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The Bicentennial of the US Constitution: The American Philosophical Society and the Role of Scholarship in the Creation of the US Republic

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September 17, 1987, marks the 200th anniversary of the signing of the US Constitution. According to Heinz R. Pagels, executive director, New York Academy of Sciences, and adjunct professor of theoretical physics, Rockefeller University, New York, "the political principles drafted into the Constitution...are indebted in large measure to the emergent ideas of seventeenth- and eighteenth-century science.... The necessity for experimentation and modification through amendment are scientific principles embedded in the Constitution.... In the integrative vision of these early thinkers, natural law profoundly informed social law."¹

As noted by Gordon S. Wood, chairman, Department of History, Brown University, the Constitution "has been described as the climax of the Enlightenment—that great, eighteenth-century attempt to apply the results of Western science and learning to human affairs."² Educated persons in eighteenth-century America strove toward "complete," Renaissance-style scholarship, and science—or "natural philosophy"—was assumed to be part of that.

In fact, Thomas Jefferson thought science fundamental to the health and prosperity of the then-new United States, as noted by Gerald Holton, the Harvard physicist and historian of science.³ In the 10th annual Jefferson Lecture, an award established by the federal government to honor "distinguished intellectual achievement in the humanities," Holton noted that Jefferson considered the two goals of science to be "the advancement both of knowledge and of 'the freedom and happiness of man.'"³ (p. 279)

It is perhaps not surprising, then, that the framers of the Constitution were intensely interested in the theoretical basis of the document they were striving to create. The Constitution's intellectual origins are generally understood to reach deep into the past, from John Locke and David Hume (in the immediate past of the framers) to the philosophers of ancient Greece and Rome.² Thus, the delegates who convened in Philadelphia in the spring of 1787 had a rich diversity of ideas and intellectual traditions upon which to draw. It is both interesting and instructive to consider the cultural milieu that shaped those who wrote the document.

The Origins of the Constitution

The current US Constitution is actually this country's second such document. The first, the Articles of Confederation, was drafted in 1777 and ratified in 1781. As noted by historian Richard B. Morris, Columbia University, the Articles of Confederation provided for the union of 13 sovereign states in a formal, but loose, association.⁴

The major differences between the Articles and the Constitution are that the Articles did not provide for a chief executive and did not empower Congress to tax, control commerce, or raise an army independent of the states. As is well known, the Articles allowed the states to retain both their sovereignty and every power not expressly granted to the national government.⁵ In practice, this left the US with neither the military strength nor the prestige to conduct its affairs as a nation.

The Constitutional Convention

According to Morris, George Washington described the US government in 1784 as "half-starved" and "limping," constantly "moving upon crutches and tottering at every step."⁵ It began to be widely recognized that the Articles were ineffective, and 55 delegates from 12 of the 13 original states (Rhode Island was not represented) met in Philadelphia in May 1787 to consider revisions to the Articles. The convention was opened with the recommendation that the delegates take the necessary actions "to render the constitution of the Federal Government adequate to the exigencies of the union."⁴

Morris notes that Jefferson referred to the Constitutional Convention as "an assembly of demigods."⁴ Certainly it was a gifted collection of statesmen; with some important exceptions (such as Jefferson himself, who was abroad), many of the young country's most respected citizens were present. The framers were practical men of business and public affairs who were well versed in political theory, and their number also included some of the sharpest legal minds in the country.

Many were also well acquainted with one another. As shown in Table 1, several of the signers of the Constitution had also signed the Declaration of Independence. Many had also attended the same schools, notably the College of New Jersey (now Princeton), Yale, the College of William and Mary, and the College of Philadelphia (now the University of Pennsylvania). Some had also served together in government and in the military, while others knew one another as colleagues in the legal profession or in business.

