



A Note on Newton, Boyle, and Hume's "Experimental Method"

Eugene Sapadin

Hume Studies Volume XXIII, Number 2 (November, 1997) 337-344.

Your use of the HUME STUDIES archive indicates your acceptance of HUME STUDIES' Terms and Conditions of Use, available at

<http://www.humesociety.org/hs/about/terms.html>.

HUME STUDIES' Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the HUME STUDIES archive only for your personal, non-commercial use.

Each copy of any part of a HUME STUDIES transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

For more information on HUME STUDIES contact humestudies-info@humesociety.org

<http://www.humesociety.org/hs/>

A Note on Newton, Boyle, and Hume's "Experimental Method"

EUGENE SAPADIN

It has long been accepted that when Hume speaks of "the experimental [read 'scientific'] method" he is referring to Newton. Kemp Smith, Mossner, and Capaldi, none of whom are noted for "carelessness and inattention," find it unnecessary to argue the point.¹ But recently, as Jane McIntyre has observed,

[t]he nature of the relationship of Hume's work to Newtonianism [has become] a matter of ongoing debate. The "experimental method" referred to in the subtitle was certainly not unique to Newton.²

The debate is due to a revisionist interpretation largely led by Peter Jones and Michael Barfoot, who says "the textual evidence for Hume's so-called 'Newtonianism' has recently been re-examined and found to be both limited and ambiguous;"³ and that "so-called," along with the scare-quotes around "Newtonianism," show a confident position. It has rapidly reached the point where a standard interpreter like Penelhum can say that Jones has not merely argued but "argued *persuasively*, that the influence of Newton on Hume has been overrated."⁴

I would like to make a brief defense of the standard interpretation. Hume may have had little formal contact with Newton's work; his fascination with Newton may have originally exceeded his grasp, as is consistent for an

Eugene Sapadin is at Wolfson College, Oxford, and the Humanities Dept., Johnson State College, Johnson, Vermont 05656 USA.

(admittedly brilliant) eleven-to-thirteen year old thrown into a Newtonian atmosphere; and his idea of what it is to be Newtonian may have developed over time. But the most likely way for Hume's "science of human nature" to become the "foundation entirely new" that he claims for it—and for its deep anti-Cartesianism to be consistent both with what he does in Books II and III of the *Treatise* and with his increasingly recognized status as a true precursor of those who say that to be a rational animal is not only to be a logical-Cartesian one—was for him to come off Boyle and be Newtonized.⁵ Boyle at first seems to fit, but finally is the model for the end of the seventeenth century, not for Hume's new beginning for the eighteenth (and beyond).

The idea behind the standard interpretation comes from the previously generally accepted fact that all the eighteenth century "empirical philosophers" (except Berkeley) *claimed* to be Newtonian. We are all familiar with the passage in Locke in which he says that he is merely a humble "Under-Labourer," engaged "in clearing Ground a little, and removing some of the Rubbish, that lies in the way" of "the incomparable Mr. Newton."⁶ Clarke carried the Newtonian banner in his correspondence with Leibniz; and Hume did, after all, refer to his desire to be "the Newton of the moral sciences." So behind the identification of Hume's "experimental method" with Newton is at least the idea that the literary-intellectual world of the early eighteenth century was Newton-obsessed but had only a general knowledge of science, and that the young Hume, who was part of that world, would have had about the same background as everyone else.

What would that background have been? A nineteenth century history of the University of Edinburgh points out that it was normal in the early eighteenth century for a student to leave the University after two years of classical education, before arriving at the Natural Philosophy and Mathematics of the last two years.⁷ Hume followed this pattern, arriving at age eleven and leaving during his third year, at thirteen or fourteen.⁸ Later in life, as he became Joint Secretary to the Philosophical Society of Edinburgh and, with Alexander Munro, edited two volumes of papers in the sciences,⁹ he would have come to read much of the detail of science, including optics, medicine, biology, meteorology, astronomy, and electricity.¹⁰ But we can assume that the scientific reading of the young Hume, who left the university without a degree, probably was concentrated on those that aroused popular controversy, were popular in general, or were "in the air"; those that would interest a literary man.¹¹ Newton qualifies on all counts.

