



THE HEBREW CALENDAR

Study Paper

*Approved by the Ministerial Board of Directors
July, 2013*

INTRODUCTION

Occasionally there are questions within the Church about the Hebrew calendar. The purpose of this study paper is to explain the position of the Church of God, a Worldwide Association, on this subject.

In order to come to a conclusion about whether to use the Hebrew calendar, it is necessary to answer key questions, such as whether there is sufficient information in the Bible itself to formulate a calendar; the history and accuracy of the Hebrew calendar; who had authority to establish the calendar; whether the calendar is based on observation, calculation or both; and how the calendar was administered and preserved throughout the ages.

Two exhaustive studies were completed on this subject in the 1990s. The conclusion reached in this paper is consistent with that reached by the Church of God down through the years—that the Hebrew calendar (also known as the Jewish calendar) was preserved by the proper Jewish authorities (who also preserved the Hebrew Scriptures) and is, therefore, the correct calendar to use for observing the holy days.

THE HEBREW CALENDAR

Observance of the annual holy days is one of the fundamental beliefs of the Church of God, a Worldwide Association. We believe this is a biblical requirement commanded for Christians today. It is obviously important to observe these annual Sabbaths on the correct dates. And, in order to observe them as a group, we must agree on the calendar that will be used. Depending on which calendar is followed, observance of these days can be at distinctly different times, possibly weeks apart.

Over the years, a few individuals have developed their own calendars, which they propose the Church use to determine the observance of the holy days rather than the Hebrew calendar. How can we be assured that a calendar is accurate and compatible with Scripture? Is there such a calendar? Where in Scripture can you find the “biblical” calendar? Or by what authority can a person devise his own calendar?

In order to establish the use of the Hebrew calendar by the Church of God, a Worldwide Association, this paper discusses the following questions:

1. Is there enough information in Scripture to develop a calendar?
2. How was the Hebrew calendar developed?
3. How accurate is the Hebrew calendar?
4. Who has authority for preserving the calendar?
5. Is it necessary for an accurate calendar to be determined by observation, or can it be properly determined by calculation?
6. Are there legitimate rules of postponement?

Can a Calendar Be Developed From Scripture?

Some will argue that there is a calendar outlined in Scripture; but when questioned, they generally admit that there are only “clues” and “hints” of such a calendar. The Bible does contain information on years, months and days; but more is required before one can publish a calendar. The truth of the matter is that the Bible neither outlines a calendar nor provides enough “clues” or “hints” to answer all the questions that are necessary for producing a calendar.

There is no single calendar clearly defined in Scripture, but Scripture does confirm the existence of a calendar or calendars during different time periods. Based on the reference to days of a month, Noah must have known of a calendar (Genesis 7:11). Moses had knowledge of a calendar (Exodus 12:2), and there was a calendar in place when the Jews returned from exile (Nehemiah 8:2) and during the Second Temple period (515 B.C. to A.D. 70), which included the time of Jesus Christ’s earthly ministry. Historically, however, there is no clear proof that one single calendar existed from the time of Noah to Christ, approximately 2,300 years.

The truth of the matter is that neither Scripture nor history provides enough information about the calendar in use at any one time to reconstruct a duplicate with an assurance of accuracy. Here are just a few of the questions that are not fully answered in Scripture, but are necessary for establishing a calendar with which to observe the holy days.

What is a “new moon”?

The Hebrew word *chôdesh* means “the first day of the month” or “the lunar month.”¹ The context of the verse determines whether we are speaking of a month (full cycle of the moon) or only the first day of that month—referred to as the new moon or new month. There is no biblical definition given for the term “new moon.”

Some define the new moon as the “dark of the moon” (when the conjunction of the sun, moon and earth occurs) while others define it as the “first crescent” (the time when the crescent becomes visible after the conjunction). During each cycle of the moon, which consists of approximately 29½ days, there can be 30 hours or more of darkness after the conjunction before a crescent will be visible to the naked eye. The minimum amount of time ever recorded between the conjunction and the sighting of the crescent was 15.5 hours.²

Here is a quote from the British physicist and author Colin J. Humphreys confirming the 30 hours of darkness:

It is important to understand that the new moon itself is invisible to the human eye, because it is lost in the glare from the sun. At new moon time, the moon, in its orbit around the earth, is between the earth and the sun. Astronomers call the moment when the moon, sun and earth are in a line ‘conjunction.’ At the time of conjunction the moon is completely invisible to the unaided eye, because the dark portion of the moon faces the earth. *It is only after a certain length of time following conjunction, typically about thirty hours, that the first faintly glowing lunar crescent becomes visible.* Two weeks after conjunction we have the full moon, when the moon is opposite the sun in the sky, rising at sunset and setting at sunrise. As the moon approaches conjunction, it is last seen, typically about thirty hours before conjunction, as a thin crescent in the morning sky. This is why there are two or three nights every lunar month when no moon can be seen at all between the disappearance of the ‘old moon’ in the morning sky and the reappearance of the ‘new moon’ in the evening sky.³

This period of darkness is from the time the moon, sun and earth are in conjunction (also called the astronomical new moon); and there is no visible moon until the crescent first appears. This means that the new moon could be declared at any time between the disappearing of the final crescent prior to the conjunction and the appearance of the first crescent after the conjunction. Most calendars and almanacs list the time of the conjunction as the new moon. This can be easily calculated since it is an exact moment in time.

In reality, one should consider the new moon to be like the full moon—one of the phases of the moon that lasts for several hours and can carry over as many as three evenings, since the early crescent can only be seen in the evening just after sunset. The critical question—if you are developing a calendar based on the sun and moon—is, “Which day during this period of time should be proclaimed as the official new moon?”

¹ Francis Brown, S.R. Driver, and Charles A. Briggs, *The Brown-Driver-Briggs Hebrew and English Lexicon*, 1906.

² U.S. Naval Observatory website, <http://aa.usno.navy.mil/faq/docs/crescent.php>.

³ Colin J. Humphreys, *The Mystery of the Last Supper: Reconstructing the Final Days of Jesus* (New York: Cambridge University Press, 2011), pp. 45-47, emphasis added.

When does the month begin?

The months in the Hebrew calendar are established based upon what is called the *molad* and, more specifically, the *molad* of *Tishri* (the first month of the Jewish civil calendar, which is the seventh month of the Jewish religious calendar). The term *molad* is difficult to define, but it generally means “birth.” The *molad* is related to what astronomers call the conjunction, but it is not the same. While the *molad* is ambiguous and nowhere clearly defined, the conjunction (or astronomical new moon) is that precise moment in the moon’s cycle when the earth, moon and sun line up with each other and it is impossible to see any illumination of the moon from the earth.

The Hebrew calendar arrives at the timing of the *molad* by using the arithmetic mean (average amount) of time from one conjunction of the moon to the next, rather than the actual conjunction. Since the orbit of the moon around the earth is elliptical, the amount of time it takes to complete one full cycle varies. Notice this quote from the NASA Astrophysics Data System:

As is well known, the mean length of a lunation is a little more than 29.5 days (more accurately, 29.5306 days). However, the actual length of a lunar month can vary considerably about this mean from one lunation to another. ... The length of a lunation—i.e., the interval between two successive conjunctions in longitude of the Moon and the Sun—is controlled by a variety of factors.⁴

The accepted lunar cycle, as used in the Hebrew calendar, is 29 days 12 hours 44 minutes and 3.33 seconds.⁵ The *molad* as a calculation is regular and predictable even though the actual time between conjunctions is not always the same. Therefore, by settling on this definition, the issue of establishing the first day of the month for the Hebrew calendar is resolved. The Hebrew calendar is not based on observation. One should keep in mind that there is no scripture that demands observation, nor is there any scripture that forbids calculation.

When does the year begin?

While Scripture refers to the first month of the year in Exodus 12:2, it provides few clues as to exactly when this month begins. Exodus 13:4 and Deuteronomy 16:1 identify the Hebrew name of the first month as *Abib*, which literally means “green ears.” Combined with the requirement for the wave-sheaf offering during Unleavened Bread, this shows that the Passover and Days of Unleavened Bread occur in the spring of the year in the northern hemisphere. Spring, by definition, would be the time of the vernal equinox, which on the Gregorian calendar for the northern hemisphere would correspond to March 20-21. When the vernal equinox occurs in the northern hemisphere, it is autumn in the southern hemisphere.

