

Deep Blue: Notes on the Jewish Snail Fight

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Received: 21 November 2014 / Accepted: 17 April 2015 / Published online: 24 May 2015
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Abstract The Bible requires Jews to tie a *tekhelet* (blue) cord as part of their *tzitzit* (fringes on traditional prayer shawl and everyday undergarment). Rabbinic sources of antiquity insisted that the *tekhelet* dye must have been produced from a marine mollusk termed *hillazon*. For various reasons, the custom of having this *tekhelet* cord, which is usually associated with the colors blue or violet, disappeared from Jewish material culture sometime in late antiquity. During the 1880s the Hasidic leader Gershon Hanoch Leiner of Radzin (Radzyń Podlaski, Poland) announced that he had found the ancient *hillazon* and succeeded in producing *tekhelet*, which he distributed to his followers. However, his *tekhelet* did not gain popularity. A much wider interest in *tekhelet* began in the 1980s, when a new *tekhelet* was introduced by religious Zionist Jews, resulting in an abundance of Orthodox publications on the subject. However, the 1980s renaissance of *tekhelet* raised objections from various Jewish Orthodox circles. This paper aims to sketch a preliminary map of the *tekhelet* debate that took place after the introduction of the second *tekhelet* in the 1980s. It opens with a brief history of *tekhelet*, followed by a description of the dominant narrative of contemporary *tekhelet*, and its main opponents. The rest of the article presents central focal points of the controversy: debates regarding the production of the dye; issues of authority regarding acceptance of the new *tekhelet*; and a

I would like to thank Prof. Zvi C. Koren and Dr. Baruch Sterman for reading an earlier version of this article. Both of them, although not always agreeing with me, provided valuable comments. Preliminary versions of this work were presented at the 5th Israeli Conference for the Study of Contemporary Religions and Spiritualities, Tel Aviv University, May 29, 2013; and at the Open University of Israel, December 11, 2013. I would like to thank the attendees of these lectures, as well as my colleagues Dr. Netanel Fisher and Dr. Uriel Gellman for their comments and suggestions. The responsibility for the final version of this article is solely mine.

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messianic tension revealed by the discussion of *tekhelet*. By providing a non-Orthodox account of the *tekhelet* debate, this article sheds light on contemporary *tekhelet* discourse yet also exposes fundamental issues in contemporary Orthodox Judaism, particularly with respect to the relationship between religion and science, and the tension between radicalism and conservatism.

Keywords *Tekhelet* · Colors and Dyes in Judaism · Religion and science · Orthodox Judaism · Zionism · Messianism

On December 30, 2013, an international conference entitled “100 Years of *Tekhelet* Research” took place in Jerusalem. The following quote was part of the materials announcing the conference:

This year marks the 100th anniversary of Rabbi Yitzchak Halevi Herzog’s foundational doctorate, *The Dyeing of Purple in Ancient Israel*. This work inaugurated the era of modern research into the lost biblical blue dye and laid the foundations for all subsequent work in the field. To celebrate this event, Ptil Tekhelet, together with *Yad Harav Herzog* and *Yeshiva University*, will be hosting an international conference with leading personalities presenting their thoughts on the re-establishment of the beautiful mitzvah of *Tekhelet*. Hundreds of thousands of Jews around the world are wearing *Tekhelet* strings on their *tzitzit* for the first time in 1300 years, and that is certainly something to celebrate!¹

Tekhelet is a dye with which the Bible commands every Israelite to color the *tzitzit* (fringes on traditional prayer shawl and everyday undergarment). It is also commanded that *tekhelet* be used in the liturgy of the tabernacle and the temple. While the Bible did not describe this dye, rabbinic literature required that it be produced from the secretion of a marine mollusk termed *hillazon*,² probably with a method similar to the production of the *purpura* dye of antiquity. Although there were likely Jews who did make *tekhelet* from *hillazon*, the knowledge of how to do so was lost sometime between the 7th and the 9th centuries CE. *Tekhelet* was considered lost or concealed (Hebrew: *ganuz*) by rabbinic Jews for almost a thousand years up until the 1880s. At that time, Rabbi Gershon Hanokh Leiner, of the Polish town of Radzyń Podlaski (henceforth: Radzin), announced that he had rediscovered *tekhelet* and began producing and distributing it to his followers and to everyone who requested it. However, Leiner’s *tekhelet* did not gain much popularity beyond his limited circle of followers, some members of other Hasidic groups, and perhaps some non-Hasidic Jews.

¹ This text accompanied the mass-funding campaign for the conference. See: <http://www.rootfunding.com/campaign/tekhelet-100> Accessed October 26, 2014. Similar texts appeared in other announcements.

² A note about terminology: Although *tekhelet* is often translated into English as *blue* and *hillazon* is commonly translated as *snail*, there are debates on these translations because every translation conveys interpretation and implies a specific resolution. Hence, in this paper I will use the Hebrew originals. Moreover, there is a difference in the spelling of the word: While Ptil Tekhelet and other *Murex* supporters usually spell it *tekhelet*, their opponents use spellings like *techeles*, *tcheiles*. I will follow the transliteration rules of the Hebrew Academy of the Hebrew Language, which suggest *tekhelet*.

Rabbi Yitzchak Halevi Herzog (1888-1959), to whom the aforementioned conference was dedicated, was one of the leaders of religious Zionism during the first half of the 20th century and served as the Chief Rabbi of Ireland and the State of Israel. He too was interested in the ancient *tekhelet* dye and researched the topic for his doctoral dissertation, which was submitted in 1913 to the University of London. Although Herzog did not try to implement his discoveries, various research efforts that began in the 1960s on the basis of his work led to the introduction of a new *tekhelet* dye in the 1980s, this time with a much wider reception.

Ptil Tekhelet, the organizer of the aforementioned conference, is the association that has made the greatest contribution to this wide reception of *tekhelet*. It is an Israeli non-profit organization founded in 1991 for the research and production of *tekhelet*. The dye produced and sold by Ptil Tekhelet is the second *tekhelet*, the *tekhelet* that was introduced in the 1980s. Ptil Tekhelet is undoubtedly the most prominent organization in the Jewish world dealing with *tekhelet* (more on this below).

Participants in the 2013 conference were not only *tekhelet* activists but also figures representing mainstream Israeli and Jewish establishments, including rabbis, archaeologists, academics from Israeli universities and New York-based Yeshiva University, an Israeli Supreme Court justice, and one Israeli politician: Knesset Member Isaac Herzog, the chairman of the Israeli Labor party and Rabbi Herzog's grandson. The conference was extensively publicized in the Israeli and Jewish-American media.³ *Tekhelet*, which hitherto had been of interest only to Orthodox Jews, particularly Modern Orthodox and religious Zionists,⁴ began to also elicit interest among non-Orthodox or secular Israeli Jews and even non-Jews, at least to the extent that can be concluded from readers' comments online.⁵

The image of *tekhelet* conveyed by both conference participants and the media promoted a specific narrative according to which *the* authentic *tekhelet* was finally rediscovered, and Ptil Tekhelet has now taken the lead in terms of research, production, and distribution. This narrative, which will be described in detail below, has been enthusiastically promoted by Ptil Tekhelet since its founding. It became the dominant narrative among the various circles of Israeli religious Zionists where *tekhelet* has played a notable role in recent years, both in terms of practical adoption and in a relatively extensive discourse promulgated by Ptil Tekhelet.

Notwithstanding the common agreement demonstrated at the conference, the narrative promoted by Ptil Tekhelet is far from consensual within broader circles of Jewish Orthodoxy or among certain scientists. Beneath the surface one finds various debates between Ptil Tekhelet and other groups that were not addressed in the conference or in its media coverage. The dominance of Ptil Tekhelet's discourse

³ See the links to the various media items: <http://tekhelet.com/in-the-news/> Accessed October 26, 2014.

⁴ Although religious Zionists are sometimes described as the manifestation of Modern Orthodoxy in Israel, these groups are not identical (Liebman 1988).

⁵ An example of what appears to be a comment written by a non-Jew to an article published on the website of CBS News: "I have never seen US Jews wearing blue fringe. Is it on their underwear?" <http://www.cbsnews.com/news/elusive-biblical-blue-dye-found-israeli-researcher-says/> (Accessed October 26, 2014).

overshadowed and marginalized other voices. Ptil Tekhelet activists do not deny that their version of *tekhelet* continues to stir debate among various parties.

This paper aims to sketch a preliminary map of the *tekhelet* debates that surfaced after the introduction of the second *tekhelet* in the 1980s, and especially after Ptil Tekhelet was established in 1991, promoting this version of *tekhelet*. By providing a place for marginal voices that undermine the contemporary dominant narrative of *tekhelet*, I am not taking sides in these debates; rather, I aim to provide a more balanced characterization of a contemporary visible Jewish cultural phenomenon. Although much has been written about *tekhelet* since the 1980s, most of these writings have been authored explicitly to promote a distinct religious agenda, either in support for or against the use of this color in contemporary Jewish life. However, no critical scholarly account of the *tekhelet* discourse has been written that is not a part of a religious project and affords equal time to diverse and sometimes opposing opinions.

To an outsider, it may seem that the debates about the details of the specific commandment of *tekhelet* focus on a marginal aspect of Jewish life. Additionally, many observant Jews, who either choose to adopt or forego *tekhelet*, might be unaware of these debates. However, I suggest that these *tekhelet* debates expose deeper fundamental tensions between Orthodox Judaism and modernity. Accordingly and more specifically regarding *tekhelet*, I would like to briefly point to two general contexts to which the debates will later be related.

The main general context is the relationship between religion and science. Opinions about this relationship have traditionally been classified as belonging to one of the three major approaches: conflict, independence, or harmony (Brooke 1991). For the purpose of the following discussion, the conflict approach sees religion as holding God as the source of change in the universe, an assumption that science cannot accept. The independence approach claims that science and religion function on separate levels of human life: religion deals with values and beliefs, whereas science deals with facts. According to the harmony approach, science and religion can be reconciled and may even contribute to one another. As part of a renewed scholarly interest in the relationship between science and religion in recent decades,⁶ scholars in the field avoid presenting these categories as well defined, separate models but rather prefer to see them as part of a wider range of options (Wilson 2000).

These approaches can also be found in Judaism (Robinson 2000; Rosenberg 1988; Ruderman 2000). The harmony category is one of the major characteristics of Modern Orthodoxy, and the relationship between science and religion is part of a broader encounter between religion and non-religious culture, often termed in Modern Orthodoxy as *Torah Umadda* (Lamm 1990).

⁶ Growing interest in this topic is evident in the fact that several books on the subject matter have been published in the last decade. For example, see, Gary B. Ferngren (ed.), *The History of Science and Religion in the Western Tradition: An Encyclopedia* (New York: Garland Publishing, 2000); Philip Clayton and Zachary Simpson (eds.), *The Oxford Handbook of Religion and Science* (Oxford: Oxford University Press, 2006); Peter Harrison (ed.), *The Cambridge Companion to Science and Religion* (Cambridge: Cambridge University Press, 2010).

On the matter of *tekhelet*, it should be remembered that *tekhelet* is first and foremost a religious ritual; as such religion cannot be removed from the discussion. The question is not so much whether science corresponds to religion; more relevant is to what extent scientific considerations can and ought to be employed in the domain of religious ritual. Hence, the various opinions that will be discussed below can be placed on an axis with one pole representing greater weight on science in religious-halakhic matters, and the other representing greater weight on religious considerations. Additionally, it is important to note that approaches to the relationship between science and religion are generally not universalistic, but rather depend on the specific context of the debate. For example, we shall see later that certain scientific disciplines (such as archaeology and the humanities) can be perceived by Orthodox viewpoints to conflict with religion, whereas other domains of science (such as natural and applied sciences) are more compatible.

