



Out of the Garden, Into the Laboratory

Jeremy Kessler

At the turn of the millennium, Paul Poskozim, a chemistry professor at Northeastern Illinois University, asked, “Are scientists, strict interpreters of nature, allowed to believe in Adam and Eve?” In April 2009, researchers at Aberystwyth University in the United Kingdom offered a playful answer. Having constructed a huge robot to help in developing hypotheses, designing experiments, and studying the genetics of fungi, the researchers named their automated scientist “Adam.” In associating an astute problem-solver with the Bible’s first man, the machine’s makers unwittingly recalled an earlier tradition of natural inquiry. As Oxford professor Peter Harrison details in *The Fall of Man and the Foundations of Science*, the sixteenth- and seventeenth-century originators of modern science regarded Adam as the first and greatest scientist. Central to the development of our contemporary scientific culture, according to Harrison, was the Protestant Reformation’s insistence on the cataclysmic and continuing effects of Adam’s Fall from perfection.

*The Fall of Man and the
Foundations of Science*
By Peter Harrison
Cambridge ~ 2008 ~ 316 pp.
\$46 (paper)

The conventional view of how the modern scientific method emerged is that the Enlightenment rejection of religious authority led to the flourishing of an empirical, experimental science. In this telling, a newfound confidence in human reason, unencumbered by dogmatic tradition, became the precondition for scientific progress. Harrison turns this familiar account on its head, tracing the very emphasis on *method* in modern science to a religiously-inspired pessimism about man’s cognitive and perceptual capacities: the “birth of modern experimental science was not attended with a new awareness of the powers and capacities of human reason, but rather the opposite—a consciousness of the manifold deficiencies of the intellect, of the misery of the human condition, and of the limited scope of scientific achievement.” Harrison’s fascinatingly revisionist story traces this pessimism not, as we might expect, to a crumbling faith in received wisdom, but to a shift in the Western theological imagination.

The standard narrative of progressive enlightenment, as promulgated

by the French *philosophes*, holds that the revival of ancient, pre-Christian skepticism led to the toppling of religious scholasticism. Scholastic thought had reached its highest expression in the writings of Thomas Aquinas, who married Church teachings with the naturalism of Aristotle. For Aristotle, reality and the human mind were well-matched: Men could grasp the essence of things without deceiving themselves or being deceived by an otherworldly force. By incorporating these Aristotelian teachings, the scholastics developed a natural theology that inferred universal truths about God and man from reports about the nature of the world. The veracity of these reports was vouchsafed by “natural light,” Aristotle’s assumed harmony between mind and world. Yet though scholastic method was naturalistic, practitioners were not encouraged to make their own novel inferences; instead, the scholastic system stressed the prior conclusions of master thinkers. In place of this reliance on the hierarchy of Church-approved thinkers came an unprejudiced exploration of the natural world by reason alone, the beginning of modern science.

So, at any rate, goes the traditional story, which Harrison seeks to correct. He proposes that the origins of modern science can be found instead in the Protestant Reformation’s introduction of a deeply religious form of skepticism. This Reformed skepticism, while rejecting the authority

of scholasticism, did so not out of a new confidence in the faculties of the individual person, but because of a deeply pessimistic estimation of those faculties as fallen and deficient. In the eyes of Reformed scientists, scholasticism—corrupted by the pagan Aristotle who had not known of Adam or Jesus—had presumptuously ignored the disordering of mind, body, and world that had taken place in the Fall.

Harrison does not emphasize the religiously-motivated skepticism of the period merely because it has received short shrift in standard recountings of the rise of secularism and science. Rather, he sees in the Reformation’s religious skepticism a better explanation of the coincidence of two related but not identical events—the rejection of the old forms of certainty developed in the Catholic universities of the Middle Ages, and the rapid adoption of new methods for the attainment of reliable knowledge. While ancient skepticism cast doubt on our ability to know the ultimate nature of reality and undermined the authority of those who purported to describe it, it offered no positive direction for those who nonetheless desired to press on in their search for knowledge, as the early moderns did. Ancient skeptics saw the vocation of philosophy as a life of contemplation, a form of self-therapy by which the anxious person becomes accommodated to the inscrutability of the world. No attitude could be

less characteristic of the seventeenth-century's dogged investigators of the natural world, whose vigor scientists continue to emulate today.

