
Symposium

Science, Technology, and Religion

Conventional wisdom holds that religion and science stand in opposition—with religion oppressing science in the past and science undermining religion in modern times. Today, many scientists and believers are wary of attempts either to reduce science to religion or religion to science; there is good reason to distrust those who seek to prove religious truths scientifically or to read religious scriptures as science textbooks. But the relationship is not simply antagonistic. Religious institutions have in many cases supported scientific inquiry. The rise of science depended in part on metaphysical beliefs with religious roots, and arguably on certain religious virtues. Religious belief, in turn, has been enriched by scientific insights into the natural world. And technological innovation has been essential to the spread of religious ideas.

*The authors of this symposium each examine some aspect of the relationship between religion, science, and technology. Writing from different religious traditions, their essays touch on history, theology, and philosophy, and they explore how modern science and innovation affect religious practice and faith. **Charles T. Rubin** considers the lessons that can (or cannot) be drawn from the Jewish legend of the golem. **Joseph Bottum** argues that the Catholic sense of wonder can survive the disenchantment of the world. **Timothy Dalrymple** makes the case for appreciating tools and using them for Christian evangelism. **Imad-ad-Dean Ahmad** criticizes pseudoscientific readings of the Koran. **Varadaraja V. Raman** suggests that ancient Hindu thought, while not scientific in the modern sense, anticipated various recent scientific debates. **Martin J. Verhoeven** pushes back against the view that Buddhism and science are in simple harmony. And **Peter Morales** describes the Unitarian Universalist search for truth and meaning through science and faith.*

The publication of this symposium is supported by a grant from the Religion and Innovation in Human Affairs Program (RIHA) of The Historical Society.

The Golem and the Limits of Artifice

Charles T. Rubin

Golems are like bagels. While the Jewish stories of the creation of an artificial human being come in a wide range of forms, they were until recently mostly variations on some basic themes. The many and diverse

Charles T. Rubin, a New Atlantis contributing editor, is an associate professor of political science at Duquesne University.

subspecies of bagels are yet more recent inventions, but the cause of their efflorescence has also been at work with the golem. For both golem and bagel have escaped the narrow bounds of their origins and gone mainstream. Thomas' (the English-muffin people) and Pepperidge Farm make things they call bagels; the golem, once an object of only the most esoteric interest among the most learned of Jews, now appears in comics or as a Pokémon card with little resemblance to any aspect of Jewish lore. An upcoming golem-themed computer game was successfully funded on Kickstarter.

Golems, it must be admitted, do not play a prominent role in Jewish thought generally, and even in Jewish mystical thought specifically their role is small. According to Moshe Idel's comprehensive treatment of the golem material, *Golem: Jewish Magical and Mystical Traditions on the Artificial Anthropoid* (1990), during the medieval period one finds accounts of creating an artificial human being using incantations, based on permutations of Hebrew letters, spoken over earth of one form or another. There is much obscurity and little obvious drama in these brief, arcane discussions and they are, relative to the vast amount of Jewish medieval thought, few and far between. Idel attempts to associate different versions of the story with different regions and schools of thought, but they are often so obscure that it is tempting to treat variations as products of the creative flights of their individual authors. Starting in the early modern period, the stories sometimes contain a more generally interesting element, with golem creation attributed to specific rabbis, and (very rarely) with issues arising about keeping a golem under control. Likewise during this period, discussion of the place of golems in Jewish law (*halakha*) becomes more common; for example, whether or to what extent the golem should be treated as a human being. It is only in the twentieth century that we see the full development of the version of the story that most people probably have in mind when they think of golems: the wonder-working Rabbi Yehuda Loew of Prague (also known by the honorific nickname "the Maharal") sculpts a man from river mud and brings him to life in order to protect the ghetto from the pogroms stirred up by the Jew-hating priest Thaddeus.

It is for the most part variants of this last version of the golem story that have engaged people concerned about bioethics, artificial intelligence, and other moral matters connected to scientific and technological innovation. The golem suggests to many modern readers a way of understanding human power over nature that is different from the more common evocation of Frankenstein's monster. The seemingly obvious lesson of Mary

Shelley's story has something to do with the dangers of overreaching and the consequences of scientific irresponsibility, of science and technology run amok. But in the golem story, even those versions where he goes out of control, he is (unlike Frankenstein's monster) eventually tamed, even if at the cost of such life as he may be said to have had. Thus the golem story is taken to teach that, while science and technology are potentially threatening, they are still very useful and not inevitably outside of our control. It is perhaps not surprising, then, that the golem story has drawn the interest of modern students of the scientific project, particularly those who see in it a longstanding desire and perhaps even a well-established defense of today's most ambitious techno-utopian endeavors. Efforts to use the golem story as a source of moral wisdom provide a window into the promises and pitfalls of thinking about questions of science and technology from a Jewish perspective.

