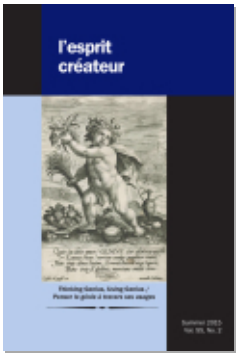
View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Apollo

Fontenelle's Newton and the Uses of Genius

Simon Schaffer



L'Esprit Créateur, Volume 55, Number 2, Summer 2015, pp. 48-61 (Article)

Published by Johns Hopkins University Press
DOI: 10.1353/esp.2015.0031

For additional information about this article
http://muse.jhu.edu/journals/esp/summary/v055/55.2.schaffer.html

Access provided by Cambridge University Library (1 Oct 2015 17:19 GMT)

Fontenelle's Newton and the Uses of Genius

Simon Schaffer

Albion, qui prétend nous servir de modèle,
Croit que Locke & Newton n'eurent jamais d'égaux;
Le Germain, que Leibnitz compte peu de rivaux;
Et nous que l'Univers n'aura qu'un Fontenelle.
Prodigue en sa faveur, le Ciel n'a point borné
Les présents qu'il lui fit aux seuls dons du génie
Vers addressés à M. de Fontenelle par M. de Crébillon,
Académie Française, August 25, 1741[1]

THE CAREER AND STATUS of Bernard de Fontenelle (1657–1757), man of letters, administrator and academician, nephew of Pierre Corneille, and protagonist of the quarrel of the Ancients and Moderns, help illuminate the shifting sense of the notion of *génie* at a conjuncture of decisive transformation in the Republic of Letters of which he was a conspicuous ornament. Made secretary of the Académie Royale des Sciences in 1697, thereafter a dominant figure in the networks of correspondence and patronage that characterised the sociability of the sciences and their public image, he was closely involved in the transformations of court power and state mobilisation of the sciences as they affected the standing of eminent natural philosophers. Scholars have taken the view that in this period, genius somehow shifted syntactically from *avoir* to *être*. Earlier in the classical age one was possessed by, or possessed, a genius; later in the Enlightenment one could instead be or live as a genius.[2] In reflections on the genius cult included in his notorious *De l'esprit* (1758), Helvétius complained that "many authors have written on genius: most considered it as a fire, an inspiration, a divine enthusiasm, and these metaphors have been taken as definitions."[3] This shift between property and persona, often expressed through the imagery of heavenly fire and the faculties of reason and spirit, was but one of many linked forms of cultural infringement and boundary transgression. Crébillon *père*'s poetic celebration in 1741 of Fontenelle's half-century membership in the Académie Française neatly linked the conventional notion that potent genius was a celestially imparted gift with the troubles of the fiercely parochial assignment of genial status to national heroes. Relations between academies, salons, and the authority of the crown often made these linkages between the sources of genius and its heroic status into urgent matters of controversy. Fontenelle's lengthy tenure of principal positions within the academies, espe-

© L'Esprit Créateur, Vol. 55, No. 2 (2015), pp. 48–61

cially through his sixty-nine *éloges* of recently deceased members of the Académie Royale des Sciences produced between 1699 and 1739, helped make him both emblem and protagonist of the cultural uses of genius. The idiom of possession and heroism associated with the notion made it an effective, though often troublesome, resource in the management of authority and public status within the communities of letters and the sciences.

Attention to Fontenelle's academic reflections on the role of genius is apt not least because Fontenelle himself was long associated with this role, especially its implications for the capacity of genius in the realm of the sciences, not solely the labours of poets and painters. In the Moderns' periodical *Le Mercure galant* (1688) the academician Charles Perrault, promoter of a range of schemes for the academic regulation of arts and sciences, helped motivate the polemic with the Ancients in a poetic epistle dedicated to Fontenelle. The verse urged the image of genius as Promethean fire, rather than the imitative convention of the classics. Genius was also proper to the sciences, capable of illuminating "that dark night / where secret Nature is hidden from our eyes, / He sees all the springs that move the Universe."[4] Decades later, in his academic eulogy for the recently deceased Fontenelle, the diplomat and playwright the Duc de Nevers evoked the most celebrated of the departed writer's eulogies, that of Newton, in which a comparison had been made between "the greatest genius of England" and Descartes, "the greatest genius of France." The Duke explained how Fontenelle had refused to accept Newtonian principles in astronomy, but had nevertheless allegedly imitated Newton's genial conduct: "it is thus that M de Fontenelle depicts for us the great Newton, as moderate as he was sublime, and such was M de Fontenelle himself."[5]