The conclusion some reach from the meaning of the Hebrew word *abib* is that we should look for a month when the barley starts to be green in the ear to determine the timing for the beginning of a year. If you arrive at a new moon and there are no green ears or heads among the barley crop, then, some suggest, you must delay the beginning of the month. However, there is no scripture that provides any such command. Those who believe the new moon is determined

⁴ F. Richard Stephenson and Liu Baolin, “On the Length fo the Synodic Month,” *The Observatory*, NASA Astrophysics Data System, February 1991, found online at <http://adsabs.harvard.edu/full/1991Obs...111...21S>.

⁵ Congregation Shir Hadash, <http://www.shirhadash.org/calendar/abouthcal.html>).

by spotting a crescent in the sky must wait and make sure the ears are green before they can declare the beginning of the month. Of course, none of this is found in the Bible.

Some who have developed their own calendars send individuals out into the barley fields in Palestine every spring, looking for green ears of barley. And, as soon as they are spotted, the word goes out by telephone and email. Today we live in a world of “instant communication,” but this type of communication would have been impossible for people living around the world a few centuries ago. How would you inform members living in South America in the 1700s as to when the year began? How were they supposed to know that the barley was green in Palestine, without the benefit of telephones and modern methods of communication?

So when is the first “new moon” or beginning of the first month of the year? To establish a calendar that is based on both the sun and the moon (lunisolar) requires answers to both of these questions: When does the year begin? And what constitutes the first new moon of the year?

What type of calendar should we use—solar or lunar or both?

The Hebrew calendar is based on both the sun and the moon, but most calendars use one or the other, since combining these two creates a higher level of complexity. Our modern Western calendar—the Gregorian calendar—is a solar calendar, while the modern Muslim calendar is a lunar calendar. Each of these calendars focuses on only one—either the sun or the moon—for its calculations.

The Bible shows the use of both the sun and moon in determining time (Genesis 1:14). Based on the average of 29½ days per lunar month, 12 lunar months that alternate between 29 and 30 days will produce a year of 354 days. However, a solar year (the time required for the earth to complete a revolution around the sun) is 365¼ days. If you plan to use both the sun and the moon, how do you resolve this 11-day difference between a solar year of 12 months and a lunar year of 12 months? If the difference isn’t accounted for, your lunar calendar will, over time, not be in sync with the seasons. This is the case with the Muslim calendar, where dates rotate through all four seasons over time.

“For seasons, days and years”

Biblical references to the calendar are scarce and not sufficient to answer all the questions that are important for establishing calendar principles. We refer to these scriptures as “having calendar consequences,” since none of them defines a calendar for us. We find examples of such scriptures in Moses’ writings.

Genesis 1:14-16 states: “Then God said, ‘Let there be lights in the firmament of the heavens to divide the day from the night; and let them be for signs and seasons, and for days and years; and let them be for lights in the firmament of the heavens to give light on the earth’; and it was so. Then God made two great lights: the greater light to rule the day, and the lesser light to rule the night. He made the stars also.”

There are two great lights in the heavens—the sun and the moon. We know, of course, that the moon is reflecting light from the sun and not the source of that light. The statement is clear that the “two great lights” are for the purpose of establishing “seasons, and for days and years.” The Hebrew word *mo’ed* (plural *mo’adim*) translated “seasons” is interesting, in that it is never used

for climatic seasons (spring, summer, fall and winter), but is used for special appointed times. Here is what Adam Clarke says about this expression “for … seasons”:

For the determination of the times on which the sacred festivals should be held. In this sense the word frequently occurs; and it was right that at the very opening of his revelation God should inform man that there were certain festivals which should be annually celebrated to his glory. Some think we should understand the original word as signifying months, for which purpose we know the moon essentially serves through all the revolutions of time.⁶

Some believe that Genesis 1:14 is more general, rather than having a specific reference to the holy days, since there is no clear biblical evidence of festival observance prior to the Flood. But it is also true that this word *mo'ed* is the primary word used for the festivals in the book of Leviticus, which Moses also wrote.

Notice Leviticus 23:2: “Speak to the children of Israel, and say to them: ‘The *feasts* of the LORD, which you shall proclaim to be holy convocations, these are My feasts’” (emphasis added).

The Hebrew word for “feasts” in this passage is the same *mo'ed* as in Genesis 1. It is sometimes translated “congregation,” but is also translated “feasts” and “appointed,” especially in the books of Exodus and Leviticus in reference to the holy days. There is a connection with the sun and moon and the establishment of the “appointed times” for the feasts. What is that connection? We depend on the moon and the sun to provide the basis for a year, seasons of the year and also the structure and length of time within each year. In order to have a lunisolar calendar, it is necessary to coordinate both the revolution of the earth around the sun and revolution of the moon around the earth.

There is no complete calendar in the Bible

The Bible offers little information on how these questions should be resolved. Upon consideration, it is obvious that without clear biblical instruction addressing these issues, one is unable to publish a calendar of his own and declare it to be the one and only “biblical calendar.” Some will respond to that by saying we have “hints” or “clues” in the Bible or that the answer is hidden in the meaning of Hebrew words—*chôdesh*, for example. But there is not sufficient information to establish an alternative to the Hebrew calendar.

With only a few general references about calendars found in Scripture, we are left with Jewish history as a primary source for understanding the current Hebrew calendar (also popularly known as the Jewish calendar).

What Does History Tell Us About the Hebrew Calendar?

Just as Scripture provides only scant information, the historical accounts of the calendar are also limited. Although there is no explanation as to why, it is a matter of historical record that the rules for determining the calendar were kept secret until revealed by Hillel II in A.D. 358/359 (the Jewish civil year runs from fall to fall, thus overlapping two years on the Julian calendar, which was in use at the time). Since this set of rules was a closely guarded secret,

⁶ Adam Clarke's Commentary on the Bible.

anyone who writes dogmatically on the subject must be questioned. That doesn't mean we can't know anything, but to know the specifics is beyond our ability without the discovery of some new historical material.

There are several sources that one can go to and obtain historical information. The Talmud and the Mishnah are two of these sources. The Mishnah contains the oral instructions written and preserved by the Jews and was compiled around A.D. 200. The Talmud is the written commentary on the Mishnah and was completed between A.D. 200 and 600. One must be careful in using the Mishnah or the Talmud in determining the historical record. These documents are written in the form of arguments and discussions rather than to explain actual historical events.

The following are other sources that can be used to establish the historical record (and were consulted in this paper):

The Universal Jewish Encyclopedia.

The Comprehensive Hebrew Calendar by Arthur Spier.

Encyclopaedia Judaica.

Rabbinical Mathematics and Astronomy by W.M. Feldman.

The History of the Jewish People in the Age of Jesus Christ by Emil Schürer.

Saadia Gaon: His Life and Works by Henry Malter.

The Code of Maimonides translated by Solomon Gandz.

Understanding the Jewish Calendar by Rabbi Nathan Bushwick.

International Standard Bible Encyclopedia.

Encyclopaedia of Religion and Ethics, "Calendar."

Encyclopaedia Britannica online version, "The Calendar in Jewish History."

The above sources agree on certain key issues, but there is a level of disagreement among some regarding the Hebrew calendar, its history and preservation.

The Hebrew calendar was developed over time

A point that scholars agree on is that the current Hebrew calendar has been adjusted down through the years. The idea that Hillel II constructed the final form of the calendar is an open question. His calendar is never mentioned in the Talmud. Evidence points out that the calendar passed through a developing series of forms and assumed its final shape in the school of official representatives of Judaism around the seventh and eighth centuries.⁷

The truth of the matter is that no one knows when the Hebrew calendar reached its final form. Scholars disagree on the date when the calendar was complete. In the 12th century we do have one of the most famous rabbis, Maimonides, confirming the calendar as we know it today.

After the Jews returned from captivity in Babylon (sixth century B.C.), several changes were noted, including changes in the calendar itself. From this time forward, the calendar employed Chaldean names for several months of the year.

The names for the Jewish months as now known come from the period following the return from Babylonia to Palestine. Before the Babylonian exile at least four

⁷ *Encyclopedia of Religion and Ethics*, "Calendar."

other names were in use: Abib (Exodus 13:4), Ziv (1 Kings 6:1, 37), Ethanim (1 Kings 8:2), and Bul (1 Kings 6:38). After the Captivity, they were renamed Nisan, Iyyar, Tishri, and Heshvan.⁸

There is no evidence from the time of the First Temple for the use of witnesses to determine the new moons. This was something that developed after the Romans took over Palestine. Some argue that these witnesses were only used to establish the authority of the Sanhedrin, since the witnesses had to report to the calendar committee of the Sanhedrin. The evidence seems to show that witnesses were only used for a relatively short period of time during the first century (or shortly before).

