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## Threads of Reason

*A Collection of Essays on Tekhelet*

by Rabbi Mois Navon

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### ***About the Book***

This collection of essays is the result of research spanning more than a decade, motivated by nothing more than the desire to reach a clear understanding of the issues surrounding the rediscovery of *tebbelet* through the *Murex trunculus*. Is it possible to renew a biblical commandment without a *mesorah* (tradition)? Must religious objects, like *tzitzit*, be made from kosher substances? Does one violate the *melakhab* (Shabbat labor) of trapping when obtaining a snail on Shabbat? Bringing together biology and halakhah, chemistry and *aggadah*, archeology and theology – and applying careful consideration and logical reason – these essays seek to address the numerous questions that arise in the endeavor to revive this unique commandment. And as *tebbelet* is a commandment that has been forgotten for over 1300 years, each essay is colored with the marvel of a lost biblical commandment returned anew to the Jewish people. This collection of essays, then, can be seen as a group of threads – threads of reason – spun into a cord strong enough to bind a new generation in the fulfillment of an ancient commandment.

## *HaPotzo – Extracting the Dye of the Murex trunculus*

One who traps and crushes (*potzēa*) a *hillazon* is culpable for one [sin offering]. R. Yehudah said he is culpable for two, for R. Yehudah maintained that crushing comes under the heading of threshing (*dash*). The [Rabbis] said to him: crushing does not come under the heading of threshing. Raba asked: What is the reasoning of the Rabbis? [Answer:] They maintain that threshing applies only to things that grow from the ground.

Shabbat 75a

The two acts of trapping and crushing are discussed here together because, explains the Ritva,<sup>1</sup> such was the method of dye extraction – i.e., trap and immediately crush (*potzēa*).<sup>2</sup> Now, while both acts are essential in obtaining *tekelet* from the *hillazon*, the question I would like to address here is, what act does *potzēa* entail?<sup>3</sup> For, while I have translated the term to be “crushing,” this remains to be seen. Indeed, as we will see, this is not a simple question. Adding to the intrigue is the fact that the answer to our inquiry will reflect directly on the physical characteristics that define the *hillazon* itself.

Starting with the Mishnah that delineates the 39 *melakhot* (work activities prohibited on Shabbat),<sup>4</sup> we find that *potzēa* is an *av melakhab* (principal act) entailing the splitting of threads.<sup>5</sup> This, however, is not the act our Gemara has in mind when it refers to the *hillazon* dye-extraction procedure, for the Gemara explains *potzēa* as a derivative act (i.e., *toldah*) of the *av melakhab* of threshing (*dash*). To be clear, while there is an *av melakhab* called *potzēa*, it is not related to the *potzēa* which is a *toldah* of the *av melakhab* of threshing (*dash*).

Now, the *melakhab* of *dash* is defined as the extraction of a substance (e.g., a grain) from its covering (e.g., husk),<sup>6</sup> and so the act of *potzea*, as a derivative act, will have to effect the extraction of the *tebbelet* dyestuff (i.e., the inner substance) from the *hillaẓon* (i.e., the outer covering). And while the Gemara concludes that, in crushing the *hillaẓon*, one is not actually culpable for threshing, this is only due to the inapplicability of the *melakhab* to living creatures. The act *qua* act, however, was done as part of the extracting of the dyestuff from the *hillaẓon*.

Refining our original question, we ask, what action does *potzea* entail that effects the dye extraction?

### Rashi

Rashi explains that the dyers would take the snail and “press it (*dobako*) with their hands in order to release its dye” (ad loc., s.v. *hapotzo*). This definition gives us pause, for in explaining that one merely presses the snail with his hands, he seemingly discounts the separation (crushing or otherwise) of a presumed shell. Did Rashi believe the *hillaẓon* to be a creature without a shell, or at best, a soft-shelled creature?

