The Feast of Trumpets
2000 AD

What is the Molad of Tishri? Why does it differ from the astronomical conjunction? Why does the Hebrew Calendar place Tishri 1, the Feast of Trumpets, two days after the Molad?

by

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Introduction

The U.S. Naval Observatory calculates the conjunction of Tishri 1 in the year 2000 to occur at 19:53 Greenwich or Universal Time (UT) 21:53 UT Jerusalem Time (JT). These figures translate to 9:53 PM JT, on the evening of September 27. The Hebrew Calendar calculates the Molad of Tishri to occur at 11:17 UT Greenwich Time or 13:17 UT Jerusalem Time. This translates to 1:17 PM JT, on the afternoon of Thursday, September 28--fifteen hours and twenty-four minutes after the calculated time of the conjunction by the U.S. Naval Observatory.

Two additional factors further extend the time between the astronomical conjunction of the moon and the observance of Tishri 1 according to the Hebrew Calendar. Although the Hebrew Calendar places the molad on Thursday, September 28, that day is not proclaimed as Tishri 1, the Feast of Trumpets. Based on Postponement Rule 1, the declaration of the Feast of Trumpets is postponed to Friday, September 29. And based on Postponement Rule 2, the declaration of the Feast of Trumpets is postponed one more day to Saturday, September 30. As a result, the Feast of Trumpets is declared almost 44 hours after the U.S. Naval Observatory calculation of the conjunction of the moon.

Is the Hebrew Calendar leading us away from the true observance of the Feast of Trumpets?

It appears that the Hebrew calendar is delaying the declaration of the Feast of Trumpets by nearly two full days from when it should be declared. This significant lapse in time between the astronomical conjunction and the declaration of Tishri 1 in the year 2000 has led some to claim that the

Hebrew Calendar is an erroneous Pharisaic invention. But as we will see, the Hebrew Calendar was not invented by men but was revealed by God in order that His people might observe His annual holy days at their appointed times.

Understanding the Hebrew Calendar

In order to understand the Hebrew Calendar, we must first learn the basis for its calculation of the Molad of Tishri. Contrary to popular belief, the Hebrew Calendar does not attempt to calculate the astronomical conjunction, as does the Naval Observatory. The astronomical conjunction occurs when the earth, moon and sun are aligned on the same longitude. While the Naval Observatory uses detailed astronomical data to calculate the exact time of the astronomical conjunction, which takes place during the "dark of the moon," (also called the New Moon by astronomers) the Hebrew Calendar uses the ***average*** time of the conjunction, or the ***mean conjunction***, to calculate the molad (Maimonides, *Sanctification of the New Moon*, p. 27).

The term "molad" does not refer to the astronomical conjunction of the moon, as many have assumed. The determination of the new moon day or Tishri 1 is not based on the exact time of the conjunction, but on the average time of the conjunction, which rarely coincides with the actual conjunction. The purpose in calculating the molad, or mean conjunction, is to align the age of the Hebrew Calendar moon as closely as possible with the actual age of the orbiting Moon. If that time falls before noon by Jerusalem time, and the day is not contradicted by the rules, that day is declared the New Moon Day (Ibid., p.4).

According to the Hebrew Calendar, the new moon day of Tishri 1 is not the astronomical conjunction of modern astronomy, but the day of the new crescent whether that crescent is visible or not. That is, Scripture does not demand that a visible crescent always be visible before the new moon day of Trumpets can be declared. Can we find Scriptural evidence to support this definition of the new moon as the visible crescent and declaration of the new moon day whether a new crescent is visible or not? Yes we can. Let us examine the Hebrew text.

The word translated "new moon" in the Hebrew text is the noun שׁדח *`ghõh'-desh* **2320**. A variant pronunciation of this word is used as a verb to express the action of renewing or restoring: "And when Asa heard these words, and the prophecy of Obed the prophet, he took courage, and put away

the abominable idols out of the land of Judah and Benjamin, and out of the cities which he had taken from mount Ephraim, and **renewed** [sdH `*ghãh-dash'* **2318**] the altar of the LORD" (II Chron. 15:8). A third pronunciation, used as an adjective, expresses the meaning of newness: "And the Gentiles shall see thy righteousness, and all kings thy glory: and thou shalt be called by a **new** [sdH `*ghah-dãhsh'* **2319**] name, which the mouth of the LORD shall name" (Isa. 62:2).

When used as a noun, sdH `*ghõh'-desh* **2320** refers specifically to a new moon or to the month which it begins. The Hebrew word translated "full moon" is a different word (hXK *keh'seh* **3677**). *Keh'seh* is used only in Proverbs 7:20 and Psalm 81:3.

The first use of `*ghõh'-desh* **2320** as "new moon" is found in I Samuel 20:5. Brown, Driver and Briggs attest that this new moon was a religious festival (*Hebrew and English Lexicon of the Old Testament* p. 225). Since the only new moon that God ordained as a religious festival is the new moon of the seventh month, it is evident that this Scripture is referring to the Feast of Trumpets. Notice the account in I Samuel 20: "And David said unto Jonathan, 'Behold, tomorrow *is* **the new moon** [sdH `*ghõh'-desh* **2320**], and I should not fail to sit with the king at meat: but let me go, that I may hide myself in the field unto the third day at even" (verse 5).

How did David know that sdH `*ghõh'-desh* **2320** would occur on the following day? The only possible answer is that the new moon had been calculated in advance. The occurrence of the new moon would signal the beginning of the seventh month and the arrival of Tishri 1. David would be expected at the table of King Saul to participate in the banquet that would be held for the Feast of Trumpets.

Continuing in Verse 18 of I Samuel 20 we read, "Then Jonathan said to David, 'Tomorrow *is* **the new moon** [sdH `*ghõh'-desh* **2320**]: and thou shalt be missed, because thy seat will be empty.' " Jonathan did not say, "Tomorrow **may** be the new moon," or, "Tomorrow will **probably** be the new moon." He said, "Tomorrow ***IS*** the new moon." Jonathan spoke these words to David with absolute certainty. They both knew that the Hebrew Calendar had predicted the occurrence of the new moon on the following day.

`Ghõh'-desh* is used again in Verse 24: "So David hid himself in the field: and when **the new moon** [ s'dH *`ghõh'-desh **2320**] was come, the king sat him down to eat meat." The king was observing the religious festival of Tishri 1, according to the calculation of the Hebrew Calendar for the new moon of the seventh month. **The account in Verse 24 shows that this observance was not held at the time of the astronomical conjunction.** The noun *`ghõh'-desh* is used in this verse with the Hebrew verb hy *hãy-yãh'* **1961**, translated "was come." *Hãy-yãh'* means to **arise** or **appear** (see Brown Driver Briggs, p. 225) and is used with this meaning in Genesis 1:5 in reference to the appearing of the evening (*erev*, or sunset) and the morning (*bo'ker*, or sunrise) on the first day of Creation.

The use of *hãy-yãh'* in I Samuel 20 reveals that when the king sat down to observe the Feast of Trumpets, the new moon was clearly visible in the evening sky. The new moon had appeared before King Saul and those who were feasting with him at the palace, and before David, who was hiding in the field. Here is undeniable evidence that the new moon of Scripture is not the astronomical conjunction. The astronomical conjunction takes place during the "dark of the moon," and is not visible from any point on earth. No part of the moon can appear in the sky during the astronomical conjunction. Yet the verb *hãy-yãh'* records that the new moon at the time of David, appeared in the sky above the palace of Saul and the field where David was hiding.

While David was in hiding, Jonathan was in the palace with his father King Saul. They had seen the new moon appear in the evening sky. They were partaking of the feast of the declaration of the new moon day of the seventh month--the Feast of Trumpets. **That day, which had been calculated in advance, was confirmed by the appearance of the new moon at the very beginning of Tishri 1. On many occasions the new crescent is not visible until very late on Tishri 1, yet the day is declared anyway—as is the case with the year 2000 AD.**

Astronomical Conjunction vs. the New Moon of Scripture

On modern calendars, the astronomical conjunction of the moon is designated as the new moon. Because the conjunction takes place during the "dark of the moon," the "new moon" is depicted as a black circle. But the "new moon" of modern astronomy is not the new moon of Scripture. It is

not the calculation of the astronomical conjunction that determines the appointed times of God, but the calculation of the best possible illumination percentage of the full moon of Tishri 15. A minimum of 17.2 hours must pass from the time of the astronomical conjunction before the new crescent can possibly be seen by the naked eye, and sometimes the new crescent is still not visible, yet the new moon day of Tishri 1 is still declared. (Please also run the program "moonc52" written by Dr. Monzur Ahmed for verification of this fact. Access "Google", enter "moonc52" and then click on "SAC." Look for "moonc52.zip" at number 1006 and click on that file line.)

The fact that the Naval Observatory calculates to the astronomical conjunction explains why its figures differ from those of the Hebrew Calendar. Rather than calculating the astronomical conjunction, **the Hebrew Calendar uses the average or mean conjunction to calculate the new moon day. The mean conjunction provides a consistent basis for calculating the new moon day or Tishri 1, which provides the best possible illumination of the full moon of Tishri 15 from year to year.** Actual time from one astronomical conjunction to another fluctuates from five minutes to three hours, and may vary more than 12 hours in the course of the year. To calculate the exact time of the conjunction each year would require double-precision (64-bit) arithmetic (Dershowitz and Reingold, *Calendrical Calculations*, p.135). The Hebrew Calendar resolves the problem by using the average or mean time—that is, 29½ days.

The variation in the length of time between astronomical conjunctions is caused by the countless irregularities that occur in the moon's orbit. To date, astronomers have identified more than 5,000 perturbations of the moon as it circles the earth. Before modern astronomy with its computerized mathematics, it would have been an impossible task to calculate the exact astronomical conjunction from year to year and then calculate on that basis the day of the new moon. That is why God established the mean conjunction as the basis for calculating the new moon. The use of the mean conjunction provides a simple, reliable and consistent basis for calculation.

Determining the New Moon Day

In the days of David and the early kings of Israel, calculating the New Moon Day was a simple task because the lunar cycle was much more constant. But during the reign of Uzziah and the later reign of Hezekiah, the hand of God directly altered the arrangement of the heavenly bodies. His divine intervention twice caused the position of the earth and the moon to shift in relationship to the sun. As a result, there were many years when the new moon was not visible from Jerusalem until one or two days after the projected time of the molad.

The changes in the heavens required new steps to be added to the process of determining the new moon. Among the procedures that were instituted to adjust the Hebrew Calendar to the changes in the heavens are the Rules of Postponement. These rules do not postpone the observance of Tishri 1 past the time of the new moon, as some have claimed. To the contrary, they keep the observance of Tishri 1 in harmony with the lunar cycle in the heavens. **In as many as six years out of ten, these rules must be applied in order to ensure that the declaration of Tishri 1 is as accurate as possible in regard to the illumination of the full moon of Tishri 15.**

Maimonides, who lived from 1135 to 1204 AD, records that determining the New Moon Day often required the application of the Rules of Postponement. Is there any Biblical evidence to support the application of these rules? The answer is revealed in the book of Ezra, which records the first observance of the Feast of Trumpets in Jerusalem after the return of the exiles of Judah.

Astronomical Evidence of Postponements in Old Testament Times

In the year 538 **BC**, Cyrus the Great proclaimed that the exiles of Judah might return to their land and rebuild their temple. Ezra records the proclamation of Cyrus:

"Now in the first year of Cyrus king of Persia, that the word of the LORD by the mouth of Jeremiah might be fulfilled, the LORD stirred up the spirit of Cyrus king of Persia, that he made a proclamation throughout all his kingdom, and *put it* also in writing, saying, Thus saith Cyrus king of Persia, The LORD God of heaven hath given me all the kingdoms of the earth; and

he hath charged me to build him an house at Jerusalem, which *is* in Judah. Who *is there* among you of all his people? his God be with him, and let him go up to Jerusalem, which *is* in Judah, and build the house of the LORD God of Israel, (he *is* the God,) which *is* in Jerusalem. And whosoever remaineth in any place where he sojourneth, let the men of his place help him with silver, and with gold, and with goods, and with beasts, beside the freewill offering for the house of God that *is* in Jerusalem" (Ezra 1:1-4).

