The Warden of Time and Space

Part 3: Summing Newton up.

Karl W. Giberson

January 1, 2002

In the year 1666 he retired again from Cambridge to his mother in Lincolnshire & whilst he was musing in a garden it came into his thought that the power of gravity (which brought an apple from the tree to the ground) was not limited to a certain distance from the earth but that this power must extend much farther than was usually thought. Why not as high as the moon said he to himself & if so that must influence her motion & perhaps retain her in her orbit.—John Conduitt

How does one evaluate the accomplishments of a figure so large as Isaac Newton, particularly when those accomplishments themselves are beyond all but the most mathematically sophisticated of biographers? How does one chronicle the life of someone who walked so infrequently on ordinary roads and spent so much time on detours of his own devising? And, in the ultimate of biographical challenges, how does one begin to assess the impact of the latter on the former—the essential task of those who would profile the life and times of the truly great?

We can't escape limitations of time and place and intellect, but we can at least enlarge our vision by taking a stroll through the fields and forests of Newton's biographers, seeing him as others have seen him. Undertaken fully, this would require a very long book, but even a rough reconnaissance of the territory may be worthwhile.

Newton had a very beautiful niece who lived with him and ran his household for much of his life, particularly during the time that he was working at the Mint. Her name was Catherine Barton, and in 1717 she married John Conduitt, who succeeded Newton as Master of the Mint in 1727. Conduitt was not a man of science, but he did know a great deal about the latter part of Newton's personal life. Conduitt was thus the first and, for a rather long time, the most influential of Newton's many biographers.

Newton scholar Rupert Hall has produced a marvelous little

volume titled Isaac Newton: Eighteenth-Century Perspectives (Oxford University Press, 1999), which gathers together a number of the most important early biographies of Newton. We must note that the word "biography" had a somewhat different meaning in the eighteenth century than it does now. Biographies were moral tales, omitting their subjects' quirks and foibles. And they were typically quite short, like the accounts in Samuel Johnson's Lives of the Poets, closer to an article or a long essay than a book-length work. (Boswell's life of Dr. Johnson was exceptional on both counts.)

John Conduitt's preliminary "biography" of Newton was written for the Academie Royale des Sciences in Paris and circulated in a variety of forms before finally appearing in print in 1806. Conduitt was no mathematician and did not presume to understand his subject's work in these areas. Conduitt did, however, actually make a request of those who had known Newton that they write down their recollections of the great man. This research was motivated, at least in part, by a eulogy of Newton produced by the French mathematician Bernard Fontenelle (1657-1757).

Employing language and categories that have since become standard, Fontenelle emphasized the distinction between rationalist and empiricist, deduction and induction, to distinguish Descartes from Newton. Remarkably, the comparison is balanced, with Descartes and Newton described as defining the limits of human mental capacity along these two different axes. Fontenelle is worth quoting in some detail on this, particularly for his clear presentation of the difference between deduction or rationalism, and induction or empiricism:

These two great men [Descartes and Newton], who are so strangely opposed to each other, had been closely alike. Both were geniuses of the first order, born to dominate other minds, and build empires. Both being excellent geometers, they saw the need to import geometry into physics. Both founded their physics on geometry which their intellects had framed. But one of them, flying high, sought to take his place at the head of everything, to master first principles by means of a few clear, fundamental ideas in order to descend thereafter to the level of natural

phenomena as their necessary consequences. The other, less bold or more modest, set about his business by relying upon phenomena in order to rise to unknown principles, resolved to accept them to the extent that they followed from the order of things. The former starts from what he clearly understands to find the cause of what he perceives, the latter starts from what he perceives to discover its cause, whether clear or obscure. The former's evident principles do not always lead him to phenomena as they are, the phenomena do not always lead the other to evident principles. The boundaries halting the advance of two men of this caliber along two different lines of thought are not boundaries set by their intellects but by the human mind itself. To this day philosophy texts illustrate the intellectual tension in eighteenth-century European thought as Continental rationalism versus British empiricism. Leibniz, Descartes, and Spinoza are the exemplars of the former; Locke, Berkeley, and Hume, the latter.

