Epilogue

The epilogue summarizes major areas of suggested innovation and then briefly re-examines the nine sections covered, taking wider latitude for conjecture. Two basic assumptions[1] underlie many of those conjectures:

- First, both *halakhic* practice and its conceptualization were influenced by the migration of Jews from the Middle East to Central and Northern Europe during a period when the impact of latitude on *zemanim* was not yet understood.
- Second, with the subsequent growth of clocks, increasingly, *halakhic* practice was specified using time in preference to the observation of natural events.[2]

It is probable that both of these factors, particularly in combination, were consequential.

Before proceeding, it is useful to reiterate two[3] areas where specific *posekim's* insufficient understanding and / or observation of basic

[1]Readers who believe that these assumptions are incorrect are unlikely to find this epilogue useful.

[2] Increasingly, time replaced observation as the basis for specifying *halakhot*. Preference for a time-based *halakhic* rule (72 minutes before sunrise or after sunset, for example) over the underlying event from which the interval of time was derived has become increasingly common. In particular, disputed or more subjectively defined phenomena, like *mi-she-yakir* or the approximate boundary between a medium and a small star, were less often utilized and, as a result, became less well understood.

astronomy likely caused errors, more often in conceptualization, but also in *pesak*.[4]

1. **Calculating using *alot ha-shaḥar* as the counterpart to the emergence of three stars, assuming that the interval between *alot ha-shaḥar* and sunrise is of the same duration as the interval between sunset and the emergence of three stars**.[5] Though associated with the opinion of Rabbeinu Tam,[6] assuming

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[3] There are a number of more technical errors of which one should be aware. First, one cannot assert 18 minutes as the time needed to walk a *mil* while also maintaining Ramban's calculation that *pelag ha-minḥah* occurs the time it takes to walk 1/6th of a *mil* prior to sunset; this error has had minimal practical consequence. Second, while failure to distinguish 22.5 minutes from 24 minutes (3/8th of an hour from 2/5th of an hour) may have resulted from the desire to assert "not 18 minutes" without differentiation, on occasion the two numbers appear to have been treated as being the same. Third, an oft recurring and practical error is determining the beginning of the *bein ha-shemashot* period by subtracting from the practiced end of *Shabbat*, three small stars, which is later than the more accurate endpoint of the day that occurs (approximately) with the appearance of three medium stars. Fourth, starting *Shabbat* after sunset does not imply agreement with the position of Rabbeinu Tam. Other errors or inaccurate observations are more isolated.

[4] Prior to the existence of clocks, independent of conceptualization, it is likely that in practice conservative approximations would compensate.

[5] Though considered only hypothetically, creating a morning *zeman* corresponding to the appearance of three stars and calculating *shaot zemaniot* between those two points is an interesting theoretical possibility raised by R. Weiss in *Minḥat Yitzḥak* 4:54 and rejected; it may also factor into R. Sofer's commentary on *Shabbat* 34b.

[6] Nehemiah 4:15, "*Ve-anaḥnu osim be-melakhah…..mei-alot ha-shaḥar ad tzait ha-kokhavim*," as explicitly interpreted in the *Yerushalmi* at the beginning of *Berakhot*, may have contributed to this approach. Even taking for granted the *Yerushalmi's* interpretation that the verse describes a normal daytime period from *alot ha-shaḥar* until the appearance of three stars, the verse does not claim that those two points are equidistant from sunrise and sunset respectively nor does it necessitate that *ḥatzot* be calculated inaccurately.

that these intervals are of equal duration impacted the calculation of the hours of the day and thereby other *zemanin* as well.[7]

2. **Improperly or inconsistently adjusting *zemanim* for latitude or season.** One can on occasion justify (or even prefer) instances where a particular interval of time is left invariant. However, when making adjustments, it is important they be made accurately and consistently. A common error in this area is the correlation of the length of the twilight period with the length of the daytime period from sunrise to sunset. As well, inconsistencies resulting from adjusting one *zeman* but not another that is conceptually linked occur in a number of different contexts.[8]

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[7] When *alot ha-shaḥar* and three stars are used as the endpoints to calculate the hours of the day, the morning *zemanim* are slightly earlier than when using a later evening endpoint; the calculations of *pelag ha-minḥah* and *ḥatzot*, however, are inaccurate. A conjecture on how this approach may have been practiced prior to the existence of clocks, avoiding these issues, is suggested in the review of section 4.

[8] The OU website illustrates the conspicuous inconsistency that results from adjusting *mi-she-yakir* but not *alot ha-shaḥar* based on both season and latitude. (A change to the OU website, a number of years ago, to also not adjust the end of *Shabbat* according the *geonim*, is odd and troubling.) While latitude is more often acknowledged as a basis for the need to make adjustments, the use of seasonal adjustments is more varied. Some *posekim* seasonally adjust the end of *Shabbat* but not *alot ha-shaḥar*. Others seasonally adjust *alot ha-shaḥar* but keep an invariant length to *Shabbat*; still others make neither adjustment. At latitudes in northern Europe, the need to make adjustments, based on seasonal variation, to *alot ha-shaḥar*, which equates to a larger depression angle, is more pronounced than the need to make adjustments to the end of *Shabbat*, which equates to a smaller depression angle. Furthermore, while physical measures such as three stars incorporate a seasonal adjustment implicitly, a fixed time-based calculation, e.g., the time needed to walk 4 *milin*, or its clock-based equivalent of 72 or 90 minutes does not.

In all likelihood, the influence on practice of these and other errors accelerated with the introduction of clocks and the reduced reliance on observation that followed.

Some suggested innovations:

Well beyond identifying the impacts of poorly understood phenomena, the application of basic astronomic observation led to insights that helped to clarify a number of areas. Before reviewing the nine sections, I will list, without reiterating supporting arguments in detail, innovations (partially) based on these insights that have been suggested:[9]

1. The dispute between the *geonim* and Rabbeinu Tam revolves around placing the interval of *bein ha-shemashot*, whose length is (at most) the time needed to walk ¾ *mil*, within the interval between sunset and *tzait (kol) ha-kokhavim*, whose length is the time needed to walk 4 *milin*. It is normally assumed that

    - the opinion of the *geonim* places the *bein ha-shemashot* period at the start of the interval, while
    - Rabbeinu Tam places it at its end.

[9] Other, more speculative areas are covered when discussing the nine sections.

Those two alternatives represent opposite extremes. Two modifications were suggested throughout this monograph.

- First, separate the dispute between the *geonim* and Rabbeinu Tam into **two** distinct **components:**
  - The **first concerns the beginning** and the **second the end of the *bein ha-shemashot* period,** subject to a constraint on the length of the *bein ha-shemashot* interval.
- Second, assume that **there are multiple hybrid / intermediate positions,** bracketed by these two alternatives.[10]

This allows

- an interpretation of the *gemara* in *Shabbat* similar (or according to some identical) to that of the overwhelmingly compelling position of the *geonim* relative to the end of the *bein ha-shemashot* period,
- while defining the beginning of the *bein ha-shemashot* period using a variant of the textual approach of the *Shulḥan Arukh* and Rabbeinu Tam.

[10] These positions are more properly characterized as variants of the position of the *geonim* as they are all much closer to their *bein ha-shemashot* interval. As noted, R. Posen argues that a position similar to what I propose was the position of the *geonim*, as opposed the *Gaon.*

While I have not seen this conceptualization formulated explicitly[11] in the classic *halakhic* literature, practice and a number of pragmatic opinions are supportive of such an approach. This approach impacted sections 5 to 8, and is central to many of the suggested innovations.

The opposite implication:

- Anyone who rejects the start of *Shabbat* precisely at or even a few minutes after sunset must embrace the approach of Rabbeinu Tam,

which does not follow logically, is found in the literature.

2. It is preferable to read the *gemara* in *Shabbat* assuming that all opinions vary insignificantly concerning the end of *Shabbat.* This is the position of almost all *rishonim* and is independent of the opinion of Rabbeinu Tam. **The *gemara's* focus is on Friday evening and the point at which the period of *bein ha-shemashot* begins; that point, as opposed to the end of *Shabbat*, is in dispute.**

3. Modern practice, contemporary *halakhic* literature, as well as colloquial idiom, typically refer to time intervals calculated from sunset. Assuming that way of thinking when reading specific

[11] Throughout R. Kapach's commentary on *Mishnah Torah*, however, he asserts that this is the position of Rambam.

sources, we fail to consider that the *gemara*, various *rishonim* and *aḥronim* (I referenced R. Lorberbaum, R. Adler and R. Sofer) **refer, as well, to intervals of time counting backward from the point at which *Shabbat* ends, not always counting forward from sunset or some other point at which *Shabbat* begins.**[12]

4. **Rabbah's interval, the time needed to walk ¾ *mil*, is more likely an upper bound on the length of the *bein ha-shemashot* period** (the length of the *bein ha-shemashot* period in the summer) counting back from the point of *ḥashekhah* **versus a lower bound** (the length of the *bein ha-shemashot* period in the spring) counting forward from sunset (or some other point). Treating the *gemara* in *Shabbat* similar to the *gemara* in *Pesaḥim* as referring only to days around the spring (but not the fall) equinox[13] is unnecessary when thinking of the interval as a practical upper bound. All of the descriptions in the *gemara*, either the appearance of the sky / horizon or the visibility of three stars, apply year-round. Some of the arguments in favor of such a position are:

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[12] R. Gettinger in *Munaḥ Yoma*, page 139, makes this point, as well as the previous point, albeit in the context of the opinion of Rabbeinu Tam.

[13] First suggested by the *Gaon* in *O. Ḥ.* 261, this approach is widely assumed in recent *halakhic* literature. Note that the *gemara* in *Pesaḥim* assumes an average day, which occurs in both the spring and fall around the equinox. However, the *Gaon*'s argument assumes, not an average interval, but a minimum interval and one that occurs only in the spring, but not in the fall; stars are not visible as early in the fall as in the spring. On the other hand, as suggested, a maximum would apply year-round. Furthermore, no *rishonim*, who limit the *gemara* in *Pesaḥim* to the equinox periods in the fall and spring, make any such assertion with respect to the *gemara* in *Shabbat*. One may well conclude from the lack of commentary that *rishonim* assumed that the *sugyah* applies year-round.

- The *gemara* in *Shabbat* is primarily focused on Friday night and the beginning of the *bein ha-shemashot* period, as opposed to its end. If the time needed to walk ¾ of a *mil* were a minimum, counting forward from the beginning of the *bein ha-shemashot* period, it would address the end of the *bein ha-shemashot* period and the end of *Shabbat*, as opposed to its beginning on Friday night.
- The three fractions (each expressed as the time needed to walk a part of a *mil*) given as alternatives for the length of the period of *bein ha-shemashot* would all have identical semantics, counting back from the assumed point of *ḥashekhah*.
- The length of the *bein ha-shemashot* interval provides a practical upper-bound as opposed to a theoretical lower-bound.
- If someone were countering the position of Rabi Yosi, who says the period of *bein ha-shemashot* is instantaneous, it is more likely that he would say that it can be "as **long** as" opposed to "as **short** as."

