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Deputy Prime Minister and Minister of Presidential Affairs

**Emirates Astronomical  
Society**

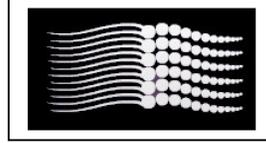


and

**Islamic Crescents'  
Observation Project**



In cooperation with  
**National Center for  
Documentation and Research**



**Organize**

## **The Second Emirates Astronomical Conference**

Role of Astronomy in the Islamic Society:  
Practical Applications to Islam, Education and Environment

**National Center for Documentation and Research  
Abu-Dhabi, United Arab Emirates  
16-18 Jumadal A'akhera 1431 AH, 30 May - 01 June 2010 CE**

**Phone: 00971-2-6663318**

**Fax: 00971-2-6212146**

**Address: P.O. Box 224 Abu-Dhabi, UAE**

**Conference Website: <http://www.icoproject.org/conf2.html>**

**Email: [conf@icoproject.org](mailto:conf@icoproject.org)**

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- Dr. Hanna Sabat (Jordan).
- Prof. Hasan Bilani (Saudi).
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- Mr. Mohammad Odeh (UAE).
- Dr. Mohibullah Durrani (USA).
- Mr. Sakher Abdullah (UAE).
- Dr. Saleh Al-Shidhani (Oman).
- AUASS Member
- AUASS Member

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## **Conference Themes and Topics**

### **1. Applications of Astronomy in Shari`a**

- a. Determination of Prayer Times (general case and special locations).
- b. Determination and Implementation of Qibla (direction to Mecca/Kaaba).
- c. Crescent observations and calculations: methods, criteria and instruments.
- d. Islamic calendar: current status and problems and perspectives.

## **2. Applications of Astronomy in Science and Education**

- a. History of Islamic Astronomy: contributions, scholars, methods and institutions.
- b. Astronomy in today's Muslim societies: basic education, higher education, research and accomplishments.
- c. Astronomical culture in today's Muslim societies: general status, associations, museums and perspectives of revitalization.
- d. Translation of (contemporary) Astronomical literature, website content and software.

## **3. Applications of Astronomy in Environment**

- a. Astronomy and Space Science serving the environment and monitoring potential or current problems.
- b. Astronomy and Space Science serving agricultural and water projects and problems.

## **4. ICOP**

- a. Presentation and discussion of the report on activities during the previous period (2007-2009).
- b. Presentation and discussion of the financial report during the previous period (2007-2009).
- c. Election of the members of the Administrative Board and of the main committees.
- d. Setting up a program for the next period (3 years).

## **Registration Fees**

- Registration fees: 400 Arab Emirates Dirham or its equivalent.
- Accompanying person fees: 300 Arab Emirates Dirham or its equivalent.
- The registration fees cover hotel accommodation, local transportation and food meals from 29 May to 02 June. Participants coming before this date or staying after this date are kindly requested to arrange their accommodation issues.
- The accommodation will be in Al-Manzel Hotel Apartments, which is rated as 5-star hotel. ([Al-Manzel Website](#)).
- The accommodation will be on a twin basis, where each two participants will share the same room.
- Registration fees should be paid through the conference website, and in case of encountering any difficulty in paying through the internet, then the participant should contact the organizing committee to arrange another alternative method.

## **Conference Location and Language**

- Conference languages are Arabic and English, with the support of direct translation between the two languages.
- The conference will be held in The National Center for Documentation and Research in Abu-Dhabi, UAE.

