Abridged Biblical Calendar (abbreviation: ABC2) by Herb Solinsky. 7/04/2021

[1] Preface

The contents of this document are an abridgment from the author's *Treatise on the Biblical Calendar*. Expansions and additional documentation are in that source. The goal in this document is to present the material in a brief understandable form for those who do not have the time to wade through the full treatise.

The Hebrew Bible, with parts of Ezra and Daniel in Aramaic, is also called the Tanak. The name “Tanak”, with emphasis on the three consonants TNK, recognizes the division of this Bible into three distinct parts as preserved in Bibles printed by Jewish sources. The word “Tanak” will sometimes be used instead of the word “Scripture” or “Bible”.

I will provide literal translations of many Scriptures. For some significant words I will supply the Strong's number and often provide a transliteration of the Hebrew word in its standard singular form (for non-verbs) or its standard form (for verbs). Sometimes I will put the Strong's number and the transliteration in square brackets immediately after the English word. When documentation is supplied, the reader should consult the alphabetical bibliography at the end.

[2] Introduction to some Divergent Views to Begin the Month

Since I began examining the biblical calendar and its history in 1967, I have encountered many divergent beliefs concerning the time that the biblical month starts, yet all proponents of these views claim that their primary source for their conclusions is the Tanak. Some of these divergent beliefs for when a biblical month starts are:
(1) The sighting of the new crescent in the western sky near sunset.
(2) The lack of sighting of the old crescent in the eastern sky near sunrise about 24 hours after a thin crescent was sighted there. This lack of sighting begins the new month according to this view. This is the ancient Egyptian method for beginning the lunar month.
(3) The full moon begins the month.
(4) Considering the 15th day of the month to be the day of the full moon, count backwards to the first day of the month.
(5) The astronomical new moon (also called the conjunction) begins the month.

There are variations and further details on these views. The goal of this study is to present evidence that eliminates all except one of these proposals, namely the first view.

Some of the reasons that there are such divergent views among independent thinkers are:
(1) Lack of knowledge of the fine points of astronomy.

(2) Lack of knowledge of the history of astronomy.
(3) Lack of knowledge of some fine points of Hebrew.
(4) Permitting analogies to biblical contexts that are not related to the calendar to weigh heavily toward one's conclusions. Misapplied analogies are a major method toward leading one astray because lack of evidence is thereby counted as if it was evidence.
(5) Lack of recognition that some Scriptures are ambiguous and the insistence that one interpretation of the ambiguous Scripture is correct, and subsequently forcing other views to conform to the beginning ambiguous Scripture. Caution must be used to avoid this pitfall.

[3] Relevant Astronomy of the Moon and the History of Astronomy

(A) Ancient Egyptian and Israelite Mathematical Astronomy

The Tanak gives no hint of advanced mathematical astronomy from the days of Moses. Ancient Hebrew lacks any hint that the Israelites had a positional numbering system based on powers of 10 with a zero, or instead, using a different number base than 10. Ancient records attach a unique Hebrew letter to a major rounded number such as 100, 500, 1000, etc., instead of indicating a positional numbering system. This necessitates great difficulty in performing large computations, especially in division and the general use of fractions. The lack of a positional numbering system would pose a great handicap in developing mathematical astronomy within a society. The question about whether ancient Jews could have learned mathematical astronomy from neighboring cultures will now briefly be discussed.

The Jewish philosopher Philo of Alexandria (c. 20 BCE – c. 50 CE) came from a wealthy family and possessed an excellent secular education, but his writings reveal that he did not study mathematical astronomy. It is clear that such a subject did not have a general practical use and required too much effort for the vast majority of wealthy people to be motivated to master. Alexandria became the leading center of Greek science and mathematical astronomy after the death of Alexander the Great. While some ancient Greek books from the first century and before did have mathematical astronomy, they were not written for beginners. It was evidently expected that a very rare student that had the motivation to master this subject would need to learn it directly from an expert in mathematical astronomy rather than from a book. In the middle of the first century Pliny the Elder, who traveled and studied science extensively, and who wrote the multi-volume work Natural Science that included some astronomy, failed to include anything on mathematical astronomy. It is not reasonable to think that people in Judea in the first century mastered mathematical astronomy. To do so, they would have had to become very proficient in Greek, and then study under a rare expert in Alexandria. It is difficult

to comprehend why anyone in Judea would be motivated to do this, and the expense would have been great to pay the astronomer for long-term lessons and to live near the famous Library-Museum in Alexandria.

We possess many ancient records involving astronomy from ancient Egypt before the time of Alexander the Great c. 330 BCE, but none of it involves mathematical astronomy. The ancient Egyptians before Alexander did not have a positional numbering system, yet they were able to perform computations that were slow and awkward, especially in the area of multiplication and division of fractions. This would be a great handicap for the development of mathematical astronomy. Historians of ancient Egyptian science are agreed that while they possessed great skill in building edifices using mathematics, they did ***not*** have the mathematical astronomy to be able to predict the time of the conjunction before the Greek scientists moved to Alexandria after 330 BCE. Greek science was transplanted to Alexandria rather than its coming from native Egyptians.

(B) Ancient Babylonian Mathematical Astronomy and the Jews

The ancient Babylonians did develop a positional numbering system involving the base 60. It had the equivalent of a zero, and the positional use of fractions. Early mathematical texts from Babylon did not employ more than three positions with the base 60 because their applications did not require long numbers. But later from about 700 BCE onward, when they applied mathematics to astronomy, they used more positional characters and developed general methods for handling lengthy fractions. These mathematical tools were exactly what was needed for success in mathematical astronomy. They incorrectly assumed that heavenly bodies traveled in circular orbits and they did not understand the laws of motion that were developed before 1700 by Sir Isaac Newton in England. Thus they had limited success, but their achievements in mathematical astronomy were still impressive.

By about 750 BCE they were able to predict the day of lunar eclipses after having discovered the Saros eclipse cycle, which is 223 mean synodic months (18.03 years). They were first able to predict the approximate position of the planets by the sixth century BCE, and within the next two centuries they were able to do the same for the moon. It was more difficult for them to predict the day of a possible solar eclipse than a lunar eclipse because such a solar eclipse (covering of the sun) was comparatively rare and requires knowing whether the shadow of the moon will reach the earth, as well as the path of that shadow on the earth. They could not do this, but eventually, by about 360 BCE the Babylonian astrologer-astronomers who worked for the pagan temple enterprise could predict that a solar eclipse might occur on a certain day, and they could

even estimate its time if it would be seen. Their average accuracy in predicting the time of a solar eclipse was about three hours. Their average accuracy in predicting the time of a lunar eclipse was about one hour.

The reason for this difference in accuracy lies in the fact that the orbit of the moon around the earth is an ellipse rather than a circle, and the earth does not lie in the center of the ellipse. The moon travels faster around the earth when it is closer to the earth, so that the time from conjunction to full moon typically differs considerably from the remaining time from full moon to conjunction. Thus full moon does ***not*** typically divide the time from conjunction to conjunction exactly in half. Hence there is a lack of symmetry in the time pattern from full moon to full moon compared to the time pattern from conjunction to conjunction. All solar eclipses must occur during a conjunction, but the vast majority of conjunctions will not result in a solar eclipse in any one geographical part of the earth. The Babylonians were very interested in attempted predictions of solar eclipses, but they did not have any special interest in predicting ordinary conjunctions because that had no practical value for them.

Predicting eclipses did have a very practical use for the Babylonian temple astrologer-astronomers. It gave them great stature in the eyes of the king and the public, and it gave their claims of being able to predict the future credibility. Thus the king would be motivated to support them with contributions and pay for their predictions. For this reason these temple scholars kept their science of mathematical astronomy a secret unto themselves. To enhance this secrecy, they wrote their works in the cuneiform script, in the Akkadian language, which had become a dead language except to these temple sscholars and a very few other scholars in Babylon. Aramaic had become the common language of the people. When the House of Judah was taken captive by Nebuchadnezzar from 605 to 586 BCE, the common language there was Aramaic. Jewish scholars in captivity in Babylon as well as after their release into general society in Babylon had no access to the secret mathematical astronomy of the pagan priests that was written in cuneiform script, with its roughly 500 different symbols. In 538 BCE Cyrus the Great of Persia conquered Babylon, and the mathematical astronomy of the Babylonian priests continued as before, along with the use of the Babylonian calendar.

When Alexander the Great conquered the Persian Empire in 331 BCE, he forced the Babylonian temple astrologer-astronomers to reveal their methods to the Greek mathematicians, and thus their advanced methods were passed to the leading Greek scholars. These Greek scholars transformed the Babylonian methods into their own methods of circular geometry, which the Babylonian priests did not use. This transfer of mathematical astronomy occurred soon after 330 BCE, and from that time onward the leading Greek mathematicians could also predict eclipses with the same accuracy in

time. Moreover, the Greek geometric methods made it natural for them to approximate the time of conjunction with about the same degree of accuracy as the Babylonians predicted solar eclipses, that is, with an accuracy that averaged about three hours.

There is no reason to imagine that the pagan priests of Babylon would have shared their secret knowledge of mathematical astronomy with the Jews because they wanted to keep the prestige and profits from astrology to themselves. The complex cuneiform script in the dead Akkadian language was foreign to the Jews, and the Babylonian priests were hostile to the religion of the Jews. Indeed the prophet Daniel wrote of the hostility of the pagan priests toward him.

The basic conclusion is that the Jews did not have any good opportunity to learn advanced mathematical astronomy before the Temple was destroyed in 70 CE. Only Jews who lived in Alexandria would have been in the proper place of skilled Greeks. Jews who lived in Judea did not have the appropriate depth of knowledge of the Greek language to grasp the advanced learning that would have been required. At the time of Moses there was no advanced mathematical astronomy available for approximately predicting the time of the conjunction. The concept that the biblical month began with a rule that involved the advance prediction of the conjunction does not agree with the history of mathematical astronomy. Moses lived about 1000 years before the Babylonians were able to approximate the time of the conjunction.

(C) Astronomy of the Moon

Sir Isaac Newton was the first one to prove that all heavenly bodies that orbit other heavenly bodies (far away from significant interference by other heavenly bodies) travel in the path of an ellipse rather than a circle. Thus the earth's orbit around the sun is an ellipse, and the sun is not in the center of the ellipse. Also, the moon's orbit around the earth is an ellipse, and the earth is not in the center of the ellipse.

Because of the elliptical orbit of the moon, the day of the conjunction cannot be known from the day of the full moon. When Richard A. Parker was a professor at the University of Chicago, he wrote the following on the bottom of page 6 of Parker 1950: “The necessary time for full moon varies from 13.73 to 15.80 days after conjunction.” This is a swing of 2.07 days, which is about 49 hours 41 minutes. This shows that the conjunction (i. e., astronomical new moon) is not exactly opposite the full moon in length of time.

If one considers counting days beginning with the sundown-to-sundown day on which the conjunction occurs, then the full moon occurs from the 14th to the 17th day of the

count. The 17th is very rare.

If one considers counting days beginning with the sundown-to-sundown day that begins with the sighting of the new crescent in the western sky, then the full moon occurs from the 12th to the 16th day of the count. The 16th is very rare. Typically the full moon occurs on the 13th, 14th, or 15th day of the count.

(D) Introduction to Psalm 81:3

These facts bring to the mind of many people the following Scripture, which is here literally translated in the Hebrew word order.

Ps 81:3, “Blow at [the] new-moon [2320 *chodesh*] [the] shofar, [also blow it] at [the] full-moon [3677 *keseh*] on [the] day of our feast.”

Later the Hebrew words *chodesh* and *keseh* will be discussed further, but this verse is so relevant to the present fact of astronomy that it will not wait. Since the feast, whether the first day of the Feast of Booths or the first day of the Feast of Unleavened Bread, begins on the 15th day of the month, this verse certainly indicates that the 15th day of the month is the full-moon. (Certainly there are divergent views on how to translate this verse, and that will be discussed later.) To harmonize this with astronomy, I would conclude that the Hebrew word *keseh* indicates general roundness of the moon, but not perfect roundness, i. e., not necessarily the day of the perfect full-moon.

This is corroborated by the first century Jewish philosopher Philo of Alexandria who wrote in one place that the full moon occurs on the 14th day of the month, and in another place that the full moon occurs on the 15th day of the month. Instead of imagining that he was contradicting himself, it is best to understand that to Philo the full moon was not the exact full moon, but the approximately round moon.

This is further corroborated by the translation of the Tanak into the Syriac Peshitta, where the Syriac word in this verse is also *keseh*, and other examples of *keseh* in the Peshitta show that it means near the middle of the month, but not necessarily precisely the middle of the month, so that it is not forced to indicate perfect roundness of the moon. The Syriac language is an offshoot of first century Aramaic, which has much in common with Hebrew. Thus *keseh* is a cognate word in Syriac and Hebrew.

(E) Noah's Flood and the Length of a Biblical Month

This is also an appropriate place to bring up a question raised by Noah's flood

concerning the length of a biblical month. Gen 7:11 mentions that the flood began on the 17th day of the second month. In Gen 8:3-4 the wording seems to imply that 150 days passed until the 17th day of the seventh month. Here five months total 150 days, which divides out to 30 days per month. Some people have claimed from this data that during the time of Noah all months had 30 days and the astronomy of the moon around the earth was different from what it became. The Tanak does ***not*** say that ***all*** months during the life of Noah had 30 days! This is an interpretation of the little information that is supplied.

Another possible interpretation is quite simple. This may be explained by realizing that with so much water covering the earth, there would be thick clouds (with much rain at the beginning), so that when the month would normally begin, no moon could be seen to mark its beginning for five consecutive months. Therefore, the maximum length of the month, namely 30 days, would be forced. The length of a month was not declared by the sound of words from heaven, but was based on the lights in the heavens (Gen 1:14-18 to be discussed later). Lights are perceived or obscured according to human eyes that observe. At this point the reader is not expected to be convinced because the logical groundwork for the deduction has not yet been presented. Here astronomy is being discussed, and a few biblical ideas are being introduced because of its relevance to astronomy.

(F) Sun Dial of Ahaz and the Length of a Tropical Year

There is another miracle associated with "the shadow of the sun dial of Ahaz going back 10 degrees" in II Ki 20:11 and Isa 38:8. No one knows any details about this sun dial or the meaning of the 10 degrees. The context associates this with the time of Sennacherib, king of Assyria, in II Ki 19:35-37; 20:6; Isa 38:6. The 14th year of Sennacherib is mentioned in both II Ki 18:13 and Isa 36:1, and secular history along with biblical reference works date this to 701 BCE. However, archaeological evidence from Babylonian cuneiform inscriptions of astronomical eclipses and other events perfectly agree with computer calculations going backwards to 747 BCE, which verify the unchanging continuation of the orbits of the heavenly bodies back to that time. This proves that the miraculous event associated with "the shadow of the sun dial of Ahaz going back 10 degrees" was a miracle as perceived by people concerning the miraculous placement of light and shadow. Although a literal translation of Isa 38:8 appears to say that the sun itself moved back 10 degrees, the context is discussing the shadow of the sun moving 10 degrees rather than the sun itself. Hence "the shadow of" should be added in italics in order to read, "So [*the shadow of]* the sun returned 10 degrees" in verse Isa 38:8.

