Is a Dateline a Logical Necessity? The Halakhic View Less Often Quoted

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In seeking to establish a halakhic dateline, many rabbinic authorities take for granted that there must be such a dateline, and debate only the location of that demarcation. But is the dateline a logical necessity, or are there other ways to differentiate between days without the creation of an arbitrary construct? I will argue in this essay that the latter approach is more reasonable and is supported in halakhic literature.

The earliest reference to a dateline in halakhah occurred in the 12th century, by which time knowledge that the Earth was round, not flat, was widespread in the scholarly world.[1] During that century, Rav Yehudah ha-Levi (*Kuzari* 2:18-20) and later Rav Zerahyah ha-Levi (Ba'al ha-Maor *Rosh Hashanah* 20b) established where the day begins, both identifying the location at 270 degrees to the west of Jerusalem, or ninety degrees to its east.[2] Their source was the distinctive status that the *Bavli* in *Rosh Hashanah* 20b ascribes to twelve noon in Jerusalem.

The Talmud asserts that if the moon is "born" during the eighteen hours between 6PM and noon, that day can be declared Rosh Hodesh; if, however, the moon is "born" after noon, that day can no longer be declared Rosh Hodesh.[3] According to the interpretation of Rav

Zerahyah and Rav Yehudah ha-Levi, until noon there are still locations on earth (eighteen hours earlier than Jerusalem) where it is not yet 6PM local time and the day is yet to begin. Once noon has passed, that day has already begun everywhere on earth. Their claim is therefore that, for a day to be declared Rosh Hodesh, there must be some location on earth where Rosh Hodesh will last the entire 24-hour legal day, from 6PM to 6 PM (a phrase that occurs in the Talmud, although not necessarily with the explanation they propose).

There are multiple alternative interpretations of the gemara in *Rosh Hashanah* which support neither the existence of a dateline nor Rav Yehudah ha-Levi and Rav Zerahyah's position regarding its precise location. Nevertheless, this explanation marks the first explicit written reference in Jewish (and possibly all) literature to a dateline, well before the halakhic dispute that would become well-known (and increasingly practical) some 700 years later.

Where and by whom else such issues were discussed in the twelfth century is not entirely known. However, a few decades after Rav Zerahyah died, a somewhat more involved but related problem, the Circumnavigator's Paradox, was addressed in writing by the Syrian Abu 'l-Fida in his *Taqwīm al-Buldān* ("Geography"), and later by Nicole Oresme in his *Traitié de l'espere* and his *Quaestiones supra speram*, among other works. The Circumnavigator's Paradox is as follows: Two hypothetical travelers, Plato and Socrates, set out in opposite directions to make their way around the world, while a third friend, Petrus, stays home. Each has his own calendar, where he carefully marks off the passing days. Some years later, on a day that Petrus says is Saturday, Plato and Socrates return to their point of origin. Socrates, who has been traveling east, claims it is Sunday, while Plato, who has been traveling west, insists it is Friday.[4]

Consider what would have occurred had Plato and Socrates met halfway around the world: they would have reported days of the week one day apart. Had both converted to Judaism, Plato might have been preparing for Shabbat, while Socrates would have been finishing *seudah shelishit*.

The underlying principle addressing the Circumnavigator's Paradox is as follows: When Plato travels west, each of his days will be slightly longer, since he is traveling in the same direction as the sun. Similarly, when Socrates travels east, each of his days will be slightly shorter.[5] No matter which direction the traveler is going, east or west, when the discrepancies from all the days are added up it will total one day,[6] provided that he is moving at or below the rate at which the Earth revolves around the sun. In the modern era, one can imagine two planes traveling exactly at the speed of the Earth's rotation, one flying east and another west. If both planes depart from New York at noon and arrive back in New York exactly twenty-four hours later:

- those traveling west will have seen no sunset and could claim that the day is the same, despite twenty-four hours having passed, while

- those traveling east will have seen two sunsets and could claim that in twenty-four hours, two days have passed.

The circumnavigators of old experienced something similar, albeit at a much-reduced speed and during a significantly longer period of time.

How are we to resolve the fact that Plato, Socrates, and Petrus each think that it is a different day? Enter the dateline[7] along with its two accompanying operational principles:

1. pass over the dateline going west, advance to the next day, but
2. pass over the dateline going east, return to the previous day.