In accordance with this proclamation, the priest Zerubbabel led a group of his people back to the land of Judah. When the exiles were settled in their cities, Zerubbabel and his fellow priests gathered the people to Jerusalem and built an altar to sacrifice burnt offerings to God. Ezra gives this account of the building of the altar, which was completed in time to observe the feasts of God in the seventh month:

"And when the seventh month was come, and the children of Israel were in the cities, the people gathered themselves together as one man to Jerusalem. Then stood up Jeshua the son of Jozadak, and his brethren the priests, and Zerubbabel the son of Shealtiel, and his brethren, and builded the altar of the God of Israel, to offer burnt offerings thereon, as *it is* written in the Law of Moses the man of God. And they set the altar upon his bases; for fear *was* upon them because of the people of those countries: and they offered burnt offerings thereon unto the LORD, *even* burnt offerings morning and evening. They kept also the feast of tabernacles, as *it is* written, and *offered* the daily burnt offerings by number, according to the custom, as the duty of every day required; And afterward *offered* the continual burnt offering, both of the new moons, and of all the set feasts of the LORD that were consecrated, and of every one that willingly offered a freewill offering unto the LORD. From the first day of the seventh month [Feast of Trumpets] began they to offer burnt offerings unto the LORD. But the foundation of the temple of the LORD was not *yet* laid" (Ezra 3:1-6).

The book of Ezra reveals that this observance of the Feast of Trumpets took place in the first year of King Cyrus (Ezra 1:1), which was 538 BC. Holy Day Calendar software programmed by Alan Ruth for the Christian Biblical Church of God calculates the molad of Tishri for the year 538 BC to have occurred on Wednesday, September 15. But since the molad fell on a Wednesday, that day was not declared as Tishri 1, the Feast of Trumpets. Based on Postponement Rule 1, the declaration of Tishri 1 was postponed to the next day, Thursday, September 16. Did the postponement by the Holy

Day Calendar of the Feast of Trumpets in 538 BC match the astronomical facts?

With the aid of computerized astronomical programming, we can determine the exact day that the new moon of Tishri would have been visible from Jerusalem in that year, based on the city's altitude, latitude and longitude. The moon must be at least 9.5 to 10 degrees above the horizon before it can possibly be seen by the naked eye. Even at that angle, it is visible only under ideal weather conditions. This angle of separation is attained when the orbits of the sun and moon are separated by about .02 degrees or more. In addition to the degree of separation and the altitude above the horizon, the age from the astronomical conjunction must be sufficient for the new crescent to be visible.

The astronomical conjunction fell at 02:39 UT (Universal Time) which was 4:39 AM JT (Jerusalem time), Wednesday, September 15. The molad, on the other hand, fell at 4d 6h 1043p. These molad figures translate to a Wednesday (the 4th day of the week), 12 AM (the 6th hour from sunset) and 57.9 minutes (18 parts are equal to 1 minute), or 00:58 UT. This figure equates to 12:58 AM at Greenwich, England, and fell on Wednesday, September 15. The time for Jerusalem equates to 2:58 AM and also fell on Wednesday, September 15. The calculated molad of the Hebrew Calendar thus fell 1 hour and 41 minutes before the astronomical conjunction. Thus the need for the application of postponement Rule 1.

It is an astronomical fact that a minimum of 17.2 hours must elapse after the astronomical conjunction before the new crescent can possibly be seen. This places the earliest possible time of visibility of the new crescent of 538 BC at 19:39 UT. This equates to 9:39 PM JT on the evening of September 15, which by Scriptural reckoning was already the next day as days end and begin at sunset. (A detailed explanation of the Scriptural method of reckoning the day is given in Appendix A at the end of this presentation.) The new crescent would not be visible, however, for another twenty hours at about 6 PM, September 16, 538 BC. Thus, due to the application of Rule 1, the new crescent was visible on Tishri 1, 538 BC.

Please bear in mind, however, that the Hebrew Calendar calculates to the best possible illumination of the full moon of Tishri 15. It does not calculate to the visible new crescent or to the astronomical conjunction. Now, a visible crescent may be seen on occasion on the evening of Tishri 1. The

fact that the new crescent may be seen more than 60% of the time sometime on or at the beginning Tishri 1 is due solely to the application of postponement Rule 1. This also means then, that the new crescent is not visible 40% or less of the time even though Tishri 1 is declared.

If Trumpets had been declared for Wednesday, September 15 the first day of the Feast of Tabernacles, or Tishri 15, would have been Wednesday, September 29, 538 BC. The illumination of the moon on the evening of September 28 would have been 99.53% with an age of 14.1 days. As it was, Rule 1 was activated and the declaration of Trumpets was moved one day to Thursday, September 16. Consequently, the illumination of the moon on the evening of September 29, the beginning of Tishri 30, was 99.86% with an age of 15.0 days. Thus the Hebrew Calendar calculated to the best possible illumination of the full moon—not the new crescent. In fact, the full moon of Nisan 15, 538 BC was a Full moon instead of a Waxing Gibbous!

The declaration of Tishri 1, the New Moon Day, on September 16, 538 BC, is supported by the astronomical facts. The one-day postponement of the Feast of Trumpets in 538 BC was necessary to keep the observance aligned with the actual phases of the moon. The same was true of the Feast of Trumpets in 515 BC, the year that the temple was completed.

The account of this observance is also found in the book of Ezra. Let us begin with Ezra's record of the decree of Darius, which led to the completion of the temple: "Then Darius the king [Darius Hystaspes] made a decree, and search was made in the house of the rolls, where the treasures were laid up in Babylon. And there was found at Achmetha, in the palace that *is* in the province of the Medes, a roll, and therein *was* a record thus written: In the first year of Cyrus the king *the same* Cyrus the king made a decree *concerning* the house of God at Jerusalem, Let the house be builded, the place where they offered sacrifices, and let the foundations thereof be strongly laid; the height thereof threescore cubits, *and* the breadth thereof threescore cubits; w*ith* three rows of great stones, and a row of new timber: and let the expenses be given out of the king's house: and also let the golden and silver vessels of the house of God, which Nebuchadnezzar took forth out of the temple which *is* at Jerusalem, and brought unto Babylon, be restored, and brought again unto the temple which *is* at Jerusalem, *every one* to his place, and place *them* in the house of God.

"Now *therefore*…let the governor of the Jews and the elders of the Jews build this house of God in his place….I Darius have made a decree; let it be done with speed" (Ezra 6:1-7, 12).

The decree of Darius was speedily executed, and the temple was completed in the sixth year of his reign: "And they builded, and finished *it*, according to the commandment of the God of Israel, and according to the commandment of Cyrus, and Darius, and Artaxerxes king of Persia. And this house was finished on the third day of the month Adar, which was in the sixth year of the reign of Darius the king [515 BC]" (verses 14-15).

The dedication of the temple took place shortly before the Passover, which was kept on the fourteenth day of the first month, followed by the seven-day Feast of Unleavened Bread: "And the children of the captivity kept the passover upon the fourteenth *day* of the first month [Monday, March 21, 515 BC].…And the children of Israel, which were come again out of captivity…did eat, and kept the feast of unleavened bread seven days with joy" (verses 19, 21-22).

Later in 515 BC, Ezra and his party arrived from Babylon with vessels for the newly dedicated house of God. The account begins in Ezra 7: "Now after these things, in the reign of Artaxerxes king of Persia [another title of Darius], Ezra…went up from Babylon; and he *was* a ready scribe in the law of Moses, which the LORD God of Israel had given: and the king granted him all his request, according to the hand of the LORD his God upon him. And there went up *some* of the children of Israel, and of the priests, and the Levites, and the singers, and the porters, and the Nethinims, unto Jerusalem, in the seventh year [by Persian reckoning; from April to April] of Artaxerxes [Darius Hystaspes] the king.

"And he came to Jerusalem in the fifth month [of the Hebrew Calendar], which *was* in the seventh year of the king [from April 515 BC, to April, 514 BC]. For upon the first *day* of the first month [of the Hebrew Calendar] began he to go up from Babylon, and on the first *day* of the fifth month [corresponding to July-August, 515 BC] came he to Jerusalem, according to the good hand of his God upon him. For Ezra had prepared his heart to seek the law of the LORD, and to do *it*, and to teach in Israel statutes and judgments" (verses 1-10).

The book of Nehemiah records Ezra's teaching of the law of God on the first day of the seventh month, which was the Feast of Trumpets: "And all the people gathered themselves together as one man into the street that *was* before the water gate; and they spake unto Ezra the scribe to bring the book of the law of Moses, which the LORD had commanded to Israel. And Ezra the priest brought the law before the congregation both of men and women, and all that could hear with understanding, upon the first day of the seventh month [Tishri 1, 515 BC].

"And he read therein before the street that *was* before the water gate from the morning until midday, before the men and the women, and those that could understand; and the ears of all the people *were attentive* unto the book of the law….And Nehemiah, which *is* the Tirshatha, and Ezra the priest the scribe, and the Levites that taught the people, said unto all the people, This day *is* holy unto the LORD your God; mourn not, nor weep. For all the people wept, when they heard the words of the law. Then he said unto them, Go your way, eat the fat, and drink the sweet, and send portions unto them for whom nothing is prepared: for *this* day *is* holy unto our Lord: neither be ye sorry; for the joy of the LORD is your strength" (Neh. 8:1-3, 9-10).

The annals of history reveal that this observance of the Feast of Trumpets took place in 515 BC. According to Hebrew Calendar calculations for that year, the molad of Tishri fell at 4d 23h 535p, which translates to Wednesday, 03:31 UT (5:31 PM JT), August 31. Based on Postponement Rule 2, the declaration of Tishri 1 was made on the following day, Thursday, September 1. Let us compare this declaration with the astronomical facts.

In the year 515 BC, the astronomical conjunction for the month of Tishri fell at 04:53 UT (6:53 AM JT), on Wednesday, August 31. The molad thus fell about 11 hours after the astronomical conjunction, which was too soon for the new crescent to be visible. A minimum of 17.2 hours must elapse after the astronomical conjunction before the new crescent can possibly be seen. This places the earliest possible time of visibility at 21:53 UT or 11:53 PM JT on Wednesday, August 31, which was after sunset, and therefore was the next day by Scriptural reckoning. Thus the declaration of Tishri 1 on Thursday, September 1, was in complete harmony with the astronomical facts.

If Trumpets had been declared for Wednesday, August 31, the first day of the Feast of Tabernacles, or Tishri 15, would have been Wednesday, September 14, 515 BC. The illumination of the moon on the evening of September 13 would have been 95.68% with an age of 12.8 days. As it was, Rule 2 was activated and the declaration of Trumpets was moved one day to Thursday, September 1. Consequently, the illumination of the moon on the evening of September 14, the declared beginning of Tishri 15, was 99.08% with an age of 13.8 days. Thus the Hebrew Calendar calculated to the best possible illumination of the full moon—not the new crescent.

The astronomical facts support an observance of the Feast of Trumpets on Thursday, August 31, in 515 BC. As in 538 BC, the observance of the Feast of Trumpets in 515 BC was based on the calculation of the molad and the application of the Rules of Postponement. These two observances of the Feast of Trumpets in the days of Ezra attest that the Rules of Postponement are mathematically correct and are essential to the calculation of the full moon of Tishri.

Daniel 10 and the Calendar Calculations of 536 BC

The book of Daniel offers more Scriptural evidence to support the calculations of the Hebrew Calendar. Let us examine the account in Daniel 10, which records that a prophetic revelation was given to Daniel in the "third year of Cyrus king of Persia" (Dan. 10:1). This verse refers to the third year of Cyrus' reign over Babylon, which was 536 BC. The following verse records that Daniel was fasting at the time the prophecy was given: "In those days I, Daniel, was mourning three full weeks" (verse 2).

Daniel also describes this period as "whole weeks" (verse 3). A more literal translation of the Hebrew text would read "weeks of days." This Hebrew expression refers to whole or complete weeks, which run from the beginning of the first day at sunset to the end of the seventh day at sunset. Thus Scripture reveals that the three weeks of Daniel's fast were indeed whole weeks, counted from the first day of the week through the seventh day.

