ספירים

סיוע לציבור, פסקי הלכה, רכיבים, מארעות ומדע
Updates for the cRc Kashrus Professional

Why Erev Pesach Rarely Occurs on Shabbos

The following is a transcript of a topic from a series of shiurim on the topic of zemanim delivered in Yeshiva Ner Yisroel (Baltimore, MD) by Rabbi Dovid Heber, a Kashrus Administrator at Star-K Kosher Certification.[1] Unless otherwise noted, most of the halachos cited in this article can be found in chapter 7 of Rambam, Hilchos Kiddush Hachodesh and/or in the summary at the end of volume 4 of Mishnah Berurah.

This year, 5768/2008, *Erev Pesach* will occur on *Shabbos*, which will bring with it an assortment of special halachos. Why is it that of the four days of the week *Erev Pesach* can possibly occur, *Shabbos* is the least common? Why is it that there are sometimes 20 years between one occurrence of *Erev Pesach* on *Shabbos* and the next?[2] To answer these questions, we have to probe a bit into the workings of the Jewish calendar.

For about the first 1,671 years of the Jewish nation's existence the Jewish calendar was written month by month, as witnesses reported the sighting of the new moon to the appropriate *Beis Din* which then declared the day of *Rosh Chodesh*. However, in anticipation of the Jews losing the rights to convene the required *Beis Din*, *Hillel* changed this procedure by establishing a perpetual calendar which began in the year 4119 (359 CE) and is set to last until *Moshiach* comes. *Hillel* established this calendar based on an intimate knowledge of astronomy which had been transmitted as an oral tradition from *Moshe Rabbeinu*, and Jews around the world all use this calendar until today. This tradition includes precise details on such items as the lengths of the revolutions of the earth and moon, and the *Torah* says that its accuracy "*demonstrates your wisdom to the nations of the world*".[3]

The calendar was established such that most of the year's arrangements depends on one primary decision –which day of the week is the first day of *Rosh Hashanah*. Once that and a few other items are decided, the rest of the year's calendar falls

into place. Among the features of the calendar are that there are always exactly 23 weeks and 3 days from *Erev Pesach* until the next *Rosh Hashanah*, such that for *Erev Pesach* to occur on *Shabbos* the next *Rosh Hashanah* must occur on a Tuesday.[4] Thus, the first clue to answering our questions is to realize that the reason *Erev Pesach* is so rarely on *Shabbos*, is that the cards are somehow stacked against *Rosh Hashanah* occurring on Tuesday.

Based on this, we can rephrase our questions to the following: 1) How is the day of *Rosh Hashanah* chosen and 2) Why shouldn't Tuesday be as likely as any other day? It turns out that there is one rule with four exceptions, known as *dechiyos*, that determines which day of the week is the first day of *Rosh Hashanah*.

The rule is that the first day of *Rosh Hashanah* is on the day when the *molad* of *Tishrei* occurs. The "*molad*" is the exact moment when the sun, earth and moon are aligned in a way that allows the sun to shine on the "new" moon for the very first time. The *molad* occurs with equal frequency of every day of the week, so that will not explain why *Rosh Hashanah* is rarely on Tuesday, and for that we have to turn to the exceptions.

There are 4 exceptions to the above rule. [Explanations for these exceptions are given in the footnote for those curious readers who are mathematically inclined].

1. *Rosh Hashanah* may only begin on Monday, Tuesday, Thursday, or *Shabbos*.[5] If the *molad* of *Tishrei* occurs on Sunday, Wednesday or Friday, *Rosh Hashanah* is pushed off to the next day.

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[1] CD's of the series are available for purchase from Rabbi Asher Shteierman at 410-358-1579. Rabbi Heber will soon publish a *sefer* on the topic of *zemanim* in Hebrew under the title *Sha'arei Zemanim*.
[2] Most recently, there were 20 year stretches between 5690 & 5710, and 5714 & 5734, and the next one will IY"H occur between 5785/2025 and 5805/2045.
[3] *Devarim* 4:6 as per *Gemara, Shabbos* 75a.