Some people have speculated that at some time before this event there were 360 days from one vernal equinox to the next vernal equinox, i. e., that the tropical year was exactly 360 days. There is ***no*** historical evidence upon which to base such a speculation. It is known that in ancient Mesopotamian history there was a desire to keep the payment of wages very simple to compute, and to always pay the same wage per day at longer intervals of time for payment. Using an *administrative* calendar to simplify payments, it was convenient to use 12 fictional months of 30 days each. Nowhere in ancient records is there evidence that such an administrative calendar exactly spanned the time from one vernal equinox to the next one. Some untrained popular writers have made declarative statements about this without cautioning the reader that this is an assumption without evidence.

(G) Joshua's Long Day and the Three Greatest Pyramids

People have conjectured that astronomy became altered during “Joshua’s long day” (see Josh 10:12-13). The earth rotates on its axis to produce the visual effect of the sun moving around the earth. But the sun does not actually move around the earth. When Joshua requested that the sun stand still, this was according to Joshua’s perception that the sun actually moved rather than the earth rotating. In this miracle, according to the literal Hebrew wording, both the sun and the moon appeared to stop moving according to human perception, so that light would be provided for the battle. The Bible is not clear how this miracle came to pass. This may have been a miracle of light perception or light movement rather than a temporary cessation of the rotation of the earth and a temporary cessation of the movement of the moon around the earth, or some other alteration of orbits involving the sun, earth, and moon. An astronomical alteration would have required a combination of many miracles including the prevention of massive ocean floods upon many shores as well as the falling of buildings and the imbalance in standing living creatures during the massive change in bodily momentum as the earth’s rotation would have been affected. It is far more plausible that the miracle involved human perception of light rather than an alteration in the relative position of the heavenly bodies. In any case, a literal reading of Joshua’s request does not take into account the reality of what happens astronomically, namely, that the earth rotates instead of the sun moving around the earth.

There are great historical monuments, namely the three greatest pyramids, that bear witness to the unchanging orbit of the earth around the sun with the earth's axis remaining very stable. These pyramids are carefully aligned with one wall exactly along the east-west line, showing the day of the equinoxes. These pyramids were built long before the time of Moses and Joshua's long day. Radiocarbon dating of wood in these pyramids approximates the time of Noah's flood. This is powerful evidence that the

astronomy of the sun relative to the earth did not change since the time that these pyramids were built. This is strong evidence that the length of the tropical year has remained stable since that time, except for the slight slowing of the rotation of the earth primarily due to the moon's tug on the earth's ocean bottoms.

When all of the above considerations are carefully pondered, the hard (non-speculative) evidence is that from the time of Noah until today the modern facts of the astronomy of the sun-earth-moon system prevail as true. I do believe that Noah's flood was a worldwide event as described in the Tanak.

(H) Conclusions from Astronomy and its History

Here are some conclusions from astronomy and its history.
(1) The variation in the orbit of the moon around the earth causes the time of the exact full moon to frequently ***not*** be close to half the time from conjunction to conjunction.
(2) Psalm 81:3 does ***not*** require that the exact full moon always fall on the 15th day of the month.
(3) The first day of the biblical month ***cannot*** be determined from knowing the day of the exact full moon.
(4) Without making unsubstantiated assumptions, there is ***no*** solid evidence that during the life of Noah all biblical months had 30 days.
(5) Without making unsubstantiated assumptions, there is ***no*** solid evidence that before Joshua's long day the tropical year had 360 days.
(6) Evidence from the three greatest pyramids indicates that modern astronomy of the sun-earth-moon system ***applies*** from the time of Noah until today.
(7) In the region of Mesopotamia and the eastern Mediterranean, the ability of humankind to approximate the time of the conjunction began c. 360 BCE by the Babylonians.
(8) Babylonian priestly knowledge of the conjunction passed to the Greek specialists c. 330 BCE.
(9) Historical evidence indicates that the Jews did ***not*** acquire the ability to approximate the time of the conjunction before the Temple was destroyed in 70.
(10) From the viewpoint of known history, the biblical month could ***not*** have begun with the conjunction because people at the time of Moses did ***not*** know how to approximate this time.

Here are some other significant facts of astronomy.

The maximum duration of a solar eclipse is less than 8 minutes.

During perfectly clear weather there are from one to three nights around the time of the conjunction when the moon cannot be seen at all.

[4] The Levitical Priesthood has a Role regarding the Calendar

According to the law of Moses certain activities related to the calendar are required to be performed by the Levitical priesthood. Specifically, at the beginning of each month, in the context of Num 10:1-10, notice the following activity of the priesthood.

Num 10:8, “And Aaron's sons, the priests, shall blow with [the two silver] trumpets.”
Num 10:10, “And on [the] day of your gladness, and on your appointed-times [4150 *moed*], and on the beginnings of your months [2320 *chodesh*], you shall blow with [the two silver] trumpets over your burnt offerings and over [the] sacrifices of your peace offerings, and they shall be to you for a memorial before your Almighty; I am YHWH your Almighty.”

A partial summary of this requirement from the law of Moses is that two priests (from Aaron and his seed) were to blow two trumpets on the first day of each month, thus giving the priests a role of significance in regard to the start of the calendrical unit of time called a month [2320 *chodesh*].

Consider the key wording by which Aaron and his sons become a priest.
Ex 29:7, “And you [Moses] shall take the anointing oil and pour [it] upon his [Aaron's] head and you shall anoint him.”
Ex 29:8, “And you shall bring his sons and clothe them [with] coats.”
Ex 29:9, “And you shall gird them [with] sashes, Aaron and his sons, and you shall bind turbans on them. And [the] priesthood shall be for them for an everlasting statute, and [in this manner] you shall fill [the] hand of Aaron and [the] hand of his sons.”

The *hand* is a symbol of power and authority. When verse nine literally states “fill the hand”, it means “to bestow authority upon”. Some translations simply have “consecrate”, which loses some of the punch.
Ex 40:15, “And you shall anoint them [Aaron's sons] as you anointed their father that they may be priests to Me. And this shall be so that their anointing shall be to them for an everlasting priesthood for their generations.”

Simply summarized, the males in lineage through Aaron shall have authority bestowed upon them as priests through a ceremony using the anointing oil upon their head. The direct Scriptures are Ex 28:41; 29:7-9; 30:30; 40:13-15.

Num 3:10, “And you shall appoint Aaron and his sons that they shall keep their priesthood. And the layman/outsider [2114 *zar*] who comes near shall be put to death.”

Num 18:6, “And I, behold, I have taken your [= Aaron and his sons] brethren the Levites from among [the] children of Israel; [they are] a gift to you [= Aaron and his sons] given to YHWH, to attend to [the] service of [the] tent of meeting.”
Num 18:7, “And you [= Aaron] and your sons with you shall keep your priesthood for everything pertaining to the altar and for that behind [the] veil, and you shall serve. I give your priesthood [to you as] a service of gift. And the layman/outsider [2114 *zar*] who comes near shall be put to death.”

Here a non-Aaronite is referred to as a layman/outsider [2114 *zar*], and if such a person attempts to come near (get close, meddle, or interfere), death shall be the punishment.

Num 3:10; 18:7 show punishment by death for violating the domain of the Aaronic Priesthood. An example of this punishment by death is seen in II Sam 6:1-8; I Chr 13:7-11. If some item, such as the two silver trumpets in Num 10:1-10, has a holy use for the priests alone, then anyone having the fear of the Almighty should refrain from meddling with it. To do so is a usurpation of authority.

Lev 10:8, “And YHWH spoke to Aaron saying,”
Lev 10:9, “you shall not drink wine or strong drink, you nor your sons with you when you go into [the] tent of meeting so that you shall not die; [it shall be] an everlasting statute for your generations”
Lev 10:10, “so that you may distinguish between the holy and between the common, and between the the unclean and between the clean,”
Lev 10:11, “so that you [= the Aaronic priesthood] may teach [the] children of Israel all the statutes which YHWH has spoken to them by [the] hand of Moses.”

Deut 24:8, “Take heed in an outbreak of leprosy, that you carefully observe and do according to all that the priests, the Levites, shall teach you as I commanded them, so you shall be careful to do.”

Jer 18:18, “... for the law shall not perish from the priest, or advice from the wise, or a word from a prophet.”

Mal 2:7, “For [the] lips of a priest should keep knowledge, and [people] should seek [the] law from his mouth, for he [is the] messenger of YHWH of hosts.”

Despite the above wording that shows the general summarized impression that the

priesthood was expected to teach the people the law of Moses, this function was not exclusive to the priesthood alone, as can be seen from the Torah next.

Deut 31:9, “And Moses wrote this law and he gave [it] to the priests, [the] sons of Levi who bore [the] ark of [the] covenant of YHWH, and to all [the] elders of Israel.”
Deut 31:10, “And Moses commanded them [= priests, Levites, and elders] saying, at [the] end of [every] seven years, at [the] appointed-time of the year of release at the feast of tabernacles”
Deut 31:11, “when all Israel comes to appear before YHWH your Almighty in [the] place that He shall choose, you shall read this law in the presence of all Israel in their ears.”

Thus the reading of the law every seventh year could be from the mouth of the priests, the Levites, and the elders, although the primary teachers of the law were shown above to be the priests.

Lev 21:10 begins with the Hebrew *v-ha-cohan ha-gadol*, which literally means “and the priest the great”, which is commonly translated “the high priest”. The Hebrew word *gadol* means “great” and it shows greatness in authority. The authority of the high priest is seen in Lev 21:10, “And the high priest among his brothers on whose head the anointing oil was poured, and [hence] whose hand was filled to put on the garments, shall not uncover his head nor tear his garments”.

Ps 133 shows Calendrical Unity via the Authority of the Aaronic Priesthood

Ps 133:1, “A song of the upward-steps, by David, Behold how good and how pleasant [is the] dwelling of brothers, yes-indeed in-unity.”
Ps 133:2, “[It is] like the good oil upon the head, descending upon the beard, Aaron's beard, descending upon the edge of his garments.”
Ps 133:3, “Like the dew of Hermon descending upon the mountains of Zion, because there YHWH commanded the blessing of life forever.”

Verse 2 mentions Aaron, the first high priest, who thus represents the Aaronic priesthood (Levitical priesthood). Anointing with oil upon the head bestows authority on the priest (Ex 28:41; 29:7-9; 30:30; 40:13-15). This is saying that dwelling in unity is like the oil of authority upon the Levitical priesthood, because unity can only come about if the priesthood properly teaches the law (Lev 10:8, 11; Mal 2:7) and signals the beginning of each month through their blowing of the two silver trumpets (Num 10:1-2, 8-10). Only then can there be spiritual unity, and with individual spiritual growth, the ideal outcome of this will be the blessing of eternal life (note Ps 133:3). The appointed-times, the days

of holy convocation, were indirectly announced by this priesthood at the beginning of the first and seventh months. This was a means of promoting unity in collective worship and unity of the days of holy convocation. There could be no opposing opinions and disunity concerning the day of the beginning of a month because of the authority of the high priest to achieve unity. This priesthood that was used to achieve unity was only given residence within Israel (Num 35:2-8).

To speak of pleasantness in unity, as seen in verse 1, implies a mental peace that can only come by willing agreement with the decision of the priesthood (Ps 133:1-2). If knowledge to achieve spiritual unity is attained, it should produce uniformity in recognizing the days of holy convocation, the appointed-times.

Through the symbol of oil, Ps 133 shows calendrical unity through the authority of the Aaronic Priesthood. Verse 1 shows that this unity is good and pleasant.
stated above, this Mishnaic concept is contradicted by Ps 133.

Positive evidence that calendrical unity was only to be achieved through the authority of the Aaronic priesthood does exist in Ps 133. In that psalm the unity of the brethren was to be achieved through the anointing oil upon Aaron's beard, which symbolizes the bestowing of authority upon that priesthood to bring about unity.

[5] Appointed-times and Years are known from Lights in the Sky, Gen 1:14-18

Gen 1:14, “And the Almighty said: Let there be lights in the expanse of the heavens to separate between the daytime and the night, and let them be for signs, and for appointed-times [4150 *moed*], and for days and years.”
Gen 1:15, “And let them be for lights in the expanse of the heavens to give light on the earth, and it was so.”
Gen 1:16, “And the Almighty made the two great lights, the greater light to rule the daytime and the lesser light to rule the night, and [He made] the stars [to rule the night].”
Gen 1:17, “And the Almighty set them in the expanse of the heavens to give light upon the earth”
Gen 1:18, “and to rule by daytime and by night, and to separate between the light and the darkness.”

In verse 14 the word *moed* appears, and all 222 occurrences of this word are shown separated into nine categories in Appendix A. From this appendix we note that the only categories that make sense in the context of periodically occurring events based on the heavenly lights are the annual festival(s), the seventh day Sabbath, and bird migrations.

Since the latter only occurs once and the former occurs 40 times, it only seems sensible to understand the appointed-times here to refer to the annual festivals and the Sabbath. Since the annual festivals are determined by, or embedded in, the calendar, this verse makes the calendar dependent on or determined by the lights in the heavens.

In verse 15 the word "them" refers back to the subject in verse 14, namely the lights. Thus verse 15 is saying in essence, "let the lights be for lights ... **to give light** on the earth". Even the names of the heavenly bodies are absent to put emphasis on the "light bringing" purpose and mission of these heavenly light bodies to fulfill the need to determine "signs, appointed-times, days, and years". The triply emphasized mission of light from the heavenly bodies (in verses 14-15) **to give light** to determine appointed-times (festivals and the Sabbath) and years must be given its appropriate place in thought and use. **Specifically verse 15 states "*to give light*", and thus it is the giving of light by the lights that is the key principle.**

The word "signs" [226 *oht*] in Gen 1:14 is used for the rainbow in Gen 9:12-13, for the ten plagues in Egypt, for the Sabbath in Ex 31:13, 17, for a miracle in Judg 6:17, for the prediction of two deaths in I Sam 2:34, and in other ways. Gen 1:14 is saying that the lights in the heavens are examples of signs. Carefully reread Gen 1:14 to note that it is not saying that signs [226 *oht*] are to determine the appointed-times and years. The subject of the sentence is the lights in the sky, not the signs. The light from the lights in the sky determine signs. The light from the lights in the sky determine appointed-times. The light from the lights in the sky determine days. The light from the lights in the sky determine years. Verse 15 shows that it is some aspect of the light from these lights in the sky that cause the determination.

The nature of the rulership of the heavenly lights mentioned in verses 16-18 is the dominance of their light, which again puts emphasis on the visible light from these lights. At the end of verse 16, concerning the stars, I added in brackets "to rule the night" because that is exactly what is mentioned about the lights, including the stars, in verse 18.

