

THE SUN'S PATH AT NIGHT

The Revolution in Rabbinic Perspectives
on the Ptolemaic Revolution



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Cover photograph: An armillary sphere, depicting the Ptolemaic model of the cosmos.

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The Sun's Path at Night:

The Revolution in Rabbinic Perspectives on the Ptolemaic Revolution

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Introduction

The clash between reason and authority has many manifestations. But it comes to the fore with the issue of statements by the Sages of the Talmud concerning the natural world that are subsequently contradicted by science. In traditionalist circles, arguments about this topic have become especially heated in recent years, with many ultra-Orthodox authorities claiming that to attribute such error to the Sages was never a traditional view and is actually heresy.¹

Typically, arguments about this topic range far and wide, covering many different statements in the Talmud and Midrash. But there is one short passage in the Talmud—a mere five lines in length—which crystallizes the entire issue. Dealing with an aspect of cosmology that is outdated and obscure from a modern perspective, most students of the Talmud today gloss over it with little comprehension; indeed, the very word “cosmology” (which refers to the structure of the universe) is unfamiliar to many people. Yet when clarified, and the views of rabbinic scholars throughout the centuries on this passage are surveyed, it powerfully illustrates the

¹ See www.zootorah.com/controversy for a range of materials relating to such controversies. See too Rabbi Reuven Schmeltzer's *Chaim B'Emunasam*, together with its rabbinic endorsements; for a critique of this work, see www.zootorah.com/controversy/chaim.html.

radical transformation that has taken place over the ages with regard to how Jews view the Sages of the Talmud.

Babylonian Vs. Ptolemaic Cosmology

The Talmud consecutively relates two disputes between the Jewish and gentile scholars concerning matters of astronomy. The first is with regard to the celestial sphere which encompasses the earth, and the constellations:

The Rabbis taught: The Sages of Israel say that the sphere is fixed and the constellations revolve [within it], and the scholars of the nations say that the sphere revolves [around the earth] and the constellations are fixed [within it]. (Talmud, *Pesachim* 94b)

As we shall later demonstrate from both general history as well as the interpretations of the Geonim and Rishonim, the view of the Sages of Israel was that of ancient Babylonian cosmology.¹ They believed that the earth is a roughly flat disc,² and the rest of the universe is a hemispherical solid dome fixed above it. The stars move around the surface of this dome; hence, “the [hemi]sphere is fixed and the constellations revolve [within it].”

The opposing view, of the scholars of the nations, was that presented by Aristotle and refined by Ptolemy in his *Almagest*. In this view, the earth is a perfect sphere, and the rest of the universe is a larger sphere³ which encompasses it and revolves around it. The stars are permanently embedded in the surface of the larger sphere, and move along with it; hence, “the sphere revolves and the constellations are fixed.”

There are those who doubt whether the dispute between the Sages of Israel and the sages of the nations was as we have described it. However, if we look at the very next lines of the Talmud, we will be able to show that this is clearly the case. This is because it presents a set of arguments which we find elsewhere. The Talmud cites the following discussion by Rebbi (R. Yehudah HaNasi) and Rav Acha bar Yaakov:

¹ See Wolfgang Heimpel, “The Sun at Night and the Doors of Heaven in Babylonian Texts,” and Moshe Simon-Shoshan, “The Heavens Proclaim the Glory of God – A Study in Rabbinic Cosmology.”

² More precisely, they believed it to be slightly raised at the center, with the Land of Israel at the apex, and Jerusalem at the very center of the apex (Talmud, *Kiddushin* 69a and *Sanhedrin* 87a; Midrash *Sifri*, *Ekev* 1). See too the statement of the Talmud, *Shabbos* 65b, regarding rainfall in Israel resulting in a rise in the Euphrates (and see the comments of Rashi and Tosafos ad loc.).

³ More precisely, a series of larger spheres.

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Rebbi said: A response to their words is that we have never found the Great Bear constellation in the south and the Scorpion constellation in the north. Rav Acha bar Yaakov objected: But perhaps it is like the axle of a millstone, or the hinges of a door socket. (Talmud, *Pesachim* 94b)

An identical set of arguments is found in the writings of Cosmas Indicopleustes of Alexandria, a sixth-century monk, in a polemic against those who believed in a spherical earth. Cosmas presents the same argument used by Rebbi and pre-empt's Rav Acha bar Yaakov's counter-argument:

But you will most effectually rebuke them if you say: Why does that [celestial] sphere of yours not revolve from the north to the south, or from some other quarter to its opposite? ...But if, again, it rolls and rotates always in the same spot without moving from place to place, then it must be upheld by supports like a turner's lathe, or an artificial globe, or on an axle like a machine or a wagon. And if so, then we must again inquire by what the supports and axles are themselves upheld, and so on *ad infinitum*... When these problems then concerning the nature of things are discussed, there remains the conclusion, as we said before, that the heaven is fixed and does not revolve. (*Christian Topography*, part I)

Cosmas Indicopleustes uses the same terminology as the Talmud. Like Rebbi, he argues that if the universe was a celestial sphere revolving around the earth, in which the constellations are embedded, then the constellations should move all over the place, and yet some constellations are always found in the north, and others always in the south. He notes that there is a counter-argument—in the Talmud, voiced by Rav Acha bar Yaakov—that the sphere has a north-south axis around which the rotation takes place, but argues that this axis itself would require support. Since the identical arguments are used, we can see that the Jewish and gentile sages were indeed involved in the dispute between the ancient Babylonian cosmology and the newer Ptolemaic model.

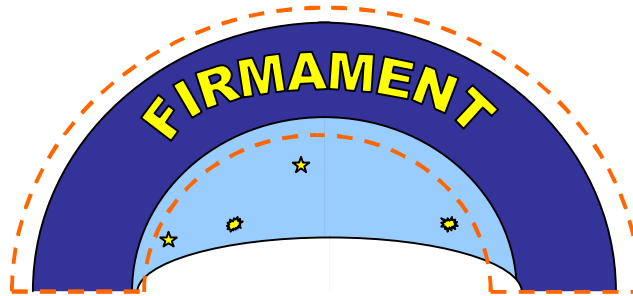
The Talmud immediately continues to relate another difference of opinion between the Jewish and gentile scholars:

The Sages of Israel say, During the day, the sun travels below the firmament, and at night, above the firmament. And the scholars of the nations say, During the day the sun travels below the firmament, and at night below the ground. Rebbi said: Their words seem more correct than ours, for during the day the wellsprings are cool and at night they steam (due to being heated by the sun passing beneath them—Rashi). (Talmud, *ibid.*)

This is a corollary of the first dispute. Consistent with the ancient Babylonian cosmology, the Jewish Sages believed that when the sun sets, it cannot continue downwards, and it must instead change direction. First it enters the firmament horizontally, and then after passing through the firmament, it changes direction

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again, rising up to pass behind the firmament back to the east. The gentile scholars, on the other hand, knew that the world is spherical and that the universe (or “celestial sphere,” in their model) surrounds it on all sides, and thus the sun can make a full orbit around the earth. This time, instead of disputing the view of the gentile scholars, R. Yehudah HaNasi acknowledges that their description appears correct, since it would account for the mist rising up in the morning from natural bodies of water; he believed this mist to be steam caused by the sun heating the water from beneath.



The dotted line depicts the path of the sun, according to the view of the Jewish sages.

From citations of these passages by some medieval Talmudists, it is clear that there were variant texts, some of which we shall later discuss.¹ However, these need not concern us here; in any case, the text in our version of the Talmud appears to be the most accurate, and is consistent with the arguments appearing in non-Jewish works of the period. By conceding to the gentile scholars, Rabbi Yehudah HaNasi was accepting the Ptolemaic system, which, while in error concerning geocentricity, was vastly closer to reality than the Babylonian system. His intellectual honesty is all the more striking in light of the fact that in the first dispute, he presented an argument to bolster the Babylonian cosmology.

The ancient Babylonian cosmology held by the Jewish sages appears in many places in the Talmud,² such as in the following discussion:

It was taught in a Beraita: Rabbi Eliezer says, the world is like an exedra, and the northern side is not enclosed, and when the sun reaches the north-western corner, it

¹ Rabbi Menachem Kasher discusses the variant texts in “The Form of the Earth and its Relationship to the Sun in the Works of Chazal and the Rishonim” (Hebrew) *Talpiyot* Year One Vols. 1-2 (Sivan 5705) pp. 155-176. We shall later discuss Kasher’s conclusions.