Plato and Socrates each passed the dateline exactly once when circumnavigating the globe. Thus, the problem of which day it is resolves easily: Socrates thinks it is Sunday, but crossing the dateline returns him to Saturday; Plato thinks it is Friday, but crossing the dateline advances him to Saturday. To those meeting halfway around the world, either one or the other crossed the dateline, or they are exactly at the dateline. In either case the problem is solved.

While the international community accepts the International Date Line at roughly the 180-degree longitude line, this is not the dateline accepted by almost all halakhic authorities. The most commonly quoted location of the halakhic dateline is that proposed by Hazon Ish (Rav Avraham Yehoshua Karelitz) in the early 1940s (in *Kunteres Yud Hes Sha'ot*), basing his opinion on Rav Yehudah ha-Levi and Rav Zerahyah.[8]

In addition to that dateline, two other halakhic datelines were proposed. Rav Yehiel Mikhel Tukatchinsky (in *Sefer Hayomam B'kadur* Ha'aretz) argued that given that rabbinic tradition states that Jerusalem sits at the top of the world, the dateline must be 180 degrees away in both directions. Rav Dovid Shapiro (*She'eilot u-Teshuvot Benei Tziyyon* 1:14), the least known of modern-day dateline proponents, cited an explicit *midrash*, which posits that as the fourth day came into existence and the sun and moon were placed into position, it was 9AM in Jerusalem. Ironically, his dateline falls 135 degrees to the east or 225 degrees to the west of Jerusalem, or neatly into the middle of the Pacific Ocean, and precisely between the other two views we have cited. After the slight update he made (*Benei Tziyyon* 2:10) to account for the period of *bein ha-shemashot* (twilight), moving the start of the day to end of the *bein ha-shemashot* period, his dateline conveniently fell within a few degrees of the International Date Line.[9]

But is the dateline just a useful construct that, in an elegant but arbitrary way, eliminates the complexities presented by a round Earth? Stated more precisely, is a dateline a logical necessity or just an expedient solution to some otherwise baffling situations? Given the dateline's recent role in our lives, perhaps it is possible for us to once more manage without such a notion. Could we instead let each individual's affinity to a particular location

determine what day of the week it is for him in non-halakhic contexts, and what *minhag ha-makom* is in halakhic contexts? Clearly, a secular dateline need not occupy a particular location, or in fact even be a line, as the current dateline demonstrates.

If the dateline is not a logical necessity, we face a more daunting task: to resolve the calendars of travelers such as those in the Circumnavigator's Paradox without use of a dateline or any equivalent concept. If that can be accomplished, something we will now demonstrate, the logical necessity of a dateline is eliminated.

As mentioned earlier, the conclusion of the Circumnavigator's Paradox is that advancing the day with each observed sunset works accurately (except in extreme latitudes) when stationary. However, the same result should not be expected when traveling, when an adjustment based on the direction of the journey must be introduced**.** A traveler from New York to Seattle is no different than one traveling to Beijing; the need to adjust to local time, if so desired, is not fundamentally different.

Logically, though perhaps not psychologically, *failing to maintain the same day of the week is not fundamentally different than failing to maintain the same clock time.* For this reason, there is no valid logical necessity for a dateline.[10] The discrepancies that follow from the Circumnavigator's Paradox require an explanation but not necessarily a dateline.

Those coming from opposite directions and meeting up halfway around the world should grasp why they are insisting that they are a day apart. Who is correct—neither or both? If both feel a strong affinity to the same location to their east or west, they can establish the day to be the same as where both their associations lie. When they both agree, all is resolved. If not, they could continue to maintain different days.

This is no different from the case of a New Yorker traveling to Seattle for an isolated meeting who needs to stay in contact with goings-on in New York, and therefore chooses to leave his watch on eastern time, versus one who is more concerned with his Seattle schedule, and chooses to change his watch to Pacific time. Neither choice is logically mandated. Our travelers meeting halfway around the world are not fundamentally different.

Similarly, a Habad *shaliah* living in western Alaska and about to start Shabbat might look across the Bering Straits and notice his colleague about to end Shabbat. It's possible that the two *shelihim* infer that their behavior implicitly places the dateline in the Bering Straits. Alternatively, though, the *shelihim* may realize that there is no logical basis for their observance; the difference in practice is because each *shaliah* maintains affinity to a different capital.