Using the conjunction (astronomical new moon) to start the month is contrary to the biblical emphasis and stress on the use of visible ***light*** to determine the appointed times. Some advocates of the conjunction theory claim that before the Babylonian captivity under Nebuchadnezzar, ancient Israel (specifically the House of Judah) determined the start of a month with the sundown that began a day, but the moon was invisible near that sundown. These people go on to claim that after the return from captivity under Ezra and Nehemiah, Israel, under the influence of the Babylonian calendar and Persian political dominance, no longer continued the alleged original practice since the time of Moses. To

judge the rationality of this view, let us read a couple of verses from Neh 8.

Neh 8:2, “And Ezra the priest brought the law before the assembly of men and women and all who could hear with understanding on the first day of the seventh month.”
Neh 8:9, “And Nehemiah who [was] the governor, and Ezra the priest the scribe, and the Levites who taught the people, said to all the people: Today is holy to YHWH your Almighty.”

Since the day that is stated to be the first day of the seventh month is definitely declared to be holy, it must have been determined correctly, and this was after the return from the captivity under Ezra and Nehemiah. Hence they could not have adopted a pagan practice contrary to what was correct under the law as taught by Moses. The Levitical priesthood had the proper pattern to determine the start of a month set in motion from this day onward down through the later centuries until the Temple was destroyed in 70 CE, and there is no known time during which the priesthood is thought to have had any significant doctrinal upheaval in its own ranks during this period.

Conclusions from this chapter:
(1) Gen 1:14-15 includes the concept that festivals, the Sabbath, and years are to be determined by the light coming from the lights in the heavens.
(2) Thus the biblical calendar is determined by light coming from the lights in the heavens.
(3) The theory that the conjunction should be used to determine the biblical month is contrary to the emphasis on light.

[6] A Month is a Cycle of the Moon

Appendix A explains the meaning of appointed-times in Gen 1:14 as festivals and the Sabbath.

Ps 104:19, "He made the moon [3394 *yahrayach*] for appointed-times [4150 *moed*], the sun knows its going-away."

This use of appointed-times establishes that the moon is one of the heavenly bodies specifically indicated in Gen 1:14.

I Ki 6:38, "And in the eleventh year in the month [3391 *yerach*] Bul, it [is] the eighth month [2320 *chodesh*], the house was finished for all its parts and for all its plans, thus he built it seven years."

I Ki 8:2, "And all the men of Israel were assembled toward King Solomon at the feast in the month [3391 *yerach*] Ethanim, which [is] the seventh month [2320 *chodesh*]."

Strong's number 3394 for moon (*yahrayach*) and Strong's number 3391 for month (*yerach*) have the same three Hebrew consonants and look the same when the vowels points are removed. (In the Hebrew language the 22 letters shown in the sections of Ps 119 are called consonants even though some of them act as vowels. The original Hebrew text of the Scriptures only had these 22 consonants. The vowels points (and some such marks are more than points, but that is the term by which they are called in Hebrew school) were added to aid pronunciation by the Masoretes about the year 650. This identical original appearance in the Hebrew word for moon (3394) and this Hebrew word for month (3391) shows that a biblical month is a cycle of the moon. These verses, I Ki 6:38; 8:2, also have another word for month [2320 *chodesh*], and it shows that the two different words, *yerach* and *chodesh*, indicate the same thing, a month.

[7] Full Moon occurs about the 14th and 15th Days of the Biblical Month

When Abraham departed from Haran and permanently moved to the Promised Land, the language of his environment changed from Akkadian to Canaanite. He was accompanied by a few hundred people who were essentially his servants. Over a few hundred years the language that this small group spoke gradually changed to a form of the Canaanite language because they were greatly outnumbered by Canaanites in their midst. Just to the north of the Canaanites, and even blending with them was the Ugaritic Kingdom. Thousands of ancient documents written in the Ugaritic language have been discovered and translated. The vocabulary of Ugaritic and ancient Hebrew are almost the same.

Scholars who know biblical Hebrew have no problem understanding ancient Ugaritic. Words that are the same in two closely related languages such as biblical Hebrew and ancient Ugaritic, and that appear in the same contexts are called cognate words, indicating that they have the same meaning in both languages. When the ancient Hebrews borrowed words from their neighbors and accepted them into their own language, the meaning was obviously borrowed along with the word, although over much time ancient Hebrew did modify or expand the meanings of some of its words. However, technical words are not expected to change in their basic meaning.

Both of the Hebrew words that mean month, namely *yerach* and *chodesh*, also occur in the Ugaritic language, and they are cognates. We can learn some the meaning of these words in ancient Hebrew through one clear context in ancient Ugaritic. In one Ugaritic text, the day of the month numbered 14 and subsequent discussion that may indicate the

next day, appears. A phrase for the full moon occurs there indicating that the full moon occurs about the 14th or 15th day of the month. This is good evidence that in the biblical month the full moon occurs near the 14th or 15th day.

In my readings concerning the ancient Ugaritic texts, I have seen nothing that would indicate any significant knowledge of mathematics or astronomy.

This Ugaritic context involving the full moon defeats the theory that the biblical month begins with the day of the full moon. Those who champion this theory argue for it on the basis of an interpretation of Ps 81:3.

[8] A Biblical Month is a Whole Number of Days

A cycle of the moon around the earth is about 44 minutes more than 29.5 days, but in this chapter we shall see from some verses using both of the Hebrew words for month, namely *chodesh* and *yerach*, that biblically speaking, a month is a whole number of days, with no fraction remaining. In Judea in the first century the Jewish culture did use a common term for hour, but earlier in ancient Israel's history, there is no small subdivision of time such as hours or minutes. However, by some unknown means, the night was apparently split into three "watches" (Ex 13:34; Judg 7:19; Ps 63:6; 90:4; 119:148; Lam 2:19).

If there is always clear weather for good visibility, and people look for the new crescent from Israel, then the number of days from one new crescent to the next new crescent will be 29 or 30. This is not true for all places on the earth. For example, with good visibility from southern Australia, this time internal can be 31 days!

The literal expression ***a month of days*** as seen in several Scriptures is idiomatically translated ***a full month*** in almost all translations. These examples (see Gen 29:14; Num 11:19, 20, 21; Deut 21:13; II Ki 15:13) show that a biblical month is a whole number of days.

[9] A Biblical Month has a Maximum of 30 Days

We have seen that a biblical month is a cycle of the moon around the earth, and it is a whole number of days. A cycle of the moon averages a little more than 29.5 days. The appointed-times (the festivals and the Sabbath) are implied from the Hebrew word *moed* in Gen 1:14. The occurrence of the festivals are based upon knowing when a month begins, and the lights in the heavens determine the festivals. This implies that the lights in the heavens determine the biblical month. The light of the moon must be involved

because a biblical month is a cycle of the moon.

Suppose the moon cannot be seen at all for some number of days when the month would normally be expected to end? How many days can a biblical month continue if the moon is not seen at all? There is a prophetic time when the moon will not give its light.

Based upon Isa 13:9-10; Joel 2:1-2; Ezek 32:7-8 there will be a future time when the sky will be darkened for some length of time, and the "day of YHWH" is associated with this time period. To students of biblical prophecy the context of Dan 7:21-27 fits that of the "day of YHWH". Dan 7:25 has the phrase "time and times and half a time". This identical expression is also mentioned in Dan 12:7 and Rev 12:14. The context of Rev 12:14 fits perfectly with Rev 12:6, and the latter is explicitly stated to be 1260 days.

The beast of Rev 13:6 fits perfectly with the beast of Dan 7:25, which is the fourth beast in Dan 7:7-8, 19-27. The "time and times and half a time" in Dan 7:25 was already shown to refer to 1260 days. Therefore, the 42 months that are mentioned in Rev 13:4-6 is the same time period of 1260 days, which is a "time and times and half a time".

Now "42 x 30 = 1260" and here "42 months is 1260 days. In this circumstance a month divides out to be 30 days. This may be explained by recognizing that the moon will not give its light, as shown in Isa 13:9-10; Ezek 32:7-8.

The result of this examination is the conclusion that a month is not permitted to have more than 30 days if the moon does not give its light or is not visible. This conclusion is also one method that was previously presented to explain the 150 days in five months during Noah's flood.

The extent of a month is from one sundown to some later sundown, with a total of 29 or 30 days, at least in theory. In practice, if there is a succession of months for which the sky is cloudy or rainy over all of Israel where people reside on days near the start of each of those months, then each of those months will have the maximum number of days per month, namely 30 days. Then, when the weather first becomes clear at the start of a month, that month may have less than 29 days to make up for the artificial prolongation of some months to 30 days.

[10] The Sun and Moon are the Primary Lights in Gen 1:14

From Lev 23:2-4 we note that the Sabbath is an "appointed-time" [4150 *moed*]. The Sabbath is often called the seventh day because it repeats in a seven-day cycle as is seen by the 50 day count to the Feast of Weeks. Thus the Sabbath is not determined by the

moon; instead it is determined by counting days, and days are determined by the alternation of darkness during the night followed by light during the day. This alternation of darkness and light is a result of the alternation of the absence and presence of the light from the sun, so that the sun is involved in determining this appointed-time, the Sabbath, but the moon is not involved for the following reason. Each month (or specific cycle of the moon) there are from one to three nights during which the moon cannot be seen at all, even with clear weather. During this period of invisibility of the moon, the days that are counted to arrive at the Sabbath have no contribution in counting light by the moon because the moon cannot be seen at that time. Notice the following description of rulership or dominance by the light of the heavenly bodies.

Ps 136:7, “To Him who made the great lights ...”
Ps 136:8, “The sun to rule in [the] daytime ...”
Ps 136:9, “The moon and the stars to rule in [the] night ...”

These verses show that the sun and moon are called the great lights, but the stars are also said to rule in the night. If it is not cloudy or rainy all night (and sometimes it is), it is possible to count the days by counting the nights during which one sees the stars as well as the daytimes during which one sees light given by the sun. However it is not possible to count days by counting the light from the moon due to its varying period of invisibility each month.

The use of the sun rather than the moon to determine the count to the Sabbath as an appointed-time, as well as calling the sun and the moon “the great lights” in Ps 136:7-9 and declaring the moon to be for appointed-times in Ps 104:19, show that the sun and moon are the major contributors as lights to determine the appointed-times.

[11] Blowing two Silver Trumpets on the Day that Begins each Month

Num 10:1-2, “And YHWH spoke to Moses saying, Make yourself two trumpets of silver. You shall make them of a hammered piece. And they shall be for summoning the assembly and for the breaking of the camps [to prepare to travel].”

The Hebrew noun (used as a gerund) that I translated “summoning” is *meekra* and has Strong's number 4744 (see BDB page 896, column 2). The Hebrew noun that I translated “assembly” is *adah* and has Strong's number 5712 (see BDB page 417, column 1).
Num 10:8, “And Aaron's sons, the priests, shall blow with [the two silver] trumpets.”

Num 10:10, “And on [the] day of your gladness, and on your appointed-times [4150 *moed*], and on the beginnings of your months [2320 *chodesh*], you shall blow with [the

two silver] trumpets over your burnt offerings and over [the] sacrifices of your peace offerings, and they shall be to you for a memorial before your Almighty; I am YHWH your Almighty."

Two general purposes are mentioned for these two silver trumpets in verse 2: (1) summoning the assembly, and (2) for the breaking of the camps. The latter purpose is relevant during the 40 years of wandering in the wilderness when they journeyed from place to place, and they also journeyed when going to war. Whenever the relevant people were called together for the purposes mentioned in this section, the trumpets were blown in specific ways to signal the nature of the event.

This shows that the Levitical priests were to blow two silver trumpets on all the important occasions, which included the first day of each month as well as on the appointed-times, and the latter include each seventh day recurring Sabbath as shown in Lev 23:2-3.

[12] Hebrew *chodesh* refers to the Day that Begins each Month

Now compare Num 10:10 with I Chr 23:30-31.

I Chr 23:30, "and [the sons of Aaron are] to stand every morning to thank and to praise YHWH, and likewise at evening,"
I Chr 23:31, "and for all the burnt offerings to YHWH for the Sabbaths, for the new-moons [2320 *chodesh*], and for the appointed-times [4150 *moed*] in the count [of animals], [according to the] ordinance concerning them continually before YHWH."

In I Chr 23:31 above we notice that the burnt offerings on the new moons [2320 *chodesh*] are mentioned, and in Num 10:10 above we notice that the burnt offerings on the beginnings of your months [2320 *chodesh*] are mentioned. The whole phrase "beginnings of your months" appears in verse 10 compared to "new-moons" in verse 31, showing that a month begins with a new moon. Verse 31 translated this word *chodesh* as "new-moons", while verse 10 translated the same word as "months". Other examples also show a double meaning for this word. Some examples where *chodesh* means "month" are Gen 29:14; Num 10:11; I Ki 5:14. Some examples where *chodesh* means "new-moon" are II Ki 4:23; Ezek 46:3; Hos 2:11; Amos 8:5. The last verse indicates that in ancient Israel the new moon day was treated as a public holiday where businesses were closed, although refraining from work on a new moon is not stated as a commandment in the law of Moses.

It has already been shown that a cycle of the heavenly body called the moon determines

a month. The translation “new-moon”, but without the hyphen, is the common translation for *chodesh* when it refers to the beginning of a month. Nevertheless, one may question whether “new-moon” is the best way to translate *chodesh*. Based upon Num 10:10 one may translate this single Hebrew word as “month-start” or “new-month” since it is definitely the beginning of a month. As already seen above, the word for moon is *yahrayach* [3394], which has no resemblance to *chodesh*. No Hebrew word for the physical body called the moon has a resemblance to the Hebrew word *chodesh*.

It is only through the other Hebrew word for month, *yerach* [3391], that we have the connection to the physical body known as the moon. On this basis it would be more literal to translate the Hebrew word *chodesh* as “month-start” or “new-month”. The Hebrew noun *chodesh* [2320] has the same consonants as the Hebrew adjective *chadash* [2319] (almost always translated “new”) and the Hebrew verb *chadash* [2318] (about half the time translated “renew” and half the time “repair”). The month following any month is not a renewal of the previous month or a repair of the previous month; instead it is indeed a new month. While the translation of *chodesh* as “new-month” seems more literal and precise than “new-moon”, the latter is so firmly accepted that this will be used in the present study.

What about the suggestion to translate *chodesh* as “renewed-moon”? The moon itself is older than it was the previous month and the physical body itself is not renewed. If one wishes to make a case for translating the word *chodesh* as “renewed-moon” based upon the light from the moon, this is quite subjective because *chodesh* has the primary affinity with month, and the month is “new”, not “renewed”.

If we apply Num 10:1-2, 8, 10 to the beginnings of the months as specified in verse 10 along with “summoning the assembly” in verse 2, the following conclusion is drawn. Two priests were to blow two silver trumpets to summon the assembly and thereby announce that a new month had begun.

