed	1.84	Apr 18.49	Apr 19	14.56	354
	408	Mar 24.56--Mar 26	Sun	1.20	Apr 7.59	Apr 8	14.03	384
	407*	Apr 12.46--Apr 14	Sat	1.31	Apr 26.39	Apr 27	13.93	355
	406	Apr 1.70--Apr 4	Thur	2.07	Apr 15.89	Apr 17	14.19	384
	405*	Apr 19.40--Apr 22	Wed	2.37	May 3.88	May 5	14.48	354
	404	Apr 8.44--Apr 11	Sun	2.33	Apr 23.60	Apr 24	15.16	355
	403	Mar 28.68--Apr 1	Fri	3.09	Apr 13.21	Apr 14	15.53	384
	402*	Apr 16.58--Apr 20	Thur	3.19	May 2.08	May 3	15.50	354
	401	Apr 5.23--Apr 8	Mon	2.54	Apr 20.29	Apr 21	15.06	

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* The asterisk marks the years having a Veadar spring. The Assuan papyri are designated by letters in the left margin.