5. According to the opinion of **Rabi Yehudah:**

- **Sirius and Canopus are medium stars**. This is consistent with the opinion that only planets are considered large stars, what the *gemara* calls "*kokhavei lekhet*" or "moving stars," that can, on occasion, be seen before sunset.

- **Even assuming[14] the appearance of three stars as the precise criterion that defines** the end of the *bein ha-shemashot* period, the appearance of **2 stars is only an indicator** that the *bein ha-shemashot* period has begun; the appearance of **2 stars cannot define** the beginning of the *bein ha-shemashot* period.

6. The *Yerushalmi* does not provide a compelling answer as to **why the end of the day is defined by the appearance of three as opposed to the more typical two stars,** two normally being considered the smallest plurality. If three stars defined the end of *Shabbat*, I have not seen any alternative to the answer that the *Yerushalmi* provides. However, consistent with our preference for defining *zemanim* based on a level of darkness, with *ḥashekhah* (as opposed to three stars) defining the end of *Shabbat*, then the reason for requiring three versus only two stars is much more fundamental:

    - When Sirius and Canopus are visible after sunset, a number of minutes before *ḥashekhah*, only a third star, of much less intensity, which appears after *ḥashekhah*, indicates that *Shabbat* has ended.

    The fact that the *Yerushalmi* does not provide this answer might indicate that the *Yerushalmi* considers stars as defining. The *Bavli* mentions stars only once at the end of a *sugyah* that revolves around

[14] I admit to being biased strongly against this opinion.

darkness and the appearance of the sky; the *Bavli* may therefore consider darkness as defining.

7. Given Prof. Levi's observations of the appearance of stars over Jerusalem and the Middle East, the customary definition of sunset proper as the assumed beginning of *Shabbat* according to both Rabbah's interpretation of Rabi Yehudah's position (and *a fortiori* Rabi Nehemiah's position) is difficult, if not impossible, to reconcile with the opinion of Shmuel.

8. Moving the beginning of the period of *bein ha-shemashot* forward from sunset even according to Rabbah, a variant of the generally assumed opinion of the *geonim*, successively solves the following issues:

    - **At 4 to 5 minutes,** the minimum time reported as the custom of Jerusalem[15] as well as the opinion of R. Shneur Zalman of Liadi,[16] the point when the sun is no longer visible even from the highest elevations around Jerusalem, Shmuel is consistent, at least in a limited sense, with R. Yosef, while remaining completely inconsistent with Rabbah.[17]

[15]See *Minhagei Eretz Yisrael* by R. Gliss, pages 102 and 282.
[16] A letter included in his *siddur* specifies 4 minutes.
[17]See *Zemanim Ke-hilkhatam* by R. Boorstyn, chapter 2, section 3, where he summarizes different 19th and 20th century *posekim* in the Middle East who supported times beyond 4 to 5 minutes and up to approximately 10 minutes after sunset. The rationale he and many of these *posekim* used is different from that which is addressed in this monograph, with heavy reliance on the notion of sea level in addition to visibility from higher elevations.

- **At 6 minutes,** an opinion that R. Ḥaim Volozhin bases on Shmuel's statement concerning the appearance of a single star that is visible in the spring to an expert observer at that time, Shmuel is more easily consistent with R. Yosef but consistent with Rabbah only in a limited sense.[18]
- **At 7 or 8 to 15 minutes,** depending on a variety of factors, Shmuel is entirely consistent with Rabi Yehudah; further, the time needed to walk ¾ *mil* can be easily considered a practical upper bound.[19]

9. Shmuel's information-rich assertion about 1, 2 and 3 stars likely means that:

- **One (medium) star <u>may</u> appear during the daytime.**
- **However, two stars only[20] appear <u>following</u> the beginning of the *bein ha-shemashot* period** (whose start may also precede the appearance of the first star).

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[18] How these first two options deal with the time needed to walk ¾ of a *mil* depends on one's position on the time needed to walk a *mil* and the precise time at which *Shabbat* ends. As well, to be more precise, R. Ḥaim Volozhin says **minimally** 6 minutes.

[19] This option is consistent with the famous R. Feinstein for the New York area extending the day for approximately 9 minutes after sunset under certain circumstances, albeit using a completely different conceptual basis.

[20] If we assume that the period of *bein ha-shemashot* begins 14 to 15 minutes after sunset, then "only" should be replaced with "almost always." Though proposed by R. Kapach in his interpretation of Rambam, it would make Shmuel's assertion slightly less precise or perhaps a *harḥakah*. The suggested meaning of Shmuel's statement is more elegant if we assume that the period of *bein ha-shemashot* starts at the latest 12 to 13 minutes after sunset in the Middle East.

- **Three stars confirm that the transition to the next day has occurred.**

10. While many equate and then struggle to resolve Rambam's approach to *Shabbat* and *Kiddush Ha-ḥodesh*, I assume they are dissimilar.[21] In both instances, Rambam considers *ḥashekhah* as defining the end of a day. For a *beit din* declaring the beginning of a new month, Rambam sees no need to impose an interval of *bein ha-shemashot.* Thus, Rambam in *hilkhot Kiddush Ha-ḥodesh* first states the *halakhah* in 2:8 and then states the recommended practice in 2:9. However, in *hilkhot Shabbat*, as noted in the opening paragraph of the prologue, when dealing with a community, Rambam utilizes a notion of *bein ha-shemashot*, an interval that he defines practically as opposed to theoretically.[22]

11. While both the appearance of the horizon and the visibility of stars are difficult to reconcile with the opinion of Rabbeinu Tam, the argument between Abaye and Ravah, looking east and west at the same point in time, is particularly challenging. I cannot conceive of anyone detecting any change looking towards the eastern sky 50 to

[21] Why so obvious an approach was not considered may be related to the assumption that the periods of *safek ḥashekhah* and *bein ha-shemashot* are coincident. Though the two notions may be practically coincident, they are certainly not conceptually the same. For those following an opinion akin to the *geonim* for the end of *Shabbat*, they may not even be practically coincident. Within the *halakhic* literature there are differing opinions about the relationship between the periods of *safek ḥashekhah* and *bein ha-shemashot.*

[22] In *hilkhot Shabbat*, Rambam would appear to use sunset and three stars practically (in both 5:3 and 5:4), with *ḥashekhah* (in 5:3) defining the end of a day.

60 minutes after sunset in the Middle East. This is perhaps the greatest observational challenge from the *sugyah* in *Shabbat* to Rabbeinu Tam's delineation of the end of *Shabbat*.

12. **It is probable that R. Adler's 24 / 35-minute period of *bein ha-shemashot* is calculated counting back from Rabbeinu Tam's conceptual end of *Shabbat.*** The alternatives, either counting back from the time that the Frankfurt community typically observed as the end of *Shabbat* or counting forward from any point in time, are less plausible. While this formulation faces textual challenges, other attempts to explain R. Adler's opinion including that assumed by the "*editors*" referenced by Dr. Leiman, as well as multiple suggestions of R. Benish, face far more difficulty.[23]

13. A number of recent essays on *zemanim*, including those by R. Kotler[24] and R. Willig,[25] suggest specific dependencies linking

- the dispute between the *geonim* and Rabbeinu Tam,

[23] Frankfurt was one of a few communities that observed a start to *Shabbat* around sunset before the 19th century. Clearly, R. Sofer did not impose that view in Pressburg where he was rabbi, and I have seen no record of his personal practice. I can only assume that R. Sofer did not feel that R. Adler's observance of *Shabbat* beginning at sunset was normative as opposed to perhaps either a personally practiced stringency, or perhaps observed only in deference to the Frankfurt community.

[24] In *Shut R. Aaron* 2:2, R. Kotler himself mentions that the practice of the Jerusalem community contradicts his assumed dependency.

[25] *Am Mordechai*, *Berakhot*, chapter 2; as mentioned, R. Willig has since modified his position.

- the dispute whether *shaot zemaniot* are calculated from sunrise or from *alot ha-shaḥar* and
- in the case of R. Willig, even the dispute over the length of time needed to walk a *mil.*

I see no such logical dependency, and found that custom and / or authorities supported almost every possible combination of alternatives.[26]

14. It is puzzling that when **calculating the opinion of** Magen Avraham **/ *Trumat Ha-deshen*, attention to the impact of latitude and / or seasonality is rarely taken into account**.[27] When accounting for the impact of latitude and / or seasonality, morning *zemanim*, like the latest time for *kriat shema*, are earlier than commonly provided; this approach would also provide an alternative for *plag ha-minḥah* (that many communities in US latitudes might find useful). Similarly, adjusting *alot ha-shaḥar* would often imply an earlier start for those fast days that start at daybreak (particularly

[26] The one exception is that anyone who might maintain a 120-minute interval for *alot ha-shaḥar* to sunrise (a rare position maintained perhaps by R. Ovadiah of Bartenura or R. Shneur Zalman of Liadi in *Shulḥan Arukh Ha-rav*, though it is unclear whether R. Shneur Zalman continued to maintain this position) must perforce calculate the hours of a day starting at sunrise; otherwise, *pelag ha-minḥah* would **always** occur after sunset. However, the conjecture in section 4 below that provides an alternative method to calculate *shaot zemaniot* according to those who calculate from *alot ha-shaḥar*, could be used in this case as well. *Pelag ha-minḥah* would then occur before sunset, removing this last dependency as well. After reading the approach suggested in the summary of section 4, this will be clear since the afternoon *zemanim* are set independently of the time of *alot ha-shaḥar*.

[27] That would entail using depression angles as opposed to a fixed 72 / 90 minutes.

the 17th of Tammuz).[28] That would avoid a practice that allows eating on the morning of a fast as late as (or even after) the time of *mi-she-yakir.*

15. **Possibly, *tzait kol ha-kokhavim* could have practical significance** for activities whose performance must occur during the daytime period but are not tied to a particular day of the week, as perhaps the construction of the *beit ha-mikdash.*

A review of the nine sections:

We now revisit the nine sections taking greater latitude for conjecture.

1. How many *milin* does one walk during the period from sunrise to sunset? What is the time needed to walk a *mil*: 18, 22.5, 24 minutes, etc.?