² See Azariah de Rossi, *Me’or Einayim*, *Imrei Binah* 1:11; Menachem Kasher, “*Shabbat Bereishit VeShabbat Sinai*,” pp. 636-639; Gad ben-Ami Tzarfati, “Talmudic Cosmography,” and Moshe Simon-Shoshan, “The Heavens Proclaim the Glory of God—A Study in Rabbinic Cosmology.” There are also certain statements in the Talmud and Midrashim that *may* indicate that *some* Sages realized the earth to be spherical.

bends back and rises above the firmament. And Rabbi Yehoshua says, the world is like a tent, and the northern side is enclosed, and when the sun reaches the north-western corner, it circles around and returns on the other side of the dome, as it says, “traveling to the south, and circling to the north...” (Eccl. 1:6)—traveling to the south by day, and circling to the north by night—“it continually passes around, and the wind returns again to its circuits” (ibid.)—this refers to the eastern and western sides, which the sun sometimes passes around and sometimes traverses. (*Bava Batra* 25a-b)

Maharsha explains that Rabbi Eliezer follows the sages of Israel and Rabbi Yehoshua follows the gentile sages.¹ However, it appears that this is not exactly correct. Rabbi Eliezer's view is indeed consistent with that of the sages of Israel,² but R. Yehoshua is not saying that the sun passes below the earth at night, in a circular route; rather, he is of the view that the sun moves horizontally along the northern edge of the celestial dome.³ This is consistent with how others present the view of the Babylonian cosmology. Severianus, Bishop of Gabala (d. 408), wrote that the earth is flat and the sun does not pass under it in the night, but travels through the northern parts “as if hidden by a wall.”⁴ The same view is stated by Cosmas Indicopleustes:

These things being so we shall say, agreeably to what we find in divine scripture, that the sun issuing from the east traverses the sky in the south and ascends northwards, and becomes visible to the whole of the inhabited world. But as the northern and western summit intervenes it produces night in the ocean beyond this earth of ours, and also in the earth beyond the ocean; then afterwards when the sun is in the west, where he is hidden by the highest portion of the earth, and runs his course over the ocean through the northern parts, his presence there makes it night for us, until in describing his orbit he comes again to the east, and again ascending the southern sky illumines the inhabited world, as the divine scripture says through the divine Solomon: “The sun riseth and the sun goeth down and hasteth to his own place. Rising there, he goeth to the south, and wheeleth his circuit, and the wind turneth round to his circuits.” (*Christian Topography*, part II)

In the Midrash, the dispute appears with some of the Sages following the Babylonian cosmology and others having adopted the Ptolemaic cosmology:

How do the orbs of the sun and moon set? R. Yehudah b. R. La'i and the rabbis [disagree]. R. Yehudah says, behind the dome and above it. The rabbis say, behind the dome and below it. R. Yonatan said: The words of R. Yehudah b. R. La'i appear

¹ Maharasha to *Bava Batra* 25b and also to *Bava Batra* 74b, s.v. “*Amar leih ma'or gadol ra'iti.*”

² As Azariah de Rossi (*Me'or Einayim*, *Imrei Binah* 1:11) points out, this is also consistent with numerous statements of his in *Pirkei d'Rebbi Eliezer*.

³ Gad ben-Ami Tzarfati, “Three Notes on the Words of the Tanna'im,” p. 141.

⁴ Reference from John L. Dreyer, *A History of Planetary Systems*, p. 211.

[correct] in the summer, when the entire world is hot and the wellsprings are cool, and the words of the rabbis, that it sets below the dome in the winter, when the whole world is cold and the wellsprings are warm. R. Shimon b. Yochai said: We do not know if they fly up in the air and scrape the firmament, or if they travel as usual; the matter is exceedingly difficult and it is impossible for humans to determine. (*Midrash Bereishit Rabbah* 6:8)

The Talmud Yerushalmi also mentions 365 different windows in the firmament through which the sun enters the sky.¹ This view is reflected in the Shabbat morning prayers, where it describes God as “piercing windows in the firmament, taking the sun out from its place.”

Rambam and the Rationalist Approach

Rambam discusses these Talmudic passages in a famous chapter of the *Guide*; Shem Tov wrote that “this chapter is the most precious of all desirable vessels”:

It is one of the ancient beliefs, widespread among both the philosophers and ordinary people, that the motions of the spheres produce mighty and fearful sounds... This belief is also well-known in our nation. Thus the Sages describe the greatness of the sound produced by the sun in the daily circuit in its sphere... Aristotle, however, rejects this, and explains that they produce no sound... You must not find it far-fetched that Aristotle differs from the opinion of our Sages in this. For this theory—that is, of the sounds of the spheres—stems from the belief that the sphere is fixed and the constellations revolve [within it]; and you already know that in such matters of astronomy, the matter has been decided in favor of the gentile scholars over the Sages. Thus, it is explicitly stated, “The wise men of the nations have defeated them.” And this is appropriate; for with speculative matters everyone speaks according to the results of his own investigation, and everyone accepts that which appears to him established by proof. (*Guide for the Perplexed* 2:8, translated from Schwartz edition)

In Rambam’s reference to the Talmud, there are two apparent points of divergence from our version of the Talmud. First is that Rambam claims that the text explicitly states that “The wise men of the nations have defeated them.” In our text, however, Rabbi only says that *venir’in divreihen midvarienu*, “their words *appear* more [correct] than ours.” The version in our text can be read as more of a tentative endorsement, and as we shall see, there were those who interpreted it to mean that Rabbi did *not* accept their opinion as correct. Azariah de Rossi suggests that Rambam was paraphrasing the text according to his understanding of it (or from memory).² However, as we shall see, Rabbeinu Tam quoted the same version as Rambam, and

¹ Talmud Yerushalmi, *Rosh HaShanah* 2:5 (58a). See Daniel Sperber, *Magic and Folklore in Rabbinic Literature*, p. 206.

² *Me’or Einayim, Imrei Binah* 1:11.

thus it appears that there was a legitimate alternative text of the Talmud in circulation at that time.¹

The second point of divergence is that Rambam apparently cites Rebbi's verdict in reference to the first dispute in the Talmud, regarding the movement of the spheres, instead of with regard to the sun's path at night. In our text, Rebbi did not endorse the gentile scholars' position in the first dispute; instead, he challenged it. Shmuel Ibn Tibbon raises this difficulty.² Some suggest that Rambam was working with a different text of the Talmud.³ However, this approach is not confirmed by any evidence.

Another approach is possible. A careful reading shows that Rambam refers to the gentile scholars being correct in "such matters" of astronomy. Rambam may have meant that in the same way as Rebbi concedes that the gentile scholars were correct with regard to the sun's path at night, it has likewise since become clear that they were correct in the former dispute, too.

Yet another possibility emerges from the discussion by Rambam's son R. Avraham (1186-1237). He notes, as we did, that the view of the Jewish scholars that the sun passes behind the firmament at night is linked to the view that the sphere is fixed and the constellations revolve in it—both are different aspects of the ancient Babylonian cosmology. Accordingly, when Rebbi conceded that the gentile scholars were correct regarding the sun's path at night, this meant that they also must have been correct regarding the sphere revolving and the stars being fixed in it.

Others Who Followed the Straightforward Meaning

Rambam was the paradigmatic rationalist, and his approach to this topic is consistent with rationalism. His son Rabbeinu Avraham famously (or infamously in some circles) cites this story to prove that the Sages of the Talmud did not possess a Divine source of knowledge for their statements about the natural world, and cites Rabbi Yehudah HaNasi's concession to the non-Jewish scholars as an example of intellectual honesty.⁴ Rambam's disciple R. Shmuel ibn Tibbon notes that the Sages'

¹ Rabbi Dr. Shnayer (Sid) Leiman, cited by Joanna Weinberg, *The Light of the Eyes*, pp. 204-205, note 20.

² *Yikavu HaMayim*, p. 52; see See Carlos Fraenkel, *From Rambam to Samuel ibn Tibbon: The Transformation of the Dalalat al Ha'irin into the Moreh ha-Nevukhim*, pp. 220-222.

³ Solomon Munk, *The Guide for the Perplexed*, vol. II p. 79 note 1.

⁴ R. Avraham ben HaRambam, *Ma'amar Al Derashos Chazal*, in *Milchamot Hashem* (ed. R. Margalio, Jerusalem 1953).

error is unsurprising in light of the fact that astronomy in the Talmudic era was greatly deficient, and adds that even in his day there are many unresolved questions in astronomy.¹ The thirteenth-century Provençal rationalist R. Yitzchak b. Yedaiah notes that unlike the sages of the Land of Israel, who were flawless experts in astronomy and knew full well that the stars are embedded in the sphere(!), the Jewish sages of Babylon accepted that they were deficient in this knowledge and thus engaged in discussion and debate with the gentile scholars, unashamed to be vanquished.² Likewise, it comes as no surprise that R. Azariah de Rossi cites this passage as an example of the Sages of the Talmud freely conceding that they were fallible in such matters.³

But it must be stressed that one does not need to be a rationalist in order to interpret the Talmud here in this way. It is the simple, straightforward meaning of the Talmud that there was a dispute regarding the physical reality and that R. Yehudah HaNasi preferred the view of the non-Jewish scholars. It therefore comes as no surprise that there are numerous Rishonim and Acharonim who explain the Talmud in this way, even those who were not part of the rationalist school.

