

***The Riddle of Samson
and the Spontaneous Generation of Bees:
The Bugonia Myth, the Crosspollination that Wasn't,
and the Heter for Honey That Might Have Been***

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Introduction

The idea for this essay germinated as I was leafing through the English translation of one of the classic works in the history of science, *Experiments on the Generation of Insects* by Francesco Redi (1626–1697). Redi's simple yet elegant experiments, which involved the complete and partial covering of a few meat-filled glass containers, and the observation of the appearance or absence of flies and maggots, served as the first nail in the coffin of the long-held belief in spontaneous generation. I had cited this work dozens of times in my lectures on the relationship of science and Jewish law in rabbinic literature.

The little biographical information I had known of Redi included his early Jesuit education, but did not reveal any particular religious inclinations or focus in his purely scientific research. You could only imagine my surprise when I noticed a chapter in his work entitled "On the explanation of the Biblical story of the bees in the carcass of a lion." The origin of this chapter and its relationship, or lack thereof, to the *kasbrut* of bee honey comprises the sweet and sticky substance of this brief essay.

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The Bugonia Myth and the Spontaneous Generation of Bees

For roughly two thousand years there existed a prevalent myth that honey bees originated by spontaneous generation from the carcasses of dead animals, primarily those of oxen. The term “bugonia,” Greek for oxen-born, became associated with this notion from the times of antiquity. The appearance and acceptance of this doctrine in literature, spanning across continents for many centuries, have been well documented.¹

Some trace the bugonia myth back to ancient Egypt, but the references from this period are more inferential than explicit.² Curiously, Aristotle, though a believer in spontaneous generation, makes no mention of the bugonia in his lengthy discussions about bees, a fact that many an author on the history of bees and honey has struggled to explain. However, from after Aristotle up to the 17th century, the bugonia found its expression in many areas of literature. The bugonia myth, with numerous variations, is found explicitly from the period of ancient Rome, including the works of Columella (4 B.C.E.–70 C.E.), the most important writer on agriculture in the Roman Empire; Celsus; Pliny; Ovid; Origen and Plutarch, up until the contemporaries of Francesco Redi in the 17th century.³

Given the prevalence of the bugonia myth, we thus understand why Francesco Redi, who set out to disprove the generally held belief in spontaneous generation, felt compelled to address the corollary belief that bees generate specifically from the carcasses of dead animals. Hence his chapter entitled “Criticism of ancient writers and description of ancient beliefs in the spontaneous generation of bees.” It is the title of the following chapter, however, that initially caught my attention—“On the explanation of the Biblical story of the bees in the carcass of a lion.” What could this reference to the famous riddle of Samson be doing in one of the greatest and most referenced works in the history of science?

The answer to this riddle, less challenging than Samson’s given the context of Redi’s book, lay in the history of the bugonia myth. The riddle of Samson was posed as follows:

Out of the eater came forth food, and out of the strong came forth sweetness.⁴

The solution to the riddle is the honey (the food and sweetness) Samson ate from the carcass of a lion (the eater and the strong) that he himself had slain. Throughout the centuries, this riddle was linked by many with the bugonia myth, as honeybees were thought to generate spontaneously from the carcasses of dead animals, in this case the carcass of the lion. Samson’s riddle was thus considered to be a direct and clear reference to the bugonia myth. The myth’s association with the riddle of Samson has been perpetuated on the green-and-gold label of the common household product, Lyle’s Golden Syrup, upon which is depicted a dead lion with bees hovering around it, a clear reference to Samson’s riddle.⁵ In fact, one prominent scientist claims the story of Samson to be the very origin of the bugonia myth.