As far as their form of worship was concerned, a number of things changed between the return of the Jews from captivity in the sixth century B.C. and the time of Christ. There is no record of a Sanhedrin when the Jews entered captivity. There is no record of a witness system for determining the new moon. How did they define the new moon? According to some scholars, they used the time of the conjunction. But this can only be calculated, since the moon is completely dark at that moment and there is nothing visible to be seen. It was certainly possible to calculate the conjunction, but did they?

The four rules of postponement, which are discussed in some detail later in this paper, were also published by the time of Maimonides (12th century) and were part of the contention with the Karaites in the eighth century. The origin of these rules is unknown, but they have been confirmed as rules of the calendar since at least the time of Maimonides. It is quite possible that they were in use during the Second Temple period (which included the time of Christ and the apostles), when at least some form of postponement would have been necessary for the calendar. The rule for postponing the first day of the seventh month if the molad occurred after 12 noon was evidently in place already by the time of the Second Temple. But when rules are secret, how can you be sure what was included or what was excluded?

The Sanhedrin and synagogue

Although the Sanhedrin and synagogue system are not spoken of in the Old Testament, by the time of Jesus Christ they both had been developed in order to preserve the Jewish religion. We see that during the time of Christ, the Sanhedrin claimed authority over the calendar—its rules, its calculations and the use of witnesses. While Christ condemns the Jews for “teaching as doctrines the commandments of men” (Mark 7:7), He does not condemn the authority of the priests and the Sanhedrin, nor does He condemn the system of local synagogues that had developed. In fact, based on what is recorded in Matthew 23:2 about sitting “in Moses’ seat” in the synagogue, one could conclude that Christ acknowledged this system (the seat of Moses is a clear reference to the synagogue) although not the practices of those who were in authority within the system.

Within the Sanhedrin, there was a select group of two or three priests (including the high priest) who formed a calendar committee. It was called the *sod ha’ibur*.⁹ Their job was to determine the proper dates for the festivals and proclaim those dates from the temple to all of Israel and to Jews scattered in other parts of the world.

⁸ S. Michael Houdmann, <http://www.gotquestions.org/Jewish-calendar.html>.

⁹ Richard Fiedler, <http://www.sodhaibur.com>.

Whatever the rules used by the Sanhedrin for their calculations, those rules are unknown to us today. But the key is that the rules were set by the Sanhedrin. There are no rules in Scripture that said the calendar was to be set by observation. There are no rules in Scripture that tell you what to do when it is cloudy. There are no rules in Scripture that require two or three witnesses for the calendar. This isn't even discussed in the Bible. The truth is that the Sanhedrin set these rules, chose the witnesses, occasionally paid the witnesses, and then calculated the dates for the holy days and announced them from the temple to all the Jews in Palestine.

The important point is that the Sanhedrin and its calendar committee, like Jewish religious leaders during the Second Temple period, did have the authority to maintain the Hebrew calendar. They did just that, and they alone had the authority to make any adjustments that might have been necessary.

The Sanhedrin continued to control the calendar after the destruction of Jerusalem in A.D. 70. Historian Paul Johnson writes of a significant event that took place at that time:

Tradition says that the Pharisaic rabbi, Johanan ben Zakkai, the deputy head of the Sanhedrin, was smuggled out of besieged Jerusalem in a coffin. ... He obtained permission from the Roman authorities to set up a centre for the regulation of the Jewish religion at Jabneh (Jamnia), near the coast west of Jerusalem. ... The rabbi and the synagogue became the normative institutions of Judaism, which from now on was a congregationalist faith. The academy at Jabneh made the annual calculations of the Jewish calendar. It completed the canonization of the Bible.¹⁰

The Sanhedrin's calendar system continued to work well until the fourth century, when the Romans threatened the Jews with persecution if they continued to maintain the Sanhedrin, which at that time was meeting in an area outside of Jerusalem. Essentially the Romans were scattering the Jews, which would make it extremely difficult for them to get the information needed to observe the holy days. Because of this dilemma, by the fourth century, the Jews had gone to a system of keeping two days for the Feast of Trumpets (and for the other holy days, with the exception of the Day of Atonement) just in case they didn't receive the announcement of the new moon in time, which could be delayed for a day or more.

Hillel II reveals calendar secrets

This led to Hillel II publishing the secret rules of the calendar in about A.D. 359. Because of the secrecy that surrounded the calendar, no one knows with total accuracy how the calendar (or calendars) used in biblical times was determined. Arthur Spier, in his book *The Comprehensive Hebrew Calendar: Its Structure, History and 100 Years of Corresponding Dates*, says the following about Hillel II and the secrecy of the rules prior to the fourth century:

In the fourth century, however, when oppression and persecution threatened the continued existence of the Sanhedrin, the patriarch Hillel II took an extraordinary step to preserve the unity of Israel. In order to prevent the Jews scattered all over the surface of the earth from celebrating their New Moons, festivals and holidays at different times, he made public the system of calendar calculation which up to

¹⁰ Paul Johnson, *History of the Jews* (New York, : Harper & Row, 1987), p. 149.

then had been a closely guarded secret. It had been used in the past only to check the observations and testimonies of witnesses, and to determine the beginnings of the spring season.¹¹

There is some historical evidence about what is called the “Hillel calendar.” Here is a sampling of what can be found in encyclopedias:

To preserve the unity of Israel, the patriarch Hillel II, in 358/359, published the “secret” of calendar making.¹²

Hillel II, one of the patriarchs belonging to the family of Hillel I, lived in Tiberias about the middle of the 4th century, and introduced the arrangement of the calendar through which the Jews of the Diaspora became independent of Palestine in the uniform fixation of the new moons and feasts.¹³

The intercalary cycle

As discussed previously, in Scripture we see the indication of differences in the calendar. Scripture shows there was a calendar in use at the time of Noah. Several references to this calendar are found in the early chapters of Genesis. Was this the same calendar that Moses used? It seems unlikely (although we can't say for sure) based on what we read in Genesis, where months are listed as averaging 30 days in length over five consecutive months (Genesis 7:11; Genesis 8:3-4). We know that since the cycle of the moon is approximately 29.5 days, using 30 days each month would result in a drifting of time, unless, of course, the cycle of the moon was different prior to the Flood.

It is assumed by scholars that any calendar from this time period used observation, but there is no clear evidence, either in the Bible or in history, of such an assertion. We do know that some form of calculations and even the use of intercalation (adding a thirteenth month approximately every three years) existed during the Second Temple period. How the intercalation was done is simply not known. Was it based on the ripeness of the crops or was it based on a mathematical formula?

Establishing the pattern of intercalary years was especially important because if all the Jews were not using the same cycle they could be observing the holy days on dates that were as much as a month different. It also seems unlikely that they would use the ripening of the crops in Palestine, since it would be just as difficult to get this word out to everyone as it would the sighting of the crescent from Jerusalem.

When Hillel II revealed the rules of the calendar in A.D. 359, intercalary months were part of the package. Since most lunisolar calendars resolve the problem with lunar years and solar years by adding a 13th lunar month approximately every three years, one should assume that some form of intercalation existed from the beginning, certainly by the time of Moses. Without some form of intercalation (leap years of some sort), the months would be out of sync with the seasons; therefore intercalation would have been a necessity for any calendar that relied on the sun and the moon.

¹¹ Arthur Spier, *The Comprehensive Hebrew Calendar: Its Structure, History and 100 Years of Corresponding Dates* (New York: Behrman House, 1952).

¹² Encyclopedia Britannica online; <http://www.britannica.com/EBchecked/topic/265890/Hillel-II>.

¹³ Encyclopaedia Britannica, 1911 edition, “Hillel II.”

There is no evidence (either biblical or historical) that the Hebrew calendar has ever been anything but a lunisolar calendar.

Jews had authority to make changes as necessary

Does history show us which calendar we should use today? Should we attempt to go back to the time of Moses? Do we even know enough about that calendar to reproduce it? What about the calendar of the Second Temple? We acknowledge that over time changes occurred with the calendar and the religious worship of the Jews. We especially see this after their return from Babylon and prior to the destruction of the temple in A.D. 70.

How Accurate Is the Hebrew Calendar?

