"Yearning for Infinity": Reason, Truth, and the Paradox of Reality

Rabbi A. Brian Stoller
Parashat Chukat 5783
June 30, 2023

My daughter took algebra this past year. It made me think back to when I was in eighth-grade algebra, which I remember being very hard.

I told her this afternoon that I would be giving a sermon about algebra tonight. Her response was: "Father! Why. Are. You. Giving. A. Sermon. About. *Algebra*??!!"

The truth is: I've become newly interested in algebra, because I'm reading a fascinating book right now by a French rabbi and philosopher named Marc-Alain Ouaknin. It's called *The Mystery of Numbers*.

And, as it turns out—not surprisingly—it's relevant to this week's parashah.

Parashat Chukat begins by describing a very weird ritual that involves sacrificing a red cow, burning it, and using its ashes to purify people who have had contact with a dead body.

The details are unimportant. What's important is that the parashah describes the requirement to perform this ritual as a "*chok*."

A *chok* is a kind of law in the Torah that our sages say has no rational basis.

Laws that are rational—like don't steal, don't murder, be honest in business, etc.—are called "*mishpatim*." They make sense. In fact, there's a good chance we'd figure them out even without the Torah telling us.

But with *chukim* (that's the plural of *chok*), we'd never know them but for the Torah because they are not discoverable through reason. Using the ashes of a red cow as a purification potion definitely fits that bill.

Other examples of *chukim* are the rules that you can't eat pork, and that you can't wear wool and linen together (either before *or* after Labor Day), and that you can't have intimate relations with your sister-in-law—unless your brother dies childless, in which case you're *required* to have kids with her on his behalf. (Can you imagine? "Mom, it's not what you think. The Torah *made* me do it!")

Irrational, indeed.

The sages were in no mood to justify the *chukim*, so they just said: "These are unquestioned statutes of the Torah."[1] Period, end of story. The old "because God said so" defense.

Now, that generally doesn't sit well with us Reform Jews. We pride ourselves on being critical thinkers; we want to *understand* before we accept something as truth.

We are the spiritual heirs of Rabbi Kaufmann Kohler and Rabbi Isaac Mayer Wise and the other classical Reformers who believed in a Judaism that is "ever striving to be in accord with the postulates of reason."[2]

But the sages understood that reason has its limits. No matter how hard we try, the human mind simply cannot understand *everything*.

To me, that's Spiritual Principle Number One. There are things about Reality (with a capital "R") that are beyond our ability to measure, understand, and control.

They are not in *accord* with reason; they are *beyond* reason. They are a mystery.

And, perhaps paradoxically, I think algebra proves it.

<div align="center">*******</div>

One of the best-known algebraic formulas is the Pythagorean theorem. Do you remember it? It's a2 + b2 = c2.

You use this formula to calculate the hypotenuse of a right triangle—and also the diagonal of a square, which is the same thing because a square is just two right triangles that share a hypotenuse.

So, go with me here. Imagine a simple square: Remember that, in a square, each of the four sides is the same measurement.

Picture a square for which each side has a measurement of 1.

Now picture the diagonal line cutting through the square from the bottom left corner to the upper right corner. What is the measurement of that diagonal line?

Let's use the Pythagorean Theorem: a2 + b2 = c2.

Side "a" has a measurement of 1. So, a2 = 12, which is 1x1, which, of course, is 1.

Side "b" also has a measurement of 1, so b2 = 12, which, again, is 1.

So, a2 + b2 = 1 + 1, which even the least mathematically inclined among us know is 2; so, c2 = 2.

Now, if "a" is the vertical side and "b" is the horizontal side, then the diagonal line we're trying to measure is "c." If c2 = 2, that means "c" is the *square root* of 2.

So, let's see: the square root of 9 is 3, the square root of 4 is 2, the square root of 2 is...

Wait. What is the square root of 2?

This is no easy question; in fact, it's one of the great mysteries of math.

The square root of 2 is what mathematicians call an "*irrational*" number.

Rabbi Ouaknin, who clearly did a lot of research in order to write his book (because we rabbis may know *Numbers,* but we don't know numbers), explains that an irrational number is one whose "decimal writing offers an infinity of unforeseeable decimals."[3]

Another famous number with similar properties is pi."[4] In shorthand, we know that pi is 3.14, but Ouaknin points out that scientists using the most sophisticated computer technology have been able to calculate pi up to more than 200 billion decimals.[5] And that's still not the end, because there is no end.

