



THE LUNI-SOLAR JEWISH CALENDAR

More complicated than its history is the calendar itself. Let's see how it works in principle.

A month is 29 days, 12 hours, and $793/1080$ th of an hour (about 44 minutes). Each month is assigned either 29 (defective) or 30 (full) days. Heshvan and Kislev can have either 29 or 30 days (see the chart on pg. 7).

In an ordinary lunar year there are 354 days ($12 \times 29\frac{1}{2}$). Because Rosh Hashanah must never fall on a Sunday, Wednesday, or Friday*, Heshvan and Kislev in the previous year are made either defective (29 days) or full (30 days), thus making the year either 353 or 355 days long. *(If Rosh Hashanah began on a Wednesday or Friday, Yom Kippur would fall on a Friday or Sunday. Since one may not cook on Shabbat there would be no way of preparing food for a Friday evening break-the-fast nor for a Saturday evening pre-fast meal; and one may not fast two days in a row. If Rosh Hashanah began on Sunday, then Hoshanah Rabbah would fall on a Saturday when, because of the prohibition to do work, it would be forbidden to wave the willow branches in celebration of the holiday).

Using the ordinary year of 354 days, how much longer is a normal solar year? _____

If nothing were done about this, the lunar calendar would fall out of phase with the sun by approximately 11 days each year. What is the problem? _____

After only three years, the lunar year would be 33 days behind the solar year. Sukot (which celebrates the fall harvest) would come too early for fall harvest, Shavuot would be too early for summer harvest, and Pesach would come too early for the corn and barley season. We simply could not celebrate our holidays in the proper season. In very early times, this was corrected by the priests who, at the end of Adar went into the fields. If the corn was not yet earing, they pronounced a leap month (Adar II) thus giving the harvest more time to ripen before Pesach. But a permanent calendar can not depend on observation, and so a system of leap-month years was calculated.

Adar II is intercalated (added) in the 3rd, 6th, 8th, 11th, 14th, 17th, and 19th years of each 19 year period of time. This 19 year circle with its 7 leap years is called the "little cycle" or *machzor katan* (מַחְזֹר קָטָן). Can you figure out the simple arithmetic which shows how seven 30 day months each 19 years will keep the lunar calendar in phase with the solar year?

There is just one more item to understand before we move on: the seasons. The Hebrew word for season is *tekufah* (תְּקוּפָה). According to the Hebrew Calendar, spring, summer, fall, and winter occur on the first day of the respective months Nisan, Tammuz, Tishre, and Tevet. Since the movements of the moon and sun do not depend on each other, a solar season is approximately $7\frac{1}{2}$ hours longer than a lunar season. It takes 28 years before the moon and sun seasons fall into exact phase with each other. ($7\frac{1}{2} \times 4$ [seasons per year] = 1 day 6 hours per year \times 28 [years] = 35 days or exactly 5 weeks. The sun and moon seasons will therefore occur on the same day of the week, the same time of day, only once every 28 years. That 28 year season-cycle is called the *machzor gadol* (מַחְזֹר גָּדוֹל) — the "great cycle".

The Best Way to Remember the Jewish Calendar

People have often protested about the awkwardness of the Gregorian (or is it the Julian?) calendar: Why *should* February have 28 days? Why does June have 30, when July has 31? Still, the calendar used by most of the world is a picnic compared with the Jewish calendar, which is based on both the moon *and* the sun. And inserting an extra month 7 times during each 19-year period makes the February 29th dilemma look like cake.

How, then, can Jews remember the Jewish calendar? By memorizing this deceptively simple, but eloquent, poem:

30 days hath *Tishre*, same as *Heshvan*, except the latter
sometimes has 29;

Kislev also can have 29 or 30, whereas *Tevet* always has
29.

Shevat, thanks God, has always 30, which doesn't help
Because *Adar*
Is totally confusing, both near and far.

Adar, you see, has 29 days,
But only during normal years.
When a leap year, *Adar One* has 30,
Moving many Jews to tears.

Adar Two, that extra month which comes seven years
Out of nineteen, that's clear,
Has 29 days, which is quite regular
And gives cause for lots of cheer.

Nisan, always 30 days,
Iyyar, always 29,
Sivan, also 30 days,
Which, to Jews, is always fine.

Tammuz? 29 of course.
Av is 30, just for show.
Elul 29, and, with *mazel*,
The Jewish calendar now you know!