



## The Great *Tekhelet* Debate—Blue or Purple?

Baruch and Judy Taubes Stermen

FOR ANCIENT ISRAELITES, *TEKHELET* WAS God's chosen color. It was the color of the sumptuous drapes adorning Solomon's Temple (2 Chronicles 3:14) as well as the robes worn by Israel's high priests (Exodus 28:31). Even ordinary Israelites were commanded to tie one string of *tekhelet* to the corner fringes (Hebrew, *tzitzit*) of their garments as a constant reminder of their special relationship with God (Numbers 15:38–39).

But how do we know what color the Biblical writers had in mind? While *tekhelet*-colored fabrics and clothes were widely worn and traded throughout the ancient Mediterranean world, by the Roman period, donning *tekhelet* and similar colors was the exclusive privilege of the emperor. And so it happened that sometime around the seventh century C.E., probably hastened by the Islamic conquest of the Levant, the source and identity of *tekhelet*, and knowledge of its manufacture, slipped into obscurity.

About a century ago, as part of his doctoral research on "Hebrew Porphyrology" (the study of purple), Isaac Herzog, who years later became the first chief rabbi of Israel, corresponded with the greatest dye chemist of his day, Paul Friedländer, about possible sources for Biblical *tekhelet*. Archaeological evidence and an exhaustive survey of the

**The tied strings (*tzitzit*) of this traditional Jewish prayer shawl have been dyed a shade of blue that many identify with Biblical *tekhelet*.**

writings of rabbinic scholars and Greek and Roman naturalists had convinced Herzog that *tekhelet* was a bright sky-blue obtained from the natural secretions of a certain sea snail, the *Murex trunculus*, known to produce a dark purple dye.\*

But the esteemed chemist challenged Herzog's contention: "I consider it impossible to produce a pure blue from the purple snails that are known to me," Friedländer said emphatically.<sup>1</sup>

Unfortunately, neither Herzog nor Friedländer lived to see a 1985 experiment by Otto Elsner, a chemist with the Shenkar College of Fibers in Israel, proving that sky-blue could, in fact, be produced from murex dye. During a specific stage in the dyeing process, exposure to ultraviolet rays (such as those found in sunlight) can cause the molecules that give the dye its natural purple color to transform into pure indigo, thus leaving the dye an unadulterated sky-blue.

Yet the debate surrounding the exact color of *tekhelet* was not settled. Depending on how long the murex dye is exposed to light and at what stage in the dyeing process, a wide range of colors and shades can result. In addition, some chemists claim that ancient dyers, who created their dyes primarily using bacterial fermentation in covered vats, probably did not know how to adjust colors through exposure to sunlight, so that their dyes would have tended to be a much darker purple. In view of the obvious expertise of ancient dyers, however, this does not seem a convincing supposition.

Furthermore, there is some literary and archaeological evidence that *tekhelet* may have been more purple than blue. Writing in the 11th century, the great Biblical exegete Rashi defined *tekhelet* as a deep blue or dark violet, "the color of the sky as it darkens towards evening" (commentary on Numbers 15:38). And at the Herodian fortress of Masada, a small swatch of first-century, violet-colored wool was discovered during Yigael Yadin's 1960s excavations. A recent analysis of the violet-colored wool by Zvi Koren, an archaeochemist at Shenkar College, found that its violet hue was produced with murex dye.

But Rabbi Herzog, like the overwhelming majority of Jewish scholars since antiquity, had firmly believed that *tekhelet* was sky-blue, with no purple tinges.

CONTINUES ON PAGE 73

\*See Ari Greenspan, "The Search for Biblical Blue," *Bible Review*, February 2003.



***Tekhelet* was God's chosen color. It colored the drapes of Solomon's Temple and was worn by Israel's high priests. But what color was *tekhelet*?**



PHOTO BY EUGENE WEISBERG/COURTESY OF AMITAT P'TIL TEKHELET

through with a fair degree of collegial amicability, and the record of the debate should help ensure that the debate itself moves on from the too stark “either-or” of its title.

