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[1] 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.

[2] The Sun and Moon determine the Festivals 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. The Sabbath 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 ...”

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].”

These verses show that the sun and moon are called the greater and lesser 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.

Ex 34:22 mentions that the Feast of Weeks occurs at about the time of the firstfruits of the wheat harvest. 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), also implies that the biblical year closely approximates the agricultural year. Hence the years in Gen 1:14 must be approximate agricultural years in time length, which approximates the tropical year of 365.2422 days.

The axis of the earth traces out a conical shape once each 25,800 years, and this causes the visible constellations to vary in relation to the vernal equinox once in a cycle of 25,800 years. Astronomy books call this cycle of 25,800 years the “*precession of the equinoxes*” because the equinoxes appear to move in relation to when the constellations appear during this long cycle. This causes the time of the visibility of the constellations in relation to the vernal equinox to advance 14.1566 days for each 1000 years. From the time of Moses until now is about 3500 years, which is about 49 days in the precession cycle. Hence the cycle of the appearance of the stars does not keep pace with the length of the year mentioned in Gen 1:14. The conclusion is that the stars are not used to determine the festivals because they do not determine months or years.

The time cycle of the planets and comets is different from the time cycle of years in Gen 1:14. All the kinds of lights in the heavens have been considered: the sun, the moon, the stars, the planets, and the comets.

The use of the sun rather than the moon to determine the count to the Sabbath as an appointed-time, as well as declaring the moon to be for appointed-times in Ps 104:19, show that the sun and moon determine the appointed-times.

[3] Introduction to the Determination of the First Month

The names of the heavenly bodies are absent from Gen 1:14-18 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”.

The moon determines the start of the months, but it does not determine which month is the first month. By process of natural elimination as shown above, the sun must be

involved for the determination of years from the viewpoint of Gen 1:14-18.

[4] 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 most of Jerusalem is about 2500 feet above sea level with Mt, Zion a few hundred feet higher), 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.

[5] 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.

The ancient meaning of the vernal equinox must be what ancient people could determine for themselves with ancient technology, and it must agree with the light principle of Gen 1:14.

What is the meaning of the vernal equinox from the biblical viewpoint?

Is the vernal equinox when the daytime and the night are equal in length? The concept of equal daytime and night is really not part of what is implied in Gen 1:14 for lights in the heavens for ancient peoples. Equal daytime and night is not a light marker when you stop to think about it!! Instead, this concept of equal daytime and night involves an accurate *measure of time*, which is not a light marker. Night is not a light. The abstract concept of equal daytime and night requires a measure of night 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 night. A measure of time for a night is not a light. The concept of equal daytime and night is really foreign to Gen 1:14.

The ancient Babylonians used a water clock to record and preserve the time of their eclipse observations. Modern computers with astronomy programs have compared their recorded eclipse times with computer generated accurate times for the lunar eclipses. The result is that the average error of their eclipse times is eight minutes, which is far in excess of the accuracy required to determine the time of equal daytime and night. The rate of water dropping varies according to the temperature. It is colder at night. From one night to the next night, the temperature will vary.

Until the year 1656 when Christiaan Huygens invented the pendulum clock, there were no known clocks accurate enough to determine when daytime and night were equal.

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 pyramids 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 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 biblical equinox is the straight line path all day, not equal daytime with night. 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 because the Almighty could not expect His ancient people to use a definition for which no instrument existed, and such an instrument is not a light in the heavens.

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 night 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.

It is unfortunate that the Latin word “equinox” literally means “equal night” according to its compositional parts. This word reflects the false assumption of the Romans who used this Latin word. We are saddled with this word, but it does not really define the ancient practical meaning of equinox.

[6] 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.

All the books of the Scriptures that have Babylonian month names are dated after 499 BCE.

This agrees with the common sense understanding described above for Gen 1:14 and *years*. In the year 539 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.

Est 9:20-21 [NASB], “Then Mordecai recorded these events, and he sent letters to all the Jews who were in all the provinces 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. If there was often a time difference between the month with a name in the Persian calendar and the month with the same name in the Jewish calendar, then within the same empire that would cause much confusion. There is a lack

of agreement among scholars concerning which Persian king ruled during the time that Esther was queen. The scholarly views that are sensible are proposed to be in the fifth century BCE.

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 a 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 worked 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. Using computers and the formulas of astronomy to compute the time of those eclipses that were time-stamped by the ancient astronomers, we know how the ancient Babylonian calendar worked.

[7] 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 Lindenberg. In the following quotations from the letter, the square brackets and the contents within them appear on page 57 of Lindenberg. 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.

There was a distance of over 500 miles from Jerusalem to the island of Elephantine, and it was all uphill from the mouth of the Nile River on the northern coast to Elephantine. It would not be feasible that this letter would get from Jerusalem to Elephantine in time for any report about the condition of barley in Israel, and nothing in the letter mentions barley or *aviv*.

[8] 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).

[9] 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] flower.”

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 ...”

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.”

Proponents of using barley attempt to use barley instead of the vernal equinox, with the claim that the sun is only used in an indirect way to influence the barley growth. Here is a response to such thinking.

(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 calendar 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. 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]”.**

[10] 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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