All in all, affinity to an area, not some overriding logic, is what matters. As we have witnessed recently, changes to the location of the dateline that affected Samoa and Tokelau were made to strengthen political affinities as opposed to because of an underlying rationale.[11]

Assuming the dateline were a logical necessity, one could then argue there must be a halakhic dateline as well, leading to the opinions discussed earlier. Of course, even if a dateline were not a logical necessity, a halakhic dateline might still exist. Given our conclusion that there is no logical need for a dateline, let us consider the halakhic positions of Rav Isser Zalman Meltzer and Rav Tzvi Pesah Frank.

Their positions and those of several others[12] are equivalent to the following formulation: Setting Jerusalem as the focal point of the earth, imagine communities are being formed by those traveling either to the west or to the east. Those going east experience sunrise and sunset a little earlier each day. As they travel further and further east, their day begins earlier and earlier than that day in Israel. For those going west, the opposite occurs. Shabbat starts in Europe a few hours later than Israel, while in Bangkok it starts many hours earlier.

What about New Zealand or Hawaii? Whoever arrives there first establishes the day of the week. Thus, if the eastern travelers arrive first, Shabbat would start earlier, whereas if the western travelers arrive first, Shabbat would start later. What would we do if those coming from the east and the west arrive simultaneously? Rabbis can apply known halakhic principles to adjudicate.[13]

What if there was a previous Jewish community at that location, with an established custom *(minhag ha-makom)* that was unfortunately lost to history? Considering that it is communities, not geography, which determine Shabbat, we only care about how the current Jewish community was established.

Certainly, difficulties arise for this radically different view that does not depend on the existence of a dateline. Had there been a Jewish community in Anchorage during the Seward purchase of Alaska from Russia, when last week's Shabbat became this week's Friday, ongoing religious life for the community might have raised significant halakhic problems, but a dateline would not have been a necessary solution.[14]

For those insisting on a halakhic dateline, on the other hand, the details can become a bit convoluted. If I am standing slightly to the east of any halakhic dateline, can I make Kiddush Friday night, enjoy my *seudah*, and then walk to the west, cross the dateline, and recite Havdalah? Can I walk back the other way and enjoy a Shabbat lunch? Though some *poskim* were (surprisingly) willing to grant such a reality, Hazon Ish avoided it by inventing the notion of "being pulled" to the side that is closest to Israel.

For example, Hazon Ish's 270/90-degree dateline cuts through China and Australia, but all of Australia is pulled towards Perth and all of China is pulled towards its western provinces. If one were to move out into Japan, New Zealand, or the Philippines, however, regardless of natural affinities or Jewish migrations, Hazon Ish would consider him/her to be on the other side of the dateline with no mechanism of sufficient strength for being "pulled back."

This was a major point of controversy for the Jews in Kobe, Japan at the time of the adoption of the International Date Line. Along these lines, some *poskim* have expressed concern for those swimming off the eastern coast of the Asian or Australian mainland or flying east on Motzei Shabbat or Sunday from either continent. [Though certainly a logical possibility, I find these concerns over those swimming hard to fathom.] Note as well that based on Rav Tukatchinsky's dateline, which falls to the east of Hawaii, some rabbis suggest not vacationing in Hawaii on Friday.[15]

And then things get a tad trickier for dateline proponents. The southern continent, Antarctica, a continent through which all 360 degrees pass, might get pulled two ways. Those on expeditions from Australia might want to keep the Australian date, but with their clocks set hours earlier; those from Israel might want to maintain the Israeli date, but with their clocks set hours later. Rav Meltzer and Rav Frank would likely not see this as problematic; different groups can maintain different affinities based on their origin. Those with a dateline intersecting Antarctica must resolve a more challenging dilemma.

While many remain convinced of the logical and halakhic necessity of a dateline, many *poskim* associate the day of the week with the *minhag* of the people of a *makom*, rather than a halakhic property of that location itself. Undoubtedly, the public benefits greatly from the simplicity of a dateline. But for halakhic practice it may be both non-existent and entirely unnecessary.

Mekaddesh ha-Shabbat ve-Yisrael ve-hazemanim often ascribes the designation of Shabbat to God, who sanctifies the Jewish people whose calendar establishes the holidays. Nonetheless, it is the Jewish people that define the day of the week for every location in which they reside.