Continuing in Daniel 10, we find that the fulfillment of the three weeks was "the four and twentieth day of the first month…"(verse 4). Because the twenty-fourth day of the first month, or Nisan, ended the three full weeks,

we know that this day was a weekly Sabbath. Counting backward from Nisan 24, we can determine that Daniel began his fast on Sunday, Nisan 4. Thus Daniel 10 establishes the weekly cycle of days for the month of Nisan in 536 BC. By checking the calculated calendar data for 536 BC, we can determine whether the weekly cycle of days matches the account in Daniel 10.

Hebrew Calendar calculations for 536 BC place Passover, Nisan 14, on Wednesday, April 11. Counting backward ten days, we find that the calendar places Nisan 4, the first day of Daniel's fast, on a Sunday. Counting forward from Passover, we find that the calendar places Nisan 24 on a weekly Sabbath, April 21. Here is clear and undeniable evidence that the weekly cycle of the calculated Hebrew Calendar matches the weekly cycle of the Old Testament.

The account in Daniel 10 clearly contradicts the claim that the Hebrew Calendar is invalid because the weekly cycle has been broken. The words that Daniel was inspired to write in 536 BC testify today that the calculated Hebrew Calendar is in perfect accord with the weekly cycle of Scripture.

By revealing that Nisan 24 was a weekly Sabbath, the account in Daniel 10 also testifies to the accuracy of the Hebrew Calendar in calculating the Molad of Tishri. Due to the number of days in the first seven months of the year, Nisan 24 and Tishri 1 always fall on the same day of the week. Both dates occur on the Sabbath about 28% of the time, as in the year 536 BC. Hebrew Calendar calculations for that year place the molad on the weekly Sabbath of September 22 at 13 hours 348 parts, which translates to 7:19 AM JT. Since the Rules of Postponement did not disallow the time of day or the day itself, the declaration of Tishri 1 was made on the eve of the weekly Sabbath. The declaration of Tishri 1, the Feast of Trumpets, on the weekly Sabbath of September 22 coincides perfectly with the chronology that is recorded in Daniel 10.

Astronomical data for 536 BC reveals another significant fact: the date of Tishri 1, the Feast of Trumpets, was not determined by observing the new moon. The earliest possible time that the new crescent can be observed is 17.2 hours after the astronomical conjunction. In 536 BC, the astronomical conjunction had not yet occurred when the new moon of Tishri was declared. Thus there was no sighting of the new crescent to verify the

declaration of the day. The observance of the Feast of Trumpets in 536 BC was based strictly on the calculation of the molad.

More than a century later, in 432 BC, the Greek astronomer Meton acquired enough data on lunar cycles to calculate what is called the Metonic or 19-year time cycle. His computations of lunar patterns verified that the average lunar cycle is 29.53 days, the figure that the Hebrew Calendar had been using to calculate the molad for hundreds of years before his time. Meton's computations were so accurate that NASA corrected the math by only 6 ten millionths of one day. Thus there is no basis for the claim that the calculations of the Hebrew Calendar cannot be used to accurately determine the molad during the days of Daniel and other prophets of the Old Testament.

Haggai 1:14-15 Confirms the Calendar Calculations of 519 BC

"And the LORD stirred up the spirit of Zerubbabel the son of Shealtiel, governor of Judah, and the spirit of Joshua the son of Josedech, the high priest, and the spirit of all the remnant of the people; and they came and did work in the house of the LORD of hosts, their God, in the four and twentieth day of the sixth month, in the second year of Darius the king" (Hag. 1:14-15).

History places the second year of Darius Hystaspes in 519 BC (April to April, Persian reckoning). Haggai dates the building of the temple from the twenty-fourth day of the sixth month—less than a week before the declaration of Tishri 1, the first day of the seventh month. The calculations of the Hebrew Calendar for that year place the Molad of Tishri at 5:31 PM JT on a Friday, September 14. Since the molad did not fall before noon of that day, as required by Postponement Rule 2, the declaration of Tishri 1 was made on the following day, Saturday, September 15.

The fact that the first day of the seventh month, or Tishri 1, was a **Saturday** demonstrates that the sixth month, or Elul, was only twenty-nine days in length, as it is today. If the month of Elul had consisted of thirty days, the twenty-fourth day of that month would have fallen on a weekly Sabbath (counting backward from Tishri 1). The Scriptures rule out any possibility of the twenty-fourth day being a weekly Sabbath, as Haggai records that the people spent that day working on the temple. Thus Haggai's account of the building of the temple supports the calculations of the Hebrew Calendar for the end of the sixth month and the beginning of the seventh month, or Tishri.

Haggai's confirmation of the Hebrew Calendar carries even more weight when we understand that the declaration of Tishri 1, the first day of the seventh month, was made before the new crescent was visible. Astronomical calculations for the year 519 BC place the conjunction of the moon after the molad, which fell at 5:31 PM (JT) on Friday evening. Since the new crescent does not become visible until at least 17.2 hours after the astronomical conjunction, there was no possibility of sighting the new crescent until after the day had been declared. As in 536 BC, the declaration of the Feast of Trumpets in 519 BC was based strictly on calculation.

Historical Evidence of Postponements in New Testament Times

The Old Testament passages that we have examined have demonstrated that although the words "calendar," "intercalation," "postponement" and **"molad"** are not found in Scripture, there is an abundance of evidence to support the accuracy of the calculated Hebrew Calendar. When we search the Scriptures of the New Testament, we find many passages that add to the weight of evidence. Much of this evidence is found in the writings of Paul, who, as a former Pharisee and member of the Sanhedrin, was well versed in calendar matters.

The New Testament records that before his conversion, Paul had been trained under the tutelage of Gamaliel (Acts 22:3). Rabban Gamaliel I the Elder was the *Nasi* or president of the Sanhedrin from 30 to 50 AD. He was the grandson of Hillel I, who held the office of *Nasi* from about 10 BC to 10 **AD**. Gamaliel I was the first to hold both honorary titles Rabban and Elder. Gamaliel died ca. 50 AD, while Paul was either in Antioch of Syria or beginning his second missionary journey. It was during Gamaliel's days that "… the Sanhedrin left the stone chamber in the Temple and moved to Chanut, a place in Jerusalem outside the Temple" (Bader, *The Encyclopedia of Talmudic Sages*, pp. 121-122). Soon afterwards the Sanhedrin was moved from Chanut to Jabneh: "It also seems certain that the great academy of Jerusalem was transferred to Jabneh during the time of Rabban Gamaliel. It remained in Jabneh for many years after the destruction of the Temple…" (Ibid., p. 126).

The *Nasi* of the Sanhedrin was responsible for all religious matters, including all matters of the calendar. It was not left to individual Jews to determine the beginnings of months by independent observation of the new crescent. Only the Sanhedrin was authorized to pass judgment in this matter, as in all calendar matters. Notice: "The *nasi* presided over the Sanhedrin, fixed the calendar together with the court by [ceremonially] proclaiming the new month and intercalating the year, led public prayers for rain, and ordained scholars (the content and scope of this ordination being somewhat unclear)" (*Encyclopaedia Judaica*, s.v. "Nasi").

After the destruction of the temple in 70 AD, the office of the *Nasi* became more significant: "On the destruction of the Second Temple there began the restorative work of R. Johanan b. Zakkai, [50-80 AD] whose

paramount aim was to reestablish unity and heal breaches in the association of the sages" (Ibid., s.v. "Sages").

In order to reestablish unity, it was vital to regulate the calendar. To this end, Zakkai worked to make his calendar court at Jabneh the central authority for all Jews, both in Israel and abroad: "…Zakkai established his *bet din* [calendar court] in Jabneh as the cultural and political center of the Jews, and it succeeded the previous Sanhedrin Gedolah. The Jabneh *bet din* was responsible for regulating the calendar and thereby became the religious and national center not only of Erez Israel, but also of the Diaspora" (Ibid., s.v. "Bet Din and Judges").

After the death of Zakkai, the office of ***Nasi*** and the responsibility for regulating the calendar passed once again to the House of Hillel. Johanan b. Zakkai was succeeded by "…Rabban Gamaliel [II 80 – c.110 AD], who was a grandson of Hillel [I] and obtained authorization from the governor in Syria (Eduy. 7:7), which indicates the status of his rule both outside and inside the country. The *nasi* figures as the leader of the nation whose authority derived not only from his being an *av bet din* and a sage but also from his lineage. At a later stage the *nesi'im* of the House of Hillel claimed descent from the Davidic dynasty (Shab. 56a; cf. TJ, Ta'an. 4:2, 68a) and retained the leadership of the nation for more than three centuries [ending with Hillel II]. That the institution continued in the possession of one family for such a long and eventful period testifies to its status and to the esteem in which it was held" (Ibid., s.v. "Sages").

When we understand the historical facts, it is evident that the *bet din* had been regulating the calendar for many generations before the time of Hillel II. The regulation of the calendar by a central authority had begun in the days of Ezra and the Great Assembly. As a priest of the lineage of Hilkiah, Ezra had inherited a full knowledge of the Hebrew Calendar, including intercalation and the Rules of Postponement. This knowledge was passed down through the sages of the Great Assembly and, after their day, through the sages of the *bet din*. When Hillel II became ***Nasi*** of the *bet din*, he received authority to regulate the calendar according to all the rules that his predecessors had followed, as had been done since the days of Ezra.

It is contrary to the records of history to claim that Hillel II invented the Rules of Postponement, or any other calculations of the Hebrew Calendar. These rules date back hundreds of years before Hillel II became leader of the

bet din. As the last of the great sages, he used the office of ***Nasi*** to ensure that the knowledge of the calendar and its calculations would not be lost. This priestly knowledge, which had until his day been withheld from the general populace, was imparted to Jews in all parts of the world. His action was motivated by concern that the scattering of the Jews under continued Roman persecution might extinguish their observance of the holy days at the times commanded by God.

To understand the role of the *bet din* in early New Testament times, let us examine the history of Rabban Gamaliel II. The following article in the *Encyclopaedia Judaica* describes the power struggle that developed over the calendar in the days of Gamaliel II:

"RABBAN GAMALIEL II, also called Rabban Gamaliel of Jabneh, grandson of (1) [Gamaliel I], succeeded Johanan b. Zakkai as *Nasi* c. 80 C.E. [The abbreviation CE has replaced AD in some works.] He saw his life's work as the strengthening of the new center at Jabneh and the concentration and consolidation of the people around the Torah, constituting an authority that would be capable of filling the place of the Temple and of the Sanhedrin which had met in the Chamber of Hewn Stones. To this end he worked energetically for the elevation of the dignity of the *nasi's* office….He stressed that his vigorous exertions were not directed to increasing his own honor or that of his household but to preserving the unity of the nation and the Torah (BM 59b). In his private life and in his personal relationships he was modest and easygoing….In spite of this, his firmness as *nasi* and his endeavors to increase the power of the new center aroused the strong opposition of the elder scholars of his generation and led to a severe struggle in which Gamaliel did not hesitate to excommunicate his own brother-in-law, Eliezer b. Hyrcanus (BM 59b). Of greatest consequence was Gamaliel's dispute with Joshua b. Hananiah on the fixing of the new moon (see Calendar).

"Gamaliel regarded the affair as a test of the authority of his *bet din* and ordered R. Joshua to demonstrate publicly that he accepted the discipline of the *nasi*: 'I charge you to appear before me with your staff and your money on the day which according to your reckoning should be the Day of Atonement.' On the advice of his colleagues, Akiva and Dosa b. Harkinas, R. Joshua bowed to the command. When he came before Rabban Gamaliel, the *nasi* rose, kissed him on his head and said to him: 'Come in peace my teacher and pupil—my teacher in wisdom and my pupil because you have

accepted my decision' (RH 2:8–9). The clashes between Gamaliel and Joshua, however, did not cease with this affair. The firmness of Gamaliel was regarded by most of the scholars as an insult to the dignity of R. Joshua and led to a revolt against his authority which ended with his removal from the office" (s.v. "Gamaliel").