"Scientists" Among the Delegates

Two of the delegates—Benjamin Franklin and Hugh Williamson of North Carolina—can also be labeled "scientists" as we now apply the term. But two important caveats about such a label need to be mentioned. First, few of the delegates engaged in only one profession and, therefore, they cannot

be as neatly categorized as many leaders can in this age of specialization. For instance, as everyone knows, Franklin was also—and perhaps primarily—a statesman and a diplomat, but he was, in addition, a printer, publisher, and philosopher. By the same token, Williamson was also a government official, a physician, and a minister. Second, both Franklin and Williamson would likely have called themselves "natural philosophers"—a term that referred to natural and physical science.⁶ (p. 144) In fact, the word *scientist* wasn't coined until nearly the mid-nineteenth century, as sociologist Robert K. Merton, Columbia, reminds us in a paper presented at the annual meeting of the American Philosophical Society (APS).⁷

The American Philosophical Society

Franklin and Williamson, as well as 11 other delegates (see Table 1), were also members of the APS at the time of the Convention (5 more delegates were elected to membership in the APS after the Convention). The APS, officially founded by Franklin in 1743 (its full title is the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge), had its roots in part in a philosophical club Franklin started in 1727;^{8,9} it is the oldest learned society in the US.¹⁰ Incidentally, Franklin also founded the Library Company of Philadelphia in 1731, the first subscription library in America "and certainly the most important," as noted by Stanford historian John C. Miller. The versatile Franklin also had a hand in founding the College of Philadelphia (the University of Pennsylvania) and the Philadelphia police and fire departments.¹¹ (p. 499)

In many ways, science in the US began with Ben Franklin; in the mid-1700s Franklin's name was synonymous with American "natural philosophy." His experiments in electricity had gained him worldwide fame, for reasons carefully analyzed in a monograph entitled *Franklin and Newton*, by historian of science I. Bernard Cohen, Harvard.¹² Franklin's achievements, as noted

Table 1: Signers of the Constitution who were elected to the American Philosophical Society (APS). Names are followed by the colleges from which the individuals graduated and the individuals' occupations. Asterisks (*) indicate signers of the Declaration of Independence. Daggers (†) indicate signers of the Articles of Confederation.

- Brearley, David.** College of New Jersey (now Princeton University), NJ. Lawyer, Continental Army soldier, judge. (Elected to APS after Convention.)
- ***Clymer, George.** Merchant, politician, Continental Congress member, businessman.
- †**Dickinson, John.** Middle Temple, London. Lawyer, politician, Continental Congress member, essayist.
- ***Franklin, Benjamin.** Printer, publisher, author, inventor, Continental Congress member, scientist, businessman, politician, postmaster, diplomat.
- Hamilton, Alexander.** King's College (now Columbia University), New York, NY. Merchant, lawyer, essayist, Continental Congress member, politician, secretary of the treasury.
- Houston, William C.** College of New Jersey (now Princeton University), NJ. Educator, Continental Army soldier, lawyer.
- Ingersoll, Jared.** Yale University, New Haven, CT; Middle Temple, London. Lawyer, Continental Congress member, politician.
- Livingston, William.** Yale University, New Haven, CT. Lawyer, politician, pamphleteer, Continental Congress member, farmer.
- Madison, James J.** College of New Jersey (now Princeton University), NJ. Politician, Continental Congress member, US secretary of state, US president, farmer, University of Virginia rector.
- Martin, Alexander.** College of New Jersey (now Princeton University), NJ. Politician, militiaman. (Elected to APS after Convention.)
- McHenry, James.** Newark Academy, DE. Physician, Continental Army physician, publisher, Continental Congress member, US secretary of war, politician.
- Mifflin, Thomas.** College of Philadelphia (now University of Pennsylvania), PA. Merchant, Continental Army soldier, politician.
- *†**Morris, Robert.** Merchant, politician. (Was elected but refused to accept membership in APS. He claimed he wasn't worthy.)
- Paterson, William.** College of New Jersey (now Princeton University), NJ. Lawyer, politician, US Supreme Court associate justice, Literary Society founder. (Elected to APS after Convention.)
- Pinckney, Charles Cotesworth.** Christ Church College, Oxford; Middle Temple, London. Lawyer, politician, diplomat, US Army officer, South Carolina College trustee. (Elected to APS after Convention.)
- Randolph, Edmund.** College of William and Mary, Williamsburg, VA. Lawyer, Continental Army soldier, politician, Continental Congress member, US attorney general, US secretary of state. (Elected to APS after Convention.)
- Washington, George.** College of William and Mary, Williamsburg, VA (attended but did not graduate.) Surveyor, farmer, politician, Continental Army commander-in-chief, US president.
- Williamson, Hugh.** College of Philadelphia (now University of Pennsylvania), PA. Theologian, physician, educator, militiaman, Continental Congress member, University of North Carolina trustee, University of the State of New York regent, businessman, scientist.
- ***Wilson, James.** University of Glasgow; University of Edinburgh, Scotland (attended but did not graduate). Educator, lawyer, businessman, Continental Congress member, US Supreme Court associate justice.