Our 1x1 square is a closed and easily discernible shape. But the measure of the diagonal line inside it, equaling the square root of 2, is one-point-something with decimals that go on forever, so it's ultimately indeterminate in full.

All this means that our simple square and its diagonal represent something very mysterious and very cool, and that is: irrationality *inside* the rational; infinity *inside* the finite.

****

How can finitude contain infinity? It's an inexplicable paradox.

And yet, its truth is a fundamental tenet of religion. Judaism teaches it.

We say in our daily liturgy: "*m'lo chol ha-aretz k'vodo*—the fullness of the whole earth is God's glory"— suggesting that the finite and measurable earth somehow contains God, whose very nature is infinite, immeasurable, and uncontainable.

Solomon acknowledged this paradox when he said, "Does God really dwell with man on earth? Even the heavens to their uttermost reaches cannot contain You; how much less this House that I have built!"[6] And yet, he built the Temple anyway; and to this day, Jews come to that site from all over the world to feel God's presence and put prayer notes in the crevices of the Wall.

And it's not unique to Judaism. Think about Christianity: God impregnated Mary, the divine seed grew inside a mortal woman, and God Himself became incarnate in a body of flesh and blood.

Infinity inside of the finite.

It makes no sense. And yet, we know that it is profoundly true. Maybe not every one of us individually will affirm it; but humanity collectively, over the course of so much time, has known this to be true.

Human beings have constructed these myths throughout our history in efforts to get at this truth—not because we're stupid or naïve, but because, even as we are confined to our finite world and bound by our limited mortal capacities, we know that there is more to Reality than we can ever fully comprehend.

Storytelling, poetry, musical composition, and science are all ways we human beings try to "express the inexpressible" (to use Heschel's venerable phrase).

The mathematicians and computer scientists who are writing algorithms to build out pi to the 200-billionth decimal and beyond are doing so in the hope of discovering new truths about Reality.

As Ouaknin puts it, "[I]t seems that the motives of the hunters of decimals often have nothing to do with reason. Isn't this one of the expressions of man's humanity, his yearning for the infinite?"[7]

****

Our commitment to reason and science is admirable and important. It's also a defining feature of Reform Judaism's religious philosophy.

But there is danger in overcommitting to them to the point that we dismiss or ignore or try to explain away the irrational and the incomprehensible.

The danger is that we will succumb to modern idolatries that worship the advancement of power, commerce, and technology no matter the costs to the human spirit and human dignity.

The pressures to embrace modern techno-religion are immense because its promises are so compelling.

But lest we walk down a path to becoming mindless, soulless drones, like old transistors from Radio Shack in a Brave New World, now is the time for those of us who believe in Judaism—and other religions, too—to assert with confidence what we *know* from collective human wisdom to be *true*:

That, as the Jewish philosopher Neil Gillman put it, "my rational self is not the whole of me, that there are dimensions of my experience that elude the critical temper, that the world remains for me a realm of enchantment."

This religious attitude, Gillman explains, "is not the naivete of a child…rather…[it] fully acknowledges the indispensability of critical thinking but resists its *imperialism*. …

"[It] does not ignore, deny, or side-step my critical faculties. It acknowledges their legitimacy, even their power. *And* it takes me beyond their reach. It is what makes it possible for me to hope that my life here on earth is not my entire destiny. …

"It comes from some other dimension of my being, from that intuitive sense that I form a part of a broader order of existence that lends my life coherence."[8]

Funny that algebra, a discipline that so elegantly demonstrates coherence and order, also reveals that our finite and measurable world is, paradoxically, also suffused with irrationality, mystery, and infinity.

It's an absurd proposition, really. And yet we know that it is profoundly true.

As our parashah says, "*zot chukat ha-Torah asher tziva Adonai*—this is the *chok*, the inscrutable law of the Torah, that God has commanded." (*Num.* 19:2)

1 Midrash Tanchuma, Chukat 7
2 "Declaration of Principles (The Pittsburgh Platform, 1885)," section 6
3 Marc-Alain Ouaknin, *The Mystery of Numbers*, 195

4 Ouaknin explains that pi is technically considered a "transcendent" number rather than an irrational one because "it is not the solution to any equation of a degree greater than 1" (197). Still, pi, like all transcendent numbers, is relevant to our discussion because it shares irrational numbers' property of infinite and unforeseeable decimals.

5 Ouaknin, 206

6 II Chronicles 6:18

7 Ouaknin, 208

8 Neil Gilman, *The Death of Death*, 273-274