Except for Rambam and R. Ovadiah of Bartenura, few maintain 24 minutes as the time needed to walk a *mil.* Both of the other major opinions have significant support. Some *geonim* and *rishonim* likely

[28] While not a Magen Avraham specific issue (since *alot ha-shaḥar* is applicable according to all opinions), invariance of the 72 / 90-minute interval is likely inherited from similar practice applied to the position of Rabbeinu Tam with respect to the end of *Shabbat* which then influenced the calculation of *shaot zemaniot* according to Magen Avraham. (See the summary for section 3, where this is further explained.) Though conceptually challenging in both contexts, a fixed 72 / 90 minutes does not create obvious observational issues, except for *alot ha-shaḥar*, and only at latitudes further from the equator, as in northern Europe.

maintained an 18-minute interval.[29] However, many *rishonim*, particular those following Ramban, adhere to 22.5 minutes. Interestingly, by the time of the *Shulḥan Arukh* most authorities are united around 18 minutes, with a small number of *aḥronim* strongly supporting 22.5 minutes.

When I began studying this topic, I was convinced by the overwhelming arguments presented by Prof. Levi based on both the text of the g*emara* and the opinion of many *rishonim*, that 22.5 minutes should be strongly preferred. However, 18 minutes also appears to be well supported; albeit in each case, the argument in favor is not definitive.

1. Geography (the distance from Modiin to Jerusalem, for example) seems to support more *milin* walked per day.[30]
2. The assumed similarity of the fractions 1/10th and ⅙th used by the *gemara* in *Pesaḥim* would place the twilight period of either the time needed to walk 4 or 5 *milin* outside of the daytime period of

[29]R. Yosef's attempt (*Yeḥaveh Daat*, volume 2, page 38) to marshal support for R. Karo's 18 minutes versus either 22.5 or 24 minutes yielded only a few sources. Given the author's encyclopedic knowledge, one can assume that his list is (nearly) exhaustive.

[30]This is entirely tentative given that there are dozens of *sugyot* that would have to be analyzed, many with complexity in identifying the locations in addition to controversy over the length of the units involved. Particularly significant is the opinion of Rabbeinu Tam in *Yuma* 67a, which recent archeological evidence seems to support; see the article by Daniel Levi in *Teḥumin* 30, pages 418 – 426. Rabbeinu Tam's opinion assumes that 2000 *amot* is in reality *amot be-alakhson*, the length of the diagonal of a square where each side is 2000 *amot*, or 2000 multiplied by the square root of 2, (approximately 1.414), or 2828 *amot*. Under that scenario, walking 40 *milin* in a day is less likely. However, according to Rashi's more standard assumption that a *mil* is 2000 *amot*, 32 *milin* is only about 20 miles, and appears to be insufficient as the amount of distance covered in a day's journey.

the time needed to walk 40 or 30 *milin*; since 5 *milin* is external from 30 *milin* (⅙th), then 4 *milin* should be external from 40 *milin* (1/10th).

3. Arguments in favor of 18 minutes from anyone maintaining 72 minutes as the length of the interval from *alot ha-shaḥar* to sunrise, a view that I also prefer slightly, and the basis of almost all of R. Yosef's examples, while not conclusive, are highly likely.
4. An assumed added "***vav***" in the text of the *gemara* in *Pesaḥim*[31] when referring to the twilight periods might have been intended to clarify or to lend further support to 18 minutes.

Since it is clear that many if not almost all *rishonim* supported 22.5 minutes, the change to 18 minutes is puzzling. As I demonstrated, a basic mathematical / logical error allowed some to misread the opinion of all *ḥakhmai Sefarad* as not necessarily supporting 22.5 minutes. Perhaps limited availability of many of the writings of *ḥakhmai Sefarad*, as well as the error, contributed to the dominance of 18 minutes as the time needed to walk a *mil*. However, I suspect that this might also be an example of the impact on *halakhic* reasoning from the increasing availability of clocks beginning in the 15th century. In central and southern Europe, clocks made 90 minutes after sunset, as the time that three stars appear, untenable. Perhaps as a result, opinion shifted to a somewhat more reasonable 72 minutes after sunset, and the associated

[31] Our text of the *gemara* reads "*teidah…"**u**"me-alot ha-shaḥar*" in the second such phrase addressing the interval between dawn and sunrise. The *vav* does not appear in certain older texts. Of course, one can also make the exact opposite point - the absence of a "*vav*" tends to support the 22.5-minute alternative.

time needed to walk a *mil* of 18 minutes. Prior to the widespread use of clocks, it is likely that observation of the skies, as opposed to an interval of time, was used to determine the end of *Shabbat.*

2. How long is the period from sunset to *tzait (kol) ha-kokhavim* (or equivalently from *alot ha-shaḥar* to sunrise) in the Middle East around the time of the equinox: 72 minutes, 90 minutes, 96 minutes, 120 minutes, etc.?

Four intervals of 24 minutes totaling 96 minutes, referenced in a number of *teshuvot*, is unsupportable since whoever would maintain a time needed to walk a *mil* of 24 minutes must also consider the period from *alot ha-shaḥar* to sunrise as the time needed to walk 5, and not 4, *milin*. A longer interval of 120 minutes, while theoretically possible, is rarely encountered in *halakhah* and is inconsistent with the point at which light is first visible in the Middle East, approximately 80 minutes before sunrise. While both 72 and 90 minutes intervals are good approximations to 80 minutes, I maintain a slight preference for 72 minutes for four reasons:[32]

[32]How adherents of Rabbeinu Tam's approach reconciled the difference in the length of the interval between dawn and sunrise versus sunset and three stars is unclear. The former would suggest 90 minutes in Europe, the opinion of many later *rishonim* who lived there. On the other hand, the latter would support 72 minutes. I suspect that given the subjective nature of determining what constitutes the first light and the additional stringencies of three small, adjacent stars, the difference may have been less evident. With the advent of clocks, 72 minutes was perhaps easier to assume if one number had to be chosen for both. This in turn may have caused observation to be less trusted and viewed as yet less authoritative.

1. The amount of light present at 72 minutes is so minimal that it was likely disregarded in *halakhah*.
2. R. Saadyah *Gaon* and Rambam, who both lived in the Middle East, support 72 minutes.
3. The simple meaning of 1/10th of the (720 minute) day is 72 minutes; assuming 1/10th is 90/900 requires a unique variant of the notion of *mi-le-bar*, adding not one but two intervals of 90 minutes to 720 minutes.
4. Around the winter solstice in Jerusalem, using an adjusted (or even fixed) 90 minutes[33] when calculating according to Magen Avraham, *pelag ha-minḥah* occurs after sunset. In the winter, when the daytime period is approximately 10 hours and the sun is 20 degrees below the horizon about 96 minutes after sunset, *pelag ha-minḥah* (1.25*66 (= (600 + 2* 96) / 12)~ 83 minutes prior to 96 minutes after sunset) occurs approximately 13 minutes after sunset.

3. How is the period from *alot ha-shaḥar* to sunrise or its equivalent from sunset to *tzait (kol) ha-kokhavim* to be adjusted at different locations and during different seasons (if at all)?

[33]Using a fixed 90 minutes, the difference is only 6 minutes and *pelag ha-minḥah* is still approximately 6 to 7 minutes after sunset. The conjecture in section 4 of the epilogue provides an alternative that eliminates this challenge to a 90-minute interval.

This is a heavily debated area in which many *posekim* leave both the morning and evening intervals invariant. The *Gaon's* comment that the points of *alot ha-shaḥar* and its evening equivalent, *tzait (kol) ha-kokhavim*, do not occur during the summer at very northern latitudes, (and are set to *ḥatzot ha-lailah*), is rarely quoted to support adjustment.

Prior to the widespread use of clocks, adjustments based on latitude and seasons were made naturally, as they were embedded in levels of darkness or the appearance of stars. For that reason, use of depression angles is just a way to make those adjustments with precision. The widespread use of clocks and the subsequent growth of time-based expressions of *halakhah* reduced the dependence on observation.[34]

Some calendars exhibit inconsistent behavior, defining *mi-she-yakir* based on physical observation, while maintaining an unadjusted period for *alot ha-shaḥar*, a position that creates anomalies at most European latitudes.[35]

In practical terms, the end of a day of the week, when defined either by a measure of darkness or the more common appearance of three stars naturally embed both latitudinal and seasonal adjustments. However,

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[34] A somewhat related and more conceptual point, concerning not clocks but time in general, is argued with multiple examples by Stern in *Time and Process in Ancient Judaism*, chapter 2.

[35]Moving beyond 60 degrees latitude from the equator, where during specific seasons it is never becomes completely dark, (creative) artificial *zemanim* like midnight (*ḥatzot ha-lailah*) for the end of *Shabbat* or perhaps the beginning of the third *ashmorah* for the earliest time for morning prayers are required.

except for a few isolated exceptions, those waiting 72 minutes[36] after sunset for the end of *Shabbat* never made upward adjustments.[37] By waiting 72 minutes, they would naturally wait longer than those watching for darkness or the appearance of stars at least until one is at approximately 50 degrees latitude or greater, regardless of the season of year. At latitudes below 50 degrees, even a depression angle of 8.5 degrees, which exceeds the observance of most communities, equates to less than 72 minutes. As a result, 72 minutes after sunset remained invariant. Given the location of the vast majority of Jewish communities between 55 degrees north latitude and the equator, those who observed 72 minutes had limited physical motivation to make either latitudinal or seasonal adjustments; three stars, most often even small ones, are visible by that time.[38] [39]

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[36] Similar arguments would hold *a fortiori* for those waiting 90 minutes after sunset.

[37] To my knowledge, no major figure except R. Soloveitchik applied precise latitudinal and seasonal adjustments to extend further the end of *Shabbat*, when following the opinion of Rabbeinu Tam in practice.

[38] To the contrary, not just were intervals not adjusted upwards, those who maintained the position of Rabbeinu Tam, either waited exactly 72 minutes or **less, not more.** As noted previously and first mentioned explicitly by R. Pimential in the 17th century *sefer Minḥat Kohen* and practiced in many communities, those following the opinion of Rabbeinu Tam actually reduced 72 minutes (often to around 50 minutes) based on the observation of three stars. Except for the view of R. Dovid Shapiro, and others in the 20th century who have made similar, rather tenuous, arguments that Rabbeinu Tam's interval begins well before sunset, conceptual views that I choose not to address, I have never read an explanation of how this was reconciled with assumed equivalence to the time of *alot ha-shaḥar* for those following the Rabbeinu Tam.