Another context related to the issue of science-religion is the use of archaeology to shape history, and the usage of that history in supporting nation-building projects (Kohl et al. 2007). An example is the use of archaeological evidence to shape the biblical past (Finkelstein and Silberman 2001). In the Jewish context, the most striking example of using archaeology in the service of national aims is what Nachman Ben-Yehuda termed the “mythmaking” of Masada (Ben-Yehuda 1995, 2002, 2007; Zerubavel 1995). Similarly, the rediscovery of *tekhelet* can be understood as yet another attempt to use archaeology and ancient Jewish history in the service of a Jewish religious nationalistic agenda.

This paper is based on both extensive publications (in textual and audio-visual formats) on the subject of *tekhelet*, and on correspondence, as well as face-to-face and phone interviews with central *tekhelet* activists and researchers.⁷ Because the discourse and debate surrounding *tekhelet* are dynamic and ongoing, this paper should be read as a tentative reflection current to the end of 2013, a year presented by *tekhelet* supporters as a triumph in the attempt to rediscover (and, in the case of some, reinstate) *tekhelet*.

“A Brief History of Modern *Tekhelet*” section of this paper contextualizes the 20th-century discourse. “The *Murex* Narrative” section introduces the narrative of Ptil Tekhelet, which is the dominant narrative of contemporary *tekhelet*, and identifies its primary opponents. The rest of the article presents central focal points of the controversy. Two sections discuss debates regarding the production of the dye: “Identifying the *Hillazon*: Tradition, Talmud, and Archaeology” section explores different opinions about the *hillazon*, the required source for the dye production process, while “Chemistry, Physics, and the Hue of *Tekhelet*” section investigates disagreements over the outcome of this process, the dye itself. The last two sections highlight debates about the performance of the commandment of *tekhelet*: “Authority and Subversion” discusses issues of authority regarding acceptance of the new *tekhelet*, while “Messianism” turns to the messianic tension that the *tekhelet* revealed.

⁷ Correspondence was initiated or interviews were conducted with (in alphabetical order): Zvi C. Koren, Mendel Singer, Ehud Spanier, Assaf Stein, Baruch Sterman, Eliyahu Tavger, Israel I. Ziderman. Shlomo England, the rebbe of Radzin, declined my request to speak or correspond.

The following analysis is one chapter of a broader project, a “biography” of the color *tekhelet* in Jewish history, focusing primarily on developments since the early-modern period. The scope of this project is wider than that of *tekhelet* of *tzitzit*. Some other aspects of *tekhelet*, including the metaphysical, mystical, social, and political dimensions of *tekhelet*, are beyond the scope of this article and will be elaborated in other chapters of the project.

A Brief History of Modern *Tekhelet*

As noted earlier, Rabbi Leiner, the rebbe of Radzin, was the first to claim to have rediscovered *tekhelet*. He identified the *hillazon* as the mollusk *Sepia Officinalis* (also known as *Common Cuttlefish*), and authored three books on *tekhelet* (1887, 1888, 1891). Shaul Magid has suggested that Leiner’s *tekhelet* project was part of a broad response to modernity that jeopardized traditional Jewish life in 19th-century Poland (Magid 1998). It was from within Orthodoxy that the opposition emerged. In part, the opposition was related to the details of Leiner’s *tekhelet*, such as the exact identification of the *hillazon* and the precise hue of *tekhelet*. However, at the core of the opposition was a 19th-century Jewish Orthodox premise that halakhic innovations should be rejected. One of the reasons for rejecting change was that some of these innovations, including *tekhelet*, bordered on forbidden attempts to hasten the coming of the Messiah. Hence, both Leiner and his opponents were acting in the name of Orthodoxy. In any event, this controversy led to the marginal reception of Leiner’s *tekhelet*.

Academic research on *tekhelet* began with Herzog’s doctoral dissertation, which was completed in 1913 (Herzog 1987). Two of his arguments are most relevant. First, he claimed that the color of *tekhelet* is blue, rather than other hues that were sometimes associated with *tekhelet* such as green or violet. He based his claim on the talmudic phrase that only God can distinguish between true mollusk-based *tekhelet* and fake plant-based dye, which was termed *kala-ilan* and was known to have been produced from the Indigo plant (Herzog 1987, pp. 94–96). Second, he evaluated three mollusks as the possible *tekhelet hillazon*. He rejected Leiner’s choice of *Sepia Officinalis* because a chemical analysis of the Radzin *tekhelet* revealed that it was actually *Prussian Blue*, which was known to be a synthetic dye not originating solely from a marine mollusk. Instead, on the basis of contemporaneous scholarship, Herzog introduced two other mollusks: *Murex Trunculus* and *Janthina Janthina*. Each of these mollusks met most of the requirements for the *hillazon*, yet each was missing something. The *Murex* had a problem with the hue. At that time only a violet (and not blue) dye could be extracted from it. Regarding the *Janthina*, the hue of its secretion seemed to fit the talmudic characterizations, but there was no evidence for using its secretions for dye, as opposed to archaeological findings of such dyeing with the *Murex* (although the color of dyeing was not blue) (pp. 61–78). Ultimately, Herzog voted for the *Janthina*. Over the course of his lifetime, Herzog succeeded in raising interest in *tekhelet*. He published articles on the topic in Hebrew rabbinic periodicals and also engaged in a halakhic discourse with various rabbis, becoming an authoritative figure on this subject.

However, in contrast to Leiner, Herzog's interest did not evolve into practical attempts to renew *tekhelet*.

The second *tekhelet*, which was introduced in the 1980s, was based on a successful attempt to produce indigo-blue dye from the secretion of the *Murex*. This achievement resulted from a growing interest in *tekhelet* since the 1960s, manifested in three parallel research paths that eventually contributed to the introduction of the *Murex tekhelet*: (1) a Zionist secular archeological excavation in the Judean desert, which drew the interest of Sidney Edelstein; (2) the Modern Orthodox project of the *Talmudic Encyclopedia*, which involved Israel Zideman; and (3) the Hasidic context of the Radzin *tekhelet*, which involved Otto Elsner.

Dr. Sidney Milton Edelstein (1912-1994), a Jewish-American chemist, textile industrialist, and donor to Israeli universities,⁸ wrote about his involvement with *tekhelet* in his preface to the publication of Herzog's dissertation, which included new relevant scientific contributions (Herzog 1987). He noted that in 1960 The Hebrew University of Jerusalem asked for his assistance in identifying dyed textiles discovered in excavations in the Judean desert conducted at the time by Yigael Yadin. Edelstein analyzed the findings in his private laboratory. One find was a purplish piece of wool that was suspected to have been dyed using a mollusk secretion but turned out to have been dyed by other materials. Edelstein's results and conclusions were published in the excavation reports, raising the interest of Radzin Hasidim who asked him to analyze their *tekhelet*. Edelstein's conclusion was identical to Herzog's: the Radzin *tekhelet* was *Prussian Blue*. In 1969 Edelstein was told about Herzog's dissertation, which played an important role in his endeavor:

My interest was aroused because I was looking for Halakhic authority which could help me to find out how to prepare the true *tekhelet*. At that time I had visions of once again restoring the industry in Israel so that the *šīṣīt* could be dyed in the original way with real *tekhelet*. (Herzog 1987, pp. 11-12)

Believing that Jewish texts should be the sources, even prescriptions, for restoring the ancient *tekhelet* and equipped with Herzog's religious authority, Edelstein took the next step, which was to initiate a scientific endeavor in order to produce the desired *tekhelet*:

In 1972, I became active at Haifa University in helping to set up a Centre for Maritime Studies. In my meetings with the head of the Centre, Dr. Linder, I was requested to make suggestions for research work. I suggested that the Centre should undertake a real study for the various sea snails which might be the source of *tekhelet*. It was agreed that this should best be done by a marine biologist. We felt that the right way to study the problem was to examine the various sea animals under live conditions, make dyeing from their secretions,

⁸ For example, in 1991 Edelstein funded the establishment of The Edelstein Center for the Analysis of Ancient Artifacts at the Shenkar College of Engineering and Design, and donated his book collection to The Hebrew University of Jerusalem. The Edelstein Center for the History and Philosophy of Science, Technology and Medicine at The Hebrew University of Jerusalem is supported by the Sidney and Mildred Edelstein Foundation.

and use the thesis of Rabbi Herzog as a Halakhic guide [...] For the first time, a true scientific biological study was begun by Dr. [Ehud] Spanier and his associates, and continued over several years. (p. 12)

The research of the marine biologist Ehud Spanier and his associates provided mollusks to two independent research efforts: the projects of Israel Ziderman and Otto Elsner.

Dr. Israel Ziderman (b. 1936), who served as a senior scientist at the Israel Fiber Institute, was drawn to the issue of *tekhelet* when in 1969 the editors of the *Talmudic Encyclopedia* asked him to evaluate Herzog's dissertation for the preparation of the article "Hillazon."⁹ Like Edelstein, he also began researching the subject, basing his efforts on Herzog's dissertation. A biochemist and an Orthodox Jew, his approach combined scientific investigation with religious-legalistic considerations. During the 1970s he became acquainted with Spanier's Center, contacted him, and received some live *Murex* snails. From those snails he then succeeded in producing a violet dye that he identified as *tekhelet*. In 1984 he founded an association named Keren Hatekhelet (lit. *Tekhelet* Foundation) "in order to advance the implementation of Rabbi Herzog's doctorate."¹⁰ The association did not achieve the goals set by its founder and eventually closed its door in 1994.

Otto Elsner, a textile expert and professor at the Shenkar College of Engineering and Design, was attracted to *tekhelet* when Hasidim of the Radzin group asked for his help in improving the *tekhelet* they prepared according to a procedure that was attributed to the aforementioned Radzin rebbe, Gershon Hanokh Leiner. Elsner wrote that he immediately understood that the Radzin *tekhelet* was not the "real" *tekhelet* and refused to cooperate with them. Nevertheless, their request ignited his interest in the subject. He conducted extensive research on *tekhelet* and concluded that as long as there was no archaeological evidence of a dyed *tzitzit*, one could not draw definite conclusions. He also adopted a postulate, which was actually a personal impression, that the hue of *tekhelet* must be blue. It was only after he began cooperating with Ehud Spanier from Haifa University that he obtained mollusks for his experiments. Eventually, in the mid-1980s, Elsner and Spanier (1987) succeeded in producing a blue hue from a *Murex* secretion by exposing the solution of the dissolved pigment to the sun. Elsner explicitly stated that this result was based on a study conducted by two German scientists. This fact is mentioned because later narratives of *tekhelet* described it as a serendipitous and original theoretical innovation.

Although some of the aforementioned figures were Orthodox Jews who wanted to renew the *tekhelet* law, all of them remained within the domain of academic research. It was Rabbi Eliyahu Tavger who actually took the scientific achievements

⁹ The *Talmudic Encyclopedia* was a prominent research project of religious Zionist Jews in the first decades of the State of Israel, parallel to the *Hebrew Encyclopedia*.

