

The
Hebrew Calendar
Is It Reliable?

Church of God, The Eternal

P.O. Box 775

Eugene, OR 97440-0775

www.cogeternal.org

© 1994 Church of God, The Eternal
Reprint: 2000

Foreword

This article is not written for those who adhere to the Hebrew calendar—those who value it for the purpose of keeping the festivals of God. It is not written for those who have no doubts about the various elements of the calendar that regulate the observance of the annual Holy Days. It is written as a rebuttal to calendar dissidents, and those influenced by them, who have chosen to disregard the facts, or lack of them, regarding the calendar and who have generated their own versions, insisting we must follow their calendars in order to be "right with God."

The abundance of references used in this article are for *their* benefit, if they have eyes to see and ears to hear. Emphasis is ours throughout in order to punctuate many of the important facts they seemed to have overlooked when in their writings they refer to many of the same sources cited in this work.

A calendar is primarily a religious institution. Modern calendar dissidents have seized upon a particular set of circumstances of our time in order to institute their own religions. Calendar dissidents are divided among themselves and are in much disagreement. As a whole, they have advanced arguments based on assumed premises without any real evidence, or that are false in themselves but not easily ascertained by the unwary. This article will expose that error.

The Hebrew Calendar

Is It Reliable?

Is there any truth to the accusation that the Hebrew calendar is unauthorized, inaccurate, and "adds to God's Word"? This article will reveal the facts.

Calendar controversies are not new. The calendars of the various heretical groups who broke away from mainline Judaism deviated considerably from the normal calendar (*Encyclopedia Britannica*, New Edition, art. "Judaism"). A calendar dispute with the priestly establishment at Jerusalem was the precipitating factor that led to the departure of the Essenes from Jerusalem to the Dead Sea. The evidence is that this group advocated a calendar that was different than the one accepted by the Jewish community (*The Anchor Bible Dictionary*, Vol. I, art. "Calendars").

The Jews of Qumran, now famous for the Dead Sea Scrolls and recognized as the Essenes, (100 B.C.–100 A.D.) emphasized "times, seasons, and the calendar." They desired to walk before God "perfectly in all things that are revealed according to their appointed seasons." They also refused to advance their times or to lag behind any of their seasons. According to them they were the covenant community who were faithful to the divine laws while the rest of Israel had erred. They were separated from the rest of the Jews by their calendar, festivals, and fasts. They insisted that "they will not leave out any day nor disturb any feasts." Their book of *Jubilees* inveighed against the harm that is done by the use of a different calendar. It objected to the lunar calendar because it was based on "observations of the moon" and makes the year come annually "ten days too soon" (*Handbook of Biblical Chronology*, by Jack Finegan, pp. 45, 47–48, 55).

What needs to be realized is that while the Qumran sect claimed that the rest of Israel was in error, this is no proof that they were conservative or innovative. Quite often the innovator attempts to pass himself off as conservative, a follower of the "legitimate" line. The facts are that the disruptive nature of their calendar would have been seen after only a few years' use, particularly the gap between the beginning of the seasons and their respective solstices and equinoxes. Four or five years is all it would have taken (*The Jewish People in the First Century*, Vol. II, edited by S. Safrai and M. Stern, pp. 842–843).

The book of *Jubilees* defended the solar calendar against the lunar one. The disciples are told that a divine messenger informed Moses: "Now you command the Israelites to keep the years in this number—364 days. Then the year will be complete and it will not disturb its time from its days or from its festivals because everything will happen in harmony with their testimony. They will neither omit a day nor disturb a festival." Later the angel predicts: "There will be people who carefully observe the moon with lunar observations because it is corrupt (with respect to) the seasons and is early from year to year by ten days."

The author of the book of *Jubilees* argued that with the lunar calendar the sacred days are profaned and the profane days are sanctified. This calendar dispute developed because the book of *Jubilees* insisted that the solar calendar was the one divinely revealed. Yet, anyone with even a limited calendar knowledge knows that if the lunar calendar was not intercalated (days added occasionally to make up for the shortage) the agricultural season will soon be observed at the wrong time of the year (*The Anchor Bible Dict.*, Vol. I, art. "Calendars"). The book of *Jubilees* accused the Jews of not following their solar calendar because they followed "the feasts of the Gentiles after their error and ignorance. For there will be those who will assuredly make observations of the moon—now it disturbs the seasons and comes in from year to year ten days too soon" (Safrai and Stern, p. 839).

The Essene dispute over the calendar is the first one we have any historical record of, but it was not the last. During the patriarchate of Simon III, 140–163 A.D., a great quarrel broke out concerning the feast days and leap years. This dispute threatened a permanent split between the Babylonian and Palestinian Jews and was averted only by much diplomacy (*The New Standard Jewish Encyclopedia*, art. "Calendar, History of").

After the third Jewish revolt (132–135 A.D.) a certain Rabbi Hananiah fled to Babylonia and attempted to intercalate the Hebrew calendar. Control of the calendar was of immense importance in Jewish life because intercalation determined the days on which religious observances, including those listed in the Bible, were observed. Calendar control, therefore, involved the ultimate political control. During the period of the Second Temple (515 B.C. to A.D. 70) this authority was very probably vested in the high priest. After the destruction of the Temple in A.D. 70 and the breakdown of any central control, the rabbis arrogated this authority to themselves. Rabbi Hananiah attempted to assert the supremacy of the Babylonian Jews by declaring their right to intercalate the calendar. He was premature. It was not until the tenth century A.D. that Babylon became the center of Jewish life, a responsibility that eventually shifted to various North African and European Jewish communities (*Christianity and Rabbinic Judaism*, edited by Hershel Shanks, p. 197).

Why did Babylonian Jewry become so unique? Because it was not only the largest Jewish community in the world, it was also not within the framework and influence of the Hellenistic and Roman worlds. It was, therefore, protected from the impact of the assimilatory nature of Hellenistic culture (Shanks, p. 262).

In the seventh and eighth centuries A.D., Judaism in the East was confronted with the rise of various sects which refused to accept the existing calendar. In the second half of the eighth century Anan b. David, the founder of Karaism, repudiated the method of computation as repugnant to the Scriptures and reinstated lunar observation. In taking this step he assented to the Islamic authorities who adhered to lunar observation. Anan b. David is said to have stated that the intercalary month might be inserted just as legitimately after the month of Shebat as after Adar. Later Karaites said that astronomical calculation was

merely cloud-peering and star-gazing and that only if weather conditions made observation impossible was it permissible to employ approximate calculations. It was not until the fourteenth century A.D. that they accepted the nineteen year cycle, and then only for regions far away from Palestine. The Karaites scattered in various countries fell into confusion and began celebrating the same festival on different days. They were eventually compelled to fall back on calendar calculations and to construct astronomical tables for the purpose. Today the Karaites determine the new moon festivals between conjunction and sunset, very closely approximating, in theory, the practice of the Rabbinate. In reality, the dating of festivals may amount to one or two days (*Encyclopedia of Religion and Ethics*, by James Hastings, art. "Calendar").

The last great controversy regarding the Hebrew calendar occurred in 921 A.D. This dispute was over the validity of the now universally recognized Hebrew calendar. Aaron Ben Meir attempted to reinstate the prerogative of the Holy Land in the fixing of the new moon and festivals which was done by calculation. He attempted to alter a most important regulation; as a result a schism between the Babylonian and Palestinian Jews took place. What this dispute really demonstrated was that the present Jewish calendar had its origin in Babylon during the period of the Gaons, that is, the heads of the various Babylonian academies (*Ency. of Religion and Ethics*, art. "Calendar"). The introduction of the astronomical calendar was an immense improvement in the practical sense, and there were no disputes from the fourth to the tenth centuries. The controversy that arose in 921 A.D. between the Palestinian and Babylonian schools regarded fixing the calendar for the following year (*Studies in Medieval Jewish History and Literature*, edited by Isadore Twersky, pp. 43–44). This dispute between Aaron b. Meir of Palestine and Sa'adia b. Joseph, the Gaon of a Talmudic academy, was because Ben Meir's calculations demonstrated that the Passover in 922 be observed two days earlier than the fixed date of the standard calendar. After a bitter exchange of letters the controversy ended in favor of the Babylonian authorities and they were never again challenged (*Ency. Britannica*, New Ed., art. "Judaism").

In the dispute Gaon Sa'adya b. Joseph al-Fayyuma put forth the theory that the existing calendar system was of immemorial antiquity and that the month and festival had always been determined by calculation. He argued that observation of the moon had not been incorporated until the third century B.C. in order to demonstrate the accuracy of calculation for the purpose of refuting heretics who questioned calculation. He also held that calculation and observation had always been in accord. While al-Fayyuma had a powerful reputation and was widely respected, both the Karaites and Talmudists easily refuted the theory on the basis of Talmudic records (*Ency. of Religion and Ethics*, art. "Calendar").

Later on, as the center of authority shifted from location to location, it was argued that many of the functions within Judaism, which were originally dependent upon ordained institutions in the land of Israel, continued on the assumption that earlier authorities either

tacitly or explicitly commissioned later generations to continue. The administration of the calendar is a case in point (Twersky, p. 50).

One fact is certain in all this, however. There has scarcely been a single (dissenting) movement in Judaism that has not been associated with a desire to manipulate the calendar (*Intercalation and the Hebrew Calendar*, by J.B. Segal, p. 260). The reason should be obvious. A calendar is primarily a religious institution (*The Calendar of the Book of Jubilees, Its Origin and Its Character*, by Julian Morgenstern, p. 67).

Modern Calendar Controversies

History repeats itself. A look at present day controversies involving the Hebrew calendar is like watching a TV rerun. Some of the arguments we hear are found in the following paragraph:

We cannot rely on calendars devised by man. The present Hebrew calendar is not what was revealed from God. It is the product of long historical development. The oracles of God did not include the calendar. The current Jewish calendar differs from the calendar God gave to Moses. It is in disharmony with the Biblical principle that the Mosaic calendar is lunar-solar in nature. No authoritative writing exists that reveals a provision to allow a change in the intercalary sequence. It is purely an assumption that God authorized the Hebrew calendar. The Pharisees and Rabbis have taken authority to themselves that God reserves for Himself in the oracles of God. The oracles of God are not a declaration by some Jewish court nor do they include the Hebrew calendar. It is the calendar that is written in the oracles of God, the word of God, that constitutes the true calendar. Most people have not taken the time to prove what is in their Bibles. In it they would not find Hebrew calendar calculations, the postponements, and the crescent of the moon. No one can observe an annual Holy Day on any day other than the true Holy Day. The Jewish calendar is in gross error. The fixed calendar used by the Jews today is part of the oral law Jesus condemned. It is the same calendar today as was used in the tenth century.

Solar System Problems

All methods of calculating time in antiquity were based on the revolutions of the moon around the earth as well as the apparent movement of the sun as it traversed the ecliptic. The problem, however, is that these circuits are incompatible. The history of the calendar in the ancient Near East is an attempt to develop a system that would reconcile both the lunar and

solar systems (*The New Catholic Encyclopedia*, Vol. II, art. "Calendars of the Ancient Near East"). The motion of the earth, for example, as it revolves around the sun, is not simple. It is made up of a complex combination of at least six elementary motions (*Astronomy Made Simple*, by Meir Degani, p. 144). The Earth is moving around the sun at an average velocity of eighteen and one-half miles per second, or roughly sixty-six thousand miles an hour. The moon's velocity around the Earth is about one-third of a mile per second but since it is a satellite it too moves sixty-six thousand miles an hour in relation to the sun. The moon is strongly pulled when it lies between the sun and the Earth, or at the time of the new moon. It moves less strongly when it is on the far side of the earth, or at the time of the full moon. The moon's path around the Earth is not circular; it is elliptical, that is, oblong. The path of the moon is wavy, its velocity variable. The moon appears to move in and out of the Earth's orbit alternately and to change its velocity from a maximum of nineteen miles per second to a minimum of eighteen miles per second (*New Guide to the Moon*, by Patrick Moore, pp. 50, 47, 159). The point on the ellipse nearest the Earth is called perigee; the point on the ellipse farthest from the Earth is know as the apogee.

Kepler's second law states that the velocity of a planet around the sun depends upon its distance; the nearer its distance the greater its velocity. The same applies to the moon. When it is at apogee it is moving the slowest, so the moon's velocity in orbit is not constant (Moore, p. 56). *The fact is that the movements of the sun and moon do not neatly coincide with the calendar systems of any human civilization* (*Religious Holidays and Calendars*, by Aidan Kelly, Peter Dresser, and Linda M. Ross, p. 6). The Jewish sage Maimonides said, "You will realize how devious and sinuous are the movements of the moon in its orbit" (*Sanctification of the New Moon*, by Moses Maimon (Maimonides), p. 72).

Of the discordant three—sun, moon, Earth—the moon is the most troublesome. Its motion is very complicated. Its orbit is constantly changing in shape as it rotates. It has a swaying motion and its speed varies along with the distance from the Earth. It fluctuates so much when it rises that for days on end it may rise at about the same time (*Clockwork Man*, by Lawrence Wright, p. 20).

We are told the three astronomical patterns which establish the year, the month, and the day are independent and incompatible. Like imperfectly matched gears they do not mesh. Ingenious calendars have been devised, but a fully accurate solution *cannot be found* because the problem of reconciling the days, months, and year is really *insoluble* (*Time*, by Samuel Goudsmit and Robert Claiborne, p. 64).

Even the seven-day week does not accord well with either a solar or lunar year (*Ency. Britannica*, New Ed., art. "Judaism"). It has been assumed that the four phases of the moon during the month led to a division of four weeks, seven and three-eighths days each. In reality the week and month belong to different systems of time reckoning. The month and the week are incongruous whose beginnings coincide only occasionally. The month and

week systems must be superimposed upon one another and both the day and week are time systems which are independent of the moon (*The Origin of the Week and the Oldest West Asiatic Calendar*, by Hildegard and Julius Lewy, pp. 1–2).

Solutions to this dilemma include ignoring the seasons and allowing the lunar cycle to determine the year as the Muslim calendar does. Another method is to intercalate (to add extra months occasionally) in order to make the systems mesh as closely as possible. The third method is to observe a solar year only by ignoring the moon altogether (*Religious Holidays and Calendars*, p. 7).

After twelve lunar months the Muslim calendar lags behind the solar cycle by eleven days. In thirty-three years it has lost an entire year. The Hebrew calendar, on the other hand, intercalates seven years out of a nineteen year cycle and the gap between the solar and lunar year is minor. The Hebrew calendar is never allowed to fall more than twenty-two days behind the sun or to advance more than eight days ahead of it. The Egyptians adopted a pure solar calendar which ignores the phases of the moon. Just as the seasons wander through the year in the lunar calendar which is not intercalated, so the moon phases wander through the month in a solar calendar. The advantage of the solar calendar was that people knew what to expect throughout each year while the Hebrew calendar was always surprising people with its intercalary months (*The Clock We Live On*, by Isaac Asimov, pp. 111–113).