Deut 16:16 shows that only three times during the year all men are commanded to appear at one central place, not at the start of all the months. Therefore, the summoning of the assembly at the beginning of their months pertained to those people that were near the one place where the two silver trumpets were blown and the sacrifices were performed. It did not pertain to all people throughout the nation.

Num 10:10 with Ps 133 shows the authority of the priesthood in declaring the start of each month through the blowing of the two silver trumpets. Num 28:11 also has the same phrase “and on the beginnings of your months”. The passage in Num 28:11-15 describes the burnt offerings, the grain offering, and the drink offering that is specific for

the priests to perform on the beginnings of their months. At this time when the people heard the specific sound of the two silver trumpets blown by the two priests, they then knew that the ceremony of the offerings for the beginning of the month were to begin soon. This sound would summon the people who were within a reasonable distance to come and witness the priestly ceremonies associated with the beginning of the month. This would be an occasion for prayers, singing, and playing musical instruments when the priesthood fully developed the service for the beginning of the month.

[13] The Month in Babylon began with the sighted New Crescent in the Western Sky

Hermann Hunger has been at the forefront of translating the cuneiform astronomical texts and understanding the details of Babylonian astronomy. He took over the work of Abraham J. Sachs who died in 1983. In the next quotation from Hunger he mentions the word *moonset*. This is the time when the moon reaches the western horizon and hence in a few moments it is no longer visible. First the moon is seen and watched until it sinks down to the horizon when it shortly disappears below the horizon. On the evening at which the new crescent is seen, moonset always comes after sunset. On this evening the time difference from sunset to moonset is almost always from 35 to 95 minutes. One day later this time difference generally increases by about 53 minutes. This context of the anciently recorded time from sunset to moonset that is part of the ancient diaries mentioned below shows that the new crescent was seen on the evening that began the first day of the month. Thus Hunger wrote below “it seems obvious”.

In response to an email question, on October 19, 2006 Hermann Hunger wrote the following in an email to the list members of the web site HASTRO-L, “Maybe the Babylonians didn't state this [the Babylonian month began with the sighting of the new crescent] as explicitly as we wish. But in their collected observations, nowadays called 'astronomical diaries', they regularly begin the section on a particular month with a statement whether the preceding month had 29 or 30 days. The next thing they note is the time difference from sunset to moonset on the evening of night 1 (remember, the [24-hour] day begins with the night, followed by daylight). From there it seems obvious that the first observable crescent moon after conjunction indicates the first day of a month. (Reference: A. J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*, Vienna 1988, 1989, 1995). Whether a month had 29 or 30 days was already watched for in Assyrian times, i. e., middle of the 7th century BC, see H. Hunger, *Astrological Reports to Assyrian Kings*, Helsinki 1992, Nos, 126 ff. And passim.”

Through examination of the literature, I note another method for explaining the beginning the month in Babylon, discussed next.

One letter, that is labeled number 303 (also labeled Harper 894) on page 208 in the book by Pfeiffer, was sent from an authoritative priest to the king of Assyria that contains the following: “On the 30th I saw the moon, it was in a high position for the 30th day; presently it will be as high as it stands on the 2nd day. If agreeable to the king my lord, let the king wait (for a report) from the city of Ashshur. The king my lord may then determine (for us) the (first) day (of the month).” The context of this letter mentions the phrase “saw the moon” as a contrast to not seeing the moon, so that this must refer to the first sighting of the crescent by the observer. Since this mentions that the moon was seen about as high in the sky as for a second day old moon, the author suggests that the king wait for a report from another location where perhaps the moon might have been seen one day earlier. The sighting was near the end of the 30th day of the month.

Here is a similar example from page 75 of Hunger 1992, where the completion of a damaged word in square brackets is by Hunger. It is catalogued as RMA 76: “We watched on the 29th day; the clouds were den[se], we did not see the moon. We watched on the 30th day; we saw the moon, but it was (already) very high. The (weather) of the 29th day has to do with it. What is it that the king my lord says?” Here the author suggests that if the weather had been clear one day earlier, it would likely have been seen. He wants the king to decide which of the two days should start the month.

In both examples the Assyrian king was to officially declare the first day of the month on the basis of the information provided. These examples and others like them make it clear that the sighting of the new crescent began the first day of the month in Assyria and Babylon.

Advancements in astronomical science led the Babylonian temple astrologer-astronomers to begin the practice of predicting the sighting of the new crescent about 450 BCE. However, this technical ability did not immediately affect the determination of how and when the Babylonian calendar began its month.

On October 20, 2006 Hermann Hunger wrote the following in an email to the list members of the web site HASTRO-L, “Further to the discussion of the Babylonian month, it is pretty certain that from at least about 300 BC (and probably earlier), the Babylonians no longer determined the beginning of the month by observation, but by advance prediction of the visibility of the lunar crescent made up to a year in advance.”

With clear weather the Babylonians knew there could be one, two, or three nights of invisibility of the moon. No month was permitted to have more than 30 days in the Babylonian calendar.

[14] Isaiah 47:13 and the meaning of *chodesh*

Isa 47:13 is a most interesting verse of Scripture because it teaches much about the Hebrew word *chodesh*. The period of Isaiah's visions is from c. 760 to c. 700 BCE. Isa 47:1, 11 is a prophecy that eventually Babylon would be defeated, and Isa 47:13 is a taunt directed at Babylon.

On page 8 of Rochberg 2004, she wrote, "The nightly watch of the sky seems to have been standard Babylonian practice since the reign of King Nabonassar (747-734 B.C.)." On page 2 of Swerdlow 1998, he wrote, "Prognosticate by the new moon they [the Babylonian astrologers] did, and by the full moon, and by the appearance of the moon, and by eclipses of the sun and moon, and by the risings and settings and conjunctions of stars and planets, and by halos and clouds and rain and winds, in short, by anything in the heavens, astronomical or meteorological, that could be taken as ominous, a prophetic sign given by the gods." When Swerdlow began with the words "prognosticate by", he meant that based upon the conditions that prevail during the time of the events mentioned, they would make predictions about the future with the intent that they would come to pass. With this historical context in mind, here is a literal translation of Isa 47:13.

Isa 47:13, "You [Babylon] are wearied with your many consultations. Now let [the] astrologers [1895 *havar*] of [the] heavens [8064 *shamayim*] stand up and save you, those who look-intensely [2372 *chozeh*] at [the] stars, those-who-make-known [3045 *yada*] at [the] new-moons [2320 *chodesh*], what will happen to you."

Some translations and commentaries on this verse attempt to interpret it in a manner that makes it appear to divide up the heavens into the signs of the zodiac. This is an error because the origin of the zodiac as 12 equally divided signs of the year began between 464 and 454 BCE. Horoscopes are based on the zodiac. The year 410 BCE is the earliest known text of a horoscope. The origin of both the zodiac and horoscopes is ancient Babylon. Today's knowledge of ancient Babylonian history makes it clear that *havar* should mean "astrologers". The context indicates that the declarations of the astrologers are predictions or prognostications. History shows that at this time the Babylonian temple astrologer-astronomers made predictions about the king and the nation.

In this verse the Hebrew word *chodesh* [2320] occurs in the plural, and it is preceded by the single letter lamed, which is a preposition that is pronounced "l". Pronounced together it is *leh-chadasheem*. The question arises concerning whether *leh-chadasheem* means "every month (i. e., monthly)" or "at the new moons" in Isa 47:13. Consider the

following factors.

(1) This plural form of *chodesh* with this preposition lamed occurs in five other places in the Tanak. These are I Chr 23:31; II Chr 2:4; 8:13; 31:3; Ezra 3:5. This preposition is flexible and its meaning depends on the context. It often means *at*, *for*, or *on*". In all six cases (Isa 47:13 being the sixth case) it may be consistently translated "at [the] new-moons". In the five examples outside Isaiah the context prevents it from meaning "every month".

(2) The translation "every month" is usually given in Num 28:14; I Chr 27:1; Est 3:7 where *chodesh* in the singular occurs twice in all three verses, and the preposition lamed is absent before these three double cases. The end of Num 28:14 literally means "month on month for [the] months of the year". In the Hebrew it is "*chodesh* [singular] *b-chadshoh* [preposition bet and singular] *l-chadshay* [preposition lamed and plural] *ha-shanah*". Here the plural form of *chodesh* is different from the plural form in Isa 47:13, though both have the preposition lamed. These three consistent examples show that the expression that is literally "month on month" (no lamed and no plural) means "every month"; thus there is no need for another expression to mean every month.

(3) In theoretical Hebrew grammar it would be a possibility for *leh-chadasheem* in Isa 47:13 to mean "every month", but there is no biblical context in which this is an example that is implied by the context. On page 395 of BDB, Isa 47:13 is quoted to end as follows: "who declare, at the new moons, of (the things) which are to come". Yet BDB contradicts itself on this, because on page 516, column 1, 9 lines from the bottom of the page, BDB states "*every* month" for *leh-chadasheem* in Isa 47:13. The Hebrew preposition lamed is very flexible, having a wide variety of meanings, so this is given as a grammatical possibility. Nevertheless, no known context implies that this was a method that was in fact used in the ancient Hebrew language to mean "every month".

(4) During the era of Isaiah, on each night the Babylonian astrologers examined the sky for anything unusual, and then such unusual events were used as the basis for prognostications. It would be needlessly redundant for the end of Isa 47:13 to mean "monthly" when in fact the examination of the heavens was a nightly matter. However, prognostications were made for every new moon even if it was a very typical new moon. More emphasis was placed on the new moons because that was of central importance to the Babylonian calendar since it began each month. Translations of reports to the Assyrian kings by those who supervised the nightly watchers of the skies that includes the time of the later life of Isaiah may be found in the book by Hermann Hunger 1992.

The above considerations provide good reasons to reject the proposal found in some

translations that *leh-chadasheem* in Isa 47:13 means “every month”.

The NRSV reaches an accurate literal sense of the whole verse. Isa 47:13 [NRSV], “You are wearied with your many consultations; let those who study the heavens stand up and save you, those who gaze at the stars and at each new moon predict what shall befall you.”

Because Babylonian prognostications were made for every Babylonian new moon regardless of whether anything unusual was seen at that evening, Isa 47:13 shows that the Hebrew word *chodesh*, new-moon, is also applicable to the Babylonian new moon!!! This shows that the fundamental concept that underlies the Israelite new-moon and the Babylonian new moon are the same. Since the Babylonian new moon day began with the sighting of the new crescent, provided that there was subsequent official recognition of this sighting, but without allowing a month to have more than 30 days, the same concept should apply to the biblical new-moon. Isa 47:13 is not the only evidence to be presented for this conclusion.

[15] The Biblical New Moon relates to the Sighting of the New Crescent

Before using Isa 47:13, we have seen that a month is a cycle of the moon, and the full moon typically occurs about the 14th or 15th day of the biblical month. We have also seen from Gen 1:14-18 that a month begins using the light from the moon as a visual indicator. The only visual discernible candidates for the biblical new moon that are available from this information are the old crescent and the new crescent. Isa 47:13 points to the new crescent. Gen 1:14 puts emphasis on the “lights”, that is, what can be seen.

Ancient Egypt had a civil calendar that ignored the cycle of the moon. But according to page 140 of Depuydt 1997, ancient Egypt also had a religious calendar that began its month with the morning one day after the old crescent was seen in the morning. The reason they waited until the morning after the morning on which the old crescent was seen, is that they could not know that the old crescent was actually the old crescent until one morning later when nothing was seen. This requirement to wait until one morning after the old crescent is one significant difference between the determination of the old crescent and the determination of the new crescent.

The Hebrew noun *chodesh* [2320] (meaning *month* as well as *new-month* or *new-moon*) has the same consonants as the Hebrew adjective *chadash* [2319] (almost always translated “new”, and having the meaning “new”) and the Hebrew verb *chadash* [2318] (about half the time translated “renew” and half the time “repair”). Hence the collective

association of ***new***, ***renew***, and ***repair*** is associated with the Hebrew word ***chodesh***, rather than the concept of old, dwindling, or thinning, which is associated with the old crescent. On page 403 of Wigram all 53 places where the adjective *chadash* [2319] occurs is shown. Some of these are not describing a physical thing, such as a new spirit and a new heart. Other things that are physical are also visible such as a new house (Deut 20:5), a new wife (Deut 24:5), new wineskins (Josh 9:13), new cords (Judg 15:13), a new cart (I Sam 6:7), a new sword (II Sam 21:16), a new garment (I Ki 21:29), a new bowl (II Ki 2:20), etc. On page 403 of Wigram all 10 places where the verb *chadash* [2318] occurs is shown. Some of these are not describing a physical thing, such as a renewed spirit. Other things that are physical are also visible such as repair the altar (II Chr 15:8), repair the house (II Chr 24:4), repair waste cities (Isa 61:4), etc. The moon is a physical object, so that when the concept of "new" is applied to a month based on the moon, it should refer to something that is visible. Gen 1:14-15 refers to lights in the heavens, and this is something visible. The new crescent is new, visible, and is based on the moon.

Therefore, from the choice of the Hebrew word *chodesh* for the new-moon, it must refer to the new crescent rather than the old crescent. Hence the biblical start of the month is seen to mean the new crescent without using Isa 47:13 as well as through using Isa 47:13.

An astronomical reason for a biblical month consisting of a whole number of days is that each new crescent first becomes visible close to sundown, which is the time that the Sabbath begins and a numbered day of the month begins. We thus see that from the biblical viewpoint, the average synodic month as a precise fraction of days, hours, and minutes is never hinted at in Scripture and is foreign to biblical thought.

In the context of Jerusalem Ezra 6:15 mentions the month Adar and Neh 6:15 mentions the month Elul. These are Hebrew transliterations of month names in the Babylonian calendar, but these verses are in the context of Jerusalem. Scripture is a witness here that ancient Israel adopted the month names of the Babylonian calendar by the time of Ezra and Nehemiah. This would cause confusion unless a biblical month began by the same concept as the Babylonian calendar. This evidence from Ezra 6:15 and Neh 6:15 is also in harmony with the conclusion from Isa 47:13, yet the reasoning from the books of Ezra and Nehemiah is independent of Isa 47:13.

[16] Philo of Alexandria and the Jewish New Moon in the First Century

As a Jew living in Alexandria, Egypt in the early first century, Philo discusses the new moon from his Jewish perspective. On page 333 of Philo_7 (Special Laws 2:41) Philo

wrote, “The third [feast recorded in the law] is the new moon which follows the conjunction of the moon with the sun.” Since this follows the conjunction, it must refer to the (visible) new crescent. On pages 391 and 393 of Philo_7 (Special Laws 2:141-142) Philo wrote, “Following the order stated above, we record the third type of feast which we proceed to explain. This is the New Moon, or the beginning of the lunar month, namely the period between one conjunction and the next, the length of which has been accurately calculated in the astronomical schools. The new moon holds its place among the feasts for many reasons. First, because it is the beginning of the month, and the beginning, both in number and in time, deserves honour. Secondly, because when it [the new moon] arrives, nothing in heaven is left without light, for while at the conjunction, when the moon is lost to sight under the sun, the side which faces earth is darkened, when the new month begins it resumes its natural brightness. The third reason is, that the stronger or more powerful element [the sun] at that time [the new moon] supplies the help [light] which is needed to the smaller and weaker [the moon]. For it is just then [at the new moon] that the sun begins to illumine the moon with the light which we perceive and the moon reveals its own beauty to the eye.”

