

Chosam Shel Zahav

On the Identification of the *Tekhelet Chilazon*

Together with the pamphlet *Eyn HaTekhelet*, concerning the determination of the color of
tekhelet

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Translated by Rafi Hecht

Abstract

Chosam Shel Zahav presents a cumulative argument identifying the rabbinic *chilazon* used to produce *tekhelet* with *Murex trunculus*, the banded dye-murex. Drawing upon Talmudic and midrashic passages, medieval Jewish commentators, Greco-Roman descriptions of the ancient dye industry, archaeological discoveries, and the biological and chemical properties of the snail, the author argues that *Murex trunculus* satisfies the traditional identifying criteria more comprehensively than any proposed alternative. Particular attention is given to its ability to produce a stable blue resembling *kala ilan*, its historical association with the dye centers of Tyre and the Mediterranean coast, and the discovery of dye installations, shell deposits, and textiles linked to the ancient *Purpura* industry. The paper addresses objections arising from descriptions of the *chilazon* as resembling the sea, resembling a fish, ascending once in seventy years, possessing ink-black “blood,” and commanding a high price. It also considers whether an uninterrupted tradition is necessary to restore the mitzvah and examines practical halachic questions concerning the dyeing process, trapping and extracting the snail, permissible materials, the number of *tekhelet* threads, and their windings. The author concludes that the combined textual, historical, archaeological, and scientific evidence establishes *Murex trunculus* as the source of ancient *tekhelet* and warrants the renewed performance of the mitzvah.

Acknowledgments

My thanks are extended to that Torah scholar who was granted merit from Heaven—without whom a mitzvah would have disappeared from Israel—namely, the eminent Rabbi Eliyahu Tavger, *shlita*; and likewise to the eminent Rabbi Shlomo Teitelbaum, *shlita*, author of *Lula’ot Tekhelet*. They investigated every aspect of this subject from all sides and answered my many questions and inquiries with extraordinary patience. I also thank Yoel Guberman, may he live and flourish, chairman of the P’til Tekhelet organization, which enables the public to fulfill the mitzvah. He showed me the entire dyeing process, from opening the *chilazon* through to the dyed wool.

I also benefited from their books—*Lula’ot Tekhelet* and Rabbi Shlomo Teitelbaum’s pamphlet distinguishing between *tekhelet* and *argaman*—and from the articles of Rabbi Eliyahu Tavger, *shlita*, which were printed in his book *Kelil Tekhelet*. These works form the principal foundation of this essay, although I endeavored, to the extent possible, to examine the material in its original sources. Anyone wishing to investigate the subject more extensively will find what he seeks in those works. They may be obtained through the P’til Tekhelet organization.

I also thank Rabbi Yechezkel Moshe Toporowitz, *shlita*, who assisted me greatly from his extensive experience in this field, reviewed the pamphlet, and offered valuable comments. With him I thank Rabbi A. S. Rapaport, *shlita*, who contributed many additions incorporated here; all the Torah scholars who reviewed the pamphlet and enlightened me with their comments; and, in particular, one of Jerusalem’s great sages, many of whose observations were integrated into the text. I also thank the benefactor who wishes to remain anonymous, who commented, clarified, and appreciably improved several points in the pamphlet.

I likewise made use of the works of the holy Rebbe of Radzyń, of blessed memory, who opened this subject through the power of his immense dialectical skill and erudition; the book *HaTekhelet* by Rabbi Menachem Burstein, *shlita*; pamphlets by Rabbi Yisrael Brand, *shlita*; articles by Rabbi Shmuel Ariel, *shlita*; the bulletin *The Mitzvah of Tekhelet in Our Time*; the pamphlets *Tekhelet for Those Who Consider*

His Name by Rabbi A. S. Rapaport, *shlita*, and *Golden Hooks*; and articles by Dr. Israel Ziderman and Dr. Baruch Stermann.

I also benefited from the pamphlets *Tekhelet and Argaman* by Rabbi Menachem Adler, *shlita*, *Between Tekhelet and Argaman*, and *The Tekhelet of the Chilazon* by Rabbi Eliezer Holl, *shlita*. Responses to the questions they raised have been incorporated into the discussion.

This edition also includes observations submitted in writing and orally by readers of the previous editions. May their strength be firm.

It should be noted that some of the objections quoted in this pamphlet are not really worthy of being committed to paper. Nevertheless, after seeing people of superficial understanding employ every conceivable argument on this subject, I considered it proper to record them.

Printed on paper concerning which there is, God forbid, no concern of Sabbath desecration.

For all matters concerning this pamphlet, one may contact Binyomin Zev Horvitz, 12 Be'er Mayim Chaim Street, Bnei Brak; telephone 054-8419444. Comments will be gratefully received.

Chosam Shel Zahav

On the Identification of the *Tekhelet Chilazon*

Based on the words of the *Chavot Yair* and Rabbi Yaakov Emden

Rabbi Meir taught: The punishment for neglecting white *tzitzit* is greater than the punishment for neglecting *tekhelet*. To what may this be compared? To a mortal king who told two servants, “Bring me a seal.” To one he said, “Bring me a seal of clay,” and to the other, “Bring me a Chosam Shel Zahav.” Both were negligent and failed to bring it. Which one deserves the greater punishment? The one whom the king told to bring a seal of clay, for it is readily available, yet he failed to bring it. (Menachot 43b)

Rashi explains:

“A seal”—they would place one upon an animal or a slave when purchased, as a sign of servitude.

“The one whom the king told to bring a seal of clay”—because it is readily available, his punishment for failing to bring it is greater.

The Sages compared *tzitzit* to the seal borne by the servants of the King of kings, the Holy One, blessed be He: the white threads to a seal of clay, and the *tekhelet* thread to a Chosam Shel Zahav. We shall answer after them: “Identify, if you please, whose are this seal and these cords.”

In sum, everything depends upon performing the commandments when we have the means to do so. This is our balm and remedy, for on account of our sins we are in exile and cannot fulfill most of the commandments. By what, then, can a servant obtain atonement and favor before his Master? Even the commandment of tzitzit is not in our hands in its complete form, on account of our sins, for we have no tekhelet. Yet this is our consolation: since we lack the means to fulfill the commandments, we receive reward as one who performed them. This applies, however, only to one whose heart is sick and pained by being prevented from performing the commandment. As for one who pays it no attention—God searches all hearts. How can he receive reward as one who performed the commandment, when it is revealed before Heaven that he does not care about it? Therefore, whenever a man places tzitzit upon his garment, he is obligated to remember the mitzvah of tekhelet and to sigh brokenheartedly because he cannot fulfill the commandment in its complete form.

—*Ya'arot Devash, Part II, Discourse 2*

Bnei Brak, 5774

Approbation of Rabbi Shmuel Nadel, *shlita*

Bnei Brak, Saturday night, 18 Iyar 5771

To the honored Rabbi, *shlita*:

I reviewed the pamphlet *Chosam Shel Zahav* and found its arguments sound and correct. Although there are points on which one could comment, and not all the proofs are conclusive, there is nevertheless no room to doubt its conclusion: that the *Murex trunculus* is the true source of the *tekhelet* dye, and that the method known to us today is more or less the method by which *tekhelet* was produced in the time of our Sages.

I consider the matter clear beyond any doubt worthy of consideration. It is evident that, in the era of our Sages and the Talmud, non-Jews also used and dyed with *tekhelet*. In all the books of ancient non-Jewish scholars that describe the types of dyes used in those times, this *chilazon* appears as a source of dye, while there is no mention of any other *chilazon* from which a blue dye was produced. Since it has been demonstrated that *tekhelet* can be produced from this *chilazon*—something I have seen with my own eyes—there is no reason to question its identification. The dye-production method likewise appears in the works of non-Jewish scholars from that period and resembles the method known to us today. From this standpoint as well, there is no basis for challenging the identification of *tekhelet* or the way it is produced.

There may perhaps be room to discuss whether, even though it is clear that this is the *tekhelet* used in the era of our Sages, we should nevertheless refrain from placing *tekhelet* on our *tallitot*, since for more than a thousand years Israel has not practiced doing so. Perhaps there is some reason not to renew this mitzvah even when we are certain of the authenticity of the *tekhelet*. Although I do not think so, it is nevertheless a question worthy of discussion.

Recently, however, various claims and doubts have been raised concerning the identification of the *chilazon*, the method of producing *tekhelet*, or the color itself. Such claims run contrary to all reason and ought not be accepted by any rational person. All the supposed proofs from the Talmud and Midrash that they cite to reject the identification of the *chilazon* have no substance and may readily be resolved.

In my opinion, what leads them to these claims is the premise that in our generation it is inappropriate to renew a mitzvah that Israel has not practiced for more than a thousand years. Since no person has the authority to decree the annulment of a mitzvah on that basis, they avoid investigating the matter and labor to cast doubt upon something that, by the standards of reason, should not be doubted.

In any event, I fully agree with the pamphlet's conclusions: the evidence proves that this is the *chilazon* of *tekhelet*, and the method of production known to us today is more or less the one practiced in the time of our Sages.

With due respect,

Shmuel Nadel

A Few Words

It is entirely true that the wise may ask: Who am I, or someone like me, to address a matter this weighty and call for the restoration of a mitzvah that has disappeared? The question stands at the doorway of the Sages of Israel—for them, not for ordinary people. The letter of our master Rabbi Yosef Shalom Elyashiv, of blessed memory, stating that one cannot obligate its use is already well known. How can a wing-clipped fly whistle at the great eagle in the heavens?

Yet look closely at how carefully he weighed his words. They were phrased with precision and caution so that they should not be understood as a definitive halachic ruling, but as doubts about the facts. He expressly explained that all his objections concerned details that had not been clarified to him, as written there. His words imply that the complete body of evidence was not presented to him. His answer addressed only the question he had been asked: whether one must take account of the claims of researchers who say they have found the *chilazon*. He concludes with the words of the *Yeshu'ot Malko*: “Therefore, one cannot rely upon and assist his undertaking.” The doubts he raised are discussed below in sections 20 and 28; concerning making the threads the same color as the *tallit*, see section 23 and note B here. Nevertheless, we learn from his words that a mere concern is not automatically defined as a doubt concerning a Torah law, and that one need not establish new practices because of remote possibilities. (A) We have never heard, however, that he ruled that this matter should not be investigated, like every other mitzvah in the Torah, to determine whether the law might require it. (B)

In truth, I am not qualified to render a halachic decision, which belongs to the Sages alone. I have come only to clarify and examine the sides and details of the question—to know how to ask, rather than grope like a blind man in a chimney or like the simple son who asks, “What is this?” We may then submit the matter for their ruling.

I entreat everyone who has eyes to see and an understanding mind to attend to the substance of this question with the seriousness and deliberation it deserves, employing the methods of reason and knowledge through which Torah is studied. Let him examine the evidence impartially, on honest scales, considering each objection and its answer in turn.

Know also that many details in this pamphlet are poor in one place and rich in another. It is therefore improper to reach a final judgment before reading it in its entirety. As the wisest of men said: “He who answers before he has heard—it is folly and shame to him.”

Preface Notes

- A. There is good reason for this, and exceptional caution is required lest the public conduct of halachah fall into the hands of the frivolous and change from month to month. Many calamities could result, and who can foresee the end of every alteration and novelty? Nevertheless, Rabbi Elyashiv certainly did not regard this consideration as sufficient to remove a possible obligation under the law. No sage has ever ruled that one who concludes that this is the *tekhelet* is exempt from wearing it and may annul a positive commandment and an absolute Torah obligation. See Horayot 2b; all the more so here, where we have heard no ruling by a sage whose investigation concluded that this is not the *chilazon*. Some might understand the principle that *tekhelet* does not prevent fulfillment with the white threads to mean that there is no absolute obligation even when *tekhelet* is available. It seems obvious that this cannot be correct—why should this mitzvah differ from any other commandment in the Torah? In any event, Yevamot 90b proves the point: the rabbinic exemption of a linen garment from *tekhelet* is described as uprooting a Torah law. See *Orach Chaim* 9:6, which states that the exemption concerns *tekhelet* alone. See also Menachot 43b, Rabbi Meir's statement concerning the greater punishment; Bava Metzia 61b, "I am He who will exact punishment," and Tosafot there, s.v. *she-toleh*; and Menachot 44a, which teaches that failure to fulfill "and they shall place ... a thread of *tekhelet*" constitutes the annulment of a positive commandment.
- B. Rabbi Elyashiv and other contemporary sages did not see fit to investigate this question, and they certainly held that they were not obligated to do so. Rabbi Elyashiv explained that there was no need to heed these claims after several people had already claimed to have discovered the *chilazon* and were subsequently shown to be mistaken, as explained in his letter. See what is written below in section 19, beginning "In this way." Those of our teachers who wish to refrain from investigating the question undoubtedly have strong grounds for doing so. Nevertheless, one who investigated and reached a conclusion would surely also hold that, as with every positive Torah commandment, he is obligated to endeavor to act and to encourage others to act. See the gloss to *Yoreh De'ah* 242:3; all the more so here, where no ruling was issued on the matter. It may also be that their reason for declining to investigate applies only to the generation's decisors and leaders, whose conduct serves as a ruling for the public and who must fear that a calamity might result from their example, but not to every individual. Still, if even they were confronted with a possible Torah obligation that could be investigated, they would certainly not consider themselves exempt.

Contents

- - 1. What Emerges from the Tosefta and the Talmud
- - 2. The Meaning of *Chilazon* in the Words of the Sages
- - 3. Numerous Identifying Features in the Words of the Sages and the Rishonim
- - 4. Its Resemblance to *Kala Ilan*
- - 5. Jewish Sages on the Identity of the *Chilazon*
- A Major Proof from the Testimony of the Greek and Roman Sages
 - 6. The Importance of *Tekhelet* among the Nations
 - 7. What Emerges from the Testimony of Non-Jewish Sages
 - 8. The Archaeological Finds
 - 9. Additional Probabilities
 - 10. Is a Particular Species of *Chilazon* Required?
- - 11. The Identifying Features in Menachot
 - 12. “Its Body Resembles the Sea”
 - 13. “Its Form Resembles a Fish”
 - 14. “It Ascends Once in Seventy Years”
 - 15. “Therefore Its Price Is High”
- The Rambam’s Identifying Features
 - 16. “It Is a Fish”
 - 17. “Its Blood Is Black as Ink”
 - 18. “It Is Found in the Salt Sea”
- - 19. Concluding Remarks
- Objections of Those Who Exempt One from Wearing *Tekhelet*, and Their Answers
 - The Basic Possibility of Restoring the Mitzvah of *Tekhelet*
 - 20. The Absence of a Tradition, Including a Negative Tradition
 - 21. The Concealment of *Tekhelet*
 - 22. The Words of the Arizal

- 23. The Requirement That the Threads Be of the Same Kind as the Corner
- “With Its Blood One Dyes Tekhelet”: The Sources on Producing *Tekhelet* from the *Purpura*
- 24. Non-Jewish Writers on *Tekhelet*
- 25. The Omission of the Source of *Argaman* from Rabbinic Literature
- The Dyeing Method and Its Additives
- 26. “How Do You Dye This Tekhelet?”
- 27. Placing the Vat in the Sun
- Notes on Several Talmudic Discussions
- 28. “One Who Traps a Chilazon”
- 29. “And One Who Wounds It”
- 30. “From That Which Is Permitted to Your Mouth”
- 31. “The Sea of Kinneret, from Which Tekhelet Comes” (Zohar)
- 32. Does It Have Sinews and Bones?
- 33. The Number of Threads
- 34. The Windings

Chosam Shel Zahav

For several years, word has spread among those who fear God that the *chilazon* of *tekhelet* has been found after the dye had been concealed for approximately fifteen hundred years. Many have acted upon the discovery, while others are perplexed and do not know how even to frame the question. Most of the leading Torah sages have likewise not undertaken an examination of the matter in all its details, many of which depend upon subjects outside the walls of the study hall and require enormous effort and time to investigate.

I therefore considered it proper to gather in one place much of the evidence in my possession and the answers to the objections raised against it. Some answers appear in the responsa section later in the pamphlet, some emerge naturally from the discussion, and many are contained in the footnotes. I generally tried to be concise, at times extremely so.

The proofs take several forms. Some are clear proofs in their own right; others are identifying features that are not conclusive by themselves but lend considerable support when combined with the remaining evidence. I have come only as a collector and organizer, to spread the table before the Sages so that they may judge the matter according to their understanding. May it be God's will that I say something worthy of acceptance.

At the outset, one must know that this entire discussion became possible only in our generation, when it was rediscovered that the *Murex trunculus*, one of the *Purpura* species,¹ can dye wool *tekhelet* without the addition of any colorant from another source. Naturalists had already proposed approximately one hundred years ago that it was the Torah's *chilazon* of *tekhelet*. Since it was not then being used in practice for dyeing, however, the method of producing blue rather than purple was unknown. Some therefore wished to argue that the Torah's *tekhelet* was purple. Their view was not accepted in the study hall because it contradicted our tradition that *tekhelet* is blue. Now that it has been demonstrated that the ordinary dyeing process can readily produce blue, that objection no longer refutes the identification. One therefore cannot cite the leading sages of earlier generations as evidence against it, since this question was never placed before them; the method has been practically accessible only since 5753 (1992–93).

This *chilazon* accords with every relevant statement recorded by the Sages, and their words offer strong evidence for it. Numerous details mentioned by the Rishonim fall precisely into place. Non-Jewish writers expressly described it, and several Jewish sages mentioned it by name. In many locations, heaps of its shells have been found with clear indications that they were used in dye production; fabrics dyed blue with its secretion have also been discovered.

¹ This entire group, or family, of snails was called *Purpura* or *Porphyra* in Greek, as it remains in modern Greek, and was likewise called by that name in Latin and in Greek and Roman literature. Ancient writers also used distinct names for the different *Purpura* species. Today the general group is called *Murex*, while the particular species identified with the *chilazon* of *tekhelet* is called *Murex trunculus*, or simply *trunculus*. Hebrew-speaking specialists call the entire family *argamonim*, and this particular species *argamon keheh kotzim*—the banded dye-murex, literally the “blunt-spined murex.” The ancient Greeks likewise described its projections, though they did not name it for them. Throughout this pamphlet I generally use *Purpura*, following recent pamphlets on this subject, except where it is necessary to distinguish this species from other *Purpura* species, in which case I use *Murex trunculus* or “blunt-spined murex.” For the *Purpura* species used for *argaman*, I use the Hebrew names: *argamonit adumat hapeh*—the red-mouthed rock shell, which the Greeks called the trumpet or *buccinum* because of its form—and *argamon chad kotzim*, the spiny dye-murex.

1. What Emerges from the Tosefta and the Talmud

The Tosefta in Menachot, chapter 9, states: “*Tekhelet* is valid only from the *chilazon*. If one brought it from something other than the *chilazon*, it is invalid.” This formulation teaches that the Sages knew of nothing in the color of an invalid blue dye resembling *tekhelet* other than dye that came from something other than a *chilazon*. They could not possibly have written, “It is valid only from the *chilazon*; if one brought it from something other than the *chilazon*, it is invalid,” if there were an additional *chilazon* that produced the proper color of *tekhelet* but was nevertheless invalid. Such wording would be inadequate even in ordinary speech, and certainly not in the language of the Sages, whose purpose was to explain rather than obscure.

Throughout that chapter they specify every condition governing the Temple commandments—the required material and location—even where a condition is preferable but not indispensable. Here they repeat the rule from both directions, validity and invalidity, leaving no possible room for doubt.² Accordingly, if we find something called a *chilazon* that was used in their era for dyeing and produces a *tekhelet* color, it must be the *chilazon* valid for *tekhelet*.

The Talmud likewise indicates that only one *chilazon* produces a color like *kala ilan*. Menachot 43a relates:

Mar of Mashki brought tekhelet in the years of Rav Achai. They tested it according to the method of Rav Yitzchak son of Rav Yehudah, and its appearance separated; they then tested it according to the method of Rav Adda, and it changed for the better. He thought to invalidate it. Rav Achai said to them: “Then this is neither tekhelet nor kala ilan?”

The plain meaning of Rav Achai’s language, and his attempt to validate it on that basis—even though it did not match the identifying features of *tekhelet* known to them—shows that he did not consider the possibility that it had been dyed with some other substance. Evidently, apart from *kala ilan*, no source was known to produce a stable blue of this kind except the *chilazon* of *tekhelet*. There is therefore no need to fear the existence of another, invalid *chilazon* whose dye is stable and looks like *kala ilan*.³

Thus, if a *chilazon* is found that dyes the color of *kala ilan*, even without modern chemical additives unavailable in antiquity, this establishes that it is suitable for the Torah’s *tekhelet*. There is no need to suspect that it is some other *chilazon* that happens to dye the identical shade.

² The word *chilazon* is not limited to this particular creature, for it encompasses several species, including a land snail, as explained in section 2. Nor does the definite expression “the *chilazon*” mean specifically one already-known *chilazon* to the exclusion of another. The Tosefta uses the same grammatical form for each material in the chapter: “A trumpet [must be] of silver” does not exclude some other kind of silver, and “A menorah is valid only from a solid mass; if made from scraps, it is invalid” does not refer only to some particular scraps. One also cannot say that another teaching supplies the missing limitation—namely, the baraita in tractate *Tzitzit*, cited in Menachot, that “the *chilazon*’s body resembles the sea,” and so forth. Many laws in this Tosefta chapter also appear in the Mishnah and elsewhere in the Tosefta, yet are repeated here. All the more so would a limitation have to be repeated when it appears nowhere in the Mishnah but only in a baraita in tractate *Tzitzit*. Moreover, the Tosefta addresses priestly garments, whereas that baraita addresses *tzitzit*. See also section 16 below: the baraita in tractate *Tzitzit* was not written to identify one valid *chilazon* and exclude another. In any event, this creature accords with each of the baraita’s features, as explained in the relevant sections. The baraita certainly cannot be invoked to exclude it.

³ One cannot say that the Sages were unaware of this dye’s existence. The center of its industry lay in their own region, as described in ancient writings. God forbid that, despite its great fame among the nations, a halachically relevant fact of this kind would have escaped the Sages of Israel.

This is especially so if we know that the same *chilazon* was used for dyeing in their time, even by non-Jews. Scripture and the Talmud show that *tekhelet* was also found among the nations, as discussed in section 6. It must therefore be the *chilazon* used by our Sages. If one suggests that several *chilazon* species may produce this color and were all used for dyeing in their era, we must conclude that all of them are valid.

The blood of the *Purpura* produces a color like *kala ilan*,⁴ as discussed in section 4. Moreover, the writings of non-Jewish scholars, discussed in sections 7 and 24, show that the *Purpura*, specifically the *Murex trunculus*, was a famous and highly important source of dye at the time the Tosefta was taught. Its dye industry was centered around Tyre—the very region in which *tekhelet* was produced in the time of the Sages. Shabbat 26a identifies the region “from the ladders of Tyre to Haifa,” and Rashi explains that dyeing was their craft. The *Purpura* must therefore be a *chilazon* valid for *tekhelet*. Otherwise, the Sages would have included its invalidity in their rule, and they certainly would not have used language likely to mislead.⁵ How could they have stated only that dye “not from the *chilazon*” is invalid without specifying that this celebrated *Purpura* was also invalid?

Even apart from this close reading of the Tosefta, if the *Purpura* were an invalid *chilazon* for *tekhelet*, it would be astonishing for the Sages to ignore completely the enormous *Purpura*-dye industry located immediately to the north of the Land of Israel, in the Tyre region, without issuing any warning. They warned repeatedly against *kala ilan*. Even if the great price of *Purpura* dye made intentional fraud unlikely, how could they fail to warn against an honest mistake, especially when *Purpura* dyeing was common in that region? Even regarding the familiar and readily available willow used on Sukkot, the Sages described at length the identifying features of the willow and the *tzafzefah* so that they would not be confused (Sukkah 34a, “What is a willow?”). All the more so here, where confusion would have been easy; they surely would not have left us only ambiguous signs.