Jan Swammerdam (1637–1680), a Dutch biologist and microscopist, criticized those who blindly followed the ancients, especially Aristotle, and claimed that his own work represented the first major advance beyond Aristotle in 2000 years. Yet, in some areas he remained wedded to religious authority. For example, he attempted to solve the Samson riddle.⁶ In his chapter on bees in his *Biblia Naturae* he claims that since bees are clean creatures and never alight on carcasses, the Samson story has seemed both strange and incredible. He suggested that the lion's carcass must have decomposed, leaving the clean, odor-free skeleton, which could have housed the bees during swarming season. Swammerdam does suggest that the riddle of Samson may indeed be the very origin of the bugonia myth: "This story of Samson and his bees, misunderstood as it was, has undoubtedly given rise to the common ignorant craze that bees originate from lions, oxen and horses."⁷

Baron Carl Robert von Osten Sacken (1828–1906), a Russian diplomat and entomologist, identifies the Samson riddle as the very first historical mention, though not origin, of this myth. He takes issue with Swammerdam's analysis and sarcastically comments that:

Swammerdam connects the belief in the bugonia with the story of the bees of Samson, as if the ancients (Greeks and Romans) knew anything about Samson!⁸

It is indeed possible and likely that the Greeks and Romans knew of the story of Samson, though it appears that, for the most part, with perhaps only one exception to my knowledge, the Jews were entirely unaware of the bugonia myth, as we shall explore below. Osten Sacken adds his own theory on the bugonia myth.

I consider the story of bugonia principally as an interesting episode in the history of science; a remarkable instance of the tenacity of ignorance, and of the insufficiency of the testimony of the senses alone, without the control of previously acquired knowledge.⁹

In fact, Osten Sacken points to the story of Samson as the earliest appearance of the bugonia belief in literature. As we will address below, this is somewhat ironic, given that the bugonia myth appears nowhere in any of the rabbinic commentaries on the Samson story throughout the ages.

As to what led to the origin of this myth, the comprehensive, cogent and eloquent work of Osten Sacken has been accepted as definitive:

The original cause of this delusion lies in the fact that a very common fly, scientifically called *Eristalis tenax* (popularly the drone-fly), lays its eggs upon carcasses of animals, that its larvae develop in the putrescent mass, and finally change into a swarm of flies which, in their shape, hairy clothing and colour, look exactly like bees, although they belong to a totally different order of insects.¹⁰

Osten Sacken further postulates the likely reasons for the demise of this myth, differentiating between the "scientific men" and the "ignorant crowd." Among the

scientific men, he avers, the general refutation of the theory of spontaneous generation by the likes of William Harvey and Francesco Redi would have sufficed to lay this specific myth to rest. Indeed, Redi himself specifically addressed the bugonia myth in his classic work. As for the ignorant masses, Osten Sacken suggests that the improvement of sanitation practices, and the removal of carcasses from public spaces, may have led to the dissipation of the myth in this segment of the population.

It is interesting to note the exegetical impact of the bugonia myth on the Samson story. In Shalom Carmy's analysis of the Samson riddle, he points to the obvious difficulty, "How could the Philistines be expected to solve the riddle, since it obviously refers to a private event in Samson's life, unknown to them."¹¹ While Carmy provides a number of answers,¹² including a suggestion of his own, Osten Sacken in essence addresses this issue in a fascinating though misguided attempt at Biblical interpretation:

(Samson) turned aside to see the carcass of the lion: and behold, there was a swarm of bees in the body of the lion, and honey... As soon as a myth is started, it begins to grow. The seeing of a swarm of bee-like flies was a fact; the finding and eating the honey was the myth grown out of the misconceived fact. The riddle, which Samson proposes afterwards, affords the proof of another fact: that the belief in the bugonia was current among the people at that time; because without that *substratum*, the riddle would not have had any meaning.

The narrator of the tale arranges it so as to make it a preamble to a riddle: When Samson gave the honey to his parents *he did not tell them* that he had taken it from the body of the lion; because if he had told them, they (as believers in the bugonia) would have solved the riddle immediately, without the necessity of guessing. The story therefore represents a real occurrence, based upon a well observed, but wrongly interpreted, natural phenomenon.¹³

The story and riddle of Samson is also interpretable without recourse to the bugonia myth. Even Samuel Bochart (1599–1677), a French Protestant Bible scholar, suggests that the presence of bees in the carcass of Samson's lion does not necessitate belief in the bugonia myth. In fact, it is nowhere stated in the text explicitly that the bees were born from the lion's carcass.¹⁴

A. E. Shipley (early 20th century) accepts Osten Sacken's basic theory of the explanation of the bugonia myth as resulting from the confusion between the drone fly and the honeybee, but takes issue with his application of the bugonia myth to the story of Samson. Shipley argues that:

The really important thing in Samson's story is the honey. The later writers about bugonia never mention honey, or the comb, or even the hive... I believe that Samson did find a hive in the dried and mummified carcass of a lion and that the honey he ate was real—not imaginary—honey.¹⁵

The Osten Sacken theory explains why people thought that the honeybee spontaneously generated from the carcass of dead animals. A similar insect, the *Eristalis Tenax* fly, appears and behaves very similarly to the honeybee and nests in the carcasses of dead animals. However, it is a fly and not a bee and thus does not produce honey.