There really is no analogy to the excitement over Newton or his status, from Locke's comment to Alexander Pope's "Nature and Nature's laws lay hid in night;/God said, Let Newton be, and all was light." While his math was pretty near impossible for the general reader,¹² there were at least five popularizations by scientists between 1702 and 1748, from John Keill's 1700 lectures at Oxford published two years later as *Introduction to Newtonianism* to

Colin MacLaurin's *An Account of Sir Isaac Newton's Philosophical Discoveries* (Edinburgh 1748), all of which stress the experimental method. And this is independent of the non-scientific expounders such as Samuel Clarke, the "reigning metaphysician" (Kuypers) of the early eighteenth century as Dr. Johnson was reigning critic of the late. Clarke, in fact, claimed to be Newtonian in his Rationalist writings on ethics, as did Ralph Cudworth.¹³ And everybody was using Newton to do theology, in print and in the pulpit.¹⁴

At the University of Edinburgh, "only advanced students could expect to ascend to the heights of sophistication displayed in Newton's *Principia*."¹⁵ Hume, who as we recall left by fourteen at the latest, is not likely to have been amongst them. (He was enrolled in Natural Philosophy in 1724, and there are some thirteen year olds who can do very advanced maths, but they tend not to give it up for philosophy by eighteen.) But not *studying* Newton is not the same as not being influenced by him, for Newton was much discussed at Edinburgh:

David Gregory, Professor of Mathematics, had introduced Newton's *Principia* in 1683 so that Edinburgh was second only to Cambridge itself in the teaching of the new science, and Gregory's successors in the chair of Mathematics continued the scientific tradition.¹⁶

This seems just the sort of atmosphere to impress a boy (or very young man; teenagers didn't yet exist) with vague ideas and designs of a "Newtonian" sort, which would crystallize in his early twenties, enabling him to "scribble many a Quire of Paper, in which there is nothing contained but my own invention."¹⁷ This "system of the sciences built on a foundation entirely new" (T xx) is the application of "the experimental Method" to the science of man, in a which a great young philosopher has found a way to accomplish what a youth formed a vague intention of doing.¹⁸

Once again, it is instructive to note Kuypers' (traditional) automatic identification of Newton with "the new science." Nor is this merely a (pre-revisionist) twentieth century phenomenon. In Hume's own day even a *Leibnizian*, Willem J. 'sGravesande, explained that he called the new science "Newtonian" because it exemplified the experimental method.¹⁹ Experimental method simply is identified with Newtonianism, and vice versa. In this same spirit, when Hume, in the Introduction to the *Treatise*, compared the period between the beginning of classical natural philosophy with Thales and the beginning of moral philosophy with Socrates, with the period between Bacon at the beginning of modern natural philosophy and the beginnings of the new moral philosophy, the names he mentions—Locke, Mandeville, Shaftsbury, Hutcheson, Butler—are all examples of moral philosophers (T xx, xxi, and note). There is no indication that he is thinking of any of the natural philosophers between Bacon and Newton.

Still, there is the claim that Robert Boyle deserves special consideration as possibly in Hume's mind. Hume thought highly enough of him to include him with Newton in the *History of England*:

There flourished during this period a Boyle and a Newton; men who trod with cautious, and therefore with more secure steps, the only road which leads to true philosophy.²⁰

And Boyle has some similarities to the "naturalist" Hume, including a work entitled *Things Above Reason*, about which more follows. There is even a striking similarity on the nature of belief: Boyle writes in *Occasional Reflections* "as for my opinions, whether of persons or of things, I cannot in most cases command them myself, but must suffer them to be such, as the nature of the things I judge requires,"²¹ while Hume in the first *Enquiry* maintains that "belief...depends not on the will, nor can be commanded at pleasure. It must be excited by nature...." (EHU 48).

But *Occasional Reflections* is from a reprint of the folio edition of Boyle's works (6 vols, London) in 1744, and so would not have been available for the Hume of the *Treatise*, unless he read the original. What was available, and in line with his general interests, was *The Philosophical Works of Robert Boyle*, edited by Peter Shaw, 3 vols, London, 1725; it is here that *Things Above Reason* appears. Still, 1725 is on any reckoning *after* Hume had left the University, so for it to be the *basis* of any early idea of experimental method, he would have had to move *from* Newton *to* Boyle, counter to the current of the age.²² And when we look at *Things Above Reason* more carefully, it is rather un-Humean. Things above reason include "all such intellectual Beings...as are, by nature, of a higher order than human souls," and "that man has free will, [in spite of] God's fore-knowledge."²³ Worse yet for a possible Hume precursor, he says that "things which surpass reason...[are] not to be judg'd of by the measures...used in judging of ordinary occurrences,"²⁴ while Hume would say it is precisely the ordinary judgments which *do* override reason.

