SABBATH THOUGHT 2024-05-04—WHY I KEEP THE CALCULATED HEBREW CALENDAR

May God bless you on His Sabbath day!

God established the sun, moon, and stars "for signs and seasons, and for days and years" (Gen. 1:14). These celestial bodies determine the days, months, seasons, and years. All life on this earth is linked to them. The seasons of spring, summer, autumn, and winter determine when plants grow and produce seeds as well as when animals, fish, birds, and insects procreate. Mankind is tied to the life cycle of living things by solar year.

The rotation of the earth and its orbit around the sun establish two important time factors—the length of a day and a solar year. A third time factor is determined by the orbit of the moon around the earth. Tracking the movements of these celestial bodies is necessary to know when a holyday begins or when to plant and harvest. However, there is a problem correlating the days, months, and years. First of all, the solar year, which is 365.24 days (365 days, 5 hours, 48 minutes, and 46 seconds), is not a whole number of days. This is also true of lunar months. The cycle of the moon from new (dark) to full (fully lit) and back to new again is 29.53 solar days (29 days, 12 hours, 44 minutes, 2.8 seconds). Correlating the sun and moon using fractional days is completely impractical. Calendars that synchronize the sun and moon must do it using WHOLE numbers of days. To accomplish this, all calendars vary the number of days per month and the number of days or months per year, resulting in months and years with only whole numbers of days.

The Calculated Hebrew Calendar (CHC)[1] varies the number of *days* per month and the number *months* per year. It is the primary calendar of modern Jews who have used it for thousands of years (it did NOT, as some thought, originate with any modern Church of God). The CHC uses a sequence of 19 years in which there are twelve 'common' years and seven 'leap' years. Common years are 353, 354, or 355 days whereas leap years are 383, 384, or 385 days. This is because common years have twelve months and leap years have thirteen months. In addition, ten of the thirteen months have their number of days fixed. Months 1, 3, 5, 7, and 11 all have 30 days whereas months 2, 4, 6, 10, and 13 all have 29 days. The remaining months 8, 9, and 12 are either 29 or 30 days, depending upon when they occur within the 19-year cycle and whether or not it is a leap year. Of particular note is the fact that the days for the first seven months are fixed (29 or 30 days) for *all* years so the number of days between dates is always the same. Also, the alternating pattern of 29 and 30 days over the first seven months *almost* averages out to the 29.53 days of a lunar cycle. This is an important factor for the holydays since all occur in the first seven months.

If all this sounds complicated, it was initially. Reconciling a solar year of 365.24 days per year with lunar months that are 29.53 solar days took some doing.

[1] For more information, see the website article Calculated Hebrew Calendar Fundamentals.

However, the CHC takes care of all the complexity and produces years and months with whole numbers of days AND synchronizes the lunar months with solar years that determine the seasons for the life-cycle of plants, animals, fish, birds, and insects necessary for all life.

In the Bible, months begin on the new moons from which the dates of the holydays are set. As it says, "[God] appointed the [new] moon for seasons *[mowed = includes holydays]*..." (Ps. 104:19). Those who reject the CHC claim that this is only accomplished by actually *observing* the new moon. However, this is not a simple task. Observing the NEW moon is next to impossible since it only occurs during the daytime when its proximity to the sun makes it difficult if not impossible to see. This is a problem. How does anyone *observe* a new moon accurately or without going blind?

The length of a lunar month is approximately 29.53 days so there are about 14 days, 18 hours between the full and new moon, so the solution to knowing when the new moon occurs is to observe the full moon and count the number of days to the new moon. The advantage is that the full moon occurs at night.

Still, the new moon must be synchronized with the solar year; otherwise, how does someone know WHICH new moon is the beginning of a specific month such as Abib so Passover can be determined? In a given solar year (365.24 days), there are about 12.37 lunar months so the 'same' new moon next year lags behind about 10 days, 21 hours (10.9 days). For example, say the new moon is observed on March 15th. That same new moon next year is ~11 days earlier on March 4th. The following year it will be February 22nd. Obviously, that makes Passover way too early. To prevent this, someone must decide WHICH full moon to use for Abib as the months shift with respect to the solar year. But how does one decide which new moon correlates with Abib (Nisan)?