This historical record confirms that the new moon of Tishri was calculated in advance by the sages of the calendar court, known as the *bet din*. If disputes arose over the date of the new moon, the *nasi*, who presided over the calendar court, had the final word. Although there were other courts at that time, the great court of Jabneh was the only court for regulation of the calendar. The academy at Jabneh was moved to Galilee after the disastrous war for independence ended in 135 AD. Strong rivalry soon emerged between the calendar court of Palestine and the various courts of Babylonia: "In addition to this central *bet din* [at Jabneh], local *battei din* continued to function, particularly in the vicinity of the academies. The Talmud speaks of the courts of R. Eliezer in Lydda, R. Joshua in Peki'in, R. Akiva in Bene-Berak, and R. Yose in Sepphoris (Sanh. 32b). Under R. Johanan's successor, Gamaliel II, the power and influence of the central *bet din* increased. The summit of its authority was reached under Judah ha-Nasi I. His grandson, Judah Nesia, may be regarded as the last *nasi* under whose direction the *bet din* was still the actual center of the Jewish people. The Talmud therefore refers to Gamaliel and his *bet din* (Tosef., Ber. 2:6) and to Judah ha-Nasi and his *bet din* (Av. Zar. 2:6), thereby indicating the central civil and religious authority of the Jews.

"Toward the middle of the third century, the *bet din* of the *nasi* gradually lost its importance due to the rise of Jewish scholarship in Babylonia and the increased oppression of Palestinian Jewry under Roman rule. Although the office of the *nasi* continued until the end of the fifth century, his *bet din* was no longer the center of the Jewish people. In Babylonia, no *bet din* ever achieved preeminent authority, even for Babylonia alone. This situation continued throughout the geonic period [600 to 1040 AD], as no central *bet din* could be established because of the rivalry between the two academies" (Ibid., s.v. "Bet Din and Judges").

The apostle Paul was one of the chief students of Gamaliel I, who played a central role in the regulation of the calendar from 30 to 50 AD. Paul was a member of the Sanhedrin at the time of Stephen's death in 30 AD (Acts 8) and remained so until 36 AD, when he was converted on the road to

Damascus (Acts 9:22). Paul was actively involved in calendar matters under the presidency of Rabban Gamaliel I the Elder. Remember, it was Gamaliel's responsibility along with the rest of the Sanhedrin (Paul included), to set the calendar each year, which included the sanctification of the month Adar for intercalation, proclaiming the wave sheaf, counting to Pentecost and most important of all, the sanctification of the Molad of Tishri. During the seven-year period that Paul participated in judging these matters, there were no less than five years in which the Molad of Tishri was postponed.

Paul renounced his membership in the Sanhedrin at his conversion to Christ in 36 AD. Shortly after his conversion, Paul was taken to the wilderness of Arabia, where he spent the next 3½ years (fall 36 AD to spring 40 AD) being personally taught by the risen Christ (Gal. 1:15-18). Paul began his missionary journeys in the spring of 46 AD, six years later. At the end of his second missionary journey, in the fall of 53 AD, Paul sailed for Jerusalem under the direct influence of the Holy Spirit. After confronting the apostles James, Peter and John during the Feast of Tabernacles season, he retired to Antioch of Syria for the winter (Acts 15:1-35). In the spring of 54 AD, another confrontation arose between the gentile believers and Judaizers who had come down to Antioch from Jerusalem at Passover time. At this time, Paul again confronted Peter, who had succumbed to the influence of the Judaizers (Gal. 2:11-14). Although these Judaizers (called "the circumcision" in the book of Acts) held a vastly different view of Christ and His ministry than did Paul, they did not disagree with him on the timing of the Passover and the Days of Unleavened Bread. <u>They were observing these days at the same time as Paul and the gentiles who had been converted through his teaching.</u>

The Passover that Paul and the gentile converts observed in 54 AD was on a Wednesday, April 10. The date of its observance was set by the first day of Tishri, according to the Hebrew Calendar. In that year the **Molad** of Tishri fell on Friday, September 20. Based on Postponement **Rule 2**, Tishri 1 was declared on Sabbath, September 21.

The New Testament record of the Passover observance in 54 AD is most significant. Although Paul had renounced his former Pharisaical beliefs and practices, and had been personally taught by Jesus Christ for 3½ years, he had not forsaken the Hebrew Calendar with its Rules of Postponement. He

had taught the gentile believers to observe the same days that the Jewish believers of the circumcision party were observing.

Paul's observance of the holy days was based on the calculations of the Hebrew Calendar as declared by the *bet din*. Had Paul rejected the court's authority in calendric matters, he and the gentile believers would not have observed the same day as the believers of the circumcision party. The record of Scripture is that Paul's observance of the feast of God matched the time of observance of the Jewish believers, who held strictly to the Hebrew Calendar and the declarations of the *bet din*.

Evidence of Intercalation in the Jerusalem Talmud

Evidence that the Hebrew Calendar of New Testament times was calculated and intercalated is found in the Jerusalem Talmud. The Jerusalem Talmud was completed a full century before the Babylonian Talmud, which was compiled about 500 AD (*Encyclopaedia Judaica*, s.v. "Talmud, Jerusalem"). The tractate *Rosh Hashanah* in both Talmuds discusses the declaration of Tishri 1 and the other new moons of the year. Because the tractate in the Jerusalem Talmud predates that of the Babylonian Talmud, it carries a greater weight of authority.

In the Jerusalem Talmud, tractate *Rosh Hashanah*, we find Rabbi Zeira and Rabbi Abbahu discussing the decisions of the *bet din*, the great calendar court of ancient Israel. In particular, they are questioning the decisions of a rabbinic authority they refer to simply as "Rabbi." The "Rabbi" they are referring to is none other than Rabban Gamaliel I the Elder. This fact is significant to our understanding of the calendar, as Gamaliel I held office from 30 to 50 AD. Thus the rabbis are discussing the calendar as it was in the days of Jesus and the apostles.

The following commentary from the Jerusalem Talmud concerns the sanctification of the new moon of Nisan, the first month of the year. The declaration of the new moon of Nisan depended on whether or not the year was intercalated. In common years, which consisted of twelve months, the year ended with the month Adar. In intercalary years, however, a thirteenth month was added to the year. This month, which followed Adar, was called Adar II. The intercalary years periodically adjusted the calendar to keep the months of the year aligned with the seasons. Until the announcement was made, the people did not know whether the new moon that followed Adar

would be declared Nisan or Adar II. The rabbinical commentary shows the confusion that had arisen because of false witnesses who had sought to hasten the declaration of the new moon of Nisan as the month of Adar drew to a close. To add to the disorder, the Samaritans had sabotaged the practice of lighting beacon fires, which the Jews had been using to announce the decision of the *bet din* as to whether or not the year would be intercalated. In an attempt to restore order, Rabban Gamaliel I had discontinued the beacon fires. His action did not alter the practice of intercalation, but only the manner in which the intercalation was announced, and thus the sanctification of Nisan. Gamaliel's action, and the problems which prompted it, are recorded in the Talmudic verses below. The words in brackets and the accompanying footnotes were added by the editor of the Jerusalem Talmud to clarify the text.

"12. Henceforth concerning [the New Moon of] *Nisan* we won't accept them; [57] concerning the rest of the months we should accept them! [58] Said Rabbi Jose the son of Rabbi Adun: the essential disordering began with Adar. [59] Henceforth, when there is agreement with them, we should not accept them; but if there is not agreement with them, we may accept them! [60] [The Mishnah teaches] this because of this. [61]"

"13. It happened that the Boethusians hired two false witnesses to testify concerning the moon that it had been sanctified. The one came, gave his testimony, and went on his way. The other came and said: I was going up the ascent of Adumim and I saw it, crouching between two rocks, its head like [that of] a calf, its ears like [those of] a kid, and I saw it, became frightened, and sprang back. And behold 200 *zuzim* are tied up in my purse. They said to him: behold the 200 *zuzim* are given to you as a gift, and those who sent you shall come to be lashed. As for you, why did you place yourself in such danger? He said to them: I saw them seeking to mislead the Sages. I said [to myself] better that I should go and make it known to the Sages."

"14. And what disorder occurred there? [62] That these [63] were lighting beacons on this day, and these [64] were lighting beacons the next day, and they used to think that the Bet Din had changed their mind to intercalate, and they became disordered."

"15. Who discontinued the beacon fires? Rabbi [65] discontinued the beacon fires…."

"60. The translation proposed for this sentence follows the emended text found in Rabennu Hananel to Rosh Hashanah 22b. Z.W. Rabinovitz, in *Sha'are Torath Eretz Israel*, p. 274, suggests a similar corrected reading. The translation of the Leiden MS and the printed texts would be as follows: 'Henceforth, when there is agreement with them, we should accept them; if there is not agreement with them, we should not accept them.' **This version assumes that since the *Bet Din Hagadol* is mathematically able to calculate when the moon will appear, they might then accept or reject testimony from witnesses unknown to them predicated upon agreement of the testimony with their own calculations."**

"61. The Mishnah teaches that because of the manipulating on the part of the *minim*, **the Rabbis decreed that they would only accept testimony from moon-witnesses known to them. Even though they might use their own calculations as an independent check on unknown witnesses**, nonetheless such a system might open them to possible error in the case of a false witness. Hence, because of the mishnaic teaching, they completely disregarded the testimony of witnesses unknown to them and unattested, even when they don't agree with the Rabbis."

"62. The Talmud text has moved on to examine the next part of Mishnah I, which deals with the Samaritans' sabotage of the beacon system."

"63. Authorized by the Bet Din."

"64. The Samaritans.

"65. According to Rabinovitz, *Sha'are*..., p. 275, we learn from R.H. chapter I, Mishnah 4: 'Because of six New Moons the messengers go forth....And while the Temple still existed, they went forth also on Iyar because of the Minor Passover.' Hence **the system of lighting beacons must have been dropped while the Temple was still standing, and the 'Rabbi' here referred to must have been Rabban Gamaliel the Elder**. Rabinovitz goes on to prove that *Nasiim* other than Judah Hanasi are referred to in the literature as simply 'Rabbi.' " (Goldman, *The Talmud of the Land of Israel: A Preliminary Translation and Explanation*, Vol. 16, pp. 61-62).

The rabbinical commentary that is recorded in the Jerusalem Talmud makes it clear that the intercalation of Adar and the occurrence of the new moon of Nisan had been calculated well beforehand. The testimony of new-moon witnesses was judged by the calculations of the *bet din*, which took precedence in calendar matters. The new moon of Nisan, like the new moon of Tishri, was determined far in advance and was only verified by observation.

The discussion of the ancient rabbis in the tractate *Rosh Hashanah* offers historical evidence that the Hebrew Calendar at the time of Christ and the

apostle Paul was both calculated and intercalated. When the *bet din* calculated the calendar for the upcoming year, the most important part of their work was the determination of the new moon of Tishri, which would set the holy day season for the entire year. Included in their calculations was the application of rules, whether written or not, which called for intercalation in a set pattern of years (3, 6, 8, 11, 14, 17, 19). The addition of a thirteenth month in these years automatically made Tishri 1, and all the holy days, fall a month later in the solar year, keeping these days in harmony with the harvest seasons. The calendar was further adjusted by applying the Rules of Postponement, which delayed the declaration of the new moon of Tishri by one or two days. This "fine tuning" of the calendar kept the months of the year aligned with the phases of the lunar cycle.

The date of Tishri 1 was calculated by the *bet din* seven years in advance to match the seven year Sabbatical Cycle. The declaration of Trumpets was made when that day arrived, whether or not the new crescent had been sighted. As the day approached, the calendar court convened for the purpose of sanctifying the New Moon Day, thus placing an official seal on their calculations. If moon-witnesses disagreed with these calculations, the Molad of Tishri was still sanctified. The calculations of the court were final in these matters.

The calculation of the Molad of Tishri and the practice of intercalation did not begin at the time of Hillel II, as some have claimed. The records of the Jerusalem Talmud clearly contradict this assertion. The historical evidence in the tractate *Rosh Hashanah* confirms that the calculated Hebrew Calendar was in effect at the time of Christ and of Paul—more than three hundred years before Hillel II, who codified these rules.