In Alexandria, the leading center of Greek mathematical astronomy at that time, the conjunction is a well known concept to Philo, and he mentions the conjunction as a contrasting time to the new moon. It is clear that to Philo the Jew in the early first century in Alexandria, the new moon is the new crescent, and this begins the first day of the Jewish month. Evidently the Greek geometrical abstract concept of the conjunction had filtered down to the educated non-astronomer, Philo. He used this concept in writing to his audience without defining it, so he understood that his audience would also understand this term.

[17] The Beginning of the Month and I Samuel 20

I Samuel 20 is very instructive to show how the biblical month began during the time of Samuel the prophet when King Saul reigned. It will be shown from the wording of this chapter that no calculated calendar could have been used at this time in Israel's history.

At this time of David's young adulthood, he has already experienced attempts by King Saul to kill him (I Sam 18:10-11; 19:9-10), but his very close friend Jonathan, the king's son, has great difficulty believing that his father wants to kill David. In order to convince Jonathan that Saul wants to kill David, David devises a plan to cause Saul to reveal his attitude toward David in the presence of Jonathan. Notice that this plan involves a day count of three from the following literal parts of verses.

I Sam 20:5, “until the third evening”.

I Sam 20:12, “about [this] time the third morrow”.
I Sam 20:19, “and [on the] third [day]”.

This shows their advance confidence that it would probably take two successive days for Saul’s actions to bring to light his attitude toward David. They expected that Jonathan would witness two consecutive days of Saul's behavior. The context assumes that the reader will automatically understand this without any explanation. We need to carefully examine the context to note what the writer of the text expected the reader to know.

I Sam 20:5, “And David said to Jonathan, Behold, tomorrow [is a] new-moon, and I should sit with the king to eat ...”.

I Sam 20:18, “And Jonathan said to him, Tomorrow [is a] new-moon, and you will be missed because your seat will be empty”.

In these verses the word “tomorrow” is translated from the Hebrew word *machar*, Strong's number 4279. This word refers to the next daytime, which begins in the morning rather than sundown. According to the choice of Hebrew words in these verses, the beginning of the festivity relating to the new moon is in the morning rather than at sundown. In these verses there is no reference to the standard Hebrew word for day, which is *yom*, Strong’s number 3117. The use of the Hebrew word for new moon in these verses is not referring to a 24-hour day, but instead it refers to the time of festivity.

These two verses show that it was considered important for David to be present at a banquet hosted by the king due to a “new moon”, and there was a seat reserved for David. There is nothing in the context to suggest that this was the beginning of the seventh month and that a holy convocation was to take place. Indeed, if this had been the beginning of the seventh month, verses 5 and 18 would have more to say about why David would be missed! The reason given is the new moon, nothing more.

The Hebrew syntax in verses 27 and 34 is the same for one phrase that is not like any place in the Hebrew Scriptures where a numbered day of the month is mentioned. The Hebrew word order is “the *chodesh* the second”, which occurs that way four times in the Hebrew Bible: I Sam 20:27, 34; I Ki 6:1; I Chr 27:4. In the latter two places it means “the second month”. This expression “the *chodesh* the second” does not have the Hebrew word *yom* for “day”, does not have a preposition attached to the beginning of the number, and has the number after the word *chodesh*. These three factors do not occur in any place where a numbered day of the month is mentioned in the Tanak. A Hebrew expression for a numbered day of the month occurs 98 times in the Bible. In 92 of these cases the Hebrew preposition *bh* (meaning “in” or “on”) precedes the number. In two of

these cases the Hebrew preposition *ad* (meaning “until”) precedes the number. In 39 of these cases the Hebrew word *yom* (meaning “day”) occurs at the number. While there are a total of four cases (Ezra 3:6; 10:17; Est 9:19, 21) in the Tanak where a numbered day of the month is mentioned and no preposition is prefixed to the number, all of these cases do have the Hebrew word *yom*, and none of these four cases have the number after the word *chodesh*. There is no example in Scripture with the syntax as in I Sam 20:27, 34 to indicate that is could mean a numbered day of the month.

The Hebrew word *chodesh* sometimes means “new-moon” and sometimes means “month”, but because the syntax of this phrase in these two verses is never used for a day of the month, and because its meaning as “new moon” here gives a satisfying explanation to the context including the planned meeting of Jonathan and David on the third day from their initial meeting, *chodesh* will be translated “new-moon” below.

I Sam 20:27 literally states, “And it happened on the morrow of the new-moon the second, [the] place of David was empty. Then Saul said to Jonathan his son, Why didn't the son of Jesse come either yesterday or today to the meal?”

When the NASB is used, items in square brackets will show where the NASB has italics, indicating that no Hebrew word occurs for the italics. It may sometimes be useful to consider omitting the words in square brackets in the NASB because they are not based on words in the Hebrew text.

I Sam 20:27 [NASB], “And it came about the next day, the second [day of] the new moon that David's place was empty ...”

Thus there was something special about that meal on two successive days that made David's presence expected at both meals.

In verses 28 through 33 Saul and Jonathan dialogue with one another so that Jonathan becomes convinced that Saul wants to kill David.

I Sam 20:34 literally states, “And Jonathan arose from the table in fierce anger, and did not eat food on [the] day of the new-moon the second because he was grieved for David, for his father had dishonored him.”

I Sam 20:34 [NASB], “Then Jonathan arose from the table in fierce anger, and did not eat food on the second day of the new moon, for he was grieved over David because his father had dishonored him.”

I Sam 20:35 literally states, “And it happened in [the] morning that Jonathan went out [into] the field at [the] time appointed [with] David, and a little boy [was] with him.”

The morning in verse 35 is within the third day that David and Jonathan had planned to meet.

The special meal at the king's table on two successive days during which the presence of David, a national hero, was expected, shows that both meals were to commemorate the start of the month. The need existed to have two days of commemorative meals because they did not know in advance which of the two days would in fact begin the new month, and because evidently the new month was not declared on the first day of opportunity for its declaration. From I Sam 20:27 we can say that David and Jonathan did not know in advance which of two successive days would officially be declared the new moon day, because otherwise there would not have been a need for two successive days of a festive meal during which David was expected to appear. The phrase in I Sam 20:5, 18 that “tomorrow is a new-moon” is literally misleading because it can be expected to cause the reader to think that they knew in advance that tomorrow would in fact actually be the first day of the new month. It should be translated “tomorrow is the new moon [festivity]”.

I Sam 20:5, 18 was applied to the first day to come, and the designation of “new-moon the second” was given to the second day to come. The need to have a second day of commemoration indicates that on the first of the two days, the new moon was not officially declared by the Levitical priesthood to be the start of a new month by the blowing of two silver trumpets in accordance with Num 10:10.

The average length of a month is close to 29.5 days, and most of the time there is an alternation of 29 and 30-day months, although there certainly are exceptions. At the time that David and Jonathan first met, one would surmise that the previous month had 29 days, so that it was most likely that the current month that was nearly over would have 30 days. Thus, when David and Jonathan first met, they planned for the current month to be a 30-day month so that their next meeting would be on the third day rather than on the second day. They believed it was most likely that a second festive meal day would be needed due to an expected 30-day month. Therefore, when I Sam 20:5 and 18 speak of “tomorrow [is the] new-moon”, that refers to the festive national holiday (not holy day) on the first of two successive days during which the new month might begin. The author of I Samuel 20 expected the reader to understand that there was to be at least one, and possibly two, successive days of festive meals at the king's table at the start of each month.

The start of a month is used to determine festivals, so by Gen 1:14, the light of a heavenly body must determine the start of a month. The first light of the moon would not anciently be known until it was seen. I Sam 20 is evidence that the day of the new moon was not pre-calculated, because otherwise there would not have been a need to plan for two successive days of festive meals. A pre-calculation would have been calculated to precisely one day rather than a choice of two days.

I Sam 20:5 and 18 should be understood to mean "tomorrow [is the] new-moon [festivity]" rather than the officially declared new moon. In other words, David and Jonathan did not really know that "tomorrow" would actually be the first day of the new month. In fact they expected that "tomorrow" would not be the first day of the new month!

When reading Josephus, one must be on guard for any reason that Josephus might have for distortion in his account of an event. In his description of I Sam 20 it is difficult to see any reason why he might deliberately distort any technicalities of the story. This chapter should not have been a controversy among Jews in the time of Josephus. He was certainly living at a time when Hebrew was still spoken among the upper class in Jerusalem where he was reared in the first century. Josephus was born in the year 37, so he was 32 or 33 years old when the Temple was destroyed in 70.

Josephus corroborates the translation of ***second new-moon*** in his paraphrase of I Sam 20:27. On pages 283 and 285 of Josephus_5, Ant 6:236, we read, "But when, on the second day of the feast of the new moon, David again did not appear, he asked his son Jonathan why, both on the past day and on this, the son of Jesse had been absent from the festive meal."

The Greek word that Josephus uses for "new moon" in the above translation is *noumeenia* (Strong's number 3561), not the Greek word *meen* (Strong's number 3376), which means "month". Thus the NASB, taking the Hebrew syntax as it is, translates it so as to agree with Josephus who chose the Greek word for "new moon" rather than the Greek word for "month". The William Whiston translation is very poor here because he translates it as though Josephus used the other Greek word (*meen*).

Page 861 of the chapter by Moshe David Herr translates I Sam 20:27 "But on the morrow of the second new moon ...", and translates I Sam 20:34 "... and he ate no food the second new moon day". According to pages 84-85 of the book by Cahn, the Karaite Benjamin Nahawendi c. 825 CE understood I Sam 20:27, 34 similarly. The German interlinear translation by Rita Steurer also translated these verses using the German translation equivalent to "second new moon" rather than "second day of the month". The

German word for new moon is different from the German word for month.

On page 36 of the book by Solomon Gandz 1970 he wrote, “There can be no doubt that ‘on the morrow of the second new moon’ [in verse 27] has the same meaning as ‘on day of the second new moon’ [in verse 34] and that both phrases refer to the second day of the new moon festival, on which a festive meal was given at the King’s table and in which David was supposed to take part.” The very title of the chapter by Gandz is “The Origin of the Two New Moon Days”.

Within the above quote from Gandz, I have added the items in square brackets, and the two expressions enclosed within apostrophes have, in Gandz' work, the Hebrew words rather than the literal translation that I have substituted.

Horace was a Roman poet and satirist who wrote in Latin and lived from 65 BCE to 8 BCE. On page 20 of the book by Horace, Satire 1.9.67-70 states: “’Surely you wanted to tell me something, something confidential?’ ‘Oh, yes, but I'll choose a better time. Today is the thirtieth Sabbath. Why offend the circumcised Jews?’ ‘I don't care about religion’, I moan”.

Here the expression “thirtieth Sabbath” is a literal translation of Horace's Latin expression *tricesima Sabbata*. On page 375 of the book by Louis Feldman 1996 we find the following comment on this expression as found in the satire, “In summary, Horace's allusion in *tricesima Sabbata* is more effective if it refers not to some meaningless nonsense but rather to the thirtieth, a Sabbath, that is, the New Moon, so prominently celebrated in Horace's time.” Here it must be understood that the Jews desired to have a holiday (not holy day) on the new moon days. The Romans understood that the word Sabbath to a Jew meant a day on which he did not work at his ordinary job. It was easier for the Jews to tell the Romans that the new moon day that was the thirtieth of each month was always a Sabbath (called the thirtieth Sabbath) than to use other more accurate words from the biblical viewpoint. Biblically the new moon was not a Sabbath, but the Jews called it a Sabbath to simplify the implications of not working to the Romans.

The first of the two possible days of sighting the new crescent would place the first day of the month on the 30th day of the old month. Hence in Jewish practice of that time the 30th would be a holiday or a vacation day, and by loose extension (not technically correct), called a Sabbath. Since Horace expected his readers to understand him, this new moon holiday, called the “thirtieth Sabbath” was well known in Rome in the late second century BCE.

It was common knowledge in the Roman Empire during Horace's adulthood that Jews refrained from work on the first of the two possible days on which the new month might begin. This harmonizes perfectly with the implications from the Hebrew in I Sam 20:27, 34 and the whole chapter. The paraphrase by Josephus also agrees with this.

If Israelite society at the time of King Saul, when the prophet Samuel was still alive, was using a calculation to determine the start of the next month, there would have been no point in having two successive days of festive meals associated with the new moon, which shows an uncertainty of which day among two successive days that would start the month. Thus no calculated calendar could have been used at this time of Israel's history. Ancient Israel did not employ predictive astronomy for their calendar.

[18] Month Start Theories from Ps 81:3 and the double word *b-keseh*

Ps 81:3 contains the Hebrew word *chodesh* for new-moon. The grammatical structure of this verse along with the controversial Hebrew double word *b-keseh* has triggered some unusual theories concerning the biblical day of the new moon, i. e., the first day of the biblical month. Keep in mind that this is a poem so that it is often translated with capitalization that reflects different lines in poetry, and this accounts for the translation from the NASB below. This verse contains the double word *b-keseh,* which is the Hebrew preposition *bh* prefixed to the Hebrew word *keseh*. This preposition most typically means “in”, “at”, or “on”. The controversy does not involve the meaning of this preposition, but instead, the meaning of *keseh* along with its attachment to this preposition. Here is a literal translation of Ps 81:3.

Ps 81:3, “Blow at [the] new-moon [2320 *chodesh*] [the] shofar, [also blow it] at [the] full-moon [3677 *keseh*] on [the] day of our feast.”

(A) Three Translations of Ps 81:3

Compare the following three translations of Ps 81:3. In the Hebrew text this is numbered verse 4.

Ps 81:3 [KJV], “Blow up the trumpet in the new moon, in the time appointed, on our solemn feast day.”

Ps 81:3 [NASB], “Blow the trumpet at the new moon,
At the full moon, on our feast day.”

Ps 81:3 [RH 8a-8b on page 30 of BT-BEZ-RH], “Blow the horn at the new moon, at the

covered time [*keseh*] for our feastday."

The above quotation from a translation of the *Babylonian Talmud* has the square brackets with English transliteration copied from the original source unchanged in spelling, even keeping "feastday" as one word. In fact the ending "our feast day" is all one word in Hebrew, and this word has the grammatical ending that shows "our". All Scripture translations in this version of the *Babylonian Talmud* are actually in italics, but I quoted it without italics (yet with italics for the transliteration *keseh*) to achieve uniformity in printed style for all three translations.