If the new moons and solar year are not synchronized, it is just a guess. This is why some tie the full moon observance to the season of the solar year by the ripening of barley green ears (the first month Abib means *green ears*). But that can be affected by weather variations. Simply put, spring can come 'early' or 'late' in the year. Synchronizing the solar year and lunar month with barley green ears that are affected by weather adds uncertainty. Even a delay of a few days in the barley at the wrong time could shift the Passover a whole month (as happened in 1999). The problem gets worse if locally grown barley is used. Barley grows differently depending upon latitude and hemisphere.

But that it not to say it is impossible. People use this method. The observed new moons for the holydays are often the same as the CHC, but there are also times when the observed dates occur a month earlier because of the different methods for synchronizing the solar year with the lunar month. A major concern with using barley to synchronize lunar months with the solar year is that it is not accurate over the decades, centuries, and millennia, unlike the CHC. Even so, keeping the months and year aligned is just as complex whether it is done with barley green ears or

with a calendar. (Note that it is even more difficult to synchronize the months and year by using the spring equinox.)

There are two MAJOR concerns with a barley 'calendar'. The first is that it never assures the solar year of 365.24 days averages out over a specific interval of time. Depending upon when the barley ripens, there could be too many or too few days per year across many decades or centuries before the solar year averages out. Also, that interval would vary. Everything is compounded when farmers in Israel disagree about WHEN the barley is ripe. Barley is impractical in so many ways, not the least of which is there can be no reliable record of HISTORICAL dates. For example, it would be impossible to know the Gregorian date of the crucifixion of Christ because no one knows the history of when the barley ripened. And this is not just a problem for modern times. How would the ancients know when Christ would come if the months and years were based upon barley crops? Without millennia of records of barley crops (and there are none) no one can know which are common or leap years. Reliable dates are only possible with a calendar such as the CHC. On the other hand, historical dates are easily tracked AND the accuracy of the 365.24-day solar year is *guaranteed* every 19 years with the CHC.

The other major concern is that before the advent of worldwide communication no one could find out when barley in Israel was ripe. That means it was impossible to know the correct date of Passover for thousands of years. Not everyone who kept it lived in the land of Israel. How did the Jews, Israelites (of the 'lost' 10 tribes), or gentile converts living outside of Israel know when to keep Passover? Or how did Jeremiah keep Passover when he was in Ireland? This is possible only with a calendar.

Is there proof for a calendar? Yes. God established the sun, moon, and stars for the PURPOSE of determining seasons, days, and years. I think all agree upon that. Did He expect this to be done by observation alone? If so, then why was Abraham skilled in both math and astronomy? Josephus (37-100 AD) wrote in chapter 8.2 of *Antiquities of the Jews*:

> "… **He *[Abraham]* communicated to them *[the Egyptians]* arithmetic, and delivered to them the science of astronomy**; for before Abram came into Egypt they were unacquainted with those parts of learning; for that science came from the Chaldeans *[Babylonians]* into Egypt, and from thence to the Greeks also."

Abraham taught math and astronomy to the Egyptians who then taught the Greeks. While knowledge of math and astronomy is not *proof* a calendar existed, the ability to create a calendar certainly existed as far back as Abraham (circa 2100 BC). Why else would history record that he was skilled in BOTH math and astronomy if he did not apply it to the workings of a calendar?

There is also archaeological evidence. The earliest is a Hebrew calendar from around 800 BC that existed before the Ten Tribes went into captivity! Why would there be a calendar in use at the time of the first Temple if the priests and Levites relied upon observation of the moon and barley green ears?

The ancients were well versed in astronomy. In 1900 divers found what is called the Antikythera mechanism. It is a Greek invention of Archimedes (287-212 BC) that predicts the movement of the sun, moon, and stars and accurately calculates eclipses. It is an ingenious device and incredibly precise. It proves the ancients mastered both astronomy and mathematics and made accurate calendars well before the time of Jesus Christ. Most amazing of all, the Antikythera mechanism was based upon a 19-year cycle calendar just like the CHC!

