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**Enlightenment
and Dissent**

**ENLIGHTENMENT, RELIGION, SCIENCE
AND POPULAR CULTURE IN THE LATE
EIGHTEENTH CENTURY**

Special Issue:

edited by

**Martin Fitzpatrick
and
Iain McCalman**

no. 17 1998



Enlightenment and Dissent

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Portrait of David Hartley MD; engraved by
William Blake from an original painting by Shackelwell

Editorial

This volume represents another special number of the journal. It is devoted to the papers presented at a colloquium on 'Enlightenment, religion and science in the long eighteenth century' held at the Humanities Research Centre of the Australian National University, Canberra, from 4-6 September 1996. We are grateful to the Humanities Research Centre for providing financial support for the publication of this special number.

Collectively the papers indicate the varieties of approaches available to scholars in studying individuals and their milieus in the late Enlightenment; it is hoped that this is representative of the richness of scholarship in this broad field rather than its confusions. In so far as a dominant theme emerged, it is of the omnipresence of the thought of David Hartley, and the protean nature of his ideas. Professor Webb's ground-breaking paper is indicative of the growing interest in Hartley and his influence. In completing his study he was fortunate to be able to draw on the forthcoming work of Richard Allen which is eagerly awaited.

We are deeply sad to report the death of Lisbeth Haakonssen not long after the completion of her paper. Her work explores new dimensions of Dissent and science, and with her recent book represents an important contribution to our understanding of Enlightenment and Dissent. This Special Issue is dedicated to her memory.

The next number of the journal will revert to a more normal format, and will include a larger than usual section of documents and review articles which have been delayed by the publication of the Samuel Clarke special number and this one.

MHF
IMC

PATERNALISM AND EXPERTISE: A PHYSICIAN'S LEGACY

Lisbeth Haakonssen

Medicine has always meddled in the affairs of other professions and social institutions. Indeed, it would be difficult to determine when, historically, it has not been prepared to intrude upon the domains of the law, the church, and the family while at the same time jealously guarding its own hard won prerogatives. These forays, and at times, full-scale invasions, have been justified by the profession's claims to the possession of what is now referred to as 'relevant expertise' or 'unique competence'.

Encapsulated in the problem recently described by Ivan Illich as 'the medicalization of life', medicine's colonizing tendencies should not be viewed exclusively as the product of modern medicine or medical technology. While the roots of this phenomenon lie deep in its professional structure and knowledge-base, important features can be traced to the eighteenth century and the attempt to establish a new role for medicine and its practitioners.

In this paper I examine the claims of a Scottish physician, John Gregory (1725-1773), to the possession of such relevant expertise in the field of moral philosophy, and, more specifically in the moral and religious education of the female sex. Gregory's, *Lecture's on the Duties and Qualifications of a Physician* (1772), is viewed as an early classic of medical ethics and its author as the founder of the modern movement commonly referred to as bioethics.¹ Gregory was also the author of his century's most re-printed conduct book for young women *A Father's Legacy to his Daughters* (1774) which superseded the Marquis of Halifax's, best-seller, *Advice to a Daughter* (1688).² Because Gregory's claim to

¹ John Gregory, *Lectures on the duties and qualifications of a physician* (London, 1772).

² John Gregory, *A father's legacy to his daughters* (London, 1774), [hereafter *Legacy*]. George Savile, Lord Halifax, *The lady's New Years gift; or advice to a daughter* (1688), in Halifax, *Complete works*, ed. J P Kenyon (Harmondsworth, 1969), 271-313. It is worth noting that Gregory's teacher, Dr. Alexander Monro, also wrote an advice book for

expertise in medical ethics is directly connected to his claim to similar expertise in the moral education of young women, the relation between these two genres will also be discussed.

* * * * *

Gregory received his early education at King's College, Aberdeen (1736-40) and his medical education at the universities of Edinburgh (1741-45) and Leyden (1745-46). He was professor of medicine at Edinburgh from 1766 to his death in 1773. A close friend and protégé of his cousin, Thomas Reid, he played an important role with other Aberdeen intellectuals in the development and popularization of Reid's common-sense philosophy. Like the latter, Gregory's views were developed in response to the philosophical ideas of such contemporary thinkers as Rousseau, Montesquieu, Buffon, Hutcheson, and Hume. And, like many Scottish thinkers, he attempted to apply the inductive method to the study of human nature according to the programme laid out by Bacon.³

During his Edinburgh years, Gregory was a member of that city's most illustrious intellectual circles and counted among his acquaintances, David Hume, Adam Smith, Hugh Blair, and the Lords Kames and Monboddo. His most intimate friends included, in addition to Reid, Mark Akenside, James Beattie and Elizabeth Montagu. Apart from the two works cited, Gregory's reputation as a philosophical physician was also based on his popular treatise, *A Comparative View of the State and Faculties of Man with those of the Animal World* (1765), where he developed those features of common-sense philosophy that provided the theoretical basis of his subsequent work.⁴

his daughter. For an account and edition of the latter, see P A G Monro, *The professor's daughter; an essay on female conduct*, in *Proceedings of the Royal College of Physicians of Edinburgh*, vol. 26, no. 1.

³ Bacon's suggestions for the reform of medicine are summarized in *The Advancement of Learning, The Works of Francis Bacon*, ed. J Spedding, R L Ellis, and D D Heath (14 vols., London, 1857-74), vol. 4, 109-117.

⁴ John Gregory, *A comparative view of the state and faculties of man with those of the animal world* (London, 1765).

Gregory's medical ethics was a synthesis of traditional but critical Hippocratic thought and a Scottish style of moral philosophy and practical ethics. With categories adapted from Protestant natural law, the latter was little more than a theoretical schematization of traditional duty ethics, encompassing all areas of life. To hang up one's shingle, to get married or take on the role or character of husband or wife, were, according to this system, acts which implied a specific contract to discharge the relevant duties of one's trade, profession or marital status. All duties specified were reciprocal - patients, for example, owed their doctors compliance and gratitude (and prompt payment of fees) and wives, the appearance, at least, of submission to the authority of their husbands. These offices were overlapping and such attributes as one's wealth, position in society, age, health, education and skills all had implications for one's duties and responsibilities.⁵ As we will see, this systematization of traditional social ethics was lent new importance through its role in the development of the modern professions.

Like many of his contemporaries, Gregory combined these moral-philosophical ideas with a generally accepted theory of sympathy. The latter was viewed as an innate principle of the mind which could be cultivated and promoted in the interests of social harmony: it could be encouraged in those in whom it was lacking and curtailed or re-directed in those who were over-endowed. Academic moral philosophy as taught to introductory courses at universities and colleges was a primary conduit of these ideas to

⁵ See L Haakonssen, *Medicine and morals in the Enlightenment; John Gregory, Thomas Percival and Benjamin Rush* (Amsterdam, 1997). Concerning the use of the notion of offices within Common Sense moral philosophy, see Thomas Reid, *Practical ethics: being lectures and papers on natural religion, self-government, natural jurisprudence and the law of nations*, ed. K. Haakonssen (Princeton, 1990).

society's educated elites, and this was supported by the polite, moralizing sermons of the Moderate clergy as well as by the many aspects of contemporary art, literature, journalism and theatre which spread the gospel of man's natural sociability and its ethical implications.

An influential propagandist for this cause, Gregory believed that it was the task of moral philosophy and hence the philosophically educated to assist in the general cultivation of social sympathy. Philosophy, in the broad sense implied by Gregory, was knowledge of nature, including human nature, applied to practical and useful purposes. Predominant features of this theory included a belief in the close connection between mind and body, a theory of the association of ideas and a physiologically based understanding of the role played by the emotions and sympathy in the development of persons and societies.