French elite commentaries on the moral and epistemic authority vested in genius within the sciences owed much to Fontenelle's formulation and embodiment of the doctrine, especially in the eulogy of Newton, delivered at the Académie Royale des Sciences on November 12, 1727. Astute remarks on Newton's moral conduct, the somewhat dictatorial power exercised over his nation and his contemporaries, his education and his relation with the publicity networks of the Republic of Letters, and the pointed juxtaposition of the geniuses of France and of England, all became key elements in this debate. Fontenelle's eulogy was longer and contained more biographical detail than most; it also provided the secretary with an opportunity to use the Englishman's doctrines of light and colour and of mechanics and astronomy to offer his own views on both experimental method and the status of causal mechanisms in cosmology. This text was decisive in the remapping of the polemical boundaries of the sciences within and beyond the boundaries of the

Académie.[6] A range of different testimonies all evidence the pervasive presence of Fontenelle's themes and the highly mutable quality of his use of genius as a way to make sense of the work of the sciences. Voltaire's *Lettres philosophiques*, composed between his residence in London in spring 1728 and his return to Paris the following year, retorted to what he saw as overweening academic control of natural philosophy. Voltaire used the language of celestial inspiration, mixed with the imagery of greatness: "If true greatness consists in having received from heaven a powerful genius, and in making use of it to enlighten oneself and others, a man such as Mr. Newton, such as is scarcely found in ten centuries, is truly the great man." Voltaire simultaneously associated this genius with the widest possible community of learning: "a genius such as Mr. Newton belongs to all the academies of Europe, because everyone had much to learn from him."[7] In his polemical denunciation of Newtonian cosmology and optics, a riposte to Voltaire's Newtonianism published in 1743, Fontenelle's correspondent the Jesuit natural philosopher Louis-Bertrand Castel extended the academician's comparison of French and English genius to explain the contrast with Cartesianism: "I believe it is in England itself that it is said that for equal geniuses the Frenchman builds high and the Englishman deep." National genius turned into individual philosophical style. "The French genius" of Descartes had confined himself to a happy and easy mechanical system; the English genius "almost dared to attempt the very work of God."[8] The comparison stayed in common use, both to revindicate Cartesian virtues and to define more precisely the character of genius in the sciences. In his well-known 1765 eulogy of Descartes, the eminent orator Antoine-Léonard Thomas insisted that the self-generated genius of the Frenchman deserved praise for making Newton possible. The Frenchman "perhaps had in breadth what Newton had in depth; Newton gave to the smallest details the imprint of genius."[9]

The range of uses of genius in such public statements about the development and fate of natural philosophy begins to demonstrate how, at a critical period in French literary and academic debate on the claims of the sciences, questions of authorship and intellectual property were central in the establishment of the term's sense. Genius might be seen as an external power, and attributed to an entire nation or institution. The concept became especially ambiguous, therefore, when granted to a heroic individual. But these ambiguities could be used to manage the major troubles of invention, discovery or authority. Sometimes the heroic status would be assigned to isolated, individual practitioners, and at others to the social institutions of the sciences. These were major themes of public conflict in an age wracked by priority disputes, fights about

rival claims to the first invention or discovery of a major innovation. Natural philosophers took part in such fights because the principles of academic conduct frequently granted them property rights in publications or artifacts that they might legitimately claim to have invented or discovered. Voltaire asked who owned Newton's genius. Castel asked about the role of national style in the development of Newtonianism. Thomas asked about the credit due to Newton as synthesizer and to his French predecessor as a necessary condition for such synthesis. Helvétius joined in the debate: whoever observed the progress of the human mind, he argued in his reflections on the achievements of Newtonian astronomy, "sees in each age five or six men of spirit in orbit round the discovery the man of genius makes." No doubt the arrival of such a man made an epoch, but it was crucial to understand the institutional and biographical circumstances that made this epochal achievement possible.[10]