Creating the Golem Tradition

The origin of the golem in Jewish thinking is usually traced back to a characteristically terse Talmudic story that does not even use that word but begins with the almost magical-sounding phrase "*Rava bara gavra*," or "Rava created a man" (Sanhedrin 65b). Rava, a very great Rabbi, sends the man he created to one Rabbi Zeira. There is no mention of why. Rabbi Zeira discovers that this being cannot speak, and concludes that he was created by one of his colleagues. No reason is given for why Rabbi Zeira, realizing he is speaking to an artificial man, commands it to return to its dust. Nor, beyond whatever conclusions might be drawn from Rabbi Zeira's command, is there any overt condemnation of Rava's having created a golem.

From this short and cryptic passage—a mere twenty-three words in the Aramaic—a mystical tradition developed, extending into the medieval and early modern period, discussing in more or less detail how such an artificial man, called in these later sources a golem, can be created. (The first appearance of a form of the word "golem" seems to be in Psalm 139, where it arguably means something like "embryo" or some not yet completely formed state.) Following hints drawn from the Talmud, and from an extremely obscure ancient volume called *Sefer Yetzirah* (the *Book of Creation*), the rituals for golem creation almost always involve manipulations and permutations of the Hebrew alphabet and the Tetragrammaton (the four-letter name of God). Idel carefully documents dozens of more or less esoteric discussions of the golem, discussions that seem to have been

intended for a narrow audience. It will surprise no one that the various Jewish authors who wrote on the golem over the centuries hardly agree on a variety of essential points, like exactly how to create one, what it can and cannot do, and what its status is in relationship to human beings.

Yet already in the nineteenth century a popularized version of the golem—rather more dramatic than most of the ancient, medieval, and early modern versions—was published by a Grimm brother, and the great scholar of Jewish mysticism Gershom Scholem notes that echoes of the golem are to be found in Achim von Arnim and E. T. A. Hoffmann. The familiar modern version of the golem story can be traced most directly back to Rabbi Yudl Rosenberg’s 1909 Hebrew literary forgery *The Wondrous Deeds of the Maharal of Prague with the Golem*, which he falsely claimed was based on a three-century-old manuscript, and Rabbi Chayim Bloch’s *The Golem of Prague*, a plagiarized reworking of Rosenberg’s book into German in the next decade. In these tellings the golem is formed by incantations performed over sculpted riverbank mud. He finds ways to communicate even though he lacks the power of speech and is indeed perfectly reasonable in a literal-minded way. He is very strong and durable, but seems to appear no different from a normal human being; he serves as the beadle for the synagogue without arousing comment, and performs missions that require him to “pass” among people outside of the ghetto. According to Rosenberg’s recent scholarly translator Curt Leviant, both books were immensely popular and, in various translations, spread the golem story throughout Europe, America, and the Middle East.

But even this well-known version does not contain more than a hint of a plot element featured in other twentieth-century versions of the story which, in the style of *Frankenstein*, highlight the golem escaping the control of its master and wreaking various degrees of havoc. For this modification we might thank, among others, not only the Grimm version, but H. Leivick’s overheated and sometimes incomprehensible 1921 play *The Golem*, as well as the 1920 film *The Golem: How He Came Into the World* (the last and only surviving installment of a trilogy that experimental filmmaker Paul Wegener made about the golem).