The answer is extremely accurate. In fact, it is considered by some to be more accurate than either the Julian or Gregorian calendars that have been used for more than 2,000 years. Here is a pertinent quote from the website Judaism 101, under the article “The Jewish Calendar: A Closer Look”:

At one time, the accuracy of the Jewish calendar was proverbial. But how accurate is it really?

The average lunar month on the Jewish calendar is 29d [days] 12h [hours] 793p [parts]. The average lunar month as calculated by modern astronomers is 29d 12h 44m [minutes] 2.8s [seconds], that is, 29d 12h 792.84p. so the variation is less than two tenths of the smallest unit of measurement recognized by the system, about half of a second. That is quite remarkably accurate. Of course, those lost half-seconds do add up: within a century, you’re off by 10 minutes.

How well does the calendar correspond to the solar year? The rabbis recognized long ago that the calendar gains 1h 485p in every 19-year cycle, adding up to a day every 300 years or so. This was important to the rabbis in scheduling certain rituals that are based on the solar year rather than the lunar year. We can see this effect when we examine the dates of Rosh Hashanah over time.

Rabbi Hillel II developed [advanced] the Jewish calendar in the Jewish year 4119. Using his calendar methods as described above, and artificially assuming that the Gregorian calendar we use today was in effect at that time, the date of Rosh Hashanah ranged from August 29 to September 28 between the years 4100 and 4200 (the 42nd century). In the present Jewish century (the 58th), the dates of Rosh Hashanah range from September 5 to October 5, a gain of 6 or 7 days. This is considerably more accurate than the Julian calendar used by Christians in Rabbi Hillel’s time (which had to be corrected by 11 days a few centuries ago), but you can see that it is gaining some time.

The discrepancy in the Jewish calendar, however, is still less than a lunar month and is therefore as accurate as it is possible to be in a lunisolar calendar. In fact, it takes about 9300 years for this discrepancy to accumulate to a full month of time. The rabbis were aware of the problem, but were quite confident that a new

Sanhedrin will be established long before this discrepancy becomes problematic.¹⁴

Here is another quote about the accuracy of the calendar from the book *The Essence of the Holy Days* by Avraham Yaakov Finkel:

The calculation of the calendar was transmitted to the sages in an unbroken chain going back to Moses. ... According to the ancient calculations, the exact time between one new moon and the next is 29 days, 12 hours, and 793 *chalakim* ‘parts of an hour’ (the hour is divided into 1080 parts). In other words, one lunar month has 29.53059 days. It is interesting to note that according to NASA (National Aeronautics and Space Administration); the time between one new moon and the next is 29.530588 days. Of course, NASA has at its disposal the most advanced and sophisticated telescopes and computers. Nevertheless, the difference between NASA’s figures and that used by Hillel II, which originated more than 3000 years ago, is .000002 or two millionths of a day, calculated for the period of one month.¹⁵

Mr. Finkel’s claim that the calendar revealed by Hillel “originated more than 3000 years ago” is debated by scholars and historians, but his point on the accuracy of the Hebrew calendar calculations is accepted by all.

It is clear that over the centuries the Jews developed an incredibly accurate calendar. This confirms a very important concept—the calendar was given to the Jews for its development and preservation and they had the authority to make adjustments as needed over time.

Who Has the Authority for Preserving the Calendar?

Only when one answers this question, can one proceed in any responsible manner with deciding which calendar to use. Every calendar has its own rules for setting up a year which, in turn, will determine the dates for the holy days. One does not need a calendar to observe the Sabbath—simply count the days in the week until you get to the seventh day. This is not true of the holy days. It is impossible to observe the holy days without a calendar. You cannot determine the 14th day of the first month without an actual calendar, and you cannot determine the first month of the year without some guiding principles for calendar development.

The primary purpose for using the Hebrew calendar in our day is for determining the dates on which to observe the holy days. We really don’t use this calendar for any other part of our lives. But the holy days are such an important part of worship that we want to be sure we are correct in the calendar we choose to use.

In Leviticus 23 all seven festivals are listed chronologically, beginning in the spring and concluding in the fall. Based on the listing of the holy days on fixed days and similar evidence throughout the Torah, it seems clear that there was a calendar in existence that Moses must have possessed prior to this writing. God speaks to Moses as though he was aware of a calendar.

¹⁴ Judaism 101 website, “The Jewish Calendar: A Closer Look,” <http://www.jewfaq.org/calendr2.htm>.

¹⁵ Avraham Yaakov Finkel, *The Essence of the Holy Days: Insights from the Jewish Sages* (Northvale, New Jersey: Jason Aronson, Inc., 1993), p. 141.

Notice that God is speaking and He tells Moses to “proclaim them to be holy.” The Hebrew word for “proclaim” in Leviticus 23:2 and 4 is *qara* and means to “pronounce” or “publish.” It has the sense of a summons or an invitation.¹⁶ What did God mean when He commanded Moses to “proclaim” His festivals? Moses was given the responsibility to summon or invite God’s people to keep those days.

From this verse the Jews have determined that God gave to them the authority for proclaiming these days. Without some form of calendar to begin with, this would have been impossible. No one would know when to observe any of the holy days. This would require the development and preservation of a calendar. It seems inescapable that if God gave them the authority to proclaim or announce the holy days, He also gave them a calendar or enough instruction to develop a calendar. Is it not also possible that God could have used an already existent calendar? We simply do not know the origin of what we now know as the Hebrew calendar. It also seems reasonable that the Jewish authorities would be responsible for preserving and adjusting that calendar down through the years.

Notice what the apostle Paul writes in Romans 3:1-2: “What advantage then has the Jew, or what is the profit of circumcision? Much in every way! Chiefly because to them were committed the oracles of God.” The word translated “oracles” is the Greek *logia*, meaning “words,” a reference to the Hebrew and Aramaic Scriptures we know as the Old Testament. God entrusted the sacred writings of the first two-thirds of the Bible to the Jews, for them to preserve and pass on for His people down through the ages.

While the term *logia* does not refer in the narrow sense to the calendar, it would seem to be a fair extrapolation that if God entrusted the sacred writings to the Jews, He would also entrust them to correctly construct and preserve a calendar to allow His people to obey one of the most important aspects of His law—the keeping of holy time. It doesn’t seem logical that God would entrust His word to them and then withhold from them knowledge necessary to obey an important part of that word.

It is clear from history that the Jewish people preserved the Hebrew Scriptures, known as the Masoretic Text, which is the basis for most modern translations of the Old Testament. We also know that they preserved the Hebrew calendar. Does the Bible prevent the Jews from making adjustments to the calendar if God gave them the authority to preserve and maintain such a calendar?

The truth of the matter is that there has never been a calendar that existed for any long period of time that did not require adjustments. Months (full cycles of the moon) do not contain an even number of days nor does a solar year. Since you are not dealing with whole numbers you will need to make periodic adjustments. These can be done by specific, regular calendar rules or by extraordinary, periodic adjustments.

One good example of such a need is the Gregorian calendar currently in use. This calendar uses a 365-day year, but the length of a solar year is approximately 365½ days. Since this number is not exactly one-fourth of a day, the addition of Feb. 29 every four years will cause the calendar to gain time, several days over the centuries. So, the Gregorian calendar makes some little-known but extraordinary adjustments during each 400-year cycle. In years that are evenly divisible by

¹⁶ *The Brown-Driver-Briggs Hebrew and English Lexicon.*

THE HEBREW CALENDAR

100 (1800 and 1900 for example), Feb. 29 is not added to the calendar even though it would be if you were following the normal four-year cycle. But in centuries evenly divisible by 400, Feb. 29 is added and that year is declared to be a leap year. This was the case in the year 2000.

We don't have a listing of the rules that existed for the calendar during the time of Christ, but what we do know is that the rules were developed within the Sanhedrin and used to establish the holy days. Christ never challenged the authority of the priests or the Sanhedrin in establishing these dates. They claimed their authority from the "seat" of Moses (Matthew 23:1-2).

There is no scripture that gives any indication how the intercalary cycle should be set, so the Jewish authorities had to make that decision. When and how it was made is simply unknown. The fact that adjustments have been made to the calendar should not concern us today. The Hebrew calendar we use today (in its most basic form) has been around since the time of the Second Temple—and we know the Jews used calculations at that time. It was revealed by Hillel in A.D. 359 and was adjusted when necessary in the years that followed, but only as long as there was a Sanhedrin or other legitimate body of Jews to make those adjustments.