## **Instructions and Deadlines**

- The deadline to submit the registration application, passport copy and personal photo and to pay the registration fees: 20 April 2010.
- The deadline to submit the abstract: 15 March 2010.
- The deadline to submit the full paper: 05 April 2010.
- The deadline to notify the participant by the results of refereeing his/her paper by the scientific committee: 01 May 2010.
- The Registration Application should be filled through the conference website at: (<http://www.icoproject.org/conf2.html> ).
- An arrival and departure details form will be added later on to the conference website. This form contains the details of the travel (date, time and flight number). Thus, it is very important to fill this form in order to proceed with the airport receiving, hotel reservation and to include the talk of the participant in the conference program. The deadline to submit this form: 05 May 2010.
- Participants with Arabic papers are kindly requested to write their abstract in both; Arabic and English languages.
- Abstract should be sent as editable format (Word, Text, etc.).
- The conference papers will be published in a special book, knowing that we will not be able to publish the papers received after the deadline or papers not received in an editable format.
- All papers will be evaluated by the Scientific Committee and only accepted papers will be presented in the conference and will be published.
- We apologize to accept conference participation after the registration deadline.
- We apologize to accept papers after the paper submission deadline.
- We apologize to issue the Visa in case we don't receive a COLORED passport copy and a COLORED personal photo before the submission deadline.

## **Visa and Airport Transportation**

- The organizing committee will take the responsibility to get the visa for the participants from countries which require visa to enter the UAE, thus kindly provide us with a COLORED copy of your passport and a COLORED personal photo by email as soon as you confirm your participation in the conference, and the committee will provide the participant with a copy of the visa by email.
- Transportation from and to the airport will be arranged by the organizing committee for the participants coming to Abu-Dhabi airport only and for the participants who submit the confirmation participation form before 05 May 2010.

## **Video Recording and Satellite Broadcast**

- The conference activities will be recorded by video cameras.
- Arrangements will be done with Aljazeera Satellite Channel to record the conference activities, to be broadcast on Aljazeera Mubasher channel later on.

## **Correspondence**

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## **Astronomical and International Participating Organizations**

Some astronomical local and international organizations will participate in the conference. Below is a list of these organizations. This list will be frequently updated at the conference website.

### **\* Astronomical Organizations:-**

- Arab Agency for Astronomy and Space News
- Arab Union for Astronomy and Space Sciences (AUASS)
- Dubai Astronomy Group / UAE

### **\* Local and International Organizations:-**

- Aljazeera Satellite Channel
- Emirates of Abu Dhabi Judicial Department / UAE
- Organic Farm / UAE

# Jewish Calendar is Slowly Drifting Off Track

Feb 16th, 2010 | By [Melech ben Ya'aqov](#) | Category: [Featured Articles](#)

## If Trend Continues, Passover Will Be In May and Rosh Hodesh One Day Later

Concept by Bruce Brill

Written by Melech Ben Ya'aqov

*To start off this new era of Your Jerusalem, we have reprinted one of our favorite and most important articles from the "old" Your Jerusalem. The following article originally ran as the headline article in the February, 1999 edition of Your Jerusalem.*



Has the Jewish Calendar's expectation of Rosh Hodesh shifted? Photo of new moon visible just after sunset. (New moon, difficult to see, is inside circle.) Taken from Ein Karem, Jerusalem.

The Jewish calendar, laid out by Hillel II in the year 4119 (358 – 359 C.E.) and in use now for approximately 1,650 years, may have slowly drifted off track according to new research done by leading experts in the field of Biblical Astronomy. The drift is due to small discrepancies between the values of astronomical constants used by the Rabbinical sages and their corresponding values according to the latest NASA data. Compounded over many years, these small discrepancies seem to have resulted in meaningful shifts in the Jewish calendar.

The calendar has shifted both in its expectation of the time of the monthly *molad*, or New Moon, and its expectation of the date and time of the *tekufah*, or vernal equinox. The first shift means that Rosh Hodesh may fall a day later than the makers of the calendar seem to have intended; the second shift means that the festivals of Pesah, Biquirim (Shavuouth), and Sukkot now fall an average of 13 days later than the makers of the calendar seem to have intended.