The same reasoning also applies among the *Purpura* species. The Mediterranean contains two other species from which modern methods may be able to produce blue—blue has in fact been produced from the red-mouthed rock shell—even though *trunculus* best matches the Talmud’s descriptions. If only one species were valid, it would have to be not merely the species that matches everything said of the *chilazon*, but also the one commonly used for dyeing in antiquity; otherwise all the foregoing questions would remain. It is evident that the common dyeing described by ancient non-Jewish scholars employed *trunculus*. The spiny dye-murex and the

⁴ Even for those who insist on forcing an elephant through the eye of a needle by suggesting that a red dye was mixed into *kala ilan* so that it was not pure blue—see *Ein HaTekhelet*, where this suggestion is shown to be groundless and rejected—whatever can be done with *kala ilan* can likewise be done with the *Purpura*, since their active colorant is the same substance. Mixtures of colors were also common in the *Purpura* industry; Pliny writes that mixing different snail species yielded purple. Thus, even if true *tekhelet* had been purple, *Purpura* could have been used to counterfeit it. When the Sages stated without qualification, “From the *chilazon* it is valid; if brought from something other than the *chilazon* it is invalid,” without specifying a particular species, *Purpura* was necessarily included.

⁵ There was no need to warn against the *Janthina*, even though it is a snail that exudes a blue secretion, because its secretion does not dye at all; the Sages warned only about things that could be used for deception. Its blue may also differ from the blue of *tekhelet*. The *Purpura*, by contrast, unquestionably dyes a *tekhelet*-like color, as demonstrated by its close resemblance to *kala ilan*. The cuttlefish is not a *chilazon* at all, and the principal color of the Radzyń dye does not come from the animal’s blood but from the chemical additives mixed with it.

red-mouthed rock shell contain only a minute quantity of the blue-producing substance, making blue harder to produce. There would have been no reason to use them when *trunculus* could do the same thing easily. It is also possible that all the murexes are regarded as a single species for halachic purposes. In any event, because the blue colorant in each is indigo, one needs a reason and proof to declare only one of them valid.

2. The Meaning of *Chilazon* in the Words of the Sages

The *Purpura* snail belongs to the class that everyone has always called *chilazon*, even before it was proposed as the *chilazon* of *tekhelet*. Calling it a *chilazon* therefore involves no newly invented definition.

It also accords with every description in the words of the Sages concerning the general meaning of *chilazon*. In the plain sense, these descriptions apply to anything called a *chilazon*, and some are stated expressly concerning the *chilazon* of *tekhelet*:

1. Its casing grows with it (Devarim Rabbah 7:11 and elsewhere).
2. Some *chilazon* species are found in the mountains after rain (Sanhedrin 91a; see *Yad Ramah* there).⁶
3. Its form resembles a snake (Bekhorot 38b; see Rashi to Leviticus 21:20).
4. Its body is closed and has no visible limbs, as cited below from the Ramban (Ritva, Shabbat 75a).
5. It is a *tolaas* (Rashi, Sanhedrin 91a; Raavyah, Shabbat §194; Rash and Raavad to *Torat Kohanim*, Metzora, section 1:14).
6. In his commentary to Mishnah Kelim 12:1, the Rambam explains *chilazon* as “shell,” as it also appears in the Arabic manuscript.

The Rishonim likewise called such a creature a *chilazon*.⁷ In Arabic the snail is known by this name; see Rabbi Yonah ibn Janach, *Book of Roots*, root *shin-bet-lamed*, and *Yad Ramah* to Sanhedrin 91a. The term *chilazon* is itself Aramaic, so its meaning may certainly be illuminated by the languages of other peoples, as the *Yad Ramah* states there.

In this respect the *Purpura* is entirely different from the cuttlefish, which the righteous Radzyñer Rebbe, of blessed memory, proposed as the *chilazon* of *tekhelet*. He sought to identify as the *chilazon* of *tekhelet* a creature that was not otherwise known as a *chilazon*. He offered no proof

⁶ The *Yad Ramah* writes that there is a marine *chilazon* and a land *chilazon*. Tosafot to Shabbat 75a, s.v. *ha-tzad*, likewise appears to agree with the *Yad Ramah* and to disagree with Rashi in Sanhedrin: Tosafot holds that the dye-producing *chilazon* cannot live on land, as does the Ritva there. The *Arukh* likewise treats them in two separate entries and appears to agree with the *Yad Ramah*. See also *Be'er Sheva* to Sanhedrin 91a. Presumably the same name was not applied to both arbitrarily, but because of their similarity of form and family.

⁷ Rashi writes in Chullin 122b, s.v. *chomet*: “*Chomet—limatza*—whose initial formation is the size of a lentil, contained in its casing, which grows with it.” He thus applies to the *chomet*, which he identifies as *limatza*, meaning the ordinary snail, the Midrash’s description of the *chilazon* in Devarim Rabbah 7:11 and elsewhere. See also Rashi to Avodah Zarah 28b, s.v. *mishkedei chilzonei*, with the Oz Vehadar annotations and references, and Ibn Janach’s *Book of Roots* cited above.

for the identification beyond finding a marine animal that could be used in a dyeing process. The features he cited are not especially distinctive of that animal, or can be interpreted differently. In addition, many serious objections may be raised against his theory, and it was ultimately demonstrated with certainty that the cuttlefish is not the *chilazon* of *tekhelet*.⁸ For this reason, most leading sages of his generation disagreed with him and did not accept even his basic claim that it should at least be treated as a doubt.

3. Numerous Identifying Features in the Words of the Sages and the Rishonim

Although there is reason to present the conclusive proofs first, as will be done below, I have considered it proper first to set out the classifications and identifying features of the *chilazon* found in the words of the Sages. They are not independent proof, but they provide important context. See note 52 below.

Scripture and the Sages record many details about the dye-producing *chilazon*, all of which are fulfilled by the *Purpura*:

1. It is found in the Land of Israel on the coast of Zevulun (Megillah 6a), from the ladders of Tyre to Haifa (Shabbat 26a).
2. It is also found in the other places mentioned by the sources, including the islands of Elishah—Italy (Ezekiel 27:7 and Targum Yonatan there).⁹
3. Its blood is “stored separately” within it (*mifkad pakid*) (Tosafot, Shabbat 75a and Ketubot 5b).¹⁰
4. It is trapped with nets (Shabbat 74b).

⁸ The Radzyń dye is produced principally by the iron compound added to the process. The animal’s blood functions only as one of the auxiliary ingredients; under such conditions even ox blood can be used, as was formerly done in the production of Prussian blue. See *Beit Aharon VeYisrael* 121 (Tishrei–Cheshvan 5766). It is possible that the Chazon Ish knew this objection, which had already been voiced in his time. Rabbi Chaim Kanievsky testified that when someone asked the Chazon Ish about Radzyń dyeing, he replied, “Take ox blood and dye with it.” Evidently, he knew that the animal’s blood contributed nothing essential and that the same additives would work equally well with ox blood. Nor was there direct evidence for Rabbi Herzog’s proposed *Janthina*; it was merely a possibility for which he had not found a refutation. Rabbi Eliyahu Tavger, *shlita*, has decisively refuted it in his article “*Argamon* or *Janthina*.” The proposal does not even reach the stage of serious discussion, because the *Janthina* secretion is not a dye. It cannot be used to dye, and researchers state that it contains no colorant. Rabbi Isaac Herzog himself offered it only as a hypothesis and never dyed with it in practice.

⁹ Its nature is to live near the rocky shores of the Mediterranean, a tendency especially characteristic of *Murex trunculus* among the snails. I was astonished to see one pamphlet use this fact as evidence against the identification. The Sages never said that the creature existed nowhere in the world outside Zevulun’s territory. They mentioned it in comparison with the other tribes: Zevulun’s territory was especially valuable, and his livelihood was readily available through it, as Megillah 6a explains. The other tribes would naturally obtain it from Zevulun rather than from foreign countries. Within the borders of the Land of Israel, those who wish to catch it still do so in Zevulun’s territory, where it is common. Indeed, the sources expressly record its presence in Italy and Tyre as well.

¹⁰ See Rashi to Shabbat 133b: “stored and standing there as if placed in a vessel.” This is the meaning of *mifkad* elsewhere, including hymenal blood, as Rashi writes in Ketubot 5b: “like a deposit, gathered and standing, and not absorbed.” One sage asked why it is called “blood” when it is merely a secretion stored in the *chilazon*’s sac. His objection is not specifically against the *Purpura*, but against the Rishonim just cited. In substance, it is no objection: even a woman’s non-blood discharges can be called “blood,” such as a green discharge. Indeed, with this *chilazon* it is especially understandable why Menachot 42b says, “We bring the *blood* of the *chilazon* and additives,” for its color resembles blood, although the reddish color appears only several moments after the animal is opened.

5. It is fixed to the seabed, as indicated by the verse “and the hidden treasures of the sand” (*Sifrei Zuta/Lekach Tov* to *VeZot HaBerachah* 33:19; Raavad’s introduction to *Sefer Yetzirah*, eighth path). This is unlike snails that float in the water, such as the *Janthina*.

The discussion in Shabbat 75a supplies three additional features of the dye-producing *chilazon*:

1. Its dye is better while the animal is alive.
2. Dye can still be extracted after its death, but it is not as clear.
3. The animal dies as a result of the wound made to extract the dye.¹¹

All three features exist in the *Purpura* and are not shared by every snail species—for example, the *Janthina* proposed by Rabbi Herzog.¹²

The features stated in Menachot 43a—“its body resembles the sea, its form resembles a fish, and with its blood one dyes *tekhelet*”—are likewise fulfilled by the *Purpura*. See sections 12–13 below and the photographs at the end of the pamphlet. The Rambam’s statement that it is a color that remains beautiful—an essential feature of the dye itself—is a major identifying feature in its favor. See sections 16–18, where the Rambam’s other descriptions are also explained.

¹¹ Rashi’s comments there also indicate that the animal need not die immediately if one takes care when opening it not to kill it. This too fits the *Purpura*: one can carefully break the shell and wound it only at the dye gland, so that it dies only after some time. Its lifeblood need not be intentionally extracted; only the small amount released when the shell is broken and the storage site of the dye is cut is involved. Tosafot there explains that when the dye blood is removed, some lifeblood is released as well.

¹² Some have objected to the Talmudic discussion itself. Apparently, the dyer wishes to remove all the animal’s dye, which can be done immediately. Why, then, should it matter that the animal dies afterward, when its dye has already been removed? With this *chilazon*, however, the passage is readily understood. The initial threshing or processing of the snail is performed by striking its shell with a hammer, which may also wound its body. Rabbi Avraham son of the Rambam likewise appears to understand “opening the *chilazon*” as referring to the shell; see *Birkat Avraham* §19. This also explains the use of *petzi’ah*, breaking open, rather than ordinary language for bodily injury, if the term refers specifically to the hard shell. The Sages often use *petzi’ah* for cracking hard objects such as nuts and skulls. If the worker is not careful, he may kill the animal with the first blow, before removing the dye blood. By the time he cuts the gland to remove the secretion, it will already be dead and its color will not be clear. Even when he is careful, he must remove the dye before the animal dies. At times he must cut again to extract all of it and must ensure that the animal does not die meanwhile. This is especially true when many snails are opened together, as dyers ordinarily worked: the shells may all be broken before the dye is removed, so care is needed that the animals, whose bodies were slightly wounded when the shells were struck, do not die in the interim. Ancient non-Jewish scholars likewise write that the *Purpura* secretion must be removed quickly so that it does not spoil.

Another method of extracting the dye, also recorded by ancient writers, was to crush the shell and then draw out its secretion. This was the method used for smaller snails. Extraction in this manner takes longer, and the animal may certainly die while its dye is being removed; the dyer must therefore keep it alive as long as possible. This is also the plain sense of Rashi’s wording there, which describes the wound as being inflicted by pressing the soft animal itself. In truth, Rashi’s precise language deserves attention: “Since his entire intent and effort are directed toward keeping it from dying in his hands, even if it dies he is merely preoccupied with another act.” Why did Rashi not simply say, “Since he does not want it to die”? His wording implies that the law does not depend only upon the worker’s immediate interest in keeping it alive. Since his entire handling of the animal involves efforts to preserve its life, his act cannot be characterized as intending to take a life, even if, at the very moment the dye is removed, he no longer cares whether it dies an hour later. Accordingly, even with the modern method, cutting the snail’s flesh would be considered an unintended killing once all its dye has been removed and the worker does not care if it dies immediately afterward.

In fact, one should not infer the physical manner of opening the *chilazon* too closely from the language of the Rishonim. Their purpose was to teach the laws emerging from the Talmudic discussion, not to describe a creature they did not know firsthand. See Ramban to Genesis 35:16, beginning “I initially wrote this.” The Rishonim themselves expressed many different views concerning the physical facts of the *chilazon*, and reality cannot accord with all of them.

4. Its Resemblance to *Kala ilan*

The Sages state that *kala ilan* and *tekhelet* are absolutely identical in appearance, to the point that only the Holy One, blessed be He, can distinguish them (Bava Metzia 61b). They are also alike in durability. Although *kala ilan* is exceptionally resistant to fading, as Bava Kamma 93b indicates, *tekhelet* resembles it in this respect as well. They can be distinguished only by a very particular test (Menachot 43a).

The identity of *kala ilan* is known from the *Arukh* and the Geonim as indigo.¹³ Since the *Purpura* dye is visually identical to indigo, this supplies major evidence that the *Purpura* is the *chilazon* of *tekhelet*. It also explains why the two dyes are so difficult to distinguish through chemical tests: the active colorant in both is the very same substance—indigo, which produces their blue color. The snail also contains bromine, whereas plant indigo contains indirubin. Although this difference is not visible in the color of the wool, it may account for their differing response to the Talmud's test.

Nevertheless, murex *tekhelet* successfully passes the Talmudic test as explained by the Rishonim to Menachot 43b, where it is taught that a dye that passes this test need not be suspected of having come from another source.

Another possibility is that the difference lay in the dyeing process. With the *chilazon*, fermentation caused by the decay of the animal's flesh helps break down the molecule and enables the dye to bind firmly to the wool. *Kala ilan* required other substances, and the resulting

¹³ See the *Arukh*, entry *kala ilan*, and apparently the responsa of the Geonim, Ginzberg edition, volume II, p. 333. Some versions read this way in Rabbeinu Chananel as cited in *Otzar HaGeonim* to Bava Kamma 93b. They all identify *kala ilan*—described by the Talmud as an exceptionally strong dye resembling *tekhelet*—with indigo, the name still used for a well-known colorant. It can be extracted from woad, and the Rambam appears to identify woad with *kala ilan*, at least insofar as its color is identical. Most indigo was produced from another plant, called *nil*, that grows chiefly in India, and the dye was called “Indian” for its place of origin. Compare Rabbi Isaac Herzog's citation of ancient non-Jewish scholars who wrote that in India people knew how to counterfeit *Purpura* dye with plants. The *Nimukei Yosef* to Bava Metzia 34a in the pages of the Rif, s.v. *ilan*, writes that *kala* means “stone” and *ilan* is the indigo plant. Indigo dye was dried and used in hard pieces resembling stones, and was therefore called “stone.” Rabbi Herzog, however, argued that in Sanskrit *kala* means an indigo-like blue color. The Tosefta's expression in Avodah Zarah 6, “*kala ilan* threshed with wood from an *asherah* must be burned,” likewise fits the indigo-production process, which includes threshing. The continuation of that Tosefta points in the same direction. See *Lula'ot Tekhelet*, p. 237, for an explanation of indigo production and of the continuation of the Tosefta; see also *Encyclopaedia Hebraica*, entry “Indigo.”

dye may have been of poorer quality.¹⁴ The craft of dyeing *tekhelet* itself was known only to skilled professionals, as discussed below in section 20, beginning “The craft itself.”

The Talmud implies that *tekhelet* and *kala ilan* were the most durable dyes (Bava Kamma 93b; Menachot 43a), and ancient non-Jewish scholars said the same of *Purpura*. Modern knowledge likewise recognizes these as the most durable natural dyes.¹⁵¹⁶

Even if the identity of *kala ilan* were unknown, the complete likeness of two rare blue-dyeing materials—one derived from a plant and one from a snail—would itself strongly suggest that one is the Torah’s *tekhelet* and the other its *kala ilan* imitation. All the more so, now that the Rishonim establish the identity of *kala ilan*, this striking likeness supplies major evidence identifying the *chilazon*.

The very existence of a natural blue colorant is itself an exceedingly rare phenomenon.¹⁷ Among all animals in the world, it is known only in the *Purpura*; certainly no other snail family is known to produce one. That alone is an important identifying feature, even without its exact likeness to *kala ilan*. In nature generally, the only known natural blue dyes for textiles—both today and in the non-Jewish literature of the Talmudic era—are plant indigo and *Purpura*. Rabbinic literature likewise mentions only the *chilazon* and *kala ilan*. The resemblance of *tekhelet* to *kala ilan* also helps determine the precise required hue: a pure blue, not purple. This is in addition to what is known from the Talmud and the Rishonim, as explained in *Ein HaTekhelet*. See that pamphlet as well for the rejection of the claim that *kala ilan* was mixed with red, although both substances can still be made to produce turquoise.

¹⁴ Modern changes in the *kala ilan* dyeing process may explain why modern indigo does not change under the test in Menachot 43a. I have indeed heard from someone who performed the test on an old *kala ilan* thread that “its appearance separated.” Alternatively, we may not know how to perform the test properly, or natural conditions may have changed and the substances mentioned by the Talmud may no longer be as caustic. In any event, this is not an objection to identifying the *chilazon*, because *Purpura tekhelet* behaves in accordance with the Talmudic test. It is instead a question about *kala ilan*, whose identity is clearly established by the Rishonim.

Tosafot to Zevachim 95a, s.v. *veha*, appears to hold that *tekhelet* may be removed by *tzafon*. This is difficult: the Talmud implies that *tekhelet* is stronger than *kala ilan*, as the Rambam writes, while *kala ilan* is not removed by *tzafon*. See *Yam Shel Shlomo* to Bava Kamma, chapter *HaGozei*, §1, beginning “I am astonished,” which rejects Tosafot’s view; and Netziv, *Meshiv Davar* II:97, who questions Tosafot. Tosafot’s own wording indicates that Rashi disagrees with them on this point. Their view would also supply another test between *tekhelet* and *kala ilan*, using *tzafon*, while the Talmud does not imply that such a test exists. Nevertheless, we do not know what this *tzafon* was and therefore cannot test it. It was an especially powerful substance, stronger than all seven agents used to remove stains, as is clear from the passage.

¹⁵ The durability results from a dyeing method entirely unlike that used for other dyes: the colorant combines with the wool and becomes one with it. This method exists only with these two dyes, which are classified as vat dyes. See Professor Zvi Koren, “Dyes and Colorants in Ancient Textiles,” reproduced at the end of *Lula’ot Tekhelet*, p. 257.

¹⁶ The *kala ilan* used in antiquity was apparently produced under conditions different from those employed today and, as stated above, may have been somewhat weaker. Nevertheless, the dye’s essential durability results from the dyeing method, as explained in the preceding note. Their reducing agent may not have been as effective, leaving some dye on the exterior of the wool. That portion would “separate in appearance,” in the Talmud’s words, because only the dye that became one with the wool would remain after the test.

¹⁷ See note 52 below, which suggests that this fact may itself constitute a uniquely identifying sign. The Radzyń cuttlefish does not dye blue; its blue comes from the other substances mixed with it. The *Janthina* does not dye at all, and there is no basis for saying that it was used for dyeing in antiquity.

5. Jewish Sages on the Identity of the *Chilazon*

In truth, the question does not fall to us to decide. It was already resolved by leading Torah authorities from whose waters we drink—the *Chavot Yair*, Rabbi Yaakov Emden, and other Jewish sages—even though they apparently knew the creature only from books. No Jewish sage is known to have disagreed with them. Who may come after them to be lenient concerning a Torah law and reject their words on the basis of remote concerns and forced constructions invented without evidence?

The *Chavot Yair* writes in *Mekor Chaim* 18:3:

In my novellae I wrote that the blood of the chilazon with which tekhelet is dyed is not blue, but the color purpur, produced from the blood of a fish called the purpur fish.

Section 16 explains that the term “fish” can include a *chilazon*. So certain was the *Chavot Yair* of this identification that he was prepared to overturn the view of all the Rishonim and declare *tekhelet* purple,¹⁸ contrary to the straightforward tradition that it is blue.

Rabbi Yaakov Emden likewise cites the non-Jewish scholars’ descriptions of the *Purpura* in *Mitpachat Sefarim*, chapter 4, as clearly referring to the *chilazon* of *tekhelet*. Rabbi David Sinzheim, author of *Yad David*, similarly writes in *Minchat Ani*, p. 111: “The writers also say that it is a snail and is called the foaming *purpur*.” Before all of them, Rabbi Avraham Portaleone wrote in *Shiltei HaGibborim*, chapter 79.¹⁹ “The marine creeping creature called *Purpura* is the *chilazon* with which *tekhelet* is dyed.” These sages’ information clearly came from the works of non-Jewish scholars, and they referred to the same *Purpura* species that those scholars described as producing a *tekhelet*-colored dye.

¹⁸ It is astonishing that one writer tried to prove from the *Chavot Yair* that the *chilazon* is not the *Purpura*. He confused a friend with an enemy and wished to argue that the *Chavot Yair* proves only that purple, not blue, was produced from it. Even if the *Chavot Yair* meant literally that the dyed wool was purple, he expressly spoke of the animal’s blood. His entire proof therefore rested upon his knowledge of the color of the secretion—a well-known fact in his generation, though the craft of producing the dye had been lost. Our explanation reconciles the *Chavot Yair*’s identification of the creature as the *Purpura* with the tradition that *tekhelet* is blue. Had he known that blue could be dyed from it, he would surely have accepted that color rather than disagreeing with the tradition of the generations and all the Rishonim.

It is also possible, though admittedly forced, to read his words as referring only to the secretion while still in its raw state, not to the color of the dyed wool. Why did he write at length, “The blood of the *chilazon* with which *tekhelet* is dyed is not blue,” rather than simply, “*Tekhelet* is not blue”? If so, he meant only to reject the plain sense of Rashi to Chullin 89a, “The appearance of its blood resembles the sea”—which may itself refer to the secretion after processing—and the Rambam’s straightforward statement that its blood is black as ink, discussed below. This interpretation is supported somewhat by the *Chavot Yair*’s own statement in *Mekor Chaim*, abridged laws 9:5: “Some meticulous people make the four corners blue, resembling the sky, corresponding to *tekhelet*.”

¹⁹ This is an early work concerning the Temple, cited several times by the *Tosafot Yom Tov*, who calls its author “the sage Rabbi Avraham the physician.” It is also cited by the *Peri Chadash* to Yoreh De’ah 80, the *Birkei Yosef* to Orach Chaim 586, and the *Chatam Sofer* to Gittin 10a.