On the term “*hillaẓon*” in Sanhedrin 91a, Rashi writes that the *hillaẓon* is a “worm (*tola’at*) that comes from the sea” (s.v. *hillaẓon*).<sup>7</sup> The only other description that Rashi provides of the creature itself is in Shabbat 74b (s.v. *tzaydei*) where he calls it “a small fish.” It appears that Rashi indeed believed the *hillaẓon* to be a shell-less creature. In his comments to Deuteronomy (8:4): “Your clothing did not wear out,” Rashi employs the Midrash: “...as the people grew so their clothing grew with them, like the clothing of the *homot* which grows with it.” The Ramban (ad loc.) notes that the source of Rashi’s comment derives from the Midrash (Ps. 23) which states, “Go and learn from the *hillaẓon*, all the time that it grows, its shell grows with it.”<sup>8</sup>

For some reason, Rashi deliberately chose to replace the term “*hillaẓon*” with that of “*homot*.”<sup>9</sup> There are two possibilities for the substitution: (1) he viewed the two creatures as equivalent and thus used them interchangeably; or (2) he felt the *homot* was a more obvious example of a creature whose shell grows with it and thus used it to explain the verse.

Let us investigate Rashi's comments on the *homēt*. Rashi, both on the Torah (Lev. 11:30) and on the Gemara (Hullin 122a, Haggigah 11a)<sup>10</sup>, translates *homēt* into Old French as *limtza* (limaçe). In each of these comments, Rashi also explains that the *homēt* has a shell that grows with it. Interestingly, *limaçe* is translated to Hebrew as *hillaẓon*. From here we might infer that *limaçe*, and so too *hillaẓon*, refers to a shelled creature; however, a search of other uses of this term by Rashi reveals that he sometimes intends a shelled creature and sometimes a shell-less creature.<sup>11</sup> Indeed, Moshe Catane, in his "Otzar Loazei Rashi," notes that *limaçe* can refer to a "*hillaẓon*" or "*hillaẓon arum*" (a snail without a shell – i.e., a slug). On the other hand, he points out that the *homēt* is clearly a *hillaẓon* "with a shell."<sup>12</sup> Thus, for Rashi, the term *hillaẓon* could mean either a snail or a slug, whereas the name *homēt* refers unequivocally to a shelled creature.

With this understanding, we can now answer our question regarding Rashi's replacement of the term *hillaẓon* with the term *homēt* in his commentary to the verse, "Your clothing did not wear out." Rashi wanted to provide a physical example of a creature whose outer "garment" grows with the growth of its body. In order to make his interpretation of the verse as clear as possible, Rashi intentionally replaced the ambiguous term "*hillaẓon*" with the unambiguous term "*homēt*."

Given this, in conjunction with his comment in Sanhedrin where he calls the *hillaẓon* a worm from the sea, we are forced to conclude that Rashi believed the *hillaẓon* used for *tebbelet* to be a type of sea slug.<sup>13</sup> Indeed, this conclusion accords well with his comments on our Gemara of "*hapotzo*," for if the *hillaẓon* was a slug-like creature, squeezing with the hands would be all that was required to effect the dye extraction.<sup>14</sup>

## **R. Herzog**

While Rashi's determination is certainly reasonable, especially given the dearth of textual sources describing the physiology of the *hillaẓon*, it is by no means unequivocal. Indeed, in his doctoral thesis on the subject, R. Herzog wrote, "The verb *patza*, employed of the crushing of the *hillaẓon*, has reference in Tannaitic [usage] to some hard crustaceous substance."<sup>15</sup> He, like the Radzyner Rebbe before him,<sup>16</sup> refers to the numerous places in the Mishnah and Gemara that use the verb *patzea* to indicate breaking open something hard like a nut or a skull.<sup>17</sup> For example, the Mishnah (Orlah 3:8) asks, "How did they crush

(*niftze'u*) the walnuts?” And the Mishnah (San. 9:6) explains that, “The young priests would take out [the criminal] from the courtyard and crush (*umefatzi'in*) his skull with an ax.”

These uses imply a blow from a strong tool – a definition that is in line with the biblical use of the word as well. In Genesis (4:23), Lamech tells his wives, “I have slain a man for wounding me (*lefitzu*), and a young man for bruising me.” The Radak (ad loc.) explains that the verb *petza* indicates a wound from a blow strong enough to extract blood. In consonance, Rashi (ad loc.) himself explains that a *petza* is the result of a blow from a sword or arrow.