Additional evidence of intercalation can be found in other tractates of the Jerusalem Talmud. A letter written by Rabban Gamaliel I the Elder as president of the *bet din* is recorded in the tractates *Sanhedrin* and *Ma'aserot*:

"From Rabban Gamaliel we discover, for the first time, why the Sanhedrin declared some years to contain thirteen months. In a letter sent to the Jews of Palestine and neighboring countries, he said: 'The time of Pesach is drawing nigh but there is no sign of spring and we will have not lambs for the Passover offering, nor young pigeons to be sacrificed by women who have given birth, nor will there be new barley for the offering of the sheaf

[*Sanhedrin* 11b, Jerusalem Talmud *Ma'aserot* 5:4] ' " (Bader, *The Encyclopedia of Talmudic Sages*, p. 126).

Rabban Gamaliel sent this letter to the Jews of Palestine and neighboring countries to inform them that spring had not yet arrived. The month in which he did so was the month Adar, which may fall "…from February 12 to March 11 or 12 and in its latest from March 2 to 30 while the 59 days of Adar I with Adar II [in intercalary years] extend from February 2 to 31 March or April 1 at the earliest and from February 11 to April 9 or 10 at the latest" (*Encyclopaedia Judaica*, s.v., "Adar").

Rabban Gamaliel's letter announced the *bet din's* sanctification of an earlier decision to intercalate the year by adding a second Adar, which would push the declaration of Nisan 1 into the spring when there would be new lambs for the Passover and new barley for the wave sheaf. In view of the evidence, it is a complete fallacy to deny that intercalation was practiced in the days of Jesus and the apostles.

There is additional significance in the record of Rabban Gamaliel's letter. As the *Encyclopaedia Judaica* shows, the month of Adar may end as many as ten or eleven days before the spring equinox. Since the decision to intercalate was always announced before the end of Adar, it is evident that the beginning of the new year was not based on the equinox. There is no evidence in history or in Scripture which links that astronomical event to the declaration of the new moon of Nisan.

The Abib:
Season of the Ripening Ears

Some have rejected the intercalary rules of the Hebrew Calendar. They claim that it is no longer necessary for the months of the year to coincide with the harvest cycle. Because the wave sheaf is no longer being offered, they see no reason to wait for the ripening of the first barley before beginning the new year.

Those who hold this view are ignoring the fact that when God linked the first month of the year to the harvest cycle, He did not make any reference to the offering of the wave sheaf. God's instructions were only to observe the Passover and the Days of Unleavened Bread in the first month. This month is clearly identified in Scripture as the time of the ripening barley, although

the offering of the wave sheaf did not begin until forty years later--after the children of Israel had entered the Promised Land. (See *Understanding God's Command for the Wave Sheaf.*)

The book of Exodus records that the knowledge of when to begin the year was spoken directly by God to Moses, who delivered it to the elders of the tribes of Israel. God's instructions begin in Exodus 12: "And the LORD spake unto Moses and Aaron in the land of Egypt, saying, This month *shall be* unto you the beginning of months: it *shall be* the first month of the year to you" (verse 2).

The phrase "the beginning of" in Exodus 12:2 is translated from the Hebrew word š¾aî *rõhsh* **7218** and simply means "head" (Brown Driver Briggs, *Hebrew and English Lexicon of the Old Testament*, p. 910). The Hebrew text identifies this month as the beginning or "head" of all the months of the year. Owens translates the phrase "this month for you the beginning of months" (*Analytical Key to the Old Testament*, vol. 1, p. 285).

Exodus 13:4 informs us that the month referred to in Exodus 12:1-2 is the month of the *abib*: "This day came ye out in the month Abib." *Abib*, meaning "green ears," is a Hebrew term for ripening grain. It is not the title of the month but a descriptive term linking the first month with the beginning of the harvest cycle. Thus the first month of the year is the "month of the ripening grain."

The Hebrew text first uses the word *abib* in Exodus 9:31-32, where we read, "And the flax and the barley was smitten: for the barley *was* **in the ear** [bi±a® *ãh-veev'* or *abib* **24**], and the flax *was* bolled. But the wheat and the rye were not smitten: for they *were* not grown up." The use of *abib* in Exodus 12 to describe the first month shows that it is the month of ear-forming (Brown Driver Briggs, p. 1). "Ear-forming" refers to the kernels of grain filling out and ripening on the barley stalks. *Abib* is used again in Exodus in 23:15 and 34:18, where we are reminded that it was during the *abib* (the ripening of the barley) that Israel came out of Egypt.

Abib is used once in the book of Leviticus: "And if thou offer a meat offering of thy firstfruits unto the LORD, thou shalt offer for the meat offering of thy firstfruits **green ears of corn** [bi±a® *ãh-veev'* or *abib* **24**] dried by the fire, *even* corn beaten out of full ears" (Lev. 2:14). The expression

"beaten out of full ears" at the end of the verse is translated from Srg *geh'res* [1643], which refers to mature kernels. By linking the words *abib* and *gehres*, the Hebrew text confirms that the month of Abib is the time in which the barley ripens to fully mature kernels. The ripening of the barley is controlled by climatic changes, which bring both sufficient heat from the sun and the latter rains that are necessary for the kernels to mature. **The status of the maturing barley crop was only one of three different factors reviewed throughout the harvest season and was only ancillary to the calendar's calculation and publication. None of these factors actually initiated or prohibited the calendars calculation but were taken into account nevertheless.**

The Biblical Concept of Season

"And the LORD spake unto Moses in the wilderness of Sinai, in the first month of the second year after they were come out of the land of Egypt, saying, Let the children of Israel also keep the passover **at his appointed season**. In the fourteenth day of this month, at even, ye shall keep it **in his appointed season**: according to all the rites of it, and according to all the ceremonies thereof, shall ye keep it" (Num. 9:1-3).

The Hebrew word translated "season" in these verses is doWm *mõh-gehd'* [4150] and should be rendered "appointed time" (Brown Driver Briggs, p. 417). The prepositional phrase in which it is used, "**in his appointed season**," is the Hebrew phrase wdoWmb. The Hebrew preposition *beth* is used here in its temporal sense. This preposition defines the appointed season as a specific point in time. Thus Owens translates the phrase "at its appointed time" (*Analytical Key to the Old Testament*, vol. 1, p. 614). The specific point in time (doWm *mõh-gehd'* [4150]) that is being referenced is the fourteenth day of the month. The appointed "season" for observing Passover is the fourteenth day of Abib, the month in which the spring barley crop begins to ripen.

The word *mõh-gehd'* is also translated "season" in Exodus 13:10: "Thou shalt therefore keep this ordinance [the Passover] **in his season** from year to year." The Hebrew expression hdoWml, translated "**in his season**," is a prepositional phrase governed by the preposition l *lamed*. *Lamed* is used in its temporal sense. Thus Owens translates this phrase "at [l *lamed*] its

appointed time" (*Analytical Key to the Old Testament*, vol. 1, p. 295). A better translation would be "**at the time of** its appointed time" (Waltke, p. 206). While this expression is quite awkward in English, it very specifically links the "season" of the Passover with the fourteenth day of the first month—the month of the *abib*.

Leviticus 23:4 clearly specifies that the feasts of God throughout the year are to be kept in their appointed seasons: "These *are* the feasts of the LORD, *even* holy convocations, which ye shall proclaim in their seasons [dowem *mõh-gehd'* **4150**]." The following verses show that there are three festival seasons during the year: Passover in the spring, Pentecost in the summer, and the Feast of Tabernacles in the fall. These three festival seasons are linked to the harvest cycle in the land of Israel. The word "seasons" in Leviticus 23 cannot possibly refer to the solar equinoxes, as these occur only in the spring and the fall. There is no equinox at the season of Pentecost.

The words "due season" in Deuteronomy 11:14 are not translated from *mõh-gehd'* **4150** but from a different Hebrew word, the noun tem *geehth* **6256**. In this context, *geehth* refers to the annual times of rain. The first rains fall sometime after the Feast of Tabernacles, when the barley is planted, and the latter rains begin to fall before the Passover, bringing the barley to maturity and beginning the harvest cycle. Thus the Scriptures link the climatic seasons with the harvest cycle, which sets the appointed times, or dowem *mõh-gehd'* **4150**, of the holy days.

Does the Biblical Concept of Season Include the Equinox?

When used in the context of the feasts of God, the word "season" does not refer to the climatic seasons. The Hebrew text uses other words to describe the climatic changes that occur during the year. The word "summer" is translated from the noun Cie *kah'-yitz* **7019** and literally means "vehement heat" (Brown Driver Briggs, p. 884). The word "winter" is translated from the noun PrFn *ghõh'-reph* **2779** and literally means "harvest-time" (Brown Driver Briggs, p. 358). Only the climatic seasons of "summer" and "winter" are found in the text. Although the word "spring" can be found, it is translated from the verb hBe *gãh-lãh'* **5927**, which refers

to the action of bringing up or springing up. There is no Hebrew noun for the season of spring.

The word "winter" appears five times in Scripture: "cold and heat, and summer and **winter**" (Gen. 8:22), "thou hast made summer and **winter**" (Ps. 74:17), "the king sat in the **winter**-house" in the ninth month (Jer. 36:22), "I will smite the **winter** house" (Amos 3:15) and "in summer and in **winter**" (Zech. 14:8). In each verse, "winter" is translated from the noun Prh *ghõh'-reph* [2779]. In Jeremiah 36:22, *ghõh'-reph* [2779] corresponds to the period of time from about mid-November to mid-December.

The Scriptures use the word "summer" to describe the time of warming, and the word "winter" to describe the time of cooling. The Hebrew text does not divide the year into four climatic seasons. This fact is reflected in Psalm 74:16-17: "The day *is* Thine, the night also *is* Thine: Thou hast prepared the light and the sun. Thou hast set all the borders of the earth: Thou hast made summer [Hebrew Ciq *kah'-yitz* [7019]] and winter [Prh *ghõh'-reph* [2779]]."

The phrase "summer and winter" is governed by the verb "hast made," which is translated from the verb rci® *yãh-tzar'* [3335]. *Yãh-tzar'* [3335] means "to form," in the same sense that God formed life and formed light. As a *Qal* stem in the perfective form, *yãh-tzar'* views summer and winter **as a unit**--with **no boundary between them**. The use of the Hebrew *waw* (translated "and") between the two seasons also shows that summer and winter are viewed as a unit.

The structure of the Hebrew text is describing two climatic seasons that form one unit, gradually warming to the extreme heat of summer and then cooling down to the deep chill of winter. The structure of the text makes no division between the two climatic seasons. There is no point in time that separates the summer from the winter.

The Hebrew text makes it clear that God does not view the seasons as four distinct divisions in the year. This modern concept is based on the Roman calendar, which is strictly a solar calendar, and as such is regulated by the spring equinox, the summer solstice, the autumnal equinox and the winter solstice. There is a vast difference between the Roman calendar and the calculated Hebrew Calendar. The Hebrew Calendar does not use the

equinoxes and solstices to keep the months aligned with the climatic seasons. If the months of the year were calculated by the equinoxes, there would be no need for intercalation.

The fact that intercalation has been used throughout the known history of the calendar confirms that the year is not set by the dates of the equinoxes. The months of the year are not based on these solar events but on the lunar cycle. Because the lunar year is shorter than the solar year, the calendar must periodically be adjusted to realign the months with the solar year. That is the reason for the rules of intercalation.

What Is the Meaning of "the Year's End?"

Some have assumed that the command to observe the feasts of the seventh month “at the year’s end” is referring to the autumnal equinox: "And thou shalt observe the feast of weeks, of the firstfruits of wheat harvest, and the feast of ingathering at **the year's end**" (Ex. 34:22).

Let us analyze this phrase in the Hebrew text. The Hebrew phrase translated "the year's" is hn®;h *ha shãh-nãh'*]. This phrase is composed of the definite article *ha*, translated “the,” and the noun *shãh-nãh'* [8141], translated “year’s.” The word "end" is translated from hpwqt *t koo-phãh'* [8622]. The word "at" is added to the English translation for reading purposes--there is no preposition in the Hebrew text.

The Hebrew word *shãh-nãh'* [8141] refers to a year "as a division of time" (Brown Driver Briggs, p. 1040). *Shãh-nãh'* [8141] may refer either to the course of the sun during the year or to the seasons of the year (*Gesenius’ Hebrew-Chaldee Lexicon to the Old Testament*, p. 840). Note that this Hebrew word does not refer to a specific point in time, such as the equinox, but to an extended period of time.

