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SCIENCE AND THE AMERICAN REVOLUTION

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Introduction

The United States of America sympathize in our grief, for his name gave a splendor to the American character, and the friends of humanity in distant parts of the world, unite with us in lamenting our common loss,—for he belonged to the whole human race.

(Rush 1796, 5)

When American physician Benjamin Rush set out to eulogize his friend David Rittenhouse, he not only remembered a single person but used the opportunity to make a statement about the idealized American man of science. Rittenhouse made an impressive subject. During his lifetime, Rittenhouse was an astronomer, supporter of independence, instrument-maker, and president of the American Philosophical Society, the country's premier scientific institution. As indicated by Rush, this position made Rittenhouse a figure of political importance because of and not incidental to his scientific reputation.¹ This combination of patriotism and science as well as Rittenhouse's ordinary family background made him an idea representation of the American man of science in the 1790s. He was intelligent, interested in the common good, and not aristocratic. These attributes, in Rush's telling, would help create a new and strong scientific tradition.

Natural knowledge—or science—is not produced in a vacuum. This is especially the case when we consider the way science is organized (who does the work) and how that work is valued (empirical, experimental, or theoretical knowledge). The American Revolution and War for Independence are not exceptions to this trend, as the Rittenhouse eulogy emphasizes. The late eighteenth century dramatically changed the social and political structures of North American society, when 13 of Britain's colonies went to war for independence and created the United States. These political changes in turn affected the manner in which natural knowledge was produced and how it was understood by contemporaries. The aims of American science to meet the questions and needs of a young republican empire rather than those of colonies became evident even as the revolution was underway. Interest in the West drove naturalists, surveyors, and geologists to claim new spaces. The urbanizing East provided opportunities for new manufacturing and "useful knowledge" to put scientific principles to work. American institutions modeled themselves after those in Europe but with subtle republican changes, like the abandonment of Latin or emphasis on useful and empirical information in an age of grand theories. In short, the era of the American Revolution created a new self-consciously
American scientific community engaged in the search for natural knowledge for their own goals and utilizing the skills of their own citizens. This chapter examines the way science and scientific communities in the United States developed in this social and political context.

And what was that context? The American Revolution is not a single event. The revolutionary era stretches from the end of the Seven Years’ War (or French and Indian War in North America) in 1763 to an uncertain end in 1783 (end of the Revolutionary War), 1789 (ratification of the U.S. Constitution), 1800 (election of Thomas Jefferson), or even 1804 (Louisiana Purchase, which expanded the nation), or 1815 (end of the War of 1812, which confirmed U.S. control of the near west and independence) (Bradburn 2009; Thompson et al. 2013; Cogliano 2014; Marshall 2012; Griffin 2012, xii–xiii). This chapter uses a broad chronology of the era, although avoids stretching into the 1810s. Not only does this allow for the discussion of very early-nineteenth-century trends and follow men of science into the near West, but it also allows us to consider whole careers of individuals and institutions. Young and eager revolutionary scientists of the 1770s—like Rush, whom we met in the previous section—became the establishment figures of scientific institutions in the 1790s and 1800s. Taking these carriers into consideration helps frame the chapter and allows us to consider the relationships that developed over time and formed the backbone of American scientific endeavors.

The first part of this chapter will focus on just that: the relationships and structures of American scientific practice during the Revolutionary era before, during, and after the War for Independence. This included the development of formal organizations dedicated to collecting, sharing, and distributing knowledge. It also included the informal social networks that supported those formal collectives. Letter-writing and visits between like-minded individuals reinforced a sense of community and shared expertise in a world without formal credentials. Part two shifts the focus from how science was done to why science was important to the early United States. It is here that politics really comes into play. The creation of a republican society—as opposed to a colonial system or monarchy—and government in North America was, in part, due to a new biological understanding of the people and spaces of the United States. Historians have shown that for many Americans, controlling the knowledge of spaces was part of claiming territory at the turn of the nineteenth century (Bolton Valencius et al. 2016). Moreover, demonstrating novel discoveries on a world stage helped American practitioners gain the respect of European counterparts. After this discussion, the chapter shifts to address how a few European men of science thought about and interacted with the United States after the Revolutionary War. For Republican scientists in an unstable Europe, the United States represented what a possible future could look like or serve as a refuge for those who needed to leave their homelands. The American republic did not always live up to its ideals or those placed upon them by outside sources.