¹⁰ A selection of Ziderman's major publications on *tekhelet*: Israel I. Ziderman, "Halakhic Aspects of Reviving the Ritual *Tekhelet* Dye in the Light of Modern Scientific Discoveries," in *The Royal Purple and Biblical Blue*, 207-220; "Lehidush Mitsvat Tekhelet Batsitsit," *Tehumin* 9 (1988), 423-446 (Hebrew); "Hagilui Mehadash Shel Hillazon Hatekhelet Beyameinu," *Hama'yan* 34.4 (2005), 27-39 (Hebrew); "The Biblical Dye *Tekhelet* and its Use in Jewish Textiles," *Dyes in History and Archaeology* 21 (2008), 36-44.

out of the laboratory and applied them to religious life. Tavger's attention was drawn to the ongoing *tekhelet* research in 1986 by Menachem Burstein, an Orthodox rabbi who was also interested in *tekhelet* and later published a comprehensive monograph on the topic (Burstein 2000). Based on his reading of the Talmud, Tavger believed that the color *tekhelet* must be blue, but when he tried to produce dyes from snails they always came out purple-red. Only when Elsner succeeded in producing the color blue was Tavger convinced that the true *tekhelet* had finally been found. Consequently, he began dyeing his *tzitziot* with that blue dye.

In 1991, three American Orthodox Jews contacted Ziderman regarding *tekhelet*: Yoel Guberman, who after a personal tragedy vowed to promote the *tzitzit* law among Jews, and two of his friends, Dr. Ari Greenspan and Dr. Baruch Sterman. Ziderman introduced them to Tavger, and the four of them joined Ziderman's Keren Hatekhelet foundation with a practical objective: to promote the research, production, and adoption of *tekhelet*. Eventually, Tavger, Guberman, Greenspan, and Sterman left the foundation and founded Ptil Tekhelet with the aim "to produce *tekhelet* strings and promote research and educational projects." Although Ziderman's Keren Hatekhelet was the first *tekhelet* association, it was the younger Ptil Tekhelet that became the more prominent organization to promote the research, production, and dissemination of *tekhelet*.

The new *tekhelet*, produced and distributed by Ptil Tekhelet, was more widely received than its predecessor, the old Radzin *tekhelet*. Lacking any survey about the actual adoption of *tekhelet* (one should also remember that many people wear their *tzitzit* under their clothes), the only available data is Ptil Tekhelet's declaration that they sold hundreds of thousands of sets of *tekhelet tzitzit* (although *tzitzit* wearers usually buy more than one set because they wear them every day). Still, the distribution of its adoption among the various sectors of Orthodox Judaism is unknown. As far as one can conclude from the opinions of various rabbis, the *Murex tekhelet* gained substantial support within circles of religious Zionists, primarily among groups of spiritualist right-wing Israelis. Concurrently, the Radzin *tekhelet* was accepted primarily by the Radzin Hasidim and also by some Bratslav Hasidim. This does not mean, however, that the *Murex tekhelet* is Zionist whereas the Radzin *tekhelet* is ultra-Orthodox. For example, there is a special ultra-Orthodox group that adopted the *Murex tekhelet*: the so-called "Zilbermans" from the Old City of Jerusalem, followers of Rabbi Itzhak Shlomo Zilberman. Another group of ultra-Orthodox supporters of the *Murex tekhelet* is *Mechon LeHafotzas Hatecheiles*, which appears to have been founded in 2013. In contrast to the Zilbermans, who adopt *tekhelet* among themselves, this institute seeks to promote *tekhelet* and targets ultra-Orthodox Jews.¹¹

A continuing frustration for *tekhelet* fans was the lack of mollusk-dyed textiles in archaeological findings of the southern Levant (not to mention a "smoking gun" of a mollusk-dyed *tzitzit*). This impasse came to an end in 2011 with two findings from the Judean Desert. In 2011, Prof. Zvi C. Koren, an analytical chemist and director of The Edelstein Center for the Analysis of Ancient Artifacts at Shenkar College of Engineering and Design in Ramat Gan, Israel, introduced for the first time a blue-

¹¹ See their website: <http://www.techeiles.org/> Accessed February 22, 2015.

violet piece of textile found in the excavations of Masada dyed by the *Murex* (Koren 2013; Kraft 2011). In 2013, Dr. Naama Sukenik of the Israel Antiquities Authority presented at the aforementioned centennial conference three pieces of *Murex*-dyed textiles, one with a green-blue hue, and suggested that this dye might be the same one as the ancient *tekhelet* (Sukenik et al. 2013).

The success in producing an indigo-blue color from *Murex* secretions during the 1980s resulted in a wave of publications on the topic of *tekhelet*. While some publications opposed the *Murex tekhelet* (as we shall see later), the majority were favorable. The pioneering publication was *The Royal Purple and Biblical Blue*, which was printed in 1987 and contained Herzog's doctorate followed by new scientific contributions of *tekhelet* activists: Spanier, Elsner and Ziderman, as well as a preface by Edelstein. Another important publication that reflected the reception of *tekhelet* in American Modern Orthodoxy was the book *Tekhelet: The Renaissance of a Mitzvah*, published in 1996 by Yeshiva University. But perhaps the most prolific writers about *tekhelet* since 1991 were the members of Ptil Tekhelet. The organization's extensive public electronic library includes not only writings by these activists, but also most of the articles about *tekhelet* in the Jewish Orthodox press.¹² Within this Orthodox press, it is noteworthy that Ptil Tekhelet publishes a periodical dedicated to articles on *tekhelet*. The most updated monograph on *tekhelet* is *The Rarest Blue: The Remarkable Story of an Ancient Color Lost to History and Rediscovered*,¹³ written by Baruch Stermann (with Judy Taubes-Stermann 2012), and translated into Hebrew about a year after it was originally published. Baruch Stermann, mentioned above as one of the founders of Ptil Tekhelet, is an Orthodox Jew with a PhD in physics.

The writings and activities that advocate for the *Murex* share various beliefs, assumptions and arguments, which merit the encompassing term "narrative," denoting a general perspective on the subject. The next section will introduce the central features of this narrative.

The *Murex* Narrative

The *Murex* narrative rests upon a theory comprised of two arguments: (1) that the *Murex trunculus* snail (more accurately: *Hexaplex trunculus*) is the authentic *tekhelet hillazon*; and (2) that the hue of *tekhelet* is light indigo-blue, neither dark blue nor violet (Herzog 1987, pp. 78-97; in particular, pp. 94-96). A major feature of this narrative is that the *Murex tekhelet* is a scientific *tekhelet*. Based on the work of Spanier and Elsner, it is backed by archeological and textual evidence introduced by Herzog as well as by later scholars on the use of the *Murex* for dyeing in ancient times. Hence, we find the explanation for the term "Science of *Tekhelet*" that is habitually used by *tekhelet* advocates (see e.g., Stermann 1996). This does not mean that opponents of the *Murex tekhelet* do not use scientific arguments, as we shall see

¹² For the library, see: <http://tekhelet.com/library-search/> Accessed October 26, 2014.

¹³ A review on the Hebrew translation: Gadi Sagiv, *Haaretz Books Supplement*, March 28, 2014, 10-11 (Hebrew).

later. However, within the range of positions on science and religion, *Murex* advocates are more oriented toward science than most of their opponents; accordingly, they are willing to pay the price for such a position, sometimes prepared to abandon talmudic requirements when they conflict with scientific evidence. Nevertheless, the *Murex tekhelet* also included some emotional and spiritual elements that propelled this narrative slightly toward the religious pole of the scale, while in general maintaining it in the scientific domain.

Murex advocates consider the *Murex tekhelet* to be a perfect example of a correspondence between religion and science (*Torah Umadda*). Rabbi Kenneth Brander from the Yeshiva University Center for the Jewish Future argues, “*Tekhelet* represents a living example of *Torah Umadda* in its fullest sense. Science, halacha, history, archeology, and the arts converge in this topic and work synergistically to highlight the promise of genuinely combining Torah, *mesorah* and modernity.”¹⁴

This statement exemplifies a harmonistic approach to the relationship of science to religion. For the *Murex* advocates, modern science rediscovered the ancient *tekhelet*, and in so doing merely reaffirmed ancient techniques. Moreover, for *tekhelet* advocates, comprehensive research of *tekhelet* seems to serve as a model for the Modern Orthodox harmonistic ethos concerning the ways science can serve religion. In this context it is noteworthy that the prominent *Murex* advocates are Modern Orthodox Jews who are natural scientists or at least have graduate degrees in the natural sciences. For example, Baruch Stermann, one of the leaders of Ptil Tekhelet, holds a PhD in physics and has authored several articles on various aspects of the relationship between science and religion. But above all, it is Rabbi Herzog who is most admired for being the perfect manifestation of the ideal of Jewish scholars whose research combines rabbinic erudition with extensive knowledge in the fields of biology, chemistry, textiles, history, philology, and linguistics.

The *Murex* narrative is also characterized by and infused with a sense of restoration and revival of the ancient Jewish past in the land of Israel. The *Murex* snail, whose shells were found in archaeological sites around the Mediterranean coast, was found again in the 20th century in the same area, this time alive, thereby serving as a link connecting past and present. Accordingly, one can also speculate that for *Murex* supporters, the lost *hillazon* is itself a visual living symbol of the people of Israel who were exiled and returned to their homeland. Moreover, the alleged rediscovery of the *Murex tekhelet* also affirms the central place of the Israelites in antiquity. “To the ancient Israelites,” write Stermann and Taubes-Stermann (2012), “these dyes possessed a holiness not by imperial fiat [like the Romans] but because God himself commanded their use in His worship” (pp. 9-10). It is noteworthy that the fascination regarding the possible restoration of a local industry of ancient times was not confined to religious supporters of *tekhelet* but shared also by secular Zionist scientists such as Ehud Spanier, Otto Elsner, and perhaps even Yigael Yadin. The interest experienced by Zionist scientists with *tekhelet* may have intensified as a consequence of the blue color of the Zionist flag being attributed to *tekhelet*. In any event, the alleged rediscovery of *tekhelet*

¹⁴ <http://tekhelet.com/programs> Accessed October 26, 2014.

functioned not only as a revival of a religious ritual, but also as a restoration of a national culture, yet another step in the revival of the Jewish people in the land of Israel. Archaeological discoveries that encouraged the *tekhelet* rediscovery—ancient pits of *Murex* shells on the Eastern Mediterranean shore, as well as pieces of mollusk-dyed cloths from the Judean Desert—translated the *tekhelet* initiative into another attempt to use archaeology for the sake of national purposes. Moreover, the fact that part of the archaeological findings were from the Judean Desert, and that Yigael Yadin himself thought or hoped that they were made of *tekhelet*, directly connected the lesser-known *tekhelet* initiative to the larger archaeological projects of the Judean desert, particularly Masada.

This Zionist orientation of *tekhelet* is supported by the fact that in addition to their Modern Orthodox orientation, Ptil Tekhelet activists belong to the religious Zionist camp. Moreover, some *Murex* advocates claim that renewing the *tekhelet* commandment in the land of Israel symbolizes the Zionist idea of a renewal of a Jewish state.

The fascination resulting from the revival of the Jewish people in and on the land of Israel brought with it messianic hope that joined with other messianic attributes of *tekhelet*. The messianic discourse surrounding *tekhelet* will be discussed below. At this stage it is important to clarify that *Murex* advocates focus on renewing the *tekhelet* of *tzitzit*, which is a personal commandment, and intentionally distance the issue from the more political messianic context of *tekhelet* in the temple. The reason for this appears to be that *Murex* advocates say that their aim is to bring *tekhelet* to every Jew regardless of the individual's political opinion, whereas the issue of the temple is heavily loaded with politics and controversy.