Rashi's explanation here is not contradictory to his explanation in the Gemara where he explains *potzea* to mean squeezing with the hand. This is because, while there are a great many uses of the verb *potzea* which refer to breaking open a hard substance (e.g., a walnut, a skull), the Mishnah and Gemara also include soft applications (e.g., crushing an olive).<sup>18</sup> This being the case, the sources in the Gemara allow for the interpretations of both Rashi and R. Herzog.<sup>19</sup>

Referring back to our Gemara (Shabbat 75a), it is understood that the act of *potzea* (as a *toldab* of *dash*) is to effect the extraction of the dyestuff from the *hillaẓon*. Postulating, as R. Herzog does, that the *hillaẓon* is a hard shelled mollusk, this would imply that the act must include both the breaking of the shell and the extraction of the dye from within the body of the snail. And indeed, this is precisely the method employed on the *Murex* snails, as described by Aristotle: “Small specimens they break in pieces, shells and all, for it is no easy matter to extract the organ; but in dealing with the larger ones they first strip off the shell and then abstract the bloom [i.e., dyestuff].”<sup>20</sup> Similarly Vitruvius explains, “After the shells are gathered they are broken into small pieces with iron bars, from the blows of which the purple dye oozes out like tears and is drained into mortars and ground.”<sup>21</sup>

## Conclusion

We set out to understand what act, described by the Gemara as *potzea* (as a *toldab* of *dash*), was involved in extracting the dye from the *hillaẓon*. We learned that Judaic literature provides very limited reference as to the type of covering that must be penetrated to remove the dyestuff from the *hillaẓon*. This led to two possible interpretations: (1) that of Rashi, who believed the *hillaẓon* to be a worm-like

creature with a soft outer covering, and thus maintained that manual squeezing effects *petzija*; and (2) that of R. Herzog, who held the *billazon* to be a hard-shelled mollusk and thus believed that the sharp blow of a strong instrument was needed to engender the *melakbah*.

While both explanations are certainly legitimate textual interpretations, numerous modern discoveries lend significant, if not overwhelming, weight to R. Herzog's interpretation.<sup>22</sup> Accordingly, one can believe that the *billazon* is a sea slug unknown to both modern researchers and ancient ones, since despite cataloguing all the flora and fauna and their uses, neither ever mentioned such a dye-producing creature.<sup>23</sup> Alternatively, one can believe that the ancient source of the coveted dye has been rediscovered and, with pride and joy,<sup>24</sup> fulfill the biblical commandment of *tzitzit* in all its intended fullness.<sup>25</sup>