[39] Even for St. Petersburg and certain communities in Scandinavia, given significant variance in how to interpret three small stars, smaller depression angles (but still greater than that which would equate to three medium stars) would allow 72 minutes to remain viable. See *Ha-zemanim Be-halakhah*, chapter 46 on European observance in a number of (very) northern European communities that used the equivalent of a depression angle of approximately 7.5 degrees for the end of *Shabbat*. In Vilna for example, using a depression angle of 8.5 degrees, the end of

On the other hand, unlike the end of *Shabbat (*or any day of the week), the beginning of the daytime period, *alot ha-shaḥar*, should not have been left invariant. In Prague during June, for example, using a depression angle of 8.5 degrees, **the end of *Shabbat* occurs about 70 minutes after sunset**, **while *alot ha-shaḥar***, specified by a depression angle of 16 degrees, **occurs over three hours before sunrise**.[40] However, as it was often axiomatically assumed, based on Rabbeinu Tam's interpretation of the *sugyah* in *Pesaḥim*, that the length of the interval between *alot ha-shaḥar* and sunrise must exactly equal the length of interval between sunset and *tzait ha-kokhavim*, **either both or neither could be adjusted**. Particularly in the age of clocks, adjusting one and not the other would violate that assumption perceptibly. Thus, I suspect that the opinion of Rabbeinu Tam may have contributed to a tradition of not adjusting the time of *alot ha-shaḥar*, in order to maintain equivalence with a fixed 72 minutes after sunset for *tzait ha-kokhavim.* The amount of illumination that defines the point of *alot ha-shaḥar* was simply assumed to be greater.[41] Particularly, in the last few generations,

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Shabbat occurs approximately 95 minutes after sunset in the summer, 40 minutes later than in the spring.

[40] In Prague, the shortest time to reach a depression angle of 8.5 degrees is about 48 minutes after sunset in March, and the time to reach a depression angle of 8.5 degrees grows to almost 70 minutes towards the summer. *Alot ha-shaḥar*, which is about 95 minutes before sunrise in March, is about 192 minutes in June and 107 minutes in December.

[41]The times for *mi-she-yakir* may be reflective. The rulings of Middle Eastern *posekim* tend to equate to depression angles of 11.5 degrees and higher, while European *posekim* tend to a range between 10 and 11 degrees, as is clear from *Ha-zemanim Be-halakhah*, vol. 1, pages 211 - 215. A later point of *alot ha-shaḥar* would force a yet later point of *mi-she-yakir*. It is also highly likely that a relatively short duration (6 minutes) between *alot ha-shaḥar* and *mi-she-yakir* mentioned by the *Pri*

when, as Prof. Ḥaym Soloveitchik has demonstrated, text based study often preempted mimetic traditions, a fixed 72-minute interval became (yet) more prevalent for the interval between *alot ha-shaḥar* and sunrise as well, given a strong textual basis for equivalence for those maintaining the opinion of Rabbeinu Tam.

In summary, three potential impacts of increased reliance on clocks have been suggested in this and preceding sections of the epilogue:

1. Reduced reliance on observation and natural skepticism concerning its accuracy,[42] particularly relative to a clock, eventually led to decreased practical knowledge of the meaning of specific physical entities,[43] which in turn further increased reliance on clocks.
2. A clear preference for 72 over 90 minutes as the point at which three (small) stars appear, and the related preference for 18 versus 22.5 minutes as the time needed to walk a *mil* emerged.[44]

Megadim in *O. Ḥ.* 58:1 is not the result of so early a point of *mi-she-yakir*, but a later point of *alot ha-shaḥar*. As a result, combining such a *pesak* with an accurate (adjusted) time for *alot ha-shaḥar* cannot be justified.

[42] At more northern latitudes, the lack of alignment with physical observations could also have been rationalized as the result of specific aspects of *zemanim* breaking down as one approaches the north and south poles.

[43] Arguably, *alot ha-shaḥar*, *mi-she-yakir* and a medium versus small star have all been impacted.

[44] This second conjecture is significantly less clear than the other two. It would have occurred in a period from approximately the 15th to the first half of the 16th century when clocks became more prevalent and for which there are few sources. Validating any of these conjectures, including a sense of how the changes developed, will require a careful, historical look at responsa in the five to six centuries following the proliferation of clocks.

3. The invariance of the interval from *alot ha-shaḥar* to sunrise resulting from its assumed equivalence to the interval from sunset to *tzait ha-kokhavim* according to the prevalent opinion of Rabbeinu Tam, created observational challenges. While the duration of the interval from sunset to *tzait ha-kokhavim* rarely exhibits any need to increase beyond 72 minutes because of either season or latitude, the point of *alot ha-shaḥar* clearly does. The assumption that the two intervals are identical weakened reliance on observation and trust in one's ability to judge levels of darkness, both further contributing to the use of clocks.

4. How are we to define the hours of the day: sunrise to sunset or *alot ha-shaḥar* to darkness?

The identification of the opinion of Magen Avraham only as far back as R. Isserlein as opposed to Ramban[45] and his school who clearly counted the hours of the day from *alot ha-shaḥar* remains puzzling.[46] Given that the position of Magen Avraham was held by all *ḥakhmai Sefarad* and was the accepted custom of Jerusalem, in spite of the influence of the students of the *Gaon*, coupled with a lack of any unambiguous reference to the position of R. Yaffe and the *Gaon* amongst *rishonim*, provides

[45]See R. Schachter's explanation that R. Soloveitchik was completely unconcerned about the opinion of Magen Avraham because of an implication from Rambam that was viewed as a supporting source for the *Gaon*. It is puzzling that R. Soloveitchik would dismiss an opinion of all *ḥakhmai Sefarad*.

[46] I assume that this was primarily the result of limited availability of the *seforim* of *ḥakhmai Sefarad*.

additional support to that alternative.[47] Their argument that time is defined by the angles of the sun is compelling,[48] but not entirely convincing.[49]

As noted in the past section, current practice, which sets times for Magen Avraham's *zeman* based on a fixed 72 / 90 minutes for both *alot ha-shaḥar* and *tzait (kol) ha-kokhavim*, is a divergence from *zemanim* based on observations that were practiced prior to the advent of clocks. For those who wish to maintain the times of Magen Avraham, their precise approximation / calculation would seem warranted. As hypothesized, the opinion of Rabbeinu Tam and the observance of a fixed 72 (or 90) minutes at the end of *Shabbat* might have contributed to a tradition of not adjusting 72 (or 90) minutes in this context as well.

While the use of a fixed 72-minute calculation is a troubling consequence of clocks replacing observation, the current (modern) alternative to calculate the approach of Magen Avraham is also a bit disconcerting. That method, introduced by R. Tukitzinsky in the

[47] R. Kapach maintained throughout his commentary on *Mishnah Torah* that it was the opinion of Rambam as well, although this is challenging given Rambam in *Teshuvot Peair Ha-dor*, 44.

[48] The argument that counting from well before and after sunrise and sunset is difficult to implement, and hence could not have been widely used before the availability of clocks, is similarly compelling.

[49] However, as was illustrated, the position of Magen Avraham runs into issues calculating *pelag ha-minḥah* at approximately 50 degrees, even if accurate adjustments are applied. One could argue that according to the overall position developed in this monograph, the precise point of sunset loses some of its *halakhic* significance. Alternatively, the thesis to be developed shortly, creating an alternative mode of calculation using three stars as the nighttime endpoint, would solve this issue until one approaches the poles where (all) the standard laws of *zemanim* break down, in any case.

calendar of Jerusalem at the beginning of the 20th century, and increasingly used by many Internet sites, uses a depression angle defined by *alot ha-shaḥar* and a symmetric point after sunset, the point of *tzait* ***kol*** *ha-kokhavim* as defined by the *Gaon*. The apparent logical necessity of utilizing *tzait* ***kol*** *ha-kokhavim* versus the more accepted use of *tzait ha-kokhavim*, defined by three (medium or even small) stars, which occurs much earlier, while logical and consistent with Ramban and other *ḥakhmai Sefarad*, remains bothersome. Assuming the verse in Nehemiah, "*Ve-anaḥnu osim be-melakhah…..mei-alot ha-shaḥar ad tzait ha-kokhavim*," as normally interpreted, it is conceivable that **the daytime period is simply asymmetric with respect to both *ḥatzot* and sunrise and sunset.** Assume that it was conclusively determined that,

- *tzait ha-kokhavim* in its usual sense, was the normative endpoint to be used operationally to calculate the approach that became known as Magen Avraham, and
- *ḥatzot* must be defined precisely.

I can think of only one solution to calculate the approach of Magen Avraham; separate calculating the hours of the day into three steps:

- First, calculate (or more likely, observe) *ḥatzot.*
- Second, calculate the morning *zemanim* from *alot ha-shaḥar* until *ḥatzot.*

- Third, calculate the evening *zemanim* from *ḥatzot* until *tzait ha-kokhavim.*

While this three-step process preserves *ḥatzot*, **it creates a different length to hours before and after *ḥatzot* – hours are slightly longer in the morning.** Might this have been the mode of calculation prior to the precision that came with the use of clocks? I suspect so. It is at least as plausible as the use of *tzait kol ha-kokhavim* that clearly has no record of actual use for many centuries prior to its use in recent times.[50] This approach creates another methodology for defining the hours of the day, following precisely the three steps listed; it provides an alternative to the calendar of R. Tukitzinsky.[51] [52] If this mode of

[50] As demonstrated in section 1, all *ḥakhmai Sefarad* who calculated that *pelag ha-minḥah* occurs at the time needed to walk ⅙th of a *mil* before sunset, were using *tzait kol ha-kokhavim* and not just the appearance of three stars. However, it is possible that they may have been articulating only a conceptual approach versus one that was practiced.

[51] To illustrate assume a day where sunrise is at 6:00AM and sunset is at 8:00PM, with *alot ha-shaḥar* 96 minutes before sunrise at 4:24AM and nightfall 42 minutes after sunset at 8:42PM; the day models times for Jerusalem. R. Tukitzinsky's attack was focused on the calculation of *ḥatzot*, calculated as the midpoint between 4:24AM and 8:42PM, at 12:33PM, 27 minutes earlier than the actual time of *ḥatzot* at 1:00PM. The latest time for reciting *kriat shema* was at 8:28:30AM. The approach that uses a corresponding point to *alot ha-shaḥar* at 9:36PM in the evening, delays the latest point for reciting *kriat shema* by 13.5 minutes to 8:42AM, correctly calculates *ḥatzot* at 1:00PM and establishes *pelag ha-minḥah* at 7:48:30PM. The alternative calculation, using asymmetric endpoints, produces the same latest time for reciting *kriat shema* at 8:42AM and *ḥatzot* at 1:00PM with the same length hour of 86 minutes used only for morning *zemanim*. The morning *zemanim* until *ḥatzot* are identical; the afternoon hour is slightly shorter (by 54 / 6 or 9 minutes) at 77 minutes. *Pelag ha-minḥah* would be 96 minutes and 15 seconds before 8:42PM at 7:05:45PM. What should be observed is that none of the alternative times for *alot ha-shaḥar* will impact the time of *pelag ha-minḥah* a surprising result that some will find troubling and others rather appealing. For completeness note that the fixed 72 minute calculation, calculates *ḥatzot* correctly, establishes an end time for reciting *kriat shema* at 8:54AM, and *pelag ha-minḥah* is at 7:29:30PM; a fixed 90 minute

determining *shaot zemaniot* was in fact used prior to the advent of clocks,[53] one can easily speculate that it was transformed by the introduction of clocks and time-based calculations. The resulting calculation created uniform hours throughout the day but an inaccurate point of *ḥatzot*, a calculation that had adherents in Europe and was successfully opposed by R. Tukitzinsky.[54] [55]

5. Of the three criteria given by the *gemara* in *Shabbat* – time, the appearance of stars and darkness (darkening / appearance of the sky / horizon), which if any are the definition of night and which are just approximations or an indication? How can opinions expressed using these three terms be compared?