Finally, since *Murex* advocates aspire to having their *tekhelet* accepted by the entire Jewish people, they formulate their message in ways that portray *tekhelet* in a positive light, shying away from potentially controversial issues. One expression of this is the argument that by the law of *tekhelet tzitzit* “the Bible calls upon the entire community to join [...] religious aristocracy. By attaching a bit of the sacred, the *tekhelet* thread, to his everyday clothes, each individual becomes, in effect, a priest” (p. 29). By introducing that kind of egalitarian face of Judaism, *Murex* advocates encourage adoption of *tekhelet* with an implicit promise of religious elevation for all.¹⁵ Another expression is an emphasis on “positive” attributes of the color blue while marginalizing the “negative.” For example, an entire chapter of *The Rarest Blue* deals with the symbolism of *tekhelet* in various cultures (pp. 189–202). Sterman and Taubes-Sterman admit in a single paragraph that: “[T]he color blue also has negative connotations,” (p. 195) but they apparently dismiss such concerns as irrational by following that sentence with this one: “[M]ore solidly founded are the psychological effects of color and the specific emotional reactions they elicit,” (p. 196) subsequently describing in detail the “positive” effects of the color blue. Shying away from negative aspects of *tekhelet* might also explain the relative neglect of the various kabbalistic texts that discuss *tekhelet* in general and *tekhelet* of *tzitzit* in particular. In addition to presenting *tekhelet* as a manifestation of the godhead, kabbalistic texts, and in particular the Zohar, emphasize its dangerous and

¹⁵ This is explicitly stated when Sterman and Taubes-Sterman quote Jacob Milgrom (ibid.).

even demonic aspects. This threatening facet could deter Jews from adopting *tekhelet*. Moreover, Kabbalah as a domain of knowledge sometimes suffers, in the eyes of both secular and religious Jews, from a negative image of irrational idolatry. *Murex* advocates seem to attempt to evade that too; instead, they present *tekhelet* as a purely scientific-halakhic matter.

All of this excitement arising out of the renewal of *tekhelet* found expression in the aforementioned centennial conference. The “100 Years of *Tekhelet* Research” was much more than a centennial celebration of Herzog’s dissertation. It was a celebration of the *Murex* narrative with all of the aforementioned components, a synthesis between religion and modern science in the State of Israel. That is, a celebration of a national religious ethos. And last but not least, this conference was a coronation ceremony for Ptil Tekhelet as the authentic successor of Herzog, a recognition endorsed by the various institutions that participated in the conference.

Murex advocates expressed ambivalence toward Radzin *tekhelet*. On the one hand, they considered Leiner the pioneer of *tekhelet* and admired him for bringing *tekhelet* into discussion and implementation. On the other hand, they criticized his project as erroneous because he pointed to the *Sepia Officinalis* as the *hillazon*. They claimed that while pigments for painting were produced from this mollusk, it was not historically known as a source of dye. Moreover, since the techniques for producing pigments from the *Sepia Officinalis* had always been known, one could not claim that it was “concealed,” like *tekhelet* had to be. *Murex* advocates also claimed that in order to reach the desirable blue steadfast dye, the dye produced by Leiner was manipulated in such a way that it lacked organic elements and was actually identical to the *Prussian Blue* dye, which can be made from other sources, not necessarily a *hillazon*. It is no surprise, then, that this sharp criticism, which could be understood as positing that Leiner produced a fake *tekhelet*, elicited a no-less sharp response from the Radzin Hasidic camp.

The first opposition to the *Murex tekhelet* from the Radzin camp was expressed in 1997 by the Radziner rebbe himself.¹⁶ It is also noteworthy that the sharpest criticism of the *Murex* narrative came in 2001 from a Radziner Hasid and professor of medicine, Dr. Mendel Singer (Singer 2001, pp. 5-29). A response from Sterman (2002, pp. 112-124) prompted another from Dr. Singer (2002, pp. 97-110).¹⁷ But opposition to the *Murex* narrative also emerged from other places. Among the general supporters of *tekhelet*, opposition to *Murex* arose from supporters of the

¹⁶ An article supporting the *Murex*, written by Rabbi Mordechai Avraham Katz and published in 1997 in *Or Yisroel*, an Orthodox Jewish periodical, initiated a debate. In response to Katz’s article, Englard published an article in the subsequent volume, followed by Katz’s response. In the next volume the journal published three additional responses (in the “Responses” section, not as articles): A response from the aforementioned *Murex* advocate Rabbi Eliyahu Tavger; the response of Elhanan Reuven Goldhaber, another scion of the Leiner family supporting Radzin *tekhelet*; and a second response by Katz, the author of the first article.

¹⁷ Additionally, after the debate, this journal published two letters, taking opposing sides: Yechiel Yizchok Perr, *ibid*, 43 (2002), 125-128; Yisroel Yosef Taub, *ibid*, 44 (2002), 116-119.

third mollusk presented by Herzog, the *Janthina*. However, this opposition soon faded.¹⁸ Concurrently, debates arose inside the *Murex* camp, primarily against some of the non-scientific religious presuppositions of Ptil Tekhelet. That type of objection, prioritizing science over religion, was expressed by scientists who were also Orthodox Jews, such as Israel Ziderman and Zvi Koren.

Beyond the opposition expressed by supporters of the competing *tekhelet*, there were indeed various objections expressed by opponents of *tekhelet* in general. In fact, objections were expressed beginning in the 19th century against the Radzin *tekhelet*, and in the middle of the 20th century against Herzog's theoretical approach. But after the introduction of the *Murex tekhelet*, general opposition was directed against it rather than against the Radzin *tekhelet*, probably because of the former's popularity. New arguments, specifically against the *Murex tekhelet*, joined together with the old arguments against *tekhelet* in general. Some of the objections came from ultra-Orthodox Jews such as Rabbi Yosef Shalom Eliashiv (1910-2012), who was considered by many to be a leading authority for non-Hasidic ultra-Orthodox Jews (Eliashiv 1998). It is noteworthy that objections came also from the religious Zionist camp, with the opposition of Rabbi Shlomo Chaim Hacohen Aviner (b. 1943), a leading figure of the religious Zionist Jews in Israel and head of Yeshivat Ateret Yerushalayim (formerly Ateret Cohanim). The nature of his opposition is best exemplified in his exchange of correspondence with Rabbi Shmuel Ariel of Yeshivat Otniel, a notable supporter of the *Murex tekhelet*.¹⁹ Of those who rejected *tekhelet* from the Modern Orthodox camp, most disappointing for the *Murex* advocates was the possible objection to *tekhelet* expressed by Rabbi Yosef Dov Halevi Soloveichik (1903-1993). His stance was followed by a split in opinion on *tekhelet* between two disciples: Rabbi Zvi Hershel Shachter (b. 1941) of Yeshiva University who supported *tekhelet*, and Rabbi Aharon Lichtenstein (1933–2015), former dean of *Yeshivat Har Etzion* in Israel, who did not (more on this below).

The *Murex* narrative was so well received among Modern Orthodox and religious Zionist Jews that it was accepted as the “true,” “real,” or “authentic” *tekhelet*. As such, this narrative marginalized or ignored various disagreements regarding *tekhelet* and overshadowed competing narratives. Notably, Ptil Tekhelet did not ignore these objections. In most cases, one of its members responded in detail, and all of the relevant documents were uploaded to their website. Drawing from this documentation, as well as on material available elsewhere, I would like to discuss some of the focal points of the debate.

¹⁸ See, for example: Shaul Kaplan, “Gilui Hatekhelet,” *Or Torah* 417 (2002), 722-730 (Hebrew). One of those who seems to have been temporarily convinced by Kaplan was the Jerusalemite rabbi and kabbalist Itzhak Meir Morgenstern, *Penei Hama* (Jerusalem, 2009), 181-195 (Hebrew). On the matter of the decline of the *Janthina* theory, see: Diana Bahur-Nir, “The Hillazon of the Messiah,” *Calcalist Supplement*, January 16, 2014 (<http://www.calcalist.co.il/local/articles/0,7340,L-3621850,00.html>) Accessed October 26, 2014).

¹⁹ The letters of Aviner: Aviner 1996. The debate between Ariel and Aviner, as well as a reprint of Aviner's letters, was published in Ariel 2005, pp. 64-91.

Identifying the *Hillazon*: Tradition, Talmud, and Archaeology

Arguments against identifying the *Murex* as the *hillazon* were presented by the Radzin Hasidim, whose *hillazon* was disqualified by supporters of the *Murex* and by opponents who were against renewing *tekhelet* in general. The basic critique was that the *hillazon* must first and foremost meet halakhic criteria, and only then could archaeological evidence be relevant or fit into the mix, if at all. In this section, two major approaches will be discussed that prioritize religion over science in identifying the *hillazon*. Each approach emphasizes a different manifestation of religion: One that ascribes priority and greater weight to tradition, and one that places greater stock in the Talmud. Based on the presentation of these approaches, I will discuss the role of science in each.

Tradition

According to the approach that gives precedence to tradition, approving the usage of a specific *hillazon* for *tekhelet* necessitates proving that there was a tradition (*masoret*) of using it for the dyeing of *tzitzit* in antiquity. This general argument, which in the 20th century was lodged in particular against the *Murex*, was articulated in the 19th century by Rabbi Yosef Dov Halevi Soloveitchik of Brisk (1820–1892) vis-à-vis the Radzin *tekhelet*. In response to a request made by Leiner to approve his *tekhelet*, Soloveitchik claimed with hesitancy that if there was a tradition that Jews knew how to prepare *tekhelet* but refrained from doing so for whatever reason, that was reason enough to decide that the relevant dye was not *tekhelet*. However, if the method for preparing *tekhelet* was forgotten, then that forgetfulness might be a halakhic starting point for approving the renewal (Leiner 1891, pp. 13–14). Three generations later, the great-grandson of the Rabbi of Brisk, the famous Rabbi Yosef Dov Soloveitchik of Boston, known for his general rejection of scientific argument in shaping halakhic decisions, responded to the argument. Applying his perspective to the case of *tekhelet*, he was interpreted as arguing, like his great-grandfather, that without a tradition of using *tekhelet* since ancient times, *tekhelet* should not be renewed (Schachter 1999, pp. 53–54; Soloveitchik 2002, vol. 1, p. 249). This argument might explain why Soloveitchik refrained from wearing *tekhelet*, and his disciple Rabbi Aharon Lichtenstein, and perhaps others, did as well. However, another disciple of Soloveitchik, Rabbi Hershel Schachter, was not satisfied with that interpretation, which seemed to him to contradict Soloveitchik's general approach (Schachter 1999, p. 53, n. 26).

While the argument of the rabbi of Brisk was adopted by other opponents of *tekhelet*, the *Murex* advocates did not reject it. On the contrary; like the rebbe of Radzin, who used this argument to support his *tekhelet*, Israel Ziderman used this formulation to argue for the *Murex*. He claimed that both archaeological and historical evidence supported the use of the *Murex* for dyeing in antiquity (not necessarily by Jews). Taken together, the scientific evidence with the Jewish tradition about the concealment of *tekhelet* met the requirements for tradition and paved the way to the renewal of *tekhelet*.