The Hebrew word *t koo-phãh'* [8622] literally means to "**come around**" or to "**complete a circuit**" (Brown Driver Briggs, p. 880). Gesenius renders this word as " 'the course of time, of season' I Samuel 1:20, 'after the course of a year' II Chronicles 24:23" (*Gesenius’ Hebrew-Chaldee Lexicon to the Old Testament*, p. 873). Before analyzing the use of *t koo-phãh'* [8622] in Exodus 34:22, let’s take a look at how this Hebrew word is used in three other Scriptures:

1) "Wherefore it came to pass, when the time was **come about** [Hebrew *t koo-phãh'* **8622**] after Hannah had conceived, that she bare a son" (I Sam. 1:20).

T koo-phãh' **8622** is used in this verse to express the end of a cycle of pregnancy--i.e., after nine months (a duration of time), Hannah gave birth to Samuel (an event). There is no reference to the time or season of year in which Samuel was born. The verse simply records a nine-month period of time that ended with the birth of Samuel. Thus both duration of time and an event in time are expressed by *t koo-phãh'* **8622**.

2) "And it came to pass **at the end of the year** [Hebrew *t koo-phãh'* **8622**], that the host of Syria came up against him: and they came to Judah and Jerusalem, and destroyed all the princes of the people from among the people, and sent all the spoil of them unto the king of Damascus" (II Chron. 24:23).

In this verse, *t koo-phãh'* **8622** is used to express a duration of time, the end of which was marked by an event--i.e., after a year had passed (a duration of time), the king of Syria attacked Jerusalem (an event). The phrase "at the end of the year" is composed of the Hebrew preposition *lamed* l prefixed to hpwqå *t koo-phãh'* **8622**, which signifies "**after the course of a year**" (Gesenius, p. 873; see also Waltke, p. 206). The wording in the Hebrew text does not refer to the end of the calendar year but simply records a duration of twelve months.

3) "His going forth is from the end of the heaven, and his **circuit** [Hebrew *t koo-phãh'* **8622**] unto the ends of it: and there is nothing hid from the heat thereof " (Ps. 19:6).

In this verse, the word *t koo-phãh'* **8622** is used to express the **cycle of the sun** as it completes its yearly circuit--i.e., the sun's passage through the heavens during the solar year (a duration of time), at the end of which it enters the cycle again (an event). Although the equinoxes and solstices are included in the sun's yearly cycle, *t koo-phãh'* does not distinguish these events from any other time in the cycle. *T koo-phãh'* **8622** views the cycle as one unbroken unit marked only by the end, which begins it anew.

Let us now examine the use of *t koo-phãh'* in Exodus 34:22. Owens translates this verse as follows:

> "and the feast of weeks
> you shall observe
> the first fruits of harvest of
> wheat
> the feast of ingathering
> at the year's end"

The feast that is to be observed “at the year’s end” is the “feast of ingathering,” known today as the Feast of Tabernacles. This feast falls at the end of the harvest cycle, which is a course or duration of time. *T koo-phãh'* **8622** is used to express the end of this period, at which time an event is to occur; i.e., after the harvest season (a duration of time), which begins in the first month and ends in the seventh month, the feast of ingathering is to occur (an event).

When we examine the context in which *t koo-phãh'* **8622** is used, it is evident that this word refers to the end of the harvest cycle: "And thou shalt observe **the feast of weeks**, of **the firstfruits of wheat harvest**, and the feast of ingathering at the year's end [hpwqa *t koo-phãh'* **8622**]." The command of God clearly links the "feast of weeks" with the harvest cycle. This feast, now named Pentecost, is not observed at the time of a solstice or equinox. It is counted from the beginning of the harvest cycle in the month of Abib. Thus the use of *t koo-phãh'* **8622** encompasses the entire harvest cycle, at the end of which the Feast of Tabernacles is to be observed. Its observance begins on the fifteenth day of the seventh month.

The phrase "at the year's end" does not refer to the end of the calendar year, which falls long after the seventh month has passed, nor does it refer to an astronomical point in time. The word hpwqa *t koo-phãh'* **8622** expresses a **duration** of time, not a specific point in time, such as the equinox. While the seasonal pattern that is set by the solar cycle has a direct bearing on the harvest cycle, the astronomical events (equinoxes and solstices) of the solar cycle do not. Although these solar events figure prominently in pagan festivals, they have no bearing on the feast days of God. Because the Hebrew Calendar is agriculturally based, the timing of the autumnal equinox

in relationship to the "feast of ingathering" is irrelevant. This feast, as appointed by God, is to be observed on Tishri 15, regardless of when the equinox occurs.

Leviticus 23:39 specifically states that the feast of ingathering is to begin on the fifteenth day of the seventh month, "when ye have gathered in the fruit of the land." This verse clearly shows that its observance follows the completion of the harvest cycle, which may occur either before or after the autumnal equinox. Thus it is totally erroneous to link the observance of this feast with the autumnal equinox.

The Role of the New Moon of the First Month

Some have rejected the rules of intercalation and have chosen to follow their own rules. They claim that the first month should be based on the spring equinox, and that all the months of the year should be calculated from the first month. Some even teach that the day of this new moon was established as a special observance. They have interpreted Deuteronomy 16:1 as a command to observe the new moon of Abib: "Observe the month of Abib [bibha *ãh-veev'* **24**], and keep the passover unto the LORD thy God: for in the month of Abib the LORD thy God brought thee forth out of Egypt by night."

When we examine the Hebrew text, we find that this verse does not support the observance of the new moon of the first month. The word "observe" in this verse is translated from rmv *shãh-mar'* **8104** and expresses the meaning "to celebrate a festival" (Brown Driver Briggs, p. 1036). This Hebrew verb does not denote visual observation of the new moon of the first month, nor is it a command to keep a festival on the day of the new moon. It is a command to observe the festivals of the **month** of Abib, not the new moon of Abib.

The new moon of the first month is not a festival, or annual Sabbath, as is the new moon of the seventh month. The new moon of the seventh month is the only new moon of the year that has been sanctified by God as a holy day. There is no Scriptural basis for observing the new moon of the first month.

Neither is there any Scriptural basis for calculating the other months of the year from the first month. The command in Exodus 12:2, "This month *shall be* unto you the beginning of months," should not be interpreted as

evidence that all the months of the year should be calculated from the new moon of the first month. Although the new moon of the first month is the first new moon of the year, it is not the new moon from which the new year is calculated. The Scriptures reveal that God ordained the new moon of the seventh month as the basis for calculating the new year.

The Role of the New Moon of the Seventh Month

The "New Year for Years" was proclaimed at the sanctification of the new moon of *Tishri* (Goldman, *The Talmud of the Land of Israel*, Vol. 16, pp. 35-39).

Calculating the new moon of the seventh month, or Tishri, is of paramount importance to the observance of the feasts of God. The record that we find in Psalm 81 shows that the calculation of the new moon of the seventh month was a law of God, delivered to the children of Israel at the time of the Exodus from Egypt:

"Blow up the trumpet in the new moon, in the time appointed, on our solemn feast day. For this *was* a statute for Israel, *and* a law of the God of Jacob. This He ordained in Joseph *for* a testimony, when he went out through the land of Egypt, *where* I heard a language *that* I understood not" (verses 3-5).

These verses declare that when God brought the descendants of Abraham, Isaac and Jacob out of Egypt, He ordained a testimony (Hebrew *geeh-dooth'* **5715**, meaning a decree or code of law) concerning a new moon (Hebrew *`ghõh'-desh* **2320**, referring to the new crescent) which was to be observed as a "solemn feast day." This new moon was the first day of the seventh month, which we call the Feast of Trumpets. Verse 3 of Psalm 81 also refers to a full moon festival (Hebrew *keh'seh* **3677**). This full moon was the fifteenth day of the seventh month, which begins the Feast of Tabernacles. Although the King James Version does not translate *keh'seh* in this verse, the New King James does. *Keh'seh* is used only in Psalm 81:3 and in Proverbs 7:20.

The *`ghõh'-desh* **2320**, or new crescent, of Psalm 81:3 is the only new moon that God commanded to be observed as an annual holy day. It is also the new moon that sets the calendar for all the holy days in the year, as Verses 4 and 5 of Psalm 81 testify. Notice: "For this *was* a statute for

Israel, *and* a law of the God of Jacob. This He ordained in Joseph *for* a testimony, when he went out through the land of Egypt, *where* I heard a language that I understood not."

The word "**statute**" in Verse 4 is translated from the noun qh *`ghõhk* [2706]. The meaning of *`ghõhk* [2706] in this context is "**a law of a religious festival**" (Brown Driver Briggs, *Hebrew and English Lexicon of the Old Testament*, p. 349). The word "**law**" in Verse 4 is translated from the noun Tp®¾m *mish-pãht'* [4941], and refers to "**a case or cause presented for judgment**" (Ibid., p. 1048). *Mish-pãht'* [4941] is synonymous with the noun qq® *ghãh-kak'* [2710], meaning "**something prescribed**" (Ibid., p. 349), and with the noun qh *`ghõhk* [2706], which is translated "**statute**" in Verse 4.

The word "**ordained**" in Verse 5 is translated from the verb wm® *soom* [7760], meaning "to compute" (Ibid., p. 962). The word "**testimony**" in Verse 5 is translated from the noun Hwdo° *geeh-dooth'* [5715], meaning "**a code of law**" (Ibid., p. 730).

When we understand the meaning of the Hebrew words, it is evident that at the time of the Exodus from Egypt, God issued to Moses and Aaron "a law of a festival" (qh *`ghõhk* [2706]). The festival for which this law was issued was the new moon (*'ghõh'-desh* [2320]) of the seventh month. This law decreed that each year the new moon of the seventh month was to be presented for judgment (Tp®¾m *mish-pãht'* [4941]) by computation (wm® *soom* [7760]), and that a written prescription (qq® *ghãh-kak'* [2710]), or calendar, was to be issued.

The record that we find in Psalm 81:3-5 reveals that God wrote the initial "calendar prescription" by computing the calendar for Israel at the time they left Egypt. He then delivered the rules for computation (the mathematics) to Moses and Aaron. **It was decreed by God that the molad of the seventh month be calculated year by year**. This law further decreed that at the sighting of the new crescent, the first day of the seventh month be sanctified as a solemn assembly by the blowing of trumpets.

The command to blow the trumpets "**at** the new moon [*`ghõh'-desh* [2320]]" in Verse 3 is referring to the sanctification of the day as Tishri 1, the Feast of Trumpets. "At" is translated from the Hebrew preposition *beth*, which is

used in its temporal sense to mark the exact time the horn is to be blown--at the time of the new moon. The Hebrew text states that trumpets are also to be blown "**at** the full moon [*keh'seh* **3677**]," although this command was omitted by the King James translators. "At" is again the Hebrew preposition *beth*, used in its temporal sense to mark the exact time the horn is to be blown--at the full moon. This blowing of trumpets refers to the sanctification of Tishri 15, the first day of the Feast of Tabernacles.

The commands for the "new moon" and the "full moon" in Psalm 81:3 make it absolutely clear that this verse is referring to the festivals of the seventh month. No other month of the year has both a new moon and full moon that were sanctified by God as annual holy days. It is the new moon of this month that God ordained as a law (*mish-pãht'* **4941**) for computing (*soom* **7760**) His holy days.

The Hebrew text clearly contradicts those who claim that the new moon of the first month should determine the appointed times of God. **The new moon of the seventh month is the new moon that God ordained to set the months of the year**. This law of God is recorded in Psalm 81, a song of Asaph--the chief musician among those who blew the trumpets in declaration of the new moon. Asaph also declares that God issued this law at the time that Israel went out of Egypt.

There is no Scriptural basis for using the new moon of the first month to calculate the beginning of the year. Those who do so are violating the clear decree of God Himself, as recorded in Psalm 81. The new moon of the seventh month is the time that God appointed for calculating His feast days throughout the year. The rules for the calculation of this new moon were delivered by God in the year of the Exodus and became the foundation of the Hebrew Calendar.

Declaration of Tishri 1 for 2000 AD

Will the use of observatory data lead to a more reliable date for the new moon of Tishri? Are the calculations of modern astronomy more accurate than the calculations of the Hebrew Calendar?