Gregory explained, that while sympathy or moral sense was a necessary source of moral good it was not in itself a sufficient one. The principle of reason was required to complete it, just as sympathy, sociability or moral sense was required to assist and render more humane the dictates of abstract reason. The complementarity of the two principles was clearly reflected in the prevailing view of gender and social class which Gregory accepted and promoted. Although he believed that a system of subordination and the distinction of ranks was an essential feature of all harmonious societies, he argued that because we are all dependent on each other for our happiness, the principle of inherent human sociability dictated that those in superior positions must, for their own as well as for the good of others, disguise as best they can their differences with those below them on the social scale. Thus, in a hierarchical society, social sympathy was viewed as a form of equality expressed most characteristically in the polite, Enlightenment ideal of complacency or Christian condescension. One version of this ideal was expressed in the argument that politeness to members of the lower orders was not to be dispensed as a form of charity or *noblesse-oblige* but as a requirement of natural justice. This spirit of equality was also evoked to counter the common law interpretation of male supremacy. While the latter had its basis in the law of the land, females could be compensated

through the superior complaisance owed to them by any man who aspired to the title of gentleman. The institution of marriage was, according to this view, the accepted path to female equality.

* * * * *

Gregory's *Legacy* was written, according to his son James, in the early 1760s, in part, as a critical response to Rousseau's account of the education of women in *Émile* (1762). Published posthumously (1773), the conduct book depicted a 'tender father in a declining state of health', all too conscious of the social dangers awaiting his, soon to be orphaned, daughters as they approached the age of courtship and marriage. He was, it seemed to many contemporaries, the voice of reason and sensibility; a polite, enlightened, paternalist who combined the authority of the father with that of the physician, the philosopher and the popular moralist.

Gregory was not a feminist in any sense that we might want to recognize, but he was known to his contemporaries - male and female - as a great champion of women who regularly entertained his circle with 'Eulogiums on the Female Sex, as at least Equal if not Superior to the Male.'⁶ Gregory's advice was, nevertheless, similar to that of most contemporary authors of conduct books. He drew on what he saw as the evidence of nature, on moral or natural law, on physiology and comparative anatomy, and on religion - to justify his claim that while women were naturally equal and even morally superior to men, they were different and this entailed that they must have a very different role to play on the stage of life.

Gregory's ideal woman possessed the conventional female virtues. He recommended as models the heroines of James

⁶ Alexander Carlyle, *Anecdotes and characters of the times*, ed. J Kinsley (London, 1973), 92.

Macpherson's poems of Ossian and in his own *Comparative View*, he expressed his admiration for female characters who combined, as did those fabled Highland maidens, the dignity and high spirits of the Roman matron, with the modern delicacy of character painted by the writers of contemporary romance.⁷ Writing twenty years after the '45, Gregory viewed the morals and manners of Scottish clanswomen through the prism of a primitivist fantasy. Like many Scottish moralists seduced by the dream of Ossian, he attempted to salvage for his own society a function for this ideal. Constitutionally fitted to combine the softer virtues of modesty, faithfulness and humility with amiability, sensibility and grace, Gregory's woman was not, however, restricted to the private sphere of the household; she had, albeit tenuously, an interesting, because more contested, role to play in a social space that was public but non-political.⁸

Gregory's precepts warned against overt expressions of self-assertion and any public demonstration of superiority of education or of mind. He advised his daughters to be cautious in displaying their good sense, keeping it 'a profound secret' from the men.⁹ On a more positive note, he insisted that women were not to be viewed as the slaves of men's pleasure but rather as companions and equals destined by nature to soften male hearts and polish their masculine manners.¹⁰

* * * * *

Gregory's *Legacy* was one of the most successful advice books of his day. Some editions appeared bound with the manuals of such sympathetic and like-minded female authors as Hester Chapone and Lady Pennington. It remained a favourite well into the next

⁷ *Comparative view*, 15.

⁸ Several accounts of gender in the eighteenth century have viewed Gregory's advice as unusually repressive. Anthony Fletcher, for example, has suggested that with Gregory, 'we find gender at its most constructed, its most artificial.' J Fletcher, *Gender, sex and subordination in England, 1500-1800* (New Haven, Conn., 1995), 391.

⁹ *Legacy*, 31.

¹⁰ *Legacy*, 6-7.

century; Caroline Gonda has noted, for example, that *Legacy* was reprinted five times between 1809 and 1816 together with excerpts from Fanny Burney's *Camilla* (1796).¹¹

Gregory's most astute eighteenth-century critic was Mary Wollstonecraft who attacked what she believed to be his specious arguments in *A vindication of the Rights of Women* (1792), along with such other 'female experts' as Rousseau, Lord Chesterfield and the Rev. James Fordyce. Wollstonecraft declared that Gregory was an amiable writer, but nevertheless included him in her list of authors who 'had rendered women objects of pity bordering on contempt.' Gregory's celebration of female sensibility at the expense of woman's capacity for reason supported opinions which had, in Wollstonecraft's words, 'led to the most baneful effect on the morals and manners of the female world.'¹² Wollstonecraft confessed, however, that she shared many of his beliefs about the value of religion in the education of females and we will examine Gregory's discussion of this issue in the context in which Wollstonecraft might have viewed it.

Like many of his contemporaries, Gregory feared that religion, particularly its public practice, no longer played an important role in the lives of many of his countrymen.¹³ Drawing on the idea of natural religion of such popular moralists and divines as Francis Hutcheson and Joseph Butler, he advocated new forms of religious practice that would appeal directly to the more educated and polite circles. As one contemporary explained, this was a period in which, Religion was just recovered from the power of the devil and the fear of hell, taught by our mothers and grandmothers. Those terrors began to wear off and religion appeared in a more amiable light. We were bid draw our knowledge of God from his works, the chief of which is the soul of a good man; then judge if we have cause to fear. The Christian religion was taught as the purest rule of

¹¹ William St. Clair, *The Godwins and the Shelleys: the biography of a family* (London, 1989), 504-510. Caroline Gonda, *Reading daughters' fictions, 1709-1834: Novels and society from Manley to Edgeworth* (Cambridge, 1996), 132.

¹² Mary Wollstonecraft, *A vindication of the Rights of Woman* (Harmondsworth, 1982), 196.

¹³ See e.g. *Legacy*, 17.

morals; the belief of a particular providence and a future state as a support in every situation. The distress of individuals was necessary for exercising the good affections of others, and a state of suffering the post of honour.¹⁴

This is a fair summary of the religious practice promoted by Gregory who shared with this author, Elizabeth Mure (1714-1795), the liberal theology of her friend and mentor, Dr. William Leechman, Professor of Divinity and close associate of Francis Hutcheson at Glasgow University. Like Hutcheson and his supporters, Gregory emphasized the role of religion as a 'rule of manners' and depicted a deity sympathetic to the 'sympathetic sex'. Like the ideal suitor he so carefully painted for his daughters in *Legacy*, his portrait of God clearly reflected and reinforced those aspects of the paternal character most valued by the ideology he promoted and which he believed himself to possess.

Gregory explained that while religious duties were equally binding on both sexes, women were providentially designed to need religion more than men. The superior sensibility of the female sex not only made them peculiarly fit for practicing the softer virtues but far more susceptible to feelings of religious devotion. This was appropriate because God had ordained that they would lead lives that included periods of great misery; and that, unlike men, they could not escape the psychological effects of life's misfortunes. Members of the male sex could always alleviate such distress by plunging themselves into business, public affairs, pleasure or riotous living. Destined for a narrower sphere, women's best means of consolation and refuge was religion. Other aspects of woman's natural lot in life required religion as a restraint rather than as consolation, not least her abundant natural vivacity which, if left unchecked would lead to dissipation or a 'rage for pleasure'.¹⁵ Without the guidance of religion and reason and the men who promoted its values, female virtue was difficult, if not impossible, to sustain.