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calculation also calculates *ḥatzot* correctly, establishes an end time for reciting *kriat shema* at 8:45AM, and *pelag ha-minḥah* is at 7:43:45PM.

[52] This approach is further complicated by the need to specify the precise time that three medium stars appear, as opposed to the time that three small stars appear that traditionally indicate the end of *Shabbat.*

[53] This method addresses completely the major questions raised by R. Pimential against counting from *alot ha-shaḥar* versus sunrise in the seventh and eight chapter of the second *maamar* of *Minḥat Kohen*, a topic beyond the scope of this monograph, which will be covered in a forthcoming monograph on *Shaot Ha-yom*.

[54] This alternative also eliminates the most obvious use of *tzait kol ha-kokhavim*; were it substantiated, one might consider the hypothetical examples of section 9 even less plausible.

[55]The practice in Jerusalem instituted by R. Tukitzinsky faces challenges, particularly in setting the afternoon *zemanim* when coupled with a 90-minute interval. As indicated earlier in the summary to section 2, in the winter where the day is only ten hours long, *pelag ha-minḥah* occurs approximately 83 minutes before *tzait kol ha-kokhavim* or about 13 minutes after sunset. Using 72 minutes, adjusted or otherwise, or the method suggested avoids such an occurrence.

I maintain a clear bias towards levels of darkness and light defining both the end and the beginning of the *bein ha-shemashot* period, as well as almost all other *zemanim*. What is not yet fully recognized is that relying on depression angles for defining the level of darkness is akin to relying on clocks to tell time.[56] More importantly, depression angles naturally incorporate adjustments based on season and latitude, something that clocks more than likely obscured. A clock is just an artifact; depression angles are a mechanism for accurately specifying the *halakhic* notion of darkness.

While both the appearances of stars and multiple levels of darkness vary naturally with seasons and latitude, clocks likely had impact with their introduction. As time became an easier and preferred method for specifying observance, it is likely that darkness levels and the appearance of stars became less often observed, less well understood and, as a result, of reduced relevance.

Motivated by the desire to understand the observations and findings of R. Tukitzinsky directly, I have carefully observed the appearance of stars and the darkening of the horizon at various latitudes and during different seasons of the year. As best as I can observe, the point at which the apex of the sky appears as dark as the eastern horizon slightly precedes the appearance of three or more stars. However, it is not yet as dark as the eastern half of the sky will become as one waits longer;

[56] I have seen calendars that while using depression angles choose to write three small or medium stars, presumably to make people more comfortable, avoiding marketing challenges and the need to explain or justify their use.

the (eastern half of the) sky darkens further until sometime after a point in the evening comparable to the point in the morning of *mi-she-yakir.* Even at that point, there is still some remaining illumination from the sun visible on the western horizon. Though this level of darkness that occurs around the appearance of three stars is, in all likelihood, what is described in the *gemara* and has been the *pesak* of generations of *posekim* for the end of *Shabbat*, it may still leave one feeling uncertain about the time at which *Shabbat* ends. Unlike *alot ha-shaḥar* where there is minimal (or no light) light, the end of *Shabbat* occurs when there is significantly more illumination. Furthermore, without the use of depression angles, many might feel that the point of *ḥashekhah* is difficult to specify with precision relative to three (small, adjacent) stars, perhaps influencing many to consider stars as defining.

Assuming that the appearance of three stars and *alot ha-shaḥar* are equidistant from sunrise and sunset also makes it nearly impossible to regard darkness as defining; one would expect it to be equally dark at those two points, and it most certainly is not. In reality, we end *Shabbat* when there is more illumination than at *alot ha-shaḥar*. This adds yet another reason why some doubted their observation of the degree of darkness, and preferred instead to think of both

- stars as defining, and
- clocks as more reliable and precise than observation.[57]

[57]Clocks and related time-based definitions suffer from their uniformity across by latitude and season. However, stars are more subject to variability based on

- the knowledge and acuity of the observer,

6. **How is the duration of the *bein ha-shemashot* period to be adjusted at different locations and during different seasons (if at all)? Might this depend on whether the period of *bein ha-shemashot* is**
    1) **an interval of uncertainty that is its own unique halakhic category, either**
        a) **a combination of both day and night, or perhaps**
        b) **a category of its own, or**
    2) **an interval with a definitive transition point that we are uncertain how to pinpoint, either**
        a) **practically or perhaps**
        b) **because of some element of *halakhic* uncertainty, or**
    3) **an example of the Rabbis establishing a *fence*?**

In this and the following two sections, the approach of the *geonim* is assumed and options for the length, end and beginning of the *bein ha-shemashot* period are discussed within their framework. It is easiest to begin with the length of the *bein ha-shemashot* period. This turns out to be a critical method to estimate the beginning of the *bein ha-shemashot* period given the assumption that the end of the *bein ha-shemashot*

- arguments about what constitutes a small, medium or large stars and
- the use of telescopes or other artificial means to improve observation.

On the other hand, if one had an agreed to definition of *hiḥsif ha-elyon ve-hishveh le-taḥton*, I believe it would be less subjective.

period is not in question. The interval of *bein ha-shemashot* can be specified either as

- the interval between two precisely defined physical events / depression angles, or
- an interval of time prior to the end of the day.

Despite the potential dependence of these alternate specifications on the theoretical alternatives for defining the period of *bein ha-shemashot*, I have argued that the issues are independent. The discussion that follows concentrates only on these two alternatives; other specifications are either variations or combinations.

One issue briefly outlined is the difference between *safek ḥashekhah* and *bein ha-shemashot*. I assume that the period of *safek ḥashekhah* is shorter than the period of *bein ha-shemashot* and represents a period of real doubt about whether *ḥashekhah* and the beginning of *Shabbat* at a biblical level has occurred.[58] Similarly *safek ḥashekhah* creates a period of doubt regarding the end of *Shabbat* as well. The period of *bein ha-shemashot* represents a longer interval, where *Shabbat* is mandated, but only at a rabbinical level, and is discussed primarily relative to the beginning of *Shabbat*.[59]

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[58] The remainder of this section could be rewritten independent of this assumed relationship between the periods of *bein ha-shemashot* and *safek ḥashekhah* if one were to feel that this assumption is not justified.

[59] A related topic is the practical as well as conceptual relationship between sunset, the beginning of the period of *bein ha-shemashot*, the beginning of the period of *safek ḥashekhah* and *ḥashekhah*. According to Rabbeinu Tam, both sunset and

The following discussion is not meant to identify a normative position, rather one that presents a highly plausible, if not preferred, reading of the *gemara* that also (partially) justifies the practice of Jewish communities in Europe that started *Shabbat* well after sunset. Seeking to justify practice even at a rabbinical level requires a relatively short period of *bein ha-shemashot*. Using either sunset or even a minimal depression angle would mean that most communities who followed *Rabbeinu Tam* started *Shabba*t during the period of *bein ha-shemashot* or worse.

As an illustrative example, assume that a community ends *Shabbat* 50 minutes after sunset with the appearance of three small stars. Assume further that while three small stars equate to a depression angle of approximately 8 degrees, three medium stars, the *gemara's* end to both the *bein ha-shemasho*t period and *Shabbat*, equates to a depression

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ḥashekhah are distinct from the other two *zemanim*. However, while both the beginning of the period of *bein ha-shemashot and* the beginning of the period of *safek ḥashekhah* are conceptually distinct, for those following Rabbeinu Tam, the two are likely to have been practically treated as coincident for a number of reasons. First, neither *zeman* has a clear astronomical definition. Second, the interval of *bein ha-shemashot* is relatively short and practicing two separate *zemanim* in that interval would be difficult. According to the *geonim*, the situation is more complex. If the period of *bein ha-shemashot* is assumed to begin after sunset according to any of the options that were developed, then it being coincident with the period of *safek ḥashekhah*, at least practically, remains reasonable. However, if *bein ha-shemashot* is assumed to begin precisely at sunset, it is difficult to imagine that sunset can be viewed as the beginning of the period of *safek ḥashekhah*. Investigation of how practice may have developed and other practical alternatives are not pursued further in this monograph. I suspect that given the dominance of the opinion of Rabbeinu Tam, even as practice for beginning the period of *bein ha-shemashot* moved to sunset, the assumed coincidence of the beginning of the period of *bein ha-shemashot* and the period of *safek ḥashekhah* may have remained.

angle of approximately 6 degrees, and occurs 35 minutes after sunset. The period of *bein ha-shemashot* begins approximately 15 minutes before that, at 20 minutes after sunset. To justify practice, two elements must be considered:

- At the biblical level, our focus is on the point of *ḥashekhah*, slightly prior to the appearance of three medium stars.
- At a rabbinical level, our focus is on the interval from the beginning of the period of *bein ha-shemashot* until *ḥashekhah.*

As listed in item 8 above, three alternative opinions, each to be adjusted by latitude and season, advance the beginning of *bein ha-shemashot* by 4 to 15 minutes from sunset. At a minimum, one would naturally maintain that a level of darkness calculated for each of those alternatives must be achieved (to create an element of doubt that is required) to begin the period of *bein ha-shemashot*. Furthermore, one can maintain that the time needed to walk ¾ *mil* is an absolute upper bound, invariant with respect to latitude and season. Thus, the period of *bein ha-shemashot* cannot begin prior to the time needed to walk ¾ *mil* before the point of nightfall. To be as lenient as possible,[60] one would

- subtract from the point of *ḥashekhah* the time needed to walk ¾ of a *mil*, and
- note the time at which a requisite level of darkness is reached,

[60]I would argue consistent with the *gemara* in *Shabbat*, as well.

and then use whichever point is later. Thus, the period of *bein ha-shemashot* begins at the earliest when a particular level of darkness is reached, (for example, a depression angle of three degrees) but the length of the *bein ha-shemashot* interval cannot be longer than the time needed to walk ¾ *mil*. Using the minimum level of darkness is required around the latitude of the Middle East and further south approaching the equator. In those locations during certain periods of the year, subtracting the time needed to walk ¾ of a *mil* from *ḥashekhah* might yield time X. However, the time at which a specific level of darkness, which must also occur prior to the start of the period of *bein ha-shemashot*, is Y minutes later, at time X+Y. For example, assuming that the time needed to walk ¾ *mil* is a maximum length of *bein ha-shemashot* attained only in the summer, in the spring and fall, the *bein ha-shemashot* period may begin only 12, not 13.5, minutes before *ḥashekhah*, when the requisite level of darkness is achieved.