The impetus for such vigorous investigation in the face of massive doubt had to come from elsewhere. Harrison finds it in the Protestant revival of the anthropology of Saint Augustine. Admittedly, that fourth-century Church father echoed the ancient skeptics in distrusting human claims to certainty of knowledge about the nature of reality. But, unlike the ancient skeptics, Augustine held out the possibility that the inadequacy of man's faculties was *not* an eternal truth. Man's epistemic failures instead arose from one particular, cataclysmic event at the beginning of human history—the Fall of Adam. By specifically locating man's downfall, Augustinian anthropology intimated that it might be overcome. As Harrison writes, “Those who took seriously the reality of the Fall... were often motivated to reverse, or partially reverse, its unfortunate effects, and this required a commitment to the active life and an energetic engagement with both social and natural realms.” What Adam had lost in the Fall is what science had to regain. The scientific revolutionaries did not view the human mind as a reliable computer but as a sick subject in need of healing.

Harrison describes four major strains of seventeenth-century

scientific thought, each tied to a slightly different understanding of the Fall and its consequences. Closest to the scholastic consensus, the first strain of thought “sought refuge in those faculties of the human mind that seemed, by their very nature, to be immune from corruption,” namely “our mathematical and logical abilities.” The case for the integrity of these capacities was often reinforced by an appeal to God; the continued presence of God in each man ensured the reliability of mathematical demonstration. We see this relationship between (on one hand) a preference for mathematical and logical methods and (on the other) a belief in the continuing security of divine guidance, in Descartes and, somewhat later, in Spinoza and Leibniz. Modern science's predilection for mathematizing the physical universe began with this first strain of Reformed method.

The other three strains that Harrison describes did not share this remnant confidence in some portion of human godliness: “Others believed that even the light of human reason had been a casualty of the Fall, and to such a degree that it was untrustworthy.” One group relied upon the truths of scripture to guide natural inquiry, believing that only God's recorded revelations could provide a trustworthy foundation of knowledge. These “scripturalists” not only viewed Adam as the greatest of scientists, but considered other major biblical figures, such as Moses, Solomon,

and Job, to be his scientific successors. This movement did not last much past the end of the 1600s—although nearly all natural philosophers of the time, including Francis Bacon, took care to harmonize their observations of nature with scriptural precedent.

Another even more skeptical group thought that only “personal inspiration,” the revelation of God without even textual mediation, could ensure true knowledge. These so-called “enthusiasts” have mostly been written out of the modern scientific imagination, though perhaps we can still hear echoes of their reliance on revelation in our own era’s continuing admiration of intuitive leaps and “eureka” moments in science and math.

While scripturalists looked to holy texts and enthusiasts to direct revelation, the final and most skeptical strain of Reformed methodology relied on the experience of nature itself. What most differentiated this “experimentalist” strain from the others was its suspicion of *any* individual acquisition of knowledge. However skeptical scripturalists and enthusiasts were about the unaided use of human reason, they still believed that *if* an individual person were blessed enough to experience revelation, this experience was self-ratifying: no doubt would remain about the truth revealed through God’s word or God Himself. Experimentalists, by contrast, believed that, as Harrison puts it, “knowledge of the natural world

would come only after laborious experimentation, the long accumulation of many different observations, and orchestration of efforts of numerous investigators.” No individual, however pious, could achieve anything like certainty about the nature of reality. Only repeated observations, continuously tested and compared, could produce reliable knowledge. We can recognize in this foundation the contours of the modern scientific enterprise.

Harrison goes further in linking the flourishing of scientific investigation to a reckoning with the meaning of the Fall. Traditional Catholic doctrine had held that when Adam fell, his *supernatural* attributes were lost with his innocence, but his *natural* attributes remained unchanged. But for the Reformed scientists, the Fall was also a loss of man’s dominion—the end of Adam’s role as knower and name-giver. For the early experimentalists, proper method therefore had to account for the loss of this Adamic control over creation. While the old Aristotelian division of the sciences had been concerned with the various objects of knowledge—plants as opposed to animals, and so on—Francis Bacon’s basic division was among the human faculties that would be investigating nature, namely sense, memory, and reason. Science would begin as a laborious process of correcting for the infirmities in these faculties. Yet

even when these infirmities had been acknowledged and partially corrected, seventeenth-century experimentalists had no great confidence in the prospects for perfect accuracy. As Harrison explains, knowledge for them would always “have a makeshift quality about it, and would lack the certainty that had been traditionally considered to be the hallmark of true science.”