in a past essay,¹³ were recognized by the Royal Society of London with the award of the prestigious Copley Medal in 1753. Three years later, he was elected to membership in that society. Among the lasting tributes to him is The Franklin Institute, founded in Philadelphia in 1824. And as noted in another essay,¹⁴ it was probably out of admiration for Franklin that the Scottish chemist John Scott endowed the city of Philadelphia with \$4,000 in 1816 for the creation of a medal bearing Scott's name, to be awarded to "ingenious men and women who make useful inventions."¹⁵

The APS enjoyed a wide reputation in the late eighteenth century—partly because of "Franklin's prestige and gift for advertising," according to historian Merrill Jensen (1905-1980).⁶ (p. 145) But the prestige of the APS was also partly because of its real achievements in science and learning.¹⁰ Among the first of these was the technical support the society provided during the transit of the planet Venus across the disk of the sun on June 3, 1769. The APS erected a telescope platform from which Philadelphia astronomers—some of them APS members—recorded accurate observations. In 1780

John Adams, who later became the country's second president, was so impressed with the goals of the APS that he formed the American Academy of Arts and Sciences in Boston, Massachusetts, along similar lines.⁶ (p. 145)

The purpose of the APS was—and is—to improve and promote knowledge of “useful” arts and sciences.¹¹ (p. 500) As such, according to Whitfield J. Bell, former librarian of the APS, it “fulfilled many functions of a national academy of science, a national library and museum, and even a patent office.”¹⁰ This, he suggests, was partly because the society was located in Philadelphia, which was the nation's capital from 1790 until 1800 and the country's political and cultural hub from 1775 through 1800. It was natural for government officials to consult with APS members on numerous subjects, such as the topography of western territories, coastal surveys, and the like.¹⁰

That the APS could function as a national repository of knowledge was also partly owing to the sheer wealth of scholarly material acquired by the society.¹⁰ As Bell notes, “Foreign governments and other libraries and institutions deposited their publications in the Society, inventors sent in models of their machines, and explorers presented curious and unusual specimens of natural history.”¹⁰ For example, Jefferson, who was president of the APS while also serving as US president, deposited the original journals of Meriwether Lewis and William Clark in the APS library. The Lewis and Clark party surveyed part of the Louisiana territory following its purchase in 1803 from France and was the first overland expedition to the Pacific coast and back. And the son of Richard Henry Lee, who made the historic motion for independence from England to the Continental Congress in 1776, presented some of his father's papers to the society, including a copy of the Declaration of Independence in Jefferson's hand.¹⁰