In sum, the belief that bees spontaneously generated from the carcasses of dead animals, known as the bugonia, was a long-held belief from ancient till pre-modern times. Francesco Redi, who successfully disproved the theory of spontaneous generation, also addressed and rejected its corollary theory of the bugonia. Osten Sacken clarified the likely origins of the bugonia belief through his detailed entomological studies. His work has been universally accepted and is cited by virtually all subsequent histories of the honeybee.

In addition, the bugonia myth has been associated with the riddle of Samson, which refers to honey being found in a lion's carcass. This association is problematic for a number of reasons. First, if Osten Sacken's analysis is correct, the creatures that were observed hovering around the carcasses of dead animals were flies, not bees. As such they were unable to produce honey, a key element in the Samson story. This led Shipley to reject Osten Sacken's analysis. Furthermore, assuming that Samson's riddle does refer to the bugonia myth, and they were actually bees hovering around the lion's carcass, bees typically alight only on clean substrates and would not be found on rotting carcasses. This problem has occupied the likes of Swammerdam, Bochart and later Shipley, as well as many others. This issue has been resolved by the assumption that the lion's carcass completed its decay and only a clean skeleton was remaining when the bees inhabited it.¹⁶ Exactly how the bugonia myth impacts on the exegesis of the passage is also a matter of debate.¹⁷

The Bugonia Myth in Rabbinic Literature

The bugonia myth, while a unique notion applying specifically to the honeybee, was a corollary of the common and accepted belief that living creatures could generate spontaneously, and not from sexual reproduction. This universally held belief found its expression in rabbinic literature throughout the centuries. A classic passage that has been associated with this belief appears in *Shabbat* 107b, where the prohibition of killing living creatures on the Sabbath is discussed. The Talmud specifically excludes lice from this prohibition since lice do not reproduce through normal sexual reproduction (but generate spontaneously). This passage was revisited by Rabbi Yitzchak Lampronti (1679–1756) in the post-Francesco Redi era when spontaneous generation was scientifically disproved,¹⁸ and has served as a springboard for the larger discussion about the interpretation of pre-modern scientific passages in rabbinic literature that conflict with our modern understanding of medicine and science.¹⁹ The doctrine of spontaneous generation is reflected in other passages that have spawned discussion in rabbinic literature throughout the centuries, such as those on the dirt mouse, vegetable men and the barnacle (or tree) goose.²⁰

As documented above, the bugonia myth, a corollary of the doctrine of spontaneous generation, was prevalent in the secular world and addressed by some of history's greatest minds since antiquity. One would therefore expect that this notion, akin to the theory of spontaneous generation, would find its expression somewhere in rabbinic literature. It is therefore quite noteworthy that the bugonia myth is not found anywhere explicitly in pre-modern rabbinic literature.

There is however, and perhaps only, one Jewish source to explicitly mention the bugonia myth, and that is found in the writings of Philo of Alexandria (20 BCE–50 CE).²¹ He uses the supposed unusual origins of bees to explain why honey is prohibited for use on the altar.

Moreover, it also ordains that every sacrifice shall be offered up without any leaven or honey, not thinking it fit that either of these things should be brought to the altar. The honey, perhaps, because the bee which collects it is not a clean animal, inasmuch as it derives its birth, as the story goes, from the putrefaction and corruption of dead oxen.²²

However, the works of Philo, though of Jewish origin, are not part of the corpus of rabbinic literature, and are virtually ignored by rabbinic authors.²³ His mention of the bugonia myth thus does not reflect the myth's acceptance or existence in rabbinic literature.