Several scholars have identified Fontenelle as a key author of this doctrine. In his brilliant 1957 essay on Fontenelle's historiography of the sciences, Georges Canguilhem argued that Fontenelle celebrated the Cartesian rupture in the history of the sciences and defended the claims of the Moderns, not because of a sudden outburst of genius but rather because of novel methods and organisations. The institutional and historicist comparison across this great divide was possible precisely because, as Canguilhem put it, "Fontenelle invents and calls upon a kind of principle, truly Cartesian in form and spirit, a principle of the conservation of genius." Fontenelle himself explained that Descartes was "a great man driven by his genius and by the superiority that he felt," who "departed from the Ancients solely to follow that very same reason that the Ancients followed." Discovery and invention were not simply to be attributed to unique individuals, but became part of the claims of the communal labours of the academies and salons that now aimed to govern and direct inquiry. This project gave the concept of genius and its inflexions many of its uses in the strenuous literary labours Fontenelle discharged within the reformed Académie Royale des Sciences.[11]

The eulogies Fontenelle composed and delivered as secretary were both an emblem of, and a commentary upon, the relation between state power and academicians' social role. Fontenelle explained how the massive overhaul of the Académie Royale des Sciences' structure in 1699 was accompanied by an explicitly new aim to shift from hieratic secrecy to the public realm. Scholarly abstruseness "naturally associated with great knowledge" might also stem from "the ardour of a lively and effervescent genius," but academic public policy demanded this obscurity be overcome.[12] The texts were printed in the *Histoire* of the Académie and from 1708 were published in separate collec-

tions, widely distributed and often based on somewhat systematic questionnaires dealing both with family and career, with upbringing and achievement.[13] The eulogies' precise wording was a matter of international concern, notably in the fierce calculus priority dispute between Newton and Leibniz over who had first invented the mathematical study of change. In summer 1717 Fontenelle answered one English critic of his eulogies of a range of mathematicians on this issue: "I promise you I will change my language whenever there is an opportunity." At the end of 1718 Newton even contemplated sending a letter complaining about Fontenelle's formulation of priority in mathematical invention: "Mr Fontenelle was not sufficiently informed."[14] In his reworking of earlier models of encomia, Fontenelle used the range of senses of genius, as imposed externally or as part of the individual's innate character, as collective and singular. It has been commonly argued that the function of such texts was at least partly to define a properly social role for the academicians at a moment when that role was much in flux.[15] Semantic usage was hardly consistent: sometimes a specific man of science was a genius, sometimes he possessed or was possessed by genius, sometimes a specific discipline or nation had its own genius. Fontenelle's aim was to define the boundaries of scholarship and to construct a reliable account of the development of the sciences as collective action. Mathematics and the sciences had their own kinds of genius. "The genius of mathematical truths and that of profound erudition are opposed," Fontenelle explained, while the calling of the military career was "entirely opposed to the genius that makes one love sciences and study."[16] The epochal transformation that Fontenelle located in the achievements of Galileo and Descartes was certainly marked by genius. Galileo was "a rare genius, whose name is seen at the head of some of the most important discoveries on which modern philosophy is based."[17] But the transformation must not be understood as a sudden irruption of unique genius. "The destiny of all great geniuses" meant they erred in many matters in which they were innovators, especially in sciences such as mechanics. "The theory of mechanics has been treated by a large number of able people of whom some were geniuses of the first order," but a long time must pass in the study of simpler cases before anything like a general science could be constructed. This was "the immutable destiny of all the Sciences."[18]

The 1727 eulogy of Newton was a crux in this project, since it seemed especially evident that the great English natural philosopher deserved genial status, especially since the range of senses granted the status of genius could ingeniously be used to manage the uniquely fraught conditions of French academic response to Newton's achievements. The eulogy became a text that

contributed decisively to the polemical program of distinction between Newtonian and Cartesian natural philosophies, and an indispensable source for all subsequent eighteenth-century biographies. The text of the eulogy, in French and English versions, was very widely distributed, and it ran through several independent editions in Paris and London.[19] There had been newsworthy rumours of Newton's death well before his actual demise. As early as May 1718, the Lausanne philosopher Jean-Pierre de Crousaz had responded to these rumours by putting himself forward in Newton's place at the Paris Académie.[20] When Newton did indeed die, Fontenelle at once contacted London colleagues such as the Huguenot priest Jacques Serces and established exchanges with Newton's own nephew, successor as director of the Royal Mint and hagiographer John Conduitt, demanding details of the protagonist's life and career, including "the first marks of genius that he gave." The detailed if tense correspondence between Fontenelle and Conduitt has given scholars rare insight into the mode of composition of an exemplary eulogy.[21] For example, Conduitt told Fontenelle that the young Newton started on mathematics to check the veracity of judicial astrology, just as the great French astronomer Jean-Dominique Cassini had done. According to Conduitt, Newton moved straight from a cursory reading of Euclid to the challenges of Cartesian geometry "and made himself master of it by dint of genius and application without going through the usual steps or the assistance of any person." Fontenelle characteristically adapted the passage to his own purposes and omitted any reference to astrology, choosing instead to stress how the English prodigy had so rapidly "leapt all at once" to the greatest achievement of French mathematics.[22] In this and cognate passages, Fontenelle repeatedly made sure that his audience understood Newton as possessed of genius. In discussing Newton's direction of the Royal Mint, for example, the eulogist explained that "his genius extended to purely political affairs," and elsewhere he used this case to underline the immense utility of learned men of science for the welfare of the state.[23]