It is these later versions that are most often employed as symbol or warning in discussions about science and technology. In 1964 Norbert Wiener, the cybernetics pioneer, published *God and Golem, Inc.: A Comment on Certain Points Where Cybernetics Impinges on Religion*. Beyond the title, however, the Jewish golem has a minuscule part. When Wiener discusses problematic aspects of the relationship between man and machine, he turns to such familiar sources as the Black Mass, *R.U.R.*, the *Arabian*

Nights, “The Sorcerer’s Apprentice,” and “The Monkey’s Paw,” rather than any Jewish traditions. On the other hand, at the dedication of a new computer at the Weizmann Institute in Israel in 1965, Gershom Scholem invoked the golem far more systematically, arguing (if in a somewhat lighthearted manner) that there were telling likenesses between the new computer and the man of clay. More recently, the sociologists of science Harry Collins and Trevor Pinch have published a trio of books on issues in science and technology featuring the golem in the title: *The Golem: What You Should Know About Science* (1993), *The Golem at Large: What You Should Know about Technology* (1998), and *Dr. Golem: How to Think About Medicine* (2005). Their intention in evoking the golem is reasonably clear, and it applies also to Rabbi Byron L. Sherwin’s *Golems Among Us: How a Jewish Legend Can Help Us Navigate the Biotech Century* (2004). Sherwin’s book, which makes a serious effort to draw lessons from the golem for genetic engineering, stem cell research, cloning, the aspiration to a “postbiological” future expressed in transhumanism, and corporate responsibility, makes for a helpful case study on a Jewish approach to this broad set of questions.

Making and Remaking Bodies

Sherwin begins his book with an overview of the golem story, and he has two very specific points he wants to make as he tells it. First, the nature of the golem, viewed across time, is very far from fixed in its character and meaning. Sherwin makes significant use of this flexibility, using the term “golem” to describe science, technology, and the modern state—after all, they are each “creations of the human mind.” Second, and more importantly, he points to the distinctly Jewish significance of golem creation. Following up a grammatical oddity in the Genesis story (in Genesis 2:3), Sherwin suggests that the world was “created to be made”—that is, God created the world with the expectation that human beings would carry on His own creative activity with the raw materials He created out of nothing. Moreover, Sherwin suggests that we see ourselves as co-creators of the world along with God, tasked with working “toward completing the process of creation begun by God.” Indeed, we are created in God’s image precisely to the extent that we possess and employ “moral and creative volition.” Sherwin alludes repeatedly to a passage from the Talmud (to which we will return) about human beings having the potential for being “God’s partners in the work of creation.” Sherwin finds further support for this outlook in, among other places, some of the writings of the real-

life Rabbi Loew, and in a parable of uncertain origin about a king who leaves servants piles of flour, flax, and grapes, rewarding the one who turns them into useful goods and punishing the one who simply guards them in the form given to him.

Sherwin's is by no means an unorthodox reading of Jewish tradition on this point about human creativity; one can find similar-sounding sentiments in, for example, the writings of Rabbi Jonathan Sacks and of the Lubavitcher Rebbe. Sherwin is at pains to suggest that there is nothing sacred about unaltered nature *per se*, nothing problematic about imitating divine creativity so long as it does not involve thinking that that creativity is unnecessary. Hence, in our scientific and technological accomplishments and strivings we are not "playing God" in any pejorative sense. Recalling another passage in Genesis, he notes that "beneficial human interventions in nature fulfill the divine mandate to human beings to subdue nature and to establish their dominion over it."

So while Sherwin acknowledges in his chapter on genetic engineering of ourselves or plants and animals, that the practice is potentially dangerous, he agrees with the view that it should be no more troubling than any other of our many abilities to alter the naturally given, which alterations are not problematic insofar as the naturally given is neither benign nor to be worshiped. His main concern therefore is not genetic redesign of plants and animals in itself, but that the purposes for doing so may be distorted by a "university-industrial complex" and by "corporate manipulation, greed, and deception." As far as genetic manipulation of human beings is concerned, Sherwin expresses reservations about possible eugenic implications, but spends more time discussing the positive implications of genetic screening and therapies.

The direct role of golems in Sherwin's discussion of genetic engineering is modest; the chapter begins with a Talmudic story of rabbis creating a calf to eat for Shabbat dinner, so golems are an anticipation of genetically modified food, "the creation of food utilizing the best available technology." At the end of the chapter Sherwin imagines that on his way to making the golem Rabbi Loew must have had thoughts about both the "benefits and blessings" and the "dangers and uncertainties" of "creating new life-forms and re-creating existing ones." Just as Rabbi Loew went ahead and made the golem, so we too can proceed with genetic engineering, Sherwin writes. God having made it possible to alter genes and possible for us actually to do it, the main question is whether we do it wisely or not.