Certainly one of the most disadvantageous factors of the wandering Muslim calendar has been the annual pilgrimage to Mecca. The rites require bare-headedness and the wearing of only two pieces of clothing, no doubt intended for a time of year when the weather was neither too cold in the night nor too hot in the day. But because of the rotation of the calendar through the hottest and coldest months of the year thousands of pilgrims have suffered from the extreme climate. In 1953, for example, the daytime heat ranged between 116 to 127 degrees, and on one day the mercury climbed to 142 degrees causing the deaths of 4,411 pilgrims on that day alone (*Of Time and the Calendar*, by Elisabeth Achelis, p. 95).

The Anchor Bible Dictionary tells us the failure to intercalate was not difficult to see even in ancient times since a month would pass through the entire cycle of seasons in just thirty-two and one-half years. The *ad hoc* intercalation of months seen in the royal letters was the standard way of solving the seasonal problem from approximately the third millennium B.C. until the middle of the first. The reader should be aware of the broad length of time mentioned here as well as the word "approximately." The dictionary goes on to tell us that evidence from the seventh century B.C. (keep this date in mind as it is significant) demonstrates that various procedures were developed for determining in advance whether a year should be normal or intercalary. One method of determining was the observation of the relationship between the longitudes of the moon and the Pleiades throughout the year (*The Anchor Bible Dict.*, Vol. I, art. "Calendars").

How Did the Solar System Get This Way?

George McCready Price, in a book entitled *Evolutionary Geology and the New Catastrophism* gives us a clue. He tells us most geologists now admit the certainty of some sort of catastrophe since man has been on the earth. The sea and land have practically shifted places all over the globe since the time of man, and as a result thousands of other living species left their fossils in the rocks. In addition, a radical and world-wide change in the climate occurred, and this happened within the human epoch. An Eden-like world was transformed by a sudden and awful catastrophe into this wholly different modern world we find ourselves in. Almost all fossils give proof of eternal springs prevailing in the Arctic regions, or semitropical conditions in the northern latitudes. What existed then was a singular uniformity of climate over the globe. Animal and vegetable relics found in the polar regions, embedded in strata, deposited in widely separated geological eras, uniformly testify that a warm climate had formerly prevailed over the globe. The differentiation of the earth's climate into tropical and Arctic zones is comparatively modern. The fossil unit as a whole represents the ruins of an older state of our present world and there is no possible line of scientific reasoning to convince us that any single type of fossil is older than the human race. The world-cataclysm indicated so clearly by new geology must correspond to the Deluge spoken of in Genesis (G.M. Price, pp. 332–333, 274, 324, 258, 264–265, 262, 331, 340). Relate this to the calendar and we find a year of 360 days is implied in the history of the flood (*Dictionary of the Bible*, by James Hastings, art. "Time").

The account of the flood reckons months of thirty days. This is clearly seen by comparing Genesis 7:11, 24 with Genesis 8:4. Here we see a five month period with 150 days. The books of Deuteronomy and Numbers were written by Moses at about 1500 B.C. In Deuteronomy 34:8 and Numbers 20:29 it is implied that the Israelite month was a length of thirty days. A look at the various ancient civilizations reveals the following, as outlined by Immanuel Velikovsky in a work well-footnoted and entitled *Worlds in Collision*: The old Babylonian year was composed of 360 days, a fact which was understood by scholars even before the cuneiform script was deciphered. The old Babylonian year consisted of twelve months of thirty days each. The Assyrian year consisted of 360 days; a decade consisted of 3,600 days. Assyrian documents refer to months of thirty days, counted from crescent to crescent. The ancient Persian year was made up of 360 days of twelve months of thirty days each. The Egyptian year was made up of 360 days before it was changed to 365 by the addition of five days. The calendar of the Eber Papyrus, a document of the New Kingdom, has a year of twelve months with thirty days each. The new moon festivals were very important in the days of the Eighteenth Dynasty, observed at thirty day intervals. There is a statement found as a gloss on a manuscript of *Timaeus* that the calendar of a solar year of 360 days was introduced by the Hyksos after the fall of the Middle Kingdom. The *Book of Sothis*, erroneously credited to the Egyptian priest Manetho, as well as Georgius Syncellus, the Byzantine chronologist, both maintain that originally the additional five days did not follow the 360 days of the calendar but were introduced at a later time. The Mayan year

consisted of 360 days; later five days were added, and every fourth year another day was added. In ancient South America the year consisted of 360 days, divided into twelve months. In China the year consisted of 360 days divided into twelve months of thirty days each. When the year changed from 360 to 365¼, the Chinese added five and one-quarter days to their year. Plutarch wrote that in the time of Romulus, the Roman year was made up of 360 days only, and various Latin authors say the ancient month was thirty days in length (Velikovsky, pp. 124, 332–340).

Numerous evidences are preserved, Velikovsky tells us, which prove that prior to the year of 365¼ days the year was only 360 days long. The texts of the Veda period, for example, refer to a year of 360 days. Passages of the length of the year are found in all the Brahmanas. The Vedas nowhere mention an intercalary period while repeatedly stating that the year consisted of 360 days. There is no mention of the five or six days associated with the solar year. This Hindu year was divided into twelve months with thirty days each. In their astronomical works, the Brahmans used very ingenious geometric methods and their failure to discern that the year of 360 days was five and one-quarter days short seems baffling. In all their historical computations Hindu chronology utilized a month of thirty days and a year of 360 days. All over the world we find at some time the calendar of 360 days, and that at some later time, about the seventh century before the present era, five days were added to the end of the year (Velikovsky, pp. 330–331, 341).

What is the significance of the statement by the prophet Daniel, ". . . he [God] changeth the times and the seasons . . ."? (Dan. 2:21)

In the seventh or eighth centuries B.C. five additional days were added to the year under conditions which caused them to be regarded as unfavorable. From about the seventh century B.C., the length of the Hindu year became 365¼ days, even though the older system was not discarded. The reason for the worldwide identity of time reckoning between the fifteenth and eighth centuries B.C. was due to the movement of the Earth along its orbit, and the revolutions of the moon during that historical period. The length of the lunar month must have been exactly thirty days and the length of the year apparently did not vary more than a few hours from 360 days. Then something happened. A series of catastrophes occurred that changed both the axis and orbit of both the Earth and the moon as well as the length of the ancient year. As a result of repeated disturbances, the Earth changed from an orbit of 360 days to one of 365¼ days and the month changed from thirty days to twenty-nine and one-half (Velikovsky, pp. 338, 332, 342).

"He changeth the times and the seasons." Our solar system being what it is there are some specific things that must take place before times and seasons are changed. The axis of the earth must shift from the perpendicular in order to affect the seasons, and the orbits of the Earth and moon must be altered in order to change the times. In view of the vast amount of evidence from many peoples all over the globe the conclusion is obvious. At one

time during a century of disturbances involving two catastrophes the moon receded eventually to an orbit of twenty-nine and one-half days, on the average, which has continued ever since. At the same time the orbit of the earth changed to one of 365¼ days. Spring follows winter and fall follows summer because the Earth's axis is inclined toward the sun. Should the axis be perpendicular (as likely was the case prior to the Flood) there would be no seasonal changes. Should the axis change, the seasons would change in their intensity and their order (Velikovsky, pp. 345, 120). Written traditions of the peoples of antiquity relate the disorder of the seasons directly connected with the motion of the heavenly bodies (ibid, p. 121).

What does the Bible record indicate?

We know a gigantic catastrophe took place perhaps millions of years ago as is revealed between verses 1 and 2 of Genesis 1. The earth *became* without form and void. It was not created that way. "For thus saith the Lord that created the heavens; God himself that formed the earth and made it; he hath established it, he created it not in [a waste], he formed it to be inhabited: I am the Lord; and there is none else" (Isa. 45:18). This catastrophe, which was the result of Satan's rebellion, laid much of the universe waste as is evidenced by the planets in the solar system. We do not know to what extent the heavenly bodies contributed to the Flood, but many scholars believe the twenty-three and one-half degree tilt of the Earth as it now exists took place during that time.

The Genesis account of creation implies perfection (Gen. 1:31). The 23½ degree tilt of the earth, which is responsible for the seasons, and the wobble in the earth's rotation, which is responsible for the precession of the equinoxes, generate many problems for mankind. Seasonal disturbances have had devastating and disastrous effects at times, and the precession of the equinoxes alters the timing of the equinoxes which, in turn, affects the calendar. The primary meaning of "seasons" in Genesis 1:14 is "appointed times" (*Gesenius' Hebrew and English Lexicon*, p. 457). "Appointed times" is the primary meaning in the other twelve passages where *moed* is translated "seasons." "Appointed times" can include the seasons as the meaning, but *moed* is also translated "an assembly," "a place where an assembly is held," "solemn feasts," "synagogue." The heavenly bodies tell us when a month or year begins. It may be arguable when the tilt of the earth took place. Fossil remains prove that at one time the climate was even over the entire globe. The twenty-three and one-half degree tilt of the earth and wobble in its rotation do not imply perfection—the condition God says the earth was in at the time of the creation account given in Genesis 1. Since the answer to when the tilt occurred is not possible to ascertain with our present knowledge, it is best not to be too dogmatic.

Look at Joshua 10:12–13. "Then spake Joshua to the Lord in the day when the Lord delivered up the Amorites before the children of Israel, and he said in the sight of Israel, Sun, stand thou still upon Gibeon; and thou, Moon, in the valley of Ajalon. And the sun stood

still, and the moon stayed, until the people had avenged themselves upon their enemies. Is not this written in the book of Jasher? So the sun stood still in the midst of heaven, and hasted not to go down about a whole day." It is speculated that this event could have been accomplished by the Earth tilting sufficiently on its axis to allow the northern hemisphere to remain light for the period delineated. Another example of God's intervention is in the book of Judges. We do not know the scope of this intervention or what specifically took place, but the text tells us, "They fought from heaven; the stars in their courses fought against Sisera" (Judges 5:20). In II Kings 20 we read, "And Hezekiah said unto Isaiah, What shall be the sign that the Lord will heal me, and that I shall go up into the house of the Lord the third day? And Isaiah said, This sign shalt thou have of the Lord, that the Lord will do the thing that he hath spoken: shall the shadow go forward ten degrees, or go back ten degrees? And Hezekiah answered, It is a light thing for the shadow to go down ten degrees: nay, but let the shadow return backward ten degrees. And Isaiah the prophet cried unto the Lord: and he brought the shadow ten degrees backward, by which it had gone down in the dial of Ahaz" (II Kings 20:8–11).

In the New Testament period a dramatic event took place at the time of the crucifixion. There was darkness over the land from noon until 3:00 P.M. (Matt. 27:45). In addition there was a great earthquake (v. 51, Matt. 28:2). Many have assumed this darkness was the result of a solar eclipse. But at this time of the Passover season the moon was full and on the opposite side of the earth from the sun. Whatever this darkness was, it resulted from some supernatural act of God as He manifested His power in the heavens.

These verses all show the power of God as He intervened in the heavens in times past. What about the future? "Behold, the day of the Lord cometh, cruel both with wrath and fierce anger, to lay the land desolate: and he shall destroy the sinners thereof out of it. For the stars of heaven and the constellations thereof shall not give their light: the sun shall be darkened in his going forth, and the moon shall not cause her light to shine. And I will punish the world for their evil, and the wicked for their iniquity; and I will cause the arrogancy of the proud to cease, and will lay low the haughtiness of the terrible. I will make a man more precious than fine gold; even a man than the golden wedge of Ophir. Therefore I will shake the heavens, and the earth shall remove out of her place, in the wrath of the Lord of hosts, and in the day of his fierce anger" (Isa. 13:9–13). "And I will shew wonders in the heavens and in the earth, blood, and fire, and pillars of smoke. The sun shall be turned into darkness, and the moon into blood, before the great and the terrible day of the Lord come" (Joel 2:30–31). "And there shall be signs in the sun, and in the moon, and in the stars; and upon the earth distress of nations, with perplexity; the sea and the waves roaring; Men's hearts failing them for fear, and for looking after those things which are coming on the earth: for the powers of heaven shall be shaken" (Luke 21:25–26).

The Talmud and other rabbinical sources tell of great disturbances in the solar system at the time of the Exodus, at the crossing of the Red Sea, and at the time the Law was given

from Mount Sinai (Velikovsky, p. 116). Velikovsky tells us, because of the various simultaneous changes in the movement of the Earth and moon at the time of the Exodus, the fact that the sky was hidden in the smoke and clouds, the calendar could not be correctly computed. The changed lengths of the year, month, and day required prolonged and unobstructed observation. The Midrashim states that Moses was unable to understand the new calendar which meant he had difficulty understanding "the secrets of the calendar" or "the secret of transition" from one time-reckoning to another, which was revealed to him. (note Exodus 12:2). Rabbinical sources say that in the time of Moses the heavenly bodies became confounded. The four quarters of the world were displaced and the calendar had to be adjusted anew (Velikovsky, pp. 122–123). The astronomical values of the day and year were not the same after the upheaval. The Papyrus Anastasi IV says the months were reversed, the "hours disordered" (ibid, p. 123). This description by Velikovsky may not be as far fetched as it sounds in the light of the great upheavals of the heavenly bodies as revealed in the Scriptures.

In the middle of the eighth century B.C., then, the calendar in use became obsolete. From 747 until 687 B.C. solar and lunar movements repeatedly changed, Velikovsky tells us, requiring calendar adjustments. Reforms that took place were soon out of date and had to be replaced. Clay tablets found in the royal library at Nineveh reveal astronomical observations made during the period before the present order of the planetary system was established. There must have been an obvious reason Jeremiah wrote, ". . . be not dismayed at the signs of the heaven; for the heathen are dismayed at them" (Jer. 10:2). Velikovsky goes on to explain that one tablet fixes the vernal equinox as the sixth of Nisan while another places it at the fifteenth of Nisan. Modern scholars are unable to explain the difference. Judging by the accurate methods employed and the precision achieved in their observations, the astronomers would not have erred nine days. In the astronomical tablets of Nineveh "three systems of planets" are extensively represented; single planets are followed in all their movements in three different schedules. The movements of the moon have two different systems. Only the last one duplicates the present solar order. In one of the systems the solstitial and equinoctial points on the ecliptic lay six degrees too far to the east. On Tablet No. 272 the distances taken by the moon on the Chaldean ecliptic from one new moon to the next are on the average three degrees, fourteen minutes too great. What this means is that during a lunar month the moon traveled a greater distance in relation to the fixed stars than present observation reveals. All the various systems recorded in the astronomical tables of Nineveh show the world order changed repeatedly in the course of a single century (Velikovsky, p. 349). Included in this knowledge is that repeated changes in the apparent course of the sun across the heavens led the astronomers of Babylonia to distinguish three paths of the sun (ibid, p. 350).