The Structure of Science

Scientific interests and revolutionary feeling grew in tandem during the 1760s and 1770s. The British victory of the Seven Years’ War (French and Indian War) made many felt prouder to be British than ever before. However, that feeling shifted as it became clear that American ideas about Britishness and British rights differed from those in power in London (Colley 2009; Calloway 2006; Bradburn 2009; Marshall 2012; Breen 2004). By the mid-eighteenth century, a growing number of American men and women followed scientific pursuits from recording the weather and keeping almanacs to attending displays of electricity or air pumps. Some showcased their original work internationally. Rittenhouse, for example, gained respect in astronomy and physical sciences. This included participating in an international attempt to measure the transit of Venus 1769—an event which occurred at the same time some colonists started agitating for greater political power within the empire. And of course, Benjamin Franklin reached celebrity status based on his electrical experiments. Although
he was far from alone in working with electricity during this period, Franklin’s experiments made connections to the natural world and involved practical applications, a trend in American science. The electrical excitement to the medicinal use of electrostatic generators, although mainly ineffectual by modern standards. More famously, lightning rods served as practical objects based upon a better understanding of the natural world (Delbourgo 2006, 15, 51–52, 58; Herschthal 2021, 66). But how did these men like Rittenhouse and Franklin—an instrument-maker and printer by trade—become symbols of revolution, modernity, and science over the course of their lifetimes?

In the late eighteenth century, the sciences lacked firm disciplinarity or formal credentials. The structure of scientific communities was fluid and largely composed of self-regulated and self-identifying groups of interested practitioners. In other words, scientific status was the result of social connections and collaborations rather than strict educational or legal credentials. Nevertheless, these communities did act as institutions (Naramore 2020, 2–3). These institutions typically convened in a physical space; however, correspondence to and from members was also a common way of expressing shared feelings and status. The American Philosophical Society, for example, fits this definition as an institution both on the ground and in the Republic of Letters. The organization existed to share and promote “useful knowledge.” It met in Philadelphia, published transactions (like an academic journal), and had formal bylaws. Members nominated and elected others with a shared interest in the natural world and had knowledge to share, like the British Royal Society (Lewis 2005, 673). For those who lived in Philadelphia, belonging to the APS also meant easy access to shared library materials and a built-in community with whom they could collaborate. This community shaped the work of members by encouraging specific projects and building a library (Schofield 1989, 26). Most institutions did not fit the mentioned characteristics so closely, but all shared at least some of these attributes. By 1800 dozens existed from the large and general APS or American Academy of Arts and Sciences to specific regional and local organizations, like state and local medical societies (“Domestic Medical News” 1800, 107–113). These groups operated in what was still an early modern scientific world built on networks of friendship and twisted together with military, political, and commercial objectives (Findlen 2019).

Meanwhile, there were no clear educational courses of study for what became the sciences except for medical instruction. Neither colonial academies nor universities had much in the way of scientific instruction and certainly not anything resembling a modern science major, an invention of the next century. Men of science were mostly self-taught, like the Bartrams of Pennsylvania, who gained renown as botanists and natural historians through international recognition of their skill (Slaughter 1996). Similarly, Benjamin Franklin’s “Dr.” was honorary, denoting his advances in the study of electricity, but he attended very little formal schooling. Others like Rush or Thomas Jefferson received strong elementary educations and even university training, but everything besides medical school was focused on classical courses of study and the humanities. The sciences were largely an additional pursuit conducted outside schools. Individuals encouraged each other to observe and record natural phenomena and report it to more established natural philosophers who were enmeshed in scientific institutions and correspondence networks (Lewis 2005, 667).

This could even happen accidentally in the case of medical correspondence, in which patients frequently described their broader surroundings. In fact, the largely accepted environmental approach to health—the assumption that personal health relied upon healthy surroundings—helped make many physicians naturalists, botanist, chemists, and meteorologists by default (Glacken 1967; Wild 2006; Valencius 2002; Hamlin 1992, 2014; Seth 2018). One letter sent to Rush by physician Joseph Hamilton Daviass in 1800 described everything from the health of locals to the rise of American intellectuals in the context of climate writing from Kentucky, “I am fully persuaded that the human animal is as subject to the influences of food and climate” (Rush Family Papers). In this way, he also acted to promote the idea of American strength by virtue of environmental conditions. Meanwhile,
by the 1790s small medical societies provided some sense of professional unity. Many included corre-
sponding members who acted as personal bridges between different organizations and regions. While
characteristics of colonial practice persisted, the tension between European metropole and provincial
periphery shifted. A new set of “centers” emerged, with Philadelphia rising as the dominant urban
force for the collection and analysis of scientific knowledge.