It should be noted that there is no reliable historical evidence that the Church of God as a body has ever used anything but the Hebrew calendar when it came to the observance of the holy days. The first recorded controversy over the calendar among Church of God groups was in the 1930s and 1940s with C.O. Dodd, an elder from the Church of God (Seventh Day). It was at that time that Herbert Armstrong wrote a letter to the Church about the calendar. Here is a quote from that letter, written in the spring of 1940:

Briefly, after very exhaustive study, and counsel with the brethren who also have made thorough study of the question for years, the facts are these: ... Research reveals two basic points on this question (intercalary months), 1st, God did not record it in the Bible, which gives us absolutely nothing more to go on than I have stated above. 2nd, history is vague on the subject, shedding little light that can be accepted and trusted. Yet we know God gave His people a fixed rule for calculating time periods, and for figuring when to hold the Festivals of Jehovah. ... In conclusion, unless God has preserved His sacred calendar through the Jews, then we do not know how to figure Passover or any of the Holy Days this year. For there is no authority for any other way. There is no Bible authority whatsoever for figuring the 1st day of the 1st month from the new moon nearest the spring equinox! ... God did not commit His oracles, or the preservation of His times to profane history, or to the Roman Catholics, but to the Israelites. And they have been preserved by the Jews.

Historically, whenever there is evidence of the Church observing the holy days, it is always according to the Hebrew (or Jewish) calendar. From a practical standpoint, how would a Christian in, let's say, the 14th century, know when to observe the holy days? Based on all the records we can locate, Christians would have used the Hebrew calendar as preserved by and used by the Jews of that day. There is no reliable evidence of anything else being used.

Calculation or Observation?

When reading the Scriptures, we realize the phrase or phrases “to view,” “to observe,” “to see,” “to spot,” or (be it said any other way) to look at (with the eyes) a visible crescent (in order to declare a new month) are not found in the Bible. The Scriptures nowhere command us to view or observe a new crescent to establish the beginning of a month. God’s inspired Word nowhere commands believers that observing a visible crescent is the proper method for deciding the first day of a month. Yet there are several calendars proposed by individuals that rely either totally on such observation or in combination with some form of calculation. Their answer is that this is the way it was done during the time of Christ. Is that true and, even if it were true, is this the way it was done during the time of the First Temple? Where does the Bible give such instructions?

We notice the following from the Scriptures:

- A calendar of some sort existed from the time of Noah, and it is clear that Israel had a calendar from the time they left Egypt. (See Genesis 7:11 and Leviticus 23.)
- God identified the month of the Exodus as the first month of the year. (See Exodus 12:1-2 and 13:4.) This was in the spring of the year around the time of the spring equinox in the areas of Egypt and Palestine.
- One example of using a calendar is found in Nehemiah 7:73–8:1: “When the seventh month came, the children of Israel were in their cities. Now all the people gathered together as one man in the open square that was in front of the Water Gate; and they told Ezra the scribe to bring the Book of the Law of Moses, which the LORD had commanded Israel.” How did they know this was the first day of the seventh month?

Notice Nehemiah 8:9: “And Nehemiah, who was the governor, Ezra the priest and scribe, and the Levites who taught the people said to all the people, ‘This day is holy to the LORD your God; do not mourn nor weep.’ For all the people wept, when they heard the words of the Law.” Is this evidence of a calculated calendar prior to the time of Christ? And what was it based on if the knowledge of the holy days had been lost, as some claim? Where is the evidence in this example of “observing” or “looking for” the crescent of the moon?

Establishing intercalary years

Nothing is stated directly in the Old Testament about intercalation (the adding of a 13th month to the lunar year to keep the seasons intact). Some consider the number of days in the first eight chapters of Ezekiel as an indication of a thirteenth month, but there are several questions to be answered and several assumptions that must be made to arrive at this conclusion. When the calendar is based on both the sun and the moon, a 13th month is necessary about every three years (seven times in a 19-year cycle) to keep the months in alignment. As with the other calendar rules, how this was determined isn’t clearly found in Scripture.

Some of the sources make the claim that during the Second Temple period (515 B.C. to A.D. 70), the beginning of each month was set by observation and the intercalary year was determined by the ripeness of the barley. The second assertion seems unlikely since the decision to add a 13th month has astronomical ramifications outside of agricultural ones. It seems that there must

have been established intercalary years during the Second Temple period. One thing that Hillel II revealed in A.D. 359 was apparently a method by which the years of intercalation could be determined in advance. This indicates that the calendar was not established based on the ripeness of the barley. The intercalary years as established by the Hebrew calendar would always produce ripe barley in the field for the wave-sheaf offering during the Days of Unleavened Bread.

Several sources confirm that calculations were used prior to Hillel II. From the website <http://www.sodhaibur.com> we find evidence that calculations were known and used for intercalary years. The following quote about Shmuel, who was born about A.D. 165, also confirms that Hillel II “revealed” the calendar rules rather than creating a calendar with its rules:

Shmuel said, “I am able to establish [calculate] the proper date of Rosh Chôdesh for the entire Diaspora.” Shmuel was born about 165 C.E. (Common Era) at Nehardea, in Babylonia and died there about 257 C.E. Shmuel died 100 years before the assumed creation of the Hebrew Calendar by Hillel II.¹⁷

The calculated Hebrew calendar was not created by Hillel in A.D. 358/359. It was created by the rabbis many centuries before but was to be used in secret.

Early evidence of a calculated calendar

Most historians agree that during the Second Temple period there were witnesses who watched for the early crescent and then reported to the calendar committee. But the following sources note that the committee confirmed their report by calculation.

The Talmudic Rabbis [from about A.D. 200 to 500] recognized the variation in length of the synodic month [lunar month of 29½ days] ... and hence they determined the beginning of every month separately by observation of the new moon as well as by calculation.¹⁸

For as the beginning of a month was fixed on the accredited evidence of witnesses who reported having seen the new moon soon after sunset on a certain day, it was the duty of the Calendar Council not only to test their evidence by stringent cross-examination ... but also to ascertain, by mathematical calculation, whether the moon could, in fact, be seen at that particular moment at the particular place from which the witnesses came.¹⁹

Then those beginnings of months (Rosh Hodesh) were sanctified and announced by the Sanhedrin, the Supreme Court in Jerusalem, after witnesses testified that they had seen the new crescent and after their testimony had been thoroughly examined, confirmed by calculation and duly accepted.²⁰

We see a general consensus among historians that calculations were known and used during the Second Temple period. It also seems obvious that a witness was not considered credible unless his testimony could be confirmed by calculation. So, even during the time of Christ, calculations

¹⁷ Richard Fiedler, <http://www.sodhaibur.com/shmuel-of-nehardea.html>.

¹⁸ W.M. Feldman, *Rabbinical Mathematics and Astronomy* (New York: Hermon Press, 1965), p. 123.

¹⁹ Feldman, p. 160.

²⁰ Spier, p. 1.

were used as the final determinant for the beginning of the month. We also see evidence of intercalation during the Second Temple period.

This tells us that all the elements of the modern calendar were in place during the Second Temple period. How they were used, which rules were used and what effect the rules of postponement had on the calendar of that day are simply unknown and cannot be confirmed by history or by Scripture.

There is no evidence from the First Temple period (1000 to 586 B.C.) of anyone looking for the new moon or of witnesses being employed. Is it possible that calculations were relied on during that time period and not observation? And is it possible that observation was only used briefly during the Second Temple period, but not before or afterwards?

We do know that astronomical calculations were in use after the Babylonian captivity and during the time of the Second Temple.

It is generally accepted that the Jewish festivals were, in Biblical times, fixed by observation of both the sun and the moon. Gradually, certain astronomical rules were also brought into requisition, primarily as a test, corroborating or refuting the testimony of observation.²¹

There is evidence that claims that the Jews always used calculation as opposed to observation to set the calendar.

Calendar calculation in Jesus' time

During the time of Christ, the Jewish religious leaders had developed an elaborate system for proclaiming the holy days. We see no evidence of this system in the Old Testament. Witnesses were sent out on the mountains around the city of Jerusalem to catch the first glimpse of the new crescent. They would then report back to the priests their findings. But history records that the priests checked their witnesses' observations with "calculations."

An interesting question arises: If the calculations disagreed with the witness, what would the priests do? Since the witnesses were being checked by the calculations, the calculations were really the final authority during the Second Temple period. The development of witnesses was typical of the Jews during the time of the Second Temple. They added layer upon layer of bureaucracy to "protect" their religion. There is no mention in Scripture of any need for or even the existence of such witnesses. In fact, the priests in the temple could easily have done this sighting for themselves.