## ~ Notes ~

- 1 Ad loc., s.v. *tannu*.
- 2 Indeed, the Gemara (Shabbat 75a) explains that the dye from a live *billazon* is more effective (see Rashi, R. Hannanel). Similarly, Aristotle explains this sequence for the *Murex*: “Fishermen are anxious always to break the animal in pieces while it is yet alive, for, if it die before the process is completed, it vomits out the bloom [i.e., purges its dye]; and for this reason the fishermen keep the animals in creels, until they have collected a sufficient number and can attend to them at their leisure” (*History of Animals*, Book 5, part 15; [http://classics.mit.edu/Aristotle/history\\_anim.5.v.html](http://classics.mit.edu/Aristotle/history_anim.5.v.html)).
- 3 For a detailed discussion on trapping, see my essay, “*HaZad Hillaẓon* – Trapping the *Murex trunculus*,” (herein, p. 51).
- 4 Shabbat 7:2.
- 5 There are actually four primary opinions on what exactly is the *av melakhab* of *potzeer*:  
 (1) Rashi (Shabbat 73a): thin the thread; (2) Rambam (Hil. Shabbat 9:20): separate the warp from the woof; (3) Raavad (ad loc.): cut off the ends of the garment from the loom; (4) Ran (Shabbat 31b): quotes the Raah who holds that after a cord is frayed, separating the strands and re-twisting them.
- 6 Hayei Adam (Hil. Shabbat 14:1).
- 7 Similarly in Lev. 21: 20 (s.v., *tablu*).
- 8 Also in Shir ha-Shirim Rabbah (4:11); Yalkut Shimoni (691); Pesikta deRav Kahana (Piska 11, Beshalah); Devarim Rabbah (7:11). Indeed, all the searches within the Judaic literature (*Safrut Haẓal*) of the Bar Ilan CD show only the version using “*billazon*.”
- 9 While one could argue that Rashi simply had a different version of the Midrash, this would make the argument (that Rashi did not believe the *billazon* to have a shell) even simpler, since the rest of his comments unequivocally support this conclusion. But there is little evidence to support the theory that Rashi had a different version, as there are no sources of a version of the Midrash using *homot* instead of *billazon* (see fn. 8), and the commentaries that do make the change to *homot* all post-date Rashi [see: R. Behayei (Deut. 8:4), Toldot Yitzhak (Deut. 8:3), Ohr HaHayim (Deut. 6:24), Maharsha (Baba Batra 74a, s.v. *piskei*), Derashot R”Y ibn Shu”ib (Ekev), Beit Efraim (Yoreh Deah 6)]. The Tifferet Yisrael (*Kelalei Bigdei Kodesh shel Kehuna*), quoting the Arukh (entry: *billazon*) uses the term *homot* interchangeably with the term *billazon*. Tos. Rid (Hag. 11a) uses the terms *homot* and *billazon* interchangeably, but explains that there are different types of *homot*, the *tebbelet* one

being different from the *shemonah sheratzim* one. Clearly there is a strong similarity between the *hillazon* and the *homet*. However, there is also a distinction, which I believe is the reason that Rashi replaced the term from the Midrash in his commentary. This will be explained in the text of this essay.

<sup>10</sup> s.v. *homet*.

<sup>11</sup> In Shabbat 77b (s.v. *shablul*), *shablul* is translated as *limtza* which *Otzar Loazei Rashi* explains refers to a “*hillazon arum*” – i.e., a slug. See also *Otzar Loazei Rashi* (Haggigah 11a, s.v. *homet*) where he emphasizes that in Shabbat 77b, the term refers to a *hillazon arum*, whereas in Haggigah 11a, the same term refers to a *hillazon* with a shell. For other examples, see Rashi on Psalms (58:9), Moed Katan 6b (s.v. *dikbtiv*).

<sup>12</sup> See his comments on Haggigah 11a.

<sup>13</sup> There is one small issue yet in need of explanation: if the *hillazon* is a shell-less creature according to Rashi, how then would he explain the original Midrash that says that the *hillazon* is a creature “whose shell grows with it”? Perhaps he believed the Midrash to be referring to a different – i.e., non-*tekbelet* producing – *hillazon*, as he indeed translates the “*hillazon*” of the Midrash to “*homet*.”

<sup>14</sup> Indeed, it should be noted that if we were to suppose that Rashi held the *hillazon* to have a hard shell, we would have great difficulty explaining how the only *melakhah* involved after trapping was squeezing. That is, to get to the stage of squeezing by hand, one would have to posit that the snail was removed from its shell by cracking (or similar act), which would be considered a *melakhah* of some sort. We would then offer that Rashi didn’t count such an act as a *melakhah* because he held that *melakhah sheinah tzrikhab legufab* does not incur biblical liability (Shabbat 93b, s.v. *v'R'Shimon*; Shabbat 12a, s.v. *ha*; see R. Kaganoff, “Kuntrus Tehillah LeDavid,” in *Nimla Tal*, Vol. 1-2, seifim 3-9, pdf pagination pp. 216-224). But then we would be faced with the rather acute problem that it is R. Yehudah who is making the argument that there are only two acts involved – *tzaidab* followed by *petzia* – and it is R. Yehuda who is the champion of the notion that *melakhah sheinah tzrikhab legufab* **does** incur biblical liability. So why would he discount the stage of removing the snail from its shell? We might then offer that cracking the shell is *mekalkel*, which all agree does not engender culpability (“R. Abba: one who digs a hole only for its dirt is *patur*; even for R. Yehudah who holds *melakhah sheinah tzrikhab legufab* holds such only when the purpose is constructive” – Shabbat 73b). However, claiming the breaking of the shell to be *mekalkel* is disputable, since one might argue that breaking the shell to get at the body is not like digging a hole to get the dirt, but more like digging a hole to get to the treasure within. Clearly the solution that Rashi didn’t believe the *hillazon* to have a shell at all is far simpler.