It would be too simplistic, however, to suggest the Philadelphia, Charleston, New York, and
Boston simply replaced London, Paris, and Edinburgh as the areas of American scientific analysis.
In many ways, American science had been and continued to be deeply intertwined with Europe
through the Republic of Letters. Correspondence networks of the seventeenth and eighteenth cen-
turies tied North America and Europe together, and the new ideas they developed emerged through
that exchange rather than diffuse from capital to province (Winterer 2016, 11–12). Nevertheless,
science in Britain’s North American colonies took on a different flavor than that practiced in the
European capitals and emphasized “useful knowledge” and information produced by men of the
middling classes. Figures like Rittenhouse, Franklin, and Rush all supported the notion that family
wealth and leisure were not required for a man to be scientifically useful.

Most Americans engaged in “scientific” practices in the 1760s and 1770s were less revered but
continued to contribute to the collection and dissemination of knowledge. Enormous amount of
natural knowledge was collected and transported throughout the revolutionary country by those
whose names we will likely never know. Many came from marginalized groups, including indigenous
people, enslaved people, and women of all races and ethnicities. Information about medicinal plants
in particular—something which was of special interest to both medical men and botanists—almost
certainly originated from these communities of practitioners. In other cases, local knowledge was
actively ignored, as in the case of indigenous narratives of burial mounds and earthworks in the Ohio
Valley (Sayre 1998, 226; Winterer 2016, 73–74). Others, like African American scientist Benjamin
Banneker worked within the traditions of western science but found themselves marginalized due
to race or gender or—as in the case of Banneker himself—presented as remarkable representatives of
their community first and scientists second (Herschthal 2021, 48–49).

In addition to broad sources of knowledge and growth of correspondence networks, it should
also be noted that actual physical scientific work required the labor of multiple people. An out-
sized example is shown above in Charles Willson Peale’s painting *Exhumation of the Mastodon*
(1806–1808). The mastodon in question was a fossilized skeleton discovered by farmer John
Masten near Newburgh, New York, and purchased by Peale for $300 (Zygmont 2015, 97).
Although an artist by profession, Peale was one of the great collectors of natural historical objects
in the revolutionary period, which put him in contact with a wide variety of collectors and
men of science. His first encounter with ancient megafauna specifically occurred in 1784 with
a commission to paint mastodon bones unearthed along the Ohio River. By that time, North
Americans had been questioning the origin and symbolic meaning of similar bones for nearly a
century. Such discoveries both demonstrated the value of American scientific contributions and
countered arguments by natural historians (especially Buffon), who posited theories of American

Peale’s painting of the excavation shows knowledge production as coordinated work. Peale stands
on the edge of the pit with his family holding part of a large drawing of mastodon bones. Mean-
while, the labor of exhuming the bones is completed by a different set of men in the pit. At least 21
figures are engaged in some form of manual labor to recover the skeleton, which later formed the
centerpiece of Peale’s collection and traveled to Europe. The technical and tacit knowledge of the
exhumation is at least as interesting and telling as the fossil itself. Machinery to move water and men
to move material worked together for discovery. Their names would never have appeared on lists of
men of science or members of the American Philosophical Society. Nevertheless, their work was
essential. Doing scientific work did not make someone a man of science or an equal in the structure
of the fledging discipline. Of course, few endeavors required the manpower of Peale’s mastodon, but the collaboration of multiple groups of workers was often necessary, and monetary transactions accompanied scientific ones.

Another Philadelphian, Benjamin Smith Barton hired a man named Frederick Pursh to collect information on the natural history of Pennsylvania, Vermont, and New York during this period (Pursh, 1806–1807). Bartram’s garden outside the city was also part commercial venture and sold seeds and specimens on both sides of the Atlantic (Slaughter 1996). In another instance of communication and the search for particular skills, the Transactions of the American Philosophical Society include an interesting example from 1807. The item consists of a letter from Simeon De Witt of Albany, New York (a geographer and surveyor) to Rush (a physician) describing an enclosed painting of a lunar eclipse by Ezra Ames (artist mainly known for portraits). The letter was intended for publication and includes De Witt’s reaction not only to the painting—now part of APS collections—but the eclipse itself along with some astronomical measurements (DeWitt 1809).