The book's chapter on stem cell research, cloning, and assisted reproductive technologies like IVF suggests that, for Sherwin, these techniques

are likewise not problematic in themselves as they too do not actually, as God does, create life, but merely manipulate what God has given us to manipulate. “Jewish bioethicists,” he says, hold that once safety questions have been addressed, reproductive cloning can proceed cautiously “under strict regulation, and for specific justified purposes” such as curing disease or providing children for the childless. Stem cell research should certainly proceed, Sherwin argues, and “Jewish law” views the embryo in a way that actually encourages the use of “excess” IVF embryos for research purposes “if the appropriate legal releases for such use are obtained.” Using such embryos is “preferable” to embryo farming, Sherwin writes, but that “preference would in no way preclude the use of embryonic stem cells for biomedical research.”

The overt role of golems in this chapter brings us back to the Biblical meaning of the term as an unformed or embryonic state. While a being in this state is “potentially a human being,” so long as it remains a golem “it cannot enjoy the legal or moral protections of personhood.” Hence, like golems (according to rulings about golems by eighteenth-century rabbinic authorities), embryos may be created and destroyed, given there is “a viable purpose for doing so, particularly a purpose aimed at the improvement of the life and health of existing human beings.” So long as we do not create life from nothing, so long as we do not fool ourselves into thinking that our otherwise acceptable imitation of divine creativity extends to making something out of nothing, we violate no limits.

In short, biotechnology gets a strong if qualified endorsement from Sherwin, assuming it is safe, effective, and used wisely; we will return to what “wisely” might mean. On the other hand, Sherwin sets himself up as a critic of transhumanism and similar aspirations to merge man and machine. The “possible evolution of machines as postbiological humans, the growing erosion of human autonomy and its surrender to machines, violates human nature, freedom, creativity, and the uniquely physical and spiritual manner of human being-in-the-world.” Sherwin links this aspiration to problematically negative views of the human body that go deep in Western thinking and to a similarly deeply rooted rejection of mortality.

Knowing When to Stop

Machine technology (including nanotechnology), or our “mechanical golems,” Sherwin writes, have influenced “our spiritual lives.... [T]he more we think of ourselves as machines, the more machinelike we will become.” But that could lead to “the physical and spiritual suicide of the

human race.” We learn from the golem stories just how important it is to keep our creations under control in order to avoid such a catastrophic outcome.

Unfortunately, the tone of Sherwin’s chapter on “corporate golems” is set early on by the earnest use of a spurious quotation from Abraham Lincoln warning against domination of “the money power of the country” in the post-Civil War period. The chapter culminates in a discussion of I. G. Farben’s role in the Holocaust as the model for “how far the power of corporate conglomerates can extend if left unchecked,” even though the bulk of the chapter centers on the significance of the question of corporations as natural or artificial persons within the specific framework of American constitutional law. In short, corporate golems vie with mechanical golems as most problematic from Sherwin’s point of view, and given that corporate golems are not projections of some future possibilities but actually already exist with their long, sometimes abusive history, it might be said that they are the most threatening of the golems. It would be bad enough, according to Sherwin, if corporations were treated merely as artificial persons, but developments in constitutional law, he argues, have effectively given them all of the constitutional and legal rights of natural persons, without the corresponding means of penalizing them when they violate the law.

Golems enter this chapter because they are both created and undone by words. The same is true of corporations, Sherwin argues; what they can and cannot do is entirely a product of the law. To prevent corporate abuses, then, we need a new legal understanding of their status. They certainly should not be treated as natural persons; they deserve no constitutional protections. But we should also strip them of artificial-person status, given how far the distinction between artificial and natural has eroded. They are not persons of any kind but, like golems, simply human-created entities. Jewish law would treat them as partnerships; stockholders are creditors of the partnership. Under these circumstances, Sherwin believes, corporate owners and managers could be held directly responsible for their wrongdoings.

