D'var Torah: Bereshit

In the beginning, from total and absolute nothing, the Creator brought forth a substance so thin it had no corporeality, but that substanceless substance could take on form. This was the only physical creation. Now this creation was a very small point and from this all things that ever were or will be formed.... If you will merit and understand the secret of the first word, b'reshit*, you will know why the Jerusalem translation is "With wisdom God created the heavens and the earth." But our knowledge of it is less than a drop in the vast ocean. —Moses ben Nachman Gerondi: Nachmanides, Commentary on Genesis*

The very first word of the Bible has been mistranslated ever since its first translation into Latin by Jerome in the late fourth century CE and into English, sometime around 1380, by John Wyclif. What's the problem with these translations?

The problem is that the first word, *b'reshit*, has been translated as "In *the* beginning." If the meaning were, in fact, "In *the* beginning," the word would have been vocalized slightly differently, with a *qamatz* underneath the *bet*, making the word *b**a**reshit*. What we have, however, is *b'reshit*—there's a *sh'va* underneath the *bet*; the *sh'va* used this way usually indicates an indefinite article while the *qamatz* shows a definite article.[1] So grammatically the word could mean "In ***a*** beginning."

The difficulty in translating this word has been recognized since before medieval times, and attracted the attention of Ibn Ezra and Rashi, each of whom explained that the word did not refer to the absolute beginning of everything, but should be understood as a statement about when God turned His attention to our own world. Both commentators[2] used grammatical analysis to show that the first verse of Genesis served as a prepositional clause, and should read "When God began to create..." or "In the beginning of God's creating...." But let's pursue the first, simpler, translation idea.

Aha, you say, the Torah has no vowels so how can we really know how *b'reshit* was supposed to be pronounced? We know it from the Masoretes, who began their work on standardizing the text of the Bible in the seventh century CE and added the vowels. They relied upon oral traditions that even then extended back over one thousand years. There are also other reasons why scholars know that this vocalization is correct.

Actually, there are some hints that the sages of pre-talmudic times recognized some ambiguity in understanding the first verse. In Proverbs, the early rabbis noticed these words:
The Lord made me the beginning of his work, the first of his acts of old.

Ages ago I was formed, before the establishment of the earth…
When he made the heavens, I was already there, when he drew a circle on the face of the deep.[3]
What was already present at "creation"? It was Wisdom, and the sages considered Wisdom to be a physical entity that was older than creation. In fact, Wisdom as a sort of force of nature was recognized by all of the cultures of the ancient near east as early as the second millennium BCE.[4] We see this belief

affirmed in several first-century CE Aramaic translations of the Bible—the targums—that translate the word "*b'reshit*" as "wisdom."

With *wisdom* did God create and perfect the heavens and the earth.[5]
In the beginning with *wisdom* did God create…[6]

Based upon internal and external evidence, scholars consider that the targums are likely based upon translation traditions of hundreds of years earlier, after Aramaic had fully supplanted Hebrew as the everyday language of the Jews. Philo,[7] first century CE, observed that "wisdom" has a number of synonyms, including "image," "appearance of God," and "*beginning*."

So if we read Genesis 1:1 as "In ***a*** beginning, God created the heavens and the earth," what does this tell us about the biblical creation process? What could the other creations be? Putting aside for now such esoteric ideas as parallel universes, oscillating universes involving multiple big bangs, multiverses, and fractal universes, we notice that Genesis 1 uses the word *bara'*, "created," only five times: once in vs 1, again in *vs 21* (for animals with *nefesh*), and three times in *vs 27* (for humans with *neshama*). It appears that the Torah considers that once the "heavens and earth" were created, the universe had the ability to produce everything else on its own. Once creation got going, no further creations were needed, except for animals and humans, those possessing animate life and souls.

The *Tanakh* ascribes other creations to God—we read in Isaiah, "*Ani Adonai... yotzer or u'vorei choshech*," "I am *Adonai*, ... forming light and creating darkness."[8] Sound familiar? We read it in our liturgy, which also holds that creation is an ongoing process. In the blessings before the *Sh'ma*, we read "...in Your goodness, day after day, You renew creation."

The creation story of Genesis 1 only describes the creation leading up to Adam's appearance. What about the other people who populate Adam's world, such as Cain's wife and her relatives? This question was asked in Lawrence and Lee's play *Inherit the Wind*, where Henry Drummond asked it of the opposing attorney, Matthew Harrison Brady; when Brady could not answer, Drummond suggested that there was *another* creation going on over in the next county! Obviously, Mrs. Cain was a resident of that next county and a beneficiary of a separate creation.