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## Archaeological Views

*continued from page 28*

Maimonides (1135–1204) had declared unequivocally that *tekhelet* was “the color of the sky opposite the sun when there is a clear sky” (*Mishneh Torah*, Laws of Tzitzit 2:1). Nearly a thousand years earlier, the second-century scholar Rabbi Meir declared, “*Tekhelet* resembles the sea, and the sea resembles the heavens, and the heavens resemble God’s holy throne” (*Midrash Sifre, Shelach*).

One major piece of evidence in favor of designating *tekhelet* as sky-blue involves an infamous story of forgery related in the Babylonian Talmud (*Baba Metzia* 61b). Unscrupulous merchants were substituting a fraudulent, cheaper dye called *kala ilan* in place of authentic *tekhelet*. The impostor, a plant-derived indigo, was a dead ringer for the real stuff, and the Talmud claims that only God could tell the difference. If *tekhelet* looked exactly like *kala ilan*, it must have been the same color as indigo: sky-blue.

Wayne Horowitz, an Assyriologist at the Hebrew University of Jerusalem, offers further significant linguistic evidence supporting the sky-blue option. In ancient Mesopotamia, there was no word for the color blue in either Sumerian or Akkadian. Hence, Sumerian *uqnû*, the word for the precious blue gem lapis lazuli, was adopted to mean lapis lazuli-colored, i.e., blue and all its various shades. This term was apparently applied to the sky, and later to blue wool (*uqnâtu*). When the foreign word *takiltu* (Hebrew, *tekhelet*) was adopted into Akkadian, it was rendered with the same cuneiform signs as *uqnâtu*. This suggests that to Mesopotamian eyes, the colors of lapis lazuli, the sky and *tekhelet* were equivalent.

So what color was ancient *tekhelet*? For us, the founders of the Ptil Tekhelet

Foundation, this is no mere academic question. We believe the preponderance of evidence—archaeological, linguistic and literary—clearly supports the traditional position and points to sky-blue as the authentic color of *tekhelet*. Over the past 25 years, we have produced hundreds of thousands of murex-dyed *tzitzit* strings that hang from prayer shawls around the world, reminding those who wear them of the sea, the sky and God’s holy throne.

*Baruch and Judy Taubes Serman are authors of The Rarest Blue: The Remarkable Story of an Ancient Color Lost to History and Rediscovered (Guilford, CT: Lyons Press, 2012).*

<sup>1</sup> Isaac Herzog and Ehud Spanier, *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* (Jerusalem: Keter, 1987), p. 116.

## Hezekiah’s Tunnel

*continued from page 61*

<sup>13</sup> The pottery is being studied in detail by Alon De Groot and Atalya Fadida. See Alon De Groot and Atalya Fadida, “The Pottery Assemblage from the Rock-Cut Pool Near the Gihon Spring,” *Tel Aviv* 38 (2011), pp. 158–166.

<sup>14</sup> A recent carbon-14 study dating the tunnel to about 700 B.C.E. is not precise enough to distinguish between the reigns of Hezekiah and Yehoash. See Amos Frumkin and Aryeh Shimron, “Tunnel Engineering in the Iron Age: Geoarchaeology of the Siloam Tunnel,” *Journal of Archaeological Science* 33 (2006), p. 227.

<sup>15</sup> I am grateful to Ronny Reich and Aren Maeir for their helpful comments. Of course, this should not be interpreted as implying agreement with what I have written.

## Biblical Views

*continued from page 26*

transformed over time. And the same is true of ideas that are core to my Judaism: These are enhanced by my understanding, provided by academic Biblical scholarship, of how what I believe now is related to various earlier theologies (note the plural!) found in the Bible. For after all, one of the most important contributions of Biblical scholarship is the idea that the Bible is a multifaceted, multivocal book. Different generations emphasize one Biblical tradition over another, and offer ever-fresh interpretations to this central text. We would all do well to remember

this, which explains, in part, why different religions, and different groups within each religion, understand God and what God might expect from us in such different ways.

I am very appreciative that **BAR** has offered me the opportunity to write this column, thereby recognizing that many of its readers are interested in the religious issues raised by academic Biblical study, including archaeological finds that draw attention to serious questions about the veracity of the Bible as a historical text. I would like to offer some encouragement and resources through this column and the website [thetorah.org](http://thetorah.org) for the many **BAR** readers who, like me, believe that scholarly and religious approaches to the Bible may be complementary.

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