The Karaite controversy

In the eighth century after Christ there was a great dispute with a group called the Karaites who set up their own religious group (which still exists to this day), separate from the main Jewish community. The Karaites are said to be descended from the Sadducees, but this doesn't seem likely. They rejected the oral law—Mishnah and the Talmud—and only accepted the written

²¹ Henry Malter, *Saadia Gaon: His Life and Works* (Philadelphia: The Jewish Publication Society of America, 1921), Chapter IV, "Saadia's Controversy With Ben Meir," pp. 70-88.

Torah. They rejected calculation for use with the calendar. Saadia Gaon (Gaon was a title given to the Jewish leaders at this time) defended the calendar by arguing that the calculations were given by God to Moses. While most scholars believe that Saadia overstated the case, one cannot overlook his argument. He was the most influential rabbi of his day.

Rejecting the fixed calendar as a heretic innovation, the Karaites held that by law of Scripture the beginning of the months must be determined by the appearance of the new crescent and no other means, and that this had been the practice of ancient Israel at all times. Rabbanite refutation of this extreme assertion found its most outspoken exponent in Saadia Gaon, who went to the opposite extreme in “demonstrating” that the fixed calendar, computation of *molad* and *tekufah*, has the force of a Mosaic-Sinaitic law that had been followed at all ages of the past, while observation of the new crescent was merely a passing episode in the history of the Jews, introduced at the time of the Sadducees.²²

The Hebrew term *tekufah* literally means “turn” or “cycle” and is considered a reference to the four seasons, the four times of “turning” during each year. It is used in four verses in the Hebrew Scriptures (Old Testament): Exodus 34:22; 1 Samuel 1:20; 2 Chronicles 24:23; and Psalm 19:6. One reference is to the time of giving birth (1 Samuel); another is to the “end of the year” when fighting took place (2 Chronicles); and another is a reference to the greatness of God which knows no limits (Psalms). The reference in Exodus is sometimes used to “prove” that the Feast of Tabernacles must occur after the autumnal equinox. Of course, the verse doesn’t say that. But it is true that the autumnal equinox will always fall just before or during the Feast of Tabernacles.

Difficulties with calendar by observation

There are numerous difficulties with observation as opposed to calculation. Of course, the greatest hurdle is the lack of any biblical requirement for observation. It is clear from the historical evidence that the necessary calculations for establishing a calendar were known from ancient times. The Jews certainly understood calculations when they returned from captivity in Babylon. Virtually all historians state that during the Second Temple period (515 B.C. to A.D. 70) calculations were used to check the accuracy of witnesses. It is unclear what happened if the calculations produced a different result from the witnesses, but the implication is that the witness would be declared a false witness in such an instance. According to most historians, calculations were being relied on to determine the validity of the witnesses and the establishment of the calendar during the time of Jesus Christ.

It is logical to conclude that if you had witnesses this must mean they were looking for something, which implies they were looking for the crescent. But did they use the first crescent, or did they watch for the final crescent to go dark? No one knows. But, of course, many speculate about this, and most commonly assume that the first crescent was the key. But what does that mean? With the aid of a telescope, an observer can spot a thin crescent when the moon is about 1 percent illuminated; but with the naked eye, it is difficult in most locations to see a crescent until the illumination reaches 5 percent.²³ This can mean the difference of several hours, and since this first crescent is only visible for a short time near sunset, this could mean the

²² *The Code of Maimonides*, Book II, Treatise 8.

²³ “The Moon Almanac” website, <http://themoonalmanac.wordpress.com>.

observer would be unable to see it until the following night. No one knows the criteria that might have been used during the time of Christ. From what we can deduce from the historical and biblical record, we see that there is nothing “evil” about calculations. Consider the biblical references to sabbatical years, years of jubilee, counting for Pentecost, etc., all of which would require some sort of calculation. And there is no biblical requirement that calendars must be determined solely by observation. In fact, to depend solely on observation creates serious issues that cannot be resolved by Scripture.

If one is relying on observation, he will need to make a whole series of decisions that have no basis in Scripture. Where is the idea of having “witnesses” to determine months found in the Bible? How many witnesses are necessary? Where will the witnesses be stationed? There is no biblical statement that requires a witness and certainly there is no biblical statement that specifies Jerusalem as the correct location. If not Jerusalem, can one simply choose a location near where he or she might live? And who has the responsibility today for forming a new calendar committee and who will be on that committee? Such a committee would be necessary to duplicate the Second Temple period.

It is a fact that the location of the witness will affect the sighting of the crescent. For example, a witness on top of Mt. McKinley in Alaska will see the crescent at a different time than a witness in Florida. Which is correct? If everyone celebrating the holy days lives in one community, it is possible for observation to work (as long as everyone agrees to the rules); but how can it work with observers living around the world and without the biblical authority to make decisions?

Other questions include what constitutes “seeing” the crescent? With the naked eye it will be difficult to see the crescent with less than 5 percent illumination in most locations, but with a telescope one can view the crescent with 1 percent illumination. Since a telescope would make observation more accurate, are telescopes permitted for the witnesses? Who can make that decision, since telescopes were not in use during the time of the Second Temple?

The truth of the matter is that a calculated and fixed calendar is more accurate and eliminates the confusion that results from attempts to develop a calendar based on an “observation only” approach. But is it biblical? Of course, a better question might be, is it unbiblical? Does it contradict or violate the Scriptures? To accept an “observation only” calendar means that one will have to either develop one’s own calendar or adopt one of at least a dozen different calendars that have been proposed. In the case of the calculated calendar, there is a long history. If we accept the statements in Leviticus 23:4 about the responsibility of the leadership in proclaiming the holy days and the implications of Romans 3:1-2 about the Jews preserving the “oracles,” then we do have a basis for accepting the Hebrew calendar.

Historians cannot say when astronomical calculations were first used in conjunction with actual visual observation, and the Bible does not answer the question. Calculations appear to have been used from the very beginning—from the time God revealed the calendar to Israel (Exodus 12; Leviticus 23; 1 Samuel 20:5, 24-27). As *The Interpreter’s Dictionary of the Bible* observes, “Although it is obvious from numerous OT passages that the ancient Hebrews possessed at least a roughly calculated calendar [see 1 Samuel 20:5-27] ... they have nowhere given us a complete account of their [calendar] system”²⁴

²⁴ George R. Buttrick, ed., *The Interpreter’s Dictionary of the Bible* (Nashville: Abingdon Press, 1992), Vol. 1, “Calendar,” p. 483.

If, for the sake of argument, we decide to use Jerusalem as the place where the visible crescent must first be seen, how was that information provided to people living in other parts of the world over the past 2,000 years? How would Church members living in England in 1500 find out that the crescent moon had been observed over Jerusalem? How would Church of God brethren living in Virginia or Pennsylvania in 1860 know that the crescent for the month of Tishri had been seen?

The Feast of Trumpets falls on the first day of the seventh month, so there isn't much time to get the word out if one is using observation. Why would God declare a holy day on the first day of a month if He intended that observation would be the only correct way to develop the calendar? It would be impossible to plan anything in advance if you had to wait to see the crescent before you declared that to be the first day and a day of worship. Other holy days could be figured out, since they don't occur until later in the month, but if your belief is totally based on observation, the Feast of Trumpets would be a problem every year.

If we used observation from Jerusalem today, we might be able to transmit the information with telephones and email, but it would have been impossible for God's Church historically to have kept a calendar based on observation of the visible crescent with Jerusalem as the chosen location for sighting. Horses and wagons, carrier pigeons or even trains would take days or weeks to carry the information several thousand miles. And, of course, don't forget that the Jews had been driven out of Jerusalem by A.D. 70, and Jews were not allowed in the city to even look for the crescent during most of the Middle Ages. Only in recent years have the Jews once again been given access to the city of Jerusalem and the surrounding mountains.

In order to prove that the correct biblical calendar must be based on observation, advocates must do the following:

- Find proof from the Bible that we are to use Jerusalem as the location for the sighting.
- Find proof from the Bible that we are to look for the period of total darkness of the moon (and only with the naked eye without using a telescope). This assumes a nonbiblical definition of total darkness for a new moon.
- Find proof from the Bible that we are to look for the visible crescent (and only visible to the naked eye without using a telescope). This assumes a nonbiblical definition of a visible crescent for a new moon.
- Find proof from the Bible that authority for the calendar has been given to someone else besides the Jews.
- Find proof from the Bible as to what to do when the moon is not visible due to cloudy weather.
- And, finally, find credible evidence that this was the calendar that God's Church has used over the past 2,000 years.

