

Sefas Emes (Pesach 5652) adds that we open the door because the future *geulah* (redemption) will be open for all (especially us!) to see the downfall of our enemies. This is the opposite of what occurred in Egypt, where klal Yisroel was specifically told (Shemos 12:22) not to leave the house until the morning. The “morning” homiletically refers to the *geulah* — only when the *geulah* comes will we merit seeing the open miracle of redemption.

The Ramchal, Rabbi Moshe Chaim Luzzatto, in his epic *Mesilas Yeshtarim* (7th Perek), points out that external actions help stimulate internal thoughts. The *Mishnah Brura* (480:10) states that the opening of the door and the filling of Kos Eliyahu are connected — just like we were redeemed in Mitzrayim, so too will Eliyahu herald the redemption in the future. Likewise, the *Pesach Meuvin* (Siman 361) and the *Mateh Moshe* (Siman 655) say we open the door to demonstrate our true belief that Moshiach is coming imminently. What better way to demonstrate that than to open our doors to welcome in Eliyahu, his forebearer. When Eliyahu comes, he will find the door wide open as we anxiously await his arrival. This action is a *zechus* that will indeed hasten his arrival. They both bring a Yerushalmi (*Kesubos*, 12th Perek, halacha 3) that Rabbi Yirmiyah told his family to bury him in the finest clothing, wearing shoes and with his staff, so when Moshiach comes he would be immediately ready to welcome him. We demonstrate that same alacrity of spirit by opening our doors Seder night, truly hoping and expecting to really see Eliyahu on the other side! The *Korban Eidah* and *Pnei Moshe* on that Yerushalmi add that this was to strengthen the people's belief in Moshiach as a real entity, not just a

mythical fable.

We all eagerly look forward to our own personal *yetzias Mitzrayim* as we fervently pray for the end of the difficult COVID-19 pandemic, and that we can emerge from the bondage of repeated lockdowns and quarantine. Many of us spent the first Pesach relatively alone, huddled together in small nuclear family units while we waited anxiously for Hashem to protect us from the plague of COVID. Told to lock down and stay inside, we felt safe indoors. Each of us can recall the effect the pandemic has had on our *yomim tovim* — the uncertainties and challenges.

Yet this year, as we iy”H open our doors in every sense and as we hopefully can welcome in other family, friends and guests again, we can experience a true *leil shimurim*, highlighted iy”H by us heralding into our homes and the collective Jewish people the ultimate guest, Eliyahu Hanavi, signaling the coming of Mashiach *Tzidkeinu* and final *geulah*.

Special appreciation to my husband, Rabbi Aaron Glatt, for assisting in research and source materials.

Tail-Recursion in the Haggadah: A Computer Science Perspective

Rabbi Lawrence Teitelman

Faculty, Computer Science Department, Stern College; Rabbi, Young Israel of New Hyde Park, NY

During my teenage years and into early adulthood, I attended various “Pesach programs” at Upstate New York hotels, first as a guest with my family, and subsequently working

as a *mashgiach*. A few decades later, I still vividly recall the scene that would repeat itself each year toward the end of the Sedarim: a large table of several dozen older singles would energetically and enthusiastically sing, “Who knows one? I know one! One is Hashem ... in the heavens and the earth.” A prominent outreach rabbi would leave his seat in the back of the dining room, where he too was vacationing with his family, to join the group at the front of the dining room, encouraging them along to sing even more energetically and enthusiastically.

This song — known in Hebrew as *Echad Mi Yodea* — is part of a series of *piyutim* (liturgical poems) that are appended to the halakhically mandated text of the Haggadah. Rabbi Tzidkiyah b. Avraham Anav (Rome, 13th century) records in his magnum opus *Shibbolei Haleket*, that it is “customary to say *piyutim* arranged with praise and thanksgiving, and so it is worthy to increase.” Various Medieval authorities identified specific *piyutim* that should be recited, ultimately culminating in a list of seven that were accepted as normative in Ashkenaz: *Chasal Siddur Pesach*, *Az Rov Nissim*, *Ometz Gevurotekha*, *Ki Lo Na’eh*, *Adir Hu*, *Echad Mi Yodea*, and *Chad Gadya*.¹ While these *piyutim* weren't necessarily customary in Sefardic lands, nonetheless, Rabbi Chaim Yosef David Azulai (“Chida,” 18th century) famously came to the defense of *Chad Gadya*, and the critique of an individual who disparaged it, noting that a “*gaon* distinguished in his generation” formulated more than ten “sweet and lovely” commentaries on *Chad Gadya*, and further attests to the “authority of the greatness of the *piyutim* of Ashkenaz.”²

Two of these *piyutim* — *Echad Mi*

Yodea and *Chad Gadya* — exhibit a structure known in the vernacular as "recursive songs," songs that with each stanza not only introduce some new element, but also repeat all the previous elements, either before or after that new element. Thus, for example, when singing "Who knows two?" in *Echad Mi Yodea*, we not only respond to that rhetorical question, but also review the answer to "Who knows one?" Similarly, in *Chad Gadya*, when talking about the dog (*kalba*), we not only mention that it bit the cat (*shunra*), but also repeat that the cat ate the goat (*gadya*), and so on.