A Major Proof from the Testimony of the Greek and Roman Sages

6. The Importance of *Tekhelet* among the Nations

The *tekhelet* color valid for *tzitzit* was used throughout the world. It was not a dye reserved for a mitzvah or for Jews. This is written in the Torah, repeated in the Prophets, stated a third time in the Writings, taught in a baraita, and discussed in the Talmud:

1. It appears in the account of Ahasuerus and among the merchandise of the islands of Elishah (Ezekiel 27:7).²⁰
2. II Chronicles 2:6 and 2:13 relates that King Solomon asked Hiram, king of Tyre, for a skilled craftsman who could work with *argaman* and *tekhelet*. The passage concerns the Temple, for which the Tosefta expressly requires dye from the *chilazon*, just as for *tzitzit*. The craft of *tekhelet* was thus found among the nations, perhaps even more than among Israel.²¹
3. Shabbat 26a states: “Nebuzaradan, captain of the guard, left some of the poorest of the land as vinedressers and laborers.’ Rav Yosef taught: The laborers were those who trapped the *chilazon* from the ladders of Tyre to Haifa.”
4. Eruvin 96b states: “Rabbi Elazar said: One who finds *tekhelet* in the marketplace—if it is in tongues of wool, it is invalid; if in threads, it is valid,” because one may assume the material had been dyed for an ordinary garment unless it had been twisted and cut to length. The same emerges from the man who wore a cloak made entirely of *tekhelet* (Menachot 39b).
5. The contribution of *tekhelet* to the Tabernacle also points in this direction. If the material possessed no importance except for a mitzvah, how did the Israelites possess *tekhelet* in the wilderness before they were commanded to use it? *Pesikta Zutrata/Lekach Tov* to Exodus 35 states: “Every man with whom *tekhelet* and *argaman* were found’—this teaches that they had brought all these various dyes from Egypt.” They may perhaps have prepared them specifically for the Tabernacle, as was done with acacia wood. The Midrash, however, more strongly implies that they had obtained the dyes from their Egyptian neighbors; *Tanchuma*, beginning of *Terumah*, likewise implies that the Tabernacle donations came from the spoils of the sea.

The Midrash expressly states that the *chilazon* was valued throughout the world. Genesis Rabbah to *Miketz* 91 interprets “Take from the produce of the land in your vessels”: “Rabbi Yehoshua of Sikhnin said in the name of Rabbi Levi: things about which the world sings

²⁰ Apparently it was not made from a different substance than other *tekhelet* mentioned in Scripture, which came specifically from the *chilazon*. This is certainly so according to the plain sense of Rashi to Exodus 25:4, who defines the very term *tekhelet* as wool dyed with the blood of the *chilazon*. The *Semag*, positive commandment 26, similarly writes: “Everywhere the Torah speaks of *tekhelet*, it means wool dyed with the blood of the *chilazon*.”

²¹ II Chronicles also states that Hiram’s father had practiced this craft and worked in *tekhelet*. One might say that “craft” there refers only to embroidery with *tekhelet*. Nevertheless, the passage requires someone skilled in embroidery with *tekhelet*, *argaman*, and so forth, listing each material separately. This suggests a distinct expertise in working with each, including the production of *tekhelet* itself.

praise—the *chilazon*, and so forth.” The entire world thus praised this commodity. The word *tekhelet* itself also appears in Assyrian inscriptions as *takiltu* and *argamannu* and is mentioned in several royal archives.

There is no reason to say that the nations’ *tekhelet* differed from the Torah’s *tekhelet*. Just as every rational person understands that the Torah’s gold is the same gold used by the nations, the same is true of *tekhelet* and *argaman*.

The literature of the nations from the era in which *tekhelet* was available is therefore of great importance. Their spontaneous testimony may be relied upon.²²

7. What Emerges from the Testimony of Non-Jewish Sages

Greek and Roman scholars who lived at different times over many centuries, from the destruction of the First Temple until after the destruction of the Second, mentioned only the *Purpura* as a dye-producing snail and described it at great length. A *tekhelet*-blue shade appears among the colors they say were produced from it; see section 24 below.

Their descriptions are extraordinarily detailed and identify the creature with complete certainty as the murex or *argamon* snail. They describe the shell’s form, the rings added each year, the growth upon it, its lifespan under various conditions—in nature, fresh water, and captivity—its reproduction and egg clusters, the seas and seabeds it inhabits, the kind of ground beneath it, its feeding, the seasons when it can be trapped, the location of the dye gland, and the various methods of extraction. Their words are reproduced at length at the end of *Lula’ot Tekhelet*.

There is no room to question the identification of their *Purpura* as the murex; no one is known to deny it. In Greece it is still called *porphyra*, even though today it is eaten rather than used for dyeing.

Rabbi Isaac Herzog, who investigated the subject extensively and questioned the identification of the *Purpura* as the *chilazon* of *tekhelet* for reasons discussed in section 19, never considered denying that this creature was the *Purpura* of the ancient authors. He wished only to say that the nations’ *Purpura* was not Israel’s *tekhelet*. In his time that remained a possible position, because the ability to produce blue from *Purpura* had not yet been demonstrated.

These writers produced comprehensive works on nature: Aristotle’s writings; Pliny’s encyclopedia of the natural world; Vitruvius’s *De Architectura*, with its extensive discussion of the dye industry; and works by Strabo, Aelian, and others. It is extremely implausible that every one of them discussed only another exceedingly expensive snail that was not the *chilazon* of *tekhelet*, while *tekhelet*—itself a very important color among the nations, as shown above—was

²² See Rambam, *Laws of Sanctifying the New Moon* 17:24. In his commentary to *Yoreh De’ah* §201, the Vilna Gaon proves several points from the writings of naturalists and accepts their testimony. See also *Pri Megadim*, *Sifte’i Da’at* to *Yoreh De’ah* 66:14. Their theories may require independent examination, but their factual testimony is certainly reliable. The *Peri Chadash* to *Yoreh De’ah* 80:2 writes that in a matter of this kind the verse “whose mouth speaks falsehood” does not apply. In all ordinary matters we rely upon the testimony of their scholars, even on questions affecting life itself. How, then, could we decline to rely upon such testimony when doing so would lead us to be stringent in fulfilling a positive Torah commandment? See also the new writings of the *Kehillot Yaakov*, §119:20, cited in *Lula’ot Tekhelet*.

forgotten by all of them, even though they were discussing snail dyes in particular. The principal subject would be missing from their books.

Moreover, these works testify that the principal center for trapping and dyeing *Purpura* was the Tyre region, precisely where the *chilazon* of *tekhelet* was trapped (Shabbat 26a) and *tekhelet* textiles were produced, as II Chronicles 2:6 implies. They also record details parallel to those in the Talmud: the secretion must be extracted while the animal is alive so that its color will be good; the dyed wool was extraordinarily expensive; and the dyeing process required testing a sample.

To maintain that the *Purpura* is not the *chilazon* of *tekhelet*, one would therefore have to posit that antiquity possessed two snail species, both exceedingly expensive and both producing exceptionally durable color. Both were used to dye wool the color of *kala ilan*; both were trapped and dyed in the same locations; both shared the same practical properties, requiring the secretion to be removed from the living creature and the dye batch to be tested; yet all surviving non-Jewish literature described only one of them and completely ignored the other.

By a remarkable “coincidence,” the valid *chilazon* of *tekhelet* would have vanished so completely that no memory, remnant, or archaeological evidence of it remained anywhere in the world. Its name would likewise have disappeared entirely from the works of every contemporary scholar throughout the centuries in which they wrote, even though they discussed the snails of that very region, and even though this missing creature was famous as a dye source among the nations and they set out to describe the region’s snail dyes. Meanwhile, the other, similar snail would have been documented repeatedly by all the non-Jewish scholars of its era, and abundant remains proving its use in ancient dye houses would have survived in the same region in which those writers and the Talmud locate the *chilazon*.

Our Sages, for their part, would never have mentioned this second snail, even in a single Midrash, and would never have warned against making *tzitzit* from it, despite the fact that it produced the same color and was trapped and dyed in the same region. Their language, as shown in section 1, instead indicates that no additional *chilazon* existed.

The hypothesis becomes still more implausible when one adds the many identifying features in which the *Purpura* accords with the words of the Sages, as set out above and below. This is a powerful line of reasoning to which there is no honest answer.

8. The Archaeological Finds

Large heaps of *Murex trunculus* shells have been discovered at numerous sites identified as dye houses. The shells were punctured at the location of the dye gland. They were found in places that rabbinic sources identify as centers for trapping the *chilazon*, clearly proving that this snail was used for dyeing in that region and period. They likewise establish that it was the commercially important *chilazon* of the era; we have no basis for inventing another murex species that supposedly disappeared in modern times. Some of these shells may still be seen in the museum at Tel Dor, so one need not rely upon archaeologists’ testimony alone.

There are also reports of enormous heaps containing many millions of shells near Sidon. The *Murex trunculus*, the blunt-spined murex identified with the *chilazon* of *tekhelet*, had been sorted separately on one side, while the other species—the spiny dye-murex and the red-mouthed rock shell, associated with *argaman*—were mixed together. The most reasonable explanation for this sorting is that the two groups served different purposes: one for *tekhelet* and the others for *argaman*. See *Lula'ot Tekhelet*, p. 228; Rabbi Isaac Herzog's *HaTekhelet BeYisrael*; and *Encyclopaedia Hebraica*, entry “Tyrian Purple.”

An ancient Tyrian coin has also been found bearing an image of the *Murex trunculus*. The creature was so important to the Tyrians that they placed it on their coinage, consistent with the ancient writers' statement that *Purpura* was the principal livelihood of the people of Tyre.

Attention should also be given to the complete absence of remains that could offer any evidence for ancient dyeing with some other snail.

Blue-dyed wool from the era in which *tekhelet* was practiced has likewise been discovered.²³ It survived—despite wool's ordinary tendency to perish over the centuries²⁴—because it had remained frozen. Testing identified the colorant as the dye substance of the *Purpura*. This too proves that blue was being produced from this snail in antiquity. See the photograph at the end of the pamphlet.

9. Additional Probabilities

First, this snail has been called *Purpura* from antiquity until today, while *tekhelet* itself was likewise called by this name in rabbinic literature and external translations until recent generations.²⁵ They were evidently given the same name because both came from the same source, the *Purpura*. The city of Haifa was called *Porphyron* in the Hellenistic period, apparently because these snails were trapped there, as Shabbat 26a states. *Tekhelet* was also called “Tyrian,” as in the *Arukh*, entry *tiryon*, after the *Purpura* dye and its source in Tyre.

²³ Some Egyptian mummies are wrapped in blue-dyed cloth that has been tested and found to contain indigo, the active colorant both in the *chilazon* and in *kala ilan*. The tests did not determine whether the indigo came from an animal or a plant. See *Lula'ot Tekhelet*, p. 178.

²⁴ This is why no woolen *tzitzit* threads from that era have survived.

²⁵ Raavyah I, Berachot §25, preserves the following version of the Jerusalem Talmud: “We read in the Jerusalem Talmud: between *tekhelet* and green, between *porphyron* and *periphenin*.” It thus calls *tekhelet* *porphyr*. The Septuagint's translation of “entirely *tekhelet*” is also reported as *holoporphuros*, meaning entirely of *Purpura*. *Porphyr* was not the name of one hue, since it was used for the snail's other colors as well; it referred to dye from the *Purpura* source. Although the German glosses printed in the *Arukh* call *tekhelet* *farber* and *argaman* *perp*—see entries *tekhelet* and *argaman*—biblical translations also apply this terminology to *argaman*.

Pirkei DeRabbi Eliezer 49 states: “Rabbi Pinchas says: A king rebelled, as it says, ‘Mordechai went out from before the king in royal clothing of *tekhelet* and white.’ Just as the king wears *purpura*, so Mordechai [wore it], as it says, ‘Mordechai went out from before the king in royal clothing of *tekhelet* and white.’” *Lula'ot Tekhelet* discusses additional sources at length. A royal robe is indeed called *porphyra* in many Midrashim even when it is not specifically *tekhelet*, as noted in the pamphlets *Tekhelet and Argaman* and *Between Tekhelet and Argaman*. It was presumably named for the *tekhelet* used in luxurious robes, as the Ramban writes in *Tetzaveh*. The *Arukh*, entry *tekhelet*, cites “the sea district is the *tekhelet* of Babylonia” and explains, “Just as *tekhelet* is the choicest part of a cloak....” See also *Arukh HaShalem*, entry *porphyra*, which notes that in Greek and Roman usage a *tekhelet* garment was called by this name.

Second, Menachot 42b describes taking a small amount in an eggshell and testing it on raw wool. Special precautions were required so that the sample test would not invalidate the rest of the vat. The test was evidently a central part of the dyeing process, for it appears in the Talmud's answer to Abaye's question, "How do you dye this *tekhelet*?" This fits the *Purpura* process especially well. One cannot tell from the outside whether its dye bath is ready to produce blue and must therefore test a sample. Pliny likewise writes that *Purpura* dye should be sampled at the end of its preparation. At one stage, the dye becomes capable of producing blue only after exposure to the sun. During the reduction process the vat itself appears yellow, because the additives break down the secretion, so it is not visually evident whether the wool will emerge blue or purple; only afterward does the color turn blue.²⁶

Third, it fits well that the use of *tekhelet* ceased only a little after the final mention in ancient literature of producing hyacinth blue—the usual translation of *tekhelet*—from *Purpura*.²⁷ If these were two different snails, it would be remarkable for both to disappear "by coincidence" in the same period. This is not conclusive, however, since one common historical cause may have ended the use of both.

Fourth, one view invalidates the second dyeing from the same vat, whose color is weaker; see the Vilna Gaon to Isaiah 1:18. This view derives the requirement from the phrase *kelil tekhelet*, entirely *tekhelet*. It fits this snail especially well, because the quality of its dye naturally declines in a second dyeing. Many other dyes show no difference between the first and second baths, although a weaker second dyeing is also found with some dyes, such as crimson, as the Talmudic passage implies and the Vilna Gaon writes there.

Fifth, one writer observed that the Rishonim discuss the possibility that the *chilazon* might still be found in our time; see section 21, beginning "Nevertheless," the notes there, and note 67. Modern zoology has identified no animal other than *Purpura* that fits the descriptions of the *chilazon*. This fact strengthens the identification.²⁸ No new large fish species have been discovered in the Mediterranean for many years.²⁹

²⁶ This is not a very strong proof. Even where sunlight is unnecessary, the dye must be sampled because one cannot tell merely by looking whether it is ready. The same may therefore be true of other dyes. Since the dyeing process is under discussion, however, it is worth noting an attractive allusion in Zohar, *Terumah* 149b: *tekhelet* emerges from a red color; the passage also says that it inherits the color of gold and afterward becomes *tekhelet*. Rabbi Menachem Azariah of Fano cites this in *Ma'amar Tzeva'ot Hashem*, part II, concerning the *tekhelet* of the Tabernacle: "*Tekhelet* emerges from a red color, as stated in the Zohar, *Terumah*." The Zohar there has the same implication.

We do not engage in esoteric matters and do not bring proofs from secrets. Nevertheless, the passage alludes to the actual craft of producing *tekhelet*: the secretion is initially reddish; during the dyeing process it becomes gold-colored; and it then becomes blue *tekhelet*.

²⁷ See Rabbi Eliyahu Tavger, "The *Tekhelet* Article," note 144, also reproduced in his book *Kelil Tekhelet*.

²⁸ If the statement that the *chilazon* was "concealed" means that it left the natural order—that it moved from its habitat between the ladders of Tyre and Haifa and migrated to other seas, contrary to its nature of remaining nearly stationary—then the absence of another candidate proves nothing. It is also possible that our eyes were closed in the present era so that we would not find it. See also note 67.

²⁹ See the sources in Rabbi Eliyahu Tavger, "The *Tekhelet* Article," p. 7. New microscopic species are found, as are fish that happened to reach the Mediterranean from other seas; many new species are likewise discovered in distant seas far from human settlement. It is well known that only a small fraction of the life in those seas has been discovered. The same is not true of large animals. I heard this from a reliable person who investigated the subject.

10. Is a Particular Species of *Chilazon* Required?

The entire debate rests upon the assumption that only one particular *chilazon* is valid. If every *chilazon* is valid, however, no identification is required. The mitzvah could be fulfilled with any *chilazon* that produces the color of *kala ilan* in a dye that retains its beauty.³⁰

The Tosefta's wording deserves attention: "It is valid only from the *chilazon*; if one brought it from something other than the *chilazon*, it is invalid." It does not appear to limit validity to a particular snail species. As explained in note 2, the definite expression "the *chilazon*" does not necessarily mean one uniquely known species; the Tosefta uses the same construction throughout.

Nor can one prove from the baraita in Menachot—"its body resembles the sea," and so forth—that a particular *chilazon* is indispensable. The baraita appears only to describe the actual *chilazon* then used for dyeing. It offers no basis to invalidate another *chilazon* that might be found to produce the same result. See section 11 below, where the baraita is shown not to establish indispensable legal conditions. The Rishonim and later authorities who recorded identifying features wrote them only to help find the *chilazon*; they never stated that another snail would be invalid if it produced an equivalent dye.

It is reasonable to say that the Torah required a *chilazon* because of its unique dyeing quality, so that only a *chilazon* possessing that special quality would be valid; see note 30. Yet according to those who reject the identification and claim that there were two snails—one valid for *tekhelet* and a second, the *Purpura*, that also existed in the Talmudic period and produced blue, as we can see and as ancient literature records in section 24—the Tosefta itself supplies clear proof that every *chilazon* is valid. The Tosefta's entire chapter enumerates valid and invalid materials, yet for *tekhelet* it merely says that dye from a *chilazon* is valid and never lists *Purpura* among

³⁰ Reason itself suggests that the Torah commanded *tekhelet* and that *tekhelet* is the name of a color. Many Midrashim use the term without reference to wool, such as "the blue-green *tekhelet* that surrounds the world" and many similar examples. See *Pesikta Zutrata/Lekach Tov* to Genesis 1; *Tikkunei Zohar*, Tikkun 70, 126b, concerning eye color; and Rambam, *Laws of Tzitzit* 2:1. How, then, can we invent an unwritten condition for the mitzvah against the plain meaning of Scripture? When the Sages require dye specifically from a *chilazon*, the requirement may be a law transmitted to Moses at Sinai, or it may derive from the Jerusalem Talmud, Kilayim 9:1, which says regarding the Tabernacle: "Just as scarlet is something possessing life, so everything [used there] must be something possessing life." Apparently this includes *tekhelet* and *argaman*, which appear with scarlet in the verse, just as the passage later compares wool and linen because they appear together.

Rashi, however, appears to understand *tekhelet* as the name of wool dyed with the blood of a *chilazon*. The Sages may have had a tradition that the name *tekhelet* denotes a particular quality of dye found only in one *chilazon*. I heard one sage infer this from the expression "between *tekhelet* and *kala ilan*," although it is not a clear proof, because *tekhelet* there may simply mean valid *tekhelet*. Even if this is not part of the term's literal definition, the Sages may have received a tradition that *tekhelet* requires a certain level of fastness, a quality found only in one snail.

To invalidate *Purpura* on this basis, even if it were not the creature used by the Sages, one would have to say that the active colorant of the original *chilazon* was not indigo—the colorant in *Purpura*—even though its hue was exactly that of indigo. Yet in every murex family, including those that do not yield blue because blue colorant is mixed with other colorants, the blue substance is indigo. Alternatively, one would have to posit that the original animal's secretion contained some additional substance that caused the dye to bind to wool better than the dye of *Murex trunculus*.

the invalid sources. On their own premise, this is powerful evidence that any *chilazon* is valid.³¹ See also note 4: even if there were room to suspect that *kala ilan* was mixed with additional colors, that would not refute the argument.

11. The Identifying Features in Menachot

The proofs of the identification are not based upon the baraita in Menachot. Nevertheless, nothing in it presents a difficulty; on the contrary, it offers additional support. Many who question the identification simply lack knowledge of the creature's actual features.

Menachot 44a teaches:

*The Rabbis taught: This chilazon—its body resembles the sea, its form resembles a fish, it ascends once in seventy years, and with its blood one dyes *tekhelet. Therefore its price is high.*

This baraita also appears in tractate *Tzitzit*.

Before explaining the statement, one must ask why these features were recorded. Did the Sages foresee that the *chilazon* would be concealed from a later generation and provide signs by which that generation alone could recover it, declaring that it could be identified only through these features? Or were they simply describing for their contemporaries the appearance of the *chilazon* still in common use—either to help those seeking it find it readily, or for some aggadic purpose?

Even if the baraita's purpose were aggadic, its words certainly have a straightforward meaning. A candidate could not be identified as the *chilazon* if it failed to accord with the Talmud's descriptions.

If the baraita intended these three features alone to enable a later generation to discover the *chilazon* and distinguish it from another, invalid, blue-dyeing snail, it would have supplied clearer signs, as the Sages do elsewhere. The signs of permitted animals in Chullin 59, for example, consist of exact details and carefully defined rules that establish the law beyond doubt. Here the descriptions are impressionistic resemblances without specifying which aspect is meant. This is especially significant according to Radbaz II:685, who holds that the features can change—the creature ascended only in the Temple era. The Rishonim, including the Rambam and *Semag*, also supplied other signs by which to identify it.

³¹ In truth, because *Purpura* is the Torah's *tekhelet*, the Tosefta does not prove that every snail is valid. No other ancient dye was known to produce an equivalent blue, so there was no reason to specify that the dye had to come from a particular snail; only *Purpura* produced blue. The argument in the preceding note may well be correct and would invalidate another snail if one were discovered that produced blue from a different substance, not indigo. But those who force the claim that two blue-producing snails already existed in the Mishnaic era face the proof stated in the text. On their own view, they must obligate the mitzvah of *tekhelet*, at least because validity does not depend on one particular *chilazon*.

The simpler explanation is that the features were given to seekers so they could distinguish the creature from other snails. Even without danger of confusing it with another blue-dyeing snail, the Sages wished to make it easier to recognize for someone unfamiliar with it.³²

The Babylonian Talmud's wording, "This is the *chilazon*"—in precise versions, "this"—is similar to Sotah 48b, "This is the *shamir*." That formulation does not mean that only a creature possessing those exact features may be used; with *shamir*, any substance that cuts in the same fashion would plainly suffice.

We must nevertheless explain the Talmud's descriptions and test whether they are fulfilled by the *Purpura*.³³

³² One writer asked why the Sages did not simply say, "Bring a *chilazon* called *Purpura*." The question has no basis. Their purpose was not to identify the creature for those who already knew it, but to describe it for someone unfamiliar with it. On his own claim that *Purpura* is not the *chilazon*, he should ask why, if the Sages intended to specify which snail it was, they did not give its foreign name. The term *chilazon* is not itself biblical Hebrew and does not define one species; it includes land snails as well. The Sages supplied foreign names when discussing the signs of permitted animals and birds; see the end of Chullin chapter 3 and Avodah Zarah 39a. A foreign species name would have made the identity clear even without the listed features. Greek authors of that era recorded distinct names for various snail species, and it is unlikely that so useful and expensive a creature as the *chilazon* of *tekhelet* had no specific name. The Sages evidently had some reason to describe its form. In truth, however, rabbinic literature ordinarily used Aramaic rather than Latin names, so the objection fails at its foundation.

³³ This introduction is intended to reject the claim that, on our explanation, the listed features are not absolutely unique and that another snail might also possess them. Even so, the central condition, "with its blood one dyes *tekhelet*," exists only in the *Purpura* species, and *trunculus* fits the remaining descriptions best.

Many comparisons made by the Sages would be unintelligible without independent familiarity with the object. Examples include the "nose" of an *etrog*, the "braided" growth of the myrtle, and the Talmud's comparison of the placenta in Niddah 26a; see also note 42 below. Rashi to Sotah 17a and Ritva to Chullin 89a explain, regarding the statement that *tekhelet* resembles the sea, that "resembles" does not mean absolutely identical. Had we not otherwise known the creature, we might have thought that "resembles the sea" meant specifically blue. Once it is known, the Sages' words teach that green may also count as resembling the sea, as explained below.

The baraita is particularly suited to aggadic interpretation. It follows the preceding statement in the Talmud, taught in Rabbi Meir's name, concerning *tekhelet*'s resemblance to the sea, and expands upon additional respects in which the *chilazon* relates to the sea: not only does its dye resemble the sea, but the creature itself resembles the sea in form or color; its form resembles a sea creature, namely a fish; and its habitat is the sea, from which it ascends only once in seventy years. Kabbalistic writers expanded upon these themes; see Zohar, *Shelach* 163b and elsewhere. Rashi to Chullin 89a similarly writes: "*Tekhelet* resembles the sea—the *chilazon* ascends from the sea once in seventy years, and the appearance of its blood resembles the sea." The ascent seems unrelated to color, yet Rashi connects it to the teaching that *tekhelet* resembles the sea and thereby the Throne of Glory. The *chilazon*'s ascent from the sea itself evokes the sea, which recalls the heavens and the splitting of the Red Sea; see Rashi to Menachot 43b, s.v. *domeh la-yam*. The wording in tractate *Tzitzit*, "What does the *chilazon* resemble?" likewise has the characteristic form of an aggadic teaching. The Rif's omission of this passage points in the same direction.