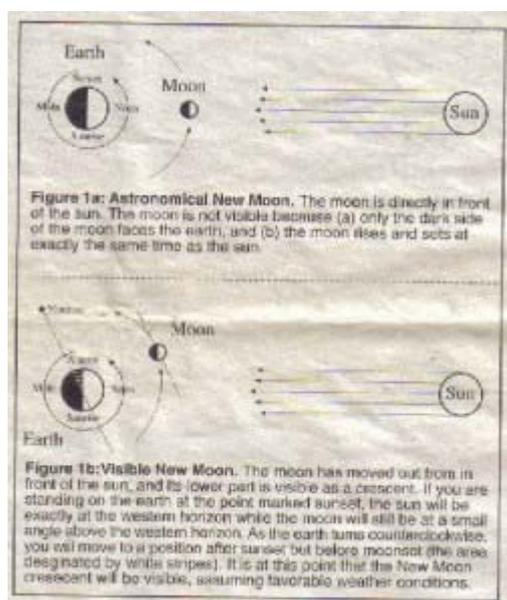
If the current trend continues, more and more Rashei Hodesh (New Months) will be declared a day later than intended and Pesah will slowly drift towards May, Biquirim (Shavuouth) towards August, and Sukkoth towards November. Opines Bruce Brill, who has done extensive research on the subject based on personal new moon sightings in Jerusalem, "The Jewish people need to celebrate feasts and fasts at the celestially correct times. ... The Jewish people are out of sync." Astronomer Robert Wadsworth of the Institute of Biblical Astronomy in Oregon City,

Oregon echoes this sentiment, "It is my strong opinion that the Jewish calendar has gotten out of sync from what was originally intended by its creators."

## ROSH HODESH SHIFT

Rosh Hodesh seems to have shifted, in some cases, to one day later than originally intended by the makers of the Jewish Calendar. This shift is due to a slight discrepancy in the value of the *synodic period* of the moon as determined by the Rabbinical sages and its corresponding value according to the latest NASA data.

The *synodic period* of the moon, known in layman's terms as the "month", is the exact time between one Astronomical New Moon and the next. The Astronomical New Moon occurs when the moon, revolving around the earth, is on exactly the same side of the earth as is the sun. [See Figure 1a] While the length of any given synodic period (month) can vary by up to +/- 0.7 days, the average synodic period, or average month, is constant over a period of many years, and is a crucial value in determining the calendar's "Rashei Hodesh", or New Months.



Reprinted from Your Jerusalem,  
Feb. 1999

The value used by the sages for the average synodic period is 29 days, 12 hours, 44 minutes and 1 "hayleq" (1/18 of a minute or 3 1/3 seconds). Translated into a decimal fraction, this value becomes 29.530594 days. According to the latest NASA data, the average synodic period of the moon is 29.530588 days, a difference of 6 millionths of a day, or translated into seconds, 0.5184 seconds. This means that, according to the value obtained by NASA, each month the Jewish calendar gains approximately an extra half second above and beyond what it should.

While half a second per month may seem insignificant, a simple calculation shows that, over time, it is not. If the Jewish calendar gains 0.5184 seconds per month, then each 12-month (regular) year it gains an extra 6.2208 seconds and each 13-month (leap) year it gains an extra 6.7392 seconds. Leap years in the Jewish calendar follow the rule, "7 leap years every 19 years." Then, another simple calculation shows that in the approximately 1650 years the Jewish calendar has been in use, there have been 608 leap years, while the remaining 1,042 years have been regular 12-month years. Thus over 1,650 years, the Jewish calendar has gained a total of  $608 * 6.7392 = 4,097$  seconds from leap years and a total of  $1,042 * 6.2208 = 6,482$  seconds from regular years, for a grand total of 10,579 seconds from both leap and regular years combined. Expressed in hours, 10,579 seconds comes out to be 2.94 hours.

The bottom line: the Jewish calendar is about 3 hours later in its expectation of the New Moon.

Based on the workings of the current Jewish calendar, this opens the possibility for many Rashei Hodesh to be declared a day late.