¹⁴ Elizabeth Mure, in J G Fyfe ed., *Scottish diaries and memoirs, 1746-1843* (Stirling, 1942), 77.

¹⁵ *Legacy*, 12.

For Gregory, the practice of religion was a matter of sentiment, not reason. All forms of instructions and literature necessary for a religious education should thus be addressed directly to the emotions and not to the intellect. Because it was an affair of the heart and the imagination, forms of religious practice should not be the subject of abstract argument. Habits of private devotion were to be encouraged because they helped women to establish a close relationship with the Supreme Being who would, in the absence of any other father figure, steady her morals and lend her the necessary propriety and dignity to fulfil the duties of her station. Clergymen, who did not share the moderate views espoused by Gregory, were to be avoided in order to eliminate the risk having one's conscience directed by men tainted with religious enthusiasm or the narrow spirit of party.¹⁶

Sympathy or humanity, that is, the capacity to respond to those in distress, should be cultivated and its false version shunned. Proper sympathy led to charity, while its counterfeit, the sort evoked by reading too many modern romances, merely inclined people to avoid distressing scenes of unhappiness. For Gregory, cases of human misery were not to be avoided but, rather, embraced as a golden opportunity to increase one's store of sympathy and thus to soften one's heart. Genuinely sympathetic persons were compensated for their discomfort through a consciousness of performing their duty as appointed. In this manner, the pain of sympathy was miraculously transformed into the pleasure of duty, which, like the fashionable and romantic 'pleasures of melancholy', characterized the aesthetics of Gregory's theory of sympathy.

In *Legacy*, as in his earlier, more theoretical account of religion in *Comparative View*, Gregory foreshadows the sentimental religiosity of such later writers as Anna Barbauld and Hannah More who promoted the ideal of pious women as sensitive creatures

¹⁶ *Legacy*, 19-20.

sustained by the force of sympathy.¹⁷ Gregory's depiction of female religious life in the chapter on 'Religion' in *Legacy* was similarly a seductive invitation to participate in the experience of 'sorrowful pleasure'. The 'secret charm of pain' or 'lovely grief', as Gregory depicted it, was the feeling of moral pleasure derived from frequent association with death and illness which would assist in the cultivation of refined and tasteful devotional habits. Lovely grief and charming pain appealed to the romantic side of Gregory and the many other contemporaries who were deeply affected by the 'pathetick' images of James Thomson's *Seasons*. Any forms of excess in these matters were, nevertheless, believed to be unhealthy and thus to be contained by the exercise of self-control; 'joys of sorrow', yes, but not the agony or the ecstasy which might escalate into religious enthusiasm.

Gregory suggested that 'Religion may be considered in three different views', namely the religion of reason, that of imagination, and that of the passions. First, there was speculative theology which, while it was an important foundation to religion, it could only appeal to and persuade the philosophical few.¹⁸ Secondly, religion taught as a 'rule of life and manners' could be a most useful support for common morality.¹⁹ Man's natural aptitude for religion could be cultivated and proper religious habits developed through the use of proper rhetorical strategies based upon scientific understanding of the association of ideas. Under the guidance of the new science of the mind, religion could become a 'practical art' very similar to medicine but one aiming at *mental* health, not least by preventing our natural religious imagination from turning into superstition, enthusiasm or scepticism. In short, like proper medicine, this part of religion required men with an exceptional combination of 'good sense' and 'genius', a combination not found in either the metaphysician or the ordinary run of clergymen. The suggestion seems to be that the proper preacher is the practical moralist with some basis in the science of the mind, in short, the sort of moderate clergymen who were Gregory's peers and friends.

¹⁷ G J Barker Benfield, *The culture of sensibility: sex and society in Eighteenth-Century Britain* (Chicago, 1992), 274.

¹⁸ *Comparative view*, 174-84.

¹⁹ *Comparative view*, 184-96.

Finally, religion is devotional, that is to say, a method of guiding the central religious passion of personal love of God and His creation through devotional aids such as poetry, music and the moral painting of religious rhetoric.²⁰

In *Legacy*, Gregory reminded his daughters that his advice in that work was directed solely to those aspects of their religious practices which were peculiar to the female sex. Other aspects of their religiosity, such as their duty to participate in regular public worship, to love and respect God, etc., were no different from those of their brothers. Gregory's explicit reference to his previous study of 'women's natural character and place in society' and 'the general rules of conduct' which, he noted, he would not touch upon in his present work indicate that *Legacy* was conceived as a branch of practical ethics. Like other forms of that genre, it was a code of manners and morals adapted to a specific character and station in life, in this case, the very general one of the woman and her female office, which, like most other offices could be analysed in terms of the character's duties to God, to herself and to others. Gregory explained that what he offered was a 'system of conduct' or 'appropriate ethics' and a guide to the etiquette of courtship.

* * * * *

Having given an impression of the ethics of the advice given by Gregory to his daughters, I turn to the theory of the human person that underlies the whole idea of the giving of advice and, more particularly, to the connection between mind and body and the role played by emotion and sympathy. This theory leads to a doctrine of how some people can have control over the emotions of others and this points to a plausible explanation of why a physician in paternal form could assume such authority in matters of female - and not only female - conduct.

²⁰ *Comparative view*, 196-202.

In the Hippocratic treatise, *On Decorum*, ancient physicians were encouraged to seek the wisdom or philosophy that could elevate their status to that of minor deities. The maxim, 'the physician-philosopher is equal to the gods',²¹ echoed through the ages and played an important role in the education and self-perception of early modern physicians, such as Gregory, who seldom failed to evoke it along with similar Hippocratic ideals in their lectures and books. For Gregory, the maxim was strongly connected to the study and care of the human mind and the question of what the physician's role might be in the development of this subject as an empirical science. He was taught that this branch of medicine was as noble as its subject and that, in the words of his Leiden teacher, Jerome Gaub, the more diligently each of us cultivates it, the more he will be worthy of the name of physician-philosopher and likewise of being deemed god-like or *Isotheos*, in the words of Hippocrates.²²

Gaub taught that it was the task of the philosophically trained physician to recognize the mutual relations of mind and body in health and disease. In his opinion, medicine could only be perfected when it had found the means, as he said, 'to make men not only robust but also as superior in character and behaviour as possible.'²³ To achieve this goal, however, the physician must not only possess Hippocratic moral philosophy, including the virtues of modesty, reserve and sound judgement, but also the skills and learning of the natural philosopher or scientist. His students were encouraged to discover new drugs and other external agents which might arouse, repress or modify the various faculties of the mind; but to be '*Isotheos*', the physician had to combine the virtues of the moral and the natural philosopher.

Crucial to this nexus was the concept of sympathy, which began to take on its modern form in the late seventeenth century and which reached its apotheosis with Hume and Smith. The concept was directly dependent upon the physiology of nerves which had become the ruling medical orthodoxy at the Edinburgh medical

school and of which Gregory and his colleagues were enthusiastic proponents. Sympathy, therefore, had the potential for being a purely analytic tool in the explanation of human motivation. This idea was gradually realized in the most famous discussions of the topic, those of Hume and Smith. For most Scottish thinkers, however, the concept of sympathy had a distinctly normative, as well as explanatory role. Gregory's view of sympathy had little to distinguish it from those of his Scottish contemporaries, particularly the fellow-members of the Aberdeen Philosophical Society, including his cousin Thomas Reid, whose Common Sense philosophy he largely adopted.²⁴ For these thinkers, sympathy was part of the principle of sociability. It was morally important to them because it seemed to provide an ascertainable foundation for benevolence and, through that, for the humanitarian reforms they strove after. Sympathy was essential to the image of human nature as inherently compassionate - with the implication that those who were not moved by sympathy were less than human. Because women were naturally endowed with an abundance of sympathy, they were, at least according to Gregory, all too human!