If the entire baraita merely intended to teach legal rules for dyeing *tekhelet*, it would not conclude, "and with its blood one dyes *tekhelet*," as if that were one of the creature's identifying features. That fact is the baraita's entire premise. It should instead have said: "Which is the *chilazon* with whose blood *tekhelet* is dyed? Its body...."

Others explain that all the baraita's features lead to its conclusion, "Therefore its price is high." The creature is difficult to trap because it is concealed by its resemblance to the sea; when seen, it looks like a fish, or perhaps lives in the water like a fish; and it emerges only once in seventy years, when it can be found more readily. Its extreme difficulty of capture explains the high price.

12. “Its Body Resembles the Sea”

The phrase “its body resembles the sea” may apparently be understood in either of two ways: resemblance in form or resemblance in color.³⁴

While it is in the sea, the shell displays many hues, commonly ranging through greens to turquoise and purple.³⁵ The sea itself changes color from place to place, and green certainly counts as resembling the sea.³⁶ The Jerusalem Talmud, Berachot 1:2, says that the sea resembles vegetation and vegetation resembles the heavens; the same appears in Psalms Rabbah 24 and, in similar form, Bamidbar Rabbah, Naso 14. Psalms Rabbah 90 compares trees to the heavens, and Berachot 9b speaks of distinguishing *tekhelet* from leek green, showing the close similarity of these colors.

According to the Rambam, who understands the resemblance as one of color, the shell’s attached coloration is certainly considered the creature’s color. Even a person is called ruddy because of his hair; all the more so is coloration that visually forms part of the shell itself. This coloration adheres to it consistently, although the shell eventually whitens after removal from the sea. *HaTekhelet*, p. 295, reports that such persistent covering is especially characteristic of *trunculus* and less common in other snails, which may inhabit other depths or have surfaces too smooth for growth to attach. It therefore supplies an identifying feature distinguishing *trunculus* from other snails.

Near shore, other organisms and their secretions adhere to the shell, and the green growth found in deeper water may be absent. Most specimens then display other colors resembling the seabed.³⁷ Their complete form may even be hard to discern. The Sages must therefore refer specifically to the green growth that appears to be part of the animal when it is clean of external objects that do not look like part of its body.

The appearance also varies with location, pollution levels, and similar conditions. In the time of the Sages, intensive trapping may have left the snails primarily in deeper waters, so that most or nearly all were green. Aristotle likewise writes that the *Purpura* is covered with algae and sea grass, a green plant.

³⁴ Some prove from tractate *Tzitzit*, which reads “resembles the heavens,” that the Rambam understood the comparison as one of color. The proof is not conclusive. Since it is the same baraita that appears in the Babylonian Talmud, our version is primary, following the Vilna Gaon’s practice of emending other versions in light of the Bavli.

³⁵ The shell certainly counts as its “body.” It is analogous to the creature’s skull and enables it to live for more than six months, even though it has no ordinary sinews and bones, as proved from the Jerusalem Talmud in section 32 below.

³⁶ This reasoning was already advanced in *Chazon Nachum* by Rabbi Eliezer Nachum, of blessed memory, teacher of the Chida, whom the Chida calls “a holy mouth” in *Birkei Yosef* 17:2. He writes: “It appears that Rabbi Shlomo Sirilio spoke of the color of the fish itself, which is *verdeni* in the vernacular—green—and that ‘the secret of the Lord is revealed to those who fear Him.’” Although this does not appear to be the most natural reading of Rabbi Shlomo Sirilio’s words, *Chazon Nachum* clearly understood that the Talmud’s statement “resembles the sea” could refer to green.

³⁷ Some explain “resembles the sea” as “resembles the seabed.” Even if Rashi understands the resemblance visually, he does not state that it must specifically be the sea’s blue color. The Rambam writes that its appearance resembles the appearance of the sea; Ramban to Genesis 1:10 proves from Scripture that the seabed itself may be called “sea.” This *Purpura* always resembles the seabed in its coloration. Where the sea is covered with algae of different colors, the *Purpura* appears the same; see the left-hand photograph at the end of the pamphlet. Its camouflage makes it difficult to locate and trap and therefore also contributes to its high price.

The Rambam's wording is exact:³⁸ in the Frankel edition, he compares the *chilazon* to the sea but *tekhelet* to the heavens. Although the Talmud also says that *tekhelet* "resembles the sea," the sea is not exclusively blue; it includes green and similar shades. The heavens, however, are blue, which is the color of *tekhelet* as explained below.

According to the printed text of Rashi,³⁹ "its body resembles the sea" does not refer to color, as the Rambam explains, but to form: "its body—the appearance of its body, the shape of its likeness." Its resemblance may then be that it looks like the waves of the sea, as in Bava Batra 4a. Scripture frequently characterizes the sea through its waves.⁴⁰ This feature is especially pronounced in *trunculus* and can therefore distinguish it from other snails.

13. "Its Form Resembles a Fish"

Rabbinic literature describes the *chilazon*'s bodily form as snake-like. Bekhorot 38b, discussing eye blemishes, identifies a *chilazon* with a snake; see Rashi to Leviticus 21:20. The Ritva to Shabbat 75a likewise writes in the name of the Ramban: "The *chilazon* is different, for it does not possess limbs but has a closed body, like the snails found in refuse."⁴¹ It is not shaped like an ordinary fish with clearly formed fins, scales, and tail.

The Rishonim call it a *tolaas*: Rashi to Sanhedrin 91a; Raavyah, Shabbat §194; Rash and Raavad to *Torat Kohanim*, Metzora 1:14. The Rambam, in his commentary to Mishnah Kelim 12:1, explains *chilazon* as "shell." It therefore resembles our ordinary snails, whose soft bodies are worm-like. Mishnah Kelim 12, as explained by Rash and Rabbi Ovadiah of Bartenura, likewise suggests a creature that coils. The phrase "its form resembles a fish" cannot therefore refer to the form of its soft body. It must refer to the shell.

Anyone who sees this *chilazon* in its normal orientation can readily perceive that its shell resembles a fish.⁴² I have viewed photographs of a great many snails, and this species is truly

³⁸ I was asked how the Rambam, who did not know the *chilazon*, could have intended this interpretation. On the questioners' own premise, that is precisely why the Rambam repeated the Talmud's language exactly when describing the creature. Only in describing *tekhelet*, whose general blue color he knew, did he alter the wording and compare it to the heavens rather than the sea.

³⁹ Some emend Rashi so that "the shape of its likeness" refers to the next phrase, "its form resembles a fish." That appears to be the correct reading. If so, Rashi may also understand "its body resembles the sea" as a color comparison, explained as above for the Rambam. Even if Rashi need not be read this way, the Talmud itself may still be so interpreted.

⁴⁰ Scripture is full of references to the sea through its waves. I have found no biblical comparison based upon the sea's appearance or color. Because the Talmud says that *tekhelet* resembles the sea, some assumed that the present passage likewise refers specifically to appearance, as the Rambam holds; this is not at all necessary. The Jerusalem Talmud, Sotah 8:1, comments on "set with *tarshish*": "Like the great sea.... Rabbi Shimon ben Lakish said: Just as in this sea, between one great wave and another are small waves...." Another Midrash says, "Just as the sea rages, so the tongue rages" (*Otzar Midrashim*, p. 352). Bava Batra 4a and Sukkah 51b say that Herod's building "looked like the waves of the sea," showing that the waves were regarded as a defining feature of the sea and supplied the basis for comparing the Temple to it.

⁴¹ It is possible that the Ritva does not mean that its external form is undivided, but that it lacks a division into internal organs.

⁴² The resemblance is obvious to anyone who looks carefully at it in its normal position; even a schoolchild recognizes it. See the photograph. The *Arukh*, entry *ratzam*, explains the phrase "a sandal resembles a fish of the sea" to mean "broad, thin, and pointed toward its head." All the more so here, where the resemblance is straightforward. The Sages make even looser comparisons: Middot 4:7 states, "The Sanctuary was narrow at the back and broad at the front, resembling a lion, as it says, 'Woe, Ariel'.... Just as a lion is narrow at the back and broad at the front, so the

distinctive in that resemblance. It can therefore serve as a sign distinguishing it from other snails.



The shell of Murex trunculus, reproduced from the original pamphlet.

Others explain “its form resembles a fish” as a description of its mode of life: it lives in water like a fish. Some Rishonim indeed call any such creature a fish. See the Rambam below and Rabbi Yaakov Emden’s siddur commentary to the Shema, where he calls it “fish-like and a marine snail.” Its reproduction likewise resembles that of fish. In rabbinic usage, *beriyato*, “its formation,” often means the manner in which something is created; see Nazir 52a, Zevachim 22a, and the frequent phrase “the creation of the world.”

14. “It Ascends Once in Seventy Years”

This statement can be understood in several ways. Rashi to Menachot says that it ascends from the earth, whereas in Bava Metzia 61b and Sanhedrin 91a he says it ascends from the sea. At first glance, the feature appears absent from *Purpura*, since no mass movement of murexes onto land once in seventy years is known.

The straightforward fact, however, is that throughout the period when *tekhelet* was concealed, the *chilazon* did not ascend once in seventy years. We must therefore ask whether, when the creature is rediscovered, this behavior must necessarily return as well.

Is the ascent once in seventy years miraculous or natural? If miraculous, there is no difficulty if the miracle does not occur today. Radbaz II:685 writes that it ascended only in the Temple era and only in Zevulun’s territory.

If the ascent is natural, it apparently cannot be part of the individual animal’s own life cycle, since creatures of this kind do not live seventy years. It may mean that the *chilazon* fastens itself firmly into the ground, as *Sefer HaKananah* writes, and that exceptionally powerful waves tear it loose. Waves of such force occur only at very long intervals, which the Sages estimated as seventy years.⁴³ Today, because the species multiplied during nearly fifteen hundred years of minimal harvesting, it may be found closer to shore and be driven onto land every several years rather than every seventy. In antiquity, intensive harvesting may have pushed its colonies farther offshore, so a comparable event occurred only once in seventy years.

Alternatively, “ascends once in seventy years” may mean that an especially large quantity ascends at that interval through the wave action just described. This may occur even today, particularly according to tractate *Tzitzit*, which reads: “It ascends only once in seven years.”

Sanctuary was narrow at the back and broad at the front.” Thus, even this limited similarity sufficed for the Sages to explain the prophet’s comparison of the altar to a lion.

⁴³ In the words of the Sages, seventy years commonly denotes a very long period, corresponding to a human lifetime. See Makkot 7a; Avodah Zarah 11b and 40b; Horayot 13b; and Me’ilah 11b.

Even according to Rashi, one might explain it as an extremely rare event. Rashi says that the creature ascends to the mountains because he identifies the mountain snails of Sanhedrin 91a with the *chilazon* of *tekhelet*. Most Rishonim disagree, as shown in note 6 from the *Yad Ramah*, Tosafot, Ritva, and the *Arukh*. In any event, if the ascent reflects the creature's own nature, that nature did not manifest throughout the period of concealment. What basis is there for insisting that it must return immediately when the *chilazon* is rediscovered?

If, instead, its nature never changed and it continued to ascend once in seventy years while no one paid attention, the same may be true of this *chilazon*. No observer has followed it continuously for seventy years to establish otherwise.⁴⁴

The Rambam, moreover, cites the Talmud's identifying features but omits this one. He may have done so because it is not an intrinsic, testable feature of the animal, in accordance with the Radbaz's explanation.

Rashi appears to make the once-in-seventy-years ascent the reason for its high price, suggesting that it could be trapped only at that time. This cannot be his intention. Several passages discuss trappers catching the *chilazon* in nets; see Shabbat 74b. It was therefore caught in the sea. Rashi himself consistently explains "ascends" as movement onto land,⁴⁵ so the statements that it was caught at sea prove that it was also captured during the intervening seventy years. Its price was high because it had to be actively trapped rather than rising by itself.

Capture is especially difficult even with nets. Its coloration and the vegetation growing upon it make it hard to see, its location cannot be known without diving, and it does not enter fishermen's nets in every season. Pliny writes that people endangered themselves to catch it. This difficulty may itself have formed part of its "concealment": it was hidden in deep water and did not ascend.

For some reason, capture for *tekhelet* certainly ceased—perhaps because of the danger of deep-water harvesting without suitable diving equipment, as Radbaz also writes in note 67 below, or because of royal decrees. See section 15, beginning "In any event." This also answers

⁴⁴ Some rabbinic statements allude to another idea; although the plain sense remains, it may then be interpreted less literally. The Vilna Gaon, *Commentary to Aggadot*, Ta'anit 23a, thus offers a nonliteral explanation of the statement that a carob takes seventy years to bear fruit. Bekhorot 8a says, "From the time a carob is planted until its fruit is complete is seventy years." The Vilna Gaon explains that it continues producing fruit for seventy years, unlike Rashi's plain reading that it first produces fruit only after seventy years.

Kabbalists compare the carob to the *chilazon*. Rabbi Chaim of Volozhin, *Ruach Chaim* to Avot 3:1, writes: "It ascends once in seventy years' is the mystery of the carob tree, the world of destruction, as is known." On the plain level too, one may therefore interpret the statement as the Vilna Gaon interprets the carob: the creature's colonies grow for up to seventy years, and by the end of that period their great abundance makes them easier to catch; they may ascend or relocate to a nearby place where they can be captured more readily.

Rabbi Menachem Azariah of Fano, *Ma'amar Tzeva'ot Hashem* II, 14–15, explains that it ascends once in seventy years "in the form of an inanimate object." This might mean that it ascends after death and fits especially well with tractate *Tzitzit*'s reading of seven years: *Purpura* lives seven years, and after death its shell washes onto land. This does not accord with Rashi, who says that they dyed with it after it ascended, since a dead animal would no longer be fit for dyeing. This is sufficient; "give to the wise and he will grow wiser." See also Zohar to Leviticus 16:1, which says that a palm tree likewise ascends at seventy years, although no such phenomenon has been observed.

⁴⁵ It cannot mean merely that it rises into fishermen's nets or moves upward from the seabed into higher water.

those who understand “once in seventy years” as at least an expression of extreme rarity and object that *trunculus* is not very rare today.

15. “Therefore Its Price Is High”

Rashi explains that its price was high because of its rarity; tractate *Tzitzit* appears to read similarly. According to the Babylonian Talmud’s version, however, the plain meaning is that it was expensive because it was used to dye *tekhelet*. Tractate *Tzitzit* may originally have had the Bavli’s version as well.

Although the snail is not especially expensive today, every ancient non-Jewish writer describes *Purpura* dye as extremely costly. Even according to Rashi, who links the price to rarity, price also depends upon demand. A commodity sought only once in seventy years would not be valuable if no one wanted it. Modern diving equipment has made capture easy and ordinary, which likewise lowers the price.

In any event, there is no difficulty. The creature is certainly more common today. Like other animals that became rare or nearly extinct, it declined under intense harvesting and survived only in deeper water—“concealed,” in the Sages’ terminology. The Sages similarly say that *shira paranda* and white glass were “concealed” or ceased, while the Rishonim explain that they became rare; see Tosafot to Shabbat 20b, s.v. *anan*. In the case of the *chilazon*, it may at times have become entirely impossible to find, so dyeing for the masses ceased.

Royal decrees also prohibited its use by the general population, perhaps the decree mentioned in Sanhedrin 12a. Knowledge of the dyeing craft was consequently forgotten, demand for the animal disappeared, and its population steadily recovered until it reached today’s abundance.

The Rambam’s Identifying Features

16. “It Is a Fish”

Question: Some object to the *Purpura* on the basis of the Rambam’s statement that the *chilazon* is a fish. *Purpura* belongs to the familiar class called snails, not fish, in light of the Rambam’s *Laws of Forbidden Foods* 2:12.

Answer: Rashi to Sanhedrin 91a, the *Yad Ramah* there, and Raavyah, Shabbat §194, call the *chilazon* a *tolaas*. Rash and Raavad to *Torat Kohanim*, Metzora 1:14, do the same, and the Ritva to Shabbat 75a reports in the Ramban’s name that it resembles a worm. There is no dispute. A sea worm can also be classified broadly as a fish. Rashi himself writes in Shabbat 74b, s.v. *tzadei chilazon*, that it is “a kind of fish.”

The proof is the verse, “Let them rule over the fish of the sea” (Genesis 1:26; see also 1:28 and 9:2). If “fish” did not include marine animals generally, the creatures of the sea would differ from every other class of animal and would not have been placed under human dominion.

The Rambam's statement in *Laws of Forbidden Foods* is irrelevant. There he defines the category included in the verse "the swarming thing that swarms" and says that an ordinary fish is not termed a *sheretz*. He does not say that aquatic *sheratzim* can never be called fish; that question is unrelated to his discussion. Concerning forbidden aquatic life, the Torah itself does not use the word "fish," but says, "everything in the water." In ordinary language, however, *dag* can denote anything living in water, even if it is not shaped like an ordinary fish. The Rambam never intended to distinguish on this basis.

Moreover, if the Rambam called the *chilazon* a "fish" specifically to exclude an aquatic *sheretz*, his statement would be astonishing, for it has no source in the Talmud. If his source were the baraita in Menachot, "its form resembles a fish," that very phrase proves the opposite: it *resembles* a fish rather than actually being one.

The *Noda BiYehudah*, second edition, *Orach Chaim* §3, in a responsum by the author's son, proves from this wording that it is not literally a fish: the Sages say it resembles a fish, not that it is a fish. The Rambam's term *dag* must therefore mean any creature whose habitat is the sea, a usage found often in the Talmud.

The Rambam himself, in his commentary to Mishnah Kelim 12:1, explains *chilazon* as "shell," as the Arabic original also reads. His son Rabbi Avraham, *The Guide for Serving God*, Nissim Dana edition, p. 273, likewise uses the ordinary Arabic word for *chilazon*, still understood today to refer to our familiar snails, which are aquatic *sheratzim*. The Vilna Gaon comments on Kelim 10:1: "Everything in the sea is a kind of fish." The Rambam himself says "a sea animal" in Kelim 1:3 and elsewhere, in *Laws of Impurity of the Dead* 6:1, substitutes "fish" in discussing the identical law. The *Chavot Yair*, who identifies the *Purpura* as the *chilazon* of *tekhelet*, calls it the *purpur* fish, following non-Jewish scholars. Similarly, Rashi to Shabbat 77b calls the *kilbit* a *sheretz*, while Rishonim quote Rashi as calling it "a non-kosher fish."

All these sources instead prove that the *chilazon* is a sea *tolaas*.

17. "Its Blood Is Black as Ink"

Question: Some object that the secretion of the *Purpura* emerges clear and only afterward develops color. Even then, it becomes deep purple, appearing black only when concentrated in the vat or when the dye dries.

Answer: Three views are found concerning the color of the *chilazon*'s blood. The Rambam and those who follow him say that it is black as ink. Rashi to Chullin 89a says that its appearance resembles the sea. The *Chavot Yair*, in *Mekor Chaim* 18:3, says that the blood used to dye *tekhelet* is not blue but *purpur*. At first glance, reality cannot accord with all three. The *Chavot Yair*'s description might appear correct—he expressly identifies *tekhelet* with *Purpura*—and the Zohar offers support, as noted in note 26.

In truth, Rashi's statement also fits. He apparently reasoned that the color of the secretion must be the color of the dyed wool, since he held that the additives could not themselves supply the color; see note 76. This is fulfilled by *Purpura*: after the dye is prepared, it becomes blue. During

dyeing, the reduced secretion is yellow, but it then returns to its natural oxidized state and becomes blue rather than purple.

Can the Rambam's description also be reconciled? We must determine the source of this identifying feature, which does not appear in the words of the Sages. It is difficult to suppose that the Rambam possessed an otherwise lost Midrash not mentioned by the Rishonim, though several Rishonim quote this statement from him.

Rabbi Isaac Herzog therefore reasonably suggested that the Rambam drew upon Aristotle,⁴⁶ who describes the *Purpura* color as black. Aristotle himself says that the secretion emerges clear and only afterward becomes dark. He calls its color *melan*. The *Arukh*, entries *imra* and *melan*, and the supplement there, explains this word as black ink and as a term for an ink-black appearance.

The Hebrew word *shachor*, black, can in any event denote any very dark appearance. The Rambam even describes the appearance of the heavens as black in *Laws of Tzitzit* 2:8. Elsewhere, *Laws of Shechitah* 7:17–19, he distinguishes two kinds of blackness: “black as ink” and “black like *kechol*,” as the language of Chullin 47b likewise implies. Since there was no separate term for every degree of darkness, the Rambam may have wished to prevent a reader from thinking the secretion was merely “black” in the sense of blue—the final color on the wool. He therefore called it “black as ink,” meaning the stronger kind of darkness.⁴⁷

⁴⁶ Rabbi Herzog actually inferred from this that the Rambam identified the *chilazon* with the *Purpura*, meaning the murex or *argamon* described by Aristotle. Some translators render Aristotle's word as “dark.” Greek indigo blue was likewise called *melan indicum*, so the term can describe any exceptionally dark color and need not mean literal ink black; at minimum, a dark colorant may be called by this term. *Lula'ot Tekhelet* also cites Philo of Alexandria calling *tekhelet* itself *melas*. The Arabic translation of Aristotle, however, uses *aswad*, black as ink. *Lula'ot Tekhelet*, pp. 166–68, cites the Rambam's own statement that he had access only to the Arabic translation of Aristotle.

⁴⁷ The Rambam uses language of “blackening” for *kala ilan*. In *Laws of Tzitzit* 2:1 he says that, although invalid dye may resemble the heavens, it may have been dyed with woad or with “black.” See also *Laws of Tzitzit* 2:8; *Laws of Shechitah* 7:19; and *Laws of Blessings* 4:9, which speaks of black wine, although virtually all wine seems to contain some redness. See also *Bi'ur Halachah* 32:3 and 33, s.v. *ha-retzu'ot*. The modern Hebrew color term *kachol* was not used by the Rishonim. When the Rambam speaks of *kechol*, he means a specific cosmetic applied to the eyes, not the modern color term blue. The same substance is called *kechol* in Mishnah Kelim 16:8; in the Jerusalem Talmud's text of Mishnah Shabbat chapter 8 and Makkot chapter 3; in many Tosefta passages, including Shabbat 8:33, Makkot 4:15, and Mikvaot 6:9; in *Sifra*, Kedoshim 3:6; and in the Rambam, *Laws of Shabbat* 18:10 and *Laws of Shechitah* 14:13. No Rishon uses a color term corresponding to modern *kachol*. *Ein HaTekhelet*, chapter 4, discusses Rashi's terminology at length.

Every deep color could be called “black.” Niddah 64b compares women in their virginity to vines and says that one vine produces black wine, while Keritot 22a calls a drop of blood “a blackening drop” even though blood contains redness. Rabbinic sources similarly distinguish black and white figs, although what they call a black fig appears purple to us.

The Rambam may therefore not intend to define the exact hue with the precision of the laws of menstrual blood, excluding the slightest reddish component. He may mean only that the secretion is in the class of blackness called “black,” rather than the blue-like blackness called *kechol*: anything tending more toward ink-darkness than *kechol*-darkness is “black as ink.” He may instead refer to the degree of darkness rather than the hue, whether very dark blue or very dark gray: its blood is as dark as ink, not merely dark like *kechol*. He did not mean that its blackness must equal ink with absolute precision. When somewhat concentrated or dry, it is literally black; see the photograph at the end of the pamphlet. Had the Rambam not written this description, we would have searched for a *chilazon* whose raw secretion itself was exactly the color of *tekhelet*, not even purple.

