Arnold C. Mendez, Sr. Sermon Title: Astronomy and the Bible Part 3: Calendar
Date and Location: CCTX 12-18-21, HTX 12-18-21.

Intro: Is the Hebrew calendar based on the sun or is the Hebrew calendar based on the moon? The answer is that the Hebrew calendar is a luni-solar calendar as such it is based on the revolution of the earth around the sun; the yearly cycle. And it is also based on the revolution of the moon around the earth; the lunar cycle or month.

Gen. 1:14 the Moon and the Sun were both used to calculate signs, season (festivals), days and years.

S.P.S. In this third part of our series of Astronomy and the Bible we will discuss how the moon in particular is tied to the Hebrew calendar. We will also look at how adjustments have to be made to it to make it align with the solar yearly cycle.

Review:
- Biblical Catastrophe: hayah = became, tohu/bohuw = formless, void, and waste.
- Sun, moon, and stars were appointed (asah) as markers for the festivals (mowed, not seasons)

1. ==There is not a specific Calendar mentioned but it does exist.==

The Calendar and Noah:
Gen. 7:11 Noah knew of a calendar, 600th year of Noah, 2nd month 17th day.
Gen. 7:25 waters prevailed 150 days.
Gen. 8:3-5 150 days mentioned, 7th month 17th day, 10th month 1st day.
Gen. 8:13 601st year of Noah, 1st month 1st day—2nd month 27th day.

How long were the months of Noah's calendar?
According to Genesis Chapter 7-8: How many days can occur between the 17th day of the 2nd month and the 17th day of the 7th month?

Gen 7:11 In the six hundredth year of Noah's life, in the <u>second month, the seventeenth day of that month</u>, on that day all the fountains of the great deep were broken up, and the windows of heaven were opened.
Gen 7:24 And the waters prevailed on the <u>earth one hundred and fifty days</u>.
Gen 8:3 And the water receded continually from earth. At the end of the <u>hundred and fifty days</u> the waters decreased.
Gen 8:4 The ark rested in the <u>seventh month, the seventeenth day of the month</u>, on the mountains of Ararat.

Therefore, the months used in the Noachian calendar were 30 days long, not the 29.53 days of our present calendar.

Ex. 12:2, 3, 6 Moses knew of a calendar.
Neh. 8:2 Nehemiah knew of a calendar.

2. What is a New Moon?

Astronomical New Moon
Astronomical New Moon is that precise moment in the moon's cycle when the earth, moon and sun line up with each other and it is impossible to see any illumination of the moon from the earth. This can be calculated precisely and is not subject to interpretation.

- Handout – show the position of an Astronomical/calculated new moon.

Observed New Moon
The Observed New Moon is
- Handout – show the position of an Observed new moon.

1Sam. 20:24 Saul feasts on the New Moon. Notice v. 18 it was common knowledge that the New Moon was the next day; this proves that during the time of the kings of Israel the New Moon was calculated and not observed.

Read Problems with observing the New Moon

- Handout – show the position of the new, full, partial solar/lunar, total solar/lunar eclipses. What to expect at the various Holy Days.

3. New moons used to determine months for the Holy Days

How accurate is the Hebrew and the Modern lunar calculations?

Read: Section-The Jewish Calendar. Essence of the Holy Days

Gen. 1:14 the moon and other astronomical bodies were created to help differentiate time. V. 14 seasons = mowed, Strong's 4150 means: appointed place, appointed time, appointed meeting, meeting, sacred season, set feast, appointed season, appointed sign or signal.

Lev. 23:2 "Speak to the children of Israel, and say to them: 'The feasts (mowed) of the LORD, which you shall proclaim to be holy convocations, these are My feasts (mowed)."

2 Chron. 2:4 Behold, I am building a temple for the name of the LORD my God, to dedicate it to Him, to burn before Him sweet incense, for the continual showbread, for the burnt offerings morning and evening, on the Sabbaths, on the New Moons (chodesh), and on the set feasts (mowed) of the LORD our God. This is an ordinance forever to Israel.
- Festivals and New Moons are different word.
New moons 02320 chodesh {kho'-desh}
from 02318; the new moon, month, monthly, the first day of the month. the lunar month

Lev. 23 the new moons are used to identify each Holy Day.
- V. 5 Passover-14th day after the NM.

- V. 6-8 DULB-15th day,--1st and 7th.
- V. 11 Wave sheaf and the count for Pentecost during the Sunday after the Sabbath during the DULB
- V. 24 Trumpets-1st day of the 7th NM.
- V. 27 Atonement-10 day after the NM.
- V. 34 First day of the FOT-15th day after the NM.
- V. 36 LGD-8th day after the first day of the FOT-22nd day after the NM.

The Molad ("birth") of Tishri is simply the 7th New Moon of the year. That is the New Year of the Hebrew Calendar.
- Lev. 23:2, 4 proclaim; qara means to "pronounce" or "publish."
- Now even though the Molad of Tishri was the New Year, 7 months were counted backwards to arrive at the first month from which the Holy Days in Leviticus 23 were determined. So, the New Moon(s) were important because they are what the holy days are based on.