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[1] Much of the history of the dateline presented here is adapted from R.H. van Gent, "A History of the International Dateline," Universiteit Utrecht Department of Mathematics (April 2017).

[2] In calendrical matters, the halakhah is expressed in terms of a canonical day that begins and ends at 6PM.

[3] Note that hours can be converted to degrees and *vice versa* by equating twenty-four hours with 360 degrees, or one hour with fifteen degrees.

[4] The theoretical Plato's claim to one less day having passed was verified in real life by Ferdinand Magellan, the 16th century explorer who was the first to circumnavigate the earth. As in Plato's theoretical voyage, Magellan's circumnavigation travelled west. As his crew's voyage concluded, a crew member tasked with marking each passing day indeed found that their calendars were a day behind those in Seville, the voyage's departure point. Magellan himself only made it as far as the Philippines, where he died in battle; only part of

his crew completed the journey.

[5] Anyone who has flown from New York to Europe or Israel (east) or to California (west) should relate immediately.

[6] One day for each traveler, equaling two days between travelers going in opposite directions.

[7] Though Magellan's circumnavigation and its resulting dating discrepancy demonstrated the need for a construct like the dateline, it was only over 350 years later that an international dateline was established in 1884.

[8] Hazon Ish's position was first proposed about 70 years earlier by Rav Moshe Lapidus and strenuously contested by Rav Shaul Natansohn.

[9] Rav Menahem Mendel Kasher argues that since no halakhic dateline is defined in the Talmud, we are free to select one; thus, he supported the use of the international dateline since halakhah accepts the general convention. Years later, Rav Yonah Mertzbach (in Alei Yonah) proposed another mid-pacific dateline by drawing a longitudinal line from the easternmost point on the Asian continent, on the Russian side of the Bering straits, about 114 degrees east of Jerusalem. These views agree with the argument that there must be a dateline and thus mark locations independent of human behavior. Nevertheless, with respect to places such as Japan, New Zealand, etc., they correspond practically with the views that remove the need for a dateline.

[10] Clearly, at any single location, once twenty-four hours have passed, it is by logical necessity the next day. However, whether the time in Hawaii or the Philippines precedes Beijing or follows Los Angeles is not a logical choice but a political one. Datelines, though politically drawn, end up specifying the date based on geography as opposed to people, although it is people and their predilections that develop a dateline's location.

[11] Were Hawaii and the Philippines a part of China and the U.S. respectively, a different positioning of the dateline might have evolved.

[12] Including Rav Yonason Steif, Rav Menachem Mendel Schneerson, and others we do not identify since their non-written positions are disputed. Rav Meltzer and Rav Frank are highlighted because of their active involvement in the debate over the date of Yom Kippur in China and Japan. I was also invited by the late Rav Uri Dasburg to a shiur discussing letters that Rav Meltzer wrote on this topic. Unable to travel to argue with the Hazon Ish in person, he sent his young student, Rav Shlomo Goren(czik).

[13] The halakhah might favor the larger or more halakhically distinguished community, the presence of poskim in one of the groups, allow a limited period of dual practice until the communities themselves decided, etc.

[14] Note that we are talking about the date in a settled area. How a traveler moving between locations that observe different days of the week is to behave with respect to various mitzvot is another matter entirely. That issue has generated an extensive halakhic literature that primarily revolves around the extent to which mitzvot depend on local versus personal observance. It should also be recognized that drawing a dateline at any location designates a date for **all** locations on earth. On the other hand, if datelines do not exist, there will be uninhabited locations where the day of the week remains undefined. Though proponents and opponents of datelines agree on the halakhic date of all significant locations, those traveling will encounter differences when they travel over locations that have a defined versus undefined date.

[15] Rav Tukatzinsky's dateline also cuts through land, namely Alaska, but this creates only a theoretical problem, since there will likely never be Jewish communities west of that part of the dateline. However, in "Sacred Time: Episode One," a recent Tikvah YouTube presentation, Rabbi Meir Soloveitchik tells a wonderful story about the westernmost point in Alaska. As would be expected, the story involving a Lubavitcher Hasid follows the view of the Rebbe (footnote 11 above), and does not comport with R. Tukatzinsky's view.