Interestingly, there is a *midrash* that speculates about the great flood in Noah's time that posits that there were many earlier creations, supporting the idea of "In ***a*** beginning."
Rabbi Abbahu said: "The Almighty created many worlds and destroyed them ... until our present world was formed."[9]

If *b'reshit* means "In ***a*** beginning," we should explore how our particular beginning came about and its implications for what may come next. This is exactly what the physicist and talmudic scholar Gerald Schroeder has done in his books and articles,[10] where he shows that creation hasn't stopped—we are still enmeshed in creation's "beginning."

Schroeder contends that the biblical description of the first six days following the creation of the universe in Genesis could be viewed as a priestly interpretation of the events that ensued after the Big Bang. Of course, the priests had no concept of the time that had elapsed since the universe was created. They were undoubtedly aware that the scientists of Babylonia, whose literature to which they had free access during the exile, believed that the world was at least 60,000 years and as many as half a million years old![11] But Genesis 1 was not written to document the world's age. Genesis 1 was written to accomplish two completely different objectives: to establish that all of the world and its contents were God's dominion and to set the stage for God's establishing the Sabbath. The invention of Shabbat was a crucial step in the development of Judaism, but that's a topic for another *d'rash*.

But what if the priestly description of creation was *intended* to be scientific? Remember that the target audience of Genesis 1 was the Jews of the middle of the first millennium BCE, who obviously did not have an understanding of the science of the age (it was known as "wisdom" then). But even though the priests couldn't have known elementary cosmology, we can see that they still came astonishingly close to the truth. Of course the description of creation is quite abstract and uses rather imprecise vocabulary. Many of the concepts involved weren't developed until the twentieth century, but their description of creation comes very close to what we currently understand. "Water" is a good example of one such concept. The very early universe consisted of a plasma, and the concept of the three forms of material existence—energy, matter, and plasma—was not developed until the twentieth century. But water is a pretty good approximation for the concept of plasma. One abstraction is the phrase "the heavens and the earth," a literary figure called a "merism," whose meaning encompasses a global concept. This phrase describes the entire universe, since to the Jews of the fourth century BCE, the heavens and the earth *were* the entire universe.

What are some other Genesis concepts? Time is a major one. Genesis 1 relates that God oversaw the formation of the universe over a six-day period, after which he rested. Are these six days true days of 24 hours, longer (or shorter) days, or are they abstractions? The rabbis debated this point extensively and they concluded the answer was—yes. All of the above. (A few important rabbis dissented, insisting that the days were 24 hours long.) But consider Psalm 90:4: "A thousand years in Your eyes are as a day that passes." Nachmanides, in contrast, wrote that those first six 24-hour days contained all the ages and all the secrets of the world.

Surprisingly, modern physics supports the rabbis' conflicting reasoning while supporting the account in Genesis 1. The key is how time passes. Einstein showed that time is relative, proving that time actually slows down in systems of high velocity or gravity—*relative to an outside observer*. Wherever you are, time is normal for you because your biology is part of your local system.

But in addition to gravity and velocity, there is another aspect of the universe that affects how time passes: the stretching of space. The universe started from a tiny volume, what scientists call a "singularity." This singularity expanded, not *into* the universe, but *became* the universe, together with all of the matter and energy within its bounds. Outside these bounds was, well, nothing. Not empty—just non-existence. To accommodate all of the material of the expanding singularity, space itself must

have stretched, and stretch it did, at a tremendous speed, resulting in the slowing of time's passage as measured from the initial singularity. How is this relevant to Genesis 1? It's actually essential to the Torah's meaning of the chapter. How? It can prove that the Genesis 1 account is literally true! Cosmologists have determined the age of the universe to be somewhere around 14 to 15 billion years, give or take a billion. Schroeder shows that by relativistic time dilation, the number of seconds contained in six days counted from the original singularity in God's space-time frame of reference amounts to the same number of years counted from the singularity in Earth's space-time frame of reference.[12]

If one determines for each "day" of the first six days of the universe from God's point of view, the corresponding epoch during the first 15 billion years of the universe from Earth's point of view, the correlation between what happens each day according to Genesis and what happens in each geological epoch, according to our understanding of cosmology, paleontology, thermodynamics, and geology, is, according to Schroeder, extraordinary.[13]

So if we follow the math, when we get to the end of the sixth day, it's some 68 million years starting from when Adam was created 5,769 years ago, and it's now Shabbat. While we count some $5{,}769 \times 52 = 299{,}988$ sabbaths since Adam's first one, God is only $5{,}769/68{,}000{,}000 = 8.5 \times 10^{-5}$, about 7 seconds, of the way into God's first. As Daniel Berry, a computer scientist at the University of Waterloo, said in a recent paper,[14] this observation may account for God's relative scarcity these days. God is still resting and is unable to interrupt his rest for trivial things like attending to the state of the universe. Perhaps we can expect a more active God starting 68,000,000 – 5,769 = 67,994,231 years from now. It will be difficult to verify this prediction.