Talmudic Criteria

Another religion-over-science approach that criticized the identification of the *Murex* as the *hillazon* argued that the *Murex* does not meet talmudic criteria for identifying the *hillazon*. This view was based on the existence of various references to the *hillazon* in rabbinic literature that can be interpreted as describing the *hillazon*. Rabbinic sources do not explicitly define these scattered references as criteria. It was probably the rebbe of Radzin who first defined a subset of these references as the requirement for identifying the *hillazon*. Future discussants on the topic of *tekhelet* expressed various opinions as to what references should be included in the set of criteria, and how each and every one of them should be interpreted. Debates arose between these different opinions.

An example of this approach can be found in the remarks of Rabbi Yisroel Reisman, a dean (*Rosh Yeshiva*) of Yeshiva Torah Vodaas in Brooklyn, New York. In a public talk (*shiur*) he gave on June 18, 2011, he explained his objections to *Murex tekhelet* (Reisman 2011). At the core of his argument was the basic postulate that for legal issues such as the *tekhelet* of *tzitzit*, the Babylonian Talmud should be the primary criteria, rather than other rabbinic works or scientific evidence. The *Murex* snail cannot be identified with the *hillazon* because it does not meet most of the talmudic references to the *hillazon*. For example, although the *Murex* is compatible with a statement that the *hillazon* is hunted between Tyre and Haifa (bShabat 26a), it does not fit other references that suggest that the *hillazon* is a fast creature that lives in deep water, alluding to an animal that is not a snail but more likely a fish. It should be noted that while Reisman criticizes the *Murex*, his argument that the *hillazon* ought to meet all talmudic references also disqualifies the Radzin *tekhelet*.

A less strict approach is that of the Radzin Hasidim, who rely on a set of criteria introduced in the 19th century by the Radziner rebbe (Leiner 1887). This approach is not as maximalist or purist as Reisman's. The Radziners do not consider all talmudic references as mandatory criteria and even allow for midrashic references to be considered criteria in addition to or instead of talmudic references. A few of the talmudic criteria the Radziners do accept are based on a single statement in the Babylonian Talmud: "This is the description of the *hillazon*: Its body is like unto the sea; its shape is like unto a fish, and it comes up once in seventy years; and with its blood *tekhelet* is dyed, wherefore is very dear" (bMen 44a. Translation according to Herzog 1987, p. 65). Mendel Singer, the sharpest opponent of the *Murex* from the Radzin camp, described this talmudic statement as the "strongest" or "primary" criteria for identifying the *hillazon* (Singer 2001, p. 8). Singer claimed, for example, that the *Murex* fails to pass the criterion of "its shape is like unto a fish."

This Radzin argument seems similar to Reisman's position and indeed the Radzin Hasidim approach gives priority to rabbinic sources over science, but differs from Reisman, who rejects any of the suggested candidates for *hillazon*. The Radzin Hasidim, willing to support their candidate, are more flexible in their approach, open to abandoning some of the talmudic sources if they generate obstacles to the *Sepia Officinalis*. It is Reisman's approach that seems to be the most extreme expression of preference of religion over science. Not only does he prefer rabbinic

sources over scientific evidence; even within the “religious” camp he gives exclusive status to the Babylonian Talmud, and demands that all the talmudic references to the *hillazon* be met. No talmudic reference can be neglected or replaced by a midrashic one.

In contrast to this approach that grants supremacy to talmudic references, *Murex* supporters, oriented more toward science, tried to minimize the number of rabbinic criteria. In Baruch Sterman’s response to Singer, on behalf of Ptil Tekhelet, he claimed that many of the talmudic references should be classified as *aggadic* material (non-legalistic text), such as the attribution of the proficiency to dye *tekhelet* to the tribe of Zebulun. This sort of *aggadic* material should not be counted as halakhic (Jewish legal) criteria for identifying the *hillazon* (Sterman 2002, p. 122). It seems that it was Singer’s critique that caused Sterman to reevaluate his position and subsequently shift his argument toward a smaller set of talmudic criteria.

Israel Ziderman was even closer to the scientific pole than Sterman. Backed by Rabbi Levy Itzhak Halperin’s halakhic responsum, Ziderman expressly claimed that archaeological and scientific evidence ought to be accorded preeminence or supremacy.²⁰ When looking for the *hillazon*, the first step is to locate a marine mollusk from which it is possible to produce a dye that meets the requirements of hue and steadfastness. Only then should this mollusk be evaluated according to rabbinic texts. Like Sterman, Ziderman also mentions a narrow set of criteria that comprise only two points: First, the basic tannaitic statement that a kosher *tekhelet* is that which is produced from a marine mollusk, whatever that be; and the midrashic historical observation that *tekhelet* was concealed. Ziderman rejects halakhic criteria even further when he argues that all of the rabbis who wrote about *tekhelet* after it was concealed (including authoritative figures such as Maimonides) never personally saw *tekhelet* or a *hillazon*. Thus their arguments ought to be understood as interpretations of the talmudic statements rather than as authoritative. It seems that Ziderman is the most “scientific” of all *Murex* advocates in the priority he ascribes to science. His approach is even more radical than that of Ptil Tekhelet, which narrows the criteria but still gives the Talmud equal footing. The differences between Ziderman and Ptil Tekhelet will emerge even more explicitly in the next section.

The debates between the *Murex* advocates and the Radzin group allude to a different historical objective in each *tekhelet* project: The Radzin Hasidim do not claim that their *tekhelet* is the original one, but rather a *tekhelet* that strictly adheres to a wide array of rabbinic criteria. In contrast, the *Murex* advocates aim for more than just a “kosher” *tekhelet*; their vision is to restore the original ancient *hillazon*. To put it succinctly: Radziners try to identify a talmudic *tekhelet*, whereas *Murex* supporters aim for an historical *tekhelet*.

The disagreement between the two camps runs even deeper. On a philosophical level, these two different approaches reflect two criteria of truth. The *Murex* supporters implicitly and maybe unconsciously have a correspondence theory of truth according to which *tekhelet* should correspond to “objective” (archaeological)

²⁰ <http://www.tekheletfoundation.com/en/halakha.php> Accessed October 26, 2014.

reality. Radziners hold a consistency theory of truth, according to which *tekhelet* should merely be consistent with a set of formal (talmudic) criteria.

Science and Its Doubts

Positioning either tradition or Talmud as the primary criteria for identifying the *hillazon* does not reject science *per se*; it downgrades it to a secondary level. In particular, those who give priority to the Talmud would not reject science, as long as their talmudic criteria are met. For example, that type of scientific argument was expressed by the aforementioned Radzin Hasid and professor of medicine, Mendel Singer, who claimed that the specific archaeological evidence promoted by the *Murex* advocates was not reliable. He argued that the scholarly literature about dyeing in antiquity cited by the *Murex* advocates was outdated. According to updated scholarship, there was no archaeological evidence for the usage of *Murex* for dyeing in blue. Although this specific criticism collapsed as soon as archaeologists found evidence of its use in the Judean desert a few years later (Sukenik et al. 2013), it still proved that scientific argument was not used solely by *Murex* advocates but also by supporters of the Radzin *tekhelet*.

A more general argument presented the whole field of archaeology as problematic because of its highly speculative nature, basing far-fetched hypotheses on scarce evidence (Adler 1999, pp. 43–44). But the most fundamental criticism challenged the use of science altogether and claimed that scientific evidence should not determine halakha. As presented above, that argument was articulated by supporters of tradition. For example, Rabbi Eliashiv (1998) wrote that scientific theories were halakhically problematic because they were refutable in principle. According to this argument, if scholars opposed Leiner's theory and pointed to a different *hillazon* (like Herzog's *Janthina*), which in turn was dismissed by later scientists who introduced a third *hillazon* (the *Murex*), then future scientists could undermine the current theory as well. Similarly, Rabbi Shlomo Aviner rejected the scientific approach to religious matters since every scientific theory is prone to refutation. He asserted that the renewal of *tekhelet* must be based on tradition: past usage of a specific *hillazon* followed by a practice of its concealment. According to Aviner, halakhic innovation should be based on stable foundations. Because tradition is not scientific, it is not refutable and thus not subject to doubt. Shmuel Ariel, mentioned above as one of the *Murex* advocates who corresponded with Aviner, argued that doubt lurks under almost every halakhic issue, yet decisors (*poskim*) do not avoid decisions.

Chemistry, Physics, and the Hue of *Tekhelet*

Debates surrounding the identification of the *hillazon* focused on the mollusks that were suggested by Herzog in 1913. It was the success in producing a blue hue from the secretion of the *Murex* that was deemed a breakthrough in the 1980s. I will now offer a simplified telegraphic background of the dye production process. The secretion of the *Murex* is a liquid that contains substances that when exposed to air

and light are converted into purple pigments, for example, dibromo-indigotin, but other pigments are also produced together with it (Koren 2008). This means that each of these molecules comprises two bromine atoms attached to an indigotin fragment, the latter being chemically identical to the blue pigment also produced from the indigo plant. Only by exposing the solution containing these dissolved pigments to sunlight was Otto Elsner able to succeed in separating the Bromine atoms from the dibromo-indigotin, thereby generating mostly indigotin, or indigo-blue. The resulting dye, which was declared *tekhelet* by the *Murex* advocates, was the focus of further debates. Criticism addressed the method used to prepare it, its chemical composition, and its hue.

On the matter of preparation, supporters of the Radzin *tekhelet* claimed that exposure to the sun is not mentioned in talmudic descriptions of the process of dyeing. Prof. Zvi Koren, who discovered the first *Murex* dyed cloth from ancient Palestine, claimed that in contrast to the Ptil Tekhelet position, exposure to the sun could not have been part of the ancient dye preparation process.

The *tekhelet*'s chemical composition too was a basis of sharp criticism in the aforementioned Singer-Sterman debate. Singer claimed that Ptil Tekhelet's argument that *tekhelet* is chemically identical to indigotin contradicts the tests that were introduced in order to distinguish between the two. In other words, that indigotin *tekhelet* cannot pass the tests for *tekhelet* described in the Talmud. He argued that since the Talmud states that the tests were performed, "it would seem presumptuous to doubt the veracity of the Gemara's tests. It is the scientist's conclusion that the *Murex* indigo is *techeilet* that needs to be re-examined" (Singer 2001, p. 15). Yet Baruch Sterman and other members of Ptil Tekhelet offered explanations as to why the talmudic tests still work. Against the backdrop of this debate, both sides consulted with Prof. Roald Hoffman, a Nobel laureate in chemistry (1991) who showed considerable interest in *tekhelet*'s chemistry and admired Herzog's work. Sterman, a *Murex* supporter, claimed that the *Murex tekhelet* contains remains of *Murex* meat that cannot be found in the indigo plant. Sterman suggested that because of this difference the *Murex tekhelet* should have passed the talmudic tests. To support this position, he wrote that "Nobel Chemist Prof. Roald Hoffman has told me that he finds this proposition plausible." Singer responded as follows:

Dr. Sterman suggests that Nobel chemist Dr. Roald Hoffman has deemed his explanation plausible. I contacted Dr. Hoffman, and he merely maintains that the presence of bits of snail meat makes it theoretically possible to develop chemical tests to distinguish snail indigo from plant indigo, not that it was at all likely for the snail meat to have any impact in the chemical test of the Gemara. (Singer 2002, p. 101)

Although Hoffman expressed general sympathy for the work of Ptil Tekhelet, and at least once even declared their *tekhelet* the authentic one, when it came to a specific scientific issue, he was cautious in formulating his opinion and did not take sides.

