

James Bowdoin and the Patriot Philosophers

The American Academy and the Dibner Institute for the History of Science and Technology celebrated the publication of a new book entitled *James Bowdoin and the Patriot Philosophers*. Written by the late Frank E. Manuel, an Academy Fellow, and his wife, Fritzie P. Manuel, the study relates in rich detail the founding of the Academy and the life of its first president, James Bowdoin.

In his opening remarks, Louis W. Cabot, Vice President of the Academy and Chair of the Academy Trust, noted that “the book has been in the minds and hands of the Manuels for many years; it is fitting that it comes to us in published form on the eve of the Academy’s 225th year.”

Gerald Holton, Mallinckrodt Research Professor of Physics and Research Professor of the History of Science at Harvard University, presented the keynote address. He observed that, with this publication, the Manuels have not only “resurrected a fascinating patriot/philosopher but they have provided deep insight into the lives, the politics, the thoughts, and sometimes the mischief of mid-eighteenth-century Boston intellectuals.” A merchant by

trade but “an amateur Newtonian scientist” by avocation, Bowdoin, like many of his compatriots, justified his interest in science on both religious and utilitarian grounds – a combination that, as the Manuels point out, “made it twice blessed.”

As an example, Holton called attention to a scientific paper, published by Bowdoin in the first volume of the Academy’s *Memoirs*, reporting on an observation “tending to prove by phenomena and scripture” that a hollow shell surrounding the sun’s planetary system was necessary to preserve the universe from collapsing. As Holton described (see accompanying excerpt), the role of religion in understanding the universe was to concern scientists, from Newton to Einstein, for centuries to come and still concerns them.

Following Holton’s presentation, George Smith, Acting Director of the Dibner Institute and Professor of Philosophy at Tufts University, reflected on the meaning of the word “Newtonian” in the years from 1780 to 1790 – the decade when the “last serious loose end of the *Principia* was finally resolved.” He observed that at the

same time that Bowdoin became Governor of Massachusetts, Laplace explained the mystery of the peculiar motions of Jupiter and Saturn. In Smith’s words, “from that day forward, observation became secondary to calculation throughout planetary astronomy.” Shortly after Bowdoin published his paper on the danger of the universe collapsing inward, Laplace described the first proof of the stability of the system not collapsing outward. “What struck me about reading the Manuels’ book,” Smith declared, “was the sharp difference between the meaning of the word ‘Newtonian’ in the city of Boston in 1780 and its meaning in the city of Paris that same year.”

Turning to Bowdoin’s role as governor of Massachusetts, Robert S. Cohen, Professor of Philosophy and Physics Emeritus at Boston University, considered the conflicting issues surrounding the suppression of Shays’ Rebellion. As Cohen explained, the class struggle and the threat of civil war, demonstrated in what Bowdoin called a “rebellion from below,” are evident in society today. Bowdoin himself admitted that the grievances of rural working class farmers against the rich merchants were justified, but as Cohen emphasized, for this “generous, humanistic man, the priority of preventing civil war dominated the ethical problems of the exploited and aggrieved people.”

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Gerald Holton (Harvard University)



George Smith (Dibner Institute and Tufts University), Silvan Schweber (Brandeis University), Fritzie Manuel, and Robert S. Cohen (Boston University)

Reflecting on the impact of the Manuels as scholars and friends, Silvan Schweber, Professor Emeritus of Physics and the History of Ideas at Brandeis University, compared Frank Manuel's classroom with "cooking" in a jazz session: "There would be animated exchanges between Frank and the students at the end of which it was clear that somehow things had fallen into place for them, a new world had been seen, a new understanding had been obtained, and an eagerness to probe more deeply had been imparted." Schweber went on to note that "Fritzie made possible all that Frank accomplished. The research was carried out jointly; she made sure that the narrative was cohesive, and that all the arguments were consistent and convincing. She could do so because she is an impressive scholar in her own right and fiercely independent in her views."