Precisely these issues of civic utility and the sciences' public role occupied the most significant moments in the Newton eulogy and its uses of genius. Fontenelle deliberately compared the different approaches of Descartes and of Newton: "the two of them were geniuses of the first order, born to dominate other minds and to found Empires."[24] The imperial language, and the artful comparison of these two kinds of genius, at once drew attention and some hostility from the eulogy's readers, notably in London. In 1729 both Castel and Voltaire reported on the Royal Society's fury that Fontenelle had dared juxtapose the French and English geniuses, while Con-

duitt told his colleagues that Fontenelle "has neither abilities nor inclination to do justice to that great man, who has eclipsed the glory of their hero Descartes."[25] In 1736 Fontenelle used dramatic language to describe the struggle he saw between Newton's system of attraction and the plenist Cartesian cosmology of celestial vortices, prophesying ultimate French victory. "Insofar as one can judge a future in which fortune's accidents have less a role than any other, the end of the war could be advantageous to this [Cartesian] System."[26] It was evident that a major battlefield in this war was genteel society. Newton's works had even allegedly replaced the romances of Mlle. de Scudéry in fashionable taste.[27] Genius was therefore useful as concept, since it might explain Newton's virtues and his vices in a more modish style. It was insinuated both that Newton had in fact failed to exercise sufficient attention to the diffusion of learning and knowledge, and that he had exercised too much power over the empire of science. Fontenelle thus implied that in the case of his early work on infinitesimal calculus Newton should have "naturally hurried to distribute his treasures, to assure himself of true ownership, which consists in discovery. But he contented himself with the riches, and did not concern himself with the glory." This reflexion on the ills of overly private modesty was certainly not drawn from Conduitt's biography but was contributed directly by Fontenelle himself. Similarly, the eulogy contained several passages that could easily be read as ironising on the great man's triumph, "as if it were already consecrated by the respect of a long series of ages […] he saw his own Apotheosis."[28] The flexible notion of genius helped because it simultaneously clarified the visionary successes of science, the evils of seclusion, and the sins of tyranny. Thus there was a strong sense, both in the Newton eulogy and elsewhere in Fontenelle's campaigns for the sciences' public standing, that the property of genius that would typically confine it to specialists and hermetically remove it from wider understanding was a major pathology of the current condition of the politics of knowledge. In a 1708 essay on the utility of mathematics and physics, Fontenelle already explained that the sciences were the province of the few, their effects invisible to most, barely recognised save with suspicion. Artisans whose achievements in fact relied on geometers' achievements were unwittingly moved, "almost as the body is by a Soul that it does not know; the rest of the world is even less aware of the Genius that governs the business, and the Public rejoices in the success it has had only with a kind of ingratitude."[29]

Just as Fontenelle had already established that obscurity and seclusion might well stem from the difficulty and putative modesty of genius, so he condemned the lack of communication of specialist inquiry's successful results to