Notwithstanding the sharp disagreements regarding preparation and composition, the major disagreement was about the appearance of the dye or the exact hue of *tekhelet*. Although *tekhelet* in modern Hebrew is associated with light blue, it would

be anachronistic to assume that that has always been the case. Talmudic sources allow for different interpretations (Herzog 1987, pp. 78–97). In medieval times there were two traditions regarding the hue of *tekhelet*: an Ashkenazi “light” tradition according to which *tekhelet* was green or light blue, and a Sepharadi “dark” tradition defining the *tekhelet* hue as very dark blue, almost black. There is also a third option, which posits that it is purple or violet. This indecisiveness regarding the hue of *tekhelet* might result from the fact that during medieval times *tekhelet* was already absent from Jewish material culture so medieval writers did not see *tekhelet*. In the 20th century, most of the *Murex* advocates followed Herzog’s suggestion that the difficulty (according to the Talmud) of distinguishing between *tekhelet* and *kala-ilan* (which is identified as indigo) implies that the hue of *tekhelet* is indigo-blue. Otto Elsner’s success in producing a blue shade from the secretion of the *Murex* provided them with final confirmation.

Notwithstanding this wide acceptance of the blue *tekhelet*, a few prominent *Murex* advocates supported the violet option. Sidney Edelstein believed that the hue of *tekhelet* was due to blue indigotin together with some purple dye, and it seems that he did not change his mind when he learned of Elsner’s achievement.²¹ More notable was Israel Ziderman’s support for violet.²² The reason for his position was the aforementioned contradiction between the indigotin *tekhelet* and the talmudic tests (Ziderman 1988, 2008). Rabbi Yehuda Rock, who is associated with Ptil Tekhelet, responded to Ziderman.²³ The disagreement between Ziderman and Ptil Tekhelet also had institutional implications: The first *tekhelet* association in Israel was Israel Ziderman’s Keren Hatekhelet, which promoted a violet *tekhelet*. Ptil Tekhelet was the second association. The disagreement over the hue was one of the informal reasons for its establishment.²⁴

An even more internal debate took place regarding the lightness of the blue hue of *tekhelet*. While Ptil Tekhelet supports a light-blue hue, there are two voices that support a darker hue. Zohar Amar (Amar 2011), a Bar-Ilan University professor, suggested that Maimonides thought that *tekhelet* should be dark. However, the staunchest supporter for dark blue-purple is the aforementioned Zvi C. Koren of Shenkar College. Koren, who introduced a dark violet *Murex*-dyed piece of textile from Masada, argued that the color of the ancient *tekhelet* was a purple-blue hue, more similar to a dark-blue than to the light-blue advanced by Ptil Tekhelet. In an interview with *The New York Times* Koren stressed that his discovery did not contradict the rabbinic claim that *tekhelet* resembles the sky, but rather that the resemblance is to a night sky. In the article, Baruch Sterman responded that the new

²¹ Rabbi Eliyahu Tavger relayed this view to me in an in-person interview on March 7, 2013. In Edelstein’s preface to Herzog’s dissertation he does not discuss the hue of *tekhelet*.

²² However, it seems that subsequently Ziderman changed his opinion after discovering that when a purple *Murex* dye is heated, it can turn blue, and perhaps constitute the hue of *tekhelet*.

²³ Yehuda Rock, “*Hidush Hatekhelet Veinyanei Tzitzit Vetekhelet*,” <http://www.tekhelet.com/pdf/rak.pdf> (Accessed October 26, 2014), 15–17. It is likely that after receiving this critical response Ziderman clarified his argument: Although the Hebrew word *sagol* סגול denotes both violet and purple, he claimed that *tekhelet* is violet whereas *argaman* is purple. See: <http://www.tekhelet.info/111037/Was-tekhelet-a-blue-colour> Accessed October 26, 2014.

²⁴ Rabbi Eliyahu Tavger communicated this to me in an in-person interview on March 7, 2013.

discovery would not change Ptil Tekhelet's guidelines, and that all shades of blue were acceptable to the ancient Israelites (Kraft 2011). But what seemed to be an exchange of ideas evolved into a bitter debate on the pages of the *Biblical Archaeology Review* under an article entitled "The Great *Tekhelet* Debate—Blue or Purple?"²⁵ Without going into great detail, I will say that Baruch and Judy Taubes-Sterman defended their light-blue position, claiming that "[t]he provenance of the Masada fragment, however, is a matter of pure speculation" (Sterman and Taubes-Sterman 2013). Koren responded twice to their arguments, while also pointedly attacking the Stermans: "It is troubling that the Stermans continue their distortions of facts, espousing misinformation and disinformation, even in their response to my criticism of their original article. To put words in my mouth, or in Rashi's mouth, that were never said or written is misrepresentation" (Koren 2014).

In the context of the relationship between science and religion, it should be noted that the debates regarding the preparation and chemical composition of the dye are scientific in principle. However, the debate about the hue commingles religious and scientific argument. The view that *tekhelet* is blue combines religious reasoning (the talmudic text) and scientific achievement (Elsner's achievement), whereas the violet and purple positions are more rooted in science. Moreover, it is noteworthy that the Ptil Tekhelet position that *tekhelet* was light-blue was criticized from two different directions. On the one hand, Amar's argument for a dark hue was rooted in religion, as it was based on the texts of Maimonides. On the other hand, Koren's argument for a dark hue was scientific and based on the chemical analysis of the piece of cloth found on Masada.

Authority and Subversion

One of the old-new arguments against both 19th- and 20th-century *tekhelet* renewal projects was the fact that proponents of *tekhelet* encountered challenges in getting formal approbations for their *tekhelet* positions from the contemporaneous leading authoritative rabbis (Hebrew: *Gedolei hador*). On the other hand, most of these rabbis did not reject *tekhelet* in a definite way. Of course, the question arises as to who is considered a leading rabbi, and how to interpret an opinion of hesitation. This argument was offered by the Radzin Hasidim against the *Murex* advocates to claim that no leading rabbinic authority supports the *Murex*. The *Sepia Officinalis*, however, was supported by Leiner, who was an authority in the eyes of the Radzin group, as well as other prominent rabbis such as Shalom Mordechai Shvadron (1835-1911) and the controversial rabbi Akiva Yosef Shlezinger (1837-1922).

An example of this argument can be found in the most notable opponent to *tekhelet* within religious Zionist circles: Rabbi Shlomo Aviner. In the aforementioned epistolary exchange with Rabbi Shmuel Ariel, Aviner argued that the approbation of contemporary leading rabbis should be a prerequisite for any *tekhelet* renewal. But these *Gedolei hador* still have not expressed their opinions. Aviner

²⁵ For references to the parts of the debate: <http://www.biblicalarchaeology.org/daily/archaeology-today/biblical-archaeology-topics/scholars-study-the-great-tekhelet-debate/> Accessed October 26, 2014.

also argued that personal adoption of *tekhelet* by lay people or by youngsters constituted acts of arrogance of pietistic pretense and rude actions vis-à-vis these leading rabbis.

In Ariel's response to Aviner, he complained that leading rabbis hesitated too much. Moreover, in the specific case of *tekhelet*, which requires knowledge from various fields, Orthodox *tekhelet* scholars should be more authoritative than rabbis who are unacquainted with the subject, prominent as they may be. In addition to this seemingly subversive argument, Ariel also hinted that by saying that no leading rabbis supported *tekhelet*, Aviner did not pay respect to leading religious Zionist rabbis who did support *tekhelet*, such as Rabbi Dov Lior.

Aviner responded furiously to Ariel's subversive tone on the source of authority on matters of the *tekhelet*:

Who are we to preach to the leading rabbis to hasten their decision? What will happen if we wait a few more years or even generations?! Is the Israelite community burning in fire because there is no *tekhelet*?! Is it such an urgent problem?! Open your eyes and you will see so many young people cry for the honor of the *tekhelet* cord. They put a *tekhelet* cord in their *tzitzit* in order not to omit a single law of the Torah. However, other laws are not so precious for them, and they repulsively transgress in slander, trivia, getting close to women, adopting rotten behavior and other sicknesses, god forbid. And this is a sign that the *tekhelet* cord is for them nothing but arrogance and haughtiness. They also do not avoid criticizing the great rabbis of our generation. But scholars and righteous like you know for sure that one needs patience and humility for these great rabbis of our generation, and humbly accept their temperance. And this is incomparably more important than the *tekhelet* cord. (quoted by Ariel 2005, p. 89)

Although Aviner explicitly excluded Ariel from the reckless young men, it seems that part of his reproach was directed toward Ariel, too. The tension between Aviner and supporters of *tekhelet* might also have had an inter-generational dimension: Ariel considered the hesitancy or dilatoriness of the sages as over-conservatism. Aviner considered that sort of criticism a dangerous subversion of an arrogant younger generation that lacked respect for its sages. From a broader perspective, Aviner's standpoint regarding renewal of *tekhelet* can be understood as a specific manifestation of a more general conservative anti-activist standpoint. Another example of that stance was his opposition to initiatives of Orthodox Jews to enter the Temple Mount. On this matter he also stated that the majority of the leading rabbis did not support the activist approach (Inbari 2009, 2012). But Aviner was not totally consistent in his position about *tekhelet*. For example, while he did not consider specific rabbis like Dov Lior as *Gedolei hador* in the context of *tekhelet*, he did consider him as such in the context of the debate about the method of teaching the Bible in the religious Zionist yeshivot (school for the study of rabbinic texts).

From a different angle, the arrogant independence and haughtiness denounced vehemently by Aviner can also be understood as an expression of what Shlomo Fischer termed "the Romantic expressivist nationalistic religious culture" (Fischer 2012, p. 110) of contemporary religious Zionism in Israel. From that perspective,

wearing a *tekhelet* cord in public is an individualistic act that expresses a pietistic return to ancient roots and emphasizes the radical aspect of *tekhelet* rather than its modern facets.

Messianism

The renewal of *tekhelet* was accompanied by messianic hope to varying degrees. There was a personal spiritual messianism of enhanced sacredness by virtue of the addition of a hitherto missing link to the whole set of commandments required by Jewish law (Magid 1998, pp. 46–48). There was also a more public or communal messianism according to which the renewal of *tekhelet* was part of a deep process of the restoration of the Jewish past, and as such brought the utopian redemption closer to realization. Finally, there was a concrete political level according to which the renewal of *tekhelet* removed one more obstacle on the path toward renewing the temple, thereby contributing to the efforts to advance the establishment of a present-day religious Jewish state.

Some supporters of renewing the temple asserted that there was no need to waste time in finding the authentic *hillazon* because in some cases a *hillazon* was not required and *tekhelet* could be produced from other sources, such as plants. This argument was also articulated in the 19th century, but not against the Radzin *tekhelet*. German Rabbi Israel Lipschits (1782–1860), who discussed the requirements for the priestly garments in the temple, concluded that on the matter of *tekhelet*, the only requirement was a steadfast “himmelblau” dye; it did not have to be produced from a *hillazon* (Lipschitz 1843, pp. 101–108). Individuals or groups that wanted to reinstate the temple worship adopted that argument in trying to remove or bypass any inhibiting factor toward practical renewal of the temple. Tzvi Hirsch Kalisher (1795–1864), a proto-Zionist rabbi with more practical aspirations to renew temple liturgy, expressed a similar stance (Kalisher 2002, pp. 99–120; pp. 161–163). Additionally, in the 20th century Herzog and Rabbi Yehiel Michel Tukachinsky (1872–1955) corresponded on this very same question about the specific requirements of *tekhelet* for the temple (Tukachinsky 1970, pp. 37–60).