The Encyclopaedia Judaica in an article on the “Calendar” mentions that the “‘sanctification’ of the 30th [day] as the New Moon [was] subject to witnesses’ reports of the time and circumstances of their sighting of the new crescent scrutinized by a court competent to check them, and only accepted if tallying with each other and *not contrary to astronomical prediction.*”²⁵ This passage confirms that calculations were required before a decision was reached.

²⁵ Michael Berenbaum and Fred Skolnik, eds., *The Encyclopaedia Judaica* (Detroit: Macmillan Reference USA, 2007), Vol. 4, “Calendar,” p. 357, emphasis added.

According to the U.S. Naval Observatory website, the record for naked-eye sighting of the crescent is 15.5 hours from the conjunction:

Although the date and time of each New Moon can be computed exactly (see, for example, [Phases of the Moon](#) in “Data Services”), the visibility of the lunar crescent as a function of the Moon’s “age”—the time counted from New Moon—depends upon many factors and cannot be predicted with certainty. In the first two days after New Moon, the young crescent Moon appears very low in the western sky after sunset, and must be viewed through bright twilight. It sets shortly after sunset. The sighting of the lunar crescent within one day of New Moon is usually difficult. The crescent at this time is quite thin, has a low surface brightness, and can easily be lost in the twilight. Generally, the lunar crescent will become visible to suitably-located, experienced observers with good sky conditions about one day after New Moon. However, the time that the crescent actually becomes visible varies quite a bit from one month to another. The record for an early sighting of a lunar crescent, with a telescope, is 12.1 hours after New Moon; for naked-eye sightings, the record is 15.5 hours from New Moon. These are exceptional observations and crescent sightings this early in the lunar month should not be expected as the norm.

Obviously, the visibility of the young lunar crescent depends on sky conditions and the location, experience, and preparation of the observer. Generally, low latitude and high altitude observers who know exactly where and when to look will be favored. For observers at mid-northern latitudes, months near the spring equinox are also favored, because the ecliptic makes a relatively steep angle to the western horizon at sunset during these months (tending to make the Moon's altitude greater).²⁶

Observation is probably the poorest method for developing and maintaining a calendar. It is subject to considerable error and requires numerous judgments and adjustments. We do not believe this is a better or more “godly” system than the Hebrew calendar.

Rules of Postponement—What Are They?

Some object to using the rules of postponement that are found in the Hebrew calendar calculations. Those familiar with the Hebrew calendar are aware that, from ancient times, there was a system for determining the beginning of months and it was based on the new moon. What some fail to realize is that the new moon is one of the phases of the moon. The time from when the moon goes dark (the astronomical new moon, the moment of conjunction) to when the crescent appears can stretch over a period as long as three evenings. In the Hebrew calendar, the *molad*, which is roughly translated as the “birth” of the moon, is determined by calculation and not observation, and it is based on the mean length of the full cycle of the moon—29 days, 12 hours, 44 minutes and $3\frac{1}{3}$ seconds. Since this is not an even number of days, adjustments and rules must be applied to arrive at a usable calendar.

²⁶ U.S. Naval Observatory website, <http://aa.usno.navy.mil/faq/docs/crescent.php>.

So, what are the “rules of postponement”? The actual Hebrew term for these rules is *dehiyyot* (also spelled as *dehiyoth*), which contains the concept of putting something off, hence the English term “postponement.”

Explanatory Supplement to the Astronomical Almanac, in its section on the Hebrew calendar, offers the following explanation of the *dehiyyot*:

The [Hebrew] calendar year begins with the first day of Rosh Hashanah (Tishri 1). This is determined by the day of the Tishri *molad* and the four rules of postponements (*dehiyyot*). The *dehiyyot* can postpone Tishri 1 until one or two days following the *molad*. . . .

The *dehiyyot* are as follows:

- (a) If the Tishri *molad* falls on day 1 [Sunday], 4 [Wednesday], or 6 [Friday], then Tishri 1 is postponed one day.
- (b) If the Tishri *molad* occurs at or after 18 hours (i.e., noon), then Tishri 1 is postponed one day. If this causes Tishri 1 to fall on day 1 [Sunday], 4 [Wednesday], or 6 [Friday], then Tishri 1 is postponed an additional day to satisfy *dehiyyah* (a).
- (c) If the Tishri *molad* of an ordinary year (i.e., of twelve months) falls on day 3 [Tuesday] at or after 9 hours, 204 *halakim*, then Tishri 1 is postponed two days to day 5 [Thursday], thereby satisfying *dehiyyah* (a).
- (d) If the first *molad* following a leap year falls on day 2 [Monday] at or after 15 hours, 589 *halakim*, then Tishri 1 is postponed one day to day 3 [Tuesday].²⁷

Two of the four rules of postponement are about astronomical issues and are important in determining the length of the following year. One is simply practical—what do you do if the *molad* (birth) occurs at noon or after? Since the *molad* can occur at any time of the day, which day is declared to be the first day of the seventh month (*Tishri*) if it occurs at noon or afterwards? This rule requires that the next day be declared the first day of *Tishri* (Rosh Hashanah—Feast of Trumpets—and also the beginning of the civil year) unless it would fall on one of the restricted days, which would then require a second day of postponement.

The rule that gets the most criticism is perhaps the simplest compared to the others but the least understood. Since there are no writings that explain the purpose of any of the rules, it is widely speculated that *dehiyyah* (a) is simply for convenience. But actually the Hebrew calendar is a more accurate calendar with the rules of postponement than it is without them. If one uses the 19-year cycle—which contains 235 months of 29 days, 12 hours, 44 minutes and $3\frac{1}{3}$ seconds—it is closer to being exact with the postponements and intercalary years currently in place in the Hebrew calendar than without them during that time span.

It does seem that all four rules of postponement (and not just three) assist with astronomical corrections of the Hebrew calendar. But, whatever the reason may be, these four rules are as

²⁷ L.E. Doggett, “Calendars,” in *Explanatory Supplement to the Astronomical Almanac*, ed. P. Kenneth Seidelmann (University Science Books, 2006), pp. 585-587.

much a part of the calendar as the rules for witnesses and the secret rules for calculations that were active during the time of Christ.

The importance of *Tishri* 1

The *molad* of *Tishri*, the seventh month of the year, is the most important date on the Hebrew calendar. All other dates for the holy days for a particular year are derived from this date. For much of the time, the actual day of the *molad* is used as the first day of the new month. However, this is not the case all the time and the start of the month may be set back, or postponed, by one day, or sometimes even by two days, after the *molad* of *Tishri* was originally calculated. But it should be clear, the *molad* of *Tishri* and the first day of the month do not exist until declared by the rules of the calendar.

The rules of postponement play a major role in establishing the first day of *Tishri*, which, in turn, is used to calculate the remaining festivals. Even if we cannot know the full details of their purpose, they are part of the calendar. Just as a game of baseball or basketball has unique rules, every calendar has its own unique rules. You cannot simply decide that you want to change those rules since the calendar doesn't belong to you. All the available historical evidence tells us that these rules were developed by the proper authorities who preserved them as part of the calendar.

Tishri 1 is the date used for the beginning of the civil year on the Hebrew calendar. This date is determined first and then the other dates for the holy days are calculated from this date. Neither the rules of the calendar nor the manner in which it is calculated are unbiblical.

Another side benefit to the rule that prevents *Tishri* 1 from falling on Sunday, Wednesday or Friday is that it simplifies the calculations used for determining the length of a year. The length of a year on the Hebrew calendar is partially determined by the day of the week on which you begin the year. So having three restricted days in a week (Sunday, Wednesday and Friday) increases the accuracy and lessens the complexity.

The Hebrew calendar has 14 possibilities for layout based on the length of a year and the day of the week on which the year begins (*molad* of *Tishri*).²⁸ If there were no restricted days and all seven were possible, the number of possible lengths would virtually double. So restricting the days for the *molad* of *Tishri* simplifies the calendar calculations.

Do the rules of postponement “move” the holy days?

Some say, “You can’t postpone God’s holy days!” Or they say, “That’s just Jewish legalism! And it’s not right. The Jews have added their own ideas to the calendar for the sake of convenience.”