R. Sherira Gaon and R. Hai Gaon both state that the view about the sun travelling through the firmament is incorrect and must be rejected.⁴ R. Yeshayah di Trani (“Tosafos Rid” 1180-1250) observes that the view of the gentile scholars is the main (“*ikkar*”) view.⁵ The Tosafist R. Eliezer b. Shmuel of Metz (1115-1198) suggests that the reason why one must knead matzah dough only with water that had sat the night after being drawn is to prevent it from being heated during the night by the sun, which is passing beneath the earth at that time. He notes that this follows the view of the gentile scholars, which Rabbi Yehudah HaNasi had concluded to appear correct.⁶ R. Eliezer’s view is quoted, endorsed and further explained by R. Asher ben Yechiel (“Rosh,” 1250-1328),⁷ R. Yerucham ben Meshullam (1280-1350),⁸ R. Moshe ben

¹ *Yikavu HaMayim*, p. 52.

² See Marc Saperstein, *Decoding the Rabbis: A Thirteenth-Century Commentary on the Aggadab*, pp. 23-24.

³ *Me’or Einayim, Imrei Binah* 1:11.

⁴ As cited in *Responsa Maharam Alashkar* #96.

⁵ Tosafos Rid, *Shabbos* 34b, s.v. *Eizehu*.

⁶ Rabbi Eliezer of Metz, *Sefer Yere'im* #52. See the commentary *To'afot Re'em* for an important correction to the text of *Sefer Yere'im*.

⁷ Rosh, *Pesachim* 2:30 and *She'eilos U'Teshuvos HaRosh, Kelal* 14, #2.

⁸ *Toldos Adam VeChavah, Nesiv* 5, Part 3.

Yaakov of Coucy ("Semag," 13th century),¹ and R. Yom Tov ben Avraham Alasevilli ("Ritva," 1250-1330).² R. Manoach b. Yaakov (13th-14th century, Provence) likewise states that one must use such water because, as Rabbi Yehudah HaNasi conceded, the sun passes beneath the world at night.³ R. Menachem ben Aharon ibn Zerach (d. 1385) noted that the Jewish Sages conceded that the constellations have no independent movement and are embedded in the spheres.⁴

R. Eliyahu Mizrachi (1450-1526), in arguing that it is permissible to teach science to non-Jews, brings the dispute between the Jewish and non-Jewish scholars regarding the sun's path at night as proof:

The implication is that they were disputing each other, each side bringing proofs to support its position. If there were a prohibition [against teaching non-Torah knowledge to gentiles], how could [the Sages] have informed [the gentiles] of their proofs and disputed with them until Rebbi decided between them and said that their view appears more correct? (Responsa Rabbi Eliyahu Mizrachi #57)

R. Yitzchak Arama (1420-1494), describes the non-Jewish scholars as having triumphed (*nitzchu*) over the Jewish sages, using the stronger terminology that appears in Rambam's *Guide*, and also refers to the Jewish sages as having conceded to the non-Jewish scholars. While understanding R. Yehudah HaNasi's statement as referring to the first dispute regarding whether the sphere or the constellations are fixed, he makes some important comments about why he believes the non-Jews to be superior in their knowledge of astronomy:

This truth was discovered first by the gentile scholars and their kingdoms because of their immense efforts in pursuing this study [of astronomy], which they concentrated on in order to serve [the heavenly bodies]... in the foreign ways of their religions, which the Torah forbade; while the Jewish sages did not need to know [all this astronomy]—except as it related to the intercalation of months and the timing of the seasons and the new moons, necessary for the Torah and [its] commandments.... The rest they considered foreign and a waste of time—foreign matters that they were never permitted to study.... (*Akeidas Yitzchak, Parashas Bo*, Chap. 37)

R. Don Isaac Abarbanel (1437-1508), explains that the Sages took their position that the constellations revolve due to a particular astronomical theory of Pliny and

¹ *Sefer Mitzvos HaGadol, Lo Ta'aseh* #79.

² Commentary on the Haggadah, s.v. *Matzah zo she'anu ochlim*.

³ Rabbeinu Manoach, Commentary to *Mishneh Torah, Hilchos Chametz U-Matzah* 5:11, s.v. *Ela bemayim shelanu*.

⁴ *Tzedah LaDerech*, part I, ch. 25.

Plotinus that was prevalent in their day.¹ Initially it appears that Abarbanel is not disagreeing with Rambam's assessment that the Sages of Israel were wrong in this belief, but later he states that the matter is still not definitively resolved and quotes R. Shimon ben Yochai from the Midrash that the Sages themselves knew that such questions are impossible to answer with certainty.

R. Moshe ben Yitzchak Alashkar ("Maharam Alashkar," Egypt, 1456-1542), discusses the view of Rabbeinu Tam concerning two sunsets (which we shall soon explore), which is based on the belief that the Sages of Israel were actually correct in saying that the sun passes behind the sky at night. He observes that the Geonim, Rambam and all the other Rishonim accepted the view of the gentile scholars, as did Rabbi Yehudah HaNasi himself, and he brings further scientific proofs for its veracity.² R. David ben Shlomo ibn Avi Zimra ("Radvaz," 1479-1573; Spain-Israel) describes the Jewish scholars as having recanted and conceded to the gentile scholars.³ Even such a dedicated kabbalist as Rabbi Moshe Cordovero ("Ramak," 1522-1570; Israel), describes the Jewish sages as having recanted and conceded to the gentile scholars.⁴

R. David Gans (1541-1613) was an interesting figure.⁵ A disciple of Maharal, he was also a diligent student of science, and grappled with many issues raised by the discovery of the New World and the revolutions in the field of astronomy. Gans notes that the Sages of Israel conceded to the gentile scholars regarding the constellations being embedded in the spheres rather than having independent movement.⁶ However, he reports that the famous astronomer Tycho Brahe told him

¹ Commentary to Genesis 1, p. 57 in Jerusalem 1964 edition. For discussion, see Andre Neher, *Jewish Thought and the Scientific Revolution of the Sixteenth Century*, pp. 220-222.

² *Responsa Maharam Alashkar* #96.

³ *She'eilot U'Teshuvot Radvaz*, Part IV, #282; also *She'eilot U'Teshuvot Radvaz Miketav Yad*, Part VIII (*Orach Chaim- Yoreh De'ah*), #191

⁴ *Pardes Rimonim* 6:3. He takes it in reference to the dispute concerning whether the sphere or the constellations are fixed.

⁵ For a full (albeit bordering on hagiographic) study, see Andre Neher, *Jewish Thought and the Scientific Revolution of the Sixteenth Century: David Gans (1541-1613) and his Times*; but see the extremely critical review of Neher's work by Yaakov Elbaum, *Tarbitz* 55:1 (1986) pp. 145-159. See too David Ruderman, *Jewish Thought and Scientific Discovery in Early Modern Europe*, pp. 82-86. For more on Gans see Yaakov Reifman, "A Biography of Rabbi David Gans (author of *Tzemach David*) and his Literary Activities" (Hebrew) *HaMagid*, vol. 14, and the response by Mattisyahu Strashun, *Mivchar Ketavim* (Jerusalem: Mossad HaRav Kook 1969) pp. 234-42; Yaakov Elbaum, *Petichot VeHitgarot*, pp. 250-52.

⁶ *Nechmad VeNa'im* 1:25.

that the Sages of Israel were actually correct and that the stars do possess independent motion; he adds that he heard the same astronomical fact from Johannes Kepler.¹ (Many other authorities likewise mistakenly thought that the new astronomy had vindicated the Sages of Israel;² all failed to realize that the view of the Sages of Israel was part of a Babylonian cosmology, in which the stars move around a dome above a flat earth.) Gans concludes by citing Abarbanel's mention of how such questions were in doubt amongst the Sages, apparently in order to show that it had already been pointed out that the Sages' concession was not absolute.

R. Avraham ben Moshe de Boton ("*Lechem Mishneh*," 1545-1585), in referring to the dispute concerning the sun's path at night, also describes the non-Jewish scholars as having triumphed (*nitzchu*) over the Jewish sages, using the stronger terminology that appears in Rambam's *Guide*.³ He also notes that the view of the non-Jewish scholars is confirmed (*sevara beduka*) and points out (following R. Eliezer of Metz) that the Jewish sages themselves ended up establishing the laws of *mayim shelanu* based on the view of the non-Jewish scholars. Like Maharam Alashkar, *Lechem Mishneh* concludes that the view of Rabbeinu Tam, which is based on the belief that the Sages of Israel were actually correct, is problematic.