In general, as Sherwin frames the issue, the key to “how a Jewish legend can help us navigate the biotech century” is to distinguish between those interventions in nature, and those products of the human mind, that are “beneficial” and those that are not. Golems teach us the necessity of guiding scientific and technological development by making moral distinctions. This point is not uncontroversial and it is to Sherwin’s credit that he sees its importance, along with the importance of linking it with the fact

that only the wisest of men could make a golem, those with “highly developed moral and spiritual character.” Their wisdom, Sherwin suggests, resides most of all in “knowing when to stop,” just as God knew when to stop creating and rest. Knowing when to stop is how our golems can be kept under our control. “When the entities we create to help and defend us threaten to harm or destroy us; when the artifacts we introduce into our world run amok; when the creatures we invent to serve us end up as our masters; when power and greed diminish our moral clarity; when the lust for knowledge clouds our quest for wisdom; and when we start to value our products more than ourselves—it is time to stop creating.” It would be boorish to argue with such fine sentiments, other than to suggest that it would be nice if wisdom included the ability to stop well *before* some of the more dire conditions mentioned as reasons for stopping were met.

Partnering with the Creator

As important as Sherwin’s conclusions are, there is something odd about the way he reaches them. It is not always clear when Sherwin is arguing from the golem legend to his conclusions, and when his conclusions illuminate his reading of the golem legend. Put another way, it seems possible that by recontextualizing the golem as he does, Sherwin contributes to what he calls in another of his books “semantic displacement,” a situation wherein old words have come to have, or been given, untraditional meanings. This problem, if indeed it is one, needs to be explored with great caution. Jewish thinking is diverse in form and content, and intelligent and well-intentioned people disagree regularly. To speak as if there is a single Jewish view on controversial matters of science and technology would be nearly as problematic as speaking of a single Christian view.

Let us begin with the idea, central to Sherwin’s argument, that we are “God’s partners in the work of creation.” In another book, Sherwin cites the origin of this thought in the Talmud, which speaks of the possibility of human beings becoming “a partner with the Holy One, blessed is He, in the act of creation” (Shabbat 10a). Now, in Jewish law one could imagine many contexts in which such a thing could be said, as a good deal of that law involves how in daily activities Jews are expected to handle and transform the material world in such a way as to elevate it to spiritual significance. Hence, for example, dietary laws, laws of sexual purity, and the like. But the context for this quotation is not quite of that nature. As translated and elucidated in the ArtScroll Talmud, the passage goes like this: “Any judge who renders a judgment that is absolutely true, even if

he sits in judgment for only one hour, i.e. a short while, is considered by scripture as if he became a partner with the Holy One, blessed is He, in the act of creation.”

Note first that in context we are not partners, but we have acted “as if” we are partners, a somewhat more modest claim. And then note that what makes the judge “as if” a partner is not (or not obviously, at any rate) his creativity, and certainly not creativity as applied to material making or doing, but rather his discerning ability to come to a judgment that is completely true. In sum, this passage has no obvious link to the technological activity that is Sherwin’s primary concern. If there is any “purposeful and beneficial” imitation of God here, it relates to His judgment, not to His creativity.

(It might also be noted that there are traditional sources that suggest the limited character of human creativity to improve what God has given. A commentary [*midrash*] on Genesis has Rabbi Simeon ben Yochi comparing the criticisms that might be offered about the architecture of a king’s palace, where people might say this pillar could be taller or this room better proportioned, to how people respond to God’s creation: “But will any man come and say, ‘Oh that I had three eyes or three feet!’ Surely not” [*Midrash Rabbah*, Genesis, 12.1]. That some transhumanists might nowadays make just such objections is testimony to their very different idea of the appropriate scope of human creativity.)

In other instances Sherwin’s recontextualization of his material is more subtle, as when he suggests the Maharal as a proponent of technological creativity. In *Golems Among Us*, Sherwin cites the Maharal as saying, “Everything that God created requires [human] repair and completion.” In another of his books, he quotes the Maharal as suggesting that “Human creativity transcends nature,” although the ability to transcend in that way is found within the God-created laws of nature. Hence the things that human beings bring into existence that are not found in nature come into being “as if they entered the world to be created.”

Now, were you to leave God out of these passages, or substitute the word “nature” for God as appropriate, you would have sentiments that nearly any transhumanist could agree with. Sherwin knows the salient difference. The Maharal’s thought was not subject to the corrosive effects of materialism that Sherwin himself identifies. For the Maharal, human creativity takes its place within a natural and moral and spiritual order ruled by God. That is why the material world is not simply an enemy in Jewish thought; it can be made to serve the purposes of spiritual discipline and rectification. Wise creativity within this framework, for Jews at any

rate, means *halakhic* creativity, creativity that bends to or advances God's will as expressed through the laws of the written and oral Torah and their authoritative interpreters.