The Feast of Tabernacles is an equinoctial festival as Exodus 23:16 and 34:22 state; that is, it falls on or near the autumnal equinox. Velikovsky is not alone in asserting that originally New Years day was observed on the tenth day of the seventh month, the same day

as the Day of Atonement. Compare Leviticus 25:9. It was later moved to the first day of the seventh month. What is striking about this is that not only on the Jewish but on the Babylonian calendar the equinoctial dates were displaced by nine days. The indication is that the calendar of feasts followed astronomical changes (Velikovsky, pp. 352–353).

The question that needs to be asked is how could the astronomers who composed the earlier tablets be so careless as to maintain that the year is 360 days long, an error that in just six years leads to a full month's divergence? How could the astronomers of the royal observatories announce to the king the movements of the moon and its phases on wrong dates—when a child can tell when the moon is new—and then record this on scholarly tablets which required advanced mathematical knowledge? This is why scholars speak of these things as enigmatic mistakes (Velikovsky, p. 350). In the days of Assurbanipal, the planetary movements, the precession of the equinoxes, and the periodic return of the eclipses were recalculated and recorded, and these new tablets, along with the old ones or copies of the old ones were stored in the palace library at Nineveh (ibid, p. 350).

From the days of Thales, born in 640 B.C., the Greeks knew that the year consisted of 365 days. Thales is credited with discovering the number of days in a year. As he was born in the seventh century B.C., is it not possible he was one of the Greeks who learned the *new length of the year*? It was in the beginning of that century that the year came to its present length. Solon, a contemporary of Thales, is regarded as the one who determined that the lunar month is less than thirty days. The persistence of clinging to a 360 day year was done not only for reverence for the earlier astronomical year but also for the convenience of computation (Velikovsky, p. 338).

What needs to be asked is if the natural year was always what it is now, is it not indeed strange that this discovery should have been credited to a sage who lived as late as the seventh century B.C. when Egypt and Assyria were already very old kingdoms and when the dynasty of David was in its last decades? It seems strange that the progress of this knowledge would leave to Thales the calculation of the days of the year, which is a simple matter, and the calculation of coming eclipses, which is an advanced achievement. The same thing can be said about Solon unless we understand *that an adjustment of the calendar to the new system was taking place* (Velikovsky, pp. 356–357).

Across the globe, the king of Peru ordered astronomical observations and calculations to be made which resulted in a yearly change from 360 to 365¼ days. All the Toltec histories comment on an assembly of sages and astrologers which had convoked for the purpose of correcting the calendar, reforming the computation of the year which was recognized as erroneous (Velikovsky, p. 358).

In the Talmud, scattered passages refer to the calendar change made by King Hezekiah. He is said to have doubled the month of Nisan in order to delay the Passover.

While the Talmud attributes this to intercalation for the purpose of making the lunar year correspond more closely to the solar year, Scripture tells us Hezekiah delayed the feast until the second month for ritual reasons (see II Chronicles 30). What permanent changes Hezekiah instituted is not stated, but it is apparent that at that time (eighth century B.C.) calendar reckoning became a complicated matter. It appears that at this time direct observation was employed, the result being a lack of ability to predict much lunar activity in advance (Velikovsky, p. 352).

The Romans introduced calendar reform near the end of the eighth or beginning of the seventh century B.C. One reform was that of Numa and the "correction of the inequality which he made was destined to require other and greater corrections in the future. He also changed the order of the months." Numa was a contemporary of Hezekiah (Velikovsky, p. 356).

Evidence also accumulates that the earth has reversed its magnetic field many times and that the axis of rotation has also changed. That is, the planet has rolled about changing the location of its geographical poles. The last time this occurred was in the eighth century B.C. This observation was made on clay fired in kilns by the Etruscans and Greeks. The conclusion of Giuseppe Folgheraiter was that in the eighth century the earth's magnetic field was inverted in Italy and Greece. P.L. Mercanton of Geneva came to the same conclusion by studying the pots of the Hallstatt culture of Bavaria. He concluded that about the tenth century B.C. the direction of the magnetic field differed only slightly from its direction today. What these researches demonstrate is that the earth's magnetic field was disturbed sometime during or immediately after the eighth century to the extent that a complete reversal took place. The eighth and beginning of the seventh centuries B.C. were periods of great cosmic upheaval (*Earth in Upheaval*, by Immanuel Velikovsky, pp. 145–147).

All around the globe the years following 687 B.C. saw calendar reforms taking place. Between 747–687 B.C. the calendar was in a chaotic state, the lengths of the year and of the month, as well as the day, repeatedly changing. The stability of the present calendar is due to the fact that its well-known order has remained unaltered (*Velikovsky*, pp. 358–359).

The question asked was, how did the solar system get this way? The Bible says God is not the author of confusion (I Cor. 14:33), so it did not start out disordered. The Bible says of God's creation, which includes the sun, moon, planets, and stars, "And God saw every thing that he had made, and, behold, it was very good . . ." (Gen. 1:31). Man's rebellion and sin against his Creator led to the Flood (Gen. 6:5). In addition, God placed an earlier curse upon man and the earth (Gen. 3:17–19). Man has continued in rebellion against God ever since. We can conclude that since the operation of the solar system directly affects man (Gen. 1:14–18) it has been subject to God's purpose as He deals with man. It is a system that not only does not mesh, but is impossible to reconcile, the problem being insoluble. Why does the Bible fail to explain what has taken place in the solar system? As we have

seen, the Bible gives a sufficient number of examples of how the solar system has been altered by God for specific reasons. God controls the heavens and the earth. No doubt dramatic solar events took place during the Exodus. What about the eighth and seventh centuries B.C.? Is there any Biblical evidence of a dramatic event? There is only one. It is found in Amos 1:1 and Zechariah 14:5. It was the great earthquake that occurred in the days of Uzziah. Uzziah, king of Judah, reigned from 809–757 B.C.

Ancient Calendar Systems

God established four units of time for mankind. These are: the day, the week, the month, and the year. The heavenly bodies were set in their place for the purpose of marking time (Gen. 1:14–18). Constellations such as the Great Bear, Orion, and the Pleiades were known in the ancient world. One of the earliest civilizations, the Sumerian, had a calendar with a thirty day month (Goudsmit and Claiborne, p. 59). The Babylonians were heirs of the Sumerian culture (*Astronomy in the Old Testament*, by G. Schiaparelli, p. 21). In Babylonia the lunar calendar seems to have remained in general usage the most, and Mesopotamia has properly been called "the classical country of the strictly lunar calendar" (Finegan, pp. 32–33). Babylonia had a luni-solar calendar from the beginning of its recorded history. Lunar calendars were widespread and predominant among the people of the Middle East. Even in Egypt a lunar calendar appears to have survived side by side with the civil calendar (Segal, pp. 252–253). Many of the details of the Babylonian calendar have been lost but what is known is the use of a lunar calendar, a system of intercalation, months divided into seven day periods, and days with twenty-four hours. The discrepancy between the solar and lunar year led to a process of intercalation and by 380 B.C. a formal system developed that contained a nineteen year time cycle intercalating the third, sixth, eighth, eleventh, seventeenth, and nineteenth years (*Religious Holidays and Calendars*, p. 8). The seven day period was well known, as demonstrated in cuneiform literature, and was common to all peoples of the Fertile Crescent (Lewy, p. 3).

With respect to the Babylonian calendar, whether the months were eventually determined by calculation instead of observation is not known. Intercalation, that is, adding an extra month, was eventually employed, though, and this system was adopted by the Assyrians (Finegan, p. 30). By the time the Babylonians had developed a sound thinking astronomy it was easy to tell from previous observations of the moon exactly when each new moon would appear. However, it was still customary to continue watching the sky for the first appearance of the crescent (Asimov, pp. 65–66). As early as the eighth century B.C. there is evidence that it was recognized in Babylonia that the insertion of seven additional months within a nineteen year period would closely approximate the additional time needed to stabilize the calendar. By the fourth century B.C. fixed years were established for these seven intercalations and the nineteen year time cycle was firmly standardized. This achievement is regarded as remarkable. The difference between 235 lunar months and

nineteen solar years is only 2 hours, 4 minutes, and 25.22 seconds. The Babylonian system came close to solving the difference between the lunar and solar year (Finegan, pp. 30–31). Finegan's figures here for the difference between the solar and lunar nineteen year time cycle vary slightly from figures given by other sources. The dates he lists correspond with those given by Velikovsky, as seen in the preceding paragraphs. It took some time after the calendar upheaval in the eighth and seventh centuries B.C. to bring about a workable solution to the astronomical problem.

People who used a luni-solar calendar system were faced with the problem of determining the season, the measurement of time, and the time of the lunar festivals. The lunar calendar can be regulated to agree with the tropic year (the length of time the earth completes its circuit around the sun) by observing the sun, that is, by measuring the lengths of daylight from sunrise to sunset, or by watching the movements of the fixed stars. Both these methods were employed by the Israelites (Segal, p. 254). The Babylonians used the first appearance of the crescent to mark the beginning of the month. The Egyptians, however, used the time when the old crescent was invisible in the morning as the beginning of their month. The Jews followed the Babylonian method (*ibid*). The Egyptian custom of using the old crescent is akin to our modern use of the conjunction as the marker.

In early Egypt the only calendar in use was the lunar calendar (*The Calendars of Ancient Egypt*, by Richard Parker, p. 53). After some period of time, the Egyptians adopted a solar calendar which was also schematic and served as the standard civil calendar. A second lunar calendar was later introduced which maintained a substantial harmony with the (civil) solar calendar. Egypt had no less than three calendars and three calendar years which continued to be used for the remainder of ancient Egyptian history (Finegan, p. 24). Finegan's dates listed are entirely too early as the Flood did not begin until 2368 B.C., and Egyptian civilization did not develop until at least a few centuries after this. In Egypt the oldest calendar was lunar in nature, and counted twelve lunar months. A thirteenth month was added to rectify the solar with the agricultural year (*New Catholic Ency.*, Vol. II, art. "Calendars of the Ancient Near East"). We do not know the time period when this lunar calendar was first intercalated, but based on what we have already seen, we can assume it was at a later date. The Egyptian civil (solar) calendar was unique for its independence from the complicated astronomical problems that are associated with luni-solar calendars. Its potential use in astronomy was not realized until Greek astronomers adopted this calendar as the standard for computing astronomical tables (*The Anchor Bible Dict.*, Vol. I, art. "Calendars").

The Greeks, Macedonians, Syrians, Babylonians, and Arabs all possessed similar lunar calendars (Finegan, pp. 57–71). The lunar month was used uniformly throughout the ancient Near East and the Mediterranean area and began with the sighting of the first lunar crescent. Only the Egyptians and later the Romans did not conform to this system and disregarded the irregular natural time in favor of regular arbitrary time, such as a fixed thirty day month and a 365 day year (*The Anchor Bible Dict.*, Vol. I, art. "Calendars").

What must not be overlooked is that Phoenician culture exercised a powerful influence on the Jews and signs of this are found in the oldest Jewish calendar. In fact, the Phoenician calendar is the equivalent of the oldest Jewish calendar. This has been clearly proven on Phoenician inscriptions (Schiaparelli, pp. 20, 105–106). Later, the official calendars used in Israel and Judah were based on the same intercalary system used in Assyria (Segal, p. 256). The Babylonian system was a model for both the Hebrews and the Moslems (Goudsmit and Claiborne, p. 66). There is little certainty what the earliest calendars used in Syria-Palestine were. Local systems that were employed gave way to borrowed ones during periods of foreign domination (*New Catholic Ency.*, Vol. II, art. "Calendars of the Ancient Near East"). It is more likely that a luni-solar calendar similar to that of ancient Babylonia prevailed in ancient Israel (*Ency. Britannica*, New Ed., art. "Judaism").

Around 500 B.C. the phase relationship between the lunar and solar cycles was discovered—the cycle is referred to as the Metonic cycle, after Meton, a Greek astronomer, who may have brought it home from Babylon (Goudsmit and Claiborne, p. 59). Calculation of the lengths of daylight gives the ability to determine the solstices. It also makes it possible to compute the full length of the year with fair approximation. The equinoxes were of vital importance in the ancient calendars of Palestine and the Middle East (Segal, p. 263). Notice again, calendar solutions did not come about until after the seventh or eighth centuries B.C. Velikovsky makes a strong point when he asks why it took so long to solve astronomical problems if the solar system had never been disrupted?

What does the above information tell us? It tells us that the Hebrew calendar was no more or no less unusual than any other calendar used in that day in that part of the world. There was nothing more special about it than the Babylonian, Assyrian, Arabic, etc. calendars. The Hebrew calendar was the same calendar God had given to all of mankind. It was based, like all calendars were, on the revolution of the earth around the sun and the orbiting of the moon around the Earth. The only really significant thing about the Hebrew calendar was the fact that Holy Days were commanded on certain days of the year, a requirement not found on any of the other similar calendars.

The Calendar God Gave to Moses

Calendar dissidents insist we go back to the calendar God gave to Moses, but by now it should be obvious that *no one* knows the exact details of the calendar God gave to Moses. Those who contend they know "the calendar God gave to Moses" would do better to call it "the calendar *we think* God gave to Moses." Besides the change in the length of the solar year and lunar month, neither intercalation nor observation of the lunar crescent are even mentioned in the Bible. Yet calendar dissidents demand we reject the method of intercalation in the present Hebrew calendar and that we accept the only "legitimate" method of determining the new moon—observation, not calculation.

What do authoritative sources say about the ancient Hebrew calendar—the calendar God gave to Moses?

Notice the following—especially the emphases:

We have very little information regarding the calendar of the *ancient* Hebrews. It is very instructive to note the contrast between the poverty of our sources and *the abundance and wealth of details of theories* (Safrai and Stern, p. 834). Comparatively little is known of the calendar of the *early Israelites from the patriarchs to the Exile* (*The Zondervan Pictorial Bible Dictionary*, art. "Calendar"). The origin of the Jewish calendar can no longer be accurately traced (*Ency. Britannica*, New Ed., art. "Judaism"). Comparatively little is known about the calendar of the early Israelites *from the time of the patriarchs to the end of the period of the First Temple*. Twelve lunar months comes to only 354 days, so it became necessary to find some way of adding eleven days needed to make a complete solar year, but how this was done *is not indicated*. It is possible that an extra month was added every two or three years as is done in the present Jewish calendar. Jewish tradition says that Hezekiah made such an intercalation. Sometime later the names of the months were dropped and ordinal numbers substituted. Nothing further is known until near the end of the period of the Second Temple (*The Universal Jewish Encyclopedia*, art. "Calendar").