These messianic aspects of *tekhelet* raised opposing responses: while some *tekhelet* advocates believed that *tekhelet* was a sign of the redemption, or that the very act of renewal of *tekhelet* advanced redemption, opponents of *tekhelet* assumed that redemption had not yet arrived. Opponents of *tekhelet* claimed that according to Rabbi Isaac Luria (Ha’ari) *tekhelet* would be renewed only when the messiah comes. This argument had already been lodged against the rebbe of Radzin and was part of an overall opposition that rejected altogether the renewal of *tekhelet*. According to that position, renewal of *tekhelet* was a forbidden hastening of redemption (*dehikat hakets*). Moreover, although not explicitly stated, Orthodox opposition to the messianic aspects of *tekhelet* could be related to the fact that the political aspect of such messianism resembled Zionism in its aspiration to restore the ancient Israelite past in the land of Israel. The blue color of the Zionist flag of the renewed *tekhelet* visibly symbolized that affinity. But Zionism was unacceptable to various Orthodox circles because of its modern secular nature that seemed to threaten traditional Jewish life.

The controversial character of the political messianism of *tekhelet* seems to explain the fact that *Murex* advocates limited themselves to expressing messianic hopes in the first two categories: the personal and communal. For example, some of them, inspired by a specific Zoharic passage, understood the appearance of the blue color from the secretion of the *Murex* as an embodiment of the appearance of a spiritual redemption, either personal or communal, but not necessarily political (Drori 2003). It appears that *Murex* advocates shied away from the political dimension of messianism possibly associated with *tekhelet*. Associating *tekhelet* with this sort of messianism could generate controversy, whereas the *tekhelet* project was aimed at the entire Jewish people, regardless of political opinion. *Murex* advocates also avoided controversial topics such as Kabbalah as mentioned above.

Adhering to this type of apparently restrained messianism, *Murex* advocates again found themselves caught between two opposing positions. On the one hand, general opponents of *tekhelet* considered them to be too messianic. On the other hand, supporters of political messianism claimed that they were too hesitant. An example for the latter opposition is the critique expressed by the Temple Institute of Jerusalem.

Among the Temple Institute's major objectives is the preparation of various artifacts required for the temple liturgy. Some artifacts present obstacles that have to be addressed. The issue of a red heifer, whose ashes are required for purification, is in fact yet to be resolved (Inbari 2009, pp. 31–50). However, the issue of *tekhelet*, required for the garments of the high-priest, among other objects, seems to have been resolved by the introduction of the new *tekhelet*. Today the Temple Institute engages in some cooperation with Ptil Tekhelet, but when *tekhelet* was introduced, the Temple Institute could not ignore the debates that surrounded *tekhelet*. In 1996, the Temple Institute published the fifth volume of its periodical *Tsfia* (Temple Institute 1996; *Tsfia* in Hebrew: Observation and Anticipation). This volume was dedicated to the dyes required for temple worship: *tekhelet*, *argaman* (purple), and *tola'at shani* (crimson or kermes dye). Much of the volume discusses *tekhelet* in an anonymous polemical manner that might have been formulated by the institute's head, Rabbi Israel Ariel (b. 1939). The text's polemical argument is twofold: first, a single polemical chapter argues against general opponents of *tekhelet*, specifically against Rabbi Menachem Mendel Kasher (1895–1983), who opposed Herzog's support of the renewal of *tekhelet* (Kasher 1967, pp. 3–11); second, a more extensive polemical discussion against the *Murex* advocates.

The polemics against *Murex* advocates includes an extensive halakhic discussion with various arguments that all lead to a similar conclusion: that the demand for a *hillazon* is not as strict and definite as the supporters of *hillazon* claim. First, there is no need to produce the dye from a specific mollusk because the rabbinic criteria are not that definite. Second, the exact hue of *tekhelet* is not important as long as it is bluish. Third and most important, producing *tekhelet* from *hillazon* is relevant only for *tekhelet* of *tzitzit*, and even in this case it is only *mitzvah min hamuvhar*, meaning it is not mandatory but only an option for observing the law in a better way. This flexible approach regarding *tekhelet* stems from a general stance that laws related to the temple should be performed despite doubts that may be associated with them. This is the recommended practice; otherwise, temple worship could linger for a long time due to excessive meticulousness.

This loose approach toward these snail fights is exemplified in the author's recommendation:

If one would like to be strict and conform to all opinions, one could put on the priestly sash various hues of *tekhelet*, such as dark blue, light blue, and even *hillazon tekhelet*, if available. That way he will conform to all demands and hues. Also, if one would like to conform to all opinions, one could take *tekhelet* from various mollusks species; color the cords according to various approaches and prepare the priestly sash as such. This way, one adheres to all halakhic opinions. (Temple Institute 1996, p. 88)

Like the aforementioned debate between Aviner and Ariel, here too the debate surrounding *tekhelet* reflects a broader tension. But whereas in the debate about *tekhelet* of *tzitzit*, *tekhelet* advocates complained that the prominent rabbis of the generation were too hesitant, in the context of the temple, these same advocates are those accused of hindering the progress of the temple. So the *Murex* advocates are accused from both the conservative standpoint of Aviner as well as the radicalist position of the Temple Institute. Notably, a few years earlier, the Temple Institute also criticized Aviner for his passive standpoint regarding entering the Temple Mount (Ariel 1985).

Concluding Remarks

Although the debates about *tekhelet* seem heated, one should be mindful of the fact that they are confined within the walls of Orthodoxy. Karaite Jews rejected the demand for *hillazon* as part of their overall rejection of rabbinic halakha. And for non-Orthodox religious Jews, especially those who do not see Orthodox halakha as obligatory, such as Reform Jews, the halakhically kosher *tekhelet* is not a pressing matter. On the contrary, in some of these circles there is general openness for and acceptance of colors in Jewish ritual. An example for this is the colorful prayer shawl initiative of Rabbi Zalman Schachter-Shalomi.

From a diachronic perspective, it is obvious that the 20th-century *tekhelet* debate is not totally new; it shares some characteristics with its 19th-century predecessor, the discussion that developed after the rebbe of Radzin introduced his *tekhelet* in the 1880s.²⁶ First, in each debate the opposition to *tekhelet* focused on the specificities of the identification of the *hillazon*, the hue of *tekhelet*, and the steadfastness of the resulting dye. Second, in both cases these specificities actually covered the issue of the legitimacy of renewing a lost commandment, whose state of not being performed became a religious directive in its own right. Finally, the two initiatives shared a pietistic impulse from below, expressed by lay-people who adopted the practice of wearing *tekhelet* and faced an opposition deeming it a subversion, either toward *Gedolei hador* or tradition.

Nevertheless, within contemporary Orthodox Judaism, the attempts to renew *tekhelet* cannot be minimized as the technicalities of one of many Jewish commandments or as an ordinary halakhic debate, similar to other past and present debates, of interest only to the

²⁶ I intend to discuss the 19th-century *tekhelet* initiative and debate in a separate article.

rabbis and not to all Jews. After presenting the *Murex* narrative in a previous section and discussing some of the objections directed toward it, I would like to now briefly discuss some of the deeper roots of the opposition to *tekhelet*.

Twentieth-century *tekhelet* encapsulates modernity's challenge to Orthodoxy. Although the *tekhelet* initiative is presented as a restoration of ancient tradition, it actually breaks with another tradition, the later Orthodox practice of intentionally avoiding *tekhelet* (which is in itself modern). The Orthodox conservative ethos of rejecting innovation and submitting oneself to the leading rabbis in the name of tradition was undermined by a modern project that pursued an even more authentic tradition. *Murex tekhelet* has at least three significantly innovative aspects, each modern in its own way; all of them seem to contribute to the acceptance of *tekhelet* by Modern Orthodox Jews and religious Zionists. Accordingly, all of them contributed to the opposition to *tekhelet* by conservative Orthodox circles.

Modern science was the main and most explicit focal point of innovation and objection. To be sure, science as such is not rejected by Orthodox Jews. In addition to the basic positive attitude toward science in the Modern Orthodox worldview, applied sciences such as medicine and engineering are accepted in the daily lives of all Jews and are often used by rabbis in their halakhic decisions. The science in the fields of archaeology and history, areas in which the research concerning the *Murex tekhelet* was heavily based, is most threatening. These fields of knowledge seem speculative, unreliable, and open to personal interpretation. They can also contradict sacred history and raise heretical doubt in the minds of religious people, even leading to secularism.

Another major point of opposition toward science was that in the case of *tekhelet* scientific knowledge was not just a secondary or auxiliary source for the halakhic discussion that halakha could do without; it was a major source without which *Murex tekhelet* could not have been renewed. This shift afforded Orthodox Jews autonomy in making their halakhic decision about *tekhelet*. Thus, *Murex tekhelet* undermined the authority of the Talmud (for example, by claiming that talmudic characterizations of the *hillazon* are *aggadic* and should not be taken literally), as well as the sovereign authority of Orthodox rabbis (for example, by the claim that they do not possess scientific knowledge that is required in the *tekhelet* case). In any event, *tekhelet* introduces a paradigm shift with regard to the sources of authority for Orthodox Jews, according to which, in some cases, science should take preference over tradition and rabbis.

Another threatening innovative aspect of *tekhelet* was the sense of authenticity that it signified, one that could be pursued individually, without the involvement of rabbis. As suggested above, the ostentatious wearing of *tekhelet* by spiritual or radical religious Zionists expressed a pietism of being among those hyper-religious who perform this lost commandment, as well as a sense of authenticity of returning to the ancient Israelite past. As Shlomo Fischer noted in a different context, that sort of expressive and somewhat romantic individualism is actually modern in nature. In the case of *tekhelet*, the threatening aspect of that hyper-religiosity was that it presented the leading rabbis who avoided *tekhelet* as not sufficiently pious.

The Zionist orientation of *Murex tekhelet* seems to have proposed another modern challenge to Orthodoxy. Although this point was not stated explicitly, identifying the *Murex tekhelet* with religious Zionism, both ideologically and

socially, might have been a source of opposition from the standpoint of non-Zionist ultra-Orthodox Jews. Related to the Zionist orientation of the *Murex tekhelet* was its orientation toward political messianism. As was the case of science, the problem was not with messianic ideas *per se* (which no Orthodox Jew could deny) but with the concomitant modern secular nationalistic associations. The *Murex tekhelet* initiative was too Zionistic and loaded with too much political messianism to be accepted in ultra-Orthodox circles. Hence, it is no surprise that the *Murex tekhelet* was accepted primarily in religious Zionist circles.

Although *tekhelet* activists felt that they represented modern science and although they were marked as such by opponents of *tekhelet*, they also faced opposition from the scientists themselves. Those scientists argued that *tekhelet* activists were not scientific enough, and that scientific evidence was being distorted for the sake of the religious objective of renewing the *tekhelet* commandment. Stated differently, their standpoint of harmony between science and religion generated objection from both the scientific and religious camps. In a similar fashion, *tekhelet* advocates were doubly criticized in the messianic domain: *tekhelet* opponents criticized their activity as hastening redemption, whereas Temple activists complained that they were delaying the messianic era.