R. Shmuel Eliezer Edels ("Maharsha," 1555-1631) also describes the Jewish sages as having conceded to the non-Jewish scholars regarding the sun's path at night.⁴ Rabbi Avraham Cohen Pimentel (*Minchas Cohen*, d.1697; Amsterdam), points out that the view that sun goes behind the sky at night is simply not true and can be proven false.⁵

R. Chaim Bachrach ("*Chavot Ya'ir*," 1638-1702; Germany) was a towering halachist who also studied astronomy. A descendant of Maharal, his approach to this topic is certainly not one of which his ancestor would approve. While, as we shall

¹ For extensive discussion of this passage in *Nechmad VeNa'im*, see Neher, *Jewish Thought and the Scientific Revolution of the Sixteenth Century*, pp. 216-228.

² Yosef Shlomo Delmedigo, *Eilim* p. 60 and *Gevurot Hashem* 5; Tuvia Cohen, *Ma'aseh Tuviah* 3:35; R. Yehudah Brill, as cited in *Pachad Yitzchak, erech Tzeidah*; R. Menachem Kasher, *Shabbat Bereishit VeShabbat Sinai*, p. 643, 649.

³ *Lechem Mishneh* to *Mishneh Torah, Hilchos Shabbos* 5:4.

⁴ *Chidushei Aggadot* to *Bava Basra* 25b, s.v. *Rabi Eliezer omer*. Note that in *Ta'anit* 9b he describes a dispute between the sages regarding the source of rain, for which each side brings Scriptural proofs, as "hinging on the views of the scientists, according to the opinions of the philosophers."

⁵ *Minchas Kohen, Sefer Mevo HaShemesh* 4, discussing how Rabbeinu Tam's view concerning sunset is not viable.

later note, he was uncertain as to whether the gentile scholars were ultimately correct, he accepts that this may well be the case and that Rambam saw it that way:

The blemish of one who errs in the study of Kabbalah is greater than that of one who errs in astronomy... albeit the common denominator [of Kabbalah and astronomy] is that [such errors reflect] mistaken understanding of the reality. And [in astronomy, unlike Kabbalah] almost nothing is entirely agreed upon and not subject to dispute, as per the dispute between the Jewish and gentile sages regarding whether the sphere is fixed and the constellations revolve, or the sphere moves and the constellations are fixed in it. And see *The Guide for the Perplexed* Part II, the end of Chapter 8 and Chapter 9, (where Rambam cites the dispute and says that the non-Jewish scholars were correct); and the Tannaim dispute whether the sun travels above the covering of the sky at night or below the earth... (*Responsa Chavot Ya'ir* #210; see too #219)

R. Yitzchak Lampronti (1679-1756) had a complex, even contradictory attitude towards disputes between the Sages and science. On some occasions, he writes that the Sages knew all wisdom and that objections for scientists should be rejected.¹ But on another occasion, he states that the Sages seem to have erred in stating that lice spontaneously generate, and cites the dispute concerning the spheres and constellations as an example of the Sages themselves conceding that they were in error.²

It is perhaps surprising that Rabbi Moshe Schick (“Maharam Schick,” 1805-1879, Hungary), despite being a student of the famously conservative R. Moshe Sofer,³ did not insist on the infallibility of the Talmudic sages. While he notes that our version of the Talmud does not state, as Rambam has it, that the Talmudic sages were definitively proven wrong, he does accept that R. Yehudah HaNasi judges them to be likely mistaken, and notes that their position on this matter was not based on divine sources of knowledge:

Regarding the question concerning what is written in Tosafot, *Berachot* 2b, s.v. “*dilma*,” in Rashi, *Pesachim* 93b, s.v. “*mei'alot hashachar*,” and in several other places, that the sun enters into the thickness of the firmament [at night]—which contradicts the conclusion of the Gemara on *Pesachim* 94b, where Rabbi says,

¹ *Pachad Yitzchak*, vol. 6, *erech nikkur*, p. 85a.

² *Pachad Yitzchak*, *erech tzeidah*. In *Pachad Yitzchak*, vol. 4 p. 72b, *erech klayos yoatzos*, he notes that he sometimes maintains that the Sages had divine sources of knowledge for their statements and sometimes does not. For a discussion of Lampronti's approach, see David Malkiel, “Empiricism in Isaac Lampronti's *Pahad Yishaq*,” *Materia Giudaica* 10 (2005) pp. 341-351.

³ Although even R. Moshe Sofer (“Chassam Sofer”) was not so conservative in these issues; discussing an anatomical issue in the Mishnah, he dismisses the explanation of Rashi and Tosafos as being not in accordance with the physical reality (Commentary to *Niddah* 18a).

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“Their view (that the sun travels beneath the earth at night) appears more correct (*nir'in*) than our own”; and where the word *nir'in* is used, Tosafot on *Eruvin* 46b, s.v. “Rabbi Eliezer etc.” writes that we rule accordingly, and the Rosh, in Chapter *Kol Sha'ah*, and the Tur and *Beit Yosef* (*Orach Chaim* 455) concur, as they quote from Rabbi Eliezer of Metz that the sun travels beneath the earth at night, and we therefore knead matzah dough only with water that has sat at least one night since being drawn. Even more perplexing (than Rashi and Tosafot's contradiction to the Gemara's conclusion) is the statement established in the Shabbat prayers: “He who opens daily the doors of the gates of the east and breaches the windows of the sky; He brings the sun out from its place, and the moon from its resting-place, and illuminates the world”—which implicitly concurs with the view that the sun enters the thickness of the firmament at night.

It seems to me that matters that were not received by the Sages as *halachah leMoshe miSinai*, but rather which they said according to their own reasoning—and with something that is not received [from Sinai] and has no root in our Torah, but rather comes from investigation and experience, it is difficult to determine [that it is true]. And there are many occasions when the sages determined, according to their own intellects, that a matter was a certain way, and the subsequent generation analyzed the matter further and disputed the earlier view. Any conclusion drawn from experimentation can only be considered probable, [not certain]. Indeed, in the dispute on *Pesachim* 94b, Rebbi said that the gentile sages' view *appeared* more correct, but he did not express certainty; for a matter like this, which is investigated only by finding evidence [of one view or the other], cannot be resolved with certainty. In truth, according to the reading of the Gemara found in *The Guide for the Perplexed*, the Jewish sages recanted their position; but according to our reading, Rebbi said only that the gentile sages' view *appears* more correct... (Responsum Maharam Schick, Responsum #7)

Maharam Schick further states that while Rebbi was only able to say that the view of the gentiles appears more likely to be correct, in his time scientific experimentation has shown it to be clearly the case:

Regarding the fundamental issue: the text of the [Shabbat] prayer quoted above has already been questioned in *Sefer HaBrit, ma'amar 4 – Shnei Me'orot*, Chap. 20, where he explains that it is the poetic style to describe things based on how they appear to the human observer [as opposed to how they really happen]. Regardless, in our Gemara it is not decided one way or the other, and we must therefore observe the stringencies resultant from each view. Therefore with regard to water passing the night we implement the stringency resulting from the gentile scholars' view; while Rashi and Tosafot described the sun's movement according to the Jewish sages of the time of the dispute in the Talmud. Although scientists now agree—and it is apparent to the eye and by experimentation—that the sun travels below the earth at night, the Shabbat prayer describes it based on how it appears to us... (Ibid.)

Another disciple of Chatam Sofer, R. Eliezer Lipman Neusatz of Magendorf, observes that the Sages were mistaken in their belief about the sun's path at night,

and that they accepted the opinion of the gentiles, just as “one accepts the truth from whoever says it.”¹ He notes that this was not the only instance of their making statements about the universe which are now known to be incorrect, and explains that the Sages were simply putting forward their own beliefs, which they occasionally attached to Scriptural verses by way of *asmachta*.