Many of the *technical aspects of the Hebrew calendar remain a mystery*, but it is known that lunar and solar cycles were reconciled in some manner as the Passover month always occurred at a specific season. This would have been impossible unless the calendar took the solar cycle into account (*Religious Holidays and Calendars*, p. 10). *There is no indication in the Old Testament of the way of fixing the beginning of the month*. When it was impossible to observe the new moon the days of each month were probably numbered from thirty to thirty (Schiaparelli, p. 103). As far as the Hebrew calendar is concerned, *one learns nothing from the Bible about the methods used for determining the beginning of the month*. It must be observed that there is inconclusive evidence from earlier Biblical literature regarding the year. Regarding the beginning of the year, later Judaism assigned the first day of the seventh month although Nisan continued to be the first month. The practice before the Exile is unclear while later there is evidence of both a spring and fall beginning (*The Anchor Bible Dict.*, Vol. I, art. "Calendars"). The difficulties regarding the *length of the Hebrew month and the mode by which it was calculated* are considerable due to the scantiness of data. No reliance can be placed on mere verbal arguments to prove the exact length of the month in historical times. As far as the solar month is concerned data are insufficient to form any decided opinion at all on the matter (*Cyclopedia of Biblical, Theological, and Ecclesiastical Literature*, by John McClintock and James Strong, art. "Month"). The Hebrew calendar with its strictly lunar base did not observe the equinox with any precision. In fact, *we have no details how they actually determined the month of Nisan* (*Empires of Time*, by Anthony F. Aveni, p. 115).

We have *no real evidence* that during the First Commonwealth (Israel prior to the Exile) *the regulation of the months was dependent upon the visual sighting of the moon*. It is doubtful that the knowledge of visual sighting and intercalation can be gleaned by a comparison with other cultures (Safrai and Stern, p. 838). It should come as no surprise that *the methods of intercalation are not mentioned in the Bible*. The Bible is the public record and holds no secrets the public should not know. The calendar, however, was the priestly prerogative and was guarded with jealous care. The secrets of intercalation were handed down by the Nesi'im from father to son and were not known outside the group of three to seven "wise men." The reason for the secrecy lies in the supreme importance of the calendar for the regular order of religious life (Segal, pp. 259–260). There is never an allusion to an intercalary month in the Old Testament. However, it is absolutely necessary to add a thirteenth month from time to time or the beginning of the year will be displaced and recede gradually around the whole circle of seasons (Schiaparelli, p. 124).

Regarding intercalation—the problems of the Hebrew calendar are still far from solution. *The scarcity of direct information from the Bible* is a leading reason much is not yet known. But there is no reason to suppose that calendar making among the Hebrews was different from their neighboring countries in which social and economic circumstances were similar (Segal, pp. 250–251). *Little is known of the procedure of determining the calendar up to the second century A.D.* when a description is given of the method of determining the beginning of the month (*Universal Jewish Ency.*, art. "Calendar"). It may be assumed that the ancient Israelites followed some sort of calendar (or calendars) but extant or Biblical sources do not reveal what their nature may have been. *No part of the Bible or Bible itself presents a full calendar*. Information has to be gleaned. The largest amount of Biblical calendrical data appears in documents written in the *exilic or postexilic periods* and the only complete calendar is found in the heretical *Book of Enoch* written in the third century B.C. (*The Anchor Bible Dict.*, art. "Calendars"). It does not follow that the Canaanite name months found in the Bible were lunar simply because the Hebrew word *yareah* is etymologically related to the noun for "moon" any more than it does that English-speaking people use lunar months because the word "month" is etymologically related to "moon." Bible literature written just before, during, and after the Exile provides many dates and calendrical hints but again *offers no systematic statement about the nature of the calendars employed in Judah* (ibid). The ancient term *yerah* meaning "month" derived from "moon" indicates the reasonableness of the assumption that the ancient Israelite calendar was luni-solar, similar to that of the Babylonians, although *we do not know the details of the methods of luni-solar harmonization and intercalation* (Safrai and Stern, p. 835).

The Pentecontad Calendar

Those who tout "the Calendar God gave to Moses" can go back for support only as far as the latter part of the Second Temple period and to the third and fourth centuries of the A.D. period. This is at least a thousand years after the time of Moses.

In addition to that, there are at least three or probably even four different calendars officially employed in Israel throughout its long history (Morgenstern, p. 35). At different periods of time the Israelites used different systems of months, one after another, and sometimes more than one at the same time (Schiaparelli, p. 104). The Pentecontad calendar, involving a sequence of fifty days, is believed to be the ancestor to the modern custom among the peasants of Palestine using a year of "seven fifties." It was found in Assyria, Babylonia, and ancient Israel. It was constructed on seven periods of seven weeks, with an added feast day at the end. The total year was 350 days with an added fifteen day period, making a total of 365 days. While some doubt this calendar was ever officially used in Israel (*The New Catholic Ency.*, Vol. II, art. "Calendars of the Ancient Near East"), the evidence is that it indeed was. Calendars of dominant powers were readily accepted by the vanquished, and Israel was a vanquished nation for long periods of time in its national history.

The most frequent use of the fifty day period is found in the Old Assyrian business documents (Lewy, p. 47). Israel was conquered and ruled by Assyria. The Pentecontad calendar found in the Old Assyrian texts was not restricted to Assyria. The Babylonian contemporaries did the same thing. A calendar using this division of the year was brought into the eastern Fertile Crescent by the Amorites which indicates its origin must have been in the west (*ibid*, pp. 75, 77). What is obvious is that the year was comprised of seven full pentecontads with a certain number of days added between two pentecontads in order to make up the full year. A pentecontad year contained 366 days (in Babylonia), seven pentecontads and a sixteen day period of intercalation. Later the Assyrians abandoned this Pentecontad calendar for the luni-solar system (*ibid*, pp. 49, 71).

Elisabeth Achelis is even more definite. She says that during the Mosaic period a radical change in the calendar came into effect. Pentecontad periods of fifty days were devised. Each period contained seven weeks of forty-nine days that included seven Sabbaths, with an extra fiftieth day as a special "offering to the Lord," always observed at the closing day of each pentecontad period. This calendar was in use for many centuries. Much later, during the Babylonian captivity, this pentecontad system was abandoned and a regular invariable seventh-day Sabbath was introduced with the Babylonian luni-solar calendar as its framework (Achelis, p. 87).

In Israel the intercalated periods of the Pentecontad calendar were divided into two separate periods and added at various times during the year. This Pentecontad calendar was in use for many centuries in Palestine. The Jews, however, suppressed the fiftieth day of each pentecontad in order to maintain the uninterrupted sequence of the Sabbath. The Pentecontad calendar must have been in use in the seventh and sixth centuries B.C. when the ancestors of the Jews described by Philo left their homeland for Egypt. Also, it is clear that in the year of the destruction of the First Temple the Pentecontad calendar was still in use in Jerusalem. The reform of the calendar was part of the post-exilic revival temple ritual and

the reformed calendar was already in use when the Second Temple was dedicated. Ezra's desire to reestablish the calendar used in the days of Joshua led to the destruction of the Pentecontad calendar (Lewy, pp. 84, 88, 106, 118, 124, 126, 143).

Hebrew Calendar Development

Calendar dissenters tell us that God's calendar is delineated in the Bible, that there is no evidence that God authorized the Jews to organize the calendar and to put their name on it. Dissenters insist the Bible contains sufficient information to determine the calendar. They tell us that those who speak in favor of the Jewish calendar replete with rules never cite any Biblical authority for those rules. According to them the calendar God gave to Moses is an empirical one, one that is based on collective human observation. Therefore, in calendar history the observation of the sun and moon was the only method used in the Biblical period.

Much of what is said in the above paragraph flies in the face of the historical record, as we have already seen demonstrated in this article. Let us examine further evidence in order to arrive at the truth.

As is the case with all other calendars, the Jewish calendar as now observed is the product of a long historical development (*Universal Jewish Ency.*, art. "Calendar"). Elisabeth Achelis tells us that at an early date the Hebrews added the concept of the Sabbath to the Canaanite solar calendar and at that period of time calendars were not too fixed or anchored. Changes were made to fit emergencies and the prevailing system could be freely altered (Achelis, pp. 86–87). There may have been frequent irregularities in establishing the exact date of individual new moons among the Israelites, but the total length of the twelve-month period is unlikely to have diverged to any appreciable degree (Segal, p. 272). The Mosaic Law did not institute the new moon festival; it was already found among the people and the Mosaic Law simply regulated it. Its origin is nowhere stated and it is referred to as "on your new moons ye shall offer." This presupposes its existence (McClintock and Strong, art. "New Moon").

The origin of the Hebrew calendar is assigned to the sons of Issachar, who are said to have pursued the study of astronomy. See I Chronicles 12:32 (*Ency. of Religion and Ethics*, art. "Calendar"). Of the three phases of supposed calendar evolution, it is believed the first was entirely empirical. The second phase involved observing the heavens for the heliacal (star) rising and setting. In the third phase, the calendar was fixed solely by computation of the mean synodic month and tropic year and no longer by observation (Segal, pp. 280–281). Is it possible to fix a time when these calendar developments took place? The answer is: No, as there is little material on which to base a conclusion. Regular intercalation which would secure seven embolismic (expanded, ie. intercalated) years in a nineteen year time

cycle, some maintain, could have been utilized in the early days of the kingdoms of Israel and Judah. Prognostication of the calendar had reached a high degree of perfection by the fifth century B.C.. There appears to be reason to suggest that computation alone was used in the sixth to fifth centuries B.C. While this may be entirely too early, Segal points out that certainly by the second century B.C. the Jews had acquired this proficiency and it was in use before the destruction of the Temple in 70 A.D. (ibid, pp. 281284). It seems entirely likely that at least from the time of Solomon and under the influence of Egypt and Phoenicia the calendar in Israel was a schematic solar calendar (Finegan, p. 37). Keep in mind there were long periods of time when Israel was apostate. It should not seem unlikely that a departure from the calendar used by Joshua did take place. This was the urgent aim of Ezra, to restore the calendar used by Joshua. Regardless of that, the present Hebrew calendar is a direct heir of ancient Babylonia just as the present Gregorian calendar is the direct heir of ancient Egypt (Achelis, p. 88). Remember, there was nothing special about the Hebrew calendar. It was, in effect, basically the same calendar in use throughout the world in its day. What made it unique was the commanded Holy Days not found on other calendars of its kind.

The command in Deuteronomy 16:1 calls for the Passover to fall in the spring, thus the Jewish lunar calendar presupposes a natural solar calendar like that used in most societies (*The Encyclopedia of Religion*, by Mircea Eliade, Vol. 8, p. 42). According to Jewish tradition, David is credited with fixing the moon's cycle at 29 days, 12 hours, and 793 parts (*Jewish Encyclopedia*, art. "New Moon, Blessing of"). This, of course, is unlikely and cannot be substantiated. Josephus states that Moses reckoned Nisan as the beginning of the year for everything relating to worship, but buying, selling, and other affairs were assigned the ancient order (*Antiquities of the Jews*, by Flavius Josephus, Book I, Chap. 3, Sec. 3).

The modern Nisan does not correspond to the ancient one. If the first month began with the new moon of March, as is commonly maintained, the climate of Palestine would not at that time of year permit the oblation of the barley sheaf that is ordered on the second day of the Paschal week (according to Jewish custom), nor could the harvest be completed before the Feast of Weeks. Josephus equates Nisan with the Macedonian Xanthicus, which corresponds to the early part of April. It is certain that in the time of Moses the "month of ears" could not have commenced before the first part of April. We must date their commencement one month later than is commonly done (McClintock and Strong, art., "Month").

The month names of the Hebrew calendar were common property among all the Semitic peoples in that part of the world. The four that are listed in the Bible may be called Canaanite month names. These are Abib, Ziv, Ethanim, and Bul. Two of these month names fall in the spring and two in the fall, corresponding to the time of the two equinoxes (Finegan, pp. 34–36). These four names demonstrate that long before the Exile the Hebrews carefully observed the seasons. The spring and fall festival were connected to the tropic year and intercalation was implicit in the customs and laws of the Hebrews before the Exile

(Segal, pp. 256–257). After the conquest of Canaan, the Canaanite names were used for month names until the building of the Temple. Then the months were called by ordinal numbers. After the return from the Exile, Babylonian names were used (Schiaparelli, p. 104). It can be concluded that as Palestine fell from the sway of Egypt to the control of Babylon that the Babylonian way of calendar reckoning was officially adopted in Palestine. While the Jewish calendar added second Adars only in years of intercalation, the result was the same as the Babylonian system which intercalated seven out of nineteen years (Finegan, p. 38). It is believed the Babylonian calendar influenced the Hebrew calendar because it was firmly established in the sixth century B.C. and there is no evidence the Hebrew calendar was clearly defined at this time (*Religious Holidays and Calendars*, p. 10). After the Babylonian exile a number of permanent and significant changes occurred in the Israelitish calendar (*New Catholic Ency.*, Vol. II, art. "Calendars of the Ancient Near East").

Historically, the Jewish calendar is the result of a long series of revisions and adjustments. While the evolution of this calendar has been studied extensively for many centuries, the historical material is often fragmentary and incomplete. The manner of inserting the thirteenth month, when called for, was a matter of slow and gradual development over a period of many years (Achelis, pp. 84–85). The seasons are at the very heart of the calendar. Their annual return is the foundation upon which an effective and orderly system must be built. Seasons are the foundation of time (*ibid*, p. 30). The month of Nisan with the Passover festival must occur in the spring, and the month of Tishri with its harvest festival must occur in the fall (*The Comprehensive Hebrew Calendar*, by Arthur Spier, p. 1). The custom of beginning the seventh month with the sound of the trumpet appears to show the inauguration of the civil year (Schiaparelli, p. 119). Talmudic literature debates whether Creation took place in Nisan or Tishri. For the purposes of dating, Tishri was chosen so that the New Year begins on the first of Tishri (Eliade, Vol. 8, p. 42). The Gezer calendar found in Palestine, going back to ancient times, demonstrates that at that time the year was reckoned as beginning in the fall and contained twelve months related to agriculture (Finegan, p. 34).

The Sabbatical year law with reference to sowing, reaping, and vintage during the same agricultural year refers to a year that could only begin in the fall. This is true also with the Year of Jubilee which began on the tenth day of the seventh month (Lev. 25:9) and lapsed from autumn to autumn. As noted, the numbering of months for religious purposes began in the spring (Schiaparelli, p. 120).