Meanwhile, early military activity also played a role in the expansion of scientific knowledge. In the 1790s, Army doctors in Western Pennsylvania fighting in Little Turtle’s War wrote back to Rush discussing the geography, geology, and biology of the region. One planned to send human skeletons back to Philadelphia (they were assumed to be ancient Indigenous people). Another, future chemistry professor James Woodhouse, focused more on his own profession and commented on the benefits of hospital practice in the military, which allowed a physician to have more control over patients. At a time when doctors spent most of their time on house calls, the ability to treat multiple people at the same time and have rigorous control over their treatment was a novelty. This may have resonated with Rush, who spent time in the Continental Army during the Revolutionary War and desperately tried to keep hospitals regulated and organized (Rush 1777). In other cases, the connection between the military and science was far more explicit. From the well-known Lewis and Clark Expedition to lesser-known state-sponsored natural-fact-finding missions, the military was one key link in the scientific structure of the new nation (Strang 2018b, 388–389).

Information also traveled along more formal routes, especially in the form of early medical journals, which published on a wide variety of topics in the decades after independence. Benjamin Smith Barton, for example, is better known for his work as a naturalist than as a physician. It is no surprise then that when editing a medical journal, The Philadelphia Medical and Physical Journal, Barton filled the pages with natural history. In addition to having journals and ready-made correspondence networks between preceptors and schoolmates, doctors were also highly mobile in the early United States. By the 1790s, long-settled regions in the East proved difficult locations for non–elite men to start a career. Cities were especially difficult between a plethora of healers, general expense, and fewer adjacent money-making opportunities. This led many young men to pick up stakes and disperse across the growing country or beyond it, pulling their intellectual networks with them. Benjamin Rush’s correspondence reflects this geographic expansion, as his students moved out into the county. They kept in touch from Western Pennsylvania, South Carolina, Kentucky, and the Mississippi Territory. The South in particular seemed like a solid prospect with its growing population (both free and enslaved) and wealth to pay for physicians (derived from the exploitation of enslaved labor) (Rush Family Papers).

This dispersal created a network of correspondence with nodes in the growing cities of Philadelphia, New York, and Charleston, as well as frontier settlements like Lexington and Pittsburgh. Knowledge moved back and forth and created professional credibility as it went. While hierarchical—Rush’s students, for example, always demonstrated deference in their letters—the structure of science and the path to professional recognition remained fluid and multifaceted during this period. The respect and recognition of peers in the American Republic of Letters was sufficient for many
men to be taken seriously. Men without finished medical degrees, like a young Daniel Drake in the Ohio Valley, could communicate with Benjamin Rush about diseases and publish in Philadelphia journals, inching him up the professional ladder (Drake 1808; King 1985; Aring 1985; Naramore 2020).

As suggested previously, the largest pool of men with formal training in what became recognized as the sciences were physicians. Doctors made up large portions of the membership of scientific societies and were often engaged in scientific research that was not strictly medical. They are also a rare group that was well on the way to modern professionalization and thus easier to identify through medical school records, correspondence networks, or simply the honorific “Dr.” During the eighteenth century, roughly 200 American men crossed the Atlantic to obtain medical degrees (Rosner 1992). In their turn, these men helped found medical faculties in Philadelphia and New York just before the Revolutionary War. Many more learned their art through various forms of apprenticeship with recognized and respected doctors in their communities. In this manner, even those who could not afford to attend medical school claimed association to a profession that was actively trying to boost its scientific credentials. Rush, in particular, was as fervent a booster of the medical profession as he was a booster of the new republic (and he signed the Declaration of Independence). In a letter to his son James (who was 16 at the time), Rush encouraged the boy to work hard in college in order to become a scientific physician, writing “without an extensive and correct education you cannot expect to succeed in it. Do not, my dear son, disappoint my expectations and wishes of bequeathing my patients to an enlightened and philosophical physician” (Rush 1951, 850).

Rush wanted his son to be a good doctor, but he may also have been looking out for his economic interests. Making it in the crowded Philadelphia medical marketplace was difficult, but formal scientific training was increasingly viewed as an asset by the general population prior to the popular anti-intellectualism and anti-elitism of the Jacksonian era. After American independence magazines, newspapers, and medical journals printed scientific studies, queries, and research. Almanacs also spread information, especially practical scientific data, including astronomical and weather information alongside a variety of other articles. Banneker’s almanac, for example, included abolitionist articles alongside typical astronomical fare (Lewis 2005, 679; Herschthal 2021, 52–53). At the same time, libraries housed scientific texts, and schools started to shift toward teaching “useful knowledge” (Wolf 1980). The Young Ladies’ Academy in Philadelphia—a day school for middling and elite young women—offered instruction in mathematics and even chemistry alongside more traditionally feminine skills like sewing (Branson 2001; Nash 1997; Rush 1806b). Meanwhile, one boarding school for boys in Maryland boasted surveying equipment, an electrical apparatus, and globes for students to use. This expanded the curriculum beyond the classical language instruction required for a college education (Rush 1806a, 1806c).