A contemporary and correspondent of Maharam Schick, R. David Yehudah Leib Silberstein (d. 1884), was a prominent Hungarian rabbi who likewise noted that R. Yehudah HaNasi had conceded that the Sages of Israel were mistaken in their view that the sun slips under the firmament at night to pass behind it (and points out that Rashi in several places seems to have followed this incorrect view).² He adds “and so too is indeed the case [that the Sages of Israel were mistaken], for the sphere of the earth is in the center of space, with the sun making a circuit around it...” R. Silberstein also notes that while R. Yehudah HaNasi was correct to concede to the view of the gentile scholars, his reasons for doing so (regarding bodies of water being heated by the sun passing below the earth) were incorrect and were based on his not knowing about the existence of continents on the other side of the world. He also adds that some of the Talmud’s earlier discussions of the cosmos are also based upon their original, mistaken view of the firmament. Later, R. Silberstein presents a defense against those who would ask how the Sages of Israel could have thought that the sun passes behind the sky at night, in light of the fact that at the North Pole, there is daylight for half the year; he responds that since the Land of Israel is the designated homeland for the Jewish People, the Sages never sought to investigate matters in distant countries. Apparently uncomfortable with this extensive analysis of the Sages’ mistaken beliefs, he concludes his discussion by noting that the real wisdom to be sought after and cherished is the esoteric wisdom of the Upper World, and that there is no reason to busy oneself with knowledge of the physical universe, which is of no importance.

It is not only amongst Misnagdim that we find authorities who conceded that this passage in the Talmud reveals the Sages of Israel to have erred in their understanding of the cosmos. In the Hassidic world, Rabbi Yisrael Friedman of Ruzhin (1797-1850) also admits this. He echoes the approach of R. Yitzchak Arama, saying that because the gentiles dedicated themselves to lower forms of wisdom such as the

¹ *Mei Menuchot* (Pressburg 1884), pp. 36a-39a. Chatam Sofer referred to R. Neusatz as his “son, pupil and bracelet” in his 1839 approbation to his book *Betziv Eli'ezer*.

² *Shevilei David, Orach Chaim* (Jerusalem 1862) no. 455, p. 96b.

natural sciences, they were able to attain greater proficiency in them than the Jews, who dedicate themselves to higher forms of wisdom.¹

While Rabbi Samson Raphael Hirsch (1808-1888) condemned Rambam as having been unduly influenced by Greek philosophy, he does follow the same approach as Rambam with regard to the scientific knowledge of the Sages. In a letter written to Rabbi Pinchos Wechsler,² he stresses that the Sages' statements about the natural world were not based on Sinaitic tradition or prophetic inspiration. He writes that the Sages themselves "respected the opinion of the gentile scholars, admitting when the opinion of the latter seemed more correct than their own," citing the dispute concerning the sun's path at night as clear proof for this.

But perhaps the most surprising endorsement of the straightforward approach to this topic is that of the kabbalist Chacham Yosef Chaim (Ben Ish Chai, 1832-1909). In his early writings, which we shall later cite, he insists that the Sages of Israel must have actually been correct. But in his later writings, he echoes Rambam's approach when discussing the statements of R. Eliezer and R. Yehoshua regarding the sun passing behind the firmament at night:

Know that regarding what R. Eliezer and R. Yehoshua say here regarding the motion of the sun, was said according to their intellectual assessment, according to whatever seemed true to them in the science of astronomy. And they did not determine these things and establish them as true; rather, each went according to whatever appeared to him in accordance with his principles of astronomy; they did not say these things as a tradition from their teachers. And therefore, nowadays, when the principles of astronomy are widespread, and they have devised observational tools for the stars and constellations and the globe and the elevations of the sun, they have seen and know many things that can be genuinely determined and universally agreed upon, [such as that] the sun travels below the earth at night on the other side of the globe... And if the Sages of Israel said this from their tradition, how could it be said that the words of the non-Jewish scholars seem more correct? And how could one bring a proof from the argument regarding steaming waters to contradict matters that were received via tradition, Heaven forbid? Rather, it is certain that the Sages of Israel did not determine these things to establish them as true; rather, they said that their intellectual assessment suggests it according to the science of astronomy that they possessed in their era, and they only suggested it as a possibility... (Chacham Yosef Chaim, *Benayahu*, *Bava Batra* 25b)

We see that even some staunch traditionalists, Chassidim and mystics nevertheless accepted that this topic demonstrated the Sages of the Talmud to be fallible

¹ Cited by Rabbi Menachem Nachum Friedman in *Maseches Avos Im Perush Man*, p. 8.

² Published by Rabbi Dr. Mordechai Breuer in *Hama'ayan* 16:2 (Tevet 5736/1976) pp. 1-16.

regarding the natural sciences. This was because the Talmud clearly and unambiguously stated as such. Nevertheless, this did not prevent others from interpreting it differently, as we shall now see.

Rabbeinu Tam and Alternate Astronomy

In contrast to all the other Rishonim, R. Yaakov ben Meir (“Rabbeinu Tam,” c. 1100–c. 1171) is cited in a report by R. Betzalel Ashkenazi as follows:

And likewise I have heard in the name of Rabbeinu Tam *z”l* that he would say regarding that which is said in the chapter *Mi Shehaya Tamei* that the Sages of Israel said that the sphere is fixed and the constellations revolve within it... and it is said there, “Rabbi Yehudah HaNasi said, A response to their words etc...” And Rabbeinu Tam said, that even though the gentile scholars were victorious over the Sages of Israel, that is a victory in arguments, but the truth is in accordance with the Sages of Israel, and that is what we say in prayer, “Who pierces the windows of the firmament” (*Shitah Mekubetzes* to *Kesuvos* 13b)

In Rabbeinu Tam’s writings elsewhere, this view is linked with his position that there are two stages of sunset. The first takes place when the sun stops moving downwards and instead moves horizontally to enter the firmament via a window. The second occurs when it has completed its journey through the four-*mil* thickness of the firmament and begins to move up and around behind it.¹

It may seem remarkable that as late as the twelfth century, Rabbeinu Tam was still maintaining a view of the sun passing behind the sky at night, which suggests that he fully subscribed to Babylonian cosmology, including a flat earth. This attests to the lack of schooling in science by the Jews of northern France, who were entirely unaware of the Ptolemaic model that was standard elsewhere. More extraordinary is that even Ramban approvingly cites Rabbeinu Tam’s view.² The wonder of this is only partially mitigated by noting that, despite his rationalistic leanings and studies of philosophy, Ramban’s formative education was under the Tosafists, and he had no training in the sciences.³

¹ *Sefer HaYashar*, *Chelek HaChiddushim* 221. See too Rashba’s discussion of Rabbeinu Tam’s view in *Chiddushei HaRashba*, *Shabbos* 34b and also *Lechem Mishneh* to *Hilchos Shabbos* 5:4.

² *Torat Ha-Adam*, in *Kitvei HaRamban*, ed. M. Chavel (Mossad HaRav Kook), vol. II p. 251.

³ Y. Tzvi Langermann, “Torah and Science: Five Approaches from Medieval Spain,” “Torah and Science: Five Approaches from Medieval Spain,” in José Luiz Goldfarb & Márcia M. H. Ferraz, eds., *Anais do VII Seminário Nacional de História da Ciência e da Tecnologia* (São Paulo: Imprensa Oficial/Edusp/Ed. Unesp 2000) p. 36.

Yet these were not the only ones to do so; we find such positions lasting through to the eighteenth century!¹ R. Ya'ir Bachrach (1638-1702), in *Chavot Ya'ir*, was in doubt as to which view is correct, and R. Yaakov Reischer (1661-1733), author of *Shevus Yaakov*, derided the science of his day on the grounds that it opposes the Talmud's position that the earth is flat.²

But it is important to consider the connection between Rabbeinu Tam's comments on the dispute in *Pesachim* and his views on the two stages of sunset. Many contemporary traditionalist advocates of Rabbeinu Tam's approach base themselves on the position that the Sages of the Talmud must be right, since they were spiritual and intellectual giants who possessed Divine inspiration and who knew all the metaphysical secrets of the universe. They therefore cannot accept the notion that the gentile scholars were right and the Jewish sages wrong, and they adopt Rabbeinu Tam's view that the Jewish sages were actually correct. But this was apparently not the basis for Rabbeinu Tam himself. After all, if the Sages were such infallible giants, then they should surely have been victorious in their arguments too, especially since (according to Rabbeinu Tam) they had physical reality on their side! Rather, it seems that it was due to Rabbeinu Tam's understanding of cosmology that he believed the Sages of Israel to have been correct in their statement. It is not that they *must* have been correct, but rather that they *happened* to have been correct, even though they did not know why.³

The same certainly appears true for Ramban. Ramban was not averse to saying that the Sages of the Talmud may have been mistaken in their scientific beliefs.⁴ Thus, his apparent belief that they were correct in their description of the sun's path at night presumably stems from his believing that the reality demonstrates them to have been correct, rather than an *a priori* assumption that they must have been correct.

Other Adherents of Alternate Astronomical Approaches

R. Moshe Isserles ("Rema," 1520-1572, Poland) likewise maintains that the Sages of Israel were correct:

¹ See the sources cited by Kasher, "Shabbat Bereishit VeShabbat Sinai," pp. 647-8 n. 16.