Intercalation, that is, adjusting the lunar cycle with the solar, was done before the establishment of the continuous calendar. Regular and periodic intercalation along definite rules probably occurred with the adoption of the "Metonic" cycle. The continuous calendar now in use, however, does not follow the Metonic cycle. Also, there have been a number of intercalary systems in operation (*Ency. of Religion and Ethics*, art. "Calendar"). What has taken place within the Jewish community is that the solar calendar (Gregorian) is used

ordinarily but the holidays are kept by the old lunar calendar. Calendar dates on the Gregorian calendar may vary each year, as intercalation takes place (Asimov, pp. 114–115). After the Exile until the institution of a regular calendar, the doctors and heads of the Synagogue utilized the methods adopted by the Babylonians and Syrians (Schiaparelli, p. 104). Both observation and intercalation were used throughout the period of the Second Temple (516 B.C. 70 A.D.) and for about three centuries after its destruction, as long as there was an independent Sanhedrin (Spier, p. 2). A special committee of the Sanhedrin had the mandate to regulate and balance the solar with the lunar year. The seasons were calculated on the basis of astronomical calculations that had been handed down as a tradition of old. The Council considered astronomical facts, religious requirements, and the natural conditions of the country (ibid, p. 1).

From the Jewish viewpoint, Judaism in the Middle Ages regarded itself as the direct and legitimate continuation of Judaism of ancient times. The tradition was that in Biblical times and following, the major courts were comprised of authorized, ordained judges whose chain of ordination went back to Joshua. This ordination was in force during Tannaitic times (80–200 A.D.) and well into the Talmudic period (220–500 A.D.). This authority was vested in the Patriarchate (Twersky, p. 41). Rabbi Akiba (first half of the second century) assigned three successive years as intercalary, which indicates that an intercalary cycle was not in use at that particular time (*Ency. of Religion and Ethics*, art. "Calendar"). The increasing despotism of Rome forced the Jews to determine the time of the new moons and feasts independently of eye witnesses. From about this time the sequence of months from Adar to Tishri must have been precisely laid down. And a fixed order of the festivals was sent to the Diaspora (dispersion) at this time (ibid). Keep in mind the Jews had been using calculations for a long time before this. As we shall see, it was no problem to shift to calculation as the method of calendar determination.

Roman persecution in the years 351–352 A.D. led to the crushing of a revolt by the Jews. Emperor Gallus and his commander Ursicinus destroyed many Jewish communities. New decrees were issued against the internal authority of the communities and against the observance of Judaism. The privileges of the nasi (the Sanhedrin head) as well as the freedom of the Sanhedrin were curtailed. The serious condition of the communities in Judea and the deterioration of the Sanhedrin center in Galilee led Hillel II to agree to limit the authority of the nasi and his functions with the proclamation of the new moon, the fixing of the festivals, and the intercalation of the year. Hillel II then published the various works which informed all Jews of the methods of the calendar. The Sanhedrin in Judea ceased to function or to maintain calendar experts. While Hillel II is credited with the present fixed calendar, it is the result of centuries of development, the aim to perfect a system of fixing the calendar (*Encyclopedia Judaica*, art. "Hillel"). It was not until Christianity became dominant and Christian rulers forbade the Jewish religious leadership to proclaim leap years or to communicate with the Diaspora that it was decided to abandon the method of official proclamation of the months and years and to fix the calendar in a permanent form. So, from

359 A.D. the calendar has been stabilized (*Universal Jewish Ency.*, art. "Calendar"). Because of intercalating a month in a certain year the calendar was long in confusion. (*The New Schaff-Herzog Encyclopedia*, art. "Synagogue"). Tradition credits Hillel II with enacting the present Jewish calendar which proved to be of incalculable value to the then living Jews and to future generations. The lunar cycle was equalized with the solar which made it possible to observe worldwide the Bible festivals. The cause of this act on behalf of Hillel II was the persecution under Constantius, who, following the tyranny of Hadrian, forbade holding meetings in order to determine intercalations. The fixing of the annual calendar became almost impossible. Yet, the entire Diaspora depended upon the calendar sanctioned by the Judean Sanhedrin. Danger had now threatened all communication as well as fixing the feasts. Hillel II determined to provide an authorized calendar for all times but by doing so cut the ties which had bound the scattered Jews to their mother country and to the patriarchate (*Jewish Ency.*, art. "Hillel II").

However, the tradition that Hillel II constructed the continuous calendar faces grave objections. The supposed calendar is never mentioned in the Talmud which received its final editing at the end of the fifth century A.D. In the early Talmudic age there are dates that cannot be reconciled with the regular calendar that is in use today. All the 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 in Babylonia around the seventh and eighth centuries A.D. (*Ency. of Religion and Ethics*, art. "Calendar"). The truth of the matter is that no one knows when the Hebrew calendar of today reached its final form. There are as many dates as there are ideas. Scholars contradict themselves in the matter constantly, a fact the reader should be aware of. Hillel is said to have sanctified all months in advance, and intercalated future leap years until such a time as a new, recognized Sanhedrin would be established in Israel (Spier, p. 2). Hillel II should get some credit for what was done, of course, but his full share is doubtful. Some of the elements of the calendar are from earlier times. Intercalation is claimed to be evident from the figures in Ezekiel 1:1; 3:15; 4:4–6 and 8:1 (*Ency. Judaica*, art. "Calendar").

The adoption of the fixed calendar, about the middle of the fourth century, made it possible for Jews everywhere to determine the first day of the month without using observation. The Jewish calendar is regarded to be the most brilliant achievement of its kind. During the time of Hillel II the system of intercalation was extremely accurate (*A Book of Jewish Concepts*, by Philip Birnbaum, p. 309). With the decline of the Sanhedrin, calendar matters were taken over by the Palestinian patriarchate (the official of the Jewish community under Roman rule) (*Ency. Britannica*, New Ed., art. "Judaism"). The fixing of the new moon and intercalary month were no longer necessary after the fourth century as interim Jewish scholars had learned the method of astronomical calculation and most probably had employed this knowledge at the time when the traditional fixation was still in vogue. When it became impossible to utilize the traditional method the astronomic calendar was adopted as the only method of fixation (Twersky, p. 42).

Hillel's calendar is not, in every detail, the calendar we have today, as the postponement rules were not yet fully developed, but the dates and duration of the festivals and length of months were firmly established (Segal, p. 307). So, the system of the fixed calendar was not yet developed until about A.D. 485 (Maimonides, Intro., p. xli). The argument has been made by calendar dissidents that the Hebrew calendar was made official long after the Bible was canonized, and that the methodology used for copying the Hebrew Scriptures has nothing to do with the Hebrew calendar. Those who hold to such a view think nothing of accepting the fact that Catholic bishops, whom they generally detest, were responsible for establishing the New Testament canon and that this formality was not completed until all of the churches accepted the New Testament writings at the end of the fourth century A.D. (*The Bible Handbook*, by Joseph Angus, p. 39). In addition, they have no qualms about accepting the Old Testament, now in use, when it was not given a final form until about 900 A.D. Its final form was the work of the Massoretes, textual critics of the first rank, who began their work around 500 A.D. and did not complete it until 900 to 1000 A.D. (*How We Got the Bible*, by Neil R. Lightfoot, p. 71). Dissidents may argue that there is no relationship between the Old and New Testaments and the calendar, but what the above demonstrates is that neither the Old nor New Testaments were finalized until well after the beginning of the A.D. period, and neither was the calendar.

Observation Versus Calculation

Calendar dissidents tell us the month begins with the observation of the crescent moon as is implied by the word *hodesh*, which means "brightly polished like a sword." Each new month, they say, is determined by the visible appearance of the new crescent of the moon in Palestine. They tell us that before the time of Kappippos (330 B.C.) astronomers were not able to predict the true conjunction of the moon and that there is uncertainty about the state of the moon if nothing is seen. That is why, they say, the only practical start of the month is something visible. This is because the synodic (moon) month varies. It is possible to have two thirty-day months or two twenty-nine-day months in a row, or three twenty-nine-day months in a row, or four or five thirty-day months in a row. So Israel, they tell us, did not know precisely when the new moon would occur. Calendar dissidents are in disagreement even among themselves. One accuses the others of idolatry for relying on the crescent moon as the beginning of the month. He says the crescent moon is often used as an idol. The true new moon, according to him, is when the sun's light strikes the face of the moon at an angle that makes the moon invisible on the earth, that is, at the conjunction.

In ancient times the beginning of the lunar cycle was defined as the moment, following a period of invisibility, the lunar crescent appeared briefly on the western horizon just after sunset. The length of the lunar month varies from 29.26 to 29.80 days and is never less than 29 days or more than 30 (*The Anchor Bible Dict.*, Vol. I, art. "Calendars"). So, the synodic month (named after Synods who determined the length of the month) is the interval between

two consecutive new moons. Its *average* duration is 29 days, 12 hours, 44 minutes, and 2.78 seconds (Degani, p. 158). This figure varies slightly from that given by other sources. As the moon moves around the Earth, there is one moment that it is exactly between the Earth and the sun. At that moment the Earth faces the dark side of the moon. For about a day before this moment the moon has not been visible from any point on the Earth and will remain invisible for about a day longer. This moment is called the *molad*, the birth of the moon. It is used (in the Hebrew calendar) as the official beginning and end point of the cycle of the moon (*Understanding the Jewish Calendar*, by Nathan Bushwick). So, each month the moon disappears and becomes invisible for about two days, or somewhat more or less. It then reappears in the evening in the west. From this day on, twenty-nine days were counted, and if the new crescent appeared on the night of the thirtieth day, this day was the first day of the new month. If it did not appear on that night, the thirtieth day would belong to the old month and the thirty-first day would be the first day of the new month (Maimonides, p. 3). The advance determination whether or not a month would have twenty-nine or thirty days was a complicated problem which was solved in Babylonian mathematical astronomy during the Seleucid period (*The Anchor Bible Dict.*, Vol. I, art. "Calendars"). While the thin crescent is often spoken of as "new," this is scientifically incorrect; the true new moon (called the conjunction) cannot be seen at all (*New Guide to the Moon*, by Patrick Moore, p. 45). The Old Testament practice was to announce the new moon only in the six months the feasts fell (*The New Schaff-Herzog Ency.*, art. "Synagogue"). The statements of the Talmudists are decisive as to *the practice in their time*, and in later times the commencement of the month was effected by strict rule. When one looks at the rule, there must have been uncertainty beforehand as to the exact day of the new moon. It not only depended upon the appearance of the moon but on the official announcement (McClintock and Strong, art. "Month"). Information regarding the Jewish calendar in the first century A.D. comes from rabbinic sources (Safrai and Stern, p. 843).

As far as the solar year is concerned, there are only four points that are usable to the calendar—the two solstices and two equinoxes. Dissidents "prove" the Bible speaks of the autumnal equinox by referring to Exodus 34:22 and to Ecclesiastes 1:5–6 for proof of the equinox and solstice. Perhaps so. The calendar, by its nature, must begin on a fixed day to which it returns every year. The fact is that neither the appearance of the barley crop in Palestine or the ingathering of the fruit points to any exact point of time. These periods vary from year to year and from locality to locality. The festivals in association with the harvests appear to be a matter of convenience, the principle consideration was the equinox (Segal, p. 256, 264). Especially so, when it is realized the seasons today are not the same as they were in the time of Moses. The Passover usually occurs at a point of time in the tropic year in which weather conditions are favorable for the pilgrimage (*ibid*, p. 286).

A regular intercalary cycle was introduced into the Babylonian calendar sometime after 500 B.C.. It is not known when the nineteen year cycle was first discovered, but it did become an official rule from 388 B.C. on. There are, however, two instances that place the

cycle as early as 497 B.C. and for this reason it is argued that it is to be dated in the fifth century B.C. (*The Anchor Bible Dict.*, Vol. I, art. "Calendars"). The Athenian Meton is given credit for discovering the nineteen year cycle which was adopted in Babylonia at about this time, perhaps independently (Safrai and Stern, p. 839). In the Hebrew calendar, the second Adar is intercalated just before Nisan in seven out of nineteen years like the Metonic cycle, but, as noted, the specific years in which it is added are not the same years as the Metonic cycle (*Religious Holidays and Calendars*, p. 12).

Getting back to the moon, the first visibility depends on a number of factors from month to month. Angular distance of the moon from the sun at the moment of observation, the height of the moon above the horizon, the moon's distance from the earth, and the degree of clarity of the atmosphere are all factors (Schiaparelli, p. 92). When we say the average length of a month is twenty-nine and one-half days this does not mean that the month is ever twenty-nine and one-half days in length. A month cannot contain a half day. Each day belongs to one month or the other. Twenty-nine and one-half days means that half the months have twenty-nine days and half thirty, the average length being twenty-nine and one-half days (Bushwick, p. 47). If the new moon has not been observed on the twenty-ninth day, the thirtieth automatically became Rosh Hodesh (New Moon), the beginning of the new month. Since the festivals falling in the month are counted from Rosh Hodesh, there was always some doubt as to which of two days would be the date of the festival (Eliade, Vol. 8, p. 42). As far as the new moon was concerned, the authorities acclaimed it as hallowed whether it appeared at its proper time or not. If it did not appear at its proper time they need not acclaim it as hallowed, since Heaven had already hallowed it (*The Mishna*, Rosh ha-Shanna, 2.7.0). If the New Moon Day was declared the thirty-first, even if the crescent had been observed on the night of the thirtieth, the declaration stood for it was not the observation of the new moon but the official pronouncement of the Mekuddas formula by the court (when it was pronounced "it is hallowed" in unison) which legally initiated the new month (Maimonides, p. 9). We are told that once fixed, the day of the New Moon remained valid even if it had been fixed under duress. Rosh ha Shana states, "If they have sanctified and afterwards the witnesses are found to be deliberately false, the sanctification is nevertheless valid" (Segal, p. 260).

Even after the examination of the witnesses had been concluded and only the formal proclamation "It is hallowed" lacking, the day just past *was not* considered the start of the month. It is thus clear that the thirtieth day of each month was of doubtful status because just before nightfall the court might perhaps proclaim that it really was the first of the month (Safrai and Stern, p. 847). If the court sanctified the new moon by inadvertence, mistake, or duress, the sanctification was valid and all were duty bound to observe the festival in accordance with the day in which the judges had sanctified the new crescent. Even though it was known the judges had erred, their decision was binding. For the Scripture states: "which ye shall proclaim" (Maimonides, p. 10). There are some traditions citing cases in which some rabbis expressed doubt as to the reliability of witnesses by whose testimony the

court had ruled the passing month deficient. If the Tosefta rules that "if they hallowed the new moon, and then the witnesses were found to have been in conspiracy, it is still hallowed; if they were forced to hallow it, or erred, whether deliberately or unwittingly, it is still hallowed" (Safrai and Stern, p. 848). Records from the closing years of the Second Temple tell us that the time of the new moon was fixed on the evidence of observers. This tells us that it was unknown beforehand whether the month was twenty-nine or thirty days. The regulation of the month was probably first in the hands of the priests and later the Sanhedrin (*Ency. of Religion and Ethics*, art. "Calendar"). Actually, the use of observers is no proof the authorities did not know when the month was to begin. The use of observers, as we shall see, became a mere formality. When the moon was not visible on account of clouds, the month was considered to commence on the morning of the day following the thirtieth (McClintock and Strong, art. "New Moon"). Owing to the weather, it was frequently impossible to observe the new moon (*Jewish Ency.*, art. "Calendar, History of").