The public caught the scientific bug along with patriotism in the 1780s and 1790s. During this era, Peale’s Museum in Philadelphia grew to the point it required one of the largest spaces in the city—Independence Hall. It was so successful that it became Peale’s main source of income, bringing in thousands of dollars each year (Schofield 1989, 21). Ordinary Americans entered the space to view some of the earliest dioramas with taxidermy birds in naturalistic positions set with painted backdrops of their habitats (Yochelson 1992). The mastodon, discussed previously, was a special curiosity when first exhibited and commanded an extra 50¢ for admission (Zygmont 2015, 98). By the early nineteenth century, the collections included specimens and objects collected on state-sponsored expeditions, including that of Lewis and Clark. Without public funding for their preservation, the Peale museum acted as an unofficial repository for specimens of public interest (Schofield 1989, 22). While the museum’s location might suggest a connection to political history, it was not the space so much as the other exhibits that mixed the revolution with scientific education. In his own painting of the museum, Peale clearly shows a row of portraits above the glass cases of natural historical specimens. Those portraits are unusually uniform in size and form a set. They act as a visual representation of
American history as it stood at the turn of the nineteenth century. Peale chose figures he considered important to the Revolutionary War and founding of the country, including military commanders, men of science, and politicians in his visual who’s who. Visitors to his museum could have viewed native bird species—collected by Peale or donated by colleagues—and at the same time pondered the visage of a young Marquis de Lafayette. Both seemed central to American understandings of themselves, as discussed in the next section (Looby 1987, 267).

**Identifying the United States**

Returning to Rush’s eulogy on Rittenhouse demonstrates the connection between American science and the new American identity during the revolution. The physician used the deceased astronomer to pinpoint the idealized role of men of science in society. He said of those engaged in scientific pursuits,

> It is to them we own our knowledge and possession of most of the necessaries and conveniences of life. . . . For us, they traverse distant regions, expose themselves to the inclemencies [sic] of the weather, mingle with savages and beasts of prey, and in some instances, evince their love of science and humanity by the sacrifice of their lives.  

*(Rush 1796, 6)*

As suggested in the previous section, Rush was not exaggerating the dangers and physical difficulties of conducting scientific research in the field. Moreover, unlike some of his medical contemporaries, Rush rejected the idea that nature was healing (Wärner 1986). Instead he supported highly interventionist forms of treatment, including heavy bleeding and purging to match the strength of the American environment and energy of the American political system (Rush 1805). In this way, he used natural history to inform medical practice and ideas about what made Americans distinctive.

Aside from general patterns of scientific endeavor, American scientists of this period are disproportionately associated with natural history and other activities, which took them out into nature rather than into the laboratory or library. This stereotype does have a grain of truth behind it in the sense that Americans of this period were especially interested in how natural knowledge could help define their country and themselves. By 1776 a substantial number of Americans agreed with the notion of political independence from Great Britain. However, a shared conviction of independence did not correspond to a shared sense of nationalism. Most of these men and women saw themselves as Virginians, New Yorkers, or Rhode Islanders before an abstract notion of “American.” The prospect of a new nation changed those terms. What were “Americans” going to be? For that matter, what was “America”? The expansionist ambitions of many white Americans were well-established prior to the war for independence. Whether for active colonial settlement or some vague notion of creating a buffer between the United States and European empires in the Southwest and North, many looked to territorial expansion as the next logical series of events in their national history. This narrative, however, was not without anxiety for U.S. citizens. How far would that expansionist fervor take the new country? What did European-descended people even know about so-called “Indian country” in the West?