The vast majority of *halakha* is unabashedly particularistic, and Sherwin does not want to make an argument that will only appeal to those who follow it most strictly. Instead, he chooses to focus most of his attention on a Jewish legend, rather than Jewish law, as the shorter route to speaking to the broad concerns of a "biotech century." The golem as an "enduring myth" has shown its ability to speak "to the human condition at all times and in all places," he says. But this apparently shorter path may prove a longer, more difficult one to meet the challenges we will be facing if, as is most obvious in the case of transhumanism, the aspirations of the biotech century are in revolt even against the human condition the myth appeals to. There is dispute as to whether the human condition is defined by a providential order of nature and spiritual life or by the materialistic view that dominates the vast majority of discussions of modern science and technology today. In seeking to bring some Jewish concepts into the world of modern science and technology, Sherwin tries to create a seamless transition between the modern scientific project, with its mission to make the world safer and more comfortable, and the Jewish spiritual elevation of the material world. But the rift remains. Trying to ignore it favors making the naturally given into a problem to be solved rather than a divine gift to be used for spiritual discipline and development, based on adherence to divinely given law.

To put the point another way, Sherwin wants to present a Jewish view on the human condition that is consistent with continued progress in science and technology in many of the directions they currently seem to be going. At the very least he wants his readers to be aware of elements of Jewish tradition that, in contrast to some other religious traditions or attitudes toward nature, suggest a more permissive stance toward certain developments in biotechnology. For a general audience, even for a non-Orthodox Jewish audience, it is understandable why he would want to minimize the strictures of *halakhic* creativity in the golem story and maximize its mythic elements. The price of shifting the focus of creativity in this way is transforming it from a spiritual good to one that serves comfortable self-preservation, the not-so-thin edge of a materialistic wedge that Sherwin might otherwise view as problematic.

On the basis of his recontextualization, Sherwin can use the golem story to highlight the legitimacy of human creativity and to identify the broad limits within which it is acceptable to "play God." But this framework,

whether or not Sherwin intends it, expands the overlap between his conclusions and the conclusions of some of those whose outlook he would critique. The aims of the transhumanists whom Sherwin criticizes, such as the melding of minds and computers, are based on the belief that human beings and machines are equally fit for our creative transformations; but genetic engineering, which Sherwin embraces, applies the same logic at the molecular level. Sherwin believes that “foreclosing stem cell research” (a position, by the way, that it is not clear anyone actually holds) would be like taking away the fire extinguishers when a building is burning because it means “surrendering the opportunity of doing all that we can to improve the lives of the living.” But the transhumanists that he frowns at make the same kinds of claims with respect to other avenues of research. In some contexts he criticizes the revolt against mortality, but not in the context of cloning and related fields. He acknowledges the danger of corporate commodification when it comes to food crops, but is strangely unimpressed by the same problem when it comes to how we see our children.

But there is another way of thinking about the golem that encourages us not to take for granted those ends that Sherwin seems to accept too readily. From it one can draw lessons that speak to and from an understanding of the human condition that takes less for granted about the wise use of modern technology.

Jewish Tradition and the Scientific Project

Given the power of materialism and modern technological thinking, the fact that Sherwin takes the twentieth-century versions of the golem as paradigmatic is already significant. At key moments he draws on a tiny fraction of the pre-modern or early modern sources to make his case, and he freely mixes these with the twentieth-century stories, in effect reading the earlier stories in light of the later. This he is entitled to do. Nevertheless, it should be noted that by taking his essential inspiration from the modern golem and highlighting those traditional sources that come closest to it, he provides a golem that is not typical of some 1,500 years of thinking about what it would mean for human beings to be able to create, in the manner of artisans, a living being. Sherwin is far from unaware that he is creating a distinctive golem, which is why from the start of his argument he stresses the broad and to some extent dynamic meaning that the term has even in the traditional sources.

Still, there are three noteworthy characteristics of the traditional golem discussions that Sherwin acknowledges but underemphasizes. The

first and perhaps most striking difference between the broad sweep of those discussions and Sherwin's version is visible when we remind ourselves how important it is for Sherwin that the golem stories teach us practical lessons about how we are to use our scientific and technological capacities beneficently—in other words, that we use the stories for problem-solving. By contrast, what Moshe Idel concludes about a large subset of golem literature is true also of the whole: “The absence of a substantial use of the Golem for practical goals is obvious in the overwhelming majority” of cases. This uselessness is evident from the start when Rava creates his man, as it were, out of the blue, and Rabbi Zeira just as casually destroys it. (And as the golem is not useful in the great majority of cases, so it also presents no danger in the great majority of cases.)