Even when saying Humean things about how "we ought to believe several things upon the information of experience...which, without that information, we should judge unfit to be credited; or antecedently to it, actually judged contrary to reason," he goes on to allow *testimony* about miracles as empirical proof,²⁵ and even allows the fulfilling of biblical prophecies as scientific proof,²⁶ which are radically contrary to basic Hume.²⁷

More important, Boyle is still too Cartesian-Rationalist to be quite as much a "foundation entirely new" as Hume requires:

Upon the whole, we may reasonable suppose, that the great author of nature so framed man, as to have furnished his intellective faculty with a light, whereby it can, not only estimate the power of a

multitude of other things, but also judge of its own nature and power, and discern some of the limits, beyond which it cannot safely exercise its act of judging and defining. But the rational soul does not only pass judgment of the things without her, but about herself, and what passes within her: she searches out, and contemplates her own spirituality, and union with the body.²⁸

This may mention the "limits of judging and defining," but the rest, from the "intellectual light" through "spirituality, and union with the body," are pure Descartes.

Finally, the term Boyle regularly uses for the method he follows is not "the experimental philosophy" but "the mechanical philosophy." In arguing for the importance of Boyle, Barfoot says that

By "experimental philosophy," Hume understood a particular version of the mechanical philosophy, international in scope but exemplified in Britain by Boyle in the late seventeenth century.²⁹

The general position may have been "mechanical," with Boyle as its paradigm, in the late seventeenth century; but by the second quarter of the eighteenth century the "particular version" Hume was claiming to apply, "experimental philosophy," was Newtonian and identified as such by everyone, including Leibnizians. By then, "mechanical philosophy" had become precisely the narrower term which Leibniz and the Cartesians used in *opposition* to Newton. "The principle of mechanical philosophy, clear and intelligible," Boyle wrote, "teaches, that the phenomena of the world are physically produced by the mechanical properties of the parts of matter; and that they operate upon one another according to mechanical laws."³⁰ This is simply not broad enough to be the basis of a new science of human nature.³¹ Hume's final word on it, from the *History*, is that "Newton...shewed...the imperfections of the mechanical philosophy" (HE VIII 334). Whatever honour he pays to Boyle, Hume's idea of experimental philosophy is Newton-based.

NOTES

1 The two major studies specifically stressing Hume's relation to science, "pre-revision," were by Mary Shaw Kuypers, *Studies in the Eighteenth Century Background of Hume's Empiricism* (Minneapolis: University of Minnesota Press, 1930; reprinted New York: Garland, 1983), and James E. Force, "Hume's Interest in Newton and Science," *Hume Studies* 13.2 (1987): 166-216.

2 Jane L. McIntyre, "Hume: Second Newton of the Moral Sciences," *Hume*

Studies 20.1(1994), 15, note 2.

3 Peter Jones, *Hume's Sentiments: Their Ciceronian and French Context* (Edinburgh: University of Edinburgh Press, 1982), esp. 11-19; Michael Barfoot, "Hume and the Culture of Science," in *Studies in the Philosophy of the Scottish Enlightenment*, edited by M. A. Stewart (Oxford: Clarendon Press, 1990), 160-161. Others of similar persuasions include John P. Wright, in *The Sceptical Realism of David Hume* (Minneapolis: University of Minnesota Press, 1983), and David Fate Norton.

4 Terence Penelhum, "Hume's Moral Psychology," in *The Cambridge Companion to Hume*, edited by David Fate Norton (Cambridge: Cambridge University Press, 1993).

5 Hume's developing interpretation of Newtonian experimental method and its radical anti-Cartesianism is argued for in Eugene Sapadin, "Newton, First Principles, and Reading Hume," *Archiv für Geschichte der Philosophie* 74 (1992).

6 John Locke, *An Essay concerning Human Understanding*, edited by P. H. Nidditch (Oxford: Clarendon Press, 1979), 10.

7 Alexander Grant, *Story of the University of Edinburgh*, (London, 1884), I 265.

8 Hume himself says that the *Treatise* was "projected before he left College," and it makes sense to take this as correct, in spite of his adding "and which he wrote and published not long after" (advertisement to last edition of *Enquiries*, written in 1773; this is the first public acknowledgement by Hume of authorship of the *Treatise*). The two statements are inconsistent; but looking back from sixty-two, it is more likely to see ten years of youth as "not long" than it is to make a mistake about where (and when) the plan was formed.

9 *Essays and Observations, Physical and Literary, Read Before a Society in Edinburgh and Published by Them*, edited by David Hume and Alexander Munro, (Edinburgh, 1754 *et seq.*). This contains a marvelously Humean introductory note saying they will *not* be publishing work in "the sciences of theology, morals, and politics" because "it is the peculiar happiness of geometry and physics that as they interest less the passions of men, they admit of more calm disquisition and inquiry" (I vii).