Responding to the remarks of her colleagues, Fritzie Manuel said that the couple's walks through Boston streets with such names as Hancock, Otis, and Bowdoin inspired the book. When Frank retired, they had the time to pursue an interest far removed from their earlier work. Curiosity led them to the area's rich library resources on the colonial period and the happy discovery of the diverse characters and personalities that inspired the early years of the Academy and the country.

James Bowdoin and the Patriot Philosophers is published by the American Philosophical Society Press. The Academy and the Dibner Institute expressed their gratitude to Mary McDonald, Editor of the APS, who worked with the Manuels to produce what is an important contribution to the history of this nation's founding. ■

Excerpt from Gerald Holton's Presentation

After Bowdoin's Inaugural Oration as the Academy's president on 8 November 1780, he began to submit a slew of scientific papers, which were collected and published also in the first volume of the Academy's *Memoirs*. Near the start of the volume are three "physical papers" of his, the third being the most interesting, "the climax of his scientific achievement," with the remarkable title, "Observation tending to prove, by Phaenomena and Scripture, the Existence of the Orb, which surrounds the whole visible material System [of the heavens]; and which may be necessary to preserve from the Ruin to which, without such a Counterbalance, it seems liable, by that universal Principle of Matter, Gravitation." What Bowdoin does here is to propose that a huge hollow sphere of an undefined substance encases the Sun's planetary system, as well as other such spheres for the outlying parts of the visible universe, and so prevent its collapse.

Why? It is an attempt to deal with an old fear: that the universe will not be a stable unity forever and ever, as is God, its Creator, Himself, but that by the mutual gravitational attraction of the planets and stars they will somehow congeal into one shameful lump. This must not happen. As Frank Manuel wrote in his book *The Religion of Newton*, God is one of order, not of confusion. Newton himself had also been deeply concerned with the possible collapse of the solar system by its own gravitation. He said to David Gregory, "a continual miracle is needed to prevent the sun and the fixed stars from rushing together through gravity;" and elsewhere Newton wrote that

God's hand is continually needed to put again into order the planets' paths after a passing comet had diverted them.

But of course the grand homogeneous sphere Bowdoin imagined would do nothing to help, since as Physics 101 teaches, in its middle there would be no gravitational attraction to help prevent the collapse, because all parts of such a sphere cancel out in their gravitational effect. Perhaps John Winthrop's lectures had not included that awkward fact.

And yet, this problem of a possible collapse of the universe had to be solved some way or other. When Einstein in 1917 came to include "cosmological consideration" when expanding his General Relativity theory, he found to his dismay that his equations did "not allow the hypothesis of a spatially closed-ness [a constancy] of the world," but permitted expansions or contractions of the universe. That seemed to him dangerous, not least because Einstein had long read and revered Baruch Spinoza's *Ethics*, which in Proposition 20 says "It follows that God is immutable (and) all his attributes are immutable." At any rate, Einstein, to assure an immutable universe, put into his equation famously a fudge factor, "an unknown universal constant," called the cosmological constant, which would keep the universe stable. James Bowdoin would have approved. But in 1929, Hubble discovered that the universe is *not* immutable but expanding, and so the cosmological constant fell into disrepair. But again, just a few years ago, it was discovered that this expansion is not steady but is *accelerating*. Ironically, contra

to Newton and Bowdoin, it seems to be tearing itself apart instead of shrinking under mutual gravity. So now some sort of cosmological fix has to be reinserted into the equation. Neither Bowdoin's quasi-religious speculations nor those of the God-filled Spinoza are of any help.

As the great Alexandre Koyré summarized the matter at the end of his book, *From the Closed World to the Infinite Universe*: "The mighty, energetic God of Newton who actually 'ran' the universe according to His free will and decision, became, in quick succession, a conservative power, an *intelligentia supra-mundana*, a 'Dieu fainéant.... The infinite Universe of the New Cosmology, infinite in Duration as well as in Extension, in which eternal matter in accordance with eternal and necessary laws moves endlessly and aimlessly in external space, inherited all the ontological attributes of Divinity. Yet only those—all the others the departed God took away with Him."

So, as scientists, we are now on our own, for better or worse. ■