Gregory defined his concept of humanity, or sympathy (he uses the two interchangeably) as 'that sensibility which makes us feel for the distresses of our fellow creatures and which incites in us the most powerful manner to relieve them.'²⁵ Like all aspects of the mind, sympathy could be studied empirically with the aim of determining its God-given purpose. Like reason, it was, however,

²⁴ For a more detailed analysis of Gregory's theory of sympathy, see L. Haakonssen, *Medicine and morals*. Concerning Gregory's background in Common Sense philosophy, see Christopher Lawrence, 'Medicine as culture: Edinburgh and the Scottish Enlightenment', Ph.D., University of London (1983), 290-302.

²⁵ *Lectures*, 19.

²¹ L J Rather, *Mind and body in the eighteenth century* (London, 1965), 111-13.

²² Rather, *Mind and body*, 113.

²³ Rather, *Mind and body*, ib.

unevenly distributed, fluctuating according to external circumstances, such as climate, and according to internal constitution, such as gender. Sympathy could be encouraged, however, in those who were lacking and moderated in those who were overly endowed.

Gregory's religious beliefs helped to promote his confidence that the book of nature was not a difficult one to read. He was sure that he had the ability to infer from his studies of human sympathy the natural purposes or ends of men and women, respectively. The possibility of manipulating sympathy was also appealing to him because it was compatible with the philosophical physician's duty to improve both the minds and characters of his patients or, in other words, to treat the whole person. His belief that women were naturally more sympathetic than men made this feature of sexual difference a plausible and, for him, attractive avenue to moral reform.

Gregory's arguments for sexually determined moral difference were based on medical, biological and philosophical assumptions which he did not question very closely, not even in his medical lectures. In particular, he accepted the conclusions of the contemporary physiology of the nerves which declared that women's nervous system, its fibres, tissues, and muscles were of a different consistency from men's and that their sexual organs played a large role in determining this crucial difference. Like other medical moralists, he proceeded from the woman's supposed physiological constitution to determine her intellectual and moral capacity. The organization of women's bodily parts, the softness of her reproductive organs, the extreme sensitivity of her nerves, and many other similar features of the female anatomy, as seen by Gregory, signalled both woman's natural moral superiority and her intellectual inferiority. While women certainly possessed reason just like men, they could not, on this view, fully develop their rationality because of the impact of their nervous system. Dominated by intense sensations, women were capable of heightened perception and great feats of imagination, but were, by the same token, incapable of performing cognitive functions as well as men. Conceiving the political in terms of the medical, he further established the scientific basis for women's exclusion from those

spheres of life which depended more on reason than sympathetic emotion.

Sympathy was, however, the much celebrated bond of social life, and women were in a position to be compensated for their intellectual disadvantages through their sympathetic prowess. Women possessed superior ability to sympathize with others, including men, as well as the ability to arouse sympathy - an example of mutuality which was a crucial feature of the theory of sympathy. Women who possessed this natural (dis)advantage could, therefore, have a powerful controlling influence on the men who were their teachers, lovers and protectors. The message of Gregory's advice-book, can thus be interpreted as a warning that if women abandoned the role to which their sympathetic strengths and cognitive weaknesses appointed them, all bets were off, so to speak.

* * * * *

Gregory's *Legacy*, his *Duties and Qualifications of Physicians* and his *Comparative View* were all part of a wider scheme. On the one hand, Gregory's science was based on the physiology of nerves and the associated theory of sympathy that explained human behaviour as naturally sentimental and, on the other, the view that reason - meaning the reason of competent men - could and should regulate sentiment. It was this claim of competence or expertise that Dr. Gregory offered his female readers. Similarly, because the practical, regulatory sciences of religion, medicine and morals had to make use of sympathy, they too were in need of the guiding hand of rational reflection. Such guidance was provided by 'proper philosophy' which was characterized by the Baconian idea of 'laying open' knowledge and making it publically accessible. This openness and drive for publicity frames the theory of paternalistic exclusion summed up in the conclusion of *Comparative View*,

The bulk of Mankind are made to act, not to reason, for which they have neither abilities nor leisure. They who possess that deep, clear, and comprehensive Understanding which constitutes a truly philosophical Genius, seem born to an ascendancy and empire over the Minds and affairs of Mankind, if they would but assume it. It cannot be expected, that they should possess all those powers and talents which are requisite in the several useful and elegant Arts of life, but it is they alone who are fitted to direct and regulate their application.²⁶

To be an elite physician trained in moral as well as natural philosophy was, in this sense, to find oneself in the role of social advisor whose task it was to point out how philosophy properly should be used in the duties of common life.²⁷ This was the basis of Dr. Gregory's claim to relevant knowledge. As for the profession which took as its province the well-being of the whole person, body and soul, there were no bounds. Like the more recent WHO definition of health, this view justified the involvement of medicine in every aspect of society as well in the private lives of individuals and their families.

Lisbeth Haakonssen
Boston University

²⁶ *Comparative View*, 203.

²⁷ James Gregory, Preface to John Gregory, *A father's legacy to his daughters, to which is prefixed an account of the life of the author* (London, Edinburgh, 1786).

PERSPECTIVES ON DAVID HARTLEY

R K Webb*

Michael Innes begins his detective novel *The weight of the evidence* (1943) by introducing the handsome, elderly philosopher and university vice-chancellor Sir David Evans, seated before a bookcase 'groaning under Locke, Hartley, and Hume'. Although Innes tells us that in the portraits of Sir David that had been hung at Burlington House only volumes of Locke and Hume appeared behind him, the scene in the great man's room on this occasion is illumined by a moving shaft of sunlight that alights first on Hartley's *Observations on man, his frame, his duty and his expectations*, before moving on to Locke's *Essay concerning human understanding*. The arrival of the detective Sir John Appleby forestalls resolution of Innes's speculation as to which title would have next been highlighted: the *A letter concerning toleration*, *The reasonableness of Christianity*, or *A treatise of human nature*.

Most modern scholars have understandably emulated the portrait painters, going straight to Locke and Hume. When more than a sunbeam's glance has alighted on Hartley, it has been cast by those with historical interests in one or another of the rather disparate fields that have sustained a sometimes forgotten Hartleian influence - psychology and neurophysiology, epistemology, utilitarianism, the origins of literary romanticism - or in a better-known figure whose debt to Hartley was acknowledged, like Priestley or Coleridge.¹ Such targeted interests also help to explain some of the

* I should like to acknowledge the help of Professor Knud Haakonssen and Dr Martin Fitzpatrick, colleagues at the Humanities Research Centre in 1996, the later assistance of Mr John Creasey of Dr Williams's Library, and particularly the careful and critical reading of an early version of the paper by Dr G M Ditchfield. The essay was completed too soon for me to take advantage of Richard C Allen, *David Hartley on Human Nature* (Albany New York, 1999), which promises to begin a new era in Hartley studies. Professor Allen read the final version of this paper and made several helpful suggestions, for which I am deeply grateful.

¹ In psychology, for example, Robert M Young, *Mind, brain, and adaptation in the nineteenth century* (Oxford, 1970), and his entries on

sympathetic discussions of Hartley in more general works, such as Leslie Stephen's discussion in the second volume of his *History of English thought in the eighteenth century* (London, 1876) or the fair and delicate eighth chapter of Basil Willey's *The eighteenth century background* (London, 1940). In this paper, I shall offer some suggestions about what seem to me neglected characteristics of the work itself and relate them reciprocally to its reception.

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There is a singular identity between the man and the book.² David Hartley was baptized on 21 June 1705, the eldest son and second child of a poor Yorkshire clergyman, also David, and his first wife, Evereld, who died shortly after her son's birth.³ The boy was raised by a Mrs Brooksbank and sent to Bradford Grammar School, where he formed a lifelong friendship with the Revd Joseph Lister, who became headmaster of the grammar school at Bury, Lancashire. In 1722, Hartley entered Jesus College, Cambridge, graduating B. A.