10 The list is due to Force.

11 "The subject matter of these classes [that Hume took at the University of Edinburgh] at that time is unknown but may be reconstructed," but this is not of primary importance because "the intellectual atmosphere prevailing at the university would, however, have been more important and Edinburgh was undoubtedly seething with new ideas of science, philosophy, and literature." Ernest Campbell Mossner, *The Life of David Hume* (Edinburgh and London: Thomas Nelson and Sons, 1954), 41.

12 Locke had to ask a friend who could follow the maths if Newton had it right.

13 For comments on Clarke, see McIntyre. For Ralph Cudworth, see his *Treatise Concerning Eternal and Immutable Morality* in *British Moralists: Selections from Writers Principally of the Eighteenth Century*, edited by L. A. Selby-Bigge, 2

vols. (Oxford: Clarendon Press, 1897).

14 One is tempted to make remarks on sermons using Heisenberg or quantum theory in discussing free will; but references to Newton were of a different order of magnitude.

15 Barfoot, 154.

16 Kuypers, 9. Note that the *Principia* wasn't published in its entirety until 1687.

17 *The Letters of David Hume*, edited by J.Y.T. Greig, 2 vols. (Oxford: Clarendon Press, 1969), I 6. This is the passage that Norman Kemp Smith says should be read as showing that Hume decided "to enter philosophy through the gateway of morals" (*The Philosophy of David Hume* [London: Macmillan, 1941], 12). The claim being made here is that it is better read as saying that he had found a new way of being Newtonian; but that argument is the topic for another paper.

18 "I shall do such things—I know not what, but they shall be the terror of the earth" is madness in King Lear. But we don't have to do speculative psychohistory to point out that the attitude—if we replace 'terror' by 'glory'—is fairly common amongst young boys.

19 Willem J. 'sGravesande, *An Introduction to the Philosophy of Newton* (The Hague, 1720).

20 David Hume, *The History of England, from the Invasion of Julius Caesar to the Revolution in 1688*, 8 volumes (London, 1818 edition), VIII 333; hereafter, HE.

21 *Occasional Reflections* in Boyle's *Philosophical Works*, 1782 edition, II 412.

22 Since *Things Above Reason* was originally published separately in 1681, it is possible that Hume read it.

23 Boyle, *Philosophical Works*, II 197-198.

24 *Ibid.*

25 Boyle, *Philosophical Works*, II 250 ff.

26 Actually, he manages both at once: "The fulfilling of prophesies and working of miracles, demonstrate the being of a God." Boyle, *Philosophical Works*, I 24.

27 More blatantly unHumean is "The Christian Virtuoso" in *The Works of Robert Boyle*, edited by Thomas Birch, 6 vols. (Hildesheim, 1966), where Boyle claims that miracles "play a vital role in establishing the truth of the Christian religion" (V 531). By any interpretation of Hume on miracles, to go beyond believing that they may happen, and beyond believing other people's reports of them, to founding a religion on it, is the essence of everything Hume is against. Still, in the interests of fairness and just plain interest, it is worth citing Boyle's anticipation, in *Things Above Reason*, of the Naturalist Hume (the full title of the sections is "Whether man may, with justice, discourse of things above reason"): "The nature of the mind is such that...it may attain to a clear conviction, that some things exist, of whose nature, and properties, it can frame no clear and satisfactory concepts. And, that men should be better able to infer propositions about several things, than to penetrate into their nature, is the less strange, because 'tis often times sufficient for our uses, to know that

such things exist; tho' that knowledge not be accompanied with a clear and distinct idea; and because the rules, as this, for example, 'whatever is produced, must have a cause,' are often clear, and easy, that enable the mind to infer conclusions about things, whose nature is very abstruse" (II 206). It is unclear whether, or how far, Boyle is accepting or going beyond the Naturalist position here, but the suggestion of knowledge without clear and distinct ideas, especially of cause and effect, is striking.

28 Boyle, *Philosophical Works*, II 204.

29 Barfoot, 167.

30 Boyle, *Philosophical Works*, II 187. He adds that the laws must be "few...primary...simple" (II 188) and "extensive" (II 89).

31 One might also think that if Hume thought the new method could get along without Newton he would have made use of this in his attacks on the *soi-disant* Newtonians Clarke and Cudworth, who along with William Wollaston were the Rationalist enemy under attack in the middle of Book II and early parts of Book III of the *Treatise* (as well as, it is being increasingly understood, in Book I). But he never does this, offering instead an alternative version of Newtonianism.

Received January 1997