Ink itself is principally black when dry. When the Rambam wishes to specify absolute, complete blackness, he expressly writes, “like dry ink.”⁴⁸

Whatever interpretation is applied to Aristotle’s express statement that the *Purpura* secretion is *melan*—whose plain meaning is black as ink—will equally explain the Rambam. Only the dark component of the secretion supplies the lasting dye, while the red component disappears. Aristotle and the Rambam may therefore refer to the colorant that remains rather than to the temporary red. At first, only blackness and redness are visible; no blue appears. The Zohar’s language alludes to these changes; see note 26.

Some suggest that Aristotle’s *melan* refers to a black vein passing through the gland; whether the principal colorant is concentrated in that vein requires investigation. The *Tzafnat Pa’aneach* identifies the Rambam’s source as the Jerusalem Talmud, Niddah 2:7, which says that fish blood is black. If that is correct, the *Purpura* certainly fits, because its secretion is darker than ordinary fish blood.

In my opinion, however, the Rambam’s principal reason is neither Aristotle nor a lost Midrash. He understood the words “with its blood one dyes *tekhelet*” literally: the color comes from the secretion itself, not from additives, as explained above regarding Rashi and in note 76. He therefore assumed straightforwardly that the secretion was “black,” intending primarily to exclude ordinary red blood. He added “as ink” because a deep colorant is required to impart a pale hue to white wool. The Rambam knew the appearance of *kala ilan*—indigo or woad—concentrated in the vat before dyeing, when it is literally black as ink.

The Rambam was not setting out another sign to exclude purple, nor saying that the secretion of the living animal is already black. He was explaining in ordinary terms how “blood,” which one would normally imagine as red, can produce *tekhelet*: this *chilazon*’s secretion differs from the blood of other marine creatures and can produce blue because it is itself extremely dark, black as ink. This appears to me clearly correct.

18. “It Is Found in the Salt Sea”

Later authorities have already explained⁴⁹ that this statement is not found in the words of the Sages and, if taken as a reference to the Dead Sea, would contradict the Talmud. The Dead Sea is not in Zevulun’s territory or between the ladders of Tyre and Haifa, and no creature can live there.

⁴⁸ The Rambam writes in *Laws of Forbidden Relations* 5:8, “black like dry ink.” Rashi to Chullin 47b, s.v. *kideyuta*, likewise says that ink’s blackness is present when it is dry, and Niddah 20a has the same implication. That passage compares ink’s blackness to dark grapes, which contain a red component. It further says that ordinary ink is somewhat lighter and that only the particular sample under discussion was “as black as the dark part of ink,” like grapes. Rabbenu Asher, Niddah 8:8, cited by the Tur and *Beit Yosef*, *Yoreh De’ah* §190, quotes Rabbenu Chananel that the limb blood of a chicken is the ink-black color discussed in Niddah. This is an extremely deep red that appears black and closely resembles the secretion of the *chilazon*. A decisor shown a woman’s blood of this color would certainly prohibit it on account of its black aspect. We can likewise observe that faded ink loses its blackness and turns purple, demonstrating that it contains some red. The Talmud’s phrase “as the dark part of ink” may therefore refer to the depth of the color rather than its exact hue.

⁴⁹ See Rabbi Yaakov Emden, *Mitpachat Sefarim*, chapter 4, cited in *Lula’ot Tekhelet*, p. 148.

The Rambam must mean, as Rabbeinu Chananel explains the phrase “salt sea” in Pesachim 28a, the Great Sea—the saltwater sea, as opposed to freshwater seas.⁵⁰ Elsewhere too, including *Laws of Kilayim* 10:1 and his commentary to Mishnah Kelim 15:1, the Rambam calls the Great Sea “the salt sea.” In Arabic it is called *al-bahr al-malih*, while the Dead Sea is called by the Rambam the Sea of Sodom; see his commentaries to Shabbat 2:1 and 2:9.

The Rambam may have learned this fact from Aristotle, as in the preceding section. Aristotle writes that the creature cannot live in fresh water, only salt water. The Rambam may therefore have used “salt sea” for the Mediterranean here, rather than his usual “Great Sea,” even though no Talmud or Midrash states that its habitat is the salt sea.

19. Concluding Remarks

You have been shown that every avenue of investigation leads to one conclusion: *tekhelet* comes from the *Purpura* snail. Every identifying feature in the Talmud is fulfilled by it. To reject the identification, one must refute the principal proofs; dismissing one or two minor textual inferences is not enough.

Rabbi Isaac Herzog himself acknowledged that it was far-fetched to suppose that *Purpura* was not the Torah’s *chilazon*, although he did not finally accept the identification. Many archaeological discoveries in the Land of Israel were not yet known in his lifetime. He rejected *Purpura* because he could not reconcile the shell’s white appearance with “resembles the sea,” having never observed the living animal underwater.

More importantly, the central evidence upon which the entire identification rests—the fact that *Purpura* produces blue like *kala ilan*—was unavailable to him. In light of the knowledge of his era, the creature’s purple dye was itself an objection, contradicting the received tradition that *tekhelet* is blue.⁵¹ His contemporaries had not succeeded in producing a pure blue from *Purpura*. Blue emerges only after the secretion has been dissolved and reduced in the dyeing process; the craft of dyeing and the required form of reduction, indispensable even for producing purple, had not yet been rediscovered. Some researchers therefore argued that *tekhelet* was purple, but Rabbi Herzog rejected their claim as contrary to tradition.

This also answers the claim that one “discovery” of *tekhelet* follows another, each claimant supposedly proving his own position and refuting the previous one in an endless cycle. No evidence at all was brought for identifying the Radzyń cuttlefish; the Radzyńer Rebbe argued only that it could be made to fit the stated features. That theory was based upon the view of a single great man and required many strained explanations. *Purpura tekhelet*, by contrast, has been examined by dozens of Torah scholars and dozens of specialists who all reach the same conclusion.

⁵⁰ The Chida takes this position in *Nachal Kedumim*, *Terumah*, as does Rabbi Chaim Kanievsky in *Kiryat Melech*. See also Radal’s commentary to *Pirkei DeRabbi Eliezer*, chapter 18, and Rabbi Yaakov Chaim Sofer’s extensive discussion in *Beit Aharon VeYisrael* 97.

⁵¹ Rabbi Herzog, *HaTekhelet BeYisrael*, chapter 11. He also objected that it does not ascend once in seventy years. Although he understood that phrase as an expression of great rarity, the murex is not rare today. See the discussion below.

No evidence was ever offered to identify *Janthina* as the *chilazon* of *tekhelet*, and it was never proposed as a certainty, only as a speculative possibility. Specialists state that its particular pigment cannot dye: it is worse than a color that fails to retain its beauty, for it comes away easily and does not bind to wool at all. It was never used in actual dye production.

The only reason *Purpura* was not accepted in the past was that the possibility of producing blue from it was unknown. Since that discovery, no specialist in natural science, history, or archaeology is known to dispute its identification as the *chilazon* of *tekhelet*.

No matter how much evidence exists, one can always force remote constructions to smooth a path toward annulling the mitzvah. One may say that two witnesses have not testified that this is the true *chilazon*, assuming only one species is valid, and that no witnesses have ruled out another creature satisfying every description yet leaving no remains and receiving no mention from ancient writers. One may also force alternative explanations of every rabbinic source indicating that no other invalid *chilazon* could exist, for, as the Ramban observes in his introduction to *Milchamot Hashem*, the gates of forced interpretation are never closed.

But this is astonishing. Do we require the standard of evidence used in capital cases, where the law commands the court to seek acquittal? In every Torah matter, we rely upon identifying signs even where they are not the strongest possible signs. A woman who remarried on that basis is not required to leave her second husband. Only with the signs of birds, because we are no longer expert in determining whether a bird is predatory, and with the signs of eggs, because a raven's egg can resemble a dove's, do we decline to rely upon such signs—and there we are stringent, not lenient.⁵²

Even if the evidence would not suffice to execute a person, the Torah obligates us to act upon the reasonable and straightforward conclusion. What basis is there for inventing an endless succession of “perhaps” and “perhaps”? All the forced alternatives would have to be so substantial that the identification does not even enter the category of a Torah doubt.⁵³

⁵² Some authorities permit a married woman to remarry based upon several signs that are not individually unique, because their combination constitutes a unique identifying sign: it is impossible for all of them to occur together in one other man. See Maharai, cited in *Chelkat Mechokek*, *Even HaEzer* 17:43. All the more so may such a combination be relied upon here, where its consequence is stringency.

The Talmud is uncertain whether an intermediate identifying sign can permit a married woman to remarry. Some of the *chilazon*'s features fall within that intermediate category, defined as any rare characteristic; see *Chelkat Mechokek*, *Even HaEzer* 17:44. Its resemblance to *kala ilan* may even be “an exceptionally unique sign” sufficient to permit remarriage initially, defined as something so rare that it occurs only once in a thousand; see *Beit Shmuel*, *Even HaEzer* 17:72.

A sign may be an ordinary natural feature rather than an accidental oddity. The signs of eggs and fish embryos are not stated in the Torah and are intrinsic natural features, yet under certain conditions we rely upon them; see *Yoreh De'ah* 83:8. Where we decline to rely upon signs, it is because the Talmud is uncertain whether their authority is itself biblical, and we therefore rule stringently.

⁵³ See Ran to Sukkah 22b, s.v. *amar*, who explains that the law of doubt concerning a Torah obligation applies even when fulfillment is not certain: taking a *lulav* at twilight, using an *etrog* of doubtful hybrid status when no other is available, and similar cases. See *Beit Yosef* 665; *Magen Avraham* 662; *Orach Chaim* 32:50 with the *Mishnah Berurah* and *Bi'ur Halachah* 33:5, s.v. *ein*; and apparently *Yoreh De'ah* 288:5. See also *Mishnah Berurah* 600:7, which calls such a case a Torah doubt even where the stringency creates a resulting leniency concerning a rabbinic prohibition.

Two witnesses will certainly never testify that this is the *chilazon* used by the Sages. But the reasoning here is clear and powerful. There is no room to raise speculative doubts as an escape from fulfilling a positive Torah commandment.

This also emerges from the Maharil, new responsa §5, cited below, and from all who wrote that the *chilazon* could someday be rediscovered; see also note 60. They could not have imagined that two witnesses would arrive with an unequivocal ancestral tradition. The Rambam, *Semag*, and many other Rishonim who record identifying features likewise show that identification by signs suffices. They presumably wrote those descriptions so the creature could be found, since some features do not themselves explain a Torah text. If we must always fear that some other creature possesses the same signs, what purpose do the signs serve?

One who is not qualified to rule—even for himself⁵⁴—should therefore present all the evidence to his rabbi. At minimum, the decisor should tell him whether, once the possibility of dyeing *tekhelet* has been established and a positive Torah obligation lies before him, he must fulfill the mitzvah properly according to his conclusion; whether there is some basis for exemption; or whether he should contrive to exempt himself from *tzitzit* altogether, for example by wearing a borrowed *tallit* for fewer than thirty days.⁵⁵ “There is no wisdom, understanding, or counsel against the Lord.” If he is obligated, how can he evade a positive commandment except by a rabbinic enactment empowered to uproot a Torah law, as Yevamot 90b says regarding the exemption of a linen garment from *tzitzit*? *Orach Chaim* 9:6 understands that exemption as applying only to *tekhelet*.

Objections of Those Who Exempt One from Wearing *Tekhelet*, and Their Answers

The Basic Possibility of Restoring the Mitzvah of *Tekhelet*

20. The Absence of a Tradition, Including a Negative Tradition

Question: The righteous Radzyñer Rebbe, of blessed memory, cites the *Beit HaLevi* as saying that if a particular marine animal and the method of extracting its dye were known to the world, yet the Jewish people did not use it, that very fact would constitute a tradition that it was not the *chilazon*.

Answer: Our master, the generation’s decisor, Rabbi Yosef Shalom Elyashiv, of blessed memory, was uncertain whether this objection applied to the present *chilazon*. He wrote that he

⁵⁴ Horayot 2b teaches that even one not qualified to rule for others—whether learned without sufficient analytical ability or analytically capable without sufficient breadth—must act upon the law as he has determined it. If the Sanhedrin had ruled that the act was prohibited, the Talmud’s rule there might not apply; but in the present case no sage has ever ruled that wearing this *tekhelet* involves any prohibition.

⁵⁵ As explained by Rema, *Orach Chaim* 14:3. For the blessing, see *Magen Avraham* 14:5 and *Mishnah Berurah* 14:11–12. See also *Magen Avraham* 13:3 §8, which states an important rule concerning one who transfers ownership of his *tallit* to exempt it from *tzitzit*. One may discuss whether the concern for appearances stated there applies to *tekhelet* today, when the overwhelming majority of Torah scholars and God-fearing Jews do not wear it. See also Ramban to Shabbat 131b, who evidently disagrees with that reasoning of the *Magen Avraham*.

did not know whether the argument was relevant here, apparently because the historical facts were not known to him.

The known history of *Purpura* answers the objection. Although the creature's existence has been known for centuries, it was known primarily where it lived. The craft of dyeing with it and the possibility of producing blue from it were unknown until our generation. It was therefore not known as the *chilazon* of *tekhelet*. Since its rediscovery and dissemination, beginning only in 5753 (1992–93), the leading halachic authorities have not sat together to resolve the matter. In truth, as shown above, eminent Jewish sages centuries ago already knew from their books that it was the *chilazon* of *tekhelet*, although they apparently had no firsthand familiarity with it.

Nor does it matter that people in its habitat knew it as food but had no tradition identifying it as the Torah's *chilazon*.⁵⁶ Once knowledge of the creature was lost for even a single generation, it would not automatically return when the species was later found. People might know that it belonged to the *Purpura* family without knowing it was used for *tekhelet*, which species to test, or how to test it. The wool-dyeing process had been forgotten; it works only with particular additives and a particular procedure, as the Talmud explains.⁵⁷

Shabbat 26a also implies that producing *tekhelet* required special expertise found only among the inhabitants of that region, as the *Chatam Sofer* observes there. Sotah 46b says, "This is Luz, where *tekhelet* is dyed," likewise implying specialized skill not known to everyone. The Zohar, *VaEtchanan* 265a, has the same implication.

Indeed, non-Jews themselves forgot this *Purpura* even though books continued to record the creature's existence and immense value, and Greeks continued calling it by its ancient name. Since the dyeing method was no longer known, no one connected the species with the ancient dye until recent generations.

If the disappearance resulted from a decree—as is known, the use of *Purpura* was legally restricted in that period—or if the craft was forgotten through war, particularly during the Arab conquest of the Land of Israel at the beginning of the Geonic era, the process naturally disappeared once it no longer had practical relevance. The creature is not found at all in Babylonia, where the principal Jewish population then lived, so knowledge of its identity was forgotten as well. The use of *argaman* remained known until the end of the Byzantine era, but *tekhelet* was made from a different snail through a different dyeing method and had already been concealed in the Geonic period.

⁵⁶ I do not understand how this can be used as contrary evidence; the premise itself requires proof. Although *argaman* dyeing is historically documented in the periods of the Rishonim and Geonim, I know of no historical source establishing that *Murex trunculus*, the *chilazon* of *tekhelet*, still existed in ordinary use then. The known evidence concerns the *Purpura* species used for *argaman*—the spiny dye-murex and red-mouthed rock shell—used by Byzantine emperors for purple. The *chilazon* of *tekhelet* may literally have been "concealed," becoming extinct or disappearing completely from view, until approximately five hundred years ago, when a non-Jewish researcher happened to find it and the *Purpura* known as the source of *tekhelet* reappeared.

⁵⁷ Menachot 42b asks, "How do you dye this *tekhelet*?" implying some difficulty. If Abaye's question concerned the additives, however, the answer appears incomplete, since they are not specified. *Golden Hooks* suggests that the question was how to test whether the dye was good and ready to produce blue, and the answer was to sample it in an eggshell. This accords with the actual *Purpura* secretion: during the process one cannot tell merely by looking whether it is ready. See also section 27, subsections A and C, below.

One might still wonder why Jews did not search for the *chilazon* to fulfill the mitzvah, since ancient literature always identified it as a *Purpura* species and Rabbi Yaakov Emden and the *Chavot Yair* said as much. This too may have formed part of its concealment by Heaven: the method of dyeing had been forgotten and could not be recovered. Why is it easier to say that the creature's nature changed and it moved to a different habitat than to say that the craft was forgotten and could not be reconstructed? In any case, such a history certainly cannot constitute a tradition that it was not the *chilazon*. The *Beit HaLevi's* objection did not concern circumstances of this kind. Indeed, the statements of later authorities cited above come much closer to constituting a tradition that it *was* the *chilazon* than the silence does to constituting a tradition that it was not.

The truth is that no generation is known to have searched for the mitzvah until the Radzyñer Rebbe. Because the sources say that the dye was “concealed,” people may have assumed that searching could not uncover it. Even in our generation it was not discovered through a deliberate search; the facts became known independently. Earlier generations had little knowledge of marine species and their properties. Only in recent centuries did that field develop greatly, and chemistry was not sufficiently advanced to test the many possible dyeing methods. No identification would have been accepted until people could actually demonstrate that the creature produced *tekhelet*.

Question: Some say that a mitzvah dependent upon knowledge of physical reality cannot be renewed without a tradition.

Answer: This is astonishing. What basis have we for adding new rules to the Torah, especially ones that lack even logical foundation? This principle appears nowhere except as a mere stringency concerning a permitted bird, where there is a risk of mistaken identification—not as a reason for leniency. Even there, the law itself permits reliance upon identifying signs.⁵⁸ The turkey is widely accepted despite the absence of an ancient tradition concerning it; various explanations have been offered why no tradition is required there.

⁵⁸ Some attribute the opposing claim to the *Beit HaLevi*. The Radzyñer Rebbe, who lived in the *Beit HaLevi's* generation, records the *Beit HaLevi's* own response and publicized it while the *Beit HaLevi* was still alive. It says the exact opposite: only if the dyeing method were known but Jews nevertheless did not use the creature would the silence constitute a negative tradition. If it was known that the method of extracting dye from the creature had been lost, the *Beit HaLevi* held that one would be obligated to wear it. Rabbi Elyashiv likewise understood the *Beit HaLevi* this way.

Both reported versions may contain truth. The *Beit HaLevi* certainly did not mean that identifying signs can never be relied upon; the Talmud expressly relies upon signs throughout, even leniently and even for commandments dependent upon physical identification. Ordinarily, however, it is difficult to find completely distinctive signs. With the cuttlefish, the subject of his response, the proposed signs proved nothing, as the *Yeshe'ot Malko* wrote: the claim was a mere hypothesis. The present case is different.

In any event, one does not derive practical law from a scholar's theoretical discussion until he expressly rules in practice. Since the cuttlefish theory already failed for other reasons, the *Beit HaLevi* had no need to reach this issue and his comment was not a practical ruling. How could an oral report be used for leniency against the Talmud, reason, and all the Rishonim and later authorities who plainly disagree? In such a case the Chazon Ish's words certainly apply: “Halachah is weighty and was not given to be established through stories” (*Orach Chaim* §9). See the following notes.

If many ancient *tallitot* were discovered with *tzitzit* dyed from *Purpura*, no rational person would say that a mitzvah may not be renewed without a tradition. Compare *Beit Yosef*, *Orach Chaim* §34, citing *Semag*, Mordechai, and Maharil, who support Rashi's order of the *tefillin* passages from old *tefillin* found in Ezekiel's tomb. The “tradition” objection can arise only where no compelling reasoning establishes the physical facts.

The Rishonim themselves prove that the *chilazon* can be found without a tradition. The Maharil writes in his new responsa, §5:

It is reasonable to fear that the matter may return to its original state and tekhelet become available.⁵⁹ All the more so according to the Semag, who writes that this chilazon fish is in the salt sea and gives identifying features; it would be easy to make tekhelet.

See note 59. Even if the identity is not established specifically through these descriptions alone, the Maharil plainly did not require a tradition.⁶⁰ The Rif and Rabbenu Asher likewise codify the laws of *tekhelet* even though they ordinarily omit subjects having no practical application, which supports the Maharil's view.⁶¹

21. The Concealment of *Tekhelet*

Question: The *Sifrei* says that the *chilazon* is hidden away for the righteous in the future, and the Midrash says that *tekhelet* was concealed.

Answer: Anyone who reads the entire passage in *Sifrei*, *VeZot HaBerachah* §354, will see that it concerns the treasures stored in Zevulun's territory for the future. From beginning to end it discusses ships and merchandise lost in the Sea of Haifa, silver and gold, and concludes with

⁵⁹ The Maharil discusses the present prohibition against linen garments with *tzitzit* and whether a decree adopted by formal vote requires another formal vote to permit it. He cites Rabbi Chaim *Or Zarua* §8, who says it did not result from a formal vote, and Rabbenu Asher, cited in *Beit Yosef* §8, who says the principle does not apply because the reason for the prohibition ceased; see also *Magen Avraham* 9:7. One cannot say that the Maharil's statement depends upon the *chilazon* being found specifically in the Dead Sea, where no other animals live, so that the location would offer conclusive proof. Later authorities show that "salt sea" means the Mediterranean. Even if an animal were found in the Dead Sea, why could there not be another concealed species with similar signs? The Maharil plainly follows reason rather than such remote possibilities. Moreover, the *Semag* is only additional support for his earlier statement: "Perhaps the matter will return to its original state; all the more so according to the *Semag*...." The possibility of finding the *chilazon* exists even without the *Semag*; the *Semag* merely adds that it could be found readily.

⁶⁰ See the end of section 19, beginning "This also emerges," where several Rishonim are shown to hold that rediscovery is possible. *Chemdat Shlomo*, *Even HaEzer* 9:23, and Malbim's *Artzot HaChaim*, *HaMeir LaAretz* 9:41, likewise write that the *chilazon* can be discovered in our time.

The Radzyñer Rebbe cites a letter from Rabbi Akiva Yosef Schlesinger, of blessed memory, testifying that Rabbi Yehoshua Leib Diskin and Rabbi Shmuel Salant agreed in principle to the renewal of *tekhelet*. Rabbi Yitzchak Elchanan Spektor's letter likewise indicates that he did not oppose renewing the mitzvah itself; he wrote only that his weakness prevented him from investigating. He even ruled that a person who had been particular to wear it during life should be buried in a *tallit* containing Radzyñ dye.

The *Beit HaLevi*'s words, as transmitted by the Radzyñer Rebbe, also show that the mitzvah can become obligatory without a positive tradition, provided no negative tradition exists. The many leading rabbis who supplied other reasons to reject the cuttlefish likewise never considered annulling a positive commandment merely for lack of tradition where the facts could be determined in other ways.

Yeshu'ot Malko, *Orach Chaim* §3, writes concerning Radzyñ dye: "In truth, if *tekhelet* were clearly available and we knew how it was dyed, it would certainly be proper to take hold of this mitzvah. But we lack complete clarification that this is *tekhelet*." See section 26 below concerning his objection to the dyeing method.

It is reported that the Chazon Ish said of Radzyñ dye: "There is no harm in wearing doubtful *tekhelet*. Had there been even the shadow of a doubt, the great men of that generation would have accepted it" (*Ma'aseh Ish* I, p. 132). Several well-known reports in his name say that we do not wear Radzyñ dye only because it does not possess even the status of a doubt.

⁶¹ One writer says that a towering sage like the Chazon Ish is required in every generation to resolve every uncertainty through the depth of his understanding and holy spirit, and that we now lack such a figure. Even if that were true, would we annul the mitzvah for this reason? Had the *Pe'at HaShulchan* and the Chazon Ish not arisen in their generations to clarify the commandments dependent upon the Land, would we not still have been obligated to fulfill those commandments as best we could?

merchandise of the *chilazon*, *tarit*, and white glass.⁶² It does not speak of the mitzvah being concealed, but of one particular treasure in the Sea of Haifa reserved for the righteous. Although the individual snails cannot remain alive until the future era, their population continues reproducing there.