² *Shailos U'Teshuvos Shevus Yaakov* 3:20.

³ Incidentally, as R. David Yehudah Leib Silverstein points out in *Shevilei David, Orach Chaim* no. 455, p. 96b, Rabbeinu Tam's grandfather Rashi also appears to have maintained the Babylonian cosmology; see Rashi's comments to *Ta'anis* 25b, s.v. *Bein Tehoma*.

⁴

Know that there are three views in astronomy. The first is the view of astronomy that has been made famous in the *Almagest*, after which all the astronomers were drawn from the time that this book was published. And it is built upon the opinion of the gentile scholars who said that the constellations are fixed and the sphere revolves.

The second is the view of the Sages of Israel, who said that the constellations revolve and the sphere is fixed. And even though they said that “the gentile scholars were victorious etc.”, I have already written in my commentary to the Megillah¹ and Sefer Aggados that they did not mean to say that the Sages of Israel retracted, but rather that due to the reasons of exile, they forgot that approach, and they did not know how to calculate all the ways of astronomy via that system, and they were forced to study via the gentiles’ astronomical system. And this is the concept of their “concession,” just as I have proved with clear proofs in the aforementioned works. (*Torat Ha-Olah* 1:2)

But unlike our theory regarding Rabbeinu Tam, R. Isserles takes the position that they *must* have been correct:

I say that the words of our Sages, of blessed memory, were all founded upon the true wisdom, and there is no snare or crookedness in their words, even though sometimes at first glance that they do not agree with the words of the scholars which are derived from proofs, especially in matters of astronomy. And some scholars rely on that which was said that the gentile scholars were victorious over the Sages of Israel (*Pesachim* 94b), and also in the words of the Rav, the *Moreh*, who wrote that the science of astronomy was incomplete in the time of the prophets and the early sages. But the one who investigates his will be shocked at saying that the Sages, of blessed memory, did not know these things! However, the person who is concerned for the honor of his Creator and honor of the Sages of the Torah will not think thus; rather, he will carefully investigate their words. For certainly it will be found in their words, as will be explained in these chapters, that they knew the secrets of astronomy just as the gentile scholars knew them, and even more than them, for the Sages knew them also via other means that were hidden from all the gentile scholars. (*Ibid.*)²

R. Yosef Ashkenazy (Poznan, 16th century) insists that the Sages of Israel must have been correct and heaps scorn upon the scientists who claim that the earth is round.³

¹ *Mechir Yayin*, Esther 2:5. Rema there claims that the view of the Sages of Israel can be traced back to the Prophets.

² In *Torat Ha-Olah* 1:2, Rema reinterprets the discussion in *Bava Batra* 25a-b in order to reconcile it with Ptolemaic astronomy; De Rossi, in *Me'or Einayim*, *Imrei Binah* 11, has a sharp critique of this (see pp. 237-238 in Weinberg edition). It is difficult to ascertain the extent to which Rema went along with R. Yehudah HaNasi's concession to the gentile astronomers; in the rest of *Torah Ha-Olah*, Rema does seem to adopt these aspects of the Ptolemaic system. See Y. Tzvi Langermann's analysis in "The Astronomy of Rabbi Moses Isserles." See too Herbert Davidson's discussion of Rema's position in "Medieval Jewish Philosophy in the Sixteenth Century" pp. 132-136.

³ Gershom Scholem, "Yediyot Chadashot al R. Yosef Ashkenazi," *Tarbitz* 28 (1959) pp. 218-220.

However, R. Ashkenazy was not exactly a mainstream figure; not only did he try to convince his community that Rambam was a heretic, he also opposed Rashba for interpreting certain sections of Aggadah non-literally.

R. Yonasan Eybeschütz (1690-1764) cites R. Yosef Shlomo Delmedigo's astonishment at the Sages of Israel, whose position was based on traditions from the prophets, apparently conceding their error (with regard to the constellations and spheres) to the gentile scholars, whose opinions are "entirely based on fallible reasoning." R. Eybeschütz answers that there was no error and there was no concession. He presents a lengthy explanation as to how the Sages of Israel and the gentile scholars were both correct, with each having a different frame of astronomical reference. R. Eybeschütz presents a novel explanation of the statements that the Sages of Israel conceded (*hodu*) to the gentile scholars; he claims that *hodu* does not mean "acknowledged" in the sense of "conceded," but rather in the sense of "praised" (as in, "*hodu l'Hashem ki tov*"). The Sages of Israel were not admitting that they were wrong; rather, they were praising the gentile scholars for being correct with regard to the astronomical frame of reference that they were discussing.¹

It should be noted, however, that while Rabbeinu Tam, Rema, R. Ashkenazy and R. Eybeschütz differ from all the other Geonim and Rishonim in maintaining that the Sages of Israel were correct, they agree with them that the Talmud is describing a scientific dispute about astronomy. Others, as we shall soon see, took an entirely different perspective.

A much later figure who insisted that the Jewish Sages were correct was R. Meyer Leibush (Malbim, 1809-1879). He claimed that the correct understanding of the Jewish Sages' view is that the sun passes beneath the watery depths on the other side of the world at night, and the dispute was regarding whether there was land on the other side of the planet or not.² Thus, while the Jewish Sages were in error in not knowing about the existence of the Americas, their error was much less than believing in a flat earth and a domed universe. Rabbi Menachem Kasher (1895-1983) claimed that while this cannot be the interpretation of the Talmudic text as we

¹ *Ya'arot Devash* 1:4.

² Malbim, *Artzot HaChaim* (Warsaw 1837), *Orach Chaim* 1, p. 3b. Note that in his commentary to Gen. 1:6, Malbim rejects the view (which he attributes to all the Rishonim, but not to Chazal) that the *rakia* is a solid firmament, arguing (problematically) that it refers to the atmosphere. He claims that the Sages were also of the view that there are no solid spheres, citing R. Shimon bar Yochai as saying that the stars move through the air; however, Malbim apparently had a corrupted text, since our version of *Bereishit Rabbah* 6:8 (cited earlier) reads quite differently.

have it, there are variant texts that support such an approach.¹ However, his conclusion, that the Jewish sages actually said that the sun travels beneath the watery depths at night, is not consistent with the other statements in the Talmud, and is clearly influenced by his explicit wish to restore honor to the Talmudic Sages by minimizing their error.²

Maharal and the Mystical Approach

R. Azariah de Rossi cited the Talmudic discussion concerning the sun's path at night as a fundamental support for his critical approach. Apparently others did too, as we find that Rabbi Yehudah Loew of Prague (Maharal, 1529-1609), whose sixth part of *Be'er HaGolah* included a condemnation and critique of de Rossi, sharply rebuts the rationalist approach to this topic before mentioning de Rossi's work, and he was presumably not referring to the aforementioned Rishonim.³ Maharal begins by citing the relevant section, but with some interesting variations:

“The Sages of Israel say, During the day, the sun travels below the firmament, and at night, above the firmament. And the scholars of the nations say, During the day the sun travels above the firmament, and at night below the firmament. Rebbi said: Their words seem more correct than ours, for during the day the wellsprings are cool and at night they steam.”⁴

Maharal's citation of the Talmud, in which the gentile scholars have the sun traveling above the firmament by day and below it at night, follows the version printed in *Ein Yaakov*. However this is not the version that is in our editions of the Talmud and which was adopted by all other commentators, in which the gentiles had it traveling *below* the firmament by day, and below the earth, not the firmament, at night. Later, we shall see that this is of considerable significance.

Maharal continues:

They understand that the intent of the Sages was to say that the sun passes through the sphere, and that this is what was said by, “at night it travels above the firmament”; and if so, this would mean that the firmament was being temporarily pierced as the sun passes into the sphere. And this is impossible; it is also

¹ “The Form of the Earth and its Relationship to the Sun in the Works of Chazal and the Rishonim” (Hebrew) *Talpiyot* Year One Vols. 1-2 (Sivan 5705) pp. 155-176.

² See p. 156.

³ In the Machon Yerushalayim/ Hartman edition, Maharal's discussion of this topic can be found in the third section of *Be'er HaShishi*, beginning on p. 177.

⁴ For discussion of Maharal's view regarding the spheres and the constellations, see Herbert Davidson, “Medieval Jewish Philosophy in the Sixteenth Century” pp. 136-139.

contradicted by the senses, for the sun only sets from the horizon; it does not set [at that time] for those that have a different horizon. And this cannot be contradicted by any intelligent person.

Maharal's rejection of the straightforward understanding of the Talmud on the grounds that it is "clearly impossible" is based upon an anachronistic view. The truth is that something which appears "obviously" false in one era does not necessarily appear false to people in another era. There were many intelligent people, over a long period, who believed that the world is flat, even though to later generations there appeared to be very obvious proofs that this is not the case.