The process works as follows: In Hillel's calendar, the average synodic period fixes a monthly point in time which can be called the "Jewish (or Average) Molad". (The word *molad* comes from the Hebrew root for birth and means 'the birth of the new moon'. It is the Jewish Molad of Jerusalem which is announced in synagogues around the world on the Shabbath before every Rosh Hodesh.) Each month's Jewish Molad is a specific jump in time from the previous month's Jewish Molad. This jump? You guessed it — the average synodic period of the moon as reckoned by Hillel II: 29 days, 12 hours, 44 minutes and 1 "hayleq" (29.530594 days). Since this jump is a bit large, the calendar is inching forward each month.

Rosh Hodesh Tishrei, which in turn sets the Rashei Hodesh for the entire year, is based on the Jewish Molad of Tishrei; Rosh Hodesh Tishrei occurs on the same day as the Jewish Molad of Tishrei unless the Jewish Molad of Tishrei occurs past noon, in which case Rosh Hodesh Tishrei is pushed off by one day. The result of this pushing off by one day is that the rest of the months of the year are also pushed off by one day. (Partial corrections can be achieved by shortening Kislev.) Now we can understand why a three hour lateness in the calendar can make such a difference: more and more Jewish Molads of Tishrei will cross the noon line, and therefore more and more Rashei Hodesh of Tishrei will be pushed off by one day, resulting in the pushing off of the Rashei Hodesh for the entire year.

## SHIFT OF THE FESTIVALS

The Festivals seem to have shifted forward by an average of approximately 13 days over 1650 years. The shift is due to a slight discrepancy in the value of the solar year as determined by the sages and its value according to the latest NASA data.

The solar year is the exact time that it takes for the earth to make one revolution around the sun. The secular (Gregorian) calendar is based on the solar year, the latest value of which is given by NASA as 365 days, 5 hours, 48 minutes and 45.6 seconds. Hillel II figured it at 365 days and 6 hours, a surplus of 11 minutes, 14.4 seconds. Simple calculation shows that over a period of 1,650 years, this would cause the Jewish calendar to drift forward 12 days, 21 hours, 7 minutes and 12 seconds.

The bottom line: the Jewish calendar is an average of 13 days later in its expectation of any given date in the solar year.



Karaites, who until this day keep Rosh Hodesh according to actual observation of the moon, celebrate after viewing the

crescent new moon.

The current Jewish calendar, which is susceptible to drifts such as those described above, stands in strong contrast to the more flexible and self-correcting system, in use before, of fixing New Moons and Festivals based on human observation.

## ROSH HODESH IN THE GOOD OLD DAYS

In times before the calendar was codified, Rosh Hodesh (the New Month) began when 2 valid Jewish witnesses (ordinary citizens) from the Land of Israel sighted the crescent of the New Moon after it emerged from its position directly in front of the sun.

Sighting the New Moon is not as trivial a matter as it may seem at first glance (no pun intended): when the moon is located directly in front of the sun (at the time of the Astronomical New Moon), the dark side of the moon faces the earth and thus the moon is invisible from the earth. [See Figure 1a] In addition, since the sun and the moon are both at exactly the same direction from the earth, they rise and set at exactly the same time. This means that even if, hypothetically, the dark side of the moon were to be illuminated by some external light source other than the sun, the moon would still be invisible because whenever the moon is in the sky, the bright sun would also be in the sky, outshining the moon.

Rosh Hodesh begins when the New Moon emerges from its position in front of the sun. [See Figure 1b] This occurs 1 to 2 days after the Astronomical New Moon, and when it does, the situation has changed only slightly: (1) only a tiny portion of the light side of the moon faces the earth and the New Moon appears as a sliver; (2) the New Moon rises and sets only slightly later than the sun.

The bottom line: the only way to view the New Moon is to find its tiny crescent near the western horizon just after the sun sets (when the strong light of the sun no longer makes it impossible to see), and just before the moon sets (only about half an hour later). The observation is therefore difficult due to (1) time limitations (the moon is about to set), (2) position (the moon, about to set, will appear only a tiny angle above the western horizon), and (3) size (the moon is a tiny crescent).

