

OUR NEAREST NEIGHBOR, PART II

By Walt Robinson,



Early astronomers studied the Moon's phases to calculate the calendar.

Since early times, the Moon has played an important role in the world's major religions. Many references to the Moon can be found in their scriptures and art. The moon also influenced the calendars that are still used today.

Christianity, which uses a "solar-lunar" calendar, chiefly uses



The date of Easter is based on the date of the Paschal Moon and the Vernal Equinox.

the Moon to determine the time at which Easter will occur. The strict conditions to determine the date for Easter are:

- Easter must be on a Sunday.
- This Sunday must follow the 14th day of the Paschal moon.
- The Paschal moon is the Full Moon that falls on, or next follows, the day of the Vernal Equinox.
- The Vernal Equinox is fixed on the calendar as March 21.

Easter can never occur before March 22 or later than April 25. The Christian calendar has no other events which are related to the moon, although the date of Easter is a focal

point for other Christian holy days, such as the beginning of Lent (period of fasting), Pentecost (descent of the Holy Spirit on the Apostles) and the Ascension (Christ's ascension into Heaven).

In the Islamic religion, the calendar is based on lunar months. The months begin when the thin crescent Moon is



Months of the Islamic calendar begin when the thin crescent Moon is first sighted in the western sky after a New Moon.

actually sighted in the western sky after sunset within a day or so after New Moon. The holy days of Ramadan and the two Eid festivals are based on such sightings. However, there is unreliability on the physical visibility of the moon, which leads to wide variations on the three important dates, even within the same country. This unreliability has at times caused disunity among the Islamic communities throughout the world. It has often been

considered to resolve this traditional method's variations with a purely scientific method.

The Qur'an makes no reference that the moon must be observed with the naked eye. There are actually many verses in the Qur'an encouraging the Islamic nations to ponder, think and explore to gain knowledge. The moon-sighting controversy should be no exception.

To favor the pure scientific method, several have looked at criteria and astronomical tables to develop a more reliable method. Professor Ilyas of Malaysia developed criteria, which depends on the moon's altitude and angular distance from the sun. If the altitude and azimuth meet certain criteria, then the moon is likely to be visible.

Dr. Monzur Ahmed has taken the scientific approach using Ilya's criteria and developed a computer program called Mooncalc. The program scans the criteria for the start of the lunar month and produces world maps showing where the crescent moon is to be first sighted. Mooncalc has many features other than this one. The software is freeware and can be downloaded from the Internet.



The Jewish calendar has been used since biblical times. It establishes the cycles of the Moon and the Sun. It is actually based on the Babylonian calendar. Jewish law



The Jewish calendar is based on the Babylonian calendar and follows the lunar cycle, but the months must also agree with the Sun's seasons.

traditionally prescribes that the months follow closely to the motion of the moon. The law also establishes that the lunar months must always follow the seasons of the year. For example, the month of Nisan, which includes the Passover festival, must always occur in the spring.

The early Babylonians discovered that if the calendar is only based on the moon, it would get quickly out of step with the seasons, which follow the cycle of the Sun. This is what happens in the Islamic calendar. So the Babylonians decided that since the seasons were governed by the Sun, that a Moon-Sun calendar should be adopted. By the 9th century BCE, after centuries of observations, Babylonian astronomers concluded that in a cycle of 19 years of 12 lunar months each, if you added 7 more months, you returned almost exactly to the same season. The Chinese already knew this and their calendar was based on the same system, known as the Metonic Cycle. The Metonic Cycle of 19 years uses the 3rd, 6th, 8th, 11th, 14th, 17th and 19th years as leap years.

The Jewish calendar therefore alternates between 29 and 30 days. Since using this method the calendar falls out of sync, the fall months of Cheshvan and Kislev are adjusted to take care of the discrepancies. The patriarch Hillel II introduced the Jewish calendar in its final form in 358–359 AD. If you follow the Jewish calendar, New Year's Day (Rosh Hashanah) fell on September 16, 2004, in the Jewish year 5765.

The Hindu calendar — up to 1957 — was a jumble of solar, lunar and luni-solar time frames. To make matters more confusing, some calendars started the month on new moon, while others started on the full moon, and all didn't agree when the New Year started! In 1957, the government stepped in and adopted basically the same rules that apply to the Gregorian calendar, which is a solar calendar (and the one we use). Their New Year was established on the vernal equinox, and the start of their zero year was set to be 78 CE (Common or Christian Era). It is now the year 2060 in the Hindu calendar.

The complicated Tibetan calendar, used in the Buddhist and

some other eastern religions, is based on lunar cycles. As the lunar cycle is less than 30 days, and the year is divided into 12 months, tricks are applied to compensate for the difference between the 12 moon cycles in approximately 354 days and the actual 365-something days of the year. For this, sometimes dates appear double or not at all. About every 30 months, like in early 2000, even a complete month was doubled for compensation. In the Tibetan calendar this is year 2130.



The complicated Tibetan calendar is also based on lunar cycles.

As we can see, the moon has played an important part in religions with regard to calendars and holy days. While there was never any moon worship — except in the pagan religions such as Wicca, which is still practiced today — the moon has always played a role in human culture. The moon's phases were the most important way of measuring time before other methods were developed, and still are in many cultures today. Since before ancient times people have watched the moon wax and wane and wondered at its beauty.

WHAT YEAR IS IT ANYWAY?

Jewish calendar	5765
Hindu calendar	2060
Islamic calendar	1425
Tibetan calendar	2130
Persain calendar	1383
Chinese calendar	4702
Indian National Calendar	1926

Many of the world's cultures have used the Moon as the basis for determining the months of their years. Several cultures still use the Moon or a combination of the Moon and the Sun for their calendar.



Walt Robinson has been a member of the Astronomical Society of Kansas City since 1987. His present duties include Webmaster for the society's Web site. He has presented many programs at the public nights at Powell Observatory and in Bonner Springs, Kan. where he lives.

Walt also runs the "Robinson Lunar Observatory" to spur interest in the moon among amateur astronomers. His recent "lunar light ray" program brought many amateurs together from across the United States and abroad to study and observe these events. An article written in the Astronomical League's Reflector explained the program, and as a result recruited many more interested amateurs into studying the moon.