When the Midrash asks whether the *chilazon* was “available,” it means sufficiently abundant to provide a livelihood. By that time it had already declined greatly from the period when Zevulun’s blessing was fulfilled and his people supported themselves from it. Rabbi David Pardo gives a similar explanation in *Sifrei Devei Rav*.

The decisive proof is that *tekhelet* remained in use for centuries after Rabbi Yose’s generation, through the end of the Amoraic era.⁶³ The Vilna Gaon’s commentary likewise explains the *Sifrei* in this way.⁶⁵

Only Devarim Rabbah and Tanchuma, completed in the period of the Savoraim or the succeeding Geonim, mention the concealment of *tekhelet*.⁶⁶ Neither says that it would remain hidden until the messianic future. Their language does not imply that it was deliberately hidden or removed miraculously, but merely that the Cause of all causes brought circumstances about in this fashion.

It may have happened through excessive harvesting: the species steadily declined until it could no longer be found. A large number of snails is required for each dyeing—approximately seven snails for a single thread twisted from eight strands and one and a half meters long—so capture in sufficient quantity eventually became impossible. The wording is exact: “*tekhelet* was

⁶² The *Sifrei* states: “‘For they will draw from the abundance of the seas’—this is the Sea of Haifa, which is stored for the righteous in the future. From where do you say that there is no ship lost in the Great Sea, nor bundle of silver or gold, precious stones and pearls, glassware, or any precious object, that the Great Sea does not cast into the Sea of Haifa, which is stored for the righteous in the future? Scripture therefore says, ‘For they will draw from the abundance of the seas.’”

“Rabbi Yose said: Once I was traveling from Cheziv to Tyre and met an old man. I asked him, ‘From what do you earn your livelihood?’ He replied, ‘From the *chilazon*.’ I asked, ‘Is it available?’ He answered, ‘By Heaven, there is a place in the sea where it lies in the mountains; sea monsters surround it, and every person who goes there is bitten by the monsters, dies, and decomposes in his place.’ I said: ‘It is evident that it is stored for the righteous in the future.’”

“‘And the hidden treasures of the sand’: ‘hidden’ is the *chilazon*; ‘treasures’ is *tarit*; ‘sand’ is glass. For the tribe of Zevulun complained before the Omnipresent: ‘Master of the universe, You gave my brothers lands, but gave me seas; You gave my brothers fields and vineyards, but gave me the *chilazon*.’ He replied, ‘In the end I will make them dependent upon you through this *chilazon*.’ Zevulun said, ‘Master of the universe, who will inform me?’ He replied, ‘Let this be your sign: anyone who steals from you will gain nothing from his merchandise.’”

⁶³ Rabbi Yose lived in the generation after the Temple’s destruction. Ravina died in the year 811 of the Seleucid era, 431 years after the destruction.

⁶⁴ See Chullin 95b, concerning Rabbi Natan bar Abaye, and Menachot 42b, concerning Abaye’s question to Rav Shmuel bar Yehudah. It is exceedingly unlikely that *chilazon* secretion had been stored for centuries and survived every upheaval. Use continued until the Savoraic period, when Mar of Mashki brought *tekhelet* in Rav Achai’s time. Some identify this Rav Achai with Rav Achai Gaon; others place him among the last Amoraim.

⁶⁵ In giving the source for the Shulchan Aruch’s phrase, “today, when *tekhelet* is unavailable,” the Vilna Gaon cites Midrash Rabbah to *Shelach* but not the earlier *Sifrei*, although he normally gives the earliest source. The *Sifrei* evidently supplies no proof, because, as explained, it addresses a different subject.

⁶⁶ Although Rabbi Tanchuma lived in the middle Amoraic period, the surviving Midrash contains later material and therefore was not completed until the Savoraic era. The Chida already writes in *Shem HaGedolim*, as does *Seder HaDorot*, that our Tanchuma is not the Midrash Tanchuma cited by the Rishonim but the work called *Yelamdenu*. In *Mar’it HaAyin* to Menachot 43a, the Chida writes that it incorporates material from several later Midrashim and even statements of the Geonim.

concealed,” not “the *chilazon* was concealed.” Dye production ceased; the animal itself did not necessarily disappear.

The concealment may also have resulted from imperial decrees in those generations restricting *Purpura* dye to the monarchy. Rome then controlled the entire Mediterranean region, the creature’s habitat and the center of dyeing expertise. See Sanhedrin 12a and section 24 below, beginning “Indeed, explicitly.” Even after the decrees ended, the creature’s identity or the craft had already been forgotten. This explanation likewise fits the wording “*tekhelet* was concealed,” rather than “the *chilazon*.”

None of this is essential, however, because no source says when the concealment must end. The dye will certainly be rediscovered by the rebuilding of the Third Temple, speedily in our days, since it is required for the priestly garments. No Midrash says that only King Messiah may reveal it. On what basis may we invent that condition, especially when several Rishonim cited above hold that it can be found?⁶⁷

22. The Words of the Arizal

Question: The Arizal appears to say that *tekhelet* does not apply when the Temple does not stand (*Pri Etz Chaim*, Gate of *Tzitzit*, chapter 5). At minimum, this proves that it cannot be rediscovered.

Answer: *Tekhelet* was certainly worn after the destruction, as is clear throughout the Talmud; see note 64. It is therefore not limited to the Temple era. One cannot say that the Arizal reasoned that it would be impossible only in some later era; just as it existed in the Amoraic period after the destruction, it may exist at another time. The Arizal was explaining the reason

⁶⁷ *Etz Yosef* to Midrash Rabbah, in the new Vagshal edition, explains “concealed” as “forgotten,” based on Rashi to Pesachim 62b, s.v. *nignaz*, who says “forgotten.” The phrase “*tekhelet* was concealed” does not appear to refer to the *chilazon* itself; otherwise the Midrash should have said “the *chilazon* was concealed.” “*Tekhelet* was concealed” more naturally indicates an impediment to dyeing, while the Midrash provides no basis for saying that the animal itself disappeared.

The *Sifrei* cited above explicitly uses “stored” for a treasure of living snails that remained in use but was difficult to access. “Concealed” can mean guarded or reserved for the righteous, as Targum Yonatan translates “that your fathers stored” in II Kings 20:17.

Some cite Ramban to *Tetzaveh*, beginning “for glory and splendor,” as implying that *tekhelet* still existed in his era. If so, he necessarily understood “concealed” to mean greatly diminished or the like. In my opinion, however, he refers there only to the *tekhelet* color generally, not necessarily dye from the *chilazon*. Yet his wording in *Milchamot Hashem* to Shabbat 12a in the pages of the Rif—“now, in these places, where there is no *tekhelet*”—implies that *tekhelet* might exist elsewhere even in his time.

Rambam, *Laws of Tzitzit* 2:9, similarly writes that it is not found in every place or every era, implying that he did not understand the Midrash as declaring it absolutely impossible for it to be found today. *Sefer HaChinuch*, mitzvah 386, says, “For many days in Israel we have not heard of anyone who merited *tekhelet* in his *tallit*.” This wording likewise implies that the event is not impossible today; the *tekhelet*’s concealment is not like that of the Ark.

The Maharil says it may readily be rediscovered, and the same is implied by every Rishon who records its identifying features; they surely did not write at length for no purpose. They understood “concealed” as a condition that does not prevent future rediscovery. The phrase does not mean that the order of creation changed, the creature’s nature was transformed, or its habitat moved. Radbaz II:685 writes instead: “It may exist today, but people do not recognize it or do not know how to trap it.” A natural cause—the difficulty of trapping it after the population declined, or the loss of the dyeing method—made its identity unknown. When that cause changes, it can emerge from concealment.

for an existing historical reality,⁶⁸ not establishing a new law. His words may be understood in several ways.⁶⁹

23. The Requirement That the Threads Be of the Same Kind as the Corner

Question: If the identification is not certain, wearing this dye may sacrifice the stringency recorded in Shulchan Aruch, *Orach Chaim* §9: “Some say that the *tzitzit* should be the color of the *tallit*, and the meticulous follow this practice.”

Answer: The halachic authorities write that this rule does not apply to white threads serving in place of *tekhelet*.⁷⁰ In any event, a voluntary stringency certainly cannot uproot a law, even if the obligation to wear *tekhelet* arose only from doubt concerning a Torah commandment.

⁶⁸ It is obvious that the Arizal did not create a new law. Even concerning a prophet, the Sages say, “These are the commandments”—a prophet may not innovate anything from now on” (Shabbat 104a and elsewhere).

Some interpret the verse “throughout their generations” to mean that only the white threads apply in every generation, while *tekhelet* applies only in the Temple era. We do not create legal derivations absent from the words of the Sages. *Or HaChaim* to Numbers 15:38 presents this only as an allusion to the rabbinic rule that the absence of *tekhelet* does not prevent fulfillment with white: “It says ‘throughout their generations’ before mentioning *tekhelet*, to say that white is for all generations, but when *tekhelet* is unavailable there is no obligation in it.” He does not say that it applies only in the Temple era, but that when unavailable it cannot be obligatory, as the Mishnah teaches.

Rabbi Moshe Najara, a student of the Arizal, similarly explains “throughout their generations” in *Lekach Tov to Shelach*. This is not a legal derivation but an allusion that in the future the mitzvah would become impossible, as indeed it went unpracticed for many generations. The Arizal explained the spiritual reason for that historical condition: the absence of the Temple accounts for the reality.

⁶⁹ One possible reconciliation is that the Arizal’s reason is that the light of *Chochmah* does not shine upon *Malchut*. In the Talmudic period, some light of *Chochmah* may still have remained after the sun set with the Temple’s destruction and had not yet ceased entirely. From the year 5600, when the light of *Chochmah* began to shine again, as stated in Zohar, *Vayera* 117a, “in the six-hundredth year...,” *tekhelet* could likewise return.

A similar teaching is transmitted in the name of Rabbi Shimshon of Ostropol, of blessed memory, in the book *Machaneh Dan* among the Radzyń Chasidim. See *Beit Aharon VeYisrael*, Sivan–Tammuz, issue 68, and *Lula’ot Tekhelet*, p. 48.

⁷⁰ *Yam Shel Shlomo*, Yevamot, chapter 1 §3; *Artzot HaChaim*, *Orach Chaim* 9:5; and Chazon Ish §3:25 write that the requirement of the corner’s color does not apply to threads serving in place of *tekhelet*. This is also explicit to anyone who examines *Mishnah Berurah* 9:14. If anyone holds that these two threads possess every law of white threads, he must hold that “the kind of the corner” does not refer to color, as indicated by the Talmud’s expression, “Let it be no more than white.” Rema rules that the practice of matching color was not adopted.

See also *Yeshe’ot Malko*, responsum 1, which says that wearing doubtful *tekhelet* involves no prohibition. It is likewise known that numerous leading sages did not fear this issue even with Radzyń dye: the Maharsham; reports concerning Rabbi Yosef Shlomo Kahaneman of Ponevezh; the statement of the Chazon Ish in note 60; and others. Rabbi Yosef Shalom Elyashiv agreed orally in a response to Rabbi Moshe Mordechai Karp, *shlita*.

Those who follow Tosafot’s number of threads might perhaps have room for stringency—if this were merely an optional stringency—because according to the Rambam and Raavad they lose the “kind of the corner” requirement by placing *tekhelet* even in threads counted as white.

Since the Talmud’s expression “Let it be no more than white” is under discussion, the same passage also proves that *bal tosif*, adding to a commandment, is no concern when threads are dyed a color other than *tekhelet*, even if they are placed for the sake of the mitzvah.

“With Its Blood One Dyes Tekhelet”

The Sources on Producing *Tekhelet* from the *Purpura*

24. Non-Jewish Writers on *Tekhelet*

A fact visible to the eyes needs no proof. Everyone can see that the secretion of this *Purpura* produces the color of *tekhelet*. It is impossible to say that ancient people who knew and used the creature were unaware of this property, as will be explained at length.

Non-Jewish writers nevertheless provide further support.⁷¹ One must understand that these authors were not attempting to describe the appearance of *tekhelet* and *argaman*, which were familiar in their time. They described the production methods and the nature of the snails from which the dyes were obtained, using the established names of *Purpura* colorants. Their words occasionally allow the hue itself to be inferred.

Aristotle does not enumerate the colors produced from the snails. He says generally that *Purpura* blood contains two kinds of color, one red and the other *melan*. See section 17, beginning “Rabbi Isaac Herzog,” and the note there.

Pliny describes two types of snails used for two kinds of dye. The *buccinum*, or trumpet—the red-mouthed rock shell—lived on rocks and produced *purpur*, meaning *argaman*. The second, called *pelagia*, comprised several species. One was the “stone murex,” found among underwater rocks, from which *conchylia* was produced. Some translators expressly identify *conchylia* as *tekhelet*. Bochart did so four hundred years ago on the basis of extensive evidence from Pliny’s works, and other translators agree. *Conchylia* was far more expensive and durable than *buccinum* dye and used different additives.

Elsewhere, Pliny says that one shade produced from the marine *pelagia Purpura*—a group including *trunculus*, the blunt-spined “stone murex,” as well as the spiny dye-murex—resembled the heliotrope flower. In another passage he describes that flower as *caeruleum*, the color of the heavens.

Elsewhere again, he compares the dye’s color to a stormy sea. He may have chosen this image because people endangered themselves at sea to capture the snail; Pliny frequently uses rhetorical language to criticize the pursuit of luxuries at the cost of human life. He makes a similar comparison for the hyacinth stone. As explained below, hyacinth is the color of *tekhelet*; see also the end of note 73. Pliny also records several degrees of brightness in this dye.

By mixing the two colors—red and blue—dyers produced a shade resembling amethyst, namely purple, though it was inferior in quality to *conchylia* itself. This too suggests that *conchylia* was blue, since purple is a mixture of red and blue. It is possible that *Murex trunculus* was commonly

⁷¹ The sources in this section are taken from *Lula’ot Tekhelet*, pp. 107, 233–35, and 263–68, which translates them extensively and gives references to the original works. I also used Dr. Meir Sass’s Latin translation, first published in *Yam*, a journal of maritime affairs of the Israel Maritime League, November 1962. That translation was unrelated to the modern restoration of *tekhelet* and renders every instance of the term translated here as *conchylia* as *tekhelet*.

used only for blue, with purple produced by mixing other snail species. Perhaps purple from *trunculus* was avoided because it faded very readily.

Scripture itself shows that *tekhelet* and *argaman* were two colors widely used among the nations, and it is reasonable to identify them with the dyes under discussion. Today as well, the simplest natural process yields the corresponding colors from *Purpura*: blue and red. It would be perverse to say that the ancient writers referred to some forgotten dye within the broad family of dark colors—among which *tekhelet* was classified, as explained above—while the dyes now rediscovered correspond exactly to the colors mentioned in the Torah: *tekhelet* produced simply from that very snail, itself a “dark” color, and *argaman*, red, yet the ancient scholars supposedly knew nothing of them.

The conclusion becomes still stronger after establishing that *tekhelet* was famous and important among the nations; that it was trapped and dyed in the region those authors describe; and that their subject is precisely the region’s snail dyes. It is impossible that this principal dye is absent from every book devoted to the subject.

Vitruvius likewise writes that the color of the secretion varies by location. In one region it is *lividum*, which translators render blue.⁷² It must therefore have been used to dye blue: when the secretion’s active colorant is blue, that is the hue it produces. Even today, snails differ in the concentration of the blue-producing substance they contain.

The Roman imperial code expressly records *tekhelet* dyeing from *Purpura*:

No private person shall have the right to unravel or sell the fertile Purpura, whether in silk or in wool, called blatta [argaman], oxyblatta [bright argaman], and also hyacinthina. If anyone nevertheless sells a fleece of the aforesaid murex, let him know that his property and his head will immediately be placed in jeopardy.

This appears in *Codex Justinianus* 4.40.1, a law from the end of the Amoraic period. *Hyacinthina* is the color of *tekhelet*, as the Septuagint translates *tekhelet*. Josephus and Philo likewise call *tekhelet* *hyacinthos*. The *Arukh* cites the same term from Aquila’s translation; see entries *airinon* and *tayinon*.⁷³

⁷² This is the translators’ rendering. I searched for the word and found it used as the name of a certain scorpion whose color is *tekhelet* blue.

⁷³ One pamphlet attempts to question the authority of these translations, but authority is irrelevant here. The translators were not attempting to prove that *Purpura* was *tekhelet*; they spoke incidentally and lived while *tekhelet* was still visible. It is impossible that they all distorted their sources and coincidentally chose the same terms used by non-Jewish writers for the snail-derived dye, or that scribal errors in every passage just happened to produce this terminology.

The modern hyacinth flower appears in shades of blue and blue-purple. The supplement to the *Arukh*, entry *hyacinth*, says it is a *tekhelet*-colored flower, and Hebrew dictionaries describe it as blue, as do many other sources. I have read that differently colored forms are cultivated varieties of the eastern hyacinth, human cultivation beginning only in the sixteenth century; they were called hyacinths for their origin, which may explain the prevalence of purple today. Ancient terminology may not have distinguished blue-purple from sky blue and may have called both “hyacinth.”

There is no necessity to assume that the color was named for the flower rather than the flower being named for the color. *Hyacinth* is also the name of a precious stone that may have had this hue; see the *Arukh*, entry *hyacinth*. *Machzor Vitry* §287 cites a Midrash comparing the Ten Commandments to precious stones and calls them *hyacinthia*, apparently because the Tablets were made of *sappirinum*; see *Yalkut Shimoni*, *Ki Tissa* §392. This is sapphire, as Tosafot to Sukkah 52b, s.v. *im barzel*, explains and as Psalms Rabbah 87 and many other sources state, and sapphire is said to resemble *tekhelet*.

All the later Jewish authorities cited above, whose sources were apparently the works of non-Jewish writers and who understood foreign languages, interpreted them as discussing the *chilazon* from which *tekhelet* was dyed. Who can deny their straightforward reading in the absence of any contradiction or difficulty? All held that *tekhelet* was blue, as is clear elsewhere in *Shiltei HaGibborim* and in the supplement to the *Arukh*, which itself defines *porphyra* as a *tekhelet* garment. Only the *Chavot Yair* added that the secretion was *purpur* in color. As explained in note 18, he may have referred only to the raw secretion rather than the color produced on wool. In any event, he too understood the ancient sources as saying that this *Purpura* produced *tekhelet*.

Archaeological evidence confirms the same conclusion. An extremely ancient blue textile has been tested in a laboratory and found to contain *Purpura* dye. Although the active dye molecule is the same indigo found in *kala ilan*, snail dye also contains minute bromine residues absent from plant indigo.

This lengthy discussion is unnecessary. We can see that no special additive is required to turn the purple secretion blue. Once it has been reduced, exposure to sunlight alone makes it blue. Even ordinary daylight indoors turns a small quantity blue after several hours. Ancient dyeing, according to their own descriptions, took several days. Blue can also be produced by heating the vat during reduction or by exposure to steam afterward. Since ancient dyers knew all the additives needed to reduce the secretion—without reduction even purple cannot properly dye wool—it is difficult to say they did not know that blue could also be produced.⁷⁴ Their work appears to have been performed outdoors, so nothing special would have been required; see section 27, subsection B.

The modern rediscovery itself occurred accidentally, not through experiments specifically directed toward obtaining blue. It took time because the substance was no longer used for dyeing but only in closed laboratories under limited conditions. Modern reagents act quickly, so

⁷⁴ One pamphlet argues that ancient dyers did not use reduction—meaning dissolution of the colorant—and therefore the secretion did not turn blue for them. This is physically impossible. See Professor Elsner's statement in *HaTekhelet*, p. 301. Without reduction, the substance remains merely an external stain, is not absorbed by the wool, and yields a poor result. The only exception would be applying secretion directly from the animal to the wool, which requires no additives and will ordinarily turn blue when the secretion or wool is heated. The sources expressly say, however, that they dyed in a vat of *chilazon* secretion rather than directly from the animal. Ancient textiles dyed with snail secretion were necessarily produced through reduction, and the staining patterns on archaeological pottery corroborate this.

Pliny writes that the secretion was mixed with water. Without reduction, mixing with water would accomplish nothing because the colorant is insoluble. He also says that a large quantity of urine was added and the mixture cooked and heated for ten days. If they dyed without reduction, none of this would be necessary; they would merely clean the secretion of flesh and smear it on the wool.

Reduction is not a new discovery by modern *chilazon* dyers. They themselves used ancient knowledge preserved in indigo dyeing to create reducing conditions. Without reduction, a second dye bath would not be paler; that decline results from the lower concentration of colorant remaining in the water. See section 9, subsection D.

The objection that continuous boiling under reducing conditions would always turn the dye blue, making purple impossible, is likewise unfounded. Purple can be produced in a more durable manner, though this is not the place for a technical explanation. More importantly, rabbinic sources never say that this creature was used to produce purple. *Argaman* is not purple but red; the bluish purple of the blunt-spined murex does not resemble red at all. Onkelos translates "He washes his garment in wine" (Genesis 49:11): "His garment shall be fine *argavan*." See also *Pesikta Rabbati* §20, *Matan Torah*, and *Bereishit Rabbati*, *Vayechi*, p. 239: "When Messiah comes, he will wear fine *argaman*, beautiful and resembling wine." *Argaman* was produced from the other snail species. Pliny mentions amethyst purple but says that it was made by mixing two species.

experimenters did not allow the mixtures to stand as long as ancient dye baths. Even today, natural purple dyers take care to exclude sunlight from the vat so that it will not turn blue.

The name *Purpura* was applied both to the creature and to *argaman* perhaps because red was its most common product. *Tekhelet* could also be obtained from plant indigo, and *argaman* may have been the more important *Purpura* dye; Bamidbar Rabbah 12 calls *argaman* the most important of the materials. Nevertheless, *purpur* terminology was also applied to *tekhelet*. See the supplement to the *Arukh*, entry *porphyra*; the German gloss to the *Arukh*, entry *tekhelet*; and note 25 above concerning the Septuagint's translation of *kelil tekhelet* as *holoporphiros*.

The isolated pottery fragments remaining from dye houses bear purple stains. This is no objection; it provides additional evidence that *Purpura* was the *chilazon* of *tekhelet*. Otherwise, why are no remains of *tekhelet* dyeing found? If *tekhelet* was *Purpura*, the result is expected: the pottery retains purple rather than blue stains. The vessels were used from the beginning of the process, when the secretion was purple; modern *tekhelet* dyers likewise find that most stains on their equipment are purple. In the dye vat itself, the reduced liquid is yellow or clear and leaves no blue stain. Most stains predate reduction, when the material was purple, or occur in the oxygenated upper layer of the vat, where the secretion is not reduced.

25. The Omission of the Source of *Argaman* from Rabbinic Literature

Question: Why did the Sages not state that the *chilazon* of *tekhelet* was the snail used for *argaman*?

Answer: Although not a proof, Ezekiel 27:7 offers an allusion that *tekhelet* and *argaman* came from one source, for both are said to come from the islands of Elishah. The passage similarly lists linen from Egypt, oaks from Bashan, and so forth. It plainly identifies the finest source of each commodity rather than saying that these materials existed nowhere else.

Rabbinic literature does not discuss the source of *argaman* at all. The Septuagint, Philo of Alexandria, Josephus, and non-Jewish scholars imply that it too came from a snail. A Midrash reproduced in *Tosafot HaShalem* to Genesis 49:13 carries a similar implication.

The Sages apparently had no reason to discuss the source of *argaman*, because it made no legal difference. The Tosefta implies that any dye is valid for priestly garments: it expressly requires *tekhelet* from the *chilazon* but says nothing comparable concerning *argaman*.

Rambam, *Laws of the Temple Vessels* 8:13, has the same implication; see *Mishneh LaMelech* there. The Rambam describes *argaman* as *lak* without mentioning the snail, though neither point has an explicit rabbinic source.