The absence of the bugonia myth from rabbinic literature is particularly remarkable for a number of reasons, not the least of which is that the first apparent reference to the bugonia myth is from the Hebrew Bible, as discussed above. Indeed, according to the Swammerdam, Samson's riddle is the very origin of the bugonia myth. Despite this fact, not one of the Biblical commentaries to my knowledge makes any reference to the spontaneous generation of bees from the carcass of the lion in their interpretation of Samson's riddle. Whether the rabbis were unaware of the myth, or simply rejected it, cannot be inferred from the rabbinic silence.

What is perhaps even more remarkable is the fact that the bugonia myth could very easily have been invoked to solve a riddle far more relevant and important in rabbinic tradition than that of Samson—the *kasbrut* of honey. The land of Israel is referred to in the Bible as the land of milk and honey. There are a number of types of honey, including date and bee honey, and it is debated as to which honey preparation this famous phrase refers.²⁴ Irrespective of the conclusion of this debate, there is a clear, undisputed tradition that bee honey is kosher. Bees ~~are winged or flying creatures that are not enumerated in the list of kosher birds, and are thus a *sberetz ha-of*, a non-kosher flying creature.~~ Furthermore, any by-product that derives from a "*tamei*?" creature, in this case the bee honey, should likewise be "*tamei*," based on the principle, "*kol ha-yotzei min ha-tamei tamei*," any substance that derives from an impure creature is itself likewise impure. How then could bee honey be kosher? The resolution of this riddle has occupied rabbinic authorities for centuries.²⁵ The Talmud²⁶ provides two possible solutions. First, it is possible that the permissibility of honey is simply a Scriptural decree. Second, the Talmud suggests that honey is not derivative from the body of the bee; rather, the bee simply serves as a repository of

the sweet substance that it obtains from the flowers and transfers to the hive. The prohibition of “*kol ha-yotzei min ha-tamei tamei*” applies only to substances that are chemically derived from the body of the impure creature. In this case, as no material from the bee itself is integrated into the honey, the honey is kosher.

Even with this *heter* (permissibility), one would still encounter the potential problem of assorted bee parts, such as wings or legs, being found in the honey, as well as other bee honey preparations, such as royal jelly. These should surely render honey non-kosher. This issue has also been addressed in a number of ways.²⁷

The bugonia myth could have potentially resolved the honey riddle, or at least provided additional avenues of resolution. The mere fact that a creature, such as a bee, is believed to generate spontaneously does not render it kosher *per se*, a fact evidenced by the fact that lice are not considered kosher, nor is the dirt mouse (at least half of it).

There have however been previous halakhic discussions about the kosher status of spontaneously generated creatures. The barnacle goose was a creature that was bird-like in appearance, but was thought to have grown or generated spontaneously on trees. For this creature, the rabbinic authorities debated whether to consider it a bird, thus requiring ritual slaughter, or a fruit, thus not requiring any preparatory procedure prior to consumption.

In addition, certain parasites that are found within fish were permitted to be eaten based on their unique reproductive origins.²⁸ These parasites would have otherwise been considered non-kosher, had it not been for the fact they were believed to have generated (spontaneously) within the flesh of a kosher fish.²⁹ In this case the following principal was applied- *kol hayotzei min ha tabor, tabor*- all that derives from a kosher animal is kosher. This is a similar principal as that discussed above regarding the honey of the bee, though relating in this case to kosher creatures.

In both of these cases, the kosher status of the creature was dictated not by the fact that these creatures generated spontaneously, but rather by the specifics of the case under consideration. One would expect no different for the bee and its honey, and such an analysis leads to an unexpected conclusion.

While the begonia myth had a number of variations, its main assumption was that the bees generated spontaneously from the carcasses of dead animals. Thus, it is completely possible, according to the myth, for bees to have generated from the carcass of a kosher animal that had been ritually slaughtered. Herein lies a potential *heter* for honey. The classic halakhic discussion revolves around the aforementioned principle – *kol ha-yotzei min ha-tamei, tamei* – any substance which derives from a prohibited creature is itself *tamei*, or prohibited. This is precisely why the permissibility of bee honey has been a halakhic enigma, as it derives from a *tamei* creature, the bee, a *sberetz ha'of*. However, if the original bee generates from the carcass of kosher animal that was ritually slaughtered, then perhaps it too, like the flesh of the animal itself, would be kosher and permitted to eat. If the bee is deemed kosher, than of course its derivative, honey, would surely be kosher as well. This would then be a case of *kol ha-yotzei min ha-tabor, tabor*, all that derives from a kosher


animal is kosher, similar to the fish parasites. Admittedly, this would only apply to some, not all, bee honey.