Natural knowledge and the assertion that American men of science could explain and control the new territory turned out to be one key way to answer those questions. These anxieties and hopes provided a place for science, medicine, and natural history to help shape the nation-building project. On the one hand, natural knowledge helped claim space by making them the recognized experts on the natural history of their country while negating the knowledge claims of both Indigenous people and Europeans (Bolton Valencius et al. 2016; Strang 2018a; Lewis 2005, 667; Kornfeld 1995, 300). Natural knowledge could also work as metaphor. The structuring of the natural world echoed the rearrangement and restructuring of society in period of instability and revolution. As Christopher Looby describes it, Americans entered scientific fields like taxonomy “as a rehearsal . . . of social and political construction . . . there is a kind of
automatic metaphorical exchange between images of natural order and ideas of social and political order” (Looby 1987, 253). On the other hand, positive receptions of American men of science and American representation in the international Republic of Letters placed those men—and in turn their country—on near-equal footing with European counterparts through their unique insights. The recognition of American scientists abroad had political value and acted as a symbol of independence. This is most famously demonstrated in the actions of Franklin during the revolution, where he used both his faux rustic American sensibilities and fame from his electrical experiments to charm the French court and influential salon (Winterer 2016; Wood 2004; Delbourgo 2006).

But Franklin was not alone. Men of science maintained academic ties formed in years before revolution and even professed that science was somehow above political disputes. The Republic of Letters carried on, and the creation of scientific knowledge was a transatlantic practice. Writing to his Scottish mentor, Dr. William Cullen, just after the peace, Rush professed that the two men had “never been at war.” In return Cullen remarked on his hopes for the future of the independent American medical profession and the growth of institutions like Philadelphia’s medical school (Rush Family Papers). Decades later, the society instituted for the promotion of Agriculture, Arts, and Manufactures in the State of New York found itself coping with the effects of foreign affairs on domestic politics. In 1800 the organization publicly acknowledged the awkwardness of having both Democratic-Republican and Federalist members who had wildly different views on the war in Europe and the future of the United States. They concluded, however, that

the Society is desirous of cultivating harmony and friendly intercourse with all persons and associations conversant in agricultural, oeconomical, and handicraft matters, in every country . . . the members feel themselves interested in their correspondence with the merchants of Glasgow, and the Board of Agriculture in London . . . the National Botanic Garden of Paris, and the Society of Arts and Sciences in St. Domingo.

(“Medical and Philosophical News,” 1800)²

Not only does this show interest in several countries but also highlights the institution’s broad mandate that included, but was not limited to, the sciences. This would be unremarkable if science were untouched by political affairs, but as demonstrated previously, it was not.

Individual Americans walked this tightrope between national interests and the desire for international recognition. In his 1800 monograph on the presence of goiter in upstate New York, for example, Barton dedicated the work to German physiologist Johann Friedrich Blumenbach rather than any American figure. Despite this Eurocentric dedication—and hope that the book would be useful to physicians on the continent—Barton had no problem pulling apart and rejecting every leading European theory about the cause of the disease. This followed other American physicians and natural historians. As Andrew Lewis notes, Americans believed that Europeans were more likely to listen to unreliable sources and privilege theory over empirical evidence (Lewis 2005, 677). Barton’s approach to goiter follows this same pattern. American observation, in this case, neatly trumped European experience and in turn was expected to alter European practice. From Barton’s vantage point, he not only presented novel observations but also convincingly challenged his European audience and called out their studies as too provincial to encompass the true, global nature of goiter. He defended his empirical—and indeed “American”—approach, writing, “I know that the path to temporary glory leads through the fairy-land of theory: but the road to present and to future usefulness lies through the field of facts and observation” (Barton 1800, vi). Similarly, one could point to Thomas Jefferson’s Notes on the State of Virginia. The text was in large part designed as a correction to Buffon’s theories on the weakness of American plant and animal life compared with those of the old world. By cataloging aspects of the Virginia environment, Jefferson hoped to counter that theory with a flood of contrary empirical facts (Jefferson 1801, 89–91).
Some Americans even left the United States and remained in a vague world of fluctuating loyalty after the revolution. Physician Thomas Horsfield took American science about as far from the United States as he could. Following his graduation from medical school in Philadelphia, he obtained a place as ship surgeon on a trading vessel headed for India. Horsfield’s experience brought him first to Batavia (Jakarta, Indonesia) and then Bengal. Fascinated by the natural history of Indonesia, Horsfield found a way to return to the Dutch colony and remain there for years. As a colonial hospital physician, Horsfield treated disease and became an expert in local botany. These skills served him well when the region’s jurisdiction shifted from Dutch to British between 1811 and 1816. During that time Horsfield became close with the new British authority and man of science Stamford Raffles. Raffles also connected Horsfield with Joseph Banks, president of the Royal Society (Raffles 1835). At the end of British Rule in Java, Horsfield left the island, bringing his knowledge and plant samples to Kew Gardens in England. He never permanently returned to the United States (Cowan 1975; Williams 2014; McNair 1942; Raffles 1835). Given these facts, was Horsfield an “American” scientist? Did his knowledge production reflect his home country? He thought it might. From a letter sent back to Rush in 1803, it seemed like his initial intentions included the desire to further fundamental medical knowledge for the benefit of the United States.