If the New Moon was sighted by witnesses and the sighting was validated by the judges on the 30th day after the beginning of the previous month, then the judges declared the 30th day to be the first day of the New Month, or Rosh Hodesh. News of Rosh Hodesh was then transmitted by messenger and hilltop fire signal, and it was permitted even to violate the Sabbath in order to transmit this news. If two witnesses did not come or were not validated by the judges on the 30th day after the beginning of the previous month, then Rosh Hodesh would begin automatically on the 31st day after the previous Rosh Hodesh. Rosh Hodesh was considered a time of celebration and renewal. (The root of the word *hodesh* is *hadash*, or new.) Celebrations were common, and extra (*mussaf*) sacrifices were offered in the Holy Temple.)

## PESAH IN THE GOOD OLD DAYS

Just as Rosh Hodesh was not fixed in advance within the lunar cycle, but determined based on observation, so the Pesah (Passover) Festival was not fixed within the solar cycle (year), but was also determined based on observation. Though Pesah was always required to be on the 15th day of the First Month, ("On the 14th day of the first month towards the evening is the Lord's Passover. And on the 15th day of the same month is the Feast of Unleavened Bread." [Leviticus 23:5]), the First Month could be pushed off by one lunar cycle by adding a month to the previous year (making it a leap year.) This was done if certain signs that Spring had not yet come were present when the First Month was scheduled to begin. The signs were important because Passover is required to fall in the Spring: "This day you come out [of Egypt] in the month of the Spring. And it shall be when the Lord shall bring you into the land of the

Canaanites ... a land flowing with milk and honey, that you shall keep this service in this month.” [Exodus 13:4]

What signs needed to be present in order to postpone Passover for one month? The Babylonian Talmud provides its opinion in tractate Sanhedrin 11b: “A year may be made leap on three grounds: (1) on account of the premature state of the grain crops, (2) or that of the fruit trees, or (3) on account of the lateness of the *tekufah* [vernal equinox, or official start of Spring].”

The explanation is as follows: (1) Grains, especially barley, which ripen in early Spring in the Land of Israel, had to be ready in time to be brought to the Holy Temple for the Omer [First Fruits] offering on the second day of Pesah. [Leviticus 23:12]. This is because the Omer offering consisted of, among other things, flour made from barley. (2) It was preferable that the fruit trees be ripe in time for Biquirim (Shavuoth) 50 days later, when both another meal offering, “The New Meal Offering”, was brought to the Holy Temple as well as the “First Fruits Basket” [Deuteronomy 26:1]. (3) The previous year could be made leap if the vernal equinox (March 21 or 22 in the current secular calendar) occurred later than the first day of Passover. If it did, then Passover would occur in the Winter, which contradicted the injunction mentioned above that it fall in Spring.

It was not enough for one of these signs to be present in order to declare a Leap Year — at least two of them had to be present. If a Leap Year was indeed declared, then the month following the 12th month of the previous year (known now as Adar) became the 13th month of the previous year (Adar II) and not the 1st month of the New Year (now known as Nissan). Then, the month following the 13th month became the first month of the New Year.

## CONCLUSION

The old system, before the institution of the calendar, was a flexible and self-correcting system based on human observation of events which would never drift too far from their intended periods. When the Nation of Israel switched over to the fixed calendar, it became tied to numerical constants which, due to minute deviations from actual corresponding astronomical values, have been slowly dragging us “out of sync” over a period of many years.

The problem, then, is this: What does a nation, in this case the Nation of Israel, do when the laws it has set for itself begin to take it away from the natural timing and flow of the universe as laid down by God? This is the meaning of the opinions expressed earlier that the Jewish Nation is “out of sync.” Next month we will present to you the work of various individuals and groups who are currently attempting to solve this problem by changing back to the more authentic and more accurate system of celestial and terrestrial observation.

*Do you have any comments about this article, or do you see a grammatical or other print error? Please e-mail us at [comments@YourJerusalem.org](mailto:comments@YourJerusalem.org).*

**Tags:** [calendar](#), [karaites](#)

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