Sherwin is on stronger ground when it comes to the calf created by the rabbis for Shabbat dinner, but it is striking that this act of food production is of little or no interest for many of those in the subsequent tradition who are interested in thinking about the golem. From our point of view, it is almost as if the later rabbis go out of their way to ignore the practical implications of this extraordinary human creativity. Which is to say, our point of view is not the same as the bulk of the tradition's. We live in a world much influenced by thinkers like René Descartes and Francis Bacon, where knowledge and power are inextricably bound together; this association is a key element in what defines our modern intellectual horizon. The mainstream of traditional golem stories is simply not about knowledge defined by its usefulness. In these stories, the measure of wisdom for the creation of a golem might be precisely the lack of interest in doing so for any practical purpose. So why create a golem at all? It is hard not to conclude after reading Idel that in most cases the creation of a golem is best understood as an example of “Torah for its own sake”—that is, making a golem is an expression of piety and knowledge of the most esoteric elements of Torah.

Thus, the second aspect of the golem that Sherwin notes but underinterprets is that this most remarkable act of creativity arises only out of the most stringent spiritual discipline. Once again, this outlook is evident beginning with the earliest Talmudic reference. For while the larger context of Rava's story is a discussion of prohibited forms of magic, its immediate context is his assertion that “if the righteous wanted, they could create a world,” which in turn is presented as a response to Rav Akiva's lament that our sins prevent a spirit of purity from resting on us (Sanhedrin 65b). So the story of Rava's speechless golem is either a suggestion of his imperfect righteousness, or a suggestion that the righteous

are less capable than he makes out. The best that can be done is the creation of a defective human being or a tasty calf. (Subsequent authors consider the possibility that in principle *only* God can endow a living being with the speech that the golem usually lacks, perhaps favoring the interpretation that Rava overstates the capacities of the righteous.)

It is of course precisely Sherwin's argument that the golem teaches us to approach our creative abilities with wisdom. For Sherwin, "Wisdom is knowing what to do with what we know and with what we can do. Wisdom is also knowing when, whether, and why to do what we can do." That Sherwin is willing to advance such questions at all is admirable; they are surely the questions that need to be asked. But then they also need to be *answered*. In the golem tradition, wisdom is exhibited by those whose exceptional piety and knowledge of esoteric Torah gives them a concrete foundation upon which to answer such questions. Fear of the Lord is the beginning of this wisdom.

The useful wisdom that Sherwin substitutes—the idea of seeing ourselves as co-creators with God—*may* be sobering and limiting, but points in a very different direction. By his lights we are not "playing God" unless we think we can make something out of nothing, or fail to acknowledge the divine source of our creative power, or assume we are omnipotent, or allow our creativity to "engender arrogance and pride rather than gratitude and humility"; in this view, the exceptional traits of the great rabbinic creators, formed from lifelong discipline, instead become ideas and attitudes far easier to achieve. But given that Sherwin lays out no program for even Jewish scientists and engineers to first study in a yeshiva, wisdom in the most stringent traditional sense is and will continue to be possessed only accidentally, and probably extremely rarely, by those who are now actively engaged in creating all of Sherwin's various kinds of golems. Lowering the bar in this way seems unsuited to the challenges Sherwin himself acknowledges.

To put it another way, to the extent that Jewish tradition is not ascetic and therefore has no trouble with our efforts as co-creators to make our lives longer, healthier, wealthier, and more pleasant, it is because doing so brings us greater opportunity to acknowledge God and thereby sanctify our lives in accord with the discipline of divine law. Within this framework, the tradition tells us that on the rarest of occasions it is possible for the most pious of men to extend human creativity to extraordinary (and yet practically limited) results. These stringent constraints, and not the legitimacy of co-creation, may be the reason why the tradition foresees so little in the way of problems from creating a golem—and of course it

may also be telling us something about the conditions under which any of us would best employ the fruits of science and technology. (The idea that the discipline with which we deploy our powers should be commensurate with the extent of those powers is one that Jewish thought does not possess exclusively; it is a theme that has been explored with great intelligence by, for example, Neal Stephenson in his novels *The Diamond Age* and *Anathem*.)