I have daily opportunities in my observations on the diseases of Batavia of confirming and applying those important truths I acquired by your invaluable instructions. . . . I now reside, for a few months, at the Hospital at this place, with the view of making such experiments with a number of native medicinal plants as the cases afford—It is in a pleasant and healthy situation; and I have daily opportunities of observing the diseases of Batavia in their different stages and modifications—But here I have to regret that the Medical persons I have daily conversation with, have not those enlightened and just Ideas, both with regard to the physiology of, and the effects of medicines, or, the human body, which can only be acquired by such opportunities as your lectures and conversation afford—Both regarding the trials I intend to make . . . and their result, and regarding my observations on the diseases of Batavia . . . I shall inform you particularly by future opportunities.

(Rush Family Papers)

Despite his location, Horsfield’s letter to Rush bears all the hallmarks of American science and the use of science to carve out a global position for the United States. Underneath his flattering words for his teacher, Horsfield suggested that his American education allowed him to make the most out of his observations in Indonesia. This heightened the value of his American professors and their theories—especially those of Rush, which explicitly broke from those of European authorities in favor of empiricism and simplicity of theory. Horsfield considered his education as transportable because it was “true” and universal even if the circumstances were local. This is essentially the same kind of argument Barton used to promote his goiter theory and Jefferson to rebuke French natural philosophers. Finally, Horsfield addressed the importance of a scientific community. In 1803 the young Horsfield longed for his medical and scientific community, the American community. Halfway around the world and in a space that couldn’t have been more different from Pennsylvania, he relied on his sense of American theory and practice as his foundation. He even planned to extend his connections and make his work more valuable to an American audience by sharing his findings with Benjamin Rush. Those findings may no longer exist, but letters from other students in the East Indies who encountered Horsfield attest to his continued interest in the United States (Williams 2014).

While American practitioners worked to create a sense of their own nation through scientific endeavor, visitors and immigrants also imagined what the young country stood for and expressed their feelings in scientific work. British dissenting minister and chemist Joseph Priestley is the most famous example of this kind of man of science. Like many other supporters of the French Revolution,
Priestly found England an uncomfortable place to call home by the mid-1790s (Kramnick 1986, 25:1–3; Dolan 2002, 41). After an attack on his home in Northern England, he made the decision to emigrate. The scientific community in the nation’s capital of Philadelphia was thrilled by the prospect of permanently welcoming a man as well-renowned as Priestly into their midst. His reputation as a natural philosopher and chemist preceded him. The medical school immediately offered him a position—which he declined—and the various learned societies welcomed him as a member. To the disappointment of some—including Rush—Priestly did not settle in Philadelphia but instead moved west to the town of Northampton, Pennsylvania, where he built a laboratory and moved his extensive library (Graham 1995, 61–63; Rush Family Papers). Despite this move, he remained in close contact with colleagues in Philadelphia and throughout the United States, often writing in defense of his theories of matter.

Although Priestly is the most famous example of a scientific man turned political exile in the United States, he was not alone. As many as 10,000 people may have immigrated to the United States in 1794 alone, many for political reasons (Graham 1995, 1). At that time Rush received a series of letters of introduction for men immigrating to the United States. A 1794 letter from Dr. James Currie of Liverpool was carried by one of these migrant families, which also pointed to similarities between Rush’s recent work and that of Erasmus Darwin—their politics shared similarities as well (Rush Family Papers; Herschthal 2021). That same year another potential migrant, H. Hodgson, wrote to Rush asking about the United States. Like Priestly, Hodgson had both scientific and religious credentials and reached out to Rush through medical networks; they had a mutual connection to English physician Thomas Percival. The letter detailed Hodgson’s reasons for leaving Britain and choosing the United States. It was an uncomfortable time for many.

America was soon after the Revolution there represented to me as a place where Civil and Religious Liberty were to be enjoyed to a far greater extent than could be expected under any Monarchy how limited so ever, and that to a person whose wishes did not extend beyond the possession of the decent conveniences of Life and the probability of securing these conveniences to a numerous family America would be an Asylum as could not be found in Europe . . . The fate however of my amiable and worthy friend Mr. Palmer has afforded the friends of mankind a convincing argument that the freedom of a British Subject very much resembles that slavery, at least of the mind, which is the Essence of the most absolute Despotism upon Earth.