Hartley in the *Dictionary of scientific biography* and on association of ideas in the *Dictionary of the history of ideas*. See also Roy Porter's entry on Hartley in the *Routledge encyclopædia of philosophy*; I am grateful to Dr Porter for an early view of that article. The classic instance for utilitarianism is Elie Halévy, *The growth of philosophic radicalism* (Paris, 1901-4, tr. London, 1928).

² In what follows I am obligated to the work of Martha Ellen Webb, in her 1981 doctoral dissertation at the University of Oklahoma, 'A reexamination of the inception, development, and 'Newtonianism' of David Hartley's *Observations on Man*' and her two summary articles 'A new history of Hartley's *Observations on Man*', *Journal of the History of the Behavioral Sciences*, xxiv (1988), 202-11, and 'The early medical studies and practice of Dr. David Hartley', *Bulletin of the History of Medicine*, lxiii (1989), 618-36. I have used some of the same sources and will be quoting from them for my own purposes, but on every significant point about Hartley's life and the writing of the *Observations* I believe that she and I are in agreement. I should perhaps add that Dr Webb and I are neither related nor acquainted.

³ Allen, ch.1, adds important detail to the account of Hartley's early life given in M E Webb, 'Early medical history', 618, n. 2. A genealogy can be found in Joseph Hunter, *Familiae minorum gentium, Publications of the Harleian Society*, xxxviii (London, 1895), 615.

in January 1725/6 and becoming a fellow of his college the next year. He abandoned his intended clerical career because he had developed scruples about subscribing the Thirty-nine Articles, in particular those dealing with perpetual damnation. After a brief interval as a schoolmaster, he became a physician, though he took no medical degree. He practised in Newark, Bury St. Edmunds, London and, after 1742, Bath, where he died on 28 August 1757.

Hartley married twice. A son by the first marriage, another David (1732-1813), became a pro-American, Rockinghamite member of Parliament, serving as a principal draughtsman, with his friend Benjamin Franklin, of the Treaty of Paris, which ended the American war in 1783. The elder Hartley's second wife brought a fortune of £7,500 to the marriage, but while, at least early on, the income eased his philosophical and theological avocation, he could not in the end afford to give up his practice.⁴ He was elected a Fellow of the Royal Society in 1736 and through his Cambridge and London connections formed some very impressive friendships - Bishops Butler and Law, William Warburton (not yet a bishop), and Stephen Hales among them - and one glimpse into his medical practice concerns a most exalted patient, the Duke of Newcastle, whose rank exempted him neither from the bleeding and purges of eighteenth-century physic nor from disagreement among his team of doctors.⁵ Yet, for all his contacts with the great world of intellect and fashion, he remained an oddly isolated figure, labouring away for twenty years on his great work according to his lights.

⁴ Hartley to Joseph Lister, 15 November 1735, 29 August 1738, and, in paraphrase, 17 May 1747, W B Trigg, 'The correspondence of Dr. David Hartley and Rev. John Lister', *Transactions of the Halifax Antiquarian Society* [hereafter HAST], (1938), 233-4, 239, 267. The Lister correspondence is central. In later years the two wrote in Byrom's shorthand, but Dr Webb has been able to make excellent use of this material.

⁵ Hartley to the Duchess of Newcastle, 23 January, 24 and 25 July, and 'Saturday' and 1 August 1738, British Library, Add. MSS, 33,065/291-2, 298; 33,083/276-7, 278-9. Hartley also prescribed for Lister, with the usual eighteenth-century compounds of empiricism and hope over which nature might eventually triumph. There is much information in M E Webb, 'Early Medical Studies'.

The history of the *Observations* began around 1730 when, through his Cambridge connections, Hartley learned of the interest of an obscure clergyman, the Revd. John Gay, in the then much-canvassed question of the sources of virtue. Gay's brief inquiry was published in 1731 as a preliminary dissertation to the translation by Edmund Law of a celebrated Latin treatise of 1702 on the origin of evil by William King, archbishop of Dublin. Gay rejected Francis Hutcheson's recent explanation of the general approbation of virtue by positing a moral sense and a public affection implanted instinctually, prior to education and beyond the reach of reason: that, Gay insisted disapprovingly, was to import occult or innate qualities. Rather, drawing on Locke, Gay argued that it was possible that all man's intellectual pleasures and pains could be derived from the association of ideas; in highly compressed form, he threw out a number of ideas that can be found, much expanded and couched in more lucid prose, in Hartley's vast work.

In resuming a long-interrupted correspondence with Lister late in 1735, Hartley explained that he had 'for some time applied myself chiefly to moral and Religious enquiries, and have got the better of every Material Doubt I ever yet had, concerning either natural or revealed Religion'. By the middle of 1735 he had already completed 'two small treatises', which he called 'The Progress to Happiness deduced from Reason - & from Scripture', demonstrating that all the intellectual pleasures are formed from sensations, that benevolence is the best means to obtain private happiness, and that through association, our natures will assure the generalization of benevolence and so that 'all must some time or other be happy'.⁶ He doubted, however, that he would ever publish and certainly not until both he and his friends were satisfied with his approach and arguments.⁷

In a letter of 13 March 1735/6, not included in Trigg's anthology of the correspondence,⁸ he elaborated on his concerns - the definition of virtue, the coincidence of moral good with private

happiness and in turn with public benefit, and universal happiness as the fundamental Doctrine both of Reason & Scripture'. He also, characteristically, felt impelled to resort to quasi-mathematical expression:

And so the three Definitions of Virtue [private happiness, public good, and conformity to the will of God] will coincide with each other ex omni parte, just, as if A shd define a Triangle from its 3 Sides, B from its 3 Angles, & C from the perpetual Equality of its Angles to 2 right ones. Nevertheless as in the Definitions of a Triangle one serves better than another for demonstrating its Properties; so the first Definition of Moral Good from private Happiness seems best accom[m]odated to the Purposes of a Teacher of Morality, because he will by that means engage the Attention of his Readers. Most Men have indeed some Regard both to public Happiness & and the Will of God, but every Man intuitively regards his own Welfare.

In the course of that year, he gave further accounts of his thinking to Lister, seeking his reactions. He certainly got a response to his arguments for universal restoration, which Hartley had called the 'great Doctrine' of Scripture. Perhaps, Lister insisted, the wicked here might be punished in the next world and brought into favour with God, but what assurance could reason give that those who refused happiness in this world 'shall have the Gift in a manner forc'd upon [them]?' Everlasting happiness, he insisted, is a free, not an extorted, choice of virtue over vice, and to make happiness a necessity would be inconsistent with our free will. Men must, therefore, 'behave as if our eternal Fate were to be decided by this one Trial'.⁹

By November 1738, the project had grown into 'An Introduction to the History of Man in Four Parts', to take up in turn his corporeal, mental, moral, and religious capacities. Hartley sent

⁶ Hartley to Lister, 2 December 1736, HAST, 236.

⁷ 15 November 1735, HAST, 234.

⁸ West Yorkshire Archives SH: 7/HL/2. I am grateful to the Archivist of the Calderdale District Archives for permission to quote from the manuscript correspondence.

⁹ Hartley to Lister, 2 December 1736; Lister to Hartley, 14 December 1736, WYA SH: 7/HL/4/1 and 2. These are not fully included in Trigg's collection. See a letter from Hartley to his sister, 2 March 1734/5, reprinted in the *Monthly Repository*, v (1810), 56-7, in which he says that in another world, God 'will force them at last to comply, and make them happy whether they will or no.'

