

## HaPotzo – Extracting the Dye of the Murex trunculus

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“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:] Because threshing only applies to things that grow from the ground.”

(Shabbat 75a).

The Ritva (ibid., s.v. *tanu*) explains that the two acts – trapping and crushing – are discussed in one expression because such was the method of dye extraction – i.e., trap and immediately crush (*potzēa*).<sup>1</sup> The question we would like to address herein is: what action does *potzēa* entail? That is, while we have translated the term to be “crushing”, this remains to be seen. As we will see, this is not a simple question. Adding to the intrigue is the fact that the answer to our inquiry reflects directly on the physical characteristics expected of the hillazon itself.

Starting with the Mishna (Shabbat 7:2) that delineates the 39 *melachot*, we find that *potzēa* is an “*av melacha*” entailing the splitting of threads.<sup>2</sup> This definition clearly differs from the act performed on the hillazon because our Gemara explains the act under the rubric (i.e., *tolda*) of the “*av melacha*” of threshing (*dash*). And while the Gemara concludes that one is not culpable for threshing, this is only due to the inapplicability of the *melacha* to living creatures; however the act *qua* act, it is agreed, was done as part of the processing of the dyestuff from the hillazon.

The *melacha* of *dash* is defined as the extraction of a substance (e.g., a grain) from its covering (e.g., husk),<sup>3</sup> and so the act of *potzēa* will have to effect the extraction of the tekhelet dyestuff (i.e., the inner substance) from the hillazon (i.e., the outer covering). The question, again, is: what action effects the dye extraction?

### Rashi

Rashi (ibid., s.v. *hapotzo*) explains that the dyers would take the snail and “press it (*dobako*) with their hands in order to release its dye.” The position of Rashi 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 hillazon to be a creature without a shell, or at best a soft-shelled creature?

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<sup>1</sup> Indeed, the Gemara (Shabbat 75a) explains that the dye from a live hillazon is more effective (see esp. Rashi, R. Hannanel, ibid.). Similarly, Aristotle (History of Animals, Book 5, part 15) 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.” See [http://classics.mit.edu/Aristotle/history\\_anim.5.v.html](http://classics.mit.edu/Aristotle/history_anim.5.v.html)

<sup>2</sup> There are actually four primary opinions on what exactly is the *av melacha* of *potzēa*: Rashi (Shabbat 73a) – thin the thread; Rambam (Hil. Shabbat 9:20) – separate the warp from the woof; Raavad (ibid.) – cut off the ends of the garment from the loom; Ran (Shabbat 31b) – quotes the Raah who holds that after cord is frayed, one separates the strands and re-twists them.

<sup>3</sup> Chayei Adam (Hil. Shabbat 14:1).

In Sanhedrin 91a (s.v., *hillazon*) Rashi writes that the hillazon is a “worm (*tolaat*) that comes from the sea.”<sup>4</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 hillazon to be a shell-less creature. Nevertheless, 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 *homēt* which grows with it.” Ramban (*ibid.*) notes that the source of Rashi’s comment derives from the Midrash (Tehillim 23) where it states, “Go and learn from the hillazon, all the time that it grows, its shell grows with it.”<sup>5</sup>

For some reason, Rashi deliberately chose to replace the term “hillazon” with that of “*homēt*.”<sup>6</sup> There are two possibilities for the substitution: (1) he viewed the two creatures as equivalent and thus used them interchangeably; (2) he felt the *homēt* was a more clear-cut 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>7</sup>, translates *homēt* into Old French as *limza* (limaçe). In each of these comments Rashi also explains that the *homēt* has a shell that grows with it. Interestingly, *limza* (limaçe) is translated to Hebrew as hillazon. From here we might infer that *limza* (limaçe), and indeed hillazon, 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 as shell-less creature.<sup>8</sup> Indeed, Moshe Catane, in his “Otzar Loazei Rashi”, notes that limaçe can refer to a “*hillazon*” or “*hillazon arum*” (a snail without a shell, i.e., a slug). He does note that the *homēt* is clearly a hillazon “with a shell”.<sup>9</sup> As such, for Rashi, the term hillazon 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 hillazon with the term *homēt* in his commentary to the verse, “Your clothing

<sup>4</sup> Similarly in Lev. 21: 20 (s.v., *tablul*).

<sup>5</sup> 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 in the Judaic Literature (*Safrut Hazal*) in the Bar Ilan CD show only the version using the “hillazon”.