Moving from the Middle East to European latitudes, the focus of this discussion, reaching a particular level of darkness level always occurs at an earlier point than subtracting the time needed to walk ¾ *mil* from the point of *ḥashekhah.* 2104833427 Thus, one obtains the latest (and most lenient) starting point for the *bein ha-shemashot* period by subtracting the time needed to walk ¾ *mil* from the point of *ḥashekhah*, assuming that interval represents an invariant maximum for the period of *bein ha-shemashot*. Support for an invariant interval of *bein ha-shemashot* came from both R. Lorberbaum and R. Sofer, and in the case of R. Lorberbaum

that was coupled with an 18-minute time needed to walk a *mil*, yielding a period of *bein ha-shemashot* of 13.5 minutes.[61] Problematically, in both of those cases the beginning of the period of *bein ha-shemashot* was derived subtracting from an end of *Shabbat* that was determined by the appearance of three small stars. Although their practice was not as stringent as our current practice, which equates to a level of darkness associated with a depression angle of 8.5 degrees, it was still one or more degrees greater than the level of darkness associated with a depression angle equating to three medium stars. An approach that subtracts from the time that three small stars appear, as opposed to an approach that subtracts from the earlier appearance of three medium stars, creates an unintended leniency that would be difficult to justify.[62]

To determine what was the practiced beginning of the period of *bein ha-shemashot* requires a detailed historical analysis beyond that begun by R. Benish.[63] It should be obvious that an early practiced point of *ḥashekhah* together with a long period of *bein ha-shemashot* is likely to avoid both biblical and rabbinic violation on *erev Shabbat*, while a later practiced point of *ḥashekhah* and a short interval of *bein ha-shemashot* would create the highest likelihood of even a biblical violation on *erev*

[61] While, some might argue that all those maintaining this fixed interval for the period of *bein ha-shemashot* follow Rabbeinu Tam, I see no reason for that dependence. The derivation of the time needed to walk ¾ *mil* as a maximum follows from the text of the *gemara* and applies to the approach developed by the *geonim* as well.

[62] R. Feinstein, as outlined below, ruled similarly. This is particularly challenging in more northern locations, as for example in Prague, where three small stars appear approximately 25 minutes later than three medium stars in the summer.

[63] *Ha-zemanim Be-halakhah* records the practices of many communities in chapter 46.

Shabbat. The two other possibilities, a longer *bein ha-shemashot* period prior to a later point of *ḥashekhah* or an early point of *ḥashekhah* preceded by a shorter *bein ha-shemashot* period, make a biblical violation less likely, but may involve a rabbinic violation. To the extent that the theoretical opinion of the Rabbeinu Tam was used, *ḥillul Shabbat* definitely occurred. However, more commonly, the opinion of Rabbeinu Tam was equated to three stars with various stringencies, and the period of *bein ha-shemashot* began some period of time before that. That would make it much more likely that violations which occurred were only at a rabbinic level. Given a large body of evidence including

- R. Pimential's redefinition of Rabbeinu Tam to the earlier point of three small stars,
- the proposed times for the period of *bein ha-shemashot* of both R. Lorberbaum and R. Adler,
- the question concerning the *brit* of a baby born about 25 minutes after sunset, posed to R. Sofer,
- the advice from R. Shneur Zalman of Liadi in his *siddur*[64] and
- the natural cautiousness that one would expect prior to the existence of clocks,

I doubt that **any** communities (as opposed to individuals) ever started *Shabbat* as late as the theory of Rabbeinu Tam would have permitted.

[64]R. Shneur Zalman of Liadi suggested that maximal protest be restricted to those who go past approximately 30 minutes, if they refuse to listen initially.

While I have scant evidence, one can only assume that **any** three stars appearing would likely be taken as indicating that *Shabbat* had begun. All of this, together with the *halakhic* literature only partially referenced above,[65] would seem to point to a beginning to the period of *bein ha-shemashot*, absent *tosefet Shabbat*, at worst between 30 and 40 minutes after sunset. In northern European communities, beginning *Shabbat* around that time likely avoided *ḥillul Shabbat* at least at the biblical level. Unfortunately, it is also probable that some individuals started *Shabbat* even later; the letter of R. Shneur Zalman of Liadi on the beginning of *Shabbat* is particularly telling.

7. When does the period of *bein ha-shemashot* end? How are the criteria specifying the end of the *bein ha-shemashot* period interpreted by various authorities?

Of course we assume adjustments for latitude and season. We need to specify two quantities:

1. the degree of darkness associated with the approximate appearance of three medium stars (the time given in the *gemara)*, and
2. the degree of darkness associated with the approximate appearance of three small, adjacent stars (what has become universally accepted practice).

[65] See as well the many calendars cited in *Ha-zemanim Be-halakhah*.

The former occurs at a depression angle of approximately 6 degrees, and the latter at about 8 degrees. Practice included many variants around those two points. Currently, a depression angle of 8.5 degrees suggested by R. Tukitzinsky, supported by R. Belsky's interpretation[66] of R. Feinstein's 50-minute *pesak*, is widely used.

Some will find the intensity with which the opinion of Rabbeinu Tam was found inconsistent with the *gemara's* description of the end of *Shabbat* excessive. Many might perhaps prefer giving greater credence to difficult and forced efforts at reconciliation.[67] However, current practice, including that of R. Karelitz and others, which disregards Rabbeinu Tam's opinion on the end of *Shabbat*, even for absolute biblical restrictions, is consistent with the conclusions reached. I do not know of another comparable instance where the uncontested opinion of the *Shulḥan Arukh* was overturned so completely.

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[66] See the letter of approbation listed on the website www.myzmanim.com.

[67] As we noted in the introduction, both the *gemara's* description of the end of *Shabbat* and its equivalence to *alot ha-shaḥar* present insurmountable challenges to the opinion of Rabbeinu Tam. Attempts like that of R. Soloveitchik address the latter, while that of R. Pimential and the many *posekim* who followed a similar approach address the former. Attempts to address both issues invariably end up claiming that Rabbeinu Tam's opinion and that of the *geonim* was similar; this argument has been made a number of times in the last century. The first such attempt by R. Shapiro in *Shut Benei Tziyyon* and those that followed do not address the opinion of Rabbeinu Tam as he was understood. I do not believe these approaches are sustainable either factually or conceptually; in any case, since they do not address the opinion of Rabbeinu Tam as it has been interpreted for generations, they are not addressed further.

8. How does the beginning of the *bein ha-shemashot* period relate to what we call sunset? What alternatives might be considered for the beginning of the *bein ha-shemashot* period?

This most controversial topic was summarized in the list of innovations above. As stated in the preamble to this monograph, **sunset is the established time to start *Shabbat***. However, based on multiple expressions in the *gemara*, some more quantitative than others, a beginning to the period of *bein ha-shemashot*

- between the earliest appearance of the first and second medium star,
- shortly before the end of *penai mizraḥ maadimin* and
- *a time to walk 3/4 of a mil* subtracted from the (latest) point of *ḥashekhah*,

can be estimated. Taken as a whole, these different expressions suggest a point between 7 and 14 minutes after sunset.

Where there is a need for greater precision in various circumstances, a *posek* might consider a construct similar to that postulated by R. Adler, specifying two points on Friday afternoon. Until the earlier point even biblical prohibitions may be violated, while only rabbinic prohibitions are allowed after that point until some number of minutes later. Perhaps a *posek* can choose to adjust by season and latitude the equivalent of two points, given for the Middle East around the spring

and fall equinox, the earlier point between 7 to 9 minutes after sunset and the later point between 10 to 14 minutes[68] after sunset. The point chosen in a particular circumstance would provide greater stringency with respect to a biblical obligation and greater leniency with respect to a rabbinic obligation.[69] In cases of (extreme) need, one might also consider limiting the length of the *bein ha-shemashot* period to **at most** 13.5 minutes prior to the appearance of three medium stars, a depression angle of approximately 6 degrees. This area has significant *halakhic* ramifications.[70]

Rabbeinu Tam's late start to *Shabbat* is yet more difficult to imagine if, prior to its formulation, the start of *Shabbat* was precisely at or before sunset. I find it highly implausible to imagine Rabbeinu Tam proposing, even as a purely conceptual position, a notion so fundamentally at variance with practice! Even if the practice had been to start *Shabbat* at or before sunset, it would make more sense that the period was only considered a non-mandated interval of *tosefet Shabbat*. Emergencies that occurred would have clarified the nature of practice. This would lend support to my conclusion: sunset was viewed at most as a non-

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[68] For a host of reasons, if forced to a single number, I would choose (11 or) 12 minutes after sunset. Approximately (8 or) 9 minutes after sunset probably has broadest support. The numbers chosen are based on personal conjecture and observation.

[69] Practically speaking this would be implemented by selecting a depression angle that designates the level of darkness in the Middle East at those times around the spring or fall equinox and then using that depression angle uniformly at other latitudes and during different seasons.

[70] Even if one were to insist on the period of *bein ha-shemashot* beginning precisely at sunset, the above *zemanim* might at the very least be considered as alternatives for defining the start of *safek ḥashekhah*.

obligatory start to (*tosefet*) *Shabbat.* As Jews migrated to Northern Europe, the start of *Shabbat* started to separate further from sunset. Most likely, the start of *Shabbat* remained at least 15 minutes prior to the appearance of three medium stars. It is for such a practice that Rabbeinu Tam provided a conceptual framework. Increased reliance on clocks centuries later may have resulted in a (slightly) later start to *Shabbat* for two reasons. First, the opinion of Rabbeinu Tam could be formulated more precisely. Second, a clock had the unfortunate effect of reducing the period of uncertainty that observation would introduce naturally.

9. How do the two meanings of day – day as in "day of the week" and day as in "during the daytime" relate? Must the end of the daytime period coincide with the end of a day of the week?

This mostly theoretical topic is another to which I hope to return. It would be surprising if the different meanings of the term day in both Hebrew and English had no *halakhic* consequence. On the other hand, one might view aspects of this distinction as a modern innovation due to *Brisker* conceptualization and entirely tenuous given that the *Gaon* did not attach any *halakhic* significance to *tzait kol ha-kokhavim*.[71] Despite insurmountable challenges to Rabbeinu Tam's position, the fact that, unlike the position of the *geonim*, both meanings of the term day

[71] I suspect that prior to the widespread existence of clocks, multiple different events were used to indicate various *halakhic* times. Over time, fewer *zemanim* emerged with the necessary stringencies applied to those that became normative.

terminate at the same time, (at *tzait (kol) ha-kokhavim*) remains a particularly appealing feature of Rabbeinu Tam's position. Whether both meanings of the term day terminate at the same time according to the *geonim* as well, is unclear.