Lister rough drafts of the third and fourth - moral and religious - parts, explaining that the first, still sketchy segment would deal with 'the Phenomena of the Body and its several parts as they are affected by the external objects of Touch, Taste, Smell, Hot, Cold, Diet, Medicines, &c., &c. as they affect and are affected by one another', while the second would trace the origins of 'the several senses of Beauty, Honour, Benevolence, &c., with their several parts and the manner in which they rise, with the time of their rise in infancy, &c., as particularly as I can' and 'explain a little how all our mental Pleasures and Pains are derived from sensible ones, either immediately, or mediately by association'.¹⁰

A preliminary version, *Conjecturae quaedam de sensu, motu, et idearum generatione*, appeared in 1747, improbably as a supplement to the second edition of his *De Lithonriptico a Joanna Stephens nuper invento dissertatio epistolaris*, which reflected his lifelong enthusiasm for Mrs Stephens's alleged cure for stone.¹¹ At last, in 1749, the *Observations* was published, in two large volumes. Ever an appealingly modest man, Hartley generously acknowledged his principal sources. After John Gay, they were the last paragraph of Newton's *Principia* and the twelfth and thirteenth queries added to the *Opticks*, which gave Hartley the notion of vibrations as the means by which sensation was conveyed to the

¹⁰ 23 November 1738, HAST, 244-5.

¹¹ The *Conjecturae* was reprinted by Samuel Parr in his *Metaphysical tracts of English philosophers of the eighteenth century* (London, 1837) and has been translated as *Various conjectures on the perception, motion, and generation of ideas* by Robert E A Palmer (Augustan Reprint Society, Clark Library, University of California at Los Angeles, 1959). Hartley himself suffered from stone disease and believed he benefited from Mrs Stephens's remedy; he took the lead in 1739 in a campaign to secure her a parliamentary grant of £5000. A principal ingredient of the concoction was soap, and it has been estimated (G. S. Bower, *David Hartley and James Mill*, New York, 1881, 2n.) that Hartley consumed two hundred pounds of soap before he died. The archbishop of Canterbury, another of Hartley's well-placed patients, recalled the 'nauseous' liquid form of the remedy which he took in 1740 (*The autobiography of Thomas Secker, Archbishop of Canterbury*, ed. John S Macauley and R W Greaves, Lawrence, University of Kansas Libraries (1988), 21, 23; a reference for which I am indebted to Dr G M Ditchfield).

brain, and Locke's incidental but still influential suggestion about the formation of complex ideas in the mind through association.

Largely in accordance with the plan Hartley had described to Lister, the first two chapters, making up about half of the first volume, are given over to an exposition of the theory that sensory impressions are conveyed by vibrations in the nerves to the medullary substance in the brain, where lesser vibrations (vibratiuncles) are set up, either presently to vanish or to remain if reinforced by repetition and accretion, which by association allow the building up of complex ideas from simple ones.¹² The remaining two chapters deal with the emergence of moral ideas through association. In the conclusion to the first volume, he deals with the necessarian scheme and with the interpretation of evil, as following from the psychological mechanisms suggested earlier, within the ruling assumptions about God's benevolence. Hartley maintained that free will, or liberty in the philosophical sense, was impossible. Because actions follow from motives formed in the mind through sensation and association, the same action must always follow while the formation of the mind remains unchanged. Necessarians repeated endlessly that their argument concerned only *philosophical* liberty, not practical liberty and that everyone was left with the ordinary impression of freedom. But the distinction was usually lost, and critics assailed the system as mere fatalism and a sure way to undermine morality by removing individual responsibility.¹³

The first chapter in the second volume deals with the being and attributes of God from the standpoint of natural religion, and the second with the truth of Christianity as derived from revelation: the fundamental axiom, both assumed and proved, is the power of God, limitless and benevolent. The third chapter derives the rule of life (a phrase found in Gay) from the preceding demonstrations, and the

¹² For an admirably concise summary of Hartley's associationism, Barbara Bowen Oberg, 'David Hartley and the association of ideas', *Journal of the History of Ideas*, xxxvii (1976), 441-54.

¹³ The sixth chapter of Joseph Butler, *An analogy of natural and revealed religion* (1736) deals with the question of necessity in terms of fatalism, which must have been centrally present in Hartley's mind in making his distinctions.

last chapter lays out the expectations of mankind, in the world and in the world to come, as determined by obedience to or flouting of the rule of life. It is here that Hartley, undeterred by Lister's objections, advances the prospect of universal restoration - that all mankind will ultimately be saved - a contention that one might expect to be anathema to most of the religious world as oversetting all order by removing the ultimate sanction of everlasting punishment. A conclusion alerts the reader to the evils threatening contemporary society with ruin.

Most writers have found it difficult to reconcile the two volumes - the one containing a radical and innovative psychology, the other (excepting the fourth chapter) an apparently conservative and conventional theological and moral tract. But Hartley saw the two as intimately connected, with the first volume providing the mechanism to support the religious and moral formation of the second.¹⁴ It is true that, over long periods in the second volume, awareness of the first is allowed to lapse, making the occasional reminders of the relevance of the psychology both jolting and somewhat unconvincing. I shall leave the question at that, giving credit to the author's intentions and observing that the two volumes exercised a very different appeal to readers over the next century, as indeed did the parts of each volume. It may, therefore, be helpful to see the *Observations* as unintendedly constructed in a way we might call modular, in six separable and recombinable segments: in the first volume, a physically based psychology, the developed associationism, and the argument for necessitarianism; in the second volume, a defense of natural and revealed religion, an exposition of the rule of life (to which must be added the ethical lament of the conclusion), and a striking eschatology.

What seems to me the differing styles of argument in the two volumes may also relate to the uses made of them in later decades. At first sight, Hartley's approach in the first volume is attractively tentative, because of his frank acknowledgment of its hypothetical approach and his extensive use, both brash and diffident, of

¹⁴ Especially noteworthy is the discussion by Robert Marsh, 'The second part of Hartley's system', *Journal of the History of Ideas*, xx (1959), 264-73.

analogy. Perhaps vibrations in the nerves do not do what is proposed, he says in effect, but on the analogy (among others) of a violin string it is a likely possibility made more so by the discoveries of anatomists and physiologists, clinical observation, and the extensive philosophical literature of the early part of the century. But despite the show of tentativeness, it seems to me that the first volume is splendidly confident, in part because of the authority his sources carry, in part because of the excitement one senses in his account of a wide range of knowledge that was, as he points out, simply unavailable to Descartes a century earlier.

The second volume, on the other hand, despite a surface bravado, strikes me as predominantly defensive. Notwithstanding his references to the mechanisms of the first part, Hartley was really concerned to defend the totality of revealed Christianity, as it appeared to rational religionists, against the threats from Deists, sceptics, and atheists - and from that more hopeful category of 'cautious unbelievers' (ii, 188). He does not abandon analogy in the second volume - indeed, at one point in a discussion of reasoning by types (e.g., David and the Paschal Lamb as types of the Messiah), he equates the type to 'the Key of Nature, Analogy', 'of such extensive Use in Philosophy' (ii, 165). But the dominant method in that volume is argumentative. The battling with texts so common in eighteenth-century theological dispute is not much in evidence; rather, each theological point is aggressively defended, typically using the formula, 'if it be said...then you must grant', to reduce the nameless sceptics and atheists to incompetent silence. Only in the sections concerned with the rule of life do we find a different mixture - of plaintiveness about a world rapidly slipping away with good medical sense, notably in those sections dealing with the virtue of moderation. Then, in a startling change of tone, the fourth chapter offers a final, powerful prediction of a world changed at its end: there Hartley emerges as a true prophetic voice.¹⁵

Turning now to a more detailed examination of the *Observations*, we may begin with a quotation from Professor

¹⁵ Compare Jack Fruchtman Jr, 'Late latitudinarianism: the case of David Hartley', *Enlightenment and Dissent*, 11 (1992), 3-22.