The change from a one-day holiday to a two-day holiday took place among the Diaspora when it became obvious that the precise hour of the appearance of the new moon for the month of Tishri could not be always ascertained. If clouds filled the sky, there could be no witnesses to the appearance of the new moon. To be certain that Rosh Hashana (New Year's Day) would be celebrated on the correct day, the holiday was extended from a one-day affair to two days (Kolatch, p. 227). The two-day custom was the result of the uncertainty up to the very last moment when the witnesses would arrive or whether the court would sanctify either the thirtieth or the following day. As a result, both days were considered one "long day." (Spier, p. 12). The post-Talmudic reasoning for the two-day observance is that outside the holy land the extra festival day compensates for the lack of sanctity. The practice in the state of Israel is to keep only one day with the exception of Rosh Hashana (Eliade, p. 42).

Was observation alone the method of determining the new moon? How could the beginning of the month be determined if conditions did not permit the new moon to be observed? What becomes obvious is that observation *alone* could not be the basis for determining the new moon. What we have seen is that determination of the moon was dependent upon a number of factors and that it was rather a loosely arranged affair, that often not until the last minute was the day determined, and that it was often not possible for the Diaspora to know when the new moon would be declared. The Bible tells us God is not the author of confusion. Not to know until the last minute when the month is to begin, and to be unsure of the dates of the Holy Days within a given month does not lend itself to order and preparation. Maimonides tells us that the court did use mathematical operations and that if the members found that the new moon might be visible they were required to be in attendance at the court the whole of the thirtieth day to be on the watch for the arrival of witnesses. Scripture, Maimonides says, made it incumbent upon the court to determine by calculation whether or not the new moon might be visible, to examine witnesses, to sanctify the new moon, and to send out messengers (Maimonides, p. 5). Even at the time when

observation was the basis for determining the New Moon Day, the court ascertained by calculation, and with great precision, according to the methods of astronomers, the exact time of the conjunction of the moon with the sun in order to ascertain if the moon would be visible on the night of the thirtieth (*ibid*, p. 27).

One of the main reasons it was impossible to publish a Hebrew calendar was that the length of the month was not determined until the thirtieth day had arrived and the length of the year was generally not determined until the month of Adar. Bushwick's view is that of many people today, that God knew there would not always be a Sanhedrin so He gave principles by which the calendar could be calculated without making observations of the sun and moon (Bushwick, p. 52). What calendar dissidents either overlook or refuse to consider is that observation in determining the moon had serious defects. During certain periods of the year continuous rainfall might prevent the new moon from being observed until several days of the month had already passed. Witnesses might be overzealous and imagine they had seen the new moon too soon. Malicious witnesses might give false testimony. Community leaders, therefore, had to study astronomy in order to ascertain by means of calculation when the new moon should appear and thus be able to check up on the testimony of witnesses. Disputes arose between those who depended upon witnesses and those who used calculation. Eventually the calendar was determined entirely by calculation and the hearing of witnesses was merely retained in order to encourage individuals to carry out their religious duties (*Universal Jewish Encyclopedia*, art. "Calendar"). The tradition of watching for the new moon persisted long after astronomers had developed methods by which the appearance of the new moon could be predicted (*Religious Holidays and Calendars*, p. 5).

Originally the court was willing to accept the testimony of witnesses during the whole of the thirtieth day. But on one occasion no witnesses had arrived by late afternoon, so the authorities were embarrassed as what to do. They hesitated to sacrifice the afternoon burnt offering because the witnesses might yet come and it would then be impossible for them to offer the new moon sacrifice, as no sacrifice could be offered after the daily sacrifice. The court, therefore, enacted a law that evidence concerning the new moon would not be accepted after the time of the daily afternoon sacrifice. In that way enough time would be left to sacrifice the additional new moon sacrifice and the daily burnt offering and to perform the respective libations (Maimonides, p. 11). If the court had been sitting the entire thirtieth day and no witnesses had arrived and the court declared the old month to be full (that is, containing thirty days) but four or five days later witnesses arrived from a remote part of the country and testified they had seen the moon at the proper time, the court would try to intimidate them, or confuse them with questions, or annoy them with investigations, or examine the testimony minutely. In effect, the court would do its utmost to avoid sanctioning the new moon retroactively since the month was generally known to be declared full. If there was no way around it, the court had no choice but to sanctify the thirtieth day retrogressively and to readjust the counting (*ibid*, pp. 14–15).

If the court found that the barley crop was not yet ripe, though it had been ascertained by calculation that the spring equinox (*tekufah*) would fall on the sixteenth day of Nisan, even if the equinox took place prior to the sixteenth the court would intercalate so that the barley harvest would be available for the Wavesheaf offering on the sixteenth of Nisan (Maimonides, pp. 16–17). In other words, they would intercalate for the purpose of the Wavesheaf offering rather than abiding by the spring equinox. There were other grounds the court used for intercalating a year. If the roads were in bad shape and people could not travel, if the bridges were destroyed and river crossings dangerous, the year was intercalated in order to allow time to repair the bridges. If the ovens for the Paschal lambs were destroyed by rain, the year was intercalated in order to repair the ovens. Additional factors were if the kids and lambs had not yet been born or were too young, or if the pigeon squabs were still unfledged, intercalation was considered (*ibid*, pp. 17–18).

The books composed by the sages of Israel of the tribe of Issachar, which consisted of calendar calculations, have not come down to us, according to Maimonides (p. 73). Visual observation could never have regulated the calendar satisfactorily, if only because visibility of the new crescent might be impossible for many months (Maimonides, Intro., p. lvii). Calendar dissidents tell us that observation was the method used in Jesus' time, implying, of course, this is what we should do. They tell us that the Jewish calendar of today was not in use in Jesus' time or during the time of the apostles. Much of this flies in the face of the facts. Calculation was in use during the period of the Second Temple, certainly before and after the time of Christ. Obviously, He did not take issue with it, since we see Him keeping the feasts the same time the Jews did. Some aspects of the calendar were not in use in Jesus' day but the very fact that Jesus respected the calendar in His day shows He did not object to the operation of the Sanhedrin in this matter. Some would tell us Jesus taught His disciples to disobey some of the laws embodied in the tradition of the elders and that the scribes and Pharisees did not have the authority to annul any of the laws of Moses. That argument would be fine if we could prove *what* was the calendar God gave to Moses. But this is unprovable for a number of reasons, one of the main ones being that the solar system has been radically altered since the time of Moses and the year and month are not even the same length as they were then. The fixed calendar, we are told, is a part of the oral law Jesus condemned. Pray tell us, where did Jesus condemn the Hebrew calendar? The fact that Jesus said absolutely nothing about the calendar and observed the same days as the Jews clearly disproves that argument.

Because of adverse weather conditions or the like, the new crescent could remain invisible on the crucial eve of the thirtieth for a period of several months in succession. In such a case the court was empowered on the authority of the Mosaic tradition to guide itself by astronomical calculation and to have a full month (with thirty days) to be followed by a defective month (with twenty-nine days) or even to declare two months of thirty days or two months of twenty-nine days, but never to let the year include less than four or more than eight full months (Maimonides, Intro., p. xxviii). Stop for a moment and consider. Suppose

the court declared two defective months when in reality they were full. The month would be off two days. Suppose they declared two months full when they were defective. Again the month would be off two days. What if Holy Days were found in the months that were now two days off? Since the day-count of the month could be either ahead or late by two days the Holy Days would be observed at the wrong time according to Leviticus 23. What we see by this is that observation could be a very unreliable method to determine the beginning of months. We can hardly suppose that a strict rule of observation prevailed in early times, nor was it necessary. The recurrence of the new moon can be predicted with considerable accuracy by means of calculating the interval that would elapse either from the last new moon, from the full moon, or from the disappearance of the waning moon. Thus, David could announce, ". . . Behold, tomorrow is the new moon . . ." (I Sam. 20:5) though the new moon could not as yet be observed (McClintock and Strong, art. "Month"). Since the new moon was determined by the moon phase in the preceding evening, it is easy to believe in an early prediction for "tomorrow." At a much later time, sanctification of the new moon was subject to witnesses and only then accepted if their reports were not contrary to astronomical prediction (*Ency. Judaica*, art. "Calendar"). The argument that the incident in I Samuel 20:5 proves that the new moon could not be at the time of the moon's invisibility and that two successive festival days shows the Israelites lacked the ability to predict with certainty when the new moon would occur is not convincing. It could just as well prove that the early Israelites used methods other than observation to determine the new moon. Or, it could mean that if the year was 360 days long with consistent thirty day months it would be quite easy to forecast the new moon. The new moon festival is not found commanded in the Mosaic Law; rather, it was regulated. It was found to be an Egyptian custom and the two or three day festival period may well rest on a long established custom. One thing is certain, the fixation of the month in Temple times was determined on the basis of *both* calculation and observation (Birnbaum, p. 308), a fact you can be sure Jesus was aware of.

Calendar dissidents tell us the Talmud contradicts the principles of the current Jewish calendar, such things as fixed numbers of days of the month, postponement rules, the Metonic cycle, etc. What must be realized is that the Talmud is a collection of writings made up of the Mishna and the Gemara. The Mishna lays out the rules decided upon, the Gemara contains the various arguments leading up to the rules. Therefore what must be remembered when studying the Talmud to support various calendar arguments is that there are two opposing tendencies. It is certain the Jews of Palestine did employ calculation in their calendar reckonings and Chaim Bornstein assembled a great number of references of calendar calculation in the Talmud. But this is exactly what should have been expected. The Jews were surrounded by peoples who had used calculation for centuries. The two opposing tendencies in the Talmud must be examined separately. An official body was responsible for fixing the calendar by means of computation but it was the general public who watched for the lunar crescent (Segal, pp. 284–285).

Intercalation appears to have depended upon actual calculation of the relative lengths of the solar and lunar years which were handed down by tradition in the patriarchal family (*Jewish Ency.*, art. "Calendar, History of"). Calendar dissidents tell us that the thirteenth month was automatically added when it became necessary to keep the feasts within the agricultural harvest. Based on a remark by Rabbi Gamaliel in the first century A.D., scholars have assumed that the method of intercalation among the Jews was based on the observation of the state of the crops. The authorities supposedly inspected the barley in the early spring. If it appeared to be late in ripening, an extra month was intercalated. Segal says this view cannot be accepted. One of the main reasons is that it is highly improbable that a priest could, by looking at the green ears of corn, forecast exactly when they would ripen, and by relating this to the moon decide whether a month should be added. Another factor makes observation of the state of the barley crop a wholly impossible guide for intercalation. The country has such a variable climate that the grain never ripens on a uniform date. Even in a normal year the variation is as much as six weeks. While it is true the state of the crops was a motive for intercalation, the motive should not be confused with the method. The most likely method employed for intercalation was the heliacal rising and setting of certain fixed stars. This method is not only reliable but also precise because the length of the stellar year corresponds almost exactly to that of the tropic year. Observation of the stars was not confined to Egypt and Babylonia; it was widespread in the East and throughout the world. We need have little hesitation, Segal says, in ascribing this system to the Hebrews. Remember, the stars are directly connected with the method of calendar making (Segal, pp. 265–268). When the Israelites were dispersed throughout the various regions of the world far distant from one another, it became impractical to utilize the methods previously employed to determine the beginning of the year, such things as the ripening of corn. Those Jews dwelling in Babylonia could follow the computations of the Babylonians which had obviously been adapted to Jewish rules in a time period when sacrifices were not obligatory (Schiaparelli, p. 127). Also, intercalation, if needed, took place in the year preceding the Sabbatical year if the Sabbatical year required intercalation. The practice of declaring the year preceding the Sabbatical embolismic is clear proof that intercalation was by computation and not by observation of the crops that would ripen three months later (Segal, p. 302, fn). The prohibition forbidding the sowing of crops during the Sabbatical year would have been more burdensome had intercalation extended from twelve to thirteen months. It was not the practice, therefore, to declare the Sabbatical year embolismic. This move was to save the people from prolonged hardship due to food shortages. Not only was it customary to avoid intercalation during the Sabbatical year but also for the following year. Little of the produce remained in the year following the restrictions of the Sabbatical year and intercalation would further delay the use of new produce, which was permissible to use after the "Omer ceremony." Also, there was no intercalation in times of famine (*ibid*, p. 302).

Authorities have stated there is no example of intercalation in the Bible. Perhaps this is so. However, some scholars believe there is. Take a look at Jeroboam (I Kings 12:33).

The Bible says that his change of the Feast of Tabernacles to the eighth month was what he "devised." The feast was held in the eighth month in Israel instead of the seventh month in Judah. It is unlikely that the festival could have been openly challenged in opposition to the Bible command. Jeroboam's action can best be found in the intercalation of a month in that year. We can infer from the circumstances that the Israelites were already familiar with the deferment of a religious festival by one month and that the practice was not new. The phrase "which he had devised of his own heart" is used pejoratively. Some scholars maintain that Jeroboam convinced the people that the year was embolismic (intercalary). So, what is postulated is that on that particular year Jeroboam intercalated while the Jews in the northern kingdom did not. This method would certainly have been effective in keeping the Israelites in the northern kingdom from going to Judah to keep the feast (Segal, pp. 257–259). Keep in mind, however, if the solar system had not been altered in other ways before the eighth century B.C. (Jeroboam's reign was 100 years earlier) there would have been no need for any intercalation as the 360 day year would have been synchronized with the 30 day month.

The Jews in Babylonia were largely non-agricultural and were not subject to the stresses and restrictions of those in Palestine. It was only the Jews in Palestine who were able to judge when it might be necessary to insert an extra month into the calendar. The Jews of the Diaspora were permitted to observe two-day festivals rather than to be granted the right to compute the calendar (Segal, p. 304). There is support for the contention that the Jews knew of the 365¼ day year in the second century B.C. and at this same time the Jewish authorities had achieved precision in their computation of the luni-solar calendar. Certainly before the destruction of the Temple, the Jews were able to arrive at the computation of the equinoxes and solstices, and to be able to accurately forecast the time of the festivals (ibid, p. 301). This was the calendar in use during the time of Christ. It was the Jews in Babylonia who gave a definite basis for calculation. They were not only in possession of the exact fundamental principles concerning the motion of the sun and moon but also of the nineteen year cycle. They knew how to reduce to practicality the calculation of the new moon and the equinoxes (Schiaparelli, p. 129). Dissidents tell us that the modern Jewish calendar is based on the Metonic cycle and that since it was not discovered until 432 B.C., the Metonic cycle was not known to Moses who lived a thousand years earlier. It is true the Jewish calendar uses a nineteen year cycle but, to repeat, it is not the Metonic cycle. The years of intercalation are not the same as the Metonic cycle. Also, to repeat, no one knows what calendar God gave to Moses, and no one knows if an intercalary cycle was even required in the time of Moses. Calendar dissidents have taken for granted many erroneous assumptions and have reached many false conclusions.