And these people want to consider the words of the Sages, yet they have not grasped their meaning at all. For if the opinion of the Sages was that the sun passes through the sphere at night and travels above the sphere, they would not have said that "the sun travels above the firmament," but rather that it travels above the sphere, just as they said previously, that the sphere is fixed and the constellations revolve.

It is indeed interesting that the Talmud uses the word "firmament" instead of "sphere," but this would not appear to be sufficient grounds to depart from the plain meaning of the text. Note that Rambam considers the two terms to be basically synonymous.¹ The Talmud probably used the term "sphere" simply to match the previous discussion, concerning whether the constellations or the sphere move.

Maharal proceeds to explain that the firmament, rather than being a physical, solid dome over the earth, is the name for the separation between the material and spiritual realms:

Rather, the concept of the sphere and the concept of the firmament are distinct from each other. The "firmament" refers to that which is the firmament for the lower regions, and this is called "firmament" in the words of the Sages, and that is the firmament which is mentioned in the Torah; for the word "firmament" is never used for the sphere. And now, the opinion of the Sages who said that during the day it travels below the firmament, and at night it travels above the firmament, means that during the day, the sun is found in the world, and the firmament is the beginning of the lower region, and the sun travels below the firmament during the day, together with the lower regions. But at night, the sun is separated from the world, and it is with regard to this that it says that the sun travels above the firmament – meaning, the firmament which is the beginning of the lower regions. And then it is said that the firmament separates between the sun and the lower regions, for the sun is not found with the lower regions, and there is no doubt that the lower regions have their own border and this border is the firmament, and this explanation is well explained. And because they thought that the words of the sages were in reference to the firmament which is the sphere, they thought it was something strange.

¹ *Mishneh Torah, Hilchos Yesodei HaTorah 3:1.*

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But you should know, that the sages were not speaking about this, except insofar as that their intent was that God, who separated between those that are on the earth below and those that are not on the earth and are above, and the firmament separates between them, and therefore the sun that God gave to the day to illuminate the earth travels below the firmament, and the firmament does not separate between the sun and the lower regions. But at night, when He did not give the sun to illuminate the earth, therefore the firmament, which God gave to separate between the upper and lower regions, separates the sun from the earth.

Maharal is stating that *because* God did not want the sun to illuminate the earth by night, *therefore* its spiritual essence is removed from the earth at that time (traveling above the firmament), which *results* in the sun disappearing from view—by passing below the horizon. Only during the day, when God wanted it to illuminate the earth, did He permit its spiritual essence to be exposed and for it to travel below the firmament.

And the scholars of the nations say that it is the opposite of this; that during the day, the sun travels above the firmament, as the firmament separates between the sun and the lower regions, and that such is appropriate, for otherwise the sun would be too effective in the lower regions, and they would not be able to exist, and therefore when the sun is on the earth, it travels above the firmament, and when it is nighttime and it is separated from the earth, there is no separation of the firmament.

According to the gentile scholars—with the version of the text that Maharal had—the spiritual essence of the sun has to be restricted by day, so as not to overpower the earth, and it therefore travels *above* the firmament. Only at night, when the sun is in any case physically removed from the earth, can its spiritual essence be allowed to express itself unchecked, and it can travel *below* the firmament.

And this is what Rebbi replied with “their words appear more correct than ours, for during the day the wellsprings are cold, and at night they steam,” for from this you see that at night the sun is not separated from the lower regions, and therefore the wellsprings steam, but by day the wellsprings do not steam as they do at night, for God placed the firmament, which separates between the upper and lower regions, to separate between them, and therefore the wellsprings are cold by day. And according to our position, that we say that the sun travels above the firmament at night, the firmament separates between the sun, and it cannot operate upon the wellsprings.

According to Maharal, Rebbi conceded that since the wellsprings are warmer by night than by day, this means that the sun travels below the firmament at night, as the gentile scholars maintained.

And this is true, for the waters themselves are suited to steam at night in that the sun travels opposite the sea and rules over the element of water, and during the day it is the opposite. This is the truth of the firmament, for Scripture states, “Let there be a firmament in the midst of the waters, and it will separate between the waters.” And

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it further states, "And God separated between the waters that were below the firmament and the waters that were above the firmament."

Maharal appears to be saying here that the real reason why the wellsprings steam at night is not because the sun is passing below the firmament, but rather because the sun has power over the spiritual element of water at night. He does not explain why the Talmud omits this important explanation as to why the Jewish Sages were actually correct.¹ Instead, he simply concludes by putting down those who interpret this account literally:

And all these things were concealed from them and they knew nothing of this, for those people only have a portion in that which is revealed and can be detected, and if so, how can they respond to matters that are concealed and hidden, for they do not know what the concept of the firmament is. And this is not the place to explain the concept of the firmament further; we shall yet explain it.

I must admit that Maharal's approach seems incomprehensible to me, especially in terms of correlating it with the fact that the earth is inhabited on all sides. This may be because I am of the same category as Azariah de Rossi, whom Maharal describes as being incapable of understanding such things. However, I nevertheless feel that although Maharal writes at length, he either does not provide sufficient words that actually explain his interpretation, or his explanation is simply incompatible with the fact of the earth being inhabited on all sides. I would further point out that Rabbi Yitzchak Adlerstein, in his English adaptation of select portions of *Be'er HaGolah*, omits this section entirely, and Rabbi Yehoshua Hartman, in his annotated edition of *Be'er HaGolah*, provides very little in the way of actual explanation, so I suspect that even dedicated followers of Maharal also struggle with his intent here.

The only comprehensive academic discussion of Maharal's exceedingly cryptic words that I have been able to find is that of the French Algerian philosopher Henri Atlan.² Unfortunately, his elaboration is scarcely less cryptic, but due to the importance of such a rare analysis, I am citing it here in full:

This discussion, with its somewhat curious conclusion, is the clew of the labyrinth for later readers, including the same Maharal of Prague, for whom the text must be understood as juxtaposing, not two realistic models of the universe, but two symbolic ones; one of them (that of the Gentile sages) could *also* be understood, and perhaps accepted, as a concrete model. Thus we are dealing here with a symbolic

¹ Hartman invokes Rabbeinu Tam, claiming that his explanation sheds light on Maharal's explanation, but this is difficult, as Rabbeinu Tam was referring to the physical universe.

² For some further discussion of Maharal's approach to this topic, see Andre Neher, *Jewish Thought and Scientific Revolution of the Sixteenth Century*, p. 206, 210 and 246.

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representation whose pretext is what would today be considered a scientific model, relying on it even while distinguishing itself from it. This being the case, “firmament” must be understood according to its scriptural definition (Genesis 1:6-7); namely, as the locus of separation between the “upper waters” and the “lower waters.”

The issue in dispute is thus the role of this separation vis-à-vis our experience of daylight. For the Jewish sages, this light illuminates only the “lower waters,” site of the multiplicity of visible objects, whereas the “upper waters” (those above the heavens) remain in the solar penumbra, adequately illuminated by a more potent light—one hidden from us—the light of the First Day, before the creation of the sun, in the mythical narrative of the seven days of Creation. As such, these upper waters are simultaneously the locus of the hidden oneness of things and of the origin of questioning. During the night, according to this view, the sun returns to the upper waters to illuminate them in their turn, or perhaps, on the contrary, to imbibe from them the light it will use to illuminate the earth during the following day. This view is opposed to that of the Gentile sages, for whom daylight is the only light, illuminating with (almost) clarity all worlds, from the multiple and bounded reality of our own experience to the infinitude of possibilities above the heavens. In this second view night acquires a quite different symbolic value: instead of being a means for renewal from the sources above the heavens, it becomes a sojourn in the netherworld, beneath lower waters and the earth that supports them.

At the same time, however, the firmament acquires a different meaning: it serves essentially as a screen to protect against a surfeit of light and heat during the day, because the sun is considered to emit its radiation from above the firmament. In this conception, moreover, during the night the sun affects the lower waters, too, through a screen, the earth itself, which, although opaque, does not keep the sun from heating the subterranean waters. Thus the succession of day and night takes place on a single level, that of the sun's mediated effect on the lower waters—the world of our terrestrial experiences—with the effects of illumination prevailing over those of heating during the day, and the reverse during the night. For the Jewish sages, by contrast, this function of the screen needed to protect against direct solar radiation is filled by a sort of “sheath” in which the sun, according to this tradition, is normally enclosed; whereas the firmament is an opaque veil separating two different worlds, two separate levels, between which the sun passes directly during the alternation of day and night. In this conception the night, although a period of darkness for the lower world, is a time of light for the upper world, that world “above the sun” where new things can come into being, whereas, according to Ecclesiastes, “there is nothing new under the sun.” This supersolar sphere, penetrated by the sun during the night and illuminated from bottom to top, while the moon reigns elsewhere, alludes to the midrashic dialectic of moon and sun, in which the lunar sphere is perceived as being in certain respects superior to the solar, for all that the latter is brighter, precisely because of the capacity for death and resurrection expressed by the phases of the moon. (Henri Atlan, *Enlightenment to Enlightenment*, p. 266-267)

Whatever the nuances of Maharal's view, it seems to me that there are three fundamental difficulties with Maharal's basic approach. First, there does not appear to be any reason to accept that Maharal's explanation is the actual meaning of the Talmud. There is nothing in the story that hints at a non-literal meaning, and Maharal's argument, that nobody could believe that the sun goes behind the sky at night, is anachronistic.