Schofield, who finds it 'turgid and prolix, almost baroque in style, with little sense of proportion in argument, eclectic and ... derivative' - a judgment that may be shared by most readers in the late twentieth century.¹⁶ But he goes on at once to note that for Joseph Priestley the book became second in importance only to the Bible. It may, therefore, be helpful to take account of some characteristics that would have had greater appeal to some eighteenth-century readers (certainly not all!) than can readily be found today.

Part of the difficulty that a modern reader must experience is the organization of the work into numbered propositions, 99 in the first volume, 95 in the second, with appended corollaries and scholia. To contemporaries, the structure carried both the authority of large-scale formal argument and the familiarity of printed, pre-evangelical sermons, with their numbered points and scrupulously mustered evidence. So, too, with Hartley's frequent resort to mathematical formulations, of which we have already seen an example in his early outlines of the work. It was certainly an approach that Hartley felt strongly about. He had been taught at Cambridge by the great algebraist, Nicholas Saunderson, the blind Lucasian professor with whom he remained on close personal terms, as he was with Saunderson's widow, getting subscribers for the posthumous algebra textbook and making certain that it was used in Lister's school at Bury.¹⁷ But here again Hartley was engaging a good seventeenth-century preoccupation with mathematical proof and, in particular, the impulse to carry the authority of mathematics into ethical speculation. Damaged though it had been by Hobbes and Spinoza, the concern was still a lively one when David Hartley was at work on the *Observations*: Thomas

¹⁶ Robert E Schofield, *The enlightenment of Joseph Priestley: a study of his life and works from 1733 to 1773* (University Park, Pennsylvania, 1997), 57.

¹⁷ 5 June and 29 August 1738, HAST, 238-9. On the context of Hartley's mathematical approach, M E Webb, *Re-examination*, 241-2 and 270-4; all of the last chapter, 'On the "Newtonianism" of the *Observations on Man*', is relevant. See also C U M Smith, 'David Hartley's Newtonian neuropsychology', *Journal of the History of the Behavioral Sciences*, xxiii (1987), 123-35.

Reid's first published work, in 1748, was *An essay on quantity; occasioned by reading a treatise in which simple and compound ratios are applied to virtue and merit*, the treatise in question being Hutcheson's *Inquiry*, though Hutcheson had excised the mathematical material in the original when he brought out a fourth edition in 1738.¹⁸

The style that imposes hard slogging on today's readers seems not to have troubled an eighteenth-century audience. One of Hartley's sternest critics, the Scottish philosopher Thomas Reid, had no difficulty with Hartley's presentation:

We see no Reason to charge Dr Hartley's *Observations on Man* with being in any Degree unintelligible. His Words are well chosen. His sentences easy perspicuous and unaffected, and the Whole Book pertinent to the Subject and Digested in good Order and Method....[I]n every part of his work he appears to have a distinct meaning and to express it in a proper Didactick Style.¹⁹

Fifty years on, Sir James Mackintosh, who thought that 'in spite of the imposing forms of geometry, the work is not really distinguished by good method', at least conceded in a left-handed compliment that Hartley's writing was 'entitled to no praise but that of clearness, and a simplicity of diction, through which is visible a singular simplicity of mind'.²⁰

¹⁸ Knud Haakonssen, 'Thomas Reid', in John W Yolton, John Valmir Price and John Stephens eds., *Dictionary of eighteenth-century British philosophers* (2 vols., Bristol, 1999), 2, 739-48, an advanced copy of which was kindly given me by Professor Haakonssen. On the move away from mathematical demonstration in the natural and human sciences, Barbara J Shapiro, *Probability and certainty in seventeenth-century England: a study of the relationships between natural science, religion, history, law, and literature* (Princeton, 1983).

¹⁹ 'Essay 2d[.] A general view of the doctrine of association of ideas', MS notes in Paul Wood ed., *Thomas Reid on the animate creation: papers relating to the life sciences* (Edinburgh, 1995), 137-8. I am grateful to Professor Haakonssen for this reference.

²⁰ In the essay on progress in ethical philosophy in the 7th edition of the *Encyclopædia Britannica*, reprinted in *Dissertations on the history of metaphysical and ethical, and of mathematical and physical science* (Edinburgh, 1835), 365. James Mill's anonymous blast, *A fragment on*

It is certainly true that for all its show of scientific rigour, the *Observations* is a vast haystack of a book, in some parts almost like the work of an autodidact, in its digressiveness and skewed proportions. Or perhaps it is just that a work had grown from something small to something large over much of a lifetime, into which the observations and ruminations of years had to find their way. Towards the end of the nineteenth century, G S Bower somewhat unkindly wrote that 'Hartley's numerous corollaries resemble the postscript of a lady's letter in this, that his best guesses and suggestions are often contained in them'.²¹ Leaving aside the put-down, there is truth in the estimate.

Sometimes one of Hartley's insights will carry the marks of the enthusiasm or obsession so evident in his dedication to Mrs Stephens's cure. For example, he was not immune from the devotion of his age to chronologies and harmonies, to resolve the conflicts in the Bible, and he offers (II, 25-6) one of his own solutions, 'an Hypothesis, by which, as it appears to me, one may reconcile the Genealogies of St. *Matthew* and St. *Luke*'. Again, he had told Lister that he was not very competent in Greek, though he still intended to try some of the Fathers, and that he had 'endeavoured at Hebrew once or twice lately, but have always been put by. However, I hope in a year or two it will do'.²² Well enough, apparently, for him to offer Hebrew as the basis for the future 'philosophical language' that would remedy the confusion of Babel (I: 317); on a broader plane, his study of Hebrew, however rudimentary, may have underlain the deep emotion evident in his powerful treatment of the restoration of the Jews to their homeland (II, 373-5).²³ But this self-indulgence must also be seen as set in a highly provocative and prescient discussion of language.

Mackintosh (London, 1835), contains only an incidental reference to Hartley in an appendix: he had many other fish to fry.

²¹ Bower, *Hartley and Mill*, 74. George Spencer Bower (1854-1928) attended Winchester and New College Oxford, where he took a first in Greats in 1877, and was called to the bar in 1880, practising on the Midland Circuit.

²² 27 September 1738, HAST, 241-2.

²³ For later Jewish restorationism, Jack Fruchtman Jr, 'Joseph Priestley and early English Zionism', *Enlightenment and Dissent*, 2 (1983), 39-46,

Another key question in the subsequent history of the *Observations* relates to the content and timing of successive editions. In 1775, Joseph Priestley, an early and enthusiastic advocate, brought out *Hartley's theory of the human mind, on the principle of the association of ideas*, to secure a wider circle of readers than he thought the original edition had obtained. This was a drastic abridgment, omitting most of the system of moral and religious knowledge in the second volume, which Priestley thought 'clogged' the work, and also leaving out (except for a brief introductory essay) the entire exposition of the theory of vibrations - which he said he agreed with but which he thought (surely rightly) would put off most readers.²⁴

Meanwhile, in 1772, Hermann Pistorius, the Lutheran rector of Poseritz on the Baltic island of Rugen, had published an exhaustive commentary on the second volume of the *Observations*.²⁵ In 1791, the London printer Joseph Johnson, who had published Priestley's redaction, brought out a second edition of the original work in a single large quarto volume, with a translation of Pistorius's commentary, a prefatory life of Hartley by his son, and a portrait. A third edition in the same year appeared in three octavo volumes, identical to the second except for omission of the portrait. The fourth edition (called the third on the title page) in 1801, also from Johnson, placed the Pistorius notes and the life in the third volume.

and Iain McCalman, 'New Jerusalems: Prophecy, Dissent and Radical Culture in England, 1786-1830', in Knud Haakonssen ed., *Enlightenment and religion: rational dissent in eighteenth-century Britain* (Cambridge, 1996), 312-35.