Around the time the Constitution was signed, the APS had just published the second volume of its *Transactions*, with a courteous apology for the hiatus between it and

the first volume, published in 1771: “The peculiar circumstances of America, since the publication of the first Transactions of this Society, will be a sufficient apology for the long delay in publishing the second.”¹⁶ During the period from 1770 through the early 1800s, the APS promoted agricultural experimentation and published the results in its *Transactions*.⁶ (p. 241) A representative list of articles compiled by M.L. Wilson,¹⁷ then director of extension work, US Department of Agriculture, included: “An essay on the cultivation of the vine, and the making and preserving of wine, suited to the different climates in North America,” by Edward Antill (1771);¹⁸ “Directions for putting up seeds and plants so as to preserve them in a state of vegetation for being transported to distant countries,” by John Ellis (1771);¹⁹ and “Hints relative to the stimulant effects of camphor upon vegetables,” by Benjamin Smith Barton (1799).²⁰ The APS also had interests in trade and economics, the development of the continent's mineral resources, and aided James Rumsey in the development of a prototype steamboat.⁶ (p. 152)

Science in the Late Eighteenth Century

The APS was the focal point of much of the knowledge and learning in the US in the late eighteenth century.²¹ Natural philosophy (science) and other forms of learning were held in high esteem; scientific knowledge was viewed in terms of its potential for mastering nature and as a means of easing and improving the physical condition of humanity.¹¹ (p. 494-5) In colonial America, where the continent's potential seemed limitless, this vision of science was especially cherished.

According to Miller, “the eighteenth century was the age of the amateur” in science.¹¹ (p. 495) “In Europe, philosophers, nobles, and even churchmen dabbled in science.” Even in colonial America, despite a shortage of scientific equipment and a lack of laboratories, there was intense interest in

“the collection and classification of facts” and with pursuits in agriculture, botany, and zoology. Although few colonial Americans made their reputations in professions that we today would call scientific, most educated men in late eighteenth-century America prided themselves on a knowledge of matters scientific.¹¹ (p. 495)

The latter part of the eighteenth century in the US was marked by the founding of the College of Physicians, which, incidentally, is also celebrating its bicentennial in 1987.¹¹ (p. 499) Medical education began when the College of Philadelphia started a program in 1765, and two years later a similar program was begun at King’s College (now Columbia).

The second half of the eighteenth century also saw the beginnings of university-based research in the US.¹¹ (p. 497-8) Prior to 1750, college faculty were expected to teach, not to do research. After 1750, however, colleges began to include science (under the rubric “natural philosophy”) in their curricula, and the new, professional teachers of science were doers as well. Indeed, Jefferson ranked some as equal in stature to such figures as Washington and Franklin. One of the men so esteemed was David Rittenhouse, who was among the group in Philadelphia that observed the 1769 transit of Venus and whose many astronomical articles helped establish the distance between the earth and the sun.¹¹ (p. 498)

Still, this is not to say that university-based research was widely established in the late eighteenth century. Indeed, David J. Rhees, assistant to the librarian for research and programs, APS, points out that “most historians would say that scientific research really did not become firmly institutionalized in American universities until the late nineteenth century—say, [with] the founding of Johns Hopkins University in 1876.”²²

The Law of the Land

Although the Constitution is revered today, it did not gain instant acceptance from the Americans whose decision it was to rat-

ify it.^{5,23,24} The country had just fought a war to escape a strong central government and was hesitant about replacing the Articles of Confederation with what many perceived to be just another version of the British king and parliament.

Thus, it is all the more impressive that the ratification of the Constitution was guaranteed within a year, for by July 1788 it had received the affirmative vote of New Hampshire, the ninth state to approve it and the last needed for the two-thirds majority necessary for ratification. Nevertheless, the Constitution did not become effective until March 4, 1789, and the Union didn’t encompass all 13 original states until North Carolina and Rhode Island joined well after Washington had taken office as president in 1790. An indication of the lingering doubt about the document was the speedy passage by Congress and the equally quick ratification by the states of the first 10 amendments to the Constitution, which later became collectively known as the Bill of Rights. These amendments safeguard some of the most important liberties of US citizens, including freedom of religion, freedom of speech, and freedom of the press.