Where is Newton, whom Fontenelle placed so clearly and so squarely in the empiricist tradition? At the risk of offending my colleagues in philosophy, I suggest that, because Newton's scientific ideas turned out to be so important and so enduring, he lost his position as a philosopher and was turned over to science. If, on the other hand, Newton's scientific ideas had turned out to be as sterile as those of Descartes, Spinoza, and Leibniz or Locke, Berkeley, and Hume, then his philosophical ideas would today be a part of the standard history of philosophy. Philosophy tends the graveyard of dead scientific ideas.

The first biography of Newton published in Britain was an exceptionally tedious article by Thomas Birch (1705-1766), who knew virtually nothing about mathematics and of whom Rupert Hall says "Birch with pen in hand was a dull dog." Birch's account, which is one long paragraph going on for several thousand words, adds little to Fontenelle except an extensive bibliography. More worthy of note is an extended piece published in 1760 in the fifth volume of the Biographia Britannica. Curiously its author, designated simply as "P" in the original publication, remains unknown to this day. Unlike Birch, "P" was proficient in mathematics and included, for the first time in English, some discussion of Newton's mathematical accomplishments. The

portrait of Newton is, not surprisingly, highly flattering, and many of the details of his life appear to have been taken from Conduitt, whose work had not yet been published. Newton's intellect was described as the finest that humanity had produced; his conduct and character throughout his entire life had been beyond reproach or even criticism.

The first substantial biography of Newton, while still brief by modern standards, was written by Paolo Frisi (1728-1784), an Italian man of letters just now coming into his own as scholars have begun to sort through his rather large manuscript legacy. Frisi's biography of Newton, published in 1778, is important in a number of respects, not least that it was the first biography to be published as a stand-alone piece. All the previous ones were parts of larger works or proceedings of some sort. Frisi's Italian vantage point allowed him to adjudicate the Leibniz-Newton calculus dispute in a manner refreshingly free of nationalist prejudice. And Frisi was the first to present a fully informed account of Newton's writings, which included discussion of Newton's forays into theology and biblical studies.

Although Frisi's work on Newton certainly eclipsed that of his predecessors, he had no way to correct their many errors of historical fact and indeed repeated a number of them. He was also unfamiliar with the details of English history and made a number of mistakes on that score. Moreover, he came to his subject with an agenda that influenced his account. Frisi's Italy was just emerging from the repressive regime that had dominated intellectual life since the condemnation of Galileo in 1633, and he used his biography of Newton to critique the political structures of his time. Indeed, in addition to his life of Newton, Frisi produced biographies of Galileo and of another thinker, Bonaventura Cavalieri, whose scientific work had also been suppressed by the church. Each of these biographies served as a literary trojan horse to argue that creative advances could only occur in an atmosphere of freedom.

The eighteenth century had witnessed the mythologization of Isaac Newton. The nineteenth century was not so kind to England's greatest intellect. Early Victorian and even some pre-Victorian writers were quite put off by Newton's heretical

Unitarianism, noticeably missing from all the earlier accounts, which make Newton a good Anglican although quite "open-minded." In 1821 an article on Newton was published by the French physicist Jean Baptiste Biot (1774-1862) that, for the first time, moved beyond simple adulation of its subject.

And not long thereafter a startling new perspective on Newton emerged from an unlikely source when, in 1835, Francis Bailey published his Account of the Revd. John Flamsteed. Flamsteed, you'll recall, was the great observational astronomer whose measurements of the motions of the celestial bodies were used by Newton to check the predictions of his emerging theory of universal gravitation. Newton's exceedingly shabby treatment of Flamsteed was exposed in some correspondence that Bailey discovered. He soon became convinced that previous biographers of Newton had been far too generous with their subject.

Biot and Bailey mark a watershed in Newton studies. By taking the fundamental step, now so commonplace, of actually reading original documents, they joined other scholars whose work constituted a critical transition in the understanding of biography.

The only biographer after Bailey who treated Newton in a uniformly positive manner was Sir David Brewster (1781- 1868), whose 1855 Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton was, despite its lack of critical distance, the most definitive account of its subject in the nineteenth century. Hall calls it the "obvious precursor to all subsequent lives of Newton," primarily for its completeness, depth, and presentation of technical matters (Brewster was a celebrated expert on optics).