In reality, until the *molad* of *Tishri* has been determined, there are no holy day dates. Criticism that the Hebrew calendar somehow moves the holy days through its rules of postponement really misses the point.

²⁸ Remy Landau, “Hebrew Calendar Science and Myths,” ed. Jonathan Hirshon, http://www.templesanjose.org/JudaismInfo/time/Hebrew_Calendar.pdf, p. 8.

All calendars have rules. In the Gregorian calendar, the month of February usually has 28 days. But every fourth year, we add an extra day, and February then has 29 days. No one makes the claim that we are wrongly postponing March 1 and thereby changing the start of spring. Everyone understands that it is necessary to add an extra day every so often so the right number of days fit into the year. The Hebrew calendar is no different. It has rules and procedures that are necessary to keep it in sync with respect to the movements of the sun and moon.

There is nothing unbiblical about any of the rules of postponement, and it can be shown that they all have an impact on the astronomical calculations and the accuracy of the calendar. The claim is made that *dehiyyah* (a) is solely for convenience. This is popularly found in books on the calendar, but is this true? There is no credible historical evidence to support this claim. It is true that *dehiyyah* (a) prevents the Day of Atonement from falling immediately before or after the weekly Sabbath. It is clearly more convenient to avoid this happening, but is this the reason for the rule? We simply don't know.

Is the full moon always on the 15th?

Some conclude that there must always be a full moon on the evening of the first day of Unleavened Bread and the evening of the first day of the Feast of Tabernacles since both of these occur on the 15th day of the month. Of course, there is no scripture that states such. We have already seen that the mean length of a lunar month is approximately 29.5 days, which means the middle of the month (the full moon) is at the 14.75 day mark. So day 15 of the month would be the approximate halfway point. This means that on the evening of the 15th day of the month, we should expect to see a full moon in the sky, since the full moon falls halfway during the moon's monthly cycle. But the 15th day may or may not be the time when there is a 100 percent, fully illuminated moon.

One must realize that, in general, "full moon" is a reference to one of the phases of the moon that lasts for approximately three nights. Most almanacs and calendars have the full moon listed on the day that the sun, moon and earth align and the moon is fully illuminated. This can be calculated precisely to the minute. But, just as the astronomical new moon is only one way to define the new moon, so the astronomical full moon is only one way to define the full moon. The best way to look at it is that the new moon and the full moon are phases of the moon's cycle rather than exact moments in time (the astronomical new moon and full moon).

When the moon is between 95 percent and 100 percent full, it is difficult for one to tell the difference with the naked eye. The 15th day of the seventh month will always begin on one of these three evenings during the full moon phase on the Hebrew calendar. This will also be true of the Night to Be Much Observed, which is the evening of the 15th day of the first month. It should be kept in mind that there is no scripture that requires there be a "perfect" full moon (100 percent illumination) on the night of the Feast of Tabernacles or the Night to Be Much Observed. In fact, the moon may not even be visible at the time when it is perfectly full (100 percent illuminated). Since the moon continues through its phases whether it is day or night, if the astronomical full moon occurs during the daytime, then technically you will already be looking at a "waning" moon, with less than 100 percent illumination, by that night.

This quote from the U. S. Naval Observatory may be helpful:

Although Full Moon occurs each month at a specific date and time, the Moon's disk may appear to be full for several nights in a row if it is clear. This is because

the percentage of the Moon's disk that appears illuminated changes very slowly around the time of Full Moon (also around New Moon, but the Moon is not visible at all then). The Moon may appear 100% illuminated only on the night closest to the time of exact Full Moon, but on the night before and night after will appear 97-99% illuminated; most people would not notice the difference. Even two days from Full Moon the Moon's disk is 93-97% illuminated.²⁹

A Matter of Responsibility

As far as a conclusion to the matter, one must ask, "If we do not accept the Hebrew calendar, then which calendar will we accept?" If there is no other recognized calendar for use in determining the festivals, one is left with the daunting task of developing his own calendar. This means that one must make "executive" decisions (without clear biblical direction) on the following matters:

- A clear definition of the new moon must be determined. Will it be the time of the conjunction of the earth, moon and sun, that is, the period of total darkness of the moon? Or will it be the time of the sighting of the crescent of the moon? The time for either can easily be calculated today; but while most calendars use the sighting of the crescent as their definition of the new moon, was this true 2,000 years ago? Neither definition has biblical support.
- If one decides that the new moon must be determined by observation, several additional questions must be answered:
 - What location on earth will be used for the sighting of the crescent? Unlike the astronomical conjunction, different altitudes and different latitudes will produce different times for the sighting and, in some cases, even different days. Some will proclaim that Jerusalem is the only appropriate place, but is that true? The Israelites kept the holy days prior to reaching the land of Canaan. While in the wilderness, they clearly could not have based any calendar decision on an observation at Jerusalem.
 - What will determine the sighting of the new moon? In other words, what level of visibility will be required? Is it 2 percent or is it 4 percent of the surface in view? What if the weather is cloudy at the point of observation? What rule will be invoked to compensate for this issue? Today, with modern telescopes, it is possible to see the crescent with as little as 1 percent of its surface illuminated. But this would be impossible with the naked eye.
- What rules will be created to deal with leap years? Without leap years, the seasons will soon be out of sync and the spring festivals will be in the summer and the fall festivals in the winter. We also have the biblical injunction in Exodus 12, identifying the first month of the year as the month for the Passover and Days of Unleavened Bread; and we know this was in the spring. One cannot consistently keep these days in the spring without leap years.
- Will each year begin with the new moon just before the spring equinox or the one just after the equinox or the one closest to the equinox? A decision in this matter will be significant and will dramatically change the calendar and observance of the festivals.

²⁹ U.S. Naval Observatory website, http://aa.usno.navy.mil/faq/docs/moon_phases.php.

Who has the authority to give the final answer on any of these issues? Over the years more than a dozen different calendars have been put forward as being the “true biblical calendar,” but none of them answered the above questions from Scripture. What scripture precisely defines the new moon? What scripture explains the calculation of leap years? What scripture lists Jerusalem as the only location for sighting the new moon? What scripture gives the percentage of the surface of the moon that would qualify as a legitimate sighting of the crescent? What scripture authorizes witnesses outside Jerusalem? What scripture gives an individual living in the 21st century the authority to answer these questions in developing his own version of the calendar? And without Scripture on his side, by what authority will this calendar be established?

Based on the Jewish interpretation of the Old Testament Scriptures, we see that Moses and Aaron were given the responsibility to “proclaim” the festivals, which required them to maintain a calendar. Jesus Christ accepted the role of the Sanhedrin as those who sat in Moses’ seat, which gave them responsibility for the calendar. And the apostle Paul referenced the Jews as having been given the oracles to preserve. While we don’t know exactly what all the oracles contained, we do know that the Hebrew calendar was preserved by the same body of people who preserved the Scriptures. In order to follow the command to keep the festivals, the Jews were required to keep a calendar.

There are two issues that should be addressed before concluding this study. One is a point of history, and the other is a point of responsibility.

What does Church history tell us about this issue? In reality, very little. Much of the past 2,000 years of Church history is hidden in obscurity. But we can state that whenever there is any historical record of the Church observing the holy days—pick any year—the observance was always based on the Hebrew calendar. There is no record of a body of believers using any other calendar until very recent times when some Church of God groups have rejected the Hebrew calendar and developed their own calendar and their own rules. But is this the correct thing to do?

The second point is the one of responsibility. Who has the responsibility for making decisions when the biblical text isn’t clear, or doesn’t provide an answer to a question? In most cases, that has been the responsibility of Church leadership. If the Church doesn’t have the authority to render judgment in such matters, then who does? What was Christ speaking about in Matthew 16:19 and 18:18 when He stated that the disciples had the responsibility to render judgments, to bind and to loose? Did Christ invest authority in the leadership of the Church, beginning with the disciples of His day?

It should be clearly understood that no one has the authority to instruct a person to do anything contrary to Scripture. But what about decisions that cannot be determined by Scripture? Who has that responsibility, or is it “every man for himself” as we read in Judges 21:25?

At the conclusion of the matter, someone must decide which calendar we will use for observing the holy days. Will we create our own, borrow one from another Church group—or should we follow the Hebrew calendar? The decision of the Church of God, a Worldwide Association—and the lesson of history—is that the Hebrew calendar is the appropriate calendar for observing God’s festivals.