The durability of the Constitution and the wisdom of the men who framed it have been proven over the years. Time has long since laid to rest most doubts about the resiliency of the form of government the Constitution created. Come join us in Philadelphia this year for the celebration of this remarkable work, the basis of the US republic.

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We the People 200 Is Part of Philadelphia's Celebration of the Constitution's Bicentennial

A constitution is a document that states the fundamental or supreme law of a country or organization. All other laws made after a constitution is adopted must conform to the principles set forth in the constitution. The US Constitution is the oldest written constitution of a functioning government in the world.¹ It was adopted by a vote of the delegates elected to special conventions, who represented the citizens of the new nation. The Constitution cannot be changed or repealed by the national Congress, but only by a vote of three-quarters of either the state legislatures or of special conventions popularly elected for that purpose.

September 17, 1987, is the 200th anniversary of the signing of the US Constitution. Like the Bicentennial of the Declaration of Independence

in 1976,² the Bicentennial of the Constitution is being observed with numerous special events, both nationwide and here in Philadelphia, the city in which both the Declaration and the Constitution were created and signed. The city's tribute to the Constitution is part of a celebration called "We the People 200," which throughout the year is featuring parades, concerts, and festivals as well as exhibitions, workshops, and seminars to examine the Constitution and its legacy.

One of the highlights of the "We the People 200" program has recently occurred: a weekend celebration called "All Roads Lead to Philadelphia," held from May 22 through May 25.³ Commemorating the beginning of the Constitutional Convention, it centered around a confer-

ence of the governors of the 13 original states; the delegates discussed the "state of the states" after 200 years of republican existence. The week-end celebration also included an exhibit called "1787 Festival," which showed what life was like the year the Constitution was created, and "Born in America," a free public concert of American music. Also in May, the two-month-long "Festival of States" began at Independence Mall and Penn's Landing; the Festival gives each of the 50 states in turn a special day to showcase itself.

Other events are planned for the month of July.³ One, called the "Freedom Festival," is scheduled for Independence Day weekend and will combine tributes to the Declaration of Independence—signed on July 4, 1776—with celebrations of the Constitution. A pageant of American history with a cast of 500, called the "Spirit of America," will be presented by the US Army Band in the city's Convention Hall at the Civic Center. The Freedom Festival parade, featuring marching bands from throughout the country, will wind down the Benjamin Franklin Parkway to Independence Mall on July 3; the next day, dozens of hot-air balloons will take to the skies from the Philadelphia Museum of Art in the "Bicentennial Balloon Bash." The fourth and fifth will also be marked by "Philly's 'Freedom's Fourth' Food Festival," which will feature gastronomic creations for which the city is famous.

Another major event in July will be a ceremonial joint session of Congress that has been in-

vited to convene in Philadelphia for the first time since 1800, when the city served as the young nation's capital.

Of special interest to scientists is an exhibit by the American Philosophical Society (APS) called "Designing a Nation: Science, Technology, and the Constitution." Running from the end of April through the end of September, it deals with federal surveys and mapping expeditions, scientific exploration, and commerce and technology. It can be seen at the APS building at 105 South Fifth Street in Philadelphia.⁴

On September 17, the largest parade ever planned in the US—starting from the four cardinal points of the compass—will converge on Independence Mall to start the celebration of Constitution Day, a one-time-only national holiday. The president, the chief justice of the Supreme Court, and the leadership of Congress, representing the three branches of government created by the Constitution, will gather at the Liberty Bell pavilion to lead a Constitution rally. A vast, outdoor picnic is scheduled to follow.³

For more information on these and other events in Philadelphia, write to the Philadelphia Convention and Visitors Bureau, 1515 Market Street, Suite 2020, Philadelphia, Pennsylvania 19102. In the US, you can also call toll-free 1-800-523-2004, extension 87.

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