Alternatively, *argaman* may have been obtainable only from a snail and lacked a plant substitute comparable to indigo for *tekhelet*. In any event, rabbinic silence presents no difficulty, since the Sages never state at all that *argaman* came from a snail, while Jewish and non-Jewish historians do.

One who wishes to say that *argaman* did not come from a snail may do so and has considerable support from several Rishonim. That position creates no difficulty whatsoever for identifying *Purpura* as the *chilazon* of *tekhelet*.

More fundamentally, *Murex trunculus*, the blunt-spined murex, produces *tekhelet* alone, not *argaman*. This may be the purpose of the baraita's phrase "with its blood one dyes *tekhelet*": to distinguish the snail customarily used for *tekhelet* from the spiny dye-murex and red-mouthed rock shell, whose dye was *argaman*. There is no reason to say that only one species is halachically valid, since the blue colorant in all is indigo; *trunculus* simply contains much indigo and the others more bromine.

The Dyeing Method and Its Additives

26. "How Do You Dye This Tekhelet?"

Question: Rabbi Yosef Shalom Elyashiv, of blessed memory, cites the *Yeshu'ot Malko* as saying that the Rishonim disagree whether the additives were mixed into the vat or applied only to the wool. How can the dispute be resolved today? More generally, how do we know which additives *tekhelet* requires?

Answer: This objection concerned the cuttlefish discussed by the *Yeshu'ot Malko*, not the *Purpura*, as will be explained.

Menachot 42b states:

Abaye said to Rav Shmuel son of Rav Yehudah: "How do you dye this tekhelet?" He replied: "We bring the blood of the chilazon and additives, place them in a vat, and boil it."

Rashi comments: "As dyers do, soaking it in *tzarif*," following the text of Tosafot and *Tzon Kodashim*. Tosafot asks:

It is astonishing: how could any other substance be mixed with tekhelet? Perhaps the material together with the additives is called tekhelet. In the commentary [Rashi] explained: to soak [the wool] in them as dyers do, soaking it in tzarif.

One may ask whether, according to Rashi, the additives must be a substance that does not impart any color, so that *tzarif* is merely an auxiliary reducing agent; or whether Rashi too permits the additives to contribute color, in which case *tzarif* would itself be a colorant. The passage continues on the next page.

Tosafot's own view clearly permits the additives to contribute color.⁷⁵ In either interpretation, no source establishes which additives may be used. Even according to Tosafot, the final result must of course remain the hue of *tekhelet* rather than changing to another color.⁷⁶

⁷⁵ Rashi to Ketubot 79b writes: "A mine of *tzarif*—alum in the vernacular—with which they dye garments and silk." It is uncertain whether he means that alum assists dyeing or itself serves as a colorant. Rabbenu Bachya to Numbers 15:38 writes: "They first soak the wool in lime, then wash it until clean, and place the blood and the wool in a boiling vat with additives such as *ohel* and *tzarif*, in the manner of dyers, so that the wool will absorb the color." This *tzarif* helps the wool absorb the color, and it is placed in the vat. The Rishonim surely do not disagree about the ordinary practice of dyers. The *Yeshu'ot Malko*'s interpretation—that Tosafot understood Rashi to apply *tzarif* only to the wool and not place it in the vat with the dye—therefore cannot be correct.

⁷⁶ Rashi evidently holds that the wool's *tekhelet* hue comes only from the *chilazon* and not from the additives, as the *Yeshu'ot Malko* understood him. Rashi to Chullin 89a writes, "The appearance of its blood resembles the sea." His source is apparently the familiar statement that *tekhelet* itself resembles the sea. The secretion and the finished *tekhelet* therefore have the same hue; the additives do not alter it.

The Rambam, *Laws of Tzitzit* 2:2, writes: “The blood is placed in a vat, and additives such as *kamonya* and the like are placed with it, in the manner of dyers.” He does not specify the additives. His language implies that any substances ordinarily used by dyers are permitted, because their function is merely to bind the dye and the precise production method is immaterial.

The present *chilazon* accords with every position—Rashi, Tosafot, and the Rambam—because the additives do not contribute color. They only assist in dissolving or reducing the secretion and do not remain in the wool. This differs from other dyes in which traces of the additives remain. Their species and the exact method are therefore plainly irrelevant.

The *Yeshu’ot Malko* says that Tosafot understood Rashi to place the additives only upon the garment and not in the vat. This is difficult, for the Talmud expressly says, “We bring the blood of the *chilazon* and additives and place *them* in the vat.” Even under his reading of Tosafot, however, the conclusion is unnecessary. The additives may be placed in the vat, as Rabbeinu Bachya says in note 75, while still serving only to help the wool absorb the color rather than to supply color themselves.

The *Yeshu’ot Malko* was apparently led to this interpretation by a version of Rashi reading, “It is the practice of dyers to soak garments in *tzarif*,” which sounded as though only the garment, not the dye, was soaked. Tosafot’s text of Rashi actually reads, “as dyers soak *it* in *tzarif*,” meaning with the dye, as *Tzon Kodashim* emends the text.

In any event, the *Yeshu’ot Malko* himself explains that additives must not be present in the vat because Tosafot require that the color contain nothing in addition to the blood of the *chilazon*. *Purpura* dye therefore satisfies every view: its additives do not supply color but only enable the snail colorant to bind to wool. His entire discussion concerns the cuttlefish dye, whose hue is created by the additives.

27. Placing the Vat in the Sun

Question: Menachot 42b does not mention placing the dye in sunlight.

Answer:

First, a small quantity will become blue even without being placed outdoors; daylight within a room suffices, although the change takes longer. Greek sources already say that the dyeing process lasted several days. It has recently been established that blue can also be produced by boiling the vat over a fire during reduction. Ordinarily, washing the wool afterward in boiling water—or even exposing it merely to steam—also turns it blue. Dyers therefore needed special measures to produce purple, not blue *tekhelet*.

This may be Rav Shmuel bar Yehudah’s novelty in describing the process: the secretion must be boiled with the additives. Abaye may have found this puzzling because it differs from dyeing with *kala ilan*, which requires no boiling because it contains no red component that must be removed.

Second, Strabo describes the terrible odor in Tyre caused by dyeing, indicating that ancient workshops operated outdoors. They therefore always had sunlight even without deliberately seeking it. I have also heard that excavated dye houses appear to have worked under the open sky.

Third, the Talmud plainly did not intend to teach professional dyers the entire craft. It does not state which additives were used, since, as explained above, the identity of the additive is not indispensable; only the final hue matters. It therefore had no reason to mention sunlight either. The Talmud discussed some particular legal point—perhaps sampling the vat, using additives, or, as suggested above, boiling rather than merely warming it as with *kala ilan*. Abaye's question may have concerned the special laws that must be observed in the dyeing process, as the passage's conclusion, "Learn three things from this," suggests.

Notes on Several Talmudic Discussions

28. "One Who Traps a Chilazon"

Question: Shabbat 75a says, "One who traps a *chilazon* and one who wounds it is liable for two [prohibited labors]." The Talmud explains that the liabilities are for trapping and threshing, not ordinary wounding. *Purpura* ordinarily remains in place and does not move far. It should therefore resemble a lame deer, whose capture is not a prohibited act of trapping (Shabbat 106b).

Answer: Beitzah 24a asks: "What is considered lacking capture? Rav Yosef said in the name of Rav Yehudah in the name of Shmuel: anything for which one would say, 'Bring a trap and let us catch it.'" *Purpura* lives in deep water beyond the reach of an unaided hand. It is camouflaged and difficult to discern and is captured only with bait placed in nets. It therefore falls squarely within "bring a trap and let us catch it."

It does not resemble a disabled deer or domesticated geese and chickens, which remain within a person's control even without further capture. Without trapping, this snail is unavailable for human use. Today it can also be collected by diving, but this ordinarily requires specialized equipment unavailable in antiquity. Even with equipment, one may say that it is not immediately reachable because its camouflage makes it look like the rocks of the sea.

Raavad's commentary to *Sefer Yetzirah* expressly says that the *chilazon* remains in one place. The view that one is nevertheless liable for capturing it must be explained as above.

Rashi goes still further. Concerning the *chometz*, one of the eight *sheratzim*, he writes in Chagigah 11a: "I say that it is a kind of *sheretz* called *limatza*, which grows in a casing that steadily coils as it grows." This is a land snail; a marine *chilazon* is an aquatic *sheretz*, whereas the eight *sheratzim* crawl on land. The Mishnah, Shabbat 107a, says: "One who traps any of the eight *sheratzim* stated in the Torah, or wounds them, is liable." Even a completely exposed land snail is thus subject to trapping, though it is already present and accessible. Rabbi Yosef

Shalom Elyashiv accepted Rashi's view as the principal practical ruling; see *Orchot Shabbat*, chapter 14, note 21.⁷⁷

It must be distinguished from a lame deer. Trapping applies where one deprives an animal of its freedom.⁷⁸ A sick or lame deer has already lost its freedom through illness; further capture adds nothing. A creature living naturally in its normal way is trapped when it is brought into captivity.

This may explain the disagreement between the Babylonian and Jerusalem Talmuds. Tosafot to Shabbat 75a cites the Jerusalem Talmud as exempting one who traps a *chilazon*. They may disagree whether taking a creature that is somewhat stationary is halachically considered trapping. Indeed, the disagreement itself suggests that the creature normally remains fairly still, since it is unlikely that they disputed the physical facts.⁷⁹ This is another sign fulfilled by *Purpura*, which typically remains nearly motionless.

29. "And One Who Wounds It"

Question: According to Rabbi Yehudah in Shabbat 75a, one who opens the *chilazon* is liable for *mefarek*, extracting. The minimum quantity for *mefarek* is the volume of a dried fig, while this *chilazon* contains less dye than that.

Answer: This question arises only according to the Rambam, who gives a dried fig as the minimum quantity for drawing blood. *Kesef Mishneh* to *Laws of Shabbat* 8:7 explains that even for the Rambam the dried-fig measure applies only to blood fit to be used as food—for example, where one wounds an animal because he needs the blood for his dog. That measure applies to foods, not dyes.

Many later authorities cite Rabbi Mordechai Banet, *Magen Avot*, s.v. *ha-shochato*, to answer a different question against the Rambam: circumcision involves far less blood than a dried fig, yet

⁷⁷ Raavad, *Laws of Festivals* 2:7, holds that even fish in a small enclosure are not considered captured because they are hidden beneath the water. *Avnei Nezer, Eglei Tal, Borer* §11, writes: "Going still further, perhaps one who takes dead fish from a river is liable for trapping." All the more so here, where the animal can move and is hidden by a form and color resembling sea rocks. Tosafot Rid to Chagigah 11a disagrees with Rashi, so according to him a land snail may be distinguished from the present creature as explained above.

⁷⁸ *Bi'ur Halachah* §316 observes that *Beit Yosef* appears to understand Rabbenu Chananel as making one liable for capturing a deer immobilized by exhaustion, even though it cannot move from its place. He asks why this differs from a lame deer, which cannot escape. Future recovery cannot be the distinction, since Shabbat 106b exempts one who traps grasshoppers when they are immobilized by dew.

I heard the following resolution in Rabbi Moshe Mordechai Karp's name: trapping can apply to an animal in its natural condition even if it presently cannot flee. Only when a change from its natural condition has already occurred is it considered captured. Ordinary exhaustion is more part of the deer's natural life than dew-induced immobilization is for a grasshopper, or illness for a deer.

This does not appear consistent with Rabbi Elazar ben Mahavai, who says that during a dry wind one is exempt for capturing grasshoppers when they come in swarms because capture is then easy, even though the grasshoppers live in their normal fashion. Rabbenu Chananel, however, explains "swarming" to mean that they have been struck by the wind. They may therefore be considered already captured because they lack their natural strength.

⁷⁹ Some ask: since the *chilazon* was caught with a net, the person should be liable only if the animal entered the net at the moment it was spread, as Tosafot to Shabbat 17b explains. That is not ordinarily how *Purpura* is captured. The objection has no substance. Tosafot discusses a net left in place and an animal remaining caught within it. Where trapping is accomplished by hauling the net from the sea, that act itself completes capture; until removal, the animal is not fully trapped. The case may also be one in which the *chilazon* is caught by hand. Finally, Tosafot's question rests upon uncertainty whether an animal will enter the net. Where capture is certain, as is common when a *Purpura* net is placed in a location populated by the snails, one may be liable even when the trap is first spread.

a verse is needed to permit it on Shabbat. Rabbi Banet answers that because of the mitzvah's importance, a smaller quantity is significant. The *chilazon's* dye blood may likewise be important; regarding carrying on Shabbat, any amount of *argaman* is significant (Shabbat 90a). Rabbi Banet himself suggests that the *chilazon* case specifically involves less than a dried fig and uses this to resolve another difficulty in the passage. See the end of his discussion.

See note 12 above concerning the Talmudic discussion of an inevitable result that the worker does not desire when opening the *chilazon*.

30. "From That Which Is Permitted to Your Mouth"

Question: How was *tekhelet* permitted in the Tabernacle? Shabbat 28a says that only the hide of a kosher animal was acceptable for the work of Heaven. *Purpura* is a non-kosher aquatic *sheretz*.

Answer: This difficulty is not unique to identifying *Purpura*. The Rishonim expressly call the *chilazon* a *tolaas*: Rashi to Sanhedrin 91a; Raavyah, Shabbat §194; Rash and Raavad to *Torat Kohanim*, Metzora 1:14. Ritva to Shabbat 75a quotes Raah and Ramban: "The *chilazon* is different, for it lacks limbs and has a sealed body like the snails found in refuse." All these sources imply that it has no fins or scales and is not kosher. Bekhorot 38b likewise implies that a *chilazon* is snake-like; see Rashi to Leviticus 21:20.

The same question applies to *argaman*, whether it came from *Purpura* or, according to the Rambam's commentary to Mishnah Kilayim 9:1, was wool dyed with *lak*, produced by the familiar Indian insect *Laccifer lacca*. It applies equally to scarlet, which is certainly produced by a known insect. The Rambam identifies it as *kermes*, as do Rash and Raavad to *Torat Kohanim* and others. Rabbenu Bachya says dye is made from grains containing the insect rather than from the insect's body; today it is known that these "grains" are the mother scale insects themselves, which are also forbidden *sheratzim*. Rabbi Yitzchak Abarbanel to Exodus 21:1–9 likewise writes that scarlet comes from actual *tolaasim*.

Later authorities explain that the rule applies only to hide, which constitutes the main material. A mere appearance of color has no independent substance. See *Noda BiYehudah*, second edition, *Orach Chaim* §3; *Chatam Sofer*, *Yoreh De'ah* II:276; and *Sha'arei Teshuvah* 33:5. The baraita itself says, "Only the hide of a kosher animal was acceptable," emphasizing hide. Tosafot and Rashba there likewise infer this and ask about hair, which the Talmud also discusses. Rashi answers that hair is also treated as hide; see Rashi to Shabbat 28a, s.v. *ela le-nikrachot*.

One may also ask whether the separately stored *chilazon* secretion resembles donkey urine, which is permitted, because it is not actually part of the animal's body but a mere excretion. Even actual *sheretz* blood requires a special verse to include it in the prohibition, and one may question whether the *chilazon's* dye secretion has the full legal status of blood for this purpose. *Even HaAzel*, *Laws of the Temple Vessels* 1:3, makes this point.⁸⁰

⁸⁰ One certainly cannot object more generally that a mitzvah may not be made from a non-kosher substance. Silk threads are unquestionably valid as *tzitzit* on silk garments, as Menachot 39a states.

31. “The Sea of Kinneret, from Which Tekhelet Comes” (Zohar)

Question: The Zohar says that the *chilazon* ascends from the Sea of Kinneret, as do the writings of the Arizal. *Purpura*, however, is caught in Zevulun’s territory in the Great Sea and elsewhere in the Mediterranean. Although failure to observe it in Kinneret is not proof—no other candidate has been found there either—Aristotle says that *Purpura* lives only in salt water, while Kinneret is fresh. It is implausible that the creature lived in Kinneret contrary to its nature everywhere else.

Answer: Rabbi Moshe Cordovero already found the Zohar’s words difficult because he took it as clear that the *chilazon* lived in the Great Sea. Rabbinic literature repeatedly implies this:

- It is found from the ladders of Tyre to Haifa (Shabbat 26a).
- *Sifrei, VeZot HaBerachah* §354, places it in the Sea of Haifa; another version reads Jaffa, and the passage also implies it was found between Akko and Cheziv.
- Megillah 6a says that Zevulun received the *chilazon* in his territory as an advantage not possessed by Naphtali: everyone needed Zevulun because of the *chilazon*. Kinneret, however, lay in Naphtali’s territory, and the other tribes could also fish there, for “all may spread nets in the Sea of Tiberias” (Bava Kamma 81a).
- The Zohar itself says that Kinneret was in Zevulun’s territory, while the Babylonian Talmud, Bava Kamma 81b, and the Book of Joshua place it in Naphtali’s.

Rabbi Moshe Cordovero therefore explains that the Zohar does not refer to the physical Sea of Kinneret, but to the sefirah of *Malchut*, called the Sea of Kinneret.⁸¹

⁸¹ The Chida agrees and rejects Rabbi Moshe Zacuto’s disagreement with Rabbi Moshe Cordovero. He writes in *Nachal Kedumim, Terumah*: “All this escaped the eyes of the great Rabbi Moshe Zacuto, who rejected Rabbi Moshe Cordovero’s statement that the *chilazon* is in the Great Sea and wrote that it was in the Sea of Kinneret; he did not recall the *Sifrei, Pesikta*, and Rambam. This is not the place to elaborate.” The Chida certainly did not intend to disagree with the Arizal, whom Rabbi Moshe Zacuto cites, but understood the Arizal as speaking in the same conceptual terms as the Zohar.

Rabbi Yaakov Emden, *Mitpachat Sefarim*, chapter 4, wished because of this difficulty to emend every corresponding passage of the Zohar. His proposal is unpersuasive, since the expression appears in several places and also in the Arizal.

Rabbi Moshe Cordovero’s reading is supported by the Zohar’s own context, even without the Talmudic proofs. The Zohar to Deuteronomy 33:18 comments on “Of Zevulun he said: Rejoice, Zevulun, in your going out, and Issachar in your tents.” It says that Zevulun went out to wage war and continues: “In Zevulun’s portion is the sea, and the Congregation of Israel is called the Sea of Kinneret; this is fitting, because *tekhelet* comes from there.” The sea in which Zevulun “went out” to wage war must be the Mediterranean, for Kinneret lies entirely within the Land of Israel and cannot be a route of departure abroad.

The Zohar derives the name “Sea of Kinneret” for that sea from the very fact that *tekhelet* comes from it; compare Zohar, *Shelach* 175b. Such a derivation would be unnecessary for the Sea of Kinneret at Tiberias, which the Torah already calls by that name. Nor does the passage appear to be proving that Zevulun’s territory extended to Kinneret. Such a reading would assume from the outset that the *chilazon* was in Zevulun’s territory and could not have existed only in Kinneret. It would then require saying that the *chilazon* did not exist in the Great Sea at all—impossible, since the Prophets imply it was found in the islands of Elishah, Italy; Shabbat 26a places it from the ladders of Tyre to Haifa; and Israel possessed *tekhelet* at the Exodus, as Exodus 35:23 states.

The Zohar first says simply that “the sea” was in Zevulun’s portion and only afterward calls that same sea “Kinneret.” It therefore refers to the sea biblically known to be in Zevulun’s portion—the Great Sea.

Elsewhere, Zohar, *Beshalach* 48b, says: “Was there only one sea in his inheritance? What, then, is ‘the shore of seas’? The companions have certainly explained it through the supernal mystery. ‘And his flank shall be toward Sidon,’ as in the expression ‘those who came from Jacob’s flank.’ Zevulun was the right thigh of the body, and the Sea of Kinneret was in his portion; from there the *chilazon* for *tekhelet* is found.” The verse “his flank shall be toward Sidon” is interpreted through the supernal mystery as the Sea of Kinneret. This must follow Rabbi Moshe Cordovero’s

32. Does It Have Sinews and Bones?

The Jerusalem Talmud, Shabbat 1:2, states:

Chizkiyah said: One who kills a louse on Shabbat is like one who kills a camel. Shmuel would cut off its hand and foot.... Rabbi Shimon ben Chalafta said: Have we not learned otherwise from the chilazon? Does the chilazon have sinews and bones? Was it not taught: Anything without sinews and bones does not live more than six months? Rabbi Yose said....

The commentators disagree about the meaning. *Korban HaEdah* and *Penei Moshe* understand the passage to say that the *chilazon* lacks sinews and bones. Others understand it to say that it possesses them: the Jerusalem Talmud proves their existence from the fact that the creature lives more than six months, because “anything without sinews and bones does not live more than six months.”

On the latter reading, we must determine whether *Purpura* possesses sinews and bones.

If it does not, there is no difficulty, because the passage can be explained as *Korban HaEdah* and *Penei Moshe* do. But even if the Jerusalem Talmud means that it has sinews and bones, the passage itself proves that the *chilazon* has no obvious sinews or bones recognizable to everyone. Its proof is not direct observation but the creature’s lifespan.

The same proof applies to *Purpura*. It lives seven years, and the accepted rule is that “anything without sinews and bones does not live more than six months.” On this understanding, it is certain that *Purpura* is halachically considered to have sinews and bones; any explanation merely clarifies why.

Sukkah 21b indicates that sinews and bones function as protection and covering. The shell, which protects and covers the snail, may therefore count as its sinews and bones.

In any event, this interpretation of the Jerusalem Talmud establishes two points:

1. The *chilazon* has no visible, familiar sinews and bones.
2. Anything living more than six months is regarded as possessing sinews and bones.

Purpura certainly fits this sign because it lives longer than six months.

interpretation: the Great Sea in Zevulun’s territory is called Kinneret. The actual Kinneret near Tiberias has no relationship to Sidon and is not in Zevulun’s portion.

The question raised within the Zohar concerns these very words. The answer does not disagree with the physical division of tribal territories but interprets it through the supernal mystery, just as the Zohar to Deuteronomy 33:18 explains that the sea is called Kinneret because the Congregation of Israel is called Kinneret.

Zohar, *BeHa’alotcha* 151a, further asks: “Since Zevulun inherits Kinneret, what portion does Judah have in it?” It answers: “Judah took all kingship and is united with it on every side.” The question is why Kinneret, meaning *Malchut*, is counted for Zevulun when Judah is identified with kingship. This plainly supports Rabbi Moshe Cordovero: the passage concerns the supernal Kinneret. Rabbi Moshe Zacuto, however, also places the physical Sea of Tiberias in Zevulun’s portion; this requires further study.

Some also infer from the Zohar’s references to “Kinneret above” and “Kinneret below” that it must mean the physical lake. Rabbi Moshe Cordovero holds that once the text expressly makes Kinneret an allusion to *Malchut*, the distinction can occur within supernal concepts themselves. Kabbalists similarly speak of “Jerusalem above” and “Jerusalem below” in relation to lower *Malchut*, which is *Malchut*, and upper *Malchut*, which is *Binah*. The same applies here.

33. The Number of Threads

It must be emphasized that I am not qualified to render a halachic ruling. Anything in this section or the following section that appears to decide the law is intended only as a source reference.

I saw an objection that the mitzvah cannot be fulfilled because the Rishonim disagree about the number of *tekhelet* threads: the Rambam requires half of one full thread before it is folded, the Raavad one full thread, and Tosafot two.

This is astonishing. Should the mitzvah be entirely annulled for that reason? It resembles one who refuses to wear *tefillin* because Rashi and Rabbenu Tam disagree about the order of the passages, before the law was resolved.