Since the *Babylonian Talmud* is a commentary on the Mishnah and includes the words of the Mishnah, it would have to be consistent with the intent of the Mishnah. The Mishnah strongly and unambiguously supports the belief that the sighting of the new crescent with subsequent approval by appropriate Jewish authority establishes the start of the month, although no month is permitted to exceed 30 days. Consequently, this translation is *not* intended to imply to its readers that its phrase "the covered time" refers to total invisibility of the moon for the whole period of late afternoon through the night. On the contrary, the new crescent may be visible for about an hour before it sinks below the horizon, but this does not violate the intent of the phrase "the covered time". The vast majority of the night the moon is covered in the sense that no observer on earth can see any directly reflected light that originates from the sun but comes from the moon.

These three translations are very different for the Hebrew word *keseh*, where the KJV gives "time appointed", the NASB gives "full moon", and the *Babylonian Talmud* gives "covered time". The original intent of the Hebrew can only mean one of these choices.

The KJV "time appointed" is based on Rashi's opinion from the middle ages. Rashi had an aversion for translating it full moon, so he claimed that the text was corrupted in one letter, and thus he promoted the theory that it meant "time appointed". This should be rejected.

The NASB translation of "full moon" is correct because (1) ancient Semitic languages have contexts that show cognate words to *keseh* with this meaning; (2) Aquila's literal translation from the early second century has this meaning; (3) the Syriac Peshitta has the cognate word here, which meant the approximate time of the middle of the month; and (4) Jerome's translation from the Tanak to Latin has the meaning "the middle of the month", where this interpretation came from those Jews who taught Jerome Hebrew before 400 CE.

(B) Three Theories from Ps 81:3

In my personal discussions about the biblical calendar with various people over the years, based on the different choices of meaning for the word *keseh* in the context of Ps 81:3, I have encountered the following different theories:

Theory A (Full is Fifteenth): This theory claims that the biblical new moon, Hebrew *chodesh*, occurs on the day, so that after consecutive days of counting, makes the astronomical full moon always fall on the 15th day of the biblical month. Therefore, by counting backwards from the computed time of the full moon, the first day of the biblical month may be determined. This theory assumes that the sighting of the new crescent from Israel will almost always agree with this method, and this is done for simplicity. This theory utilizes a translation like the NASB. This is false as previously explained because the elliptical orbit of the moon does not have such a precise relationship between the first day of the biblical month and the 15th day of the biblical month.

Theory B (Full is New): This theory claims that the day of the biblical new moon, Hebrew *chodesh*, begins at the sunset that the full moon is detected, not about a half month earlier. Therefore, the first day of the biblical month begins with the detection of the full moon (not with a computation). This theory utilizes a translation like the NASB.

It was previously explained that the full moon occurs about the 14th and 15th days of the biblical month because the development of the Hebrew language in comparison to the environment of Israel shows the close affinity of Hebrew to the language of the Canaanites where there is an ancient context using Hebrew cognate words with the full moon about the 14th and 15th days of the month.

Isa 47:13 and also Ezra 6:15 and Neh 6:15 show the identification of the Israelite new moon with the Babylonian new moon. This argues against this viewpoint. Philo of Alexandria argues against this viewpoint.

After Ezra and Nehemiah returned to Jerusalem from the Babylonian captivity, Neh 8:2, 9 states that the day they called the first day of the seventh month was holy. This means that the biblical method to determine the first day of the month was still being used shortly after the Babylonian captivity. Hence their method to determine the first month did not get corrupted in Babylon during the captivity. With one hereditary priesthood from that time forward into the first century, it is difficult to imagine that the concept of what determined the first day of the month could change so radically that the start of the month could get shifted by about half a month, according to theory B.

Next, three verses from the Psalms will be presented that have a sentence structure similar to Ps 81:3 to show that the reader need not insist that the full moon defines the new moon based upon the grammar of this verse. Hence it is permissible to add the word "and" to the translation in order to give the correct sense to the reader. In poetry, normally expected words may need to be supplied in translation. The sentence structure of Ps 81:3 has the following three characteristics:
(1) The Hebrew word for "and" does not exist in the verse.
(2) The Hebrew has two or more prepositional phrases with the same preposition.
(3) Only one verb occurs, and this precedes the prepositional phrases.

These characteristics apply to the following three verses, all translated according to YLT because it preserves the Hebrew sufficiently to note the grammar.

Ps 13:2. "Till when do I set counsels in my soul? Sorrow in my heart daily?" Here "soul" and "heart" are not identical. The phrases are not near synonyms.

Ps 50:9, "I take not from thy house a bullock, From thy folds he goats." Here "thy house" and "thy folds" are not identical. The phrases are not near synonyms.

Ps 116:8, "For Thou hast delivered my soul from death, My eyes from tears, my feet from overthrowing." Here "death", "tears", and "overflowing" are not identical. The phrases are not near synonyms.

These poetic examples show that the two prepositional phrases in Ps 81:3 need not be near synonyms on the basis of the grammar. Hence this theory is merely a guess on the basis of grammar, and is defeated by the several reasons given above.

Theory C (New is Conjunction): This theory claims that the biblical new moon, Hebrew *chodesh*, is technically the time of the astronomical new moon (conjunction), not about one or two days later. The biblical day that begins on or after the conjunction is considered the first day of the biblical month. This theory utilizes a translation like the *Babylonian Talmud*, but its meaning of "covered" is taken to mean that the moon is not seen at all from late afternoon and all through the night. Here are the reasons to reject this viewpoint.

(1) Gen 1:14-15 refutes the use of the conjunction to determine the beginning of a biblical month because the conjunction is based on a calculation, and this is not a light.

(2) The time between the old crescent and the new crescent can allow from one to three nights during which the moon cannot be seen under clear weather conditions. In

practice, this means that the approximate time of the conjunction could not have been known without a computation.

(3) According to the known history of astronomy at the time of Moses, the Israelites did not have the ability to calculate the time of the conjunction.

(4) From Isaiah 47:13 the use of *chodesh* shows that the Babylonian new moon and the Israelite new moon were the same, and the Babylonian new moon began with the sighting of the new crescent. This is contrary to the use of the conjunction.

(5) Ezra 6:15 and Neh 6:15 use the Babylonian month names from Jerusalem, and this use of month names that avoid the conjunction is also contrary to the use of the conjunction.

(6) A careful study of I Samuel 20 shows that they did not know in advance how many days there would be in the month that was ending. Thus the conjunction was not used to determine the start of a month.

(7) According to Philo of Alexandria the Jewish month began with the sighting of the new crescent after the conjunction.

(F) Can *keseh* in Ps 81:3 be the verb *kasah* (3680)?

The only way that the verb *kasah* (3680), meaning "to cover" or "to conceal", can have the preposition *bh* prefixed to it (as it is in Ps 81:3) is if the verb has the infinitive construct form. The infinitive construct form of this verb is *ksoht*, not *keseh*. The form *ksoht* does not occur in Ps 81:3. Hence the verb *kasah* [3680] cannot be the Hebrew word in Ps 81:3. It so happens that a different grammatical form of this verb does look like *keseh*, but this is invalid grammar, so it simply cannot be the word here.

[19] From Where should the New Crescent be Sighted?

All biblical contexts that mention the festivals seem to take it for granted that there are no conflicts and that there is just one day that is holy for each specific commanded assembly. The only exception might be the start of the seventh month where ancient Israel would occasionally keep two successive days unless the first day of the two was confirmed to be the first day of the month (I Sam 20). The Aaronic priesthood was the authority that provided unity (Ps 133). They were only supposed to dwell within Israel (Num 35:2-8).

The borderline for visibility is wide and fuzzy. Humidity and a great height above sea level can even cause gaps in visibility. The wide fuzzy path of first visibility of the new crescent not only has gaps, but its path on the surface of the earth is curved and the curve varies from month to month for any one place. Any rule to reconcile this is arbitrary and subject to debate.

We do not have any Levitical priesthood functioning today, but if we are given the same information that they could have through postings on web sites, then we could presumably arrive at the same decision they would, thus simulating the priesthood..

The way to attain peace and unity is to use the implication of Paul in Acts 18:21 in which he showed respect for the determination of the calendar by the Levitical priesthood by wanting to be there for the feast.

The problems with using local visibility are:
(1) How is it defined in today's world?
(2) How is it consistent with Num 10:10; Isa 2:3; Micah 4:2 where the priests determine the new month from Israel?
(3) How can it avoid confusion and disunity (Ps 133)?
(4) Does it avoid arbitrary decisions of distance for accepting witnesses?
(5) What do you do in Australia where it sometimes requires a 31-day month for sighting with good visibility?
(6) It will sometimes cause part of the world to keep the festivals one month later than other parts as in 2007.

The advantages of using visibility of the new crescent within Israel are:
(1) The definition is simple.
(2) It is consistent with Num 10:10; Isa 2:3; Micah 4:2.
(3) It is unifying and avoids confusion – Ps 133.
(4) Over 90 percent of the time it is not a borderline situation and it is predictable.

The use of the international date line (IDL) for the 24-hour day, starting with sundown as it gradually sweeps across the globe, has attained worldwide acceptance by keepers of the Sabbath. The sighting of the new crescent from within the boundaries of Israel should determine the day, and this day should be accepted around the world based upon the IDL with sundown as it sweeps across the globe. Places to the east of Israel may sometimes have to observe two days for the first day of the seventh month as was done according to I Sam 20.

[20] Introduction to the Determination of the First Month

Gen 1:14, “And the Almighty said: Let there be lights in the expanse of the heavens to separate between the daytime and the night, and let them be for signs, and for appointed-times [= festivals, 4150 *moed*], and for days and years.”
Gen 1:15, “And let them be for lights in the expanse of the heavens to give light [215 *ohr*] on the earth, and it was so.”
Gen 1:16, “And the Almighty made the two great lights, the greater light to rule the daytime and the lesser light to rule the night, and [He made] the stars [to rule the night].”
Gen 1:17, “And the Almighty set them in the expanse of the heavens to give light upon the earth”
Gen 1:18, “and to rule by daytime and by night, and to separate between the light and the darkness.”

The names of the heavenly bodies are absent to put emphasis on the “light bringing” purpose and mission of these heavenly lights to fulfill the need to determine “signs, appointed-times, days, and years”.

Probing into Gen 1:14 with regard to its last word *years*, what could the lights in the heavens involve for years? Candidates include the sun, moon, stars, planets, and comets. The fact that the Feast of Tabernacles relates to a time literally described as “*in your gathering of the produce”* (the Hebrew does not actually have a past tense for this in Ex 23:16; Lev 23:39; Deut 16:13), implies that the biblical year closely approximates the agricultural year, so that the long-term average length of the biblical year is the same as the ordinary tropical year, which is about 365.2422 days. This eliminates the planets and comets from consideration for *years*, because their pattern of visibility has no relation to the period of the tropical year. In fact this also rules out the stars because the phenomenon described in astronomy books under the name “*precession of the equinoxes”* causes the time of the visibility of the constellations (certain star clusters that were given names) to advance 14.1 days for each 1000 tropical years. With the elimination of the stars, planets, and comets, only the sun and moon are left to consider. The moon determines the start of the months, but it does not determine which month is the first month. By process of natural elimination, the sun must be involved for the determination of years from the literal and direct viewpoint of Gen 1:14.

[21] Light Triggers

In order to understand what is intended from Gen 1:14 for *years*, we should look for a consistent pattern in what we already know about the beginning of *days* and *months*. Light from the heavenly bodies is a trigger for the events described. The light trigger for distinguishing a new day is the transition from light to dark of the sun. The light trigger

for beginning a new month is the new crescent in the western sky. Gen 1:14 declares that the lights themselves determine these matters, not a prediction of these lights, and not an approximate calculation of these lights.

For these two events (start of a day and start of a month):

(1) The light trigger occurs at the beginning of the event; and

(2) Only the lights themselves, no advance prediction or calculation is present. We should expect these two characteristics of a light trigger to apply to the determination of *years*. This continues the pattern.

To continue this biblical pattern we should expect these two characteristics of a light trigger to apply to the determination of each new year. Deut 11:12 has the expression "*from the beginning of the year",* showing that a biblical year has a definite beginning. Num 28:14 has the expression "*each month throughout the months of the year"*. Hence a year consists of whole months, and the months are numbered as seen in Lev 23. We need to consider a light trigger that determines the first month. To be consistent with the pattern having the two characteristics described, we should seek a light trigger that identifies which new crescent is the first in the year, it should occur at or shortly before that event, and the trigger should not require advance prediction.

As already mentioned, the sun must be involved. There are only four repeatable signs of the sun that recur in an annual pattern: the two equinoxes and the two solstices. Among these four, only the vernal equinox fits the time of the year that the Israelites left Egypt for the following reason.

Jer 36:22, "Now the king was sitting in the winter house in the ninth month, with [a fire] burning in the hearth before him."

This shows that the ninth month occurs in the winter. Since there are roughly three months per season, this would imply that the sixth month occurs in the autumn, the third month occurs in the summer, and the first month occurs in the spring. Of course the spring begins with the vernal equinox. Another Scripture that corroborates the involvement of the vernal equinox is Ex 34:22, which calls the Feast of Weeks the "*firstfruits of the harvest of wheat".* This occurs in Israel from about mid-May through early July. If you back up from this 50 days plus about another 20 with consideration for the count to the Feast of Weeks, that is about two months and 10 days. This also approximates the time of the vernal equinox. Hence two separate biblical identifiers lead to the vernal equinox. The other three signs of the sun are too far away in time to be candidates. Thus Scriptural descriptive approximations are used to point to the vernal equinox as the only candidate for Gen 1:14.

Therefore, from Gen 1:14 (along with some helping Scriptures) we note that the vernal

equinox is the trigger of light from the sun that points to the new crescent that begins the first month.

Next, consider why the vernal equinox must occur at or shortly before the first new crescent to fulfill the pattern and avoid advance prediction. For example, let us suppose that someone proposes that the first new crescent is the one for which the 15th day of that month is on or after the vernal equinox. That would mean when the new crescent for that month is seen, one would have to know in advance that when the 15th day arrives, it will be on or after the vernal equinox. Someone may argue why it should matter whether we know in advance. Why can't people merely wait until the 15th day arrives and compare that with the vernal equinox? In other words, why is it necessary to know at the beginning of the month whether it is the first month or the 13th? Consider the people in ancient Israel and what they were expected to do for the first month.

When people are expected to leave their homes to attend the Passover festival in one central location (Deut 12:5-7) throughout all Israel, they need to know at the beginning of the month whether it is the first month or the 13th month so they can make preparations of clothing, food, exchange of goods for silver, wagon repair, long distance travel over hilly land (Deut 11:11, and Jerusalem is about 3500 feet above sea level), etc. The whole family was ideally expected to go (Ex 12:25-27), so that travel was not rapid. They must prepare and leave in advance in order to arrive for the Passover. Gen 1:14 literally speaks of the lights in the heavens, not predicted lights in the heaven.

The conclusion is that the new crescent that occurs on or after the vernal equinox begins the first month. This definition for the first month is a natural result from Gen 1:14 and a few other Scriptures that relate to the year, such as Deut 12:5-7.