A concluding example:

The migration of Jews from the Middle East to other locations required adjustment in practice that often necessitated creating concrete concepts in areas that might have otherwise been left unexplored. That process contributed to a wealth of material with which many *posekim* have had to grapple. Both the categorization and the new approaches that have been proposed should make this vast *halakhic* literature more understandable.

As I mentioned in the preamble, criticism within the rabbinic literature has been muted,[72] and potential inaccuracies have often not been identified and discussed adequately. As a result, it is impossible (perhaps even for great *posekim* who are unacquainted with astronomy or the impacts of season and / or latitude) to read the literature without intense effort. The writings of a *posek* like R. Weiss, who lived in the United Kingdom and Israel, are of particular relevance and importance, and demonstrate his effort to align sources with observation.

[72] There are a few notable and important exceptions. While I have identified almost all of the errors found in the literature, I have refrained from identifying many of the instances where they occur,

Let me illustrate using the most widely followed *posek* of our times, and conclude with a few words that I hope will be taken as they are meant. I choose R. Feinstein because I assume most will conclude that if his responsa illustrate my concerns, I could have chosen the writings of various other major *posekim* as well, exhibiting either similar or other issues.

Consider five decisions of R. Feinstein:

1. In the New York area, *Shabbat* ends 50 minutes after sunset even in accordance with Rabbeinu Tam.
2. One may recite the morning prayers as early as 90 minutes before sunrise under special circumstances.
3. One performs a *brit* the following week on Wednesday, for example, for a baby born late Wednesday afternoon, until 9 minutes after sunset.
4. In the New York area, specific activities forbidden on *Shabbat* only at a rabbinic level are permissible under special circumstances until (30 to) 40 minutes after sunset on Friday.
5. Unlike other *zemanim*, *ḥatzot* is always at the same time (that varies by location) and does not vary throughout the year.

Summarizing issues discussed previously, the arguments in these *teshuvot* can be challenged in six[73] different areas:

1. Like R. Pimential's approach to Holland, R. Feinstein's derivation of 50 minutes for New York, reasons by analogy from the appearance of stars, using Lithuania as his base for 72 minutes. Were R. Feinstein to have used Israel / Babylonia, certainly a more logical choice,[74] he would undoubtedly have reached a radically different conclusion. R. Willig expresses a similar point, albeit less directly.[75] Generally, this *pesak* is quoted without hesitation or comment.[76]
2. As R. Feinstein is following the conceptual approach of Rabbeinu Tam, then the end of *Shabbat* and the time for *alot ha-shaḥar* ought to be symmetric, both separated by the same number of minutes from sunset and sunrise, respectively. Instead, R. Feinstein:

    - Relies on a 22.5 versus 18-minute time needed to walk a *mil* for *alot ha-shaḥar* but never even suggests a 22.5-minute based stringency for *Shabbat*.

[73] R. Feinstein's mention of the time needed to walk 4 *milin* as 96 minutes, while given no practical consequence, is also problematic. R. Feinstein's view of *mi-she-yakir* and a number of his passing comments may shed light on some of his unstated reasoning; this highly speculative area is not addressed.
[74] However, Israel is a location where he had no mimetic tradition.
[75] This issue was raised directly (and respectfully) in a recent *sefer* by R. Heber, *Shaarei Zemanim*, page 90.
[76] Perhaps new meaning for the term *ḥasid shoteh* can be ascribed to the publishers of a sheet that I picked up at the *Kote*l, which provides R. Feinstein's 50 minute *zeman* for New York for use in Jerusalem.

- Adjusts only the end of *Shabbat* but not *alot ha-shaḥar* based on latitude.[77]
- Never addresses the relationship between his rulings, which, according to the opinion of Rabbeinu Tam whom he is following, are conceptually linked.

3. Adjusting *zemanim* based on latitude to correlate to physical occurrences, like the appearance of stars or the degree of light, is strongly supported. However, adjusting by location the length of time to walk a *mil* that is not in any way linked to latitude,[78] has no logical basis and leads to conclusions that are in fundamental conflict with observation.[79]
4. Deriving the beginning of the *bein ha-shemashot* period by subtracting from the time that *Shabbat* ends is common in *pesak,* and rooted in the text of the *gemara.* However, it requires that the end of *Shabbat* be established accurately. The time that R. Feinstein uses for the end of *Shabbat* is his (and R. Tukitzinsky's) calculation, which is among the most stringent methods for calculating what is already a stringency based on three small stars and not the point that the *gemara* uses, three medium stars. This

[77] R. Feinstein mentioned briefly the possibility of adjustments based on latitude for setting the time of *alot ha-shaḥar*, but chose not use them.
[78] In *Igrot Moshe O. Ḥ.* 4:62, R. Feinstein suggests (50 / 4 =) 12.5 minutes for the length of time needed to walk a *mil* in the New York area.
[79] While there exists imprecise language in the literature that speaks in terms of such adjustments maintaining certain ratios, using it as a basis for a *pesak* that reduces / equates 13.5 minutes to 9.375 minutes is inexplicable. As noted, this is logically equivalent to asserting that a watch that measures 72 minutes in Lithuania, only measures 50 minutes in New York.

is further impacted by R. Feinstein's use of a "truncated / adjusted" time needed to walk ¾ *mil* of 9.375 minutes (as opposed to 13.5 minutes) for the New York area, resulting in a significant leniency. To be concrete, as opposed to the 40 minutes (50 minutes and subtracting 9.375 minutes for the *bein ha-shemashot* interval) after sunset that R. Feinstein derives, three medium stars are visible approximately 27 to 32 minutes after sunset. *Safek ḥashekhah* and certainly the period of *bein ha-shemashot* precedes that point by some number of minutes. Of course, R. Feinstein, operating within the framework of Rabbeinu Tam, may not consider 50 minutes as a stringency.

5. *Ḥatzot* varies slightly day to day (given the tilt of the earth in its orbit) according to all of the methods for calculating the hours of the day. The variation is approximately 20 minutes in the New York area.
6. At a very exacting level, R. Feinstein calculates adjustments based on latitude without regard for the non-linear relationship that exists between the duration of different sub-intervals of *bein ha-shemashot*.[80]

In all but the third item above, R. Feinstein had an extensive literature from which to derive support. As was noted, R. Soloveitchik carefully recast the opinion of Rabbeinu Tam to avoid these and other issues.

[80] This issue becomes more consequential at latitudes further from the equator. In a society that provides times for *vasikin* using fractions of seconds, perhaps there is a need for such precision. Specifically, because of the non-linearity, the beginning of the twilight period exhibits less variance based on latitude or season than its end.

However, he maintained a conceptually elegant approach to Rabbeinu Tam as well as a personal stringency, which is unheard of in the *halakhic* literature, widely divergent from practice and, nonetheless, does not address the observational challenges to Rabbeinu Tam from the *gemara* in *Shabbat.* However, given that this is an area with a long tradition of practice, great *posekim*, of whom R. Feinstein is a unique example, exhibit an impeccable sense[81] that guides them in how to decide. I remain struck by the accuracy of R. Feinstein's major decisions, independent of their problematic rationale. Let us re-examine the five decisions and how they might be alternatively justified:

1. *Shabbat* ends 50 minutes after sunset in the New York area. Despite this not being the conceptual opinion of Rabbeinu Tam, as R. Feinstein assumes, it is precisely[82] the opinion of the *geonim* as calculated by R. Tukitzinsky, the first major contemporary figure to write extensively on this topic combining knowledge of both *halakhah* and astronomy.
2. One may recite the morning prayers as early as 90 minutes before sunrise in special circumstances. A latitudinal and seasonal adjustment of 90 minutes provides a basis for yet greater leniency. Beyond reliance on a time needed to walk a *mil* of 22.5 minutes, 90 minutes in New York is close to both the scientific point of first light (approximately 90 to 120 minutes

[81] In addition to or perhaps as a result of *siyattah di-Shemayah*.
[82] R. Belsky's (re)interpretation of R. Feinstein makes this correspondence precise. See his letter of approbation for www.myzmanim.com available on the website and the website's detailed explanation of their use of depression angles in computing the position of R. Feinstein.

before sunrise), and, more importantly, a latitudinal and seasonal adjustment applied to 72 minutes (approximately 80 to 110 minutes). The fact that R. Feinstein was willing to rule so differently on the end of *Shabbat* and *alot ha-shaḥar* aligns completely with practice,[83] albeit in conflict[84] with the conceptual viewpoint of Rabbeinu Tam.

3. <u>One performs a *brit* the following week, for example, on Wednesday for a baby born late Wednesday afternoon, until 9 minutes after sunset.</u> Clearly, this *pesak* is in perfect alignment with the analysis developed in this monograph and similar to the tradition of Jerusalem over the generations that assumed that a baby born a few minutes after sunset has his *brit* on the same day the following week.[85] Even rejecting Rabbeinu Tam's late end of *Shabbat* based on the overwhelming arguments of the *Gaon* and others, a start to a day a few minutes after sunset is supported by generations of practice. Currently, R. Feinstein's slightly delayed beginning to the period of *bein ha-shemashot* is often rejected.

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[83] Maintaining a briefer interval between sunset and the end of *Shabbat* than between *alot ha-shaḥar* and sunrise is strongly supported by many who follow the approach of either the *geonim* or R. Pimential, including the custom of Jerusalem where *alot ha-shaḥar* begins the daytime period 90 (adjusted) minutes before sunrise while *Shabbat* is concluded at most 42 minutes after sunset.

[84] Often implicit and perhaps unrecognized, this was exhibited concretely in calendars where, as discussed, the calculation of Magen Avraham was flawed.

[85] See *Minhagei Eretz Yisrael* by R. Gliss, pages 102 and 282, who mentions 4 to 5 minutes and *Zemanim Ke-hilkhatam* by R. Boorstyn, chapter 2, section 1, footnote 7, who claims that R. Shmuel Salant would rule that a baby born after sunset but before the call of the *mugrab*, seven to ten minutes after sunset, has his *brit* on the same day the following week.