<sup>6</sup> While one could argue that Rashi simply had a different version of the Midrash, this would make our argument – that Rashi did not believe the hillazon to have a shell – even simpler. But there is little evidence to support the theory that Rashi had a different version. For, there are no sources of a version of the Midrash using *homēt* instead of hillazon (see fn. 5), and the commentaries that do make the change to *homēt* all post-date Rashi [see: R. Behaye (Dev. 8:4), Toldot Yizhak (Dev. 8:3), Ohr HaHayim (Dev. 6:24), Maharsha (Baba Batra 74a, s.v. *piskei*), Derashot R”Y ibn Shu”ib (Ekev), Beit Efraim (Y.D. 6)]. The Tifferet Yisrael (Kelalei Bigdei Kodosh shel Kehuna), quoting Aruch (*hillazon*) uses the term *homēt* interchangeably with the term hillazon. Tos. Rid (Hag. 11a) uses the terms *homēt* and hillazon interchangeably, but explains that there are different types of *homēt*, the tekhelet one being different from the *shemona sberatzim* one. Clearly there is a strong similarity between the hillazon and the *homēt*; however, there is also a distinction, which I believe is the reason that Rashi, as will be explained in the text of this essay, replaced the term from the Midrash in his commentary.

<sup>7</sup> s.v., *homēt*.

<sup>8</sup> In Shabbat 77b (s.v. *shablul*), *shablul* is translated as *limza* to which Otzar Loazei Rashi explains is referring to a “*hillazon arum*” – i.e., a slug. See also Otzar Loazei Rashi (Haggigah 11a, s.v. *homēt*) where he emphasizes that in Shabbat 77b the term refers to a hillazon arum, whereas in Haggigah the same term refers to a hillazon with a shell. For other examples see Rashi on Psalms (58:9), Moed Katan 6b (s.v. *dikhtiv*).

<sup>9</sup> See his comments on Haggigah 11a.

did not wear out.” Rashi wants to provide a physical example of a creature whose outer “garment” grows with it. In order to make his interpretation of the verse as clear as possible, Rashi intentionally replaced the ambiguous term “hillazon” with the unambiguous term “*homel*”.<sup>10</sup>

Given this, we are left with no choice other than to conclude that Rashi believed the hillazon used for tekhelet to be a type of slug living in the sea.<sup>11</sup> This conclusion accords quite nicely with his comments on our Gemara of “ha’potzo”, for indeed, if the hillazon was a slug-like creature, squeezing with the hands would be all that was required to effect the dye extraction.<sup>12</sup>

## R. Herzog

While Rashi’s determination is certainly reasonable, given the dearth of textual sources describing the physiology of the hillazon, it is by no means unequivocal. R. Herzog, in his doctoral thesis on the subject, wrote: “The verb (*patzā*), employed of the crushing of the hillazon, has reference in Tanaitic [usage] to some hard crustaceous substance.”<sup>13</sup> He, like the Radzyner Rebbi before him,<sup>14</sup> refers to the numerous places in the Mishna and Gemara which use the verb *potzēa* to indicate breaking open something hard like a nut or a skull.<sup>15</sup> For example, the Mishna (Orlah 3:8) asks, “How did they crush (*niftze’u*) the walnuts?” And the Mishna (San. 9:6) explains that, “The youth priests would take out [the criminal] from the courtyard and crush (*u’mefatzi’in*) his skull with an ax.”

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<sup>10</sup> I would like to note that this conclusion contradicts my earlier writing in “Trapping the Murex trunculus”. There I concluded that Rashi indeed believed the hillazon to be interchangeable with the *homel*. At the time, I was swayed by the translations of limaçon as hillazon and failed to realize that such translations were not all necessarily referring to a shelled snail. For the record, this mistaken conclusion did not have any impact on the conclusions of that essay because I also accounted for the possibility that the *homel* was not equivalent to the hillazon.

<sup>11</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 Midrash that says that the hillazon is a creature “whose shell grows with it”? We could respond that he believed the Midrash to be referring to a different, i.e., non-tekhelet producing, hillazon.

<sup>12</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 *melacha* 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 otherwise) which would be considered a *melacha* of some sort. We would then offer that Rashi didn’t count such as a *melacha* because he held that *melacha shaina tzricha legufa* does not incur biblical liability (Shabbat 93b, s.v. *v’R’ Shimon*; Shabbat 12a, s.v. *ha*; see R. Kaganoff, “Kuntrus Tehila LeDavid”, *Nimla Tal*, Vol 1-2, seif gimmel-tet, pdf pagination pp.216-224). But then we would be faced with the rather acute problem that it is R. Yehuda who is making the argument that there is only *tzvuda* followed by *petzia*, and he is the champion of the notion that *melacha shaina tzricha legufa* does not 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 is not culpable (“R. Abba: one who digs a hole only for its dirt is *patur*; even for R. Yehuda who holds *melacha shaina tzricha legufa* – 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 like digging a hole to get to the treasure therein. In any case, clearly the solution that Rashi didn’t believe the hillazon to have a shell at all is far more simple.

<sup>13</sup> R. Herzog, “Hebrew Porphyrology”, *The Royal Purple and The Biblical Blue* [Jerusalem, 1997], p.57.