[22] What is the Biblical Vernal Equinox?

In this modern age astronomers define some astronomical terms in a way that would have been impossible for ancient people. This is primarily due to the fact that modern science has a three dimensional view of the solar system that ancient people did not have, and modern science recognizes that the sun is the body around which the other heavenly bodies of the solar system revolve compared to the ancient view that the sun and stars circled the earth (except for two known ancient astronomers whose views were not accepted). Another reason for differences in ancient definitions is that ancient people sometimes made incorrect assumptions besides the assumption that the sun and planets encircled the earth. Comparatively few people among today's laymen have examined the ancient meaning of the vernal equinox, and hence there is much confusion over the meaning of the vernal equinox.

What is the meaning of the vernal equinox from the biblical viewpoint? From page 353 of Ruggles 2005 we note the following about the three greatest pyramids in Egypt, all from Giza, “The sides of each of the Giza pyramids were carefully aligned upon the cardinal directions (north-south or east-west). This alignment followed established practice, but the accuracy with which it was achieved at Giza is truly impressive, particularly in the case of Khufu's pyramid [the greatest one]. Each of its sides is cardinally aligned to within six arc minutes, or one-tenth of a degree. This is equivalent to no more than one-fifth of the apparent diameter of the sun or moon. The other pryamids are only slightly less well aligned. Khafre's to within about eight arc minutes and Menkaure's to within sixteen.”

Estimates are that these pyramids were built before the time of Moses. In fact, radiocarbon dating, which makes some assumptions for its accuracy, dates these three pyramids to about 4500 BCE, near the time of the flood. The earth's axis and tilt has remained virtually constant for those years despite all the earthquakes and other upheavals this planet experienced because those pyramids have kept their east-west line in agreement with the equinoxes. When Ruggles used the term *equinox* in the above quote without any qualification, as a modern scientist he used it in a sense that agrees *in time* with the modern definition of equinox.

Ancient peoples could determine the true east-west line based upon the the fact that on the days of the equinoxes (and only on those days), the sun's path (and the sun's shadow of a vertically hanging rope) falls along the same straight line all day from sunrise to sunset. This is the straight line definition of the equinoxes. The vernal equinox is the day of the equinox when the weather is changing from cold toward hot in the northern hemisphere where Israel lies. This definition holds true for all areas except near the poles of the earth.

There is a spiritual significance to this straight line meaning of the vernal equinox. The straight line all day long of the sun's shadow relates to the straight path of your behavior that does not go to the right or the left.

Deut 5:32, “And you shall be careful to do as YHWH your Almighty commanded you. You shall not turn aside to the right or the left.”

The equinox represents a path of righteousness because it shows a straight line path all day. These are the only days on which it symbolizes being straight.

Mal 4:2, “But for you who fear My name the *sun* of righteousness will rise with healing in its wings, and you will go forth and skip about like calves from the stall.”

This indicates sinlessness and perfection, and the authority to make a person righteous and healthy. Specifically the vernal equinox shows the perfect time to await the first month. Any other clock for this purpose is a counterfeit.

The modern definition of the equinox is equivalent to the ancient method of seeking the day on which the sun's shadow makes a straight line all day.

Concerning the extremely high accuracy of aligning the largest ancient Egyptian pyramids with the east-west direction, and hence a precise knowledge of the time of the equinoxes by the ancient Egyptians, Neugebauer 1980 wrote on pages 1-2, “It is therefore perhaps permissible to suggest as a possible method a procedure which combines greatest simplicity with high accuracy, without astronomical theory whatsoever beyond the primitive experience of symmetry of shadows in the course of one day.” A diagram and further discussion by Neugebauer explain how the Egyptians could have achieved the accurate alignments without any mathematically sophisticated theory. The reason he sought and proposed this method is simply that his studies into ancient Egyptian mathematics and astronomy did not hint at any Egyptian ability to accurately predict the time of the equinoxes.

The concept of equal daytime and nighttime is really not part of what is implied in Gen 1:14 for lights in the heavens for ancient peoples. Equal daytime and nighttime is not a light marker when you stop to think about it!! Instead, this concept of equal daytime and nighttime is an accurate *measure of time*, which is not a light marker. Night is not a light. The abstract concept of equal daytime and nighttime requires a measure of nighttime compared with a measure of daytime. This requires the existence of some instrument that can accurately measure time to almost one minute of accuracy in a day. During the days near the equinoxes, the length of daylight changes by two minutes per day, so that some instrument that can accurately measure time to a resolution less than this would be required to make a true judgment of equal daytime and nighttime. A measure of time for a night is not a light. The concept of equal daytime and nighttime is really foreign to Gen 1:14.

Until the year 1656 when Christiaan Huygens invented the pendulum clock, there were no clocks accurate enough to determine when daytime and nighttime were equal. The biblical equinox is the straight line path all day, not equal daytime with nighttime. Many ancient peoples made the assumption that daytime and nighttime were equal on the days of the equinoxes, but this assumption was not capable of being verified in practice in ancient times. This incorrect ancient assumption should be rejected as the biblical meaning of the equinox. Only the practical meaning that could be physically determined should be accepted, and this is the straight line path of the sun all day. The straight line path would determine the same day all over the earth except near the poles. In contrast to this, the day of equal daytime and nighttime varies by as much as several days depending on the latitude of the observer on the earth because the refraction of the sun's light rays differs according to the latitude, and refraction will alter the length of daytime. Even Talmudic literature refers to the time of the equinoxes as the time of equal daytime

and nighttime, showing a false assumption that is contrary to the naturally intended meaning of Gen 1:14.

[23] Adoption of the Babylonian Month Names

The conclusion from Gen 1:14 that the first month is the one whose first day occurs on or after the vernal equinox will now be corroborated with a historical event that has a basis from Scripture.

The biblical books of Ezra and Nehemiah show the adoption of the Babylonian calendar's month names in the context of Jerusalem. In the fifth century when the Babylonian calendar became patterned (from 499 BCE onward), it began its first month on or after the vernal equinox. This agrees with the common sense understanding described above for Gen 1:14 and *years*. In the year 538 BCE Persia defeated the Babylonian Empire and adopted the Babylonian calendar, although they did not prevent local calendars from continuing to exist. For example, the local Persian calendar (the Zoroastrian religious calendar) still continued and the Egyptian civil calendar still continued. In fact the Persians dated legal documents in both the Babylonian calendar and the Egyptian civil calendar, thus using two calendars simultaneously.

In southern Egypt, the Persian Empire controlled the city of Scyene and the military base on the island of Elephantine where ancient documents have been discovered with events dated in both the Egyptian civil calendar and the Babylonian calendar. Before 1990 there was a debate within the scholarly community concerning whether these documents were dated using the Jewish calendar or the Babylonian calendar, but since the 1990 paper by Bezalel Porten was published, we have solid grounds for the scholarly acceptance that the Babylonian calendar was used there. The Egyptian civil calendar had 12 months of 30 days each, plus five additional days, so that each year had exactly 365 days. In the ancient Persian capital city of Persepolis, ancient documents have been found with events dated in both the Persian version of the ancient Egyptian civil calendar and the Babylonian calendar. The Persian version of the ancient Egyptian civil calendar also had 12 months of 30 days each, plus five additional days. However, the names of the months were different and the placement of the five additional days was different. A simple chart could be used to convert any date from the Egyptian civil calendar into its Persian version. All this illustrates that the Persian Empire did not demand uniformity in calendar usage within its empire.

Neh 5:14 shows that Nehemiah was appointed governor of Judah under the Persian King Artaxerxes. This shows that Judah was part of the Persian Empire, not a fully

independent nation. Yet in Neh 13:30 the words of Nehemiah are, “Thus I purified them [the people in Judah] from everything foreign...” Nehemiah had the authority to keep the religion pure even though Judah was part of the Persian Empire. Persia allowed the different peoples within its empire to keep their own religion. In Ezra 6:15 and Neh 6:15 we see the adoption of the Babylonian month names into the calendar of Jerusalem after Ezra and Nehemiah returned to Jerusalem from the exile to Babylon.

To avoid confusion within the Persian Empire, the only way that Ezra and Nehemiah would have accepted the Babylonian month names into their religious calendar would be for those months to agree with the months in their own calendar, except in rare cases. Of course some months may differ by one day due to rain or a borderline case of visibility. Perhaps once or twice in that century with a borderline case near the vernal equinox and a rainy day, they might be different that year by one month to begin the year. The common bond that would cause Ezra and Nehemiah to accept the Babylonian month names into their religious calendar within the same empire is for them to notice the natural boundary of the vernal equinox for the first month.

We understand how the ancient Babylonian calendar works because their eclipse records agree with modern computer simulation data for those eclipses. There are hundreds of eclipse records from ancient Babylon between 747 BCE and the first century. About 200 of them also have the time of day based on their water clocks whose smallest unit of time was four minutes (= 1/360 of one day). Using computers and the formulas of astronomy to compute the time of those eclipses that were time-stamped by the ancient astronomers, John M. Steele has published papers showing that the accuracy of their water clocks averaged eight minutes for the time of those eclipses!! The only way that all that data could work out so precisely is that modern scholars have certainly proved that we know the dates of the ancient Babylonian calendar except for some one day possibilities based on rain or clouds hindering the sighting of the new crescent.

There is a lack of agreement among scholars concerning which Persian king ruled during the time that Esther was queen. The scholarly views proposed are all in the fifth century BCE.

Est 9:20-21 [NASB], “Then Mordecai recorded these events, and he sent letters to all the Jews who were in all the provences of King Ahasuerus, both near and far [this would include Judah], obliging them to celebrate the 14th day of the month Adar, and the 15th day of the same month annually...” Est 9:1 states that the 12th month is Adar. The context is the region called Susa (Est 9:6), and Est 9:26-32 shows this to be the origin of the Jewish festival of Purim. Ezra 6:15 mentions the same month name Adar taken from the Babylonian calendar's 12th month.

[24] The Passover Letter shows the Jerusalem Nisan was the Babylonian Nisanu

One of the Aramaic letters found at Elephantine is known in scholarly circles today as the Passover Papyrus. The Hebrew-Aramaic alphabetic characters in this letter along with an English translation are found on pages 56-57 of Lindenberger. In the following quotations from the letter, the square brackets and the contents within them appear on page 57 of Lindenberger. The letter contains “This year, year five of King Darius”, which dates the letter in 419/418 BCE. There are gaps in the letter because it is poorly preserved. The addressing of the letter says “[To] my brothers Yedanyah and his colleagues, the Jewish garrison, from your brother Hananyah”. It was written from one Jew in friendship to the Jews on the island with whom the author had familiarity. Part of the preserved text of the letter says, “Be scrupulously pure. Do not [do] any work [...]. Do not drink any [...] nor [eat] anything leavened [... at] sunset until the twenty-first day of Nisan [...]”. Another translation of this same segment of this letter is on page 283 of Whitters where he adds in square brackets some guesses in gaps in the text as follows, “be pure and take heed. [Do n]o work [on the 15th and the 21st day, no]r drink [fermented drink, nor eat] anything [in] which the[re] is leaven [from the 14th at] sundown until the 21st of Nis”. Note that the final letter of Nisan is missing in the poorly preserved papyrus so only “Nis” is shown. This provides historical evidence that after the return from exile under Ezra and Nehemiah, Jews named the first month Nisan as a substitute for the word *aviv*. On page 283 Whitters comments, “The letter came from one Hananiah, who apparently wanted the Jews in Egypt to celebrate Passover and Unleavened Bread appropriately. The address and greeting rule out a local Egyptian official or Persian overlord.” If the name Nisan was not significant for the first month to Jews, the letter could simply have said the first month or used an expression with Abib (Hebrew *aviv*) to signify the first month. This should be accepted as ancient historical evidence outside the Tanak that Jews of the fifth century BCE considered the Babylonian month name Nisanu as equivalent to the first month of their year.

[25] Summary of Evidence that favors Specific use of the Vernal Equinox

(1) Gen 1:14-18; Ex 34:22; Jer 36:22 were explained to show that a light trigger from a heavenly light determines the beginning of the year, and specifically the light trigger is the vernal equinox. The new crescent on or after the day of the vernal equinox begins the first month of the year, using Deut 12:5-7 (”one place” and the needed time to arrive).
(2) The Babylonian calendar's first month was named Nisanu, which the Jews transliterated into Hebrew as Nisan. From 499 BCE onward the Babylonian calendar did not permit Nisan to begin before the vernal equinox. Ezra 6:15; Neh 6:15 show the use of Babylonian month names in Jerusalem, yet with Jews using these names throughout

the Persian Empire. (3) Est 9:1, 20-21 shows the twelfth month to always be Adar in the Persian Empire. (4) The Passover Letter in 419/418 BCE, written from a Jew in Judea to Jews on the island of Elephantine near the southern border of Egypt where Persians administered the Babylonian calendar, explained that Nisan was the month of Passover. This shows that the Jew who wrote the letter from Judea expected that Nisan in the Babylonian calendar would be the same as Nisan in Judea, since that was the month of Passover. Thus this letter that has survived in the very dry desert from over 2400 years ago on this island is primary historical evidence that the month names in Jerusalem were expected to agree in time with the same month names in Persia. (5) Philo of Alexandria in the first century states that the vernal equinox begins the first month as in other nations (those toward the east still used the Babylonian calendar).

[26] Claims that the Barley in Israel determines the First Month

The following literal translations are provided as a reference to Scriptures that are sometimes claimed by some people to show that barley determines the first month of the biblical year. These translations are based on a thorough study of the Hebrew words from all biblical contexts, several lexicons, and several commentaries over many years.

Ex 9:31, "And the flax and the barley were ruined because the barley [was in the] ear [= ***aviv***] and the flax [was in] bud."
Ex 9:32, "But the wheat and the spelt were not ruined, for they [ripen] late."
Ex 12:2, "This month [shall be] to you [the] beginning of [the] months. It [shall be the] first of [the] months of the year."
Ex 34:18, "You shall keep [the] feast of the *matsot*. Seven days you shall eat *matsot*, which I commanded you at [the] appointed-time of the month of *aviv* because in the month of *aviv* you went out from Egypt."
Lev 2:14, "And if you-offer a cereal-offering of firstfruits [= *bikurim*] to YHWH, you-shall-offer ears [= ***aviv***] roasted/parched-grain with fire, [that is] fresh-grain crushed-grain [for a] cereal-offering of your-firstfruits [= *bikurim*];
Lev 2:15, and you-shall-put oil upon-it and lay frankincense upon-it; it [is] an offering.
Lev 2:16, And the priest shall burn its-memorial-portion from its-crushed grain and from its-oil with all its-frankincense, an [offering by] fire to YHWH."
Lev 23:10, "Speak to [the] children of Israel and say to them, 'When you come into the land which I am going to give to you and reap its harvest, then you shall bring [the] first [= *raysheet*] sheaf [= *omer*] of your harvest to the priest.
Lev 23:11, "And he shall wave the sheaf before YHWH for your acceptance on the morrow of the Sabbath the priest shall wave it,
Lev 23:12, "on [the] day that you wave the sheaf you shall offer a year old male lamb without blemish for a burnt offering to YHWH

Lev 23:13, “and a cereal offering with it, two-tenths [of an ephah] of fine flour mixed with oil, an offering by fire to YHWH, a pleasing odor and its drink offering of a fourth of a hin of wine.
Lev 23:14, “You shall not eat bread, nor roasted/parched-grain, nor fresh grain until this same day, until you have brought [the] offering of your Almighty. It is a statute forever throughout your generations in all your dwellings.'”
Deut 16:1, “Keep [the laws of] the month of *aviv* and perform the Passover to YHWH your Almighty because in the month of *aviv* YHWH your Almighty redeemed you from Egypt [by] night.”
Deut 16:9, “Seven weeks you shall count for yourself from [about the time] you begin [to put the] sickle to standing-grain, you shall begin to count seven weeks.”