In the period of the Amoraim (third to fifth centuries A.D.) in both Palestine and Babylon, we hear of increasing frequency of calculations and regulations for the calendar (*Ency. of Religion and Ethics*, art. "Calendar"). When the Sanhedrin ceased in Palestine the fixing of the New Moon Day and intercalating years was accomplished by such methods of calculation as we are using today (Maimonides, p. 22). Under the patriarchate of Judah III

(300–330 A.D.), the testimony of witnesses with regard to the appearance of the new moon was a mere formality, the settlement of the day depended entirely upon calculation (*Jewish Ency.*, art. "Calendar, History of"). In the course of time less and less evidence of observers and various methods of computation increased though the patriarchate through his council continued to fix the time of the new moon the old way (*Ency. of Religion and Ethics*, art. "Calendar"). The incidence of solstices and equinoxes was the primary element by which intercalation was decided among the Jews in the A.D. period. In the second century Rabbi Judah, the nasi, treated witnesses with studied indifference. He accepted evidence about the new crescent even from murderers and from those who testified only by hearsay. He proclaimed the new moon without waiting for its actual appearance, and did not hesitate to delegate his authority to a lesser rabbi. In the third century Rabbi Yohanan said, "One does not pay over-much attention to witnesses concerning the new moon." The reason being, of course, that computation was relied upon. But what should be realized is that the competence of Jewish authorities belongs to a much earlier age as is seen by the familiarity of the Jews in Elephantine (a Jewish colony in Egypt during the fifth century B.C.) with the calendar. We may assume their ability to determine the months was shared by their Jewish brothers in Palestine (Segal, pp. 288–289).

As far as the court was concerned, it had the authority to ascertain by calculation and to determine which year was to be calculated. It could do so whenever it pleased, even many years in advance. It might not, however, announce the intercalation of a year before the year began (Maimonides, p. 20). Why did the rabbis continue to encourage the people to make observations? This was the manner by which the public could be convinced that those who were computing the calendar and proclaiming it were not acting arbitrarily or disregarding the course of the seasonal year as well as the requirements of the nation (Segal, pp. 301, 304). Prior to publishing the calendar, many scattered Jewish communities appointed their own observers in order to determine the new moon. This situation generated so much strife and division because the beginning of the month varied from place to place. Hillel II recognized the potential problem, how destructive this would become, so he published the calendar rules. His decision has been hailed as one which helped preserve the Jewish faith. Jews completely isolated from one another have been able to maintain their unity and identity because of the common religious calendar and its observances. From the time of Hillel II until now, the Hebrew calendar has evolved into one of the most intricate systems of time reckoning (*Religious Holidays and Calendars*, p. 11). While modern calendar dissidents have been quick to criticize Hillel II for "compromising" with the Roman government, it was this act that prevented the calendar from being relegated to the bin of forgotten history. It is for that very reason calendar dissenters have various calendars of their own, albeit controversial in nature to the accepted Jewish calendar, with which to worship as they see fit. The accusation that Hillel was outside his authority and violated Deuteronomy 4:2 by adding to the word of God contradicts their main argument that the calendar is not even included in the oracles of God. So, what is all the fuss about?

Some calendar dissidents call for the return of the practice of both observation and calculation. What an exercise in futility! Had observation been exclusive there would have been no reason to change. As has been pointed out, it became an impossibility to properly direct the scattered Jews in keeping the Holy Days accurately. One dissident has an astronomical chart he has devised which shows "the proper time" to expect the new moon to arise in Jerusalem. So, what we should do, according to him, is to switch to his chart. Another dissident tells us when he could not understand the answer to various questions, he asked God and God gave him a series of replies. Among other things, God told this dissident what He had originally instructed Moses regarding various calendar matters. Historically, the Hebrew calendar became schematic and independent of what is considered by many to be the true new moon. The conjunction rather than the visible appearance of the crescent in the west, which is seen one or two days following the conjunction, is now regarded as the beginning of the month. This method is at least on time with the actual revolutions of the moon. And where is the Bible proof that God commanded observation as the method for determining the new moon? *There is not one single text that orders anyone to use the visible crescent as the monthly marker.* The system of observing the new moon became entirely impractical after the destruction of the Temple and the dispersion of the Jews. A central authority for proclaiming the new month could not adequately meet the needs of a widely scattered people (*Religious Holidays and Calendars*, p. 11).

The Postponement Rules

Dissidents tell us there is a severe condemnation in the Bible about tampering with the calendar, for example, such things as the postponement rules. The rules which delay the beginning of the year are the principle reason many object to the Hebrew calendar. We do not find them commanded in the Bible, but neither do we find any rule to establish a calendar based on observation. Dissidents generally disregard the Hebrew calendar as a part of the oracles of God. So, how can one be guilty of tampering with what is not an oracle from God? As far as the Hebrew calendar is concerned, for any particular month, the first day of the calendar may coincide with the new moon or it may be one or two days later. But what is the problem here? We have already seen that there was much flexibility in determining the new moon. That often it could not be observed and the month was determined arbitrarily. It did not take the Jews long to figure this out. As a whole, the operation of the calendar, even when observation was in vogue, was a rather loose affair. This principle can be readily seen. The number of days in a year can vary from 353 to 385 depending on whether or not a year is ordinary or embolismic. The first day of the month can fall on any day of the week, that day varying from year to year. The days of the week upon which the annual festivals fall vary from year to year despite the fixed date of the festival in the Jewish month (*Ency. Britannica*, New Ed., art. "Judaism").

We have seen that the solar system does not mesh, that there have been dramatic upheavals on the earth and in the solar system, that God is not the author of confusion, and that the solar system did not begin in a disordered manner. It is virtually impossible to harmonize the calendar without periodic adjustments. Some of the earliest calendar rules were not in force during the Mishnaic period (80–200 A.D.). Every Holy Day could fall on any day of the week, the Day of Atonement could fall on a Friday or Sunday, and the New Year could fall on a Sunday. These were excluded by later calendar rules (Safrai and Stern, pp. 849–850). At the root of the postponement rules is the fact that calculations are based on mean or average motion. For example, when the conjunction occurs Tuesday night, and the New Moon Day is postponed until Thursday, it frequently happens that the new crescent will not be visible even on Thursday or Friday nights (Maimonides, p. 33). Remember, it is possible for the moon to rise at very nearly the same time for several nights in a row, so this statement by Maimonides is not as strange as it may seem. The rule regarding the *molad* of Tishri (beginning of the seventh month) is that the conjunction of the moon and sun at the beginning of the seventh month must come before noon. If it comes at noon or later, the beginning of the month is postponed until the following day. This is because the new moon at sunset cannot be seen anywhere in the world with the unaided eye if the conjunction is so late in the day. If it occurs before noon it is possible to be seen somewhere on the earth, even though it cannot be seen in Palestine. It is therefore justifiable for the fixed calendar to assign Rosh Hashana (Feast of Trumpets) on the day of the *molad* as long as the *molad* occurs before noon (Bushwick, p. 80).

Dissidents tell us the ancient Pharisees required food preparation for two days if the Day of Atonement fell on a Friday. They say if God's word requires hardship and a burden on the Day of Atonement, so be it. But there were some very real reasons the calendar rules forbade Yom Kippur (Day of Atonement) falling on a Friday, Sunday, or Tuesday. Remember, with the present solar system it is impossible to properly mesh the Holy Days with the weekly Sabbath. The first feast day mentioned in Leviticus 23 is the weekly Sabbath. Should it be excluded from consideration when it comes to keeping the annual Holy Days? Should the annual Holy Days be observed at the expense of the weekly Sabbath? If Yom Kippur were to fall on a Friday, it would be impossible to prepare food for the Sabbath. If it were to fall on a Sunday, it would be impossible to properly prepare on the Sabbath for the Sunday fast. The only seemingly questionable postponement rule is forbidding Yom Kippur to fall on a Tuesday in order to prevent the last day of the Feast of Tabernacles from falling on the Sabbath. This rule was established to keep from interfering with the ceremony of striking a bunch of willows against the ground during the synagogue service as a symbol of casting off sins (Kolatch, p. 241). However, there is another consideration involved in this postponement as we shall presently see. An additional factor regarding the postponement rules for the Day of Atonement coming before or after the weekly Sabbath is that burying the dead is not done on the Sabbath. If Atonement precedes the Sabbath there would be no burial on that day and neither on the following day. The same is true if Atonement follows the Sabbath.

Rosh Hashana (Feast of Trumpets) is not permitted to fall on a Wednesday, Friday, or Sunday. The postponement rules were arranged so that the Holy Days would not interfere with the observance of the Sabbath and the observance of the Sabbath would not interfere with the Holy Days. If the Feast of Trumpets were to fall on a Wednesday, the Day of Atonement would fall on a Friday, thus making it impossible to properly prepare for the Sabbath. If the Feast of Trumpets were to fall on a Friday, the Day of Atonement would fall on a Sunday, which would allow no time during the weekly Sabbath to prepare for the Day of Atonement. If the Feast of Trumpets fell on a Sunday, the same problem regarding the beating of the willows on the weekly Sabbath would occur, as the last day of the Feast of Tabernacles would fall on the weekly Sabbath. This last rule would be a questionable postponement if this were the only consideration since Christians do not beat willows during Sabbath services. However, if Tishri 21, the last day of the Feast of Tabernacles, fell on the weekly Sabbath, the first day of the Feast of Tabernacles would fall on a Sunday. Preparation for the first high day would have to be done on the weekly Sabbath, which is forbidden on the Sabbath. So, overall, the rule forbidding the last day of the Feast of Tabernacles to fall on the weekly Sabbath does have Biblical authority.

Considering the postponement rules a principle surfaces. They reflect a reverence for *both* the weekly Sabbath and the annual Holy Days. Those who reject the calendar because of the postponement rules reflect the kind of a God they worship—one who is uncaring, unfeeling, who has no consideration even for His own law regarding the weekly Sabbath. This is not the God who has love and concern for His people. The solar system, as we have it today, requires calendar adjustments; this applies to the annual Sabbaths as well. Adjustments would be necessary for a calendar containing a 360 day year with 30 day months, as well as for a calendar containing a 365¼ day year with 29½ day months. The seven day cycle does not synchronize with any known calendar system, past or present. All calendar systems require adjustments in order to avoid the conflict between the weekly Sabbath and annual Holy Days. It will not be until the restoration of all things (Acts 3:21) that all of God's creation will be restored to its former perfection. This includes the solar system. God is well aware of the present problems regarding the calendar. For over forty years the Church of God of the last days followed the Hebrew calendar and was *blessed* for doing so. It was not until the prophetic failure of 1972 and the doctrinal changes of 1974–1975 that God's blessings were removed from His church. The apostasy that occurred at that time did not involve the calendar. The Bible speaks of only two major apostasies after the time of Christ—the one that occurred beginning in about the middle of the first century and continuing for three hundred years, and the one which is to occur shortly before the return of Christ. How many years was God's church blessed by obeying all of God's Law including observance of the annual Holy Days? The observance of these Holy Days was the result of adhering to the Hebrew calendar. Either we accept this calendar or we have no way of knowing what days are what. We will be in the same condition as calendar dissenters, hopelessly divided, disagreeing and arguing with one another.

The question is: Who received the calendar? Who was commissioned to proclaim God's Holy Days? It was the children of Israel, and specifically the priesthood. Following the Babylonian captivity, for six hundred years the Jews alone proclaimed the Holy Days. No other people on the face of the earth were fulfilling this command. Persecution eventually forced them to publish the calendar and to sanctify the Holy Days centuries in advance. Outside of some Sabbath-keeping groups, the Jews have been the ones who have continued this calendar. There is presently a movement among them to make some of the small corrections in order to adjust it again to meet the vicissitudes of the solar system. Calendar dissenters, who say the only logical calendar is the same one Jesus observed and that we must return to the calendar God gave to Moses, would do well to find out which calendar Jesus did observe and to recognize that it is impossible to know what calendar God gave to Moses. Since they say God was the one who created the calendar, follow it and let God work out the problems, we can expect them to be waiting for the problems to be "worked out" right up to the time Jesus Christ returns!

Bibliography

- Achelis, Elisabeth.
Of Time and the Calendar. First Edition. New York: Hermitage House, 1955.
- Angus, Joseph.
The Bible Handbook. Reprint. Grand Rapids, MI: Zondervan Publishing House, 1952.
- Asimov, Isaac PhD.
The Clock We Live On. London & New York: Abelard–Schuman, 1959.
- Aveni, Anthony F.
Empires of Time. New York: Basic Books, Inc., Publishers, 1989.
- Birnbaum, Philip.
A Book of Jewish Concepts. Revised Edition. New York: Hebrew Publishing Co., 1975.
- Bushwick, Rabbi Nathan.
Understanding the Jewish Calendar. New York, Jerusalem: Moznaim Publishing Corporation, 1989.
- Degani, Meir H.
Astronomy Made Simple. New Revised Edition. New York: Doubleday and Company, 1976.
- Encyclopedia Britannica*.
S.v. "Judaism." Vol. 15. Chicago: Encyclopedia Britannica, Inc., 1993.
- Encyclopedia Judaica*.
S.v. "Calendar." Vol. 5. Jerusalem: Keter Publishing House, 1972.
- Eliade, Mircea, ed.
The Encyclopedia of Religion. Vol. 3. New York: Macmillan Publishing Company, 1987.
- Finegan, Jack.
Handbook of Biblical Chronology. Princeton: Princeton University Press, 1964.
- Freedman, David N., ed.
S.v. "Calendars." In *The Anchor Bible Dictionary*. Vol. 1. New York: Doubleday, 1992.
- Gesenius.
Gesenius' Hebrew-Lexicon to the Old Testament. Translated by Samuel P. Tregelles. Michigan: Zondervan Publishing House, 1963.

Goudsmit, Samuel A., and Robert Claiborne.

"*Time*." Life Science Library. Virginia: Time Life Books, Inc., 1980.

Hastings, James, ed.

Dictionary of the Bible. New York: Charles Scribner's Sons, 1963.

_____.
Encyclopedia of Religion and Ethics. Vol 2. New York: Charles Scribner's Sons, 1909.

Jackson, Samuel Macauley, Charles C. Sherman, and George W. Gilmore, eds.

"Synagogue." In *The New Schaff-Herzog Encyclopedia of Religious Knowledge*. Vol. 11. New York & London: Funk and Wagnalls Company, 1911.

