

EDITOR'S JOURNAL

Tapping the Revolutionary Potential of “Useful Knowledge”

LISA MARGONELLI

When Belgica Reyes started to take community college classes in applied artificial intelligence at Miami-Dade College, she sought both the economic mobility of a “future-proof” job and something bigger: “I wanted to be part of what’s coming next, not just watch it happen.” In this issue, Miami-Dade College vice president of research and innovation Antonio Delgado Fornaguera explains how an organized network of community colleges has quickly built the capacity to educate thousands of Americans in AI—in a way that is “credible to employers, affordable for students, and scalable across the country.”

This spring, in preparation for the celebration of the 250th anniversary of the Declaration of Independence, I’ve been reading histories of the ways that revolutionary Americans used science. In letters, almanacs, and commonplace books, they shared their fervor for cataloging natural history, herbal remedies, chemistry, and astronomical observations. At the time of the American Revolution, the political philosopher Thomas Paine’s *Pennsylvania Magazine* published illustrated descriptions of recent local inventions—a fire escape, dredger, sulfur furnace, and waterproof cement—in an effort to “contribute every thing in our power towards the improvement of America.” A decade later, the writers of the Constitution gave Congress the explicit power to “promote the Progress of Science and useful Arts” through the creation of patent laws, underscoring how crucial inventors and their inventions were to the country’s development from the very beginning.

This story about the early days of US science is as well-known as Ben Franklin and his kite, but I’ve been struck by the way that people saw knowledge and innovation as both a personal responsibility and a form of nation-building. In

her book *Scientific Americans: Invention, Technology, and National Identity*, historian Susan Branson describes how the early republic’s interest in innovation combined the personal with the political. “The legacy of revolution gave Americans a language with which to articulate ambitions for national self-sufficiency, the expansion of trade, and internal development,” she writes. “Within this national framework, individuals sought improvements for themselves, their families, and their communities.” Through this lens, Belgica Reyes’s contemporary desire to “be part of what’s coming next” with AI feels like an extension of this early DIY urge to build a self, a country, and a shared future.

Most historians start the story of American science around the middle of the 1800s, with the establishment of the Smithsonian, the National Academy of Sciences, and land grant universities. That makes some intuitive sense, because the science and technology of today is still connected to those institutions, and is still shaped by powerful ideas about professionalism and specialization that were incubated in them.

In contrast, the science practiced by the founders and other early Americans had a different flavor. It was sociable rather than professional: George Washington and Thomas Paine spent an evening in rowboats poking the mud and lighting methane bubbles on fire. They saw science as a kind of enlightened politics, as when poet Hannah Griffitts warned astronomer David Rittenhouse away from revolutionary “politicks” and back to his telescopes because his genius required him to “pour fair Science on our Age.” Knowledge was seen as a path to building better people and citizens, leading physician Benjamin Rush to pitch chemistry classes to young women in Philadelphia to build their characters, “be the means of

banishing fools,” and “afford you pleasure in solitude.” Finally, it was a way to strengthen “the very sinews of government,” according to natural historian Charles Willson Peale. To do this, he offered children free admission to his museum if they brought him an interesting gift. Thanks to this policy, he ended up with a large arsenal of hairballs from cow stomachs.

This kind of science often went by another name: “useful knowledge.” In Britain, the concept of useful knowledge grew out of seventeenth-century religious ideas about improving human life. By the mid-1700s, when Benjamin Franklin appropriated it for the name of the American Philosophical Society for the Promotion of Useful Knowledge, the idea had been secularized. In the American context, useful knowledge was practical, morally ambitious, and not “confined to mere speculation,” as the initial *Transactions of the American Philosophical Society* put it in 1771: “When theories, grounded upon experiments, are applied to the common purposes of life; and when, by these, agriculture is improved, trade enlarged, the arts of living made more easy and comfortable, and, of course, the increase and happiness of mankind promoted; knowledge then becomes really useful.”

This interplay of theories and common purposes plays a big role in economic historian and Nobel Prize–winner Joel Mokyr’s explanation of how the Industrial Revolution took off after the 1760s. Useful knowledge became revolutionary when there was feedback between *propositional*, or analytic, knowledge and *prescriptive*, or applied, knowledge. This interaction created continuous improvements and was “the taproot of modern economic growth,” he argues. Enabling this process were cultural innovations, including a belief in progress; publications and organizations to share the knowledge; and communities to test the knowledge and apply it.

Right after the Revolution, Americans got busy sharing useful knowledge and connecting it with citizenship and nation-building, constructing an architecture that enabled feedback. In 1787, for example, Trenton, New Jersey, formed a Society for the Improvement of Useful Knowledge, while Kentucky created one for the Promotion of the stuff. In 1795, Paul Revere helped found the Massachusetts Charitable Mechanic Association, with a charter that made the argument that people who work with machines are good for society. Bringing them together in an organization “will prove highly beneficial, in promoting mutual good offices and fellowship; in assisting the necessitous, encouraging the ingenious, and in rewarding fidelity.” As Mechanic Associations sprung up across the country, they were joined by a wave of organizations formed to “diffuse” useful knowledge, by means of lectures, newsletters, and encyclopedias. By the middle of the 1800s, the so-called lyceum movement turned academic lectures into public entertainment. Boston’s Lowell Lectures, for example, had

500 young people learning “that acids were not alkalis and Homer did not write the Iliad,” according to an observer. “The boys invited the girls, and after the lecture they walked home together, ending the evening with an oyster supper.”

Today the scientific enterprise is a long way from oyster suppers, but we find ourselves in a revolutionary time, when familiar institutions and roles are being abandoned or reconceived. Algorithms and AI are destabilizing social, political, and intellectual norms while the federal role in science has changed so rapidly and with so little warning that no one knows where it stands. In response, workshops, book projects, working groups, and Substacks (so many Substacks) have sprung up to explore how science can assist democracy and vice versa.

When the future is uncertain, the scientific enterprise tends to ransack the past for episodes that anchor its legitimacy: the Manhattan project, the extremely endless frontier, the Apollo program. At this moment, the enterprise might consider useful knowledge, with its culture of sociability, dual emphasis on learning as self-improvement and nation-building, and focus on better lives. This would not be the centralized and highly planned federal science system of the last 75 years; but it might offer a vision of science suitable for revolutionary times like ours.

Despite worries about whether Americans trust in the institution of science is faltering, a quick look at Instagram, TikTok, YouTube, or Reddit will find people eagerly searching for and sharing useful knowledge about medicine, mechanics, physical fitness, and much more. Doing this has become part of their identities, but it is also in the service of a wide variety of patriotic, political, and money-making projects. As with Reyes, useful knowledge lets people go where the action is and be part of history rather than a bystander. It offers the possibility of empowered citizenship.

Another aspect of useful knowledge is the importance placed on diffusing it. It’s significant that Reyes found the kind of education she desired at a community college; these institutions educate more than four out of every 10 undergrads in the United States. But there are other ways for the institutions of science to bring knowledge closer to people looking for it. In an interview in this issue, Neil Shubin, the new president of the National Academy of Sciences, mentions the potential of collecting Academies reports into an AI-assisted, searchable archive to give people access to information at “whatever level they are, whether a kid doing a term paper, a teacher writing a lesson, somebody in the general public, or a policymaker. It could change how we communicate with the outside world, with our sponsors, and beyond. It can also change how we do our work. It’s a multiplier of what people can do.” Perhaps finding new approaches to useful knowledge can once again be a taproot for economic growth while promoting “the increase and happiness” of humanity.