Here are additional comments relating to the above verses, barley, and *aviv*.

(1) The context of the hail plague in Egypt in Exodus 9 states that all the barley was ruined throughout all the land of Egypt. Barley was grown near the banks of the Nile River for a distance of 500 miles from the Mediterranean Sea southward. It was warmer in the south of Egypt than in the north, so that the period of variation in the ripening of barley in Egypt before the Aswan Dam was built was five weeks. For all of the five weeks variation in ripening, the word ***aviv*** is used in Ex 9:31 to describe the state of the barley. This length of variation in the growth of barley shows that *aviv* in Scripture applies to a wide range of stages of growth of barley rather than only one stage of ripening. Therefore, *aviv* is much too loose a word to pin down only one month to which it may refer. The variation of climate in Israel causes the ripening of barley to vary over a seven week period depending on the location in Israel, and the meaning of *aviv* is very loose, covering several stages of growth of barley. This is too wide a range to pin down only one month from such a vague description. In order to use **barley as a trigger** to determine the first month, it would have to signify a clearly discernible objective test in Israel that would provide a “yes or no” decision by the end of a month that would be the last of the months of the year that was ending. Since the meaning of *aviv* is wide rather than narrow, such a ***trigger*** is impossible with the use of barley. The word *aviv* means “ear or ears [of grain]”.

(2) On the sunlit side of the moon, the temperature on the surface of the moon is a little above that of boiling water because of the energy from the sun. This heat is caused by the lack of an atmosphere on the moon. It is the presence of an atmosphere on the earth that reduces the heat energy from the sun differently at different times of the year in different places on the earth. It is actually the atmospheric conditions on earth that are especially influenced by the tilt of the earth's axis that enables the temperature to warm as the winter is ending in Israel. Thus the atmospheric conditions on earth allow an

increase in heat and thereby enables the winter barley to grow and ripen. In ancient Israel as shown by usage in the Scripture, it was understood that the sun was responsible for heat in the summer, but the word for light was not recognized as being responsible for heat. The word that was repeatedly stressed in Gen 1:14-18 is ***light***, not heat. The biblical trigger is light, not heat. The word "**sun**" (indicative of heat) is not used in Gen 1:14-18. Thus Gen 1:14-18 is genuinely an astronomical context, not an agricultural context because of its use of light and its avoidance of heat. Heat would indicate an influence on crops such as barley. Light does not do this as it is used in Scripture. A primary point is also that the sun is **not** responsible for the ripening of barley, but instead it is the increase in heat that is caused by the **atmosphere** on the earth. Without the atmosphere, the surface on the earth would exceed the temperature of boiling water.

(3) When the Israelites celebrated the Passover (Josh 5:10-12) very soon after they first crossed over the Jordan River, they did not go looking for the state of the barley in various regions of Israel. They were in the lower Jordan River valley where barley regularly ripens the soonest in the seven weeks variation within Israel. Barley is in the ear (***aviv***) in February in the lower Jordan River valley. While no one who wants to use barley to begin the first month seems to want to begin the first month in February, that is what such a viewpoint would favor based on the wide use in the meaning of *aviv* indicated by the hail plague. Those who favor the use of barley to determine the first month claim that *aviv* refers to **only one stage** of the ripening of barley, which contradicts its use in the hail plague throughout all of Egypt.

(4) Nothing in the description of the firstfruits offering in Lev 2:14 restricts ***aviv*** to only one stage of the ripening of barley. This is further evidence of the inability to use the concept of *aviv* as a narrowly defined trigger for a "yes or no" objective decision. Since Scripture does give the clear meaning from the hail plague that *aviv* is broad in the scope of the stages of ripening of the ears or heads, it is not suitable as a trigger for Gen 1:14 where years is concerned.

(5) The claim that Gen 1:14-15 is to be interpreted in a manner that makes the light from the sun merely an indirect source for the ripening of barley, not only ignores the ancient Israelite cultural usage of light as found in the Tanak, but it avoids a literal understanding of Gen 1:14-15, and thus casts aside the very Scripture that is intended to explain how to determine the first month on the basis of a light trigger. The presence of "years" in Gen 1:14 prevents the light trigger for years from being cast aside. The other corroborating evidence from the Passover Letter and the biblical use of Babylonian month names is also cast aside. Neh 8:2, 9 shows that those who returned from the Babylonian exile had preserved the calender from before the exile because they knew to declare a date as **holy**.

(6) In the Hebrew text where all six places in which the "month of *aviv*" occurs, the Hebrew definite article exists before the word *aviv*. This is also true of the month name Ethanim (the seventh month) in I Ki 8:2. What distinguishes the first month and the seventh month from all other months is that the greatest number of festivals fall in those months. In fact, the only festival that occurs outside of those two months is the Feast of Weeks. We have no historical record that explains the reason that these two month names have the definite article before them, so that people are free to speculate upon the reason. One reasonable speculation is that these months are special in the sense that they contain most of the festivals. Reasons for having a definite article before Hebrew nouns vary, unlike typical use of the English language. Some proponents in favor of using the barley to determine the first month claim that the definite article before *aviv* proves that the description implied by the word *aviv* is so specific that it cannot apply to any other month. This is a false speculation because the use of *aviv* in the context of the hail plague shows that it applies to multiple stages of the growth of barley, which spans five weeks in Egypt.

(7) Some proponents of the use of barley to determine the first month claim that the placement of Ex 12:2 (see the translation above) in Scripture proves that the first month is determined by the description embodied in the word *aviv*. The problem with this claim is simply that the use of the word *aviv* that precedes this (Ex 9:31 on the hail plague) and that follows this (Ex 13:4 "month of aviv") are not in the same context with Ex 12:2. Based upon the reports of ripe barley and early ears of barley from Egypt, the hail plague occurred between mid-January and mid-February when translated into our modern calendar. This is well before the time context of Ex 12:2. In Ex 12:2 there is advance instruction of what will soon happen in the first month. Then there is a discussion of what did happen. Then there is a discussion of what to do in future years. After this, Ex 13:4 occurs. Thus Ex 13:4 is outside the context of Ex 12:2. It is merely wishful thinking to claim that *aviv* is in the context of Ex 12:2. Moses should not be expected to be thinking of barley in Israel at the words of Ex 12:2 because he had never before been in the land of Israel to see barley there. It requires speculation to explain the placement of the first month on the basis of Ex 12:2 and Ex 34:18.

(8) With the seven week variation in the time for the general harvest of barley in Israel based upon the different temperature ranges in that land, the word *aviv* applies to barley from sometime in February to sometime in June. Hence the word *aviv* in the phrase "month of *aviv*" does not uniquely apply to the first month as a description.

(9) The wave sheaf offering is discussed in Lev 23:10 where the word "harvest" occurs. BDB provides three meanings for this Hebrew word translated "harvest". It does not

have to mean “harvest-ready” as relating to the time for the general harvest in one location in Israel.

(10) The wave sheaf offering is explicitly discussed in Lev 23:9-16; Deut 16:9-10. In these verses there is no discussion concerning the state of the ripening of the barley, nor is there any discussion about what happens to the wave sheaf offering after it is held up by the priest. Presumably it could be burned or used by the priesthood, but nothing is said. It is best not to make assumptions when there is a lack of evidence.

(11) In Lev 23:10 the Hebrew words for “reap” and “bring” are in the plural form, showing that people as a mass were expected to bring their wave sheaf offering from their land (cut before they departed for the feast) to the priest. It does not use the word for “all”, so that many would bring a sheaf to the priesthood, but not all people. There is no statement that the priest goes out looking for it. The word for sheaf (*omer*) has two different meanings in the Tanak. The Septuagint translation into Greek is *dragma*, which is not ambiguous in Greek, and it means a bundle that is cut down by a swing of a sickle. This is a small bundle of cut stalks bearing ears of barley.

(12) The description of what happens to the firstfruits in Lev 2:14-16 is a contrast to what is mentioned about the wave sheaf offering, which is not specifically called “firstfruits”. Instead, the word for “first” or “beginning” is used in Lev 23:10.

(13) The first Hebrew word of Deut 16:1, *shamar*, translated “keep” is ambiguous. It is also the first Hebrew word in Deut 5:12 with a similar meaning. An ambiguous verse should not be used as significant evidence to establish a controversial viewpoint.

(14) Some proponents of the use of barley to determine the first month claim that Deut 16:9 prohibits the harvest of grain until the day of the wave sheaf offering. Such thinking only comes from adding words that are not in the Hebrew as shown by words in brackets in the above translation. The only prohibition is in eating of the new grain until the wave sheaf offering, as seen in Lev 23:14.

Conclusion: The barley harvest in Israel does have some loose time association with the first month, but there is no legal precise relationship. The word *aviv* is too broad in meaning to be used as a precise trigger to determine the first month. **The word *aviv* means “ear or ears [of grain]”.**

[27] Appendix A: Appointed-times [4150 *moed*]

9 Usages, 222 Occurrences

Appointed Meeting (Tent of Meeting) - 146 Occurrences

Ex 27:21	Ex 28:43	Ex 29:4	Ex 29:10	Ex 29:11
Ex 29:30	Ex 29:32	Ex 29:42	Ex 29:44	Ex 30:16
Ex 30:18	Ex 30:20	Ex 30:26	Ex 30:36	Ex 31:7
Ex 33:7	Ex 33:7	Ex 35:21	Ex 38:8	Ex 38:30
Ex 39:32	Ex 39:40	Ex 40:2	Ex 40:6	Ex 40:7
Ex 40:12	Ex 40:22	Ex 40:24	Ex 40:26	Ex 40:29
Ex 40:30	Ex 40:32	Ex 40:34	Ex 40:35	Lev 1:1
Lev 1:3	Lev 1:5	Lev 3:2	Lev 3:8	Lev 3:13
Lev 4:4	Lev 4:5	Lev 4:7	Lev 4:7	Lev 4:14
Lev 4:16	Lev 4:18	Lev 4:18	Lev 6:16	Lev 6:26
Lev 6:30	Lev 8:3	Lev 8:4	Lev 8:31	Lev 8:33
Lev 8:35	Lev 9:5	Lev 9:23	Lev 10:7	Lev 10:9
Lev 12:6	Lev 14:11	Lev 14:23	Lev 15:14	Lev 15:29
Lev 16:7	Lev 16:16	Lev 16:17	Lev 16:20	Lev 16:23
Lev 16:33	Lev 17:4	Lev 17:5	Lev 17:6	Lev 17:9
Lev 19:21	Lev 24:3	Num 1:1	Num 2:2	Num 2:17
Num 3:7	Num 3:8	Num 3:25	Num 3:25	Num 3:38
Num 4:3	Num 4:4	Num 4:15	Num 4:23	Num 4:25
Num 4:25	Num 4:28	Num 4:30	Num 4:31	Num 4:33
Num 4:35	Num 4:37	Num 4:39	Num 4:41	Num 4:43
Num 4:47	Num 6:10	Num 6:13	Num 6:18	Num 7:5
Num 7:89	Num 8:9	Num 8:15	Num 8:19	Num 8:22
Num 8:24	Num 8:26	Num 10:3	Num 11:16	Num 12:4
Num 14:10	Num 16:18	Num 16:19	Num 16:42	Num 16:43
Num 16:50	Num 17:4	Num 18:4	Num 18:6	Num 18:21
Num 18:22	Num 18:23	Num 18:31	Num 19:4	Num 20:6
Num 25:6	Num 27:2	Num 31:54	Deut 31:14	Deut 31:14
Josh 18:1	Josh 19:51	I Sam 2:22	I Ki 8:4	I Chr 6:32
I Chr 9:21	I Chr 23:32	II Chr 1:3	II Chr 1:6	II Chr 1:13
II Chr 5:5				

Annual Dated Festival/Festivals - 40 Occurrences
(In the context of Lev 23:2, 4 mentioned below, the seventh day Sabbath is included with the festivals in the use of *moed*. Hence, as a periodic time, the Sabbath is included with the festivals under the use of *moed*. This indicates that the Sabbath is also a festival, but there is no biblical evidence that an annual festival is also a Sabbath (= specific Hebrew word *shabat*), except for the Day of Atonement – see Lev 16:31; 23:32.)

Gen 1:14	Ex 13:10	Ex 23:15	Ex 34:18	Lev 23:2
Lev 23:2	Lev 23:4	Lev 23:4	Lev 23:37	Lev 23:44
Num 9:2	Num 9:3	Num 9:7	Num 9:13	Num 10:10
Num 15:3	Num 29:39	Deut 16:6	Deut 31:10	I Chr 23:31
II Chr 2:4	II Chr 30:22	II Chr 31:3	Ezr 3:5	Neh 10:33
Ps 104:19	Isa 1:14	Isa 33:20	Lam 1:4	Lam 2:6B
Lam 2:7	Lam 2:22	Ezek 36:38	Ezek 44:24	Ezek 45:17
Ezek 46:9	Ezek 46:11	Hos 2:11	Hos 9:5	Hos 12:9

Appointed Time - 22 Occurrences

Gen 17:21	Gen 18:14	Gen 21:2	Ex 9:5	Num 28:2
I Sam 9:24	I Sam 13:8	I Sam 13:11	I Sam 20:35	II Sam 20:5
II Sam 24:15	II Ki 4:16	II KI 4:17	Ps 75:2	Ps 102:13
Jer 46:17	Dan 8:19	Dan 11:27	Dan 11:29	Dan 11:35
Hab 2:3	Zech 8:19			

Appointed Place - 7 Occurrences

Josh 8:14	Job 30:23	Ps 74:4	Ps 74:8	Isa 14:13
Lam 2:6A	Zeph 3:18			

Appointed People - 2 Occurrences

Num 16:2 Lam 1:15

Appointed Prophetic Time Interval - 2 Occurrences

Dan 12:7 Dan 12:7

Appointed Sign - 1 Occurrence

Judg 20:38

Bird Migration - 1 Occurrence

Jer 8:7

General Season - 1 Occurrence

Hos 2:9

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