[4] This is because there are a fixed number of days in the months of *Nissan* through *Elul* (and most other months) (*Rambam* 8:5), and this gives rise to the mnemonic given in *Shulchan Aruch* 428:3 linking the days of the week of certain *Yomim Tovim*.
[5] This is well known by the acronym לא אד"ו ראש. The reason is that if *Rosh Hashanah* is on Sunday, *Hoshanah Rabbah* will be on *Shabbos* and people won't be able to fulfill the *minhag* to bang the *aravos*/*hoshanos* (*Gemara Succah* 43b). *Chazal* didn't want *Rosh Hashanah* to occur on Wednesday or Friday, because then *Yom Kippur* would be the day just before or after *Shabbos* (i.e. Friday or Sunday) and for two days in a row people wouldn't be able to cook or (even have non-Jews) bury people who died (*Gemara Rosh Hashanah* 20a).
  This exception has the largest impact on why *Rosh Hashanah* is least likely to occur on Tuesday, because it says that there is twice as much chance *Rosh Hashanah* will occur on each of the days other than on Tuesday.

2. If the *molad* occurs after noon of any day, *Rosh Hashanah* is on the next day.[6]

3. When the *molad* of *Tishrei* occurs on a Tuesday at the <u>beginning</u> of a (Jewish) non-leap year after about 3:15 AM, *Rosh Hashanah* is pushed off to Thursday.[7]

4. When the *molad* of *Tishrei* occurs on a Monday at the <u>end</u> of a (Jewish) leap year after about 9:30 AM, *Rosh Hashanah* is on Tuesday.[8]

According to these exceptions, we can now make two charts of when *Rosh Hashanah* will occur. The first will be for the 12 out of every 19 years that are not a Jewish leap year (or after a leap year for the 4th exception) and the second is for the other 7 years:

Day of Rosh Hashanah – 12 years out of 19

Molad is at or after…	…and before	*Rosh Hashanah* is on…	Hours of *molad*
Shabbos at noon	Monday at noon	Monday	48
Monday at noon	Tuesday at 3:15 AM	Tuesday	15.25
Tuesday at 3:15 AM	Thursday at noon	Thursday	56.75
Thursday at noon	*Shabbos* at noon	*Shabbos*	48

Day of Rosh Hashanah – 7 years out of 19

Molad is at or after…	…and before	*Rosh Hashanah* is on…	Hours of *molad*
Shabbos at noon	Monday at 9:30 AM	Monday	45.5
Monday at 9:30 AM	Tuesday at noon	Tuesday	26.5
Tuesday at noon	Thursday at noon	Thursday	48
Thursday at noon	*Shabbos* at noon	*Shabbos*	48

If we analyze these numbers, we will see that overall the average is that *Rosh Hashanah* occurs on Tuesday only 11.5% of the time, or just once every 9 years (and is just about evenly split between the other three days).[9]

So we now have the answer to our questions. *Erev Pesach* only occurs on *Shabbos* in years when *Rosh Hashanah* of the <u>next</u> year is on Tuesday, and a combination of exceptions contribute to that happening only once in 9 years.

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[6] This exception is known as *molad zakain*, and the reason for it depends on a *machlokes* between *Rashi* (*Rosh Hashanah* 20b s.v. *chaf daled*) who holds that the new moon is visible 6 hours after the *molad* and *Bal HaMaor* (ad loc.) who holds it isn't visible for 24 hours. According to *Rashi*, if the *molad* occurs after noon, witnesses in *Yerushalayim* couldn't possibly <u>see</u> the new moon before the day ended, and therefore *Rosh Hashanah* must be pushed off to the next day.