Let's check the accuracy of the declarations of those who reject the Hebrew Calendar and rely on the astronomical conjunction to determine the day of the new moon. The astronomical conjunction for the month of Tishri

will fall on Wednesday, September 27, 2000 at 19:54 UT, which translates to 9:54 PM JT. If we were basing our decision of the time of the astronomical conjunction, then by Scriptural reckoning (from sunset to sunset), the Feast of Trumpets would be declared for Thursday, September 28, 2000. This would be the earliest that Tishri 1 could be declared, based on astronomical data in lieu of the Hebrew Calendar. For those who do not calculate, but rely on visibility only, there would be **no possibility of sighting the new crescent** on the eve of a September 28 Trumpets, as the day would be declared (6 PM JT) almost four hours before the astronomical conjunction.

Observing the Feast of Trumpets on September 28 would place Tishri 15 (the first day of the Feast of Tabernacles) on Thursday, October 12. The rising moon on the eve of that date will have an illumination of 96.71% with an age of 13.1 days, indicating that the declaration was too early.

How does the accuracy of the Hebrew Calendar compare to the astronomical calculations?

The Hebrew Calendar calculates the mean conjunction or Molad of Tishri to fall on Thursday, September 28 at 19 hours and 310 parts. This translates to 1:17 PM JT or 11:17 UT. Based on Postponement Rule 2, the declaration of Tishri 1 is postponed to Friday, September 29. And based on Postponement Rule 1, the declaration of Tishri 1 is postponed one more day to Saturday, September 30. The declaration of the Feast of Trumpets on Saturday, September 30, not only ensures that the new crescent will be visible from Jerusalem on the eve of the observance, but more importantly ensures the greatest possible illumination of the full moon of Tishri 15.

The declaration of the Hebrew Calendar for Tishri 1 in the year 2000 places Tishri 15 on Saturday, October 14. The full moon on the eve of the first day of the Feast of Tabernacles will have an illumination of 99.57% with an age of 15.1 days—a mere .43% shy of a perfect 100%. Thus the dates set by the Hebrew Calendar for the month of Tishri are more accurately aligned with the lunar phases than are the dates set by astronomical calculations.

Declaration of Nisan 1 for 2000 AD

Let's apply the same comparison to the date of the Passover. Does the use of observatory data lead to more accurate results than the Hebrew Calendar?

The U.S. Naval Observatory calculates the astronomical conjunction of Nisan 1 in the year 2000 to occur at 20:13 JT which translates to 8:13 PM on the evening of Tuesday, April 4. Since the conjunction falls after sunset, if the conjunction were the determining factor, this figure would place Nisan 1 on Wednesday, April 5, and Nisan 15 on Wednesday, April 19.

The new moon on the eve of Wednesday, April 5, will not be visible because the conjunction will occur at 8:13 PM that evening. As a minimum of 17.2 hours must pass from the time of the conjunction before the new crescent can possibly be seen. The full moon on the eve of April 19, which by this reckoning would be Nisan 15, the first day of the Feast of Unleavened Bread, will be a perfect 100%, indicating that the declaration was on target. However, the full moon on the eve of Tishri 15, which by this reckoning would be Thursday, October 12, will be only 96.71%, averaging out to 98.36% accuracy for the two dates.

How do the calculations of the Hebrew Calendar compare?

The Hebrew Calendar places Nisan 1 on Thursday, April 6, and Nisan 15 on Thursday, April 20. The new moon on the eve of Thursday, April 6, will be visible over Jerusalem for a little less than one hour after sunset, waxing at 1% visibility. The crescent will be visible because almost 20 hours will have passed since the conjunction the evening before. The full moon on the eve of Nisan 15 will be 98.59%, which is 1% less than the date set by observatory reckoning. However, the full moon on the eve of Tishri 15, which by Hebrew Calendar rules falls on Saturday, October 14, will be a perfect 100%. Thus the Hebrew Calendar achieves an average of 99.30% accuracy for the two dates.

The calculations of the Hebrew Calendar for the months of Nisan and Tishri are more accurately aligned with the phases of the moon than are the dates that are calculated by observatory data. When we examine the six-

month period from Nisan 1 to Tishri 1, the superior accuracy of the Hebrew Calendar is evident. It achieves the greatest possible accuracy in matching the phases of the moon because its calculations are based on the average length of the lunar month as opposed to the specific time of the moon's conjunction. This factor is especially critical in the year 2000. When we use the astronomical conjunction to calculate the length of the six-month lunar period from the beginning of Nisan to the beginning of Tishri, we find that the total number of days does not match the known average for this cycle. Observatory data for the year 2000 tells us that this six-month period extends from 20:13 JT, April 4, to 21:53 JT, September 27. The total time of this period is 176.07 days, or an average of only 29.345 days per month. This figure is 1.11 days short of the known average of 177.18 days per lunar month.

According to the Hebrew Calendar, the six-month period from Nisan 1 to Tishri 1 begins on April 6 and extends to September 30. When we calculate the length of this period, from the beginning of April 6 to the beginning of September 30 (sunset to sunset reckoning), we reach a total of 177 days. The average number of days per month by Hebrew Calendar calculations is 29.5305941, which is within .0000006 of the known average.

The use of this average figure enables the Hebrew Calendar to match the lunar phases during the six-month period as closely as possible in the year 2000. Calculations that are based on the astronomical conjunction cannot lead to accurate dating because there is a full day missing in the six-month period. Despite the extreme fluctuation in the moon's cycle, the Hebrew Calendar achieves an almost perfect score in matching the desired phases of the moon, as defined by Scripture. Most important of all, its declarations match the command of God in Psalm 81:3 that the feasts of the seventh month be observed on the day of the new crescent and on the day of the full moon.

When we compare the figures of those who rely on observatory data with the figures of the Hebrew Calendar, it is evident that the calculations of the Hebrew Calendar are consistently more accurate. The average number of 29.5305941 days per month (29 days, 12 hours, 793 parts) that the Hebrew Calendar uses keeps our observance of God's feasts in line with the lunar cycle throughout the holy day season.

In Conclusion

The Hebrew Calendar has no need of the astronomical conjunction to calculate the new moon of Tishri. To determine the day of the new moon, the Hebrew Calendar always used the mean or average lunar period of 29 days, 12 hours, and 793 parts. What is the reason for this calculation? Simply this: the Scriptures command that the Feast of Trumpets be observed on the day in which the new crescent of the seventh month first appears.

In Old Testament times and in New Testament times, the Hebrew Calendar accurately projected the appearance of the new crescent, and the feasts of God were observed at their appointed times. No astronomical tables were consulted to validate the dates of these festivals. After thousands of years of festival dates have been accurately calculated, why do some assume that there is a need to improve the calculations of the Hebrew Calendar?

Much of the New Testament chronology centers around the declarations of the holy days of God. Should we now attempt to invalidate the observances that are documented in the Gospel accounts, when Jesus Himself sanctioned these declarations by His own example? Such action would show arrogant disregard for the inspiration of Scripture and the Lordship of Jesus Christ.

The postponement rules and mathematical constants of the Hebrew Calendar supersede all the astronomical calculations that may be obtained from an observatory, almanac, or other source of lunar information. None of these sources has any bearing on the declarations of the feasts of God. The Hebrew Calendar does not now nor has it ever defined the **Molad** of Tishri as the time of the astronomical conjunction. The two calculations are not aimed at defining the same event. Determining the exact time of the moon's conjunction is not part of the calculations for the dates of the feast days.

Astronomical data cannot improve on the accuracy of the Hebrew Calendar. All attempts to forge a better calendar by the infusion of mounds of information have demonstrated that, while it is not possible to construct a

perfect relationship between the lunar phases and God's feast days, the Hebrew Calendar is, nonetheless, the best calendar possible.

The moon is simply too variable in its movements to be measured and catalogued in such a way as to increase the reliability of lunar calendar dates. Its position in space at a given point in time cannot be predicted with absolute accuracy. By analogy, it would not be sound logic to require the driver of a delivery truck to be at a certain location at a given moment in time if he is not able to control the speed of the vehicle at all points on the route. Since the speed of travel between any two points is a variable for both a moving vehicle and an orbiting moon, determining its location at a given time does not enable us to predict exactly where it will be at a future time. If we attempt to predict its location at a future time, our calculations are more likely to be accurate if they are based on an average speed of travel. That is why the Hebrew Calendar uses the figure of 29.53 days per lunar month to calculate the new moon of Tishri. Any attempt to introduce other astronomical data will only complicate the process and lead to error in trying to match a calendar date to a lunar phase.

Plain mathematical evidence exists to show that the calculations of the Hebrew Calendar are aimed at mid-course corrections based on an average, which reduces the potential for errors. The Hebrew Calendar avoids specific readings of the moon's position at a finite point in time. The results of using the average or mean lunar period and applying the four Rules of Postponement will demonstrate that this method is much more accurate than calculations that are based on specific astronomical data. The figures speak for themselves. Since postponements are applicable 61% of the years, gross miscalculations would occur if these rules were not valid.

A comparison of the calculated Hebrew Calendar with calendars that are based on the moment of the darkest moon or the observation of the new crescent will demonstrate that through the years, the Hebrew Calendar achieves the highest percentage of accuracy in matching day of the month to the desired lunar phase. This degree of success would not be possible without the Rules of Postponement and the use of the average lunar month (29.53 days) for calculations.

We cannot demand that the moon be at a certain position and at a precise percentage of illumination on a specific day of the month, when it is not constant in its finite direction or the rate of its travel. We are able to predict

where it will be, but we cannot shift the days of the month so that its position in the sky and the percentage of illumination will match the desired lunar phase. To compensate for the irregularity of the lunar cycle, the Hebrew Calendar adjusts its declarations by postponements and averaging in order to match the lunar phases as often and as closely as possible. No method exists that can surpass its calculations. Our computers and modern mathematics enable us to calculate 64-bit figures and to know the exact time of the moon's conjunction each month of the year, but these figures are useless for calculating God's feast days. The increased availability of astronomical data that is offered by our modern, hi-tech computer age cannot improve the accuracy of the lunar dates that are calculated by the Hebrew Calendar.

We have presented the facts concerning the known lunar data for the declarations of the holy day season for the year 2000. Based on the criteria of a visible crescent moon for the beginning of the first and seventh months of the festival season, a 100% rising full moon on the eve of Nisan 15 and the eve of Tishri 15, and a total length of 177 days from Nisan 1 to Tishri 1, the declarations of the Hebrew Calendar are far superior to those of other calendars. A proposed calendar based on observatory data tracked by the most sophisticated computer technology on earth (the U.S. Naval Observatory) barely scores in these categories, meeting only one of the requirements—a perfect full moon on the eve of Nisan 15. In contrast, the Hebrew Calendar achieves a remarkable score, meeting all the requirements except a perfect full moon on the eve of Nisan 15, which it misses by only 1%.

Some might criticize the Hebrew Calendar for refusing to modify the standard of 177 days between Nisan 1 and Tishri 1, since, in 2000, this time span is actually 176.07 days by astronomical fact. However, we cannot deny the results of using the average constant. The Hebrew Calendar has maintained a higher percentage of accuracy down through the centuries by utilizing the 177-day mean figure. This year's declarations will achieve a near perfect illumination for the rising moon of Nisan 15 and a perfect illumination for the rising moon of Tishri 15. No other calendar can achieve this level of accuracy in calculating the holy days of God.

As a year of extreme lunar fluctuation, the year 2000 would appear to be a golden opportunity for an astronomically based calendar to make its best showing. But we have compared the dates set by astronomical calculations with the dates set by the Hebrew Calendar, and have demonstrated that the

Hebrew Calendar excels in its accuracy. Since the calculated Hebrew Calendar is not broken, perhaps we should stop trying to fix it.

Appendix A

The Biblical Definition of a Day

Genesis 1 describes the re-creation of the earth after Lucifer's rebellion and warfare: "In the beginning God [miḥ² l¶ *ᵉlõh-heem'* 430] created the heaven and the earth. And the earth was [had become] without form, and void [desolate and waste]; and **darkness** [covering the entire earth] *was* upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be **light**: and there was light. And God saw the light, that *it was* good: and God divided the light from the darkness" (Gen. 1:1-4).