<sup>14</sup> Interestingly, the Radzyner Rebbi writes that “*petzia* refers only to a thing that is very hard” (“Sefunei Temunei Hol”, *Sifrei HaTekhelet Radzyner* [BneiBrak, 1990], p. 27).

<sup>15</sup> A search of the root **פצץ** in the classic literature (*safrut bazel*) returns 475 results as follows – Mishna: 18; Tosefta: 30; Masechtot Ketanot: 6; Babylonian Talmud: 94; Jerusalem Talmud (Vilna): 70; Midrash Halacha: 26; Midrash Aggada: 231. It should be noted that some of these refer to the splitting open of softer things, like strings or olives, as well as to the injury of the testicle (*patzua daka*).

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 (*l’phitziy*), and a young man for bruising me.” Radak (ibid.) explains that the verb *petza* indicates a wound from a blow strong enough to extract blood. In consonance, Rashi (ibid.) himself explains that *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 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 Mishna and Gemara also include soft applications (e.g., crushing an olive).<sup>16</sup> As such, the sources in the Gemara allow for the interpretations of both Rashi and R. Herzog.<sup>17</sup>

As mentioned previously, the act of *potzea* (as a type of *dash*) is to effect the extraction of the dyestuff. Postulating, as R. Herzog does, that the hillazon is the 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. Tellingly, this is indeed the method employed on the Murex snails as described by Aristotle (History of Animals, Book V, Part 15): “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>18</sup> Similarly Viruvius 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” (Marcus Vitruvius Pollio, de Architectura, Book VII, Ch. 13, pt. 3).<sup>19</sup>

## Conclusion

We set out to understand what act, described by the Gemara as *potzea* (a *tolda* of *dash*), was involved in extracting the dye from the hillazon. We learned that Judaic literature provides very limited reference as to the type of covering that must be penetrated to remove the dyestuff. This led to two possible interpretations: (1) that of Rashi, who believed the hillazon to be a worm like creature with a soft outer covering and thus explained that manual squeezing would effect *potzia*; (2) that of R. Herzog, who held the hillazon to be a hard-shell snail thus requiring the sharp blow of a strong instrument to engender the *melacha*.

While both explanations are certainly legitimate textual interpretations, numerous modern discoveries lend significant, if not overwhelming, weight to R. Herzog’s

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<sup>16</sup> See for example Mishna Sheviit (4:9), Babylonian Talmud (Shabbat 50b).

<sup>17</sup> It should be noted that in determining the hillazon as a shelled creature, we understand the Midrash that states that the hillazon is a creature whose “shell grows with it” as being consistent with all references to the hillazon in the Midrash and Gemara. This, as opposed to Rashi (see fn. 11).

<sup>18</sup> 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 simply smashing:

[http://www.youtube.com/watch?v=IZw3Z2ms9-8&list=FLLmgeDkrBbv6J3teDpq4JEg&index=2&feature=plpp\\_video](http://www.youtube.com/watch?v=IZw3Z2ms9-8&list=FLLmgeDkrBbv6J3teDpq4JEg&index=2&feature=plpp_video)

<sup>19</sup> See [http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Vitruvius/7\\*.html](http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Vitruvius/7*.html)

interpretation.<sup>20</sup> One can believe that the hillazon is a sea-slug hidden away from the eyes of both modern researchers as well as the ancients who catalogued all the flora and fauna and their uses, yet never mentioned such a dye-producing creature.<sup>21</sup> Alternatively, one can believe that ancient source of the coveted dye has been found and, with pride and joy,<sup>22</sup> fulfill the biblical commandment of *tzitzit* in all its intended fullness.<sup>23</sup>

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<sup>20</sup> See: Menahem Borstein, *Ha-Tekhelet* (Jerusalem, 1988); Yisrael Ziderman, “Reinstitution of the *Mizyah* of *Tekhelet* in *Zizit*” (Hebrew), *Tehumin* 9 (1988): 423-46; Yehuda Rock, “Renewal of *Tekhelet* and Issues on *Zizit* and *Tekhelet*” (Hebrew), *Tehumin* 16 (website version); Eliyahu Tavger, “*Maamar ha-Tekhelet*”, *Kelil Tekhelet* (Jerusalem, 1993): 312-34; Rabbi Chaim E. Twerski, “Identifying the Chilazon”, *Journal of Halacha and Contemporary Society*, XXXIV(Fall 1997): 77-102. R. S. Taitelbaum, *Lulaot Tekhelet* (Jerusalem, 2000).

<sup>21</sup> Aristotle, *History of Animals*. Pliny, *Natural History*.

<sup>22</sup> Tzitzit are to be worn with pride and joy as the symbol of the King (Mishna Berura 8:11:26).

<sup>23</sup> “The essence (*ikkar*) of the *mizyah* is *tekhelet* and one wearing white (strings) without *tekhelet* has not fulfilled a complete *mizyah* (*mizyah sheleimah*)” – Rashi on *Menakhot* 40a (s.v. *b'sh potrin*).