the public. Conduitt offered Fontenelle no details on the structure and composition of Newton's masterpiece, *Principia mathematica*, and the eulogist relied on his own prior work in the *Histoire* to explicate its significance. It was in this context that Fontenelle introduced his comparison of Newton and Descartes, and that he most explicitly launched his critique of the English mathematician's deliberate obscurity. "This book, where the deepest geometry serves as basis for an entirely new physics, did not at first gain all the fame it deserved, and that it would have one day." It was insinuated that Newton had consciously abbreviated his exposition, derived consequences from premises without clear demonstration, and demanded too much expert study of the revelations of genius presented in the work.[30] Nor was this a new attack. As early as 1704 Fontenelle had grumbled that the mathematics of infinitesimal analysis had been "a kind of mystery and so to speak a cabalistic science" confined to the few geniuses who could divine its sense. Newton was explicitly criticised since he had refused to publicise his method for finding the shape of the solid of least resistance.[31] Passages taken from Conduitt on Newton's modesty could therefore easily be transmuted into waspish remarks about a regrettable failure to discharge the proper duty of the public man of science. In such moves, Fontenelle could also draw on a widespread idiom within his academy that damned mathematical geniuses such as Newton for their deliberate obscurantism. In 1718 Fontenelle's colleague, the eminent academician René-Antoine de Réaumur, then charged with major government programs in industrial surveys and natural history, expressed exactly the same concern to his familiar Lausanne correspondent Crousaz: "it is inconceivable that pleasure has been taken in enveloping in shadows what is most luminous in the sciences: this is not to the honour of men's genius."[32] Réaumur shared with Fontenelle the strong sense that deliberate obscurity was a sign of charlatanism, even if also an apparently indispensable accompaniment of genius itself.

Just as the uses of genius allowed a slippage between the moral virtues of modesty and the ills of elite inaccessibility, so too they nourished an intriguing rhetorical movement between praise of epistemic authority and denunciation of social authoritarianism. Once again, the Newton eulogy offered several occasions for Fontenelle to exploit this strategy. He was already well aware of the habit of Newton and his allies at the Royal Society of London to seek to police their repute and the news culture of the Republic of Letters, as in their rapid response in 1717–18 to any hint that Newton had not established his absolute priority in the invention of the analytical calculus. Both in optics and in astronomy, the 1727 eulogy carefully navigated the puzzle of genius' authority. In the case of experimental optics, for which Fontenelle used his

own knowledge of Newton's writings and the reviews printed in France, he hinted that the experimental method was full of "labyrinths" and was hard always to follow exactly, and thus replications of Newton's experimental claims could be expected to fail. This was a clever means of explaining, or explaining away, the uneven reception of Newton's doctrine that white light was composed of a number of different primordial colour-making rays and that no such ray could ever be further decomposed by a prism. In the 1670s the outstanding Paris experimenter Edmé Mariotte had used a prism apparently to decompose an allegedly primitive ray. This result had for a generation helped block French acceptance of the Newtonian doctrine of light and colour.[33] Fontenelle explained why, in terms that appealed to the challenges of experimental genius, "the separation of these rays was so difficult that when Mr. Mariotte undertook it following the first reports of Mr. Newton's experiments, he failed, he who had such a genius for experiment and had succeeded so well in so many other subjects." In this case, the unique qualities of Newton's genius were used to explain why his optical project remained hard to confirm: "the coping stones he left in this imperfect building could barely be employed only by hands as skilful as those of the first architect."[34]

These remarks on Newton and Mariotte in the eulogy Fontenelle composed in autumn 1727 were written in the wake of Paris experiments that at last seemed successfully to replicate the original prism trials. A protagonist in these experiments in Newton's favour was the Paris lawyer and anglophile Nicolas Gauger, who at the very same moment as Fontenelle's eulogy produced a long account of Newtonian optics and its triumph. Gauger firmly denounced Mariotte as a seeker of personal fame, careless of the need to examine the Newtonian system in detail. But the lawyer also used Newton's apparently special status as genius and hero to exempt the Englishman from the common custom of "the Republic of Letters, a land of liberty," in which "we are no longer in the age of authorities." Gauger argued that "the rank that his merit has given him in the Republic of Letters demands that authors who wish to attack him […] should do so with much moderation and self-control, and have a respect for this illustrious savant that one does not at all have for ordinary men, and even more today than in his lifetime."[35]

This was exactly the version of authoritarianism against which Fontenelle began to direct his ire in his eulogy. In a range of cases, he diagnosed controversies in which "the strongest reasons were on one side and on the other Mr. Newton's name": the power of that name too often carried the day.[36] Those who continued to doubt the authority of Newton's prismatic optics divined a strong connection between the power of Newton's repute and the embodiment

of that power in the very instruments he demanded be used. Thus Crousaz told the French translator of Newton's *Opticks* that Newton had insisted that prisms be seen as filters of light: "I have been on my guard against the prejudice towards which such a great name might draw me," leading the Swiss philosopher to experiments that went against the English optical theory.[37] The Jesuit natural philosopher Castel echoed these arguments: "Newton supposes that the prism […] is an infallible criterion that decides all questions in the last instance." Such claims to infallibility, so Castel argued, unwontedly turned philosophical debate into something like a duel. He reckoned that the English "absolutely wish that we take as facts and experiments everything it pleased their master to put on the market." He insisted that "this is highly imperious, for facts are not to be denied, and their manner of philosophising becomes an affair of honour, about which the least difficulty cannot be raised with them without giving them a denial like those concerning which the world's madness demands that a sword be put in one's hand."[38]