The Scriptural account makes it clear that God was looking down upon the earth at the boundary line of light and darkness. From a specific point above the face of the earth, God "... saw the light [that now shone upon the portion of the earth facing the sun], that it was good: and God divided the light [shining upon half the earth] from the darkness [that still covered the other half that remained in]]. And God called the light Day [mwy *yohm* 3117], and the darkness he called Night [Hebrew ᵎl¶® *lah'-yil* 3915]. And the evening [bro *geh'rev* 6153] and the morning [rqb½ *bõh'-ker* 1242] were the first day" (Gen. 1:4).

God Himself defined the lighted surface of the earth as Day and the darkened surface as Night. The word *lah'-yil*, which literally means "a twisting away from light," reveals that God created the cycle of day and night by setting the earth in rotation. As the earth began turning, the sun began to rise on one side of its surface while at the same time the sun was setting on the opposite side. Thus God instantaneously created both day and night. It is by the perpetual turning of the earth on its axis that the cycle of day and night was begun and has continued for thousands of years.

When God set the earth in rotation, He did not choose to begin marking time with the rising of the sun at the first dawn. Rather, He chose to begin counting from the first sunset, so that the evening of the day preceded the morning: "And the **evening** [bro *geh'rev* 6153, sunset] and the **morning** [rqb½ *bõh'-ker* 1242, sunrise] were the first day" (Gen. 1:5).

That the first day began with the setting of the sun is confirmed by an analysis of this verse in the Hebrew text. As Owens shows, the Hebrew verb that is translated "were" in Genesis 1:5 is a *Qal* verb in the imperfective form (*Analytical Key to the Old Testament*, vol. 1). The imperfective form reveals "an aspect (*Aspekt*) in which a situation is understood as ongoing, whatever its temporal relation to the time of speaking" (Waltke, *An Introduction to Biblical Hebrew Syntax*, p. 691).

Waltke continues with a quote from Comrie explaining the significance of the imperfective: "Another way of explaining the difference between perfective and imperfective meaning is to say that the perfective [completed time] looks at the situation from outside, without necessarily distinguishing any of the internal structure of the

situation, whereas **the imperfective looks at the situation from inside, and as such *is crucially concerned with the internal structure* of the situation**, since it can look backwards towards the start of the situation, and look forwards to the end of the situation, and indeed is equally appropriate if the situation is one that lasts through all time, without any beginning and without any end " (Ibid., p. 476, emphasis added).

The Hebrew imperfective is used in Genesis 1:5 to reveal the internal structure of a twenty-four hour day. This verse identifies four specific parts in the day: "Day" (*yohm*), "Night" (*lah'-yil*), "evening" (*geh'rev*), and "morning" (*boh'-ker*). Is there any indication in the Hebrew text as to the order of these four constituent units? Yes, there is. The use of the consecutive *waw* , translated "and," not only defines the limits of each day, but also reveals the sequence of time elements within each day: "**And** the evening and the morning were the first day." The divine pattern for every day of every week is: sunset, darkness, sunrise, and daylight.

Verse 5 of Genesis 1 states: "And God called the light Day, and the darkness he called Night. Some have interpreted the fact that "Day" is listed first as evidence that Day precedes Night. However, the structure of the Hebrew text shows that the action of naming the Night was completed before God named the Day.

The Hebrew verb that is translated "called" is imperfective in the first clause (showing ongoing action) but is perfective (showing completed action) in the second clause. The use of the perfective form in the second clause confirms that the Night had already been named when God named the Day.

God called the light "Day" (*yohm*); He did not call the light "morning" (*boh'-ker*). God called the darkness "Night" (*lay'-yil*); He did not call the darkness "evening" (*geh'rev*). Yet many believe that "morning" (*boh'-ker*) is naming the daylight portion of the day, and "evening" (*geh'rev*) is naming the darkness of night.

The King James translation of Verse 5 seems to justify the claim that "evening" (*geh'rev*) is synonymous with "Night", and "morning" (*boh'-ker*) is synonymous with "Day" (*yohm*). In this translation, the verb "were" is renaming "evening" and "morning" as the first day, thus making it appear that evening/Night and morning/Day are synonymous terms. But this is not the meaning of the Hebrew text. Notice Owens literal translation of the Hebrew text:

"called
God
the light
Day
and the darkness
He called
night
and there was [hi[illegible] *hãy-yãh'* 1961] **evening**
and there was [hi[illegible] *hãy-yãh'* 1961] **morning**

day
one" (*Analytical Key to the Old Testament*, vol. 1).

The English verb "was" is translated from the Hebrew *hãy-yãh'* 1961. *Hãy-yãh'* is a *Qal* stem in the imperfective form and is used here in a *consecution* of tenses; i.e., leading clauses are prefaced with a consecutive *waw*.

In its context in Genesis 1:5, *hãy-yãh'* 1961 has the fundamental meaning "*to come into being, become*" (Brown, Driver, Briggs, *A Hebrew and English Lexicon of the Old Testament*). *Hãy-yãh'* 1961 is used twice in this verse, with the nouns "evening" (בֶּרֶב *geh'rev* 6153) and "morning" (בֹּקֶר *bõh'-ker* 1242). *Hãy-yãh'* 1961 represents these two subjects as the agents of the action by answering the questions "What is happening to the evening?" and "What is happening to the morning?" *Hãy-yãh'* answers these questions by responding: "The evening is coming into being" and "The morning is coming into being."

The fact that *hãy-yãh'* 1961 is a *Qal* stem in the imperfective form, and that it is used in a *consecution* of similar tenses, shows that it is describing a sequence of events. Thus Owens translates this verse:

"**and there was** [*hãy-yãh'* 1961] **evening** [*geh'rev* 6153]
and there was [*hãy-yãh'* 1961] **morning** [*bõh'-ker* 1242]."

Fox's translation shows the precise meaning of *geh'rev* and *bõh'-ker*:

"**There was setting,**
there was dawning" (The Schocken Bible).

Fox adds the following footnote:

"setting...dawning:

"The Heb. terms *erev* and *boker* are rather more specific than the usual 'evening' and 'morning.' "Elsewhere I have used 'sunset' and 'daybreak'; the latter would have clashed with 'day' in these lines."

When we understand the true meaning of Genesis 1:5 as revealed in the Hebrew text, it is clear that the terms "evening" and "morning" are not renaming "Night" and "Day." These terms are not synonymous but are identifying four distinct units of time in the daily cycle that God set in motion at the Creation: evening-night-morning-day, or, more specifically, sunset-darkness-sunrise-daylight.

Appendix B

The Rules of Postponement

Postponements are part of the process of calculating the new moon day of Tishri. After calculating the molad, the following requirements must be met before the declaration of Tishri 1 is made.

Rule 1: When the Molad of Tishri or advancement occurs on a Sunday, Wednesday, or Friday, the declaration of Tishri 1 is advanced one day to a Monday, Thursday or Saturday (Sabbath) respectively.

Rule 2: When the Molad of Tishri occurs at noon (18 hours 0 parts) or later, the declaration of Tishri 1 is advanced to the next day.

Rule 3: When the Molad of Tishri of a common year falls on a Tuesday, at or after 9 hours and 204 parts, the declaration of Tishri 1 is advanced to Wednesday. The application of Rule 1 advances the declaration one more day to Thursday.

Rule 4: When the Molad of Tishri of a common year immediately following an intercalary year occurs on a Monday, at or after 15 hours and 589 parts, the declaration of Tishri 1 is advanced to Tuesday.

Appendix C

The Months of the Hebrew Calendar

Name of Month	Festival Year	Civil Year	Roman Month
Nisan	1st	7th	March-April
Iyar	2nd	8th	April-May
Sivan	3rd	9th	May-June
Tammuz	4th	10th	June-July
Ab	5th	11th	July-August
Elul	6th	12th	August-September
Tishri	7th	1st	September-October
Marcheshvan	8th	2nd	October-November
Kislev	9th	3rd	November-December
Tebeth 10th	4th		December-January
Sh'bat	11th	5th	January-February
Adar	12th	6th	February-March
V'Adar	13th		

Appendix D

The Annual Festivals of God
2000 AD

Festival	Day of Week	Day of Month
First Day of Sacred Year	Thursday	April 6
Passover (observed the previous evening)	Wednesday	April 19
First High Sabbath Unleavened Bread	Thursday	April 20
Last High Sabbath Unleavened Bread	Wednesday	April 26
Pentecost	Sunday	June 11
Feast of Trumpets	Saturday	September 30
Day of Atonement	Monday	October 9
First Day of Tabernacles	Saturday	October 14
The Last Great Day	Saturday	October 21

Glossary of Terms

Note: All astronomical definitions are taken from Norton's 2000.0 Star Atlas and Reference Handbook.

astronomical conjunction the point in time during the dark phase of the moon, when the earth, moon and sun line up on the same axis. The astronomical conjunction is not the molad.

astronomical new moon the moon's phase at total darkness. See also **dark of the moon**.

autumnal equinox the point where the sun crosses the celestial equator moving southward, about September 23 each year

common year any one of three types of years in the Hebrew Calendar; a deficient common year contains 353 days, a regular common year contains 354 days and a perfect common year contains 355 days. See also **leap year**.

conjunction See **astronomical conjunction**.

dark of the moon the totally dark phase of the moon. Referred to by astronomers as the "new moon."

equinox the time when the sun crosses the equator, making the length of day and night equal

fall equinox See **autumnal equinox**.

Greenwich Mean Time (GMT) the mean solar time at the longitude of Greenwich, counting from midnight. See also **Universal Time (UT)**.

Jerusalem time (JT) the mean solar time at the longitude of Jerusalem, counting from midnight. Expressed in hours and minutes; (i.e., 7:45 PM). Expressed in Hebrew Calendar time (19:35, that is, 12:00 plus 7:35 hours equals 19:35).

Julian Date (JD) a system of dates used by astronomers that counts the number of days that have elapsed since a given starting date; Julian dates are reckoned from Greenwich noon and are given in decimal form. (For example, 2000 January 1 at Greenwich noon is JD 2451545.0.) Not the same as Julian Calendar.

intercalary year a year with a thirteenth month, specifically, years 3, 6, 8, 11, 14, 17, 19 of each 19-year cycle. See also **leap year**.

latitude the angular distance, measured in degrees, north or south of the equator

leap year any of three types of years in the Hebrew Calendar; a deficient leap year contains 383 days, a regular leap year contains 384 days and a perfect leap year contains 385 days. See also **common year**.

longitude the angular distance, measured in degrees, east or west of the prime meridian of Greenwich.

lunation the time taken by a complete cycle of phases of the moon, such as from one full moon to the next. A lunation lasts 29.53 days; it is the same as a synodic month.

new moon in Scripture, the visible crescent as seen from Jerusalem. Not the same as the astronomical new moon, which is not visible.

Metonic cycle the period of 19 calendar years (6939.6 days) after which the moon's phases recur on the same day of the year. There are 235 lunations in a Metonic cycle.

Molad the mean or average conjunction of the earth, moon and sun; its mean or average length is 29.53059 days. The *Molad* is not the same as the astronomical conjunction. See also **synodic month**.

part a measurement of time in the Hebrew Calendar equating to $3^{1/3}$ seconds. There are 18 parts to a minute and 1040 parts to an hour.

postponement a one or two day adjustment to the calculation of the Molad of Tishri. The Rules of Postponement enable the process of calculating the declaration of the new moon of Tishri to achieve the greatest degree of accuracy in relationship to the lunar cycle.

spring equinox See **vernal equinox**.

synodic month the interval between successive new moons. It is also known as a lunation. Its mean or average length is 29.53059 days, but the actual value can vary between 29¼ and 29¾ days.

time zones the 24 divisions of the earth, each 15 degrees broad, with the prime zone centered on the Greenwich meridian. Time in the zones to the east of Greenwich is ahead of GMT, while zones to the west of Greenwich are behind GMT. Jerusalem is east of Greenwich and ahead of Greenwich time by two hours.

Universal Time (UT) the name given to Greenwich Mean Time (GMT) in 1928 for scientific purposes.

vernal equinox the point where the sun crosses the celestial equator moving northward, about March 21 each year

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