Despite this remarkable pessimism about the human capacity for knowledge, the fact that man’s infirmity was natural instead of supernatural allowed for a natural response. While the highest goal of scholastic learning had been the recovery of Adam’s supernatural stature, the Protestant double understanding of the Fall provided for a novel division of labor. As theologians pursued a restoration of innocence, thinkers more inclined to the contemplation of the natural world could set themselves an equally sacred task—the pursuit of Adam’s lost dominion, his mastery of nature:

While the loss of *innocence* could be restored only by grace, human *dominion*, made possible by Adamic knowledge, was not a supernatural gift but a natural capacity. Though corrupted by sin, it could “in some measure” be repaired by natural means—as Bacon put it—“by various labours.” This struggle to recover, through effort and industry in the present life, capacities that were once

part of the natural endowment of human beings was integral to the Protestant vision of the earthly vocation.

While medieval Catholicism held that “the supernatural gifts lost by Adam could be restored in part through divine grace, channeled through a sacramental system presided over by the priesthood” and ultimately traced back to Jesus’ redemptive sacrifice, the experiments that Protestant thinkers like Francis Bacon instituted could be “regarded as a parallel sacramental system, aimed at the restoration of corrupted Adamic abilities that were salvageable in the present life.” So Bacon himself maintained, declaring in his *Great Instauration*, “I perform the office of a true priest of the sense.”

Another consequence of the experimentalists’ belief in the prevalence of man’s natural infirmity was a new conception of inquiry, one that proposed not just observation of the world but intervention in it. Bacon spoke almost conspiratorially of the “deceitful resemblances of objects and signs, natures so irregular in their lines,” as he catalogued the perversity of the world that surrounded him. This dark view of nature meant that to penetrate its depths would require not just discernment but correction, not just care but strength. Natural events might have to be torn from their normal contexts and tamed by artificial constraints before

they would reveal their causes and internal logic. Bacon explicitly advocated the study of nature “out of its normal course.”

This call to coerce nature in search of truth was revolutionary. Traditional natural philosophy, following Aristotle, made a foundational distinction between “natural” and “violent” motion, paralleling the distinction between nature and art. In a state of natural motion, things appear as they truly are; in a state of violent motion—caused by the presence of active human agents and other perversions—the true nature of things is obscured. According to this view, experimentalists such as Bacon and our modern laboratory scientists would not be studying nature at all, but only a “monstrous creation” of their own violent hands. In the view of the experimentalists, however, nature was so obscure that coercion was required to reveal its original truths. Adam’s vocation had been dominion, the ordering of nature; when he fell, nature had become disordered. It was thus a matter of sacred history that man now had to strive tirelessly to reconstruct, rather than simply to uncover, the true order of the world. As Bacon’s contemporary John Donne wrote, the goal of human activity, including scientific activity, was “To rectifie nature to what she was.”

Gradually, then, the Reformed scientists’ remarkable suspicion

of nature came to magnify, rather than diminish, their estimation of man. If man was more fallen than the Catholic scholastics believed, he nonetheless had a novel mission that not even Adam had possessed: to tame anew a coy and fractious natural world. Harrison points to modern economic thought, born of the matrix of seventeenth-century experimentalism, as evidence of this new estimation of post-Adamic vocation. To the modern economist, human desire, once the chief indicator of the evil of fallen man, became a virtuous instrument of man’s increasing dominion—“the signal feature of human existence to which could be attributed the origin of human society.”

Reformers came to insist that even as the “human institutions that characterize this epoch are recognizably deficient,” they are nonetheless “divinely sanctioned for their limited purposes.” Science, like all other human institutions, was deficient. But this awareness of deficiency was balanced by a new sense of purpose on earth. It was the God-given task of Adam’s sons to actively reconstruct the dominion which Adam had once exercised over it.

This pursuit of dominion was itself a redemptive project, one that implicated the whole of society, not just the individual conscience or spirit. This vision of the collective redemption of nature through work lies at the heart of not just modern

science, but modern politics as well. That shared vision helps explain the persistently fervent scientific bent of the progressive political movements of the eighteenth, nineteenth, and twentieth centuries. Harrison's argument suggests that science and political progressivism are united not so much by their shared elevation of reason over faith or tradition as by their shared commitment to the rectification of nature.

Perhaps the most lasting legacy of experimentalism is not its preference for intervention in the natural order over passive observation, but its social conception of science, in which science is an unavoidably collective project, something that we do in the open, together. If such a

conception of science has necessarily endangered the natural motion of things, through it we may yet discover the need for greater harmony in our interactions amongst ourselves and with the non-human world. The modern scientific enterprise contains within its genesis both a protocol of violence and an inclination toward mutuality, an assumption about the utility of power and a warning about the perils of its prideful use. Our great responsibility is to steer science, like all other human endeavors, away from ruination and toward redemption.

Jeremy Kessler is a student at Yale Law School and Yale University's Department of Comparative Literature.