This approach to the kashrut of honey could precipitate lengthy analyses about the attendant halakhic principles and their application.

However, this argument was never even advanced. True, it may not have withstood halakhic scrutiny, and very well may have been utterly rejected on halakhic grounds, but surely such an argument, or one similar to it, would have been conceived somewhere throughout the history of rabbinic literature had the bugonia myth been known or accepted. Why was the bugonia myth ignored and omitted from all of rabbinic literature? I have no definitive answer.

Conclusion

From the time of antiquity, there was a curious belief, called the bugonia myth, according to which bees generated spontaneously from the carcasses of dead animals. The first literary reference, and possible origin, of the bugonia myth is traced to the story of Samson's riddle in the Bible. Yet, ironically, this myth was not accepted by, nor propagated through, rabbinic literature. This myth, virtually ubiquitous in the ancient world up through the seventeenth century, could have easily been used to solve a more complex legal riddle than that of Samson, namely the *kashrut* of bee honey. If, as per the bugonia myth, honeybees generated spontaneously, they could have been legally categorized as a permissible creature, thus rendering their by-products or bodily secretions, such as honey, kosher for consumption. Why other notions of spontaneous generation permeated rabbinic literature while the bugonia myth did not is a riddle for which I have no satisfactory answer.

A final thought to ponder: Had the permissibility of honey in rabbinic literature indeed been based on the notion of the spontaneous generation of bees, we would likely be debating the *kashrut* of honey today, as the theory of spontaneous generation has been long dispelled. A similar debate continues to rage on regarding the *kashrut* of parasites in fish. The original Talmudic source permitting the ingestion of fish parasites appears to be based, at least in part, on the belief that the parasites generated spontaneously within the flesh of the fish. As we now know this to be factually incorrect, the *heter* for ingesting these parasites in the course of eating fish has been called into question. I guess we of sweet tooth are fortunate that the sting of the bugonia myth never penetrated the skin of our tradition. 

Notes

- 1 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894). This is an expanded version of his essay “On the so-called Bugonia of the ancients and its relation to Eristalis Tenax,” *Bullettin della Societa Entomologica Italiana* 25 (1893): 186–217.
- 2 Bee Wilson, *The Hive: The Story of the Honeybee and Us* (New York: MacMillan, 2007), 73–74.
- 3 Francesco Redi, *Experiments on the Generation of Insects (1688)*, trans. Meb Bigelow (Chicago: Open Court Publishing House, 1909), 38–43.
- 4 Judges 14:14.
- 5 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 73.
According to the website of Lyle’s Golden Syrup (www.lylesgoldensyrup.com), the “lion and bees” trademark was established in 1904 and designed based on the religious beliefs of the company’s founder, Abraham Lyle. However, the depiction does not in and of itself imply that the bees spontaneously generated from the lion’s carcass, and the biblical allusion is valid irrespective of the belief in the bugonia myth.
- 6 See Matthew Cobb, “Reading and Writing *The Book of Nature*: Jan Swammerdam (1637–1680),” *Endeavor* 24:3 (2000): 122–128. Cobb seems to indicate that Swammerdam unquestioningly accepted the bugonia myth, though Osten Sacken proves otherwise.
- 7 Cited from C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 12.
- 8 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 12–13.
- 9 See C.R. Osten Sacken, “On the so-called Bugonia of the ancients and its relation to *Eristalis Tenax*,” *Bullettin della Societa Entomologica Italiana* 25 (1893): 198. For some reason, this quote and its accompanying paragraph were omitted from the expanded book-length version of the essay.
- 10 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 3.
- 11 Shalom Carmy, “The Sphinx as Leader: A Reading of Judges Chapters 13–16,” *Tradition* 14:3 (Spring, 1974), 66–79, esp. 71–72.
- 12 One of the answers Carmy provides is that of Yehezkel Kaufmann, who suggests that the riddle might indeed be interpretable or solvable without recourse to Samson’s personal history. In fact, Kaufmann argues, the notion of bees generating from a carcass is not at all foreign, thus rendering Samson’s situation not so unusual. He brings evidence from a passage in Herodotus about the beheaded Onesilos, whose head was hung up by the Amathusians on the city gate and in the course of time was occupied by bees and their honeycombs. This passage itself is an allusion to the bugonia myth, and the details of this passage are discussed in C.R. Osten

- Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 64.
- 13 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 16.
- 14 C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 17.
- 15 A.E. Shipley, "The 'Bugonia' Myth," *The Journal of Philology* 34:67 (1918): 97–105.
- 16 See also, C.R. Osten Sacken, *On the Oxen-Born Bees of the Ancients (Bugonia) and Their Relation to Eristalis Tenax* (Heidelberg: J. Hoerning, 1894), 62ff. In fact, this theory is supported by Judges 14:8, which states that some time passed before Samson returned to the lion carcass and saw the hovering bees and honey.
- 17 For academic discussions about the exegetical significance of bees in *Tanakh*, including discussion of Samson's riddle, see Heinrich Margulies, "Das Rätsel der Biene im alten Testament," *Vetus Testamentum* 24:1 (January 1974): 56–76, discussed in B.A. Asen, "Deborah, Barak and Bees: Apis Mellifera, Apiculture and Judges 4 and 5," *Zeitschrift für die Alttestamentliche Wissenschaft* 109:4 (1997); and Pieter Arie Hendrik de Boer, *Fatherhood and Motherhood in Israelite and Judean Piety* (Leiden: Brill, 1974), 32–36.
- 18 See David B. Ruderman, "Contemporary Science and Jewish Law in the Eyes of Isaac Lampronti of Ferrara and Some of His Contemporaries," *Jewish History* 6 (1992): 211–224, reprinted in David B. Ruderman, *Jewish Thought and Scientific Discovery in Early Modern Europe* (London and New Haven: Yale University Press, 1995), 256–272.
- See also the little-known passage of Benzion Raphael Kohen Frizzi (1756–1844), in his magnum opus *Petach Einayim* (Livorno, 1815), volume 2, 36b, which mentions Redi and Vallisneri (1661–1730), and seems to leave the possibility open that there are certain creatures that spontaneously generate. *Petach Einayim* is a seven-volume work of over one thousand pages expounding the scientific and philosophical aspects of the Talmud. On Frizzi and his work, see Benzion Dinaburg (Dinur), "Benzion Refael Hakohen Frizzi and his work 'Petach Einayim,'" *Tarbiz* 20 (1948–1949): 241–264 (Hebrew).
- 19 For references on this topic, often referred to as "*nishtana hateva*," see Edward Reichman, "Anatomy and the Doctrine of the Seven-Chamber Uterus," *Hakirah* 9 (Winter 2010): 245–265, esp. 246–247n6. The most comprehensive, systematic study of the issue of *nishtana hateva* has been conducted in Neriah Gutel, *Sefer Hishtanut ha-Teva'im ba-Halakhab* (Jerusalem: Machon Yachdav, 1995). The second edition of this work (1998) contains a forty-page appendix of comments by Rav Zalman Nechemia Goldberg.
- 20 For lengthy discussion of these creatures in rabbinic literature, see Natan Slifkin, *Sacred Monsters: Mysterious and Mythical Creatures of Scripture, Talmud and Midrash* (New York: Yashar Books, 2007), 307–367. On the barnacle goose, in addition to the wonderful essay by Slifkin, see Edwin Ray Lankester, "The History of the Barnacle and the Goose," *Diversions of a Naturalist* (McMillan Company: New York, 1915),

117–141, and F. Max Muller, *Lectures on the Science of Language* (Longman, Greens and Co.: London, 1885), 583-604. Both of these authors discuss the Jewish sources as well.