Fontenelle's eulogy provided plentiful resources for such denunciations of the ills that accompanied Newton's great authority. As several commentators have pointed out, at the centre of that eulogy was a link Fontenelle sought to forge between Newton's imperium and the deluded metaphysical notion of "attraction," the mysterious capacity of bodies to act instantly at a distance across empty space along the line joining their centres, a notion expelled by rational Cartesian mechanism and now tragically reintroduced into natural philosophy.[39] "The perpetual use of the word attraction, sustained by a great authority, and perhaps also by the inclination that it is believed Mr. Newton had for the thing itself, at least familiarises readers with an idea banned by the Cartesians."[40] Fontenelle offered a social analysis of how the notions of empty space and attraction had gained ground, even among the French. He exclaimed his incredulity that it should ever have become necessary to "pray to Heaven" to keep the French from such notions, since they seemed so disposed to clarity in philosophy and to resistance towards foreign imports.[41] However, according to Fontenelle, the conduct of the Royal Society under the genius who led it had turned that institution into little more than a militant sect: "they recognised him as their chief, and as master, no rebel dared rise up." The English were distinguished by their habit of rallying behind such elevated heroes.[42]

Fontenelle's correspondents provided him with fresh resources for the argument. When his colleague Pierre Rémond de Montmort visited England in 1715, so Fontenelle understood, the powers of the Royal Society had failed to seduce him to accept the doctrine of attraction, even though Montmort himself

confessed that despite his typically French resistance to matters that came from abroad, he maintained an "admiration that I possess, along with the whole of Europe, for that vast and prodigious genius" embodied in the Society's president.[43] This admiration was by no means enough to preserve Montmort from the fight. In the wake of Fontenelle's eulogy for Newton, the eminent Swiss mathematician Jean Bernoulli supplied copies of Montmort's letters that confirmed "the weakness common to the English nation of mutually elevating themselves." Bernoulli thus counselled Fontenelle that he must be even more sceptical about Newton's apparent moral virtues: "I leave you to judge from all this whether what the English are peddling to us about the greatness of Mr. Newton's soul must be taken as current coin."[44] Castel picked up the same theme explicitly. By emptying celestial space, Newton had apparently set the planets at liberty, yet it was always necessary to be distrustful of those who proclaimed such freedom, since they too often reimposed "weighty chains of the most insupportable tyranny." The political comparison was clear: "Will Newton be the Cromwell of Philosophy?"[45] For Fontenelle and several of his readers, the question of the link between the elevated and genial status of the great man and the social implications of his conduct remained central. Thus in a very late essay in defence of Cartesian cosmology, Fontenelle returned directly to his principal claim about the institutional and moral resources at work in natural philosophy: "Newtonianism has gained such authority, or such vogue, that it deserves to be attacked directly and in all forms."[46]

Fontenelle's eulogy of Newton and its associated idioms of praise and polemic provide an important exemplar of the uses of the concept of genius in the early Enlightenment. Constructed with characteristic agility, the work unambiguously associated genius with capacities such as invention, originality, and heroic power. In his widely read 1719 essay on poetry and painting, Fontenelle's eminent academic colleague Jean-Baptiste Dubos emphasised the innate qualities of genius and that each profession had its own genius, arguing that "Nature wished to distribute its talents between men so as to render them necessary, one to another."[47] One of the most distinctive features of Fontenelle's use of such arguments was his taking seriously the responsibility of genius to these demands of cultured and somewhat egalitarian sociability. It emerged, especially in Newton's case, that the virtues of genius, its idiosyncrasies and its powers, could all too easily transmute into the vices of obscurantism and tyranny. These transmutations had direct implications for the embattled condition of natural philosophical doctrines, in projects such as experimental optics and gravitational cosmology. At least as significantly, they also mattered for rival models of the good conduct of the social order of

the realm of knowledge much more widely and politically. Fontenelle's late eighteenth-century imitator at the Société Royale de Médecine, Vicq d'Azyr, would put the point in characteristically pithy terms: "The great names repeated admiringly by every voice are those that least need our eulogies; they hold a place in the history of the sciences." The eulogist's proper aim was to unfold the entire social system of the production of knowledge: "independent of the genius who watches over scientific progress and causes it to move forward, do we not owe a debt of gratitude to those hard-working men who are concerned with details, and without whose activities the edifice would never be built?"[48]