Schroeder points out that there are events in the history of the universe for which science has no explanation—they cannot be explained by physics. For example, consider the one-time force that inflated the 10^{-35}-second old universe for 10^{-34} second from 10^{-24} centimeter, a million-fold less than the diameter of an electron, to 12 centimeters, the size of a grapefruit—a rate of expansion that is far in excess of any possible velocity. Just before the inflation, the universe was a black hole from which no light could escape. After the inflation, conditions soon permitted light to escape, and there was—suddenly and literally—light. Without the one-time force, the universe would have collapsed back to the singularity from which it had started 10^{-34} seconds earlier and the universe we know today would never have happened.

What caused this one-time force? Did God provide this force? The second sentence of Genesis appears to say so. "The earth was unformed and void, and darkness was on the face of the deep; *ruach Elohim*—God's wind/spirit/power/force—hovered on the face of the waters." Schroeder argues that the darkness that was on the face of the deep was the black-hole universe at 10^{-35} seconds and the wind, or force, which hovered on the face of the *mayim* was the one-time inflationary force that expanded the black hole into a ball of plasma. This was the first *bara'* of B'reshit. After the inflation, photons could now

escape the former black hole and light could finally appear. Well, the third verse, after "God's wind," is none other than "God said: Let there be light, and there was light."

Another early event which cannot be explained by science concerns life's origin. Schroeder points out that even under the most optimistic estimates of the probability for various chemical processes to happen by chance, the time required for random chemical reactions to produce even the most simple self-replicating molecule far exceeds not only the 4.5-billion-year age of the Earth, but also the 15-billion-year age of the universe. What caused life to evolve as we know it, and in fact to appear just 700 million years after the formation of the Earth?[15] According to Genesis, God created life—represented by the four other mentions of *bara'* in Genesis 1. How did this happen? Clearly something either jiggled the thermodynamics of chemical reactions in the primeval oceans to produce proteins and nucleic acids, or—what? No one knows.

Where does time come from? In the Torah, each day of creation is enumerated. The fifth verse says: "There was evening and morning, day one." But the corresponding description of the second and subsequent days is different: not "evening and morning, day two"; rather, it says "evening and morning, a second day." Only on the first day does the text use a different grammatical form: not "a first day," but "day one" (*yom echad*—which could also mean an "only day"). Why "one day"? It's because we are viewing events from God's perspective. There hadn't yet been another day to begin a sequence. This idea was important to biblical commentators, so let's see how.

In KI's adult-study sessions with Jack Love last year, Jack covered textual studies of the Talmud by exploring the works of the Bible's commentators. Nachmanides was one such commentator, and I'll bet Jack mentioned that Nachmanides was a major figure in early Jewish mysticism. Saying he was a mystic isn't a denigration of his scholarship; the manner of thinking needed to be a good mystic actually enhanced his ability to think beyond the bounds of the received knowledge of the day. Nachmanides would have made a fine cosmologist if he lived today, since it appears that he had essentially figured out the Big Bang theory when he described the first seconds of the universe in his *Commentary on Genesis*, which I quoted at the start of this *d'rash*. In it, he states that before the universe, there was nothing, but then suddenly the entire creation appeared as a minuscule speck. He even gives a size for the speck: it was something very tiny, smaller than a seed of mustard. And he says that was the only physical creation. There were no other physical creations; all other creations were spiritual. We could view this statement as an interpretation of God's manipulation of potentialities rather than matter!

Nachmanides went on to say, "*Mishe-yesh, yitfos bo z'man*," "when something is formed, time takes hold." It wasn't until matter formed from the speck that time "took hold." Not time "began." Time existed before matter formed, but there was nothing around subject to its passage. But when matter formed, time "took hold." This is a tremendous insight! When the original plasma-energy substance condensed into matter, that's when the universe's clock started. Science has shown that for pure plasma, a quantum wave-particle construct, time does not pass. Energy is propagated at the speed of light, and at light speed time contracts to zero. Once energy changed into matter, according to $E = mc^2$, time started to apply to the matter. The universe was aging, but time only took hold, became relevant,

when matter formed. This moment of time before the clock began for the Bible lasted about 1/100,000 of a second, a minuscule time. But in that time, the universe expanded from a tiny speck to about the size of the Solar System. From that moment on matter had formed, and time had something to work on. That's when time started.

Nachmanides also was aware of the nature of the physical earth—that it was a sphere. He wrote: "On the earth both evening and morning are always present. There are on the earth at every moment ever changing places where it is morning and in the places opposite them it is evening." But, he wondered, why does the Genesis account mention evening and morning before the earth, sun, and moon were created? Further, evening followed by morning doesn't even constitute a day! Surely the priestly authors of Genesis 1 knew this. This strange wording was intended to convey a message, and Nachmanides quotes Onkelos, who, back in the second century CE, deciphered that message. The Hebrew for "evening" is *erev*. The root of the word *erev* corresponds to a word meaning "obscure" or even "disordered." "Morning" is *boker*, whose root corresponds to another word meaning—guess—"discernable" or "orderly." The Torah is telling us that after each day, the universe has progressed from disorder to order. For the sixth day, our current translations read, "...and God saw all that He had made, and found it very good." But Onkelos translated this phrase as "God saw all his works, and they were in complete order."

