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Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison: A Review

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Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison, by I. Bernard Cohen, New York: Norton, 1995.

reviewed by Teresa Castelão-Lawless

One of the most important claims in contemporary science studies is that scientific knowledge is not value-free but instead is largely influenced by social and political contexts. Although social constructivists have seriously challenged the view that science is objective and thereby provoked a shift in the public's perception of scientific enterprise, the first scholarly research on the *impact of society on science* was undertaken not by social constructivists but by intellectual and social historians, and more recently by historians of science. Cohen returns to the perspective which emphasizes the *impact of science on society*. His purpose is to "determine the degree to which scientific considerations were in any real sense a guide to the political actions of the Founding Fathers."(19) In the process, Cohen rebukes the social constructivists who find the "social" embedded in every scientific fact and the "scientific" in every act of government. However, Cohen counters their excesses with his own.

Cohen's method is a threefold approach to the connection between politics and science. He first explores the scientific or technological interests of Thomas Jefferson, Benjamin Franklin, John Adams, and James Madison, and then gives an overview of their scientific and philosophical education. He tries to establish convincing arguments for his claim that the rhetorical devices used in their political documents include metaphors, analogies, and concepts taken directly from the physical sciences (mainly Newtonian), medicine, and the life sciences. Cohen develops these issues by devoting one chapter to each of the Founders but Madison, who is allotted only eleven pages out of the last chapter, "Science and the Constitution." He further explores these issues in a preparatory chapter, "Science and American History"; in profuse illustrations of the science and technology of the time; and in twelve "supplements." The book contains a reasonable amount of propedeutic notes.

These four Founding Fathers were extraordinarily literate men, having attended some of the most prestigious schools in the country—e.g., William and Mary, Harvard, and Princeton—and showed interest in science throughout their lives. Jefferson and Franklin created scientific theories and technological devices. Jefferson, for instance, invented a new kind of clock, a moldboard for a plow, a revolving bookstand, and a portable desk with a polygraph, the latter of which proved useful when he became a supervisor of patents and inventions. He was also

interested in physics, astronomy, paleontology, archeology, scientific agriculture, and mathematics, the latter of which proved particularly useful to him when Washington asked him to "assign to each state a number of representatives in the Congress that would accord with the provisions of the Constitution"(88) and later, when he was given the task of building a program "to establish a standard of weights and measures to be used in the United States." (102) In his *Notes on the State of Virginia* he supported his political opinions with statistical data, information on minerals, customs of the Native Americans, and so on. In the "6th Note," he rebutted with scientific arguments Buffon's position that the species of the New World tended to degenerate and become weaker than those of the Old World.

In a brief analysis of the *Declaration of Independence,* Cohen shows other connections between Jefferson's scientific views and political thought: for instance, that "Laws of Nature" is a direct reference to Newton's three laws of motion, as spelled out in the *Principia*, or that Jefferson's love of Euclidean geometry is what led him to consider that the right to equality, life, liberty and the pursuit of happiness are "self-evident truths" (in the same sense as Euclid's axioms are self-evident).

Cohen believes that Franklin's *Experiments and Observations on Electricity* was "one of the most notable [scientific books] of the age"; (139) that his explanation for the discharging of lightning created "the first satisfactory theory of electrical action" (p. 136), and coined a number of terms for the science of electricity; and that his invention of the lightning rod was convincing proof that science could be applied to everyday problems, even though the acceptance of "Franklin rods" was difficult since a common superstition held that "dire effects would follow from the attempts to interfere with the forces of nature." (164)

Unlike Jefferson, Franklin did not deliberately use scientific metaphors in his political work, because Franklin believed that the purpose of his work was to make "a political point to influence public opinion"; (151) it had to be easily understood for mass consumption. However, in *Observations Concerning the Increasing of Mankind* and in *The Interest of Great Britain Considered with Regard to Her Colonies, and the Acquisitions of Canada and Guadaloupe,* he uses comparative statistical data to explain at length the political relations between America and the British Empire, and, anticipating some of Malthus' theories, makes a case for unlimited growth of the populations governed by a system of natural checks and balances. In the second book, he makes a political argument for acquiring Canada and other lands by invoking the authority of numerical data.

John Adams, although not a scientist, also used scientific concepts and principles to defend political positions. Adams' learning of Newtonian science at Harvard under John Winthrop enabled him to use the authority of Newton's third law of motion against the political positions (also "Newtonian") of Benjamin Franklin. The *Federalist* papers also indicate that Adams used scientific concepts in his political thought: "later in life he developed ideas concerning the system of checks and balances in the American system of government in which he made use of the concept of physical balance and the notion of a giant machine."(.222) However, Cohen is disturbed

because some of Adams' analogies seem to suggest that he had forgotten the sense of Newton's first and third laws of motion.

Quick reviews of James Madison's *Federalist* papers and his "debates and discussions at the Constitutional Convention" (269) show that scientific concepts, like "equilibrium" and "balance" in such of his expressions as "legislative balances and checks", "equilibrium of power", and "equilibrium of the national house of representatives," are used to make political claims. We do not learn much more about Madison because most of this chapter is devoted to an analysis of the claims of Woodrow Wilson and others that the *Constitution of the United States* has Newtonian overtones.

The chapter on Adams and the section on Madison are the weakest parts of *Science and the Founding Fathers.* Cohen says that at a certain point in his political fight with Franklin, Adams was confused about Newton's first and third laws of motion, perhaps because he forgot Winthrop's lessons on the subject. One could as easily assume that Adams did not know enough about these laws; after all, he was not a scientist. Moreover, using scientific concepts does not necessarily mean that one is deliberately making a connection with science. Once introduced into the language, a term may take on a life of its own. The same applies to the case of Madison's use of "balance" and "equilibrium." In fact, ordinary people today use scientific concepts like "relativity," "ego," and "survival of the fittest," but that does not mean that they have read Einstein, Freud, and Darwin, or that they understand the technical meaning of these terms. It seems more reasonable to see these originally scientific terms as having been assimilated into the common language and having extended their meanings.

There are other contradictions in this book. Several times Cohen introduces something twice. For instance, in the beginning, he asserts that the Founding Fathers were aware of using scientific metaphors in their political claims; but near the end, he speculates that it might have been unconscious. Also, he overgeneralizes by calling the *Declaration of Independence* visibly Newtonian in its use of scientific analogies, when all he gives as proof is the document's first two sentences. Indeed, the lack of substantial quotes from primary sources—especially of the very ones that would have been crucial for his argument to hold—is puzzling.

This book will not be considered a classic in the history of science, nor a masterpiece in social and political theory, but it is a good lesson on the extremes to which we may all fall prey to prove a pet theory, and it is an interesting introduction to the scientific education and the scientific and political accomplishments of these four Founding Fathers.