Second, Maharal's explanation goes against every previous interpretation. This does not necessarily mean that it is incorrect from a historical perspective, but it certainly points in that direction. If the authors of the Talmud did mean what Maharal thought them to mean, they excelled at misleading their readers! One must wonder whether Maharal realized that his approach went against that of all the Rishonim, and how he accounted for this. Did he think that he had rediscovered the true meaning of the Talmud, that all the Rishonim had somehow missed? Or did he think that their words, too, require some sort of deeper explanation? It is impossible to know.

A third difficulty with Maharal's approach is that, since, as we noted, Maharal was apparently working with a corrupt version of the text (regarding the belief of the gentile scholars), it is ironic that he finds it to be a perfect description of the metaphysical reality. But the appeal of Maharal's approach is obvious; it allows one to maintain belief in the superior nature of the Jewish sages.

Other Adherents of the Mystical Approach

Maharal was the first to adopt a mystical interpretation of this topic, but it subsequently proved very popular. R. Moshe Chaim Luzzatto (1707-1746) likewise explains (referencing *Bava Batra* 25b and *Sanhedrin* 91b) that when the Sages spoke of the sun passing behind the firmament at night, they were referring to the spiritual root of the sun.¹

Rabbi Pinchas Eliyahu Hurwitz of Vilna (d. 1821), in *Sefer HaBris*, writes that references to the sun passing through windows refers to the upper spiritual worlds, where there truly are windows in the path of the spiritual sun. He notes that this was the view of all the Sages, being mentioned in *Eruvin*, *Bava Batra*, the Talmud Yerushalmi and *Pirkei d'Rebbi Eliezer*, as well as in *Pesachim*. R. Hurwitz therefore expresses surprise at Rabbi Yehudah HaNasi's apparent acquiescence to the gentile scholars and rejection of the all aforementioned Talmudic Sages—"surely they are all

¹ *Adir BeMarom*, part I, *B'Shaata DiTzlota DeMincha DeShabbata* p 66b.

holy, and God is in the midst of them,” since Scripture also makes reference to the doors,¹ gates² and windows³ of Heaven. He also objects that Rabbi Yehudah HaNasi brings “reason and experiment,” i.e. empirical evidence, to support the view of the gentile scholars, “and the Sage is not like the experimenter.” R. Hurwitz resolves this by saying that “these and those are the words of the Living God”—Rabbi Yehudah HaNasi was referring to the physical reality, whereas the aforementioned Sages were referring to the spiritual reality.⁴

R. Naftali Tzvi Yehudah Berlin (“Netziv,” 1816-1893), in the context of distinguishing between the physical sun and the spiritual force of the *mazal* of the sun, states that the Sages of Israel, in their dispute with the gentile scholars concerning the sun’s path at night, were referring to the spiritual sun, “but they did not reveal their intent, as was their way in matters of sanctity.”⁵ Interestingly, Netziv was not averse to the rationalist approach and even cites de Rossi on several occasions.

Although earlier we cited Chacham Yosef Chaim as taking the straightforward, rationalist approach to this topic, in his own earlier writings he took a very different approach.⁶ Like Netziv, he claims that the Sages of Israel were referring to the spiritual “soul” of the sun, which at night returns to the spiritual heavens, resulting in the physical sun’s power being diminished. He compares this to the human soul leaving the body at night, while the body sleeps and operates at a lower level. (This explanation does not appear to square with the fact of the earth being round; the sun operates with equal power at all times, but in different parts of the world.)

Whatever the explanation, you must know with truth and faith that the words of the Sages of Israel in every place are living and enduring, for they are truth and their words are truth. And aside from the secret meaning to which they intended to allude with their words, sometimes you find that even in the *peshat* approach they had a deep intent. And it is because we are lacking many preparations even in the way of *peshat*, we cannot understand their true meaning, even according to the *peshat* of their words...

¹ Psalms 78:23.

² Genesis 28:17.

³ Genesis 7:11.

⁴ *Sefer HaBrit* 1:4 *Shnei HaMe’orot* 10.

⁵ *Ha’amek Davar* to Deuteronomy 4:19.

⁶ *Ben Yehoyada* to *Pesachim* 94b.

The motivation behind the mystical approach, as Hurwitz makes clear, was to ensure that the revered Sages of the Talmud should not have committed a scientific error. As time went by, this consideration was also extended to the Rishonim, and it became difficult for some to accept that Rabbeinu Tam believed in a flat earth with a dome-shaped firmament. Thus, R. David Luria (Lithuania, 1797-1855) claimed that Rabbeinu Tam, too, was referring to a spiritual mystical reality rather than physical facts.¹

Conclusion

The Talmud's discussion concerning the sun's path at night, strikes many readers as being quite extraordinary. First there is the matter of the Jewish sages holding a view of the universe that is very, very wrong; then there is R. Yehudah HaNasi deciding that the gentiles are correct and the revered Jewish sages are in error. As Rabbi Dr. Isadore Twersky notes, "the passage has a long history of interpretation, reflecting various moods: embarrassment, perplexity, satisfaction, with some attempts at harmonization or reinterpretation or restricting the significance of the report."²

But the pattern of this history of interpretation is interesting. For the Geonim and Rishonim, there was absolutely no doubt that the Talmud was discussing a dispute about astronomy, and for the overwhelming majority of them, it was to be straightforwardly understood as attesting to the Sages having been in error. Most reported this in a matter-of-fact way, apparently not seeing it as any cause for concern, while for some it was positive testimony of the Sages' intellectual honesty and evidence that they were not infallible. The only dissenting voice of that time, Rabbeinu Tam, was not necessarily motivated by any consideration other than the fact that he genuinely believed that the sun did indeed go behind the sky at night.

Beginning in the sixteenth century, this all changed. Rema insisted that the Jewish Sages *must* have been correct, due to their great stature, even if they did not know how to explain why they were correct. And Maharal innovated an entirely new method of ensuring that the Sages remained infallible; by attributing an entirely different meaning to their words, according to which they were not speaking at all about the difference between Babylonian and Ptolemaic cosmology. These approaches were to prove very popular, even while there were still those who could

¹ See his note at the end of his introduction to *Pirkei De-Rabbi Eliezer*.

² "Joseph Ibn Kaspi: Portrait of a Medieval Jewish Intellectual," p. 256 note 52.

not ignore the straightforward and traditional meaning of the text. As rationalism declined, as the perceived stature of the Talmudic Sages became ever more elevated, and as the words of the Talmud became perceived as ever more full of depth, such reinterpretations became increasingly desirable. In traditionalist circles today, on the rare occasions when this passage in the Talmud is discussed, the *only* approaches to be cited on this topic are those of Rabbeinu Tam¹ and/or Maharal!²

Rabbi Yehudah HaNasi had no problem accepting that the gentile scholars were victorious over the Sages of Israel. But as the centuries passed, it became more and more difficult for rabbinic scholars to share his openness. Unsurprisingly, it was also difficult for them to accept the Copernican revolution that was taking place.³ The transition from Babylonian cosmology to Ptolemaic cosmology was actually much easier at the time than the later transition from Ptolemaic cosmology to Copernican cosmology was to be, but it was just as difficult for later generations to look back upon.

¹ This is sometimes proffered by people who apparently see no difficulty in saying that the sun really does go behind the sky at night, while at other times Rabbeinu Tam's view is itself re-interpreted to be talking about the Sages being correct in a mystical sense.

² See, for example, *Mishpachah* magazine's supplement *Kolmus: The Journal of Torah and Jewish Thought* 14 (Kislev 5771) p. 13. An interestingly self-contradictory approach is seen in the Schottenstein Talmud; it introduces the discussions of cosmology in *Pesachim* by assuring the reader that they all conceal a deeper meaning (i.e. only validating Maharal-type approaches), but then later cites R. Avraham ben HaRambam that R. Yehudah HaNasi's statement attests to the Sages' intellectual honesty!

³ I am currently preparing an extensive essay on this topic for publication.

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