"Recursion" is also a computational technique included in introductory programming courses as a means to calculate mathematical formulae such as factorial [$\text{fact}(n) = n \times \text{fact}(n-1)$] and the Fibonacci sequence [$\text{fib}(n) = \text{fib}(n-1) + \text{fib}(n-2)$] and solving logical problems such as the "Towers of Hanoi." Higher-order terms are calculated from lower-order terms. Somewhere subsequently in the Computer Science curriculum, however, students learn that recursion can sometimes be "dangerous", leading to exponential growth in the amount of work that needs to be performed, and rendering such an approach "intractable." An alternative, bottom-up methodology known as "Dynamic Programming" is taught, as well as a hybrid procedure called "Memoization," both of which seek to eliminate the repetition that can easily arise in some recursive algorithms.

It is self-evident that the authors of *Echad Mi Yodea* and *Chad Gadya* deliberately designed their respective *piyutim* to be recursive. Presumably, the repetitive style, even as it roughly squares the time required to sing each *piyut* at a point in the Seder when people are understandably

exhausted, also breeds an increasing familiarity with the text, which in turn enables and encourages participants to progressively sing even more energetically and enthusiastically. There is an additional consideration, however, which takes us back to *Maggid*, where we assert that, "in every generation (*be-khol dor va-dor*) there are those who stand up [seeking to] annihilate us, but Hakadosh Barukh Hu saves us from their hands." Rather than simply state it as a matter of fact, we immediately produce *Lavan* as an example of this phenomenon (*tze u-lemad ma bikesh Lavan ha-Arami*). Yet, it is at the end of the Seder in *Chad Gadya*, that we expand on this theme and allude to the cycle of nations who have risen up against us, only to meet their demise at the hands of another force.

The famous story of Rabbi Elazar ben Azaryah concludes that even in Messianic times, we will continue to remember *yetziat Mitzrayim* — the Exodus from Egypt — even as a greater salvation will have since occurred.³ *Chad Gadya* reminds us that all the trials and tribulations along the way are also worthy of our mention and attention. Similarly, *Echad Mi Yodea* not only correlates the numbers one through thirteen with various entities in Jewish tradition, but reinforces them through repetition and reiteration.

In the Talmud (*Sukkah* 27a), a *gezera shava* is drawn between Pesach and Sukkot, each of which occur on the fifteen of their respective months Nissan and Tishrei. This equation has halakhic implications, such as the obligation for an individual to eat in the sukkah on the first (and second) nights, just as he must eat matza at the Seder on the first (and second) nights. The first night of Pesach is

also connected to the night of Tisha B'Av. Some attribute this to a general obligation to remember the exile from Israel, and the destruction of Jerusalem and the Beit Hamikdash, in our times of joy and jubilation. More specifically, there is a calendric link (known "*ATBaSh*"⁴), which observes that Tisha B'Av always falls on the same day of the week as the first day of Pesach. Either way, there are many manifestations of *zekher la-mikdash* (remembering the Holy Temple) in the sense of mourning and commemorating.⁵ In terms of the present discussion, it is significant that on Tisha B'Av, we mourn not only the destruction of both Batei Mikdash which were destroyed on that ominous day, but also, in the context of Kinot, lament our long history of persecution and suffering. Like *Chad Gadya*, it is not enough to focus on the present proceeding; we must revisit and re-engage with our long history.

Endnotes

1. See Rabbi Menachem Mendel Kasher, *Haggadah Shelemah* (Hebrew), Jerusalem 5727, Ch. 36.
2. For more on the last section of the Haggadah, see *Torah To-Go*, Pesach 5779, and especially the articles on *Echad Mi Yodea* and *Chad Gadya* by Rabbi Meir Goldwicht and Rabbi Zvi Romm respectively, available at <https://www.yutorah.org/togo/pesach/>
3. Cf. Talmud, *Berakhot* 13a, which notes that at least instinctively, one is inclined to forget an earlier salvation when superseded by a subsequent one.
4. See *Shulchan Arukh*, *Orach Chayim* 428:3.
5. For a discussion of this theme, see Rabbi Mayer Twersky, "Zeicher le-Mikdash," *Torah To-Go*, Pesach 5769.