See also the important recent contribution to the ongoing Torah and science dialogue by Moshe Meiselman, *Torah, Chazal and Science* (Jerusalem: Israel Bookshop Publications, 2013). He has lengthy discussions on spontaneous generation, including on lice and the dirt mouse, as well as on the general issue of *nishtana bateva*.

- 21 Curiously, the Wikipedia entry on “Bugonia” erroneously states, “the bugonia belief is also reported in the Jerusalem Talmud and in the Babylonian Talmud.” The cited reference from the Jerusalem Talmud is to Shabbat 1:3b. The discussion there is about spontaneous generation as it pertains to lice, parallel to the passage in the Babylonian Talmud Shabbat 107b. It is not a specific reference to the bugonia myth, but rather to the general concept of spontaneous generation. The reference cited from the Babylonian Talmud is to Bava Kamma 16a. I was unable to find anything resembling the bugonia myth on this page, though perhaps the word *zibura* was mistranslated. See Julius Preuss, *Biblical and Talmudic Medicine*, ed. and trans. Fred Rosner (Northvale, NJ: Jason Aronson, Inc., 1993), 199. *Zibura* is a bee sting. Osten Sacken, in his thorough study, makes no reference to Jewish sources that espouse or even mention the bugonia myth.
- 22 Philo, *Special Laws*, 1.291.4.
- 23 Personal communication with my father-in-law, Professor Louis Feldman of Yeshiva University. About the first rabbinic author, Azaria de Rossi, who incorporated the work of Philo into his rabbinic canon, see Giuseppe Veltri, “The Humanist Sense of History and the Jewish Idea of Tradition: Azaria de Rossi’s Critique of Philo Alexandrinus,” *Jewish Studies Quarterly* 2:4 (1995): 372–393; and Azariah de Rossi, *The Light of the Eyes*, ed. and trans. Joanna Weinberg (New Haven and London: Yale University Press, 2001), 110–159 (chaps. 4–6); as well as Naomi G. Cohen, “Philo Judeaus and the Torah True Library,” *Tradition* 41:3 (Fall 2008): 31–48; and Naomi G. Cohen, “Philo’s Place in the Chain of Jewish Tradition,” *Tradition* 44:2 (Summer 2011): 9–17.
- 24 Ari Z. Zivotofsky, “What’s the Truth about ... ‘A Land Flowing with Milk and Honey’?” *Jewish Action* (Winter 2005): 56–59.
- 25 See, for example, *Encyclopedia Talmudit*, s.v., *devash*, column 198; Abraham Korman, “The Kashrut of Honey,” *Shanah be-Shanah* (1992): 235–245, esp. 240 (Hebrew). For further discussion of the heter for honey, see N.N. Segal Berger, “Regarding the Heter for Honey and Royal Jelly,” *HaDarom* 16 (*Nisan* 1962): 112–119 (Hebrew); and Mordechai Carlebach, *Chavatzetlet Hasharon on Sefer Bamidbar* (Jerusalem: [n.p.], 2007), 429–430 (Hebrew).
- 26 *Bechorot* 7b.
- 27 See Abraham Korman, “The Kashrut of Honey,” *Shanah be-Shanah* (1992): 235–245, esp. 240 (Hebrew).

- 28 On the kashrut of fish parasites, see, for example, J. David Bleich, "Piscatorial Parasites," *Tradition* 44:1 (Spring 2011): 65-101; and Elli Bohm, "Worms in Fish: The Recent Controversy," *Halacha Berura* 13:9 (2010): 1-10.
- 29 The phrase that reflects the spontaneous generation of the parasites is "*minai ka gavli*." This is the simple understanding of the passage in *Hulin* 67b. Rabbi Yisroel Belsky, in his lengthy responsum on worms in fish, suggests that the phrase means that the worms simply grow within the flesh of the fish, not that they spontaneously generate there. It should be noted that the permissibility for eating insects or worms that were considered to spontaneously generate is generally restricted to ingestion of the creature within its place of growth. See Rambam, *Hilkebot Tolaim* for lengthy and detailed discussions of these laws. Rambam clearly appears to have accepted the doctrine of spontaneous generation. This may not extend to the bees once they fly off the body of the carcass in which they were believed to spontaneously generate. This could negate any possible permissibility of eating bee honey even if you accept that the bees generate spontaneously.