
to see patterns that may not be there. When the mysteries overwhelm our weak minds, our religions invoke a Great Designer, and the age-old struggle by scientists and spiritualists to explain the unexplainable continues.

Yet what else can we do but seek and question? Science, after all, has looked into the future and seen our eventual doom, if not by fire then by ice. Eternally hopeful nonetheless, we launch probes into space beyond the reaches of our most powerful telescopes and send as our emissary Johann Sebastian Bach on a compact disc. But for Johnson, "expecting galactic neighbors to recognize our signals as signals" may be the ultimate exercise in wishful thinking. In the end, he can do little more than offer up a kind of prayer to the pursuit of knowledge, even if all we are constructing are "Towers of Babel that reach higher and higher above the plains."

SCIENCE AND THE FOUNDING FATHERS: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison. *By I. Bernard Cohen.* Norton. 368 pp. \$25

Not since Theodore Roosevelt, who gave a biology lecture at Oxford University, has there been a U.S. president with a serious claim to competence in experimental science. What a change from the intellectual temperament of the first presidents, for whom science was an integral part of their lives. They were, after all, men of the 18th century, and, in the Age of Reason, reason found no higher expression than in science. As Cohen, a professor emeritus of the history of science at Harvard University, shows, "the sciences served as a font of analogies and metaphors as well as a means of transferring to the realms of political discourse some reflections of the value system of the sciences."

Cohen fills his book with entertaining anecdotes about the Founding Fathers' scientific doings. James Madison made detailed measurements of the organs of the female weasel (the mole too), and Thomas Jefferson published the data in his *Notes on the State of*

Virginia (1787) to refute the view of a French naturalist who had declared that all plant and animal life would degenerate in the inferior natural conditions of the New World.

Cohen tellingly points the science toward the politics. In America, the rational, empirical, and apparently successful methods of the one inspired the practical optimism of the other. In 1786, Benjamin Franklin justified the new country's halting political progress by arguing that "we are, I think, in the right Road of Improvement, for we are making Experiments."

But Jefferson and Franklin held their duty to politics above scientific inquiry. When Franklin abandoned his own experiments to respond to public crises, he wrote, "Had Newton been Pilot but of a single common Ship, the finest of his discoveries would scarce have excused or atoned for his abandoning the Helm one hour in Time of Danger"—particularly, Franklin added, "if she had carried the Fate of the Commonwealth."

In his *Principia* (1687), Isaac Newton proclaimed the three laws of motion to be self-evident truths, though previously they had been evident to no one. Jefferson admired Newton and hung his portrait at Monticello. When he wrote in the Declaration of Independence that certain "Truths" were "self-evident," we can hear the echo, and perhaps surmise that he too was referring to hypotheses—human equality and unalienable rights—of which many were unpersuaded.

Cohen argues that Jefferson invoked Newton's authority only *by analogy*, and that neither he nor Franklin believed there were exact scientific laws for society as there were for the natural world. He refutes Woodrow Wilson's assertion that the Constitution should be interpreted as a reflection of Newtonian principles about forces in balance that produce some perfect adjustment. Rather, he says, "science in general and the Newtonian philosophy in particular served to provide acceptable metaphors for discussion or argument." But Americans are fortunate that the nation's Founders went to school on such metaphors.