Col. 2:16 The new moons are mentioned not because they are Sabbaths but because that what was used to calculate the annual Holy Days.

4. <mark>Differences in the solar year and the relation to the lunar cycle</mark>

The Hebrew calendar is a lunar-soli calendar. Muslims use a lunar calendar; Western world use a solar calendar. Without adjustments the solar year and the months would not be synchronized.
Example: In the Gregorian calendar normal years have 365 days, every year divisible by 4 has an extra day added on February 29th. This changes the calendar by one day on that year. No one complains that March 1st is moved. It is one of the rules of the calendar we use.
- Handout – Common Time Periods
Lunar month = 29.53059 days (average)
Solar year = 365 d, 6 h, 56 s or 365.257 days
12 lunar cycles = 29.53059 d X 12 = 354.37 d
Days in a solar year 365.257 d compare with 12 lunar cycles 354.37=10.887 d difference

- 19-year time cycle
Leap month added in seven of every 19 years. This includes 3rd, 6th, 8th, 11th, 14th, 17th, and 19th years have an extra month added to these years. This years with an extra month added are called intercalated years.

19-year time cycle = 12 years + 7 leap years
12 years of 12 lunar cycles = 12 X 354.37 = 4252.44 days
7 year of 13 lunar cycles = 7 X (354.37 + 29.53059) = 2687.30 days
19 year intercalated time period = 6939.744 days

365.257 days in a year X 19 years = 6939.883 days, A difference of about 6 minutes, to solve for this, adjustments are made over longer periods of time.

Since the lunar cycle is 29.53059 days long, Jewish calendar alternates between 30 and 29 days. Because of rules of postponements some months may have a day added or subtracted.

Read: Section-Full and Deficient Months. Essence of the Holy Days

Concl: In the book of Genesis the sun, moon and stars were used as markers for times or signs, for the festivals, for days, and for years. All calendars are based on an understanding of the times for the lunar, and solar cycles. Without the moon, the sun, and the stars it would be impossible to have a calendar. Without a calendar it would not be possible to worship God properly. In reality a functioning calendar is necessary for the church to exist, for us to keep the commandments and for us to inherit sonship with God.

In our next message in this series we will look at more details on how the astronomical bodies are tied to the Holy Days and the festival of God.

==Problems with observing the New Moon==

Lunar crescent visibility varies with weather conditions, clouds, atmospheric dust and clarity (especially in the westerly direction), temperature, humidity, nearby and westerly light pollution, and local elevation with unobstructed view of the horizon. Astronomically it depends on the apparent lunar size and brightness, elongation from Sun, and altitude above the horizon at sunset. Human factors include observer maturity, truthfulness, sanity, visual ability and stereoscopic perception, iris pigmentation and pupil diameter, experience and preparation, and the use of optical aids such as telescopes or binoculars.

It also helps a lot to know exactly when and where to look, and then to actually look at the correct position in the sky! When the new lunar crescent is very dim, it may be visible only to more light-sensitive peripheral vision, rather than the sharpest central color vision. In such cases, it might be seen only when one looks slightly askance of its position, then away, then back again.

WHEN would we observe new moons: based on when the new moons occur over Jerusalem, or based on when they occur locally at whatever location on Earth where we may happen to be? For example, the weekly Sabbath is observed based on the time at which the local sunset occurs. But the annual Sabbath days are typically observed based on when the new moon over Jerusalem occurs. So would we observe new moons "as they come to us" . . . with the result that people in different parts of the world would observe the new moons on different days of the Roman calendar? Or would all of us around the world observe new moons based on when they occur in Jerusalem?

The Day of Trumpets is a new moon day. So, if we were to observe new moons based on when they occur in our locality, then we would end up keeping the Day of Trumpets (and therefore also the Feast of Tabernacles) on different days from other people in different areas of the world.

==Section-The Jewish Calendar.==
==The Essence of the Holy Days-Insights from the Jewish Sages==
==by Avraham Yaakov Finkel pg. 141.==

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

Section-Full and Deficient Months
Essence of the Holy Days-Insights from the Jewish Sages
by Avraham Yaakov Finkel pg. 218.

Each month of the Jewish Year has approximately 29½ days. Because we count a month by full days and do not reckon half days, a system has been devised whereby the months are alternately 29 and 30 days. A 29-day month is called…deficient, and a 30-day month is called full.

The following rule applies: *Nisan, Sivan, Av, Tishri,* and *Shevat* are always full (30 days). *Iyar, Tamuz, Elul, Tevet,* and *Adar,* are always deficient (29 days).

In some years, *Cheshvan* and *Kislev* are both full months, in other years, both are deficient.

In an intercalated year, *Adar* I is full and *Adar* II is deficient.