One question still not answered by science about the universe is how much matter is in it and thus, what is its future history. We know that ever since the universe began with the Big Bang, the universe has been expanding and that the rate of expansion does not appear to cosmologists to be slowing. What is the ultimate fate of this expansion? There are three possibilities: 1) continued expansion; 2) slowing and stopping; and 3) contraction back into to a singularity—a Big Crunch.

If the future of the universe is to be a Big Crunch, this implies that there could be another Big Bang, and a force beyond what physics knows to get the universe to expand again would be needed. If God has done it once, why could God not have done it before and continue to do so in the future? If God can provide a one-time-per-Big-Bang inflationary force to get the expansion going in earnest, God can surely provide enough energy to overcome the energy loss that would occur in a Big Crunch to make sure that the next Big Bang is big enough to expand again. Since God is infinite, there is no problem for God to have done this always or to have started once with a first big bang and to have done some, many, but possibly only a finite number of cycles.

Now we can return to the multiple-beginning wording we discussed for the first verse of Genesis. Perhaps in saying "In ***a*** beginning, God created the heavens and the earth," the Torah is saying that our current creation was just one of many; that indeed there is a cycle of expansion and contraction, and that God provides the force to make it work over and over again, at God's will. Perhaps the use of "In ***a*** beginning..." was intended to alert us of the ultimate fate of the universe in which we live.
Shabbat shalom.
—Stephen Rayburn
October 2009

Notes

1. Grammatical purists will object to this treatment of the word *b'reshit*, which is, grammatically, in the "construct state." In the construct state a noun is connected to another noun; in this case, however, it is connected to a verb, *bara'*, meaning "created." According to Hebrew grammar, a noun in the construct cannot take the *qamatz* vowel under the *bet*. However, such an analysis ignores the fact that this verse is written in early Hebrew, and rules of modern grammar did not necessarily apply, nor were they applied as strictly as in the Hebrew of the talmudic era.
2. Sholmo ben Isaac (Rashi), *Commentary on Bereshit*; Abraham Ibn Ezra, *Sefer ha-Yashar: Bereshit*.
3. Proverbs 8:22–27
4. Kugel, James L., *The Bible as it Was*, Harvard University Press, 1997. p. 53.
5. Jerusalem Targumim: Fragment Targum
6. Jerusalem Targumim: Targum Neophyti
7. Philo, *Allegorical Interpretation*, ca. 10–40 CE.
8. Isaiah 45:7
9. *B'reshit Rabba* 9:2
10. Schroeder, G., *Genesis and the Big Bang: The Discovery Of Harmony Between Modern Science and the Bible*, Bantam, 1990; *The Science of God*, Free Press, 1997; *The Hidden Face of God: Science Reveals the Ultimate Truth*, Free Press, 2001.
11. Pellegrino, Charles, *Return to Sodom and Gomorrah*, Avon, 1994, pp. 23, 33, 88, 346.
12. To understand this time dilation, assume that every second a pulse of light flashes at the point of the Big Bang in God's frame of reference. The speed of light is about 300 million meters per second. Thus, at least initially, the pulses would be spaced 300 million meters apart. Since then, however, the universe has been expanding. This expansion causes a stretching of space itself, so the distance between the pulses stretches too. Since the speed of light remains constant, the time between pulses increases to the point that what was one second in God's frame of reference is about a trillion seconds in our frame of reference. Cosmologists have measured this expansion ratio and call it the "red shift." Expressing this ratio in days gives us six trillion days, or about 16 billion years. Since Adam was created some time during the sixth day, not at its end, and for some technical cosmological reasons, the 16 billion years should be reduced by a little less than 10%, leaving the age of the universe from the Bible's viewpoint as about 15 billion years.
13. Note that each day in Genesis 1 does not constitute one-sixth of the total time. The five-plus days of Genesis until Adam's creation are not of equal duration in our reference frame. Each time the universe doubles in size, the passage of time halves as we project that time back toward the beginning of the universe. The rate of doubling, that is, the fractional rate of change, is very rapid at the beginning and decreases with time simply because as the universe gets larger, it takes longer and longer for its overall size to double. Because of this, the first five days contain most of the 15± billion years.
14. Berry, D. M., *Understanding the Beginning of Genesis: Just How Many Beginnings Were There?* Jewish Bible Quarterly *31*(2):90–93, 2003.
15. Stanley, Steven M., *Earth System History*, W. H. Freeman, 2004.