(Rush Family Papers)

Thomas Fyshe Palmer, as well as the two other men mentioned in the letter—Thomas Muir and William Skirving—were sentenced to transportation to Australia by the Scottish courts for the crime of sedition (Balden 1893). This unsettling situation made the United States seem like a promising destination. Its republican sympathies, English-speaking population, and large numbers of post-revolutionary British migrants all spoke in its favor. For men of science, it also held the promise of novel research and easy inclusion in scientific communities (with some assistance from transatlantic connections and colleagues). Physicians and clergymen in particular hoped that growing communities were in need of their services leading to straightforward, if not easy career paths.

However, the British were not the only Europeans interested in the United States. Around the same time as Priestly and Hodgson migrated (or considered doing so), French travel writer the Comte de Volney arrived in the United States for what turned out to be an extended visit based on both political and scientific feeling. Like the British Dissenters, Volney had political reasons for leaving France. But he was also curious about American nature and set out to describe the county in more scientific terms than his previous book on Syria and the Levant. In the United States, he hoped to find a moderate republic living in peace. Despite later disenchantment with the country and the
anti-French Federalist government of John Adams, Volney did manage to collect and synthesize a large amount of natural knowledge. In addition to extensive travel in most of the states and even some newer territories in the Northwest, Volney joined the informal community of men of science. His work cites meeting and data shared with a who’s who of American men of science, including those introduced previously (Volney 1804, 129–136). His text maintained some standard European critiques of the American environment but relied heavily on data collected by Americans themselves, indicating the back and forth in methods as well as information between nations. American science and men of science were making a mark on their country and how the world viewed them.

**Conclusion**

Thomas Jefferson viewed his victory in the election of 1800 as a second American Revolution. The strength of the new Democratic-Republicans held well into the new century. Meanwhile, the country had a president who actively cast himself as a man of science and man of the Enlightenment. This vision of Jefferson and his era is encapsulated in an 1801 engraving made by Cornelius Tiebout after a

![Figure 2.1](image_url)  
**Figure 2.1** Thomas Jefferson as president showing the connection between his “revolution” of 1800 and American science.
Rembrandt Peale (Charles Wilson Peale’s son) portrait. In the image Jefferson appears in all his Republican and scientific glory. The president stands in the center physically connecting the scientific and political. One hand holds up the Declaration of Independence, while the other gestures to the document underscoring his role as primary author. The other objects in the room, however, all have some sort of scientific flavor. The table on which rests the Declaration also boasts a bust of Benjamin Franklin. Franklin was a political figure, of course, but also a scientific one, as discussed previously. In this image, Jefferson presents himself as a successor of Franklin, not of Washington. The right side of the engraving, meanwhile, holds two scientific instruments, an electrostatic generator and a globe. Both hint to the progress of American science. The former addresses Franklin and his successors in the field of electricity, while the latter might either be a nod to geography and surveying or to astronomy depending on the type of globe. This is not a typical presidential portrait. However, it does show Jefferson as he would want to be seen, a Republican leader as interested in scientific truth as he is in politics. He is grounded by natural knowledge rather than allusions to classical or biblical morality. Jefferson appears as a thoroughly rational leader for the scientific empire of liberty he hoped to encourage.

It is an image of the revolution and the flurry of scientific work that is only hinted at in this chapter. The idea of Americanness rooted in science and vice versa lessened over the course of the nineteenth century, but it was essential to early national self-fashioning in the period of the revolution.

Notes

1 Throughout this chapter I will use the term “scientist” despite the fact that it is an anachronism for this period. This is for the ease of the reader and conforming to the purview of this book. However, I will also use contemporary terms like “natural philosopher” and more accurate modern terms like “natural knowledge” to describe some research interchangeably.

2 “Medical and Philosophical News.” The Medical Repository (1800): 111.

References and Further Reading

Delafield-Benjamin Smith Barton Collection, American Philosophical Society, Mss.B.B284d.


“Medical and Philosophical News.” The Medical Repository (1800): 111.


Rush, Benjamin. 1777. Directions for Preserving the Health of Soldiers, Addressed to the Officers of the Army of the United States. Published by order of the Board of War.

———. 1796. An Eulogy, Intended to Perpetuate the Memory of David Rittenhouse, Late President of the American Philosophical Society. Philadelphia: Printed for J. Ormrod, No. 41 Chestnut-Street.


Rush Family Papers, Benjamin Rush Correspondence, Library Company of Philadelphia.