According to *Bal HaMaor*, even if the *molad* occurred long before noon, witnesses in *Yerushalayim* wouldn't see the new moon in time but witnesses someplace further west of *Yerushalayim* would be able to see it before the day ended in that location. If however, the *molad* occurs when it is noon of Monday (for example) in *Yerushalayim*, at the part of the world which is the furthest point west of *Yerushalayim* (i.e. 18 hours west, at the halachic dateline) it is sunset on Sunday night and "Monday" is just beginning. Even in that location the new moon won't be visible until Monday ends (i.e. 24 hours later) and therefore *Rosh Hashanah* must be pushed off to Tuesday because there is no place in the world where witnesses can possibly see the new moon on Monday. [For *molad* purposes, sunset is assumed to be at 6 PM every day of the year].

[7] This exception is known by the acronym ג"ט רד which means that if the *molad* occurs on Tuesday (ג), 9 hours (ט) and 204 *chalakim* (רד) after the day begins (at 6 PM) or later, *Rosh Hashanah* is pushed off to the next day (and since *Rosh Hashanah* cannot occur on Wednesday, it must be further pushed off until Thursday). There are 1,080 *chalakim* in an hour, so 9 hours and 204 *chalakim* into the day is equivalent to 6 *chalakim* (20 seconds) after 3:11 AM.

The reason for this exception is that after a non-leap year the *molad* of *Tishrei* is 50 weeks, 4 days, 8 hours and 876 *chalakim* after the *molad* of the previous *Tishrei*. [In *molad* shorthand, this is written as 4:8:876 or 8:876]. If so, if the *molad* of this *Tishrei* is at ג"ט רד or later and this year isn't a leap year, the *molad* of the next *Tishrei* will be at noon on *Shabbos* (because *Shabbos* is 4 days after Tuesday, and 9:204 plus 8:876 is exactly 18 hours after 6 PM, which is noon). Since the *molad* is at noon on *Shabbos*, *Rosh Hashanah* will be on Monday due to exception #2 and exception #1, which will mean the year will stretch for 356 days, (from a Tuesday to a Sunday). The longest a non-leap year can be is 355 days, and therefore *Rosh Hashanah* of the ג"ט רד year is pushed off until Thursday, which leaves the year as an acceptable 354 days long.

[8] This exception is known by the acronym בט"ו תקפט which means that if the *molad* occurs on Monday (ב), 15 hours (טו) and 589 *chalakim* (תקפט) after the day begins (at 6 PM) or later, *Rosh Hashanah* is pushed off to Tuesday. There are 1,080 *chalakim* in an hour, so 15 hours and 589 *chalakim* into the day is equivalent to 13 *chalakim* (43.3 seconds) after 9:32 AM.

The reason for this exception is that after a leap year, the *molad* of *Tishrei* is 54 weeks, 5 days, 21 hours and 589 *chalakim* after the *molad* of the previous *Tishrei*. If so, if the *molad* of the current *Tishrei* is at בט"ו תקפט or later and the previous year was a leap year, the *molad* of the <u>previous</u> *Tishrei* was at noon on a Tuesday (because Tuesday at 12:000 plus 5 days 21:589 equals Monday at 15:589). Since the *molad* of the previous *Tishrei* was at noon on Tuesday, *Rosh Hashanah* had to be on Thursday due to exception #2 and exception #1, which means that the year will be 382 days (from a Thursday to a Monday). The shortest a leap year can be is 383 days, and therefore *Rosh Hashanah* of the בט"ו תקפט year is pushed off until Tuesday, which leaves the <u>previous</u> year at 383 days long.

This exception – when the *molad* of *Tishrei* occurs between 9:32 AM and noon on a Monday after a leap year – is so rare that it has occurred less than a dozen times since 4119 and the very last occurrence before the year 6000 was just a few years ago in 5766/2005.

[9] For Tuesday, the calculation is as follows. Of the 3,192 hours when the *molad* of *Tishrei* can possibly occur in 19 years (168 hours in a week * 19 = 3,192), 368.5 of those hours ([15.25 * 12] + [26.5 * 7]) would cause *Rosh Hashanah* to be on Tuesday, and 368.5 is 11.5% of 3,192. A similar calculation for the other days in the week shows that *Rosh Hashanah* occurs on Monday 28% of the time, Thursday 31.9% and *Shabbos* 28.6%