Josephus, Flavius.

The Works of Flavius Josephus. Translated by William Wiston. Philadelphia: David McKay Publishing, n.d.

Kelly, Aidan, Peter Dresser, and Linda M. Ross.

Religious Holidays and Calendars, An Encyclopaedic Handbook. Frederick G. Ruffner Jr., 1993.

Kolatch, Alfred J.

The Jewish Book of Why? New York: Jonathan David Publishers, Inc., 1981.

Landman, Isaac, ed.

The Universal Jewish Encyclopedia. Vol 2. New York: The Universal Jewish Encyclopedia Inc., 1940.

Lewy, Julius, and Hildegard.

"The Origin of the Week and the Oldest West Asiatic Calendar." In *Hebrew Union College Annual*, Vol. 17. Cincinnati: Hebrew Union College, 1943.

Lightfoot, Neil R.

How We Got the Bible. 7th printing. Grand Rapids, MI: Baker Bookhouse, Oct. 1972.

Maimonides, Moses ben.

"Sanctification of a New Moon." In *The Code of Maimonides*. Book 3. Introduction by Julian Obermann. New Haven: Yale University, 1956.

M'Clintock, John, and James Strong.

Cyclopedia of Biblical, Theological, and Ecclesiastical Literature. vols. New York: Harper and Brothers, Publishers, 1880.

Moore, Patrick.

New Guide to the Moon. New York: W.W. Norton and Company, 1976.

- Morgenstern, Julian.
 "The Calendar of the Book of Jubilees, Its Origin and Its Character." In *Vetus Testamentum*. Vol. 5. n.p., 1955.
- New Catholic Encyclopedia*.
 S.v. "Calendars of the Ancient Near East." Vol. 2. n.p., n.d.
- Parker, Richard A.
The Calendars of Ancient Egypt. No. 26. Chicago: University of Chicago Press, 1950.
- Price, George McReady.
Evolutionary Geology and the New Catastrophism. Mainview, CA: Pacific Press Publishing Associates, 1926.
- Safrai S., and M. Stern.
The Jewish People in the First Century. Vol. 2. Philadelphia: Fortress Press, 1976.
- Schiaparelli, G.
Astronomy in the Old Testament. Oxford: Clarendon Press, 1905.
- Segal, J.B.
 "Intercalation and the Hebrew Calendar." In *Vetus Testamentum*. Vol. 7. n.p., 1957.
- Shanks, Hershel, ed.
Christianity and Rabbinic Judaism. Washington, D.C.: Biblical Archeology Society, 1992.
- Spier, Arthur.
 "Historical Remarks on the Jewish Calendar." In *The Comprehensive Hebrew Calendar*. New York: Behrman House, 1952.
- Tenney, Merrill C., ed.
The Zondervan Pictorial Bible Dictionary. Michigan: Zondervan Publishing House, 1963.
- Twersky, Isadore, ed.
Studies in Medieval Jewish History and Literature. Cambridge: Harvard University Press, 1979.
- Wigoder, Geoffrey D., ed.
 S.v. "History of Calendar." In *The New Standard Jewish Encyclopedia*. New Revised Edition. New York: Facts on File, 1992.
- Wright, Lawrence.
Clockwork Man. New York: Horizon Press, 1968.

Velikovsky, Immanuel.

Earth in Upheaval. Garden City, NY: Doubleday and Co., 1955.

—————.

Worlds in Collision. New York: Doubleday and Co., 1950.

Index

- Aaron ben meir 3
Abib 22
Adar 3, 22, 24, 28, 30
Adjustments 11, 13, 23, 37, 38
Agricultural harvest (season) 2, 16, 23, 33, 34
Ahaz 10
Amoraim 34
Angular distance 28
Annual Holy Days Foreward 1, 4, 6, 23, 24, 37–39
Apogee 5
Appointed seasons 1
Appointed times 10
Arabs 16, 17
Assurbanipal 12
Assyrian year; see Year, Assyrian
Assyria(ns) 8, 13, 15–17, 19, 20
Astrologers 13
Astronomers 12, 16, 26, 29, 30
Astronomical changes 12
Astronomical chart 36
Astronomical facts 24
Astronomical observation 11, 13
Astronomical patterns 6
Astronomical prediction 32
Astronomical problem 15–17
Astronomical tables 3, 12, 16
Astronomical values 11
Astronomical works 8
Astronomy 15, 16, 21, 27, 30
Athenian 27
Atonement 12, 37, 38
Axis 9, 10
Axis of rotation 13
Babylon 2, 3, 16, 22, 34
Babylonia 2, 12, 14–16, 19–21, 25, 27, 33, 34
Babylonian year; see Year, Babylonian
Babylonians 2, 3, 8, 33, 39
Barley 22, 27, 31, 33
Bavaria 13
Book of Enoch 19
Brahmanas 8
Bul 22
Calculate 12, 18, 23, 30, 35
Calculation 3, 4, 13, 15–17, 23–26, 29–37
Calendar control; see Control, Calendar
Calendar, astronomical 3
Calendar, Babylonian 12, 14–17, 19, 20, 22, 27
Calendar, Gezer 23
Calendar, Gregorian 21, 23
Calendar, Hebrew 1–4, 6, 10, 17–19, 21–23, 25–27, 30, 31, 35, 36, 38, 39
Calendar, lunar 1, 2, 6, 14–16, 22, 23
Calendar, Muslim 6
Calendar, Pentecontad 19, 20
Calendar, solar 1, 2, 6, 15, 21–23
Calendars, dissidents Foreward, 17, 25, 26, 30–36
Canaanite 19, 21, 22
Canon 25, 26
Cataclysm 7
Catastrophe 7, 9
Chaim Bornstein 32
China (year); see Year, China
Clay tablets 11
Climate 6, 7, 10, 22, 33
Commissioned 4, 39
Conjunction 3, 15, 26, 27, 30, 36, 37
Constantius 24
Constellations 11, 14
Control, Calendar 2
Control, Political 2
Cosmic upheaval 14
Court 4, 24, 28–32, 35
Cycle 3, 6, 7, 15, 16, 18, 21–24, 26–28, 32, 34, 38
Daily sacrifice 30
David, Anan B.3
David, King 13, 22, 32
Diaspora 24, 25, 29, 34
Dissidents 26, 27, 34, 36, 37
Earth 5, 7, 9–11, 13–15, 17, 26, 28, 37, 39
Earth moved out of place 11, 14
Earthquake 10, 14
Eber Papyrus 8
Ecliptic 5, 12
Egypt 13–16, 20–22, 33, 35
Egyptian 6, 8, 15, 16, 32
Egyptian year; see Year, Egyptian
Eighteenth Dynasty 8
Elephantine 35
Elliptical 5
Embolismic 21, 33, 34, 36
Emperor Gallus 24
Equinoctial 12
Equinox 11, 12, 28, 27, 31
Equinoxes 1, 9, 12, 16, 22, 27, 34, 35
Essenes 1, 2
Ethaniam 22
Etruscan 13
Exile 17–19, 22, 23
Exilic period 19
Ezra 20, 21
Feast days 2, 19, 37
Feasts 1, 2, 10, 12, 24, 25, 27, 31, 33
Feasts of the Gentiles 2
Fertile Crescent 15, 20
First Commonwealth 18
First Temple 17, 20
Flood 7, 9, 14, 16
Galilee 24
Gaons 3
Gemara 32
Geneva 13
Geographical poles 13
Giuseppe Folgheraiter 13
Greeks 12, 13, 16

Gregorian (solar) 23
 Hadrian 24
 Hallstatt culture 13
 Hananiah; see Rabbi Hananiah
 Hebrews 16, 17, 19, 21, 22, 33
 Heliacal 21, 33
 Hellenistic culture 2
 Hezekiah 10, 13, 17
 High Priest 2
 Hillel II 24, 25, 35
 Hindu year; see Year, Hindu
 Hodesh 26, 28
 Hyksos 8
 Intercalate 2, 6, 7, 16, 20–22, 25, 28, 31, 33, 34
 Isaiah 10
 Israel 1, 4, 10, 16, 18–21, 25, 26, 29, 31, 34, 39
 Israelite 1, 7, 15, 17, 19, 21, 32–34
 Issachar 21, 31
 Jewish tradition 17, 22
 Jewry, Babylonian 2
 Jews, Babylonian 2, 3
 Jews, Palestinian 2, 3
 Josephus 22
 Joshua 10, 20, 21, 24
 Jubilee 23
 Jubilees, Book of 1, 2, 4
 Judah III 35
 Judaism 1, 3, 4, 18, 24, 25
 Kappippos 26
 Karaism 3
 Kepler 5
 Latitude 7
 Leap years 2, 24, 25
 Longitude 7
 Lunar Crescent 16, 17, 26, 32
 Lunar observation 2, 3
 Lunar-solar 4
 Luni-solar 14–16, 19, 20, 34
 Macedonian 16, 22
 Magnetic field 13
 Maimonides; see Bibliography
 Manetho 8
 Massorettes 26
 Mayan year; see Year, Mayan
 Mecca 6
 Mekuddas 28
 Meton 16, 27
 Metonic Cycle 16, 23, 28, 32, 34
 Middle Kingdom 8
 Midrashim 11
 Mishna 28, 32
 Mishnaic 37
 Moed 10
 Molad 27, 37
 Moon, crescent 5, 8, 15, 26–28, 31, 35–37
 Moon, cycle 22, 27
 Moon, festival 2, 8, 15, 21
 Moon, full 5, 32
 Moon, path 5
 Moon, phases 6, 12, 32
 Moon, velocity 5
 Moon, waning 32
 Mosaic Law 21, 32
 Moses 1, 4, 7, 11, 17, 19–20, 22, 27, 31, 34, 36, 39
 Mount Sinai 11
 Nesi'im 18
 New Moon 3, 5, 8, 12, 15, 17, 18, 21, 22, 24–30, 32, 34–37
 Nineteen-year cycle 3, 6, 15, 21, 22, 27, 34
 Nineveh 11, 12
 Nisan 11, 13, 18, 22, 23, 28, 31
 Numa 13
 Observation 1–3, 7, 11–13, 15, 17, 21, 23, 25, 26, 28–33, 35, 36
 Observers 29, 35
 Omer Ceremony 33
 Ophir 11
 Oracles 4, 36
 Oral Law 5, 31
 Orbit 5, 9, 17
 P.I. Mercanton 13
 Papyrus Anastasi IV 11
 Passover 3, 10, 13, 18, 22, 23, 27
 Patriarchal 33
 Patriarchate 2, 24, 25, 35
 Patriarchs 17
 Perfection 9, 10, 21, 38
 Perigee 5
 Persecution 24, 39
 Persian year; see Year, Persian
 Peru 13
 Pharisees 4, 31, 37
 Phases 6, 12, 16, 21, 32
 Philo 20
 Phoenicia 21
 Phoenician 16
 Planetary 11, 12
 Planets 5, 9, 12–14
 Pleiades 7, 14
 Postexilic period 19
 Postponement 4, 25, 32, 36–38
 Precession 9, 12
 Proclaim 24, 28, 35, 36, 39
 Qumran 1
 Rabbi Akiba 24
 Rabbi Gamalliel 33
 Rabbi Hananiah 2
 Rabbi Judah 35
 Rabbi Yohanan 35
 Rabbinates 3
 Rabbinical 11
 Reaping 23
 Revision 23
 Rites 6
 Roman 2, 13, 16, 24, 25, 35
 Roman year; see Year, Roman
 Romulus 8
 Rosh Ha Shana 28
 Rosh Hashana 29, 37, 38
 Rosh Hodesh 28
 Sa'adia B. Joseph 3
 Saasya B. Joseph Al-Fayyuma 3, 4

Sabbath 20, 21, 37–39
 Sabbatical year; see Year, Sabbatical
 Sages 5, 13, 31
 Sanhedrin 23–25, 29–31, 35
 Seasons 1, 2, 6–10, 15, 18, 22, 23, 27
 Second Temple 2, 17, 19, 20, 23, 29, 31
 Seleucid 27
 Semitic 22
 Seven-day week 6
 Seventh Century BC 7, 8, 12–15
 Shake the heavens 11
 Shebat 3
 Signs 10, 11, 16
 Simon I 2
 Sisera 10
 Solar, cycle 6, 16, 18, 23, 24
 Solar, eclipse 10
 Solar, month 18
 Solar, movements 11
 Solar, order 12
 Solar, year 6, 8, 13, 15–17, 23, 27, 33
 Solar system 5, 7, 9, 11, 14, 17, 31, 34, 37–39
 Solon 12, 13
 Solstice 1, 16, 27, 34, 35
 Solstitial 12
 South America (year); see Year, South America
 Sowing 23, 33
 Stars 10–12, 14, 15
 Star, gazing 3, 33
 Star, Heliacal 21, 33
 Stellar year; see Year, Stellar
 Sumerian 14
 Sun 5, 6, 9–12, 14, 15, 17, 21, 26–28, 30, 34, 37
 Sunday 37, 38
 Sun Rise 15
 Sunset 3, 15, 26, 37
 Synagogue 10, 23, 37
 Synchronize 34, 38
 Synodic (moon) month 21, 26
 Synods 26
 Syrians 16, 23
 Tabernacles 12, 34, 37, 38
 Talmud 11, 13, 25, 32
 Talmudic 3, 23–25, 29
 Talmudic Academy 3
 Talmudists 4, 27
 Tannaitic 24
 Tekufah 31
 Thales 12, 13
 Third Jewish Revolt 2
 Thirteenth month 16, 18, 23, 33
 Thirty-day month 26, 34, 38
 Three hundred–sixty-day year; see Year, 360 day
 Three hundred–sixty-five-day year; see Year, 365 day
 Timaeus 8
 Times 1, 7–10, 18, 23–26, 32
 Tishri 23, 24, 29, 37, 38
 Toltec 13
 Tosefta 28
 Tropic year; see Year, Tropic
 Trumpets 23, 37, 38
 Twenty-nine day month 22, 26, 38
 Upheaval 11, 14, 15, 37
 Ursicinus 24
 Uzziah 14
 Vedas 8
 Vintage 23
 Visual sighting 16, 18
 Wise Men 18
 Witness 24, 28–30, 32, 35
 Xanthicus 22
 Yareah 19
 Year, 360 day 7–9, 12, 32, 34, 38
 Year, 365 day 8, 9, 12, 13, 16, 19, 34, 38
 Year, Assyrian 8
 Year, astronomical 12
 Year, Babylonian 8
 Year, China 8
 Year, Egyptian 6, 8, 16
 Year, Hindu 8
 Year, Mayan 8
 Year, Persian 8
 Year, Roman 8
 Year, Sabbatical 23, 33
 Year, South America 8
 Year, stellar 33
 Year, tropic 15, 21, 22, 27, 33
 Yerah 19
 Ziv 22