But that these are not the conditions under which we presently operate hardly needs to be stressed. Indeed, when Sherwin suggests that transhumanist redesigners of humanity are being prideful and arrogant for forgetting the divine source of their creativity, most would reply that he is judging them before a tribunal whose legitimacy they do not accept. They see the science and technology which we use to improve the world as having no need of what has been called “the God hypothesis.” Rather than worrying about stopping points, they count on technology to solve any problems it creates. In the meantime, those whose moral character is no better or worse than the norm routinely attempt to expand our power to transform the world in accordance with our own wills. The most modest efforts to restrict scientific research or technological development are greeted with outraged defenses of intellectual freedom, and dire warnings of competitive disadvantage. And this kind of thinking has its effect on Sherwin; consider his reluctance about “foreclosing” stem cell research and the language he adopts to state it. Keeping our golems under control means first keeping ourselves under control, and that is usually harder than believers in progress have tended to think.

A third broadly agreed upon characteristic of the golem tradition suggests how odd it is that Sherwin should connect improving the world by co-creation with the golem story at all: nearly all versions of the golem story agree the golem is not an example of creation that completes what God has done, but rather an example of an essential imperfection in the creativity even of those who are most attuned to divine wisdom. In all but a tiny fraction of stories, the golem can neither speak nor procreate. In one of the very few cases where the golem does speak, it is to rebuke his creator, Jeremiah, precisely for having imitated God such that “people will say there is no God in the world but you,” a danger Sherwin knows is reflected in today’s world. Jeremiah accepts the rebuke and concludes that it is worthwhile to study the creation of a golem, but only for the sake of understanding, not for the sake of doing. The contrast with the great project of biotechnology, which is to improve the human norm, could hardly be clearer.

Power, Progress, and Piety

Sherwin tries very hard to find common ground between two very different outlooks on knowledge and human power: the tradition of golem stories, which broadly tends to paint a picture of those who have most subsumed their will to God's engaged in a test of their piety with no practical outcome in mind and necessarily imperfect results, and the modern technoscientific project, which sees itself as using unaided human reason to improve the world. Sherwin's hybrid is problematic—but that does not mean that the traditional golem has nothing to tell us about the coming biotech (and nanotech and infotech) century.

Sherwin is correct that our scientific and technological efforts require moral wisdom so that we know when to stop. He is well aware that science, and all the disciplines that emulate its supposed value-neutrality and frame themselves on the proposition that no *oughts* can be derived from their study of what *is*, in principle cannot supply such wisdom. Yet they presume to have it when they claim to put us on a path of “progress.” If progress is to mean anything other than change, it must mean the creation of a better world. But what does “better” mean? What goals should we be attempting to achieve? These are moral questions, questions about what constitutes a good life.

We have some ready answers to these questions, and for the most part Sherwin adopts them. “Better” means obvious things like improved health, greater wealth, more choices, fewer restraints—greater power over our own lives, whether overcoming nature or the influence of corporations. There is a good deal to be said in defense of these answers, and much to be grateful for in the world that science and technology have allowed us to create. But the traditional golem opens a perspective that is powerful by being subversive of much that we take for granted in our thoughtless assumptions about progress. While steeped in piety, it teaches lessons that might resonate even with those who are not pious. For from within its orientation around divine things the golem tradition teaches a kind of human wisdom: that knowledge ought not always be measured by usefulness, that the greatest creativity arises out of accepting discipline and constraint, that even the most perfect of human beings can still only create imperfect things. The lessons of the Jewish legend intersect with our life experiences. We are reminded of them when terrorists turn airplanes into weapons, when a computer glitch roils the stock market, or a volcano halts air traffic, or an oil rig blows up, or even when our cell phone drops an important call.

In the world of the Jewish legend, golems are few and far between. In our world, golems as Sherwin understands them are everywhere, and more are on the way. The traditional golem encourages us to step back from this world, providing an alternate vantage point from which we might assess the priorities that make us so ready to define the quality of our lives by the number of golems available to gratify our desires. Even in the absence of any shred of truth to the traditional way of creating an artificial man, the golem legend may yet be telling us something true about living our lives. One can do something useless, and yet not be wasting one's time. Creativity is not the same as willfulness. Above all, the golem is less a celebration of human power than a reminder of its limits. The best that the best of us can do has not only feet of clay, but is clay throughout.