<sup>15</sup> R. Herzog, “Hebrew Porphyrology,” in *The Royal Purple and The Biblical Blue* (Jerusalem: Keter, 1987), p. 57.



- <sup>16</sup> Interestingly, the Radzyner Rebbe writes that “*petzua* refers only to a thing that is very hard” (“Sefunei Temunei Hol,” in *Sifrei ha-Tekhelet Radzyn* [Benei Berak: Mishor, 1990], p. 27).
- <sup>17</sup> A search of the root פצץ in the classic Jewish literature (*safrut hazal*) returns 475 results as follows – Mishnah: 18; Tosefta: 30; Masekhtot Ketanot: 6; Babylonian Talmud: 94; Jerusalem Talmud (Vilna): 70; Midrash Halakhah: 26; Midrash Aggadah: 231. It should be noted that some of these refer to the splitting open of softer things, like strings or olives, as well as referring to the injury of the testicle (*patzua dakab*).
- <sup>18</sup> See, for example, Mishnah Shevi’it (4:9) and Talmud (Shabbat 50b).
- <sup>19</sup> It should be noted that in determining the *hillaẓon* to be a shelled creature, we understand the Midrash that states that the *hillaẓon* is a creature whose “shell grows with it” as being consistent with all references to the *hillaẓon* in the Midrash and Gemara. This is as opposed to Rashi (see fn. 13).
- <sup>20</sup> *History of Animals*, Book V, Part 15 – See: [http://classics.mit.edu/Aristotle/history\\_anim.5.v.html](http://classics.mit.edu/Aristotle/history_anim.5.v.html).  
See this video in which John Edmonds (who discovered how the ancients performed vat dyeing using the *Murex*) demonstrates the ancient method of dye extraction by the single act of smashing/crushing: <http://youtu.be/IZw3Z2ms9-8>.
- <sup>21</sup> Marcus Vitruvius Pollio, *De Architectura*, Book VII, Ch. 13, pt. 3 – See: [http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Vitruvius/7\\*.html](http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Vitruvius/7*.html).
- <sup>22</sup> See: R. Menachem Burstein, *Ha-Tekhelet* (Jerusalem: Sifriyati, 1988); Israel Ziderman, “Reinstitution of the Mitzvah of Tekhelet in Tzitzit,” *Techumin* 9 (1988), pp. 423-46; R. Yehuda Rock, “Renewal of Tekhelet and Issues on Tzitzit and Tekhelet,” *Techumin* 16 (5756), online version; R. Eliyahu Tavger, “Ma’amar ha-Tekhelet,” in *Kelil Tekhelet* (Jerusalem, 1993), pp. 312-34; R. Chaim Twerski, “Identifying the Chilazon,” *Journal of Halacha and Contemporary Society* XXXIV (Fall 1997), pp.77-102. R. Shlomoh Taitelbaum, *Lulaot Tekhelet* (Jerusalem: Ptil Tekhelet, 2000).
- <sup>23</sup> Ancient catalogs: Aristotle, *History of Animals*. Pliny, *Natural History*. Modern catalogs: Encyclopedia of Life (<http://eol.org>); Global Biodiversity Information Facility: (<http://www.gbif.org>); Biodiversity Heritage Library: (<http://www.biodiversitylibrary.org>).
- <sup>24</sup> *Tzitzit* are to be worn with pride and joy as the symbol of the King (Mishnah Berurah 8:11:26).
- <sup>25</sup> “The essence (*ikar*) of the mitzvah is *tekelet* and one wearing white [strings] without *tekelet* has not fulfilled a complete mitzvah” – Rashi on Menahot 40a (s.v. *b”sh potrin*).