University of Cambridge

Notes

1. *Œuvres complettes de Crébillon* (Paris: Libraires associés, 1785), 3:215.
2. Michel Delon, *L'idée de l'énergie au tournant des lumières* (Paris: PUF, 1988), 492; Georges Matoré and Algirdas Julien Greimas, "La naissance du génie au 18e siècle: Étude lexicologique," *Le Français moderne*, 25 (1987): 259.
3. Claude Adrien Helvétius, *De l'esprit* (Paris: Durand, 1758), 475; Christof Schöch, "Le temps du génie: Attributs temporels du génie créateur et idées sur la temporalité au XVIIIe siècle français," *Revue des sciences humaines*, 303 (2011): 144. All translations are my own.
4. Charles Perrault, "Le génie: Epistre à Monsieur de Fontenelle," *Parallèle des anciens et des modernes* (Paris: Coignard, 1688), separate pagination, 28–29; Simone Mazauric, *Fontenelle et l'invention de l'histoire des sciences à l'aube des Lumières* (Paris: Fayard, 2007), 177–81.
5. "Extrait de la réponse de M. le Duc de Nivernois au Discours de M. Séguier," in Fontenelle, *Œuvres* (Paris: Brunet, 1758–66), 11:xlvi–vii.
6. Claudine Pouloin, "L'éloge de Newton par Fontenelle: L'éthique académicienne en question," *Revue Fontenelle* 8 (2010): 159–80.
7. Voltaire, *Lettres philosophiques* (Amsterdam: Lucas, 1734), 105, 278; Stephen Gaukroger, "The Académie des Sciences and the Republic of Letters: Fontenelle's Role in the Shaping of a New Natural Philosophical *Persona*, 1699–1734," *Intellectual History Review*, 18 (2008): 388.
8. Louis-Bertrand Castel, *Le vrai système de physique générale de M. Isaac Newton* (Paris: Simon, 1743), 18, 155.
9. Antoine-Léonard Thomas, *Éloge de Descartes* (Paris: Regnard, 1765), 66–67; Delon, 497.
10. Helvétius, 478.
11. Georges Canguilhem, *Études d'histoire* et *de philosophie des sciences* (Paris: Vrin, 1994), 55–56; Fontenelle, preface to Marquis de l'Hôpital, *Analyse des infiniment petits,* 2nd ed. (Paris: Montalant, 1716), vi; Mazauric, 273–76.
12. Fontenelle, *Œuvres*, 3:391; "Éloge de Parent," *Histoire de l'Académie Royale des Sciences* (1716), 91.
13. Charles Paul, *Science and Immortality: The Éloges of the Paris Academy of Sciences* (Los Angeles: U of California P, 1980), 13–14; Mazauric, 85–86; Suzanne Delorme, "Des éloges de Fontenelle et de la psychologie des savants," in *Mélanges Georges Jamati* (Paris: CNRS, 1956), 96–98.
14. Isaac Newton, *Correspondence*, 7 vols. (Cambridge: Cambridge U P, 1959–77), 6:394–5 and 7:17–20; Poulloin, 161.