Perhaps the best proof that the ancients used calendars is the story of the flood. Recall that leap years in the CHC are 383, 384, or 385 days. That is much longer than a solar year and would be evidence of a calendar that uses a sequence of common and leap years—years with 12 months and years with 13 months—to average out to the 365.24 days of a true solar year. A year that is 383, 384, or 385 days would be irrefutable confirmation of a calendar similar to the CHC. And that very evidence exists in the biblical record of the Noachian flood circa 2350 BC! The story has amazing detail, including the date of the start of the flood as well as the duration of each stage—rain, prevailing water, abating water—in exact number of days. Why did God record all those details? I believe they prove a calendar similar to the CHC was being used during the days of Noah!

The story of the flood begins with, "In the six hundredth year of Noah's life, **in the second month, the seventeenth day of the month**, on that day all the fountains of the great deep were broken up, and the windows of heaven were opened." (Gen. 7:11) and "the **rain** was on the earth **forty days and forty nights**." (Gen. 7:12). From verse 24 we know that "the **waters prevailed** on the earth **one hundred and fifty days**." After the rain stopped, "the waters receded continually from the earth. **At the end of the hundred and fifty days the waters decreased.**" (Gen. 8:3). Finally, "it came to pass in the six hundred and first year *[of Noah]*, **in the first *month*, the first *day* of the month**, that **the waters were dried up** from the earth" (Gen. 8:13). The flood record is from the 17th day of the second month to the first day of the first month of the next year. How long was that year? Add up the numbers:

Gen 7:11	Abib (first month) 1 to Iyar (second month) 17 when the flood began.	46	Year 600 of Noah. Abib has 30 days plus 16 days into Iyar.
Gen 7:12	40 days and 40 nights of rain.	40	
Gen 7:24	Days waters prevailed on the earth.	150	
Gen 8:3	Days waters abated from the earth.	150	Year 601 of Noah, Abib (first month) 1.
Gen 8:13	First day of next year	-1	Abib 1 of the next year is not counted.
	TOTAL	**385**	

It is astounding that the year of the flood was 385 days, the exact number of days of a leap year in the CHC. A 385-day calendar year REQUIRES other years to be much shorter to stay aligned with the 365.24 days of a solar year—exactly the way the CHC works!

Astronomical knowledge of the sun, moon, and earth are crucial for any calendar to remain accurate over millennia but that information cannot be gathered over the lifespan of one man. The Antikythera mechanism of the third century BC was based upon ancient data of the celestial bodies. It was not possible for Archimedes to

record it over a few decades of his life. His calculator was the result of data recorded centuries prior.

The same is true with the CHC. The CHC was initially recorded in 358-359 AD by the Jewish patriarch Hillel II. Some argue it is a recent invention not approved by God. However, Hillel II was a member of the Sandedrin and a descendant of Gamaliel the Elder under whom Paul tutored (Acts 22:3). His credentials and lineage lend no small authority to his writings on the calendar, which he recorded to provide Jews in the diaspora the means to keep the holydays. It is important to understand that the data for his calendar predated his life. Hillel II could not have acquired the necessary knowledge within his lifetime—it had to exist long before he recorded in ~300 AD so it surely existed at the time of Christ and well before.

Given the complexity of the relationships between the earth, sun, and moon, it seems unlikely that God expects the holydays to be determined solely by observing the moon and barley crops. Moreover, a calendar like the CHC does *not* replace observation; it is simply the culmination of centuries of observations. Just as there are highly skilled mathematicians and astronomers today, the same was true in ancient times, Abraham being one. Above all, a calendar allows people ANYWHERE on earth to know when to keep the holydays without relying upon sources in Israel.

I believe that the Bible proves a form of the CHC was in use at the time of the flood and likely during the time of Abraham. Also, nowhere in the Bible is there a command to literally *observe* the new (or full) moon. The word for *observe* means to *guard* or *protect*, not look or see. Neither does the Bible forbid the use of any calendar. On the contrary, the CHC calendar uses the movements of the celestial bodies as its FOUNDATION, which ties the months the new moons as well as aligns the calendar years with the solar years so it is accurate over millennia.

To the Jews "were committed the oracles *[utterances, beyond what was written]* of God." (Rom. 3:2) and I believe that includes the CHC. History clearly shows a form of the CHC has been used for almost two thousand years and likely since the days of Noah. Whether by using the CHC or observance of the moon, all must decide how they determine the holydays and "... whatever *is* not from faith is sin." (Rom. 14:23).

May God's grace and peace be upon you!

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