A target of double criticism, *tekhelet* advocates seem to be part of a wider phenomenon of religious Zionist researchers who attempt to use scientific knowledge for their religious objectives. An illuminating parallel to the contemporary *tekhelet* debate is what Michael Feige termed “the second stage of national archaeology” in Israel (Feige 2007). Feige discussed a circle of amateur religious Zionist archaeologists who conducted archaeological research in the occupied territories of Judea and Samaria, seeking archaeological evidence to support the history of ancient Israel in these areas. These sorts of archaeological research activities were not limited to the shaping of a national narrative but like *tekhelet*, were also applied in the halakhic domain. For example, these archaeologists suggested rescheduling the festive day of Purim in places that they believed to have been surrounded by a wall in biblical times. Beyond the basic similarity of using archaeology to shape a national narrative as well as to generate halakhic conclusions, there is similarity in the structure of the opposition: *tekhelet* activists as well as the second-stage national archaeologists are considered too scientific by their own religious establishment on the one hand, but not scientific enough and too religious by professional scientists, be it chemists or archaeologists, on the other.

The multifaceted character of the *tekhelet* debates constitute much more than a commandment. *Tekhelet* is a simple visual symbol that concurrently connotes modernity, pietism, and Zionism. As such, *Murex tekhelet* conveys a comprehensive ethos and functions as a component of the group identity of some Modern Orthodox Jews, in particular religious Zionists. Without adopting any particular position in the *tekhelet* debates, I posit that all sides would agree with Rabbi Israel Reisman in his *shiur* against *tekhelet*; that “in certain circles the blue *tekhelet* is very much like the black hat is in the yeshiva world—it has a meaning of its own. It identifies you with a certain *toyredikeh velt* [world of Torah]” (Reisman 2011, 50:25). The bluish thread of *tekhelet* has thus become a highly visible sign of a modern-pietist-Zionist Judaism, with all of its complicated relationships to science, authority, and messianism.

References

- Adler, Menachem Mendel. 1999. *Kuntres tekhelet ve-argaman*. Jerusalem: Hamosad Le'idud Limud Hatorah (Hebrew).
- Amar, Zohar. 2011. The color of *tekhelet* according to Maimonides. *Hama'yan* 52(2): 77–87 (Hebrew).
- Ariel, Israel. 1985. When will the temple be rebuilt? *Tsfia: Anthology for the issues of our time* 2: 49–58 (Hebrew).
- Ariel, Shmuel. 2005. *Ma'amarim benose tekhelet*. Otniel: Beit Vaad Har Hevron (Hebrew).
- Aviner, Shlomo Haim Hacohen. 1996. Igrot ktsarot. *Iturei Kohanim* 140: 15–18 (Hebrew).
- Ben-Yehuda, Nachman. 1995. *The Masada myth: Collective memory and mythmaking in Israel*. Madison, WI: University of Wisconsin Press.
- Ben-Yehuda, Nachman. 2002. *Sacrificing truth: Archaeology and the myth of Masada*. Amherst, NY: Humanity Books.
- Ben-Yehuda, Nachman. 2007. Excavating Masada: The politics-archaeology connection at work. In *Selective remembrances: Archaeology in the construction, commemoration, and consecration of national pasts*, ed. Philip L. Kohl, Mara Kozelsky, and Nachman Ben-Yehuda, 247–276. Chicago: University of Chicago Press.
- Brooke, John Hedley. 1991. *Science and religion: Some historical perspectives*. Cambridge: Cambridge University Press.
- Burstein, Menahem. 2000. *Tekhelet*. Jerusalem: Sifriati-Gitler (Hebrew, first edition: 1988).
- Eliashiv, Yosef Shalom. 1998. Tekhelet of tzitzit in our times. *Halikhot sadeh* 109: 9–10 (Hebrew).
- Drori, Tsfania. 2003. Zerizim Makdimim Lilbosh Tekhelet Malkhut. *Ma'ayanei Hayeshu'ah: Hatnu'ah Letarbut Israel* 85 (Hebrew).
- Elsner, Otto, and Ehud Spanier. 1987. The past, present and future of Tekhelet. In *The royal purple and the biblical blue: Argaman and tekhelet: The study of Chief Rabbi Dr. Isaac Herzog on the dye industries in ancient Israel and recent scientific contributions*, ed. Ehud Spanier, 167–177. Jerusalem: Keter Publishing House.
- Feige, Michael. 2007. Recovering authenticity: West-Bank settlers and the second stage of national archaeology. In *Selective remembrances: Archaeology in the construction, commemoration, and consecration of national pasts*, ed. Philip L. Kohl, Mara Kozelsky, and Nachman Ben-Yehuda, 277–298. Chicago: University of Chicago Press.
- Finkelstein, Israel, and Neil Asher Silberman. 2001. *The Bible unearthed: Archaeology's new vision of ancient Israel and the origin of its sacred texts*. New York: Free Press.
- Fischer, Shlomo. 2012. Fundamentalist or romantic nationalist? Israeli modern orthodoxy. In *Dynamic belonging: Contemporary Jewish collective identities*, ed. Harvey E. Goldberg, Steven M. Cohen, and Ezra Kopelowitz, 91–111. New York: Berghahn Books.
- Herzog, Isaac. 1987. *The royal purple and the biblical blue: Argaman and tekhelet: The study of Chief Rabbi Dr. Isaac Herzog on the dye industries in ancient Israel and recent scientific contributions*, ed. Ehud Spanier. Jerusalem: Keter Publishing House.
- Inbari, Motti. 2009. *Jewish fundamentalism and the Temple Mount: Who will build the third temple?* (trans: Shaul Vardi). Albany: SUNY Press.
- Inbari, Motti. 2012. *Messianic religious Zionism confronts Israeli territorial compromises*. Cambridge: Cambridge University Press.
- Kalisher, Tzvi Hirsch. 2002. In *Drishat Tzion*, ed. Yehuda Etzion. Jerusalem: Mossad Harav Kook (Hebrew).
- Kasher, Menachem Mendel. 1967. *Torah shlema*, vol. 25. *Addendum to Parashat Truma*. Jerusalem: Machon Torah Shlema (Hebrew).
- Kohl, Philip L., Mara Kozelsky, and Nachman Ben-Yehuda. 2007. *Selective remembrances: Archaeology in the construction, commemoration, and consecration of national pasts*. Chicago: University of Chicago Press.
- Koren, Zvi C. 2008. Archaeo-chemical analysis of royal purple on a Darius I stone jar. *Microchimica Acta* 162: 381–392.
- Koren, Zvi C. 2013. New chemical insights into the ancient molluscan purple dyeing process. In *Archaeological chemistry VIII, ACS symposium series 1147*, ed. Ruth Ann and James H. Burton, chap. 3, 43–67. Washington, DC: American Chemical Society.
- Koren, Zvi C. 2014. Zvi C. Koren's reply to the Stermans' response: Continuing the tekhelet debate. <http://www.biblicalarchaeology.org/daily/biblical-artifacts/artifacts-and-the-bible/zvi-c-korens-reply-to-the-stermans-response/> (Accessed 26 Oct 2014).

- Kraft, Dina. 2011. *Memo from Ramat Gan: Rediscovered, ancient color is reclaiming Israeli interest*. <http://www.nytimes.com/2011/02/28/world/middleeast/28blue.html?emc=eta1> (Accessed 26 Oct 2014).
- Lamm, Norman. 1990. *Torah Umadda: The encounter of religious learning and worldly knowledge in the Jewish tradition*. Northvale, NJ: Jason Aronson.
- Leiner, Gershon Hanokh. 1887. *Sefunei tmunei hol*. Warsaw: Haim Kelter Publishing House (Hebrew).
- Leiner, Gershon Hanokh. 1891. *Eyn hatekhelet*. Warsaw: Meir Yehiel Halter Publishing House (Hebrew).
- Liebman, Charles S. 1988. Modern orthodoxy in Israel. *Judaism* 100: 405–410.
- Lipschitz, Israel. 1843. *Mishnayot seder moed im peirush tiferet Israel, part Kuvat rochlim*. Danzig: Rathke & Schroth.
- Magid, Shaul. 1998. 'A thread of blue': Rabbi Gershon Henoch Leiner of Radzyń and his search for continuity in response to modernity. *Polin* 11: 31–52.
- Reisman, Yisroel. 2011. http://www.yutorah.org/lectures/lecture.cfm/761970/Rabbi_Yisroel_Reisman/Techeles_Hachodosh (Accessed 26 Oct 2014).
- Robinson, Ira. 2000. Judaism since 1700. In *The history of science and religion in western tradition: An encyclopedia*, ed. Gary B. Ferngren, 329–332. New York and London: Garland.
- Rosenberg, Shalom. 1988. *Torah Umada Bahagut Hayehudit Hahadasha*. Jerusalem: Ministry of Culture and Education (Hebrew).
- Ruderman, David B. 2000. Judaism to 1700. In *The history of science and religion in western tradition: An encyclopedia*, ed. Gary B. Ferngren, 270–276. New York and London: Garland.
- Schachter, Tzvi. 1999. *Nefesh Harav*. Jerusalem and New York: Flatbush Beth Hamedrosh (Hebrew).
- Singer, Mendel E. 2001. Understanding the criteria for the chilazon. *Journal of Halacha and Contemporary Society* 42: 5–29.
- Singer, Mendel E. 2002. A response to Sterman in the letters section. *Journal of Halacha and Contemporary Society* 44: 97–110.
- Soloveitchik, Yosef Dov Halevi. 2002. *Shiurim Lezekher Aba Mari*. Jerusalem: Mossad Harav Kook (Hebrew).
- Sterman, Baruch. 1996. The science of Tekhelet. In *Tekhelet: The renaissance of a Mitzva*, ed. Alfred S. Cohen, 63–78. New York: Yeshiva University Press.
- Sterman, Baruch. 2002. The source of techelet: A response to Dr. Singer. *Journal of Halacha and Contemporary Society* 43: 112–124.
- Sterman, Baruch, and Judy Taubes-Sterman. 2012. *The rarest blue: The remarkable story of an ancient color lost to history and rediscovered*. Guilford, CT: Lyons Press.
- Sterman, Baruch, and Judy Taubes-Sterman. 2013. *Baruch and Judy Taubes Sterman respond*. <http://www.biblicalarchaeology.org/daily/archaeology-today/biblical-archaeology-topics/baruch-and-judy-taubes-sterman-respond/> (Accessed 26 Oct 2014).
- Sukenik, Naama, David Iluz, Orit Shamir, Alexander Varvak, and Zohar Amar. 2013. Purple-dyed textiles from Wadi Murabba'at: Historical, archaeological and chemical aspects. *Archaeological Textiles Review* 55: 46–54.
- Temple Institute. 1996. *Tsfia: Hikrey mikdash*, 5 (Hebrew).
- Tukachinsky, Yechiel Michel. 1970. *Ir hakodesh vehamikdash*, part 5. Jerusalem: Salomon Printing House (Hebrew).
- Wilson, David B. 2000. The historiography of science and religion. In *The history of science and religion in western tradition: An encyclopedia*, ed. Gary B. Ferngren, 2–11. New York and London: Garland.
- Zerubavel, Yael. 1995. *Recovered roots: Collective memory and the making of Israeli national tradition*. Chicago: University of Chicago Press.
- Ziderman, Israel. 1988. Lehidush mitsvat tekhelet batsitsit. *Tehumin* 9: 423–446 (Hebrew).
- Ziderman, I. Irving. 2008. The biblical dye tekhelet and its use in Jewish textiles. *Dyes in History and Archaeology* 21: 36–44.

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