Eruvin 6b and elsewhere states:

One who wishes to follow Beit Shammai may do so; one who wishes to follow Beit Hillel may do so. One who follows the leniencies of Beit Shammai and the leniencies of Beit Hillel is wicked. Of one who follows the stringencies of Beit Shammai and the stringencies of Beit Hillel, Scripture says, "The fool walks in darkness." Rather, if he follows Beit Shammai, he must follow both their leniencies and stringencies; if Beit Hillel, both their leniencies and stringencies.

The present refusal is worse: by doing nothing, one follows no opinion at all. Let this claim be forgotten and never repeated, for it annuls many fundamental Torah obligations.

Whatever arrangement one adopts, it is no worse than wearing only white threads, as commonly practiced, or only *tekhelet*. Just as the absence of *tekhelet* does not prevent fulfillment with white, the absence of white does not prevent fulfillment with *tekhelet*. The Talmudic discussion shows that even partial fulfillment is not thereby worsened; at minimum, the person is like one who wears white alone or *tekhelet* alone.⁸² The only question is how best to fulfill both the commandment of *tekhelet* and that of white.⁸³

⁸² Even if the white commandment is not fulfilled perfectly through the threads serving in place of *tekhelet*, the rule "If he has no *tekhelet*, he places white" is fulfilled. The Talmud says that even where white was not made in the required manner—for example, if beginning with white were indispensable after the fact—one nevertheless fulfills the Sages' view that white does not prevent *tekhelet*. Tosafot explains that the commandment of tassels is satisfied even through defective white, because it may still be called "four cords." The same applies where the *tekhelet* itself was not made in the required manner: the commandment of tassels has been fulfilled.

The Rambam likewise appears to agree with Rashi and Tosafot that four *tekhelet* threads fulfill the mitzvah of *tzitzit*. He expressly writes: "One who wears a *tallit* containing white, *tekhelet*, or both together has fulfilled one positive commandment," without limiting the statement to remnants of broken threads. *Sefer HaMitzvot*, principle 11, also says that *tekhelet* could have been counted as a separate mitzvah because neither component depends upon the other.

It remains to be discussed whether, according to the Rambam, all-*tekhelet* threads might also fulfill the white commandment and be no worse than *kala ilan*; see note 86. The Rambam would nevertheless lose the "kind of the corner" requirement, and Shulchan Aruch 9:5 says the meticulous follow that practice, though Rema says it was not accepted.

⁸³ There is no concern for *bal tosif* or *bal tigra*, adding to or subtracting from a commandment. Beyond the obligation to resolve the law, several reasons make those prohibitions inapplicable.

First, *Mishnah Berurah* 11:60, following the Vilna Gaon, rules that where the mitzvah cannot otherwise be fulfilled, additional *tzitzit* threads present no concern of *bal tosif*. One certainly should not avoid the mitzvah entirely for that reason.

More fundamentally, the Rishonim at the beginning of *HaTekhelet*, and apparently Menachot 41b, permit making all the threads *tekhelet* or all white. When a person possesses only one color, he is presently obligated in those threads

One who follows the Rambam certainly loses nothing in the fulfillment of white, but according to the Raavad and Tosafot he fails to fulfill *tekhelet* in the required quantity. One who uses one thread according to the Raavad may, on one reading, satisfy even the Rambam's requirement of white and lose nothing at all.⁸⁴ According to Tosafot, however, he lacks the required amount of

through the commandment of tassels. Similarly, if one *tekhelet* thread is "extra," he nevertheless needs it to complete eight ends because he has not placed another white thread.

Concerning *bal tigma*, Rashba and Ritva to Rosh Hashanah 16a, and *Minchat Chinuch* mitzvah 455:1, explain that refraining from a positive commandment itself violates *bal tigma*. This is a strong reason to wear *tekhelet*: in addition to the Torah obligation, one who can fulfill *tekhelet* and does not do so may, according to all views, violate *bal tigma*. The case of *tekhelet* is more severe because the person fulfills *tzitzit* only partially. The *Beit HaLevi*, responsa 1:42, writes that according to all views one who wears white without available *tekhelet* violates *bal tigma*; see also *Sefat Emet* to Rosh Hashanah 28b. All the more so if he consistently annuls a mitzvah he could fulfill.

By contrast, one who places *tekhelet* but, because of the limits of his knowledge and understanding, is unable to do more resembles one who lacks an *etrog* and takes the other species; see *Orach Chaim* 651:12 and Taz there §17. He does not violate *bal tigma* because all four species are unavailable. Menachot 38a likewise indicates that when *tzitzit* threads tear on Shabbat and cannot be repaired, the only issue is carrying. In a *karmelit* it is permitted for human dignity, with no concern for Torah-level *bal tigma*.

Rabbi Yitzchak in Mordechai, Menachot §944, famously permits wearing a *tallit* whose threads tore on Shabbat because unavoidable failure does not annul a positive commandment. He too does not fear *bal tigma*, although Rosh Hashanah 28b concludes that one violates the rule at the time of the mitzvah even without intending to perform the mitzvah; see *Bi'ur Halachah* §34, s.v. *yaniach*, which applies the same principle to *bal tigma*. *Sefat Emet* to Rosh Hashanah explains the reason. Rabbi Yehoshua's words in Zevachim 80a may mean the same: "*Bal tigma* was stated only when it is by itself"—when he subtracts because uncertainty compels him, it is not *bal tigma*.

The present question may in fact be outside *bal tigma* entirely. One may add four *tekhelet* threads without *bal tosif* because the Torah did not say that the tassels must specifically be white. Where no white cord was placed, the person's mitzvah may consist of *tekhelet* or white. The same applies to *bal tigma*: if the issue is failure to perform the mitzvah, doing nothing is certainly worse and unquestionably violates it. If the issue is partial performance, the Torah commands tassels of either *tekhelet* or white when only one is available. If a person had only three white threads and one *tekhelet*, that would certainly be his required arrangement, since even four *tekhelet* threads may be used. If he possesses two *tekhelet* threads, the problem cannot be that he places the first thread, which he is obligated to place; it can only be the failure to fulfill the complete *tekhelet* arrangement, like any omission of a positive commandment. If he stipulates that any nonconforming arrangement is not intended for the mitzvah, there is certainly no concern; see *Bi'ur Halachah* there.

⁸⁴ Eruvin 96b states that *tekhelet* found in the marketplace is invalid if in tongues of wool but valid if in threads. Why do threads differ? Perhaps they too were spun for a garment. The answer is that they are twisted. But perhaps they were twisted for the hem of a garment? The threads are cut to length, and people would not trouble themselves to that extent for an ordinary garment.

Kesef Mishneh, *Laws of Tzitzit* 1:7, cites the Rambam's response to the sages of Lunel: "One should spin one thread partly *tekhelet* and partly white." *Magen Avraham* 15:1 infers that the Rambam does not allow one initially to make a whole *tekhelet* thread and tie it to a white thread. The Rambam's recommended construction requires much more work than ordinary twisting. Why, then, would a person finding such a thread in the marketplace have to fear that it was not made for *tzitzit*? Chullin 95b similarly requires identifying signs for Rabbi Natan bar Abaye's lost ball of *tekhelet* because of concern for *kala ilan*. That case involved an entire bundle. If the Rambam's split-color construction were the only valid one, there would be no concern that it was made for an ordinary garment, just as twisted threads are presumed to be for *tzitzit*. Deliberate forgery cannot be the concern, because then twisting would prove nothing either.

The difficulty is resolved if the Rambam also validates a whole *tekhelet* thread; people ordinarily made it that simpler way. His split-color construction describes what the literal requirement demands: the Torah says one *petil*, not two. No rabbinic derivation of this kind appears anywhere, and the Rambam did not invent a new exegesis. He meant only that the Torah contains no source requiring more than one *petil*, while one who wishes may make the whole thread *tekhelet*. The phrase "one should make" can mean "one may make," a common Rambam usage.

The Vilna Gaon to *Orach Chaim* §12 gives the Rambam's source: *Sifrei* says, "They shall make themselves a tassel—one might think each is made independently; Scripture therefore says 'a cord.' How many form a cord? No fewer than three, according to Beit Hillel; Beit Shammai says...." The Raavad interprets the remaining one as a whole thread, while the Rambam interprets it as literally one thread-end. This provides no basis for saying that the Rambam's seventh end cannot fulfill the white requirement. Only three complete threads are learned from "cord" to require white. The Rambam and Raavad apparently read the *Sifrei*: "Beit Shammai says three of wool and a fourth of

tekhelet and apparently does not fulfill the commandment of *tekhelet*.⁸⁵ Nevertheless, he is certainly no worse than one who wears only white, as explained in note 82.

One who follows Tosafot may, according to the Rambam and Raavad, lose part of the mitzvah of white. Tosafot appears to hold that one who makes all the threads *tekhelet* does not fulfill the commandment of white.⁸⁶ It remains to be considered whether the Rambam and Raavad agree.

Every option therefore contains both a stringency and a leniency: one may lose either *tekhelet* or white. Where the law is unresolved in such a case, Rambam to Chullin 43b and Rashba to 44a apply the rule, "One who wishes to follow Beit Shammai may do so; one who wishes to follow Beit Hillel may do so." Since every practice rests upon a great authority, a person may

tekhelet." Although one can force the Rambam to read "a fourth" as part of the fourth, it certainly supplies no source that the other half must specifically be white.

⁸⁵ Tosafot's conclusion in Menachot 38a, s.v. *ha-tekhelet*, is that *petil* means one, but "cords" establishes four complete threads and reason assigns half to *tekhelet*. This appears to define the mitzvah of the *tekhelet petil* itself as two threads.

One might nevertheless distinguish two commandments. Concerning "cords," the Talmud says that one who has no *tekhelet* places white and fulfills the tassel command even where neither the ideal *tekhelet* nor ideal white arrangement is complete, as explained in note 82. The command of a "thread of *tekhelet*," however, cannot be fulfilled with white. The two therefore need not share identical parameters. The *petil* command may be fulfilled by one thread, while "cords" initially requires two *tekhelet* threads; but defective performance of "cords" remains valid in every arrangement.

This would reconcile Tosafot with the plain meaning of Scripture and the Sages' consistent language of "the *tekhelet* thread." See Sotah 17a; Chullin 89a; Ta'anit 22a, where the entire tassel is named for the *tekhelet* thread; Midrash Aggadah to Numbers 15; and passages that explicitly speak of "one thread of *tekhelet*," including Targum Yonatan to Numbers 16:2, Zohar *Shelach* 175b, *VaEtchanan* 265a, and Midrash Mishlei 11. It would be astonishing if the Talmud never clarified that the verse's apparent one thread means otherwise, even while discussing the number of white threads without mentioning the number of *tekhelet* threads.

Rashi to Korach, Numbers 16:1, expressly says, "One thread of *tekhelet* exempts it," although Rashi follows Tosafot in requiring two *tekhelet* and two white threads for the ideal tassel. One *tekhelet* thread therefore fulfills the command of the *tekhelet petil*; two are required only through the command of "cords," which is not indispensable because white can satisfy it. *Semag*, positive commandment 26, offers some support: "two of white and two of *tekhelet*, or three of white and one of *tekhelet*." See *Arukh HaShulchan*, *Tzitzit* 9:2, although *Beit Yosef* says the *Semag* apparently did not wish to enter the dispute.

Tosafot, however, says that according to Beit Shammai the verse's word *petil* is not exact; see Menachot 41b, s.v. *Beit Shammai*: "Beit Shammai now holds...that *petil* is not literal." This apparently applies to the command of the *petil* as well and requires further study.

⁸⁶ This does not resemble *kala ilan*, of which the Talmud says, "Let it be no more than white." Tosafot apparently treats valid *tekhelet* as a distinct kind. Rashi and Tosafot understand "white does not prevent *tekhelet*" as referring to a tassel made entirely of *tekhelet*, demonstrating that the white command is not fulfilled thereby. I have now seen Rashba, responsa III:280, explain that "white does not prevent *tekhelet*" means that *tekhelet* itself also fulfills the command of white; this requires further study.

The Rambam holds that the Talmud's answer concerning remnants of threads applies even according to the Sages, who say the two colors do not prevent one another. That passage therefore does not prove that *tekhelet* alone fails to fulfill white. *Kesef Mishneh* says the Talmud does not establish the case as one of *tekhelet* alone because such an arrangement certainly fails; his words refer to using only one *tekhelet* thread, as his language in *Laws of Tzitzit* 1:4 shows. One might infer in the opposite direction that the Talmud did not establish the case as all-*tekhelet* because the Rambam regarded it as obviously valid: it also fulfills white.

Nevertheless, the Rambam certainly requires the designated white threads to be actually white. Even on an entirely blue *tallit*, *Laws of Tzitzit* 2:8 requires white threads. He too apparently holds that *tekhelet* does not fulfill ideal white, though I am unsure whether this is indispensable or rabbinic; see Tosafot to Menachot 41b, s.v. *ein poter*.

If the Raavad interprets "white does not prevent *tekhelet*" as Tosafot does, one who uses two *tekhelet* threads may lose the white command in the extra thread and fulfill only the rule that white does not prevent *tekhelet*. There is a further loss in the "kind of the corner" requirement: the Raavad appears to agree with the Rambam that these threads should be white and seems to regard the rule as biblical. Rema, *Orach Chaim* 9:5, however, rejects their view for this purpose, and *Shulchan Aruch* implies that matching color is a stringency rather than law.

choose any of them. This is especially true of one who consistently follows a particular sage's rulings, for Rashba I:253 permits him to follow that authority here as well.⁸⁷ For one who acts contrary to the settled practice of his own community, the prohibition against forming conflicting factions in one city may require consideration.

No arrangement causes a greater loss than wearing white alone. There is therefore no basis for annulling the mitzvah entirely because of the uncertainty.

34. The Windings

Every method is valid after the fact according to all authorities, but the Rishonim disagree about the preferred initial arrangement.

The Talmud says that the windings begin and end with white but does not clarify whether the intermediate windings are *tekhelet* or white, or how many of each. It also gives three windings as the measure of a *chulyah* and says that one should make no fewer than seven and no more than thirteen. Most Rishonim⁸⁸ understand this as the number of *chulyot*: no fewer than seven groups and no more than thirteen.

On the basis of Midrash, the custom is also to make five knots. Rava sought to prove in the Talmud that a knot is tied after each *chulyah*, though it is uncertain whether his argument was rejected. Tosafot says that without *tekhelet* we are not particular about the order and laws of the *chulyot*. Where *tekhelet* is available, Tosafot's first answer and Rabbenu Asher alternate white and *tekhelet*. With seven *chulyot*, a knot follows every pair—one white and one *tekhelet*.

With thirteen *chulyot*, the Vilna Gaon's arrangement in *Yahel Or* to *Pinchas* 227a follows the same interpretation of Tosafot and Rabbenu Asher and regards thirteen as optimal. One ties a knot; winds alternating white and *tekhelet chulyot*, each of three windings; and places a knot after every four *chulyot*. After the fourth knot, one makes three white windings—one final white *chulyah*—and ties the last knot.⁸⁹

⁸⁷ The Vilna Gaon's words must be cited here. In *Yahel Or* to *Pinchas* 228a, he writes: "The only daughter is the *tekhelet* of the *tzitzit*, and it is the fourth thread, according to the Raavad. As I wrote there, this is the principal view, and so reads our *Sifrei*." *Imrei Noam* to Berachot 9b, Tosafot s.v. *ela*—a collection of the Vilna Gaon's teachings by his students—comments on Tosafot's statement that there were two white threads: "The halachic authorities disagree and hold that they made only one thread of *tekhelet*."

Tosafot's version of the *Sifrei*, apparently in both *Shelach* and *Ki Tetzei*, accorded with their position. This seems to have been the source upon which Tosafot and the other Ashkenazic authorities relied as an uncontested premise that four of the eight ends were *tekhelet*. They therefore brought no Talmudic proofs and did not debate the number.

When Tosafot at the beginning of *HaTekhelet* says the *Sifrei* "disagrees with our Talmud," it refers to Beit Hillel's statement in the *Sifrei*, which is the immediate subject. Tosafot means that the Bavli follows Beit Shammai, as Tosafot to Bekhorot 39b, s.v. *kamah*, explains, in accordance with Rav Pappa in Menachot 41b. See Tosafot there, s.v. *Beit Shammai omrim*: "Beit Shammai's reason...as we derive..." The number was evident from the *Sifrei*.

Even the Vilna Gaon's commentary appears to predate his emendation of the *Sifrei* and not to have possessed a version like the Raavad's, for he derives the Raavad from the very *Sifrei* quoted by Tosafot rather than from another text. In his glosses to *Sifrei*, however, he emends *Ki Tetzei* to match the present *Shelach* text and exchanges Beit Hillel and Beit Shammai in *Shelach*, producing the Raavad's view. As *Yahel Or* says, the principal view follows our *Sifrei*. This emendation resolves many difficulties in the plain meaning of that passage.

⁸⁸ The Raavad understands the Talmud as referring to the number of windings within each *chulyah*. He also has a different method of winding; see his extended comments to *Laws of Tzitzit* 1:7.

⁸⁹ The order four, four, four, and one is not compelled by Tosafot itself. *Sefer HaChinuch* orders them three, three, three, and four. I presented the Vilna Gaon's order for several reasons.

According to the Rambam, one who makes thirteen *chulyot* winds only the first turn in white, then two turns of *tekhelet*, and ties a knot. He then makes eleven *chulyot* of *tekhelet* alone, separating each group of three slightly, and in the final *chulyah* makes two *tekhelet* windings followed by one last white winding.

Rashi more strongly implies that the first and last *chulyot* are entirely white and all the intermediate windings *tekhelet*.

In practice, some follow the final great decisor, the Vilna Gaon,⁹⁰ making five knots, with groups of four alternating white and *tekhelet chulyot* between the first four knots and one white *chulyah* between the final pair of knots.

Others follow the Rambam, especially those who follow his number of threads. Even those who ordinarily follow the Rambam should consider whether five knots are nevertheless required. The Jewish people did not accept the Rambam's arrangement even for white-only *tzitzit*. In most communities the settled practice, following Shulchan Aruch, is to make five knots, based upon a Midrash cited by the Rishonim and the Zohar. The Rambam mentions only *chulyot*, since five knots do not appear in the Talmud. For him the rules governing the windings of *tekhelet tzitzit* and of *tzitzit* when *tekhelet* is absent are one; nevertheless, even most communities that follow his rulings did not adopt his practice here.

Sefer HaChinuch, mitzvah 386, at the end of "The root of the mitzvah," apparently follows the Rambam that the winding thread is *tekhelet*, yet requires five knots:

How are they made? He ties them with a double knot in five places. Between each knot he makes three chulyot, and in the middle of the final interval he makes four chulyot, for a total of thirteen.

Some who follow Tosafot and Rabbenu Asher arrange the *chulyot* in this pattern. It is attractive and simpler, dividing the groups more evenly. The Vilna Gaon, however, did not adopt it and had kabbalistic reasons known to those initiated into his teaching.

First, the Vilna Gaon expressly describes *tzitzit* with *tekhelet*, while *Sefer HaChinuch* does not explicitly discuss *tekhelet*. Tosafot says that the arrangement of white alone is custom rather than law. In truth, *Sefer HaChinuch* apparently orders white in this way because he holds that this is the order with *tekhelet*.

Second, the Vilna Gaon's order is specifically based upon Kabbalah. *Sefer HaChinuch* may merely have chosen the most visually balanced arrangement, without requiring that precise pattern. Alternatively, his reason may be the principle of increasing in holiness, which would make his sequence deliberate.

A further kabbalistic consideration favors *Sefer HaChinuch*: Zohar, *Pinchas* 228b, appears to require a thumb's width between knots. *Sefer HaChinuch*, however, does not cite this reason, and our inference from the Zohar carries no weight against the Vilna Gaon's express words.

Third, the Vilna Gaon is the later authority.

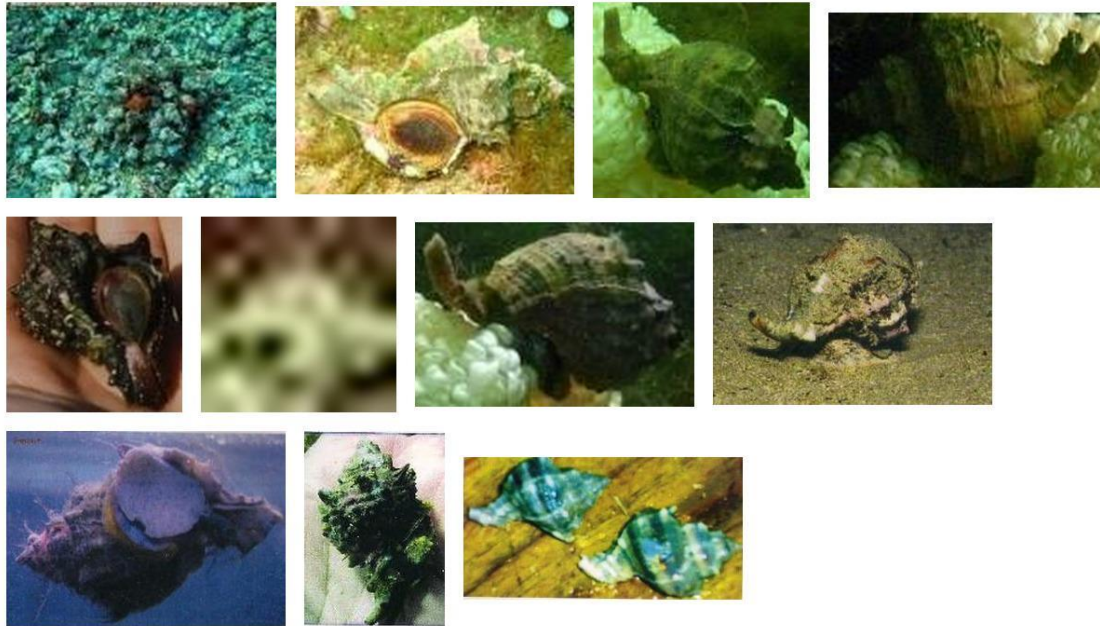
⁹⁰ Some wished to make the dispute over windings depend upon the dispute over thread count. According to the Rambam, the half-thread exists entirely to be wound around the others, so he winds with it throughout. According to Tosafot, the colors are equal in thread count and therefore also equal in the windings.

Nevertheless, one may use one complete thread—two of the eight ends—while winding according to Tosafot. The Raavad uses one complete thread but treats the colors equally in the windings and rejects the Rambam's view that the windings are principally *tekhelet*. The Vilna Gaon in *Yahel Or* likewise accepts the Raavad's one-thread count while following Tosafot in alternating equal white and *tekhelet chulyot*. Rashi's view of the windings also does not appear to fit the proposed rationale.

Illustrations from the Original Hebrew Edition

The purpose of these photographs is not to serve as proof of the identification, but to show that the proposed identification accords with the Talmud's descriptions.

“Its Body Resembles the Sea” (Section 12)



Living Purpura (Murex trunculus, the blunt-spined murex) in various colors while underwater or shortly after capture. Even the green specimens are considered sea-like, as the Jerusalem Talmud states that the sea resembles vegetation.

“Its Blood Is Black as Ink” and “We Test It on Raw Wool”



From left to right: concentrated secretion prepared for dyeing; the secretion mixed only with water in the vat; and the yellow reduced vat with the wool, which turns blue when exposed to air.

Wool Dyed with *Kala Ilan*—Indigo

See *Ein HaTekhelet*, chapter 1, concerning the proof from the color of *kala ilan*.



Wool dyed with indigo.

Ancient Textile Dyed with *Purpura*

Both its purple and blue colors were produced from *Purpura*.



An ancient excavated textile dyed with Purpura.

A Historical Depiction of *Tekhelet*



*The Roman emperor Charlemagne with his son Louis the Pious in 814 CE, wearing a tekhelet-colored garment.
Source: Grandes Chroniques de France, Paris, Bibliothèque nationale de France, Français 73, fol. 128v. See Ein HaTekhelet for the response to the claim that tekhelet was purple.*