4. In the New York area, specific activities forbidden on *Shabbat* only at a rabbinic level are permissible under special circumstances until (30 to) 40 minutes after sunset on Friday. Perhaps the most challenging, given the undisputed assumption that the *gemara* meant the beginning of the *bein ha-shemashot* period to extend back from three medium stars (a depression angle of about 6 degrees) versus R. Feinstein's roughly 8.5 degrees, and R. Feinstein's use of a "truncated / adjusted" 9.375 minutes as the time needed to walk ¾ *mil*. Nonetheless, being exceedingly liberal with respect to a rabbinic prohibition, especially in the face of need, has a long tradition. Unfortunately, in the New York area, in most, if not all seasons of the year, 40 minutes after sunset is well past the point of *ḥashekhah*. Even 30 minutes is likely past the point of *ḥashekhah* in the New York area during part of the spring and fall.
5. *Ḥatzot* is always at the same time. Similar to R. Feinstein's 50 minutes for the end of *Shabbat*, there is a need for seasonal adjustment. Like a number of rabbis who oppose this type of complexity in *pesak*, though differently motivated, R. Feinstein's tradition was to use a single time.[86]

[86] I wonder if the earlier practice that I hypothesized, where *ḥatzot* was simply observed and hours were reckoned from that point, may have had a role implying a non-calculated approach.

On the first three rulings, R. Feinstein's *pesak* can be easily justified on other grounds.[87] The latter two are somewhat less critical and more problematic. However, it is often dangerous for Rabbis to apply or extend elements of R. Feinstein's logic to other areas where *zemanim* are critical without his innate sense of how to *pasken.*[88]

Final Comments:

The intent of this monograph is to address seminal issues relevant to the period of *bein ha-shemashot* without covering in depth many important sub-topics. Hopefully, the approach and observations will make this vast literature easier to study. While I did not want to address explicitly either philosophic issues or practical issues of *pesak*, I suspect that my personal opinions on both are clear. I was strongly motivated to defend *minhag Yisroel*, a mimetic tradition that for many centuries, up until the Second World War, relied on the opinion of Rabbeinu Tam in many parts of Europe.

As I studied this topic, I was repeatedly revisiting three issues:

- If in ancient times, sunset, a very easily identified occurrence, was considered the precise starting time for *Shabbat*, how could it

[87] These first three opinions have broader support beyond the authorities briefly quoted, as I have repeatedly demonstrated throughout this monograph.
[88] There are a number of examples in the recent *halakhic* literature where either 40 minutes is applied as a basis for a leniency, or one (unknowingly) subtracts from a point of *ḥashekhah* incorporating various stringencies (and hence creating an unintended leniency) where use of the earliest point of *ḥashekhah* would clearly be appropriate.

have ever been forgotten and / or abandoned? If *Shabbat* started sometime after sunset, then the position of Rabbeinu Tam and an overwhelming number of *rishonim* is more plausible. As Jews migrated northward, the required beginning to *Shabbat* separated even further from sunset, particularly if the period of *bein ha-shemashot* was thought to have an unchanging maximum length - the time needed to walk ¾ of a *mil*.[89]

- If observation challenged only Rabbeinu Tam's opinion of the time for the period of *bein ha-shemashot* while leaving use of sunset proper as the beginning of the period of *bein ha-shemashot* free of any issues, why did major figures living in southern Europe and even the Middle East, including Ramban and R. Yosef Caro, adhere to Rabbeinu Tam's opinion?
- How could generations of practice that relied on various alternatives based on the opinion of Rabbeinu Tam be so easily and completely discounted? In my mind, the modern predisposition to treat sunset proper as the beginning of the *bein ha-shemashot* period, rejecting, for example, even R. Feinstein's limited reliance on (elements of) the approach of Rabbeinu Tam is unwarranted.

I hope that what I have written, at least partially, addresses these questions.

[89] Whether Jews in particular locales voluntarily started *Shabbat* earlier during various periods of history is not our focus. It is hardly surprising that the practiced interval of *bein ha-shemashot* has lengthened (slightly) over the generations, as well.

The approach developed posits that the period of *bein ha-shemashot* begins after sunset, later than many assume, while its end is somewhat earlier than current practice.[90] While some will contend that the criticism, suggested innovations and conclusions do not exhibit sufficient deference to generations of *pesak*, I hope that this monograph demonstrates a commitment to integrity, clarity, simplicity, consistency with basic astronomic observations, faithfulness to basic texts and *halakhic* insights and respect for generations of practice.

In summary, a fulsome defense for a later start to *Shabbat* is anchored on three points:

1. *Mi-she-tishkeh ha-ḥamah* refers to a point after sunset.

[90] R. Y. C. Sonnenfeld's *teshuvah* 33 (an approbation to a *sefer* on *zemanim*) on this topic is remarkably supportive. While speculating that we may have to wait for Elijah to defend the fundamental difficulties with Rabbeinu Tam's end to the period of *bein ha-shemashot* and *Shabbat*, he raises issues with the approach of the *Gaon* as to the beginning of the period of *bein ha-shemashot* from *sugyot* that imply that the day extends past sunset. While suggesting that we follow both *ḥumrot* and stating a personal preference not to attempt to decide on a matter so long in dispute, he expresses hope that this will be clarified one day. I believe that I have taken a step in that direction. In any case, regardless of his suggested practice, like this monograph he acknowledges issues with the end time of *Shabbat* according to Rabbeinu Tam and raises issues with the start time of *Shabbat* according to the *geonim.* While not surprisingly, R. Sonnenfeld suggests that one adopt the stringencies of both positions; the approach developed, attempting to justify generations of practice, did the opposite, making use of the leniencies of a hybrid approach. Reiterating, in remarkable alignment with historical practice, the challenges to Rabbeinu Tam relate primarily to his period of *bein ha-shemashot* well over an hour after sunset, while the challenges to the *Gaon* relate to his beginning the *bein ha-shemashot* period precisely at sunset.

2. The time needed to walk ¾ of a *mil* is the maximum, not the minimum, length of the period of *bein ha-shemashot* in the Middle East.
3. When applying the *gemara's* maximum interval of *bein ha-shemashot* to other locations, its length need not be extended.

The first is the preferred reading of the *gemara* in *Shabbat* in accordance with most *rishonim.* The second is strongly supported by simple logic and arguably by the statement of Shmuel, though certainly at variance with the prevalent contemporary interpretation based on the approach of the *Gaon*. The third is clearly debatable, but represents the implicit viewpoint of some major *posekim* and a plausible approach to what is more than likely only a *harḥakah*. All three are needed to defend fully historical practice. However, even the first, or certainly the first two points, should influence contemporary *pesak*, particularly in extenuating circumstances.[91]

Those familiar with R. Kapach's approach to Rambam throughout *Mishnah Torah*, will recognize that his conclusions as to Rambam's

[91]Beyond conjecture, lacking any textual or historical basis, and more in the realm of speculation, I wonder if the *Gaon*'s identification of sunset as the precise point when the period of *bein ha-shemashot* begins had an overriding religious objective of preventing serious desecration of *Shabbat* that any slightly later point might have weakened. As was noted, R. Zalman of Liadi was slightly more lenient both in his assertion that the period of *bein ha-shemashot* begins 4 minutes after sunset and at a later point, around 20 to 30 minutes after sunset, where he felt there was no option other than strong protest and rebuke. R. Ḥaim Volozhin delayed the start of the period of *bein ha-shemashot* beyond 4 minutes, by at least 2 additional minutes. Current practice has adopted sunset precisely, almost without reservation; it seems appropriate that strict adherence to sunset as the beginning of the period of *bein ha-shemashot*, particularly in cases of need, be examined more carefully.

position on the twilight period and much of this monograph are consistent. While R. Kapach's approach tacitly assumed stars, as opposed to darkness, as defining both the beginning and the end of the period of *bein ha-shemashot*, something I believe that Rambam did not support, R. Kapach's practical conclusions and insights into Rambam aligns Rambam across *Mishnah Torah*[92] with the ideas that have been developed.[93] [94]

While their rationales were different, many of the *posekim* who agreed with an approach similar to R. Pimential's supported a position akin to what has been suggested throughout the monograph. In practice, they allowed work after sunset proper and awaited only three (small) stars, not a full 72 minutes. Most importantly, they would never allow work on Friday, anywhere nearly as late as Rabbeinu Tam's conceptual position would suggest.[95]

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[92] R. Kapach asserts that the period of *bein ha-shemashot* begins 15 minutes after sunset, somewhat later than I believe Rambam necessarily maintained.

[93] As has been mentioned previously, objections to the approach of the *geonim* derive from *sugyot* where sunset does not appear to be a precise delimiter. Similarly, despite Rambam's clear identification with the position of the *geonim*, some try to align his position with Rabbeinu Tam based on the fact that he did not consider sunset as critical as many assumed that an approach like that of the *geonim* had to maintain. As has been argued throughout this monograph, the "**either-or**" assumption of either Rabbeinu Tam or the *geonim*, without intermediate positions, is an assumption that I find neither conclusive nor correct.

[94] Building on R. Kapach's approach, a future paper will attempt to demonstrate that Rambam maintained a hybrid / intermediate position, similar to the position of the *geonim*, consistent with the text of the *gemara*, astronomic observation and supportive of the approach taken in this monograph.

[95] Additionally, R. M. Posen throughout *Ohr Ha-meir* argues that while the *Gaon* himself considered sunset proper as the beginning of the period of *bein ha-shemashot*, the *geonim* maintained a position similar to the hybrid position developed throughout this monograph. However, unlike this monograph,

Both the practice suggested by many of the *posekim* who decided similarly to R. Pimential, as well as R. Kapach's interpretation of Rambam are in conceptual alignment with the approach developed throughout this monograph. Prior to the widespread use of clocks, it is entirely plausible that despite agreement with Rabbeinu Tam's conceptual position, R. Pimential's approach may have been the practice of some / many communities. Perhaps even for Ramban, R. Yosef Caro, and others who lived in southern Europe, some of whom moved or travelled to the Middle East, practice that is so divergent from observation cannot be tacitly assumed.[96]

Clearly, in the study of *zemanim*, one has to "look up" as well as "look in." Over the past few hundred years, careful observation of nature has most often been replaced by a fixation with time and timepieces. While observation could often temper conceptualization and moderate its practical application, clocks and time measurements offer no such

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- his proofs derive primarily from analysis of *geonic* texts and how they are referenced by *rishonim*,
- his interpretation of the primary *sugyah* in *Shabbat* differs in specific details,
- he assumes stars, not darkness, as defining without any mention of a dispute or its relevance and
- he is more definitive about the exact beginning of the period of *bein ha-shemashot*.

Interestingly, R. Posen notes that R. Zalman of Liadi, who maintained a slightly delayed start of the period of *bein ha-shemashot*, quotes the *geonim*, while the *Gaon* does not. His discussion of the *gemara* in *Pesaḥim* also differs from the analysis in this monograph. He also does not raise the possibility, given the opinion of R. Ḥaim Volozhin, that perhaps the *Gaon* was asserting sunset only *le-migdar miltah*.

[96] This divergence between practice and conceptualization is something I cannot explain; in any case it also cannot be denied. It is an area that would require a careful historical analysis.

constraints. The precision of clocks contributed a misleading and often mistaken sense of accuracy and did little, if anything, to enhance clarity in an already complex area.