15. Mazauric, 165–66; Paul, 29; Volker Kapp, "Les qualités du scientifique et le prestige social des sciences dans les éloges académiques de Fontenelle," in *Fontenelle*, Alain Niderst, ed. (Paris: PUF, 1984), 442; Gaukroger, 391.
16. Fontenelle, "Éloge de Bianchini," *Histoire de l'Académie Royale des Sciences* (1729), 106; "Éloge de Dufay," *Histoire de l'Académie Royale des Sciences* (1739), 79.
17. Fontenelle, "Éloge de Viviani," *Histoire de l'Académie Royale des Sciences* (1703), 137–38; Leonard Marsak, "Bernard de Fontenelle: The Idea of Science in the French Enlightenment," *Transactions of the American Philosophical Society*, 49 (1959): pt. 7, 39, n.41.
18. Fontenelle, "Sur le jet des bombes," *Histoire de l'Académie Royale des Sciences* (1707), 121; *Histoire de l'Académie Royale des Sciences* (1725), 87.
19. Charles Coulston Gillispie, "Fontenelle and Newton," in *Isaac Newton's Papers and Letters on Natural Philosophy,* I. Bernard Cohen and Robert E. Schofield, eds., (Cambridge: Cambridge U P, 1958), 442; Alfred Rupert Hall, *Isaac Newton: Eighteenth-Century Perspectives* (Oxford: Oxford U P, 1999), 56; Patricia Fara, *Newton: The Making of Genius* (London: Macmillan, 2002), 132.
20. Crousaz to Réaumur, May 24, 1718, Académie des Sciences, Archives, dossier Crousaz, 67/13.7.
21. Rob Iliffe, ed., *Early Biographies of Isaac Newton* (London: Pickering and Chatto, 2006), 1:66–67; Michael Freyne, "*L'éloge de M. Newton* dans la correspondance de Fontenelle," *Corpus: revue de philosophie,* 13 (1990): 75–77; Pouloin, 185.
22. Iliffe, 89–90, 98; Fontenelle, "Éloge de Newton," *Histoire de l'Académie Royale des Sciences* (1727), 151–52; J. B. Shank, *The Newton Wars and the Beginning of the French Enlightenment* (Chicago: U of Chicago P, 2008), 168–69.
23. Fontenelle, "Newton," 165; "Éloge de Lagny," *Histoire de l'Académie Royale des Sciences* (1734), 110; Mazauric, 155.
24. Fontenelle, "Newton," 160.
25. Voltaire, 63; Castel to Fontenelle, February 1729, in Fontenelle, *Œuvres*, 11:168; Iliffe, 1:138.
26. Fontenelle, "Sur l'accord des deux lois de Kepler dans le sistème des tourbillons," *Histoire de l'Académie Royal des Sciences* (1736), 97; Marsak, 23.
27. Mary Terrall, *The Man who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment* (Chicago: U of Chicago P, 2002), 85.
28. Fontenelle, "Newton," 153, 166; Pouloin, 169.
29. Fontenelle, *Histoire du renouvellement de l'Académie Royale des Sciences en 1699* (Paris: Boudot, 1708), sigs. Aii^{v}–Aiii^{r}; Mazauric, 145–46.
30. Fontenelle, "Newton," 154.
31. Fontenelle, "Éloge de Guillaume-François de l'Hôpital," *Histoire de l'Académie Royale des Sciences* (1704), 128, 131; Pouloin, 165–68.
32. Réaumur to Crousaz, June 2, 1718, Bibliothèque Communale et Universitaire de Lausanne, fonds Crousaz, 9:265–69.
33. Henry Guerlac, *Newton on the Continent* (Ithaca: Cornell U P, 1981), 98–99.
34. Fontenelle, "Newton," 161, 163.
35. Nicolas Gauger, "Lettre à M. l'abbé Conti, juillet 1727," *Continuation des Mémoires de Littérature et d'Histoire*, 5, pt. 1 (March 1728), 44, 47; Loup Verlet, *La malle de Newton* (Paris: Gallimard, 1993), 208.
36. Fontenelle, "Newton," 168; Poulloin, 176.
37. Crousaz to Coste, October 1 [1721], Bibliothèque Cantonale et Universitaire de Lausanne, fonds Crousaz, 2:200.
38. Castel, 445, 441–42.
39. Gillispie, 440; Hall, 56; Shank, 171; Mazauric, 330–31.
40. Fontenelle, "Newton," 157.
41. Fontenelle, "Éloge de Saurin," *Histoire de l'Académie Royale des Sciences* (1737), 116–17.
42. Fontenelle, "Newton," 165.
43. Fontenelle, "Éloge de Montmort," *Histoire de l'Académie Royale des Sciences* (1719), 91; Pierre Rémond de Montmort, "Dissertation sur les principes de M. Descartes comparez à ceux des Philosophes Anglais," *L'Europe savante* 5 (October 1718): 294.

44. Freyne, 85–86; Pouloin, 171–72.
45. Castel, 202.
46. Fontenelle, *Théorie des tourbillons cartésiens avec des réflexions sur l'attraction* (Paris: Guérin, 1752), 186.
47. Jean-Baptiste Dubos, *Réflexions critiques sur la poésie et la peinture* (Paris: Mariette, 1719), 2:8–9.
48. Daniel Roche, "Talents, raison et sacrifice: L'image du médecin des Lumières d'après le Éloges de la Société royale de médecine," *Annales ESC*, 32 (1977): 868.