The highly flawed, sub-Victorian Newton of the nineteenth century emerged not from Brewster's superb hagiography but rather from a series of articles on Newton written by the great logician Augustus de Morgan (1806- 1871). It was de Morgan who established conclusively that Leibniz had not plagiarized Newton in his discovery of the calculus. Leibniz had indeed discovered the same calculus as Newton, neither influenced by the other—a coincidence that Brewster, and indeed all who had preceded him, including Newton himself, found too incredible to accept.

Despite the successes of nineteenth-century scholars in tarnishing the gilded Newton they had inherited from the eighteenth century, a full and clear picture of their subject was still a long ways off. In addition to the more or less standard biographies of Newton, catalogues of his writings and correspondence were also being published, generally with annotation and commentary. Such catalogues, of course, would include papers on alchemy, biblical prophecy, theological controversies (like the Nicene disputes about the Trinity), and the like. These documents were dismissed by the cataloguers as so much dross. "Newton's manuscripts on alchemy are of very little interest." Some scholars—although not Brewster— declared that these papers, many of which were produced by Newton in his old age, were the products of senility. Another century was to pass before the significance of these works for understanding Newton began to be established.

Surprisingly, the primary document for assessing the "nonscientific" Newton is a 1936 publication by Sotheby's auction house titled Catalogue of the Newton Papers sold by Order of the Viscount Lymington. To auction off something so esoteric as miscellaneous unpublished papers of Newton required that adequate and "exciting" descriptions of the documents had to be developed in preparation for their auction. This document preceded the dispersal of a great many of Newton's papers to scholars and collectors around the world, some of which have since become lost. A trunkful of Newton's papers was purchased at auction by John Maynard Keynes, the great economist, himself dubbed the Newton of that dismal science.

Keynes was astonished at the apparition that emerged from that trunk. Newton's voyages beyond the boundaries of science, into the murky seas of theology, alchemy, and ancient history, clearly were not idle diversions or the wanderings of a senile mind, temporarily unhitched from its moorings. Newton's nonscientific papers had been produced throughout his life, with the same consistency, effort, and attention to detail as his scientific work. It appeared that someone unfamiliar with the standard interpretation of Newton could examine his vast legacy and conclude that he was an alchemist who wrote a book on mathematical physics, or a theologian who wrote a book on

optics.

In a ceremony at Woolsthorpe, Newton's boyhood home, on Christmas Day 1942, three hundred years to the day after tiny premature Isaac had so inauspiciously entered history, John Maynard Keynes addressed a small group of scholars. Keynes had been digesting the Newton papers he had purchased at auction and was speaking, in the midst of World War II, as perhaps the only person who had anything approaching a complete picture of the complex Newton. His comments are striking, provocative, even disturbing:

In the eighteenth century and since, Newton came to be thought of as the first and greatest of the modern age of scientists, a rationalist, one who taught us to think on the lines of cold and untinctured reason. I do not see him in this light. I do not think that any one who has pored over the contents of that box which he packed up when he finally left Cambridge in 1696 and which, though partly dispersed, have come down to us, can see him like that. Newton was not the first of the age of reason. He was the last of the magicians, the last of the Babylonians and Sumerians, the last great mind which looked out on the visible and intellectual world with the same eyes as those who began to build our intellectual inheritance rather less than 10,000 years ago. Isaac Newton, a posthumous child born with no father on Christmas Day, 1642, was the last wonder-child to whom the Magi could do sincere and appropriate homage.

The revelation that Keynes received and passed on has played an important role in subsequent biographies of Newton, providing a much clearer picture of how he spent his time, a first step toward a better understanding of the man himself. Among a number of excellent works on Newton in recent decades, Richard Westfall's monumental biography Never at Rest, published in 1980, is regarded by many scholars as the definitive account for our time. But even Westfall, who spent more than 20 years getting to know Newton, has expressed his concerns about the proper assessment of his remarkable subject. Newton remains a singular figure.