²⁴ Priestley's edition ends with a table of the omitted sections. The only changes he made in what he retained were those necessary for connective sense. It should be noted that Priestley amassed several volumes of notes of 'facts concerning human nature' intended for a volume illustrating Hartley's theory, but these were destroyed in the Birmingham Riots of 1791 (Letter to Theophilus Lindsey, in J. T. Rutt ed., *The theological and miscellaneous works of Joseph Priestley* (25 vols., London, 1817-1831), I, pt. 1, 5-6.

²⁵ On Pistorius (1730-95), *Allgemeine Deutsche Biographie*. Among his other publications were translations of Joseph Priestley's *Forms of prayer and other offices* (1786) and William Belsham's *Essays philosophical, historical, and literary* (1798).

The fifth edition (Bath, 1810) returned to two volumes, without Pistorius but with the life and a newly engraved portrait, and adding prayers and religious meditations by Hartley (described erroneously as M D). A sixth edition in 1834 is simply the 1749 text.²⁶

This publishing history entails considerable frustration because one cannot often be certain which edition was used by later readers and so whether the neglect of one or more of the modular segments means rejection or simple ignorance. It seems likely that Priestley's version had a wider influence over the next generation or two than the original edition had had in its own time: Coleridge apparently began with Priestley's Hartley but caught up with one of the 1791 editions, which seems to have stimulated his wider and eventually more critical views.

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Apparently, Hartley himself had doubts that the *Observations* would find immediate or general acceptance among philosophers or even that it would be much read, though he hoped that 'it would become the adopted system of future philosophers'.²⁷ It is difficult to know how far this pessimism was justified. I have found no reviews of the book, but it was only the beginning of the reviewing age, and some of Hartley's arguments were sufficiently corrosive that a general publication (like the *Gentleman's Magazine*) might have thought it wise to avoid noticing it. In 1780 Lord Monboddo wrote to Richard Price criticizing Priestley (in another connection) and adding that 'the only one from whom he professes to have learned his Metaphysics, is one Dr. Hartley, of whom I never heard so much as a name till I was last in London'.²⁸ There is, however, some indication of immediate interest, prior to the publication of

²⁶ I have followed the account given in Theodore Huguélet's introduction to the facsimile edition of the 1749 volumes (Gainesville, Florida, 1966).

²⁷ See the sketch of Hartley's life by his son in the three-volume edition of 1791, p. xiii.

²⁸ 15 September 1780, W Bernard Peach and D O Thomas eds., *The Correspondence of Richard Price 1748-91* (3 vols., Durham, North Carolina; Cardiff, Wales, 1983-91), I, 195.

Priestley's version, and it is possible to extrapolate back from the response of readers of a later generation to its earliest effects.

Obviously the book made its way to Germany, where Pistorius produced his commentary on the second volume, and to France, where in 1755 the abbé Henri Jurain, a teacher of mathematics in Reims, published a two-volume translation of the first, which he dedicated to Buffon. Jurain explained to his readers that the second volume, which he insisted had little relation to the first, did not merit translation for two reasons: its solid exposition of natural theology, the Christian religion, and the rules of morality did not add to works available in French, while, in addition, in that volume Hartley had fallen into the Origenist error of denying hell and eternal punishment. The first volume, on the other hand, offered much that was novel and worthy of attention, with the added advantage of being less abstract and clearer than Locke. Jurain particularly admired Hartley's derivation (ch. 3, props. 79-87) of the origins of language, writing, and mathematical reasoning from association. He assured his readers that the work carried no taint of materialism and, as an added protection, substituted for the conclusion to the first volume, in which Hartley had set out his necessarian views, his own conclusion maintaining the superiority of men to beasts, the immateriality of the soul, and the existence of free will.²⁹ Such assurances no doubt helped the granting of the licence with which the book was published.

²⁹ *Explication physique des sens, des idées, et des mouvements, tant volontaires qu'involontaires* (Reims, 1755). Jurain has so far eluded me. He does not appear among the correspondents of Didérot, Rousseau, or Voltaire, nor was he a contributor to the *Encyclopédie*. Hartley, too, is absent from the *Encyclopédie*, either in his own name or in the entry on association of ideas by the chevalier de Jaucourt [John Lough, *The contributors to the 'Encyclopédie'* (London, 1973), 84-5]. It would be hard to better the conclusion in the entry on Hartley in *La Grande Larousse* (1875), that, while Hartley's doctrines had lost their credit in England, 'en France, elles n'en ont jamais eu pour une excellente raison: on ne les connaît pas'. One of the best brief nineteenth-century appreciations of Hartley's contributions, however, came from a French psychologist, Théodule Ribot, in his *English Psychology* (tr. London, 1873), 35-43. The writer of the Hartleian article on Philosophy in *Rees's*

In England, on his first reading of the *Observations* shortly after publication, the poet Edward Young recommended it to his friend Samuel Richardson, and did so again after re-reading it, apparently unaware that Richardson was, in fact, the book's publisher. A work of distinction, Young called it, calculated for men of sense and certain to be rewarding to 'any man who considers himself immortal'. 'So few books have any thing new in them, that those which have are entitled to our particular regard It is evident that Dr. Hartley has thought for himself.'³⁰ The testimony is significant in coming from an Oxford-trained lawyer, Anglican cleric, and government pensioner who stands out in a potential audience dominated by Dissenters and Cambridge latitudinarians and radicals. The Bath physician William Oliver, whose opinion of the manuscript Hartley must have solicited, wrote to Philip Doddridge while the book was still in press to say that a copy would be sent to him as soon as it was published and to ask for his opinion. In a later letter he criticizes Hartley's arguments for universal restoration.³¹

We are singularly fortunate in having detailed documentation of one early reading, by Joseph Priestley himself. Having entered Daventry Academy in 1752, the year after the death of its founder Philip Doddridge and in the first year after its relocation from Northampton, Priestley found himself in an intellectual situation peculiarly suited to his questing temperament and unusual anywhere for its openness. This atmosphere, in which, as Priestley famously recalled, the tutor Caleb Ashworth regularly took the conservative side while the sub-tutor Samuel Clark as regularly argued for heterodoxy, was a consequence partly of Doddridge's methods, partly of the by then established use of English as the language of instruction, which (while somewhat depreciating the

Cyclopædia in 1819 (see below, n.48) was aware of the existence of Jurain's work.

³⁰ Young to Richardson, 8 May 1749, *The Correspondence of Samuel Richardson*, ed. A L Barbauld (6 vols., London, 1804), II, 25-7. When 'Selector' came across this letter, he sent it to the *Monthly Repository*, where it was published in October 1806, i, 569.

³¹ Geoffrey F Nuttall, *Calendar of the correspondence of Philip Doddridge DD (1702-51)* (London, 1979), nos. 1378 and 1490. Today Oliver's chief claim to fame is the invention of the Bath Oliver biscuit.

classics) made it easy for recent or new publications to become the currency of debate.

The question of liberty and necessity was intensively canvassed at Daventry: Priestley records a discussion with two fellow students on 10 May, a lecture by Clark on 'the doctrine of the brain' on 18 May, and on 25 May spending 'till eight o'clock with Mr. Ashworth in his closet in serious discourse, and about necessity, extremely agreeable'. Engagement with the question had gone far enough by late September 1754 that Priestley wrote a carefully planned letter to Hartley, even before reading a word in the *Observations*, which, however, he began on 26 October, completing his reading of the first volume (he did not continue with the second at this point) on 12 November. A week later he began work on an essay on *Practical necessity*, which he was correcting on 8-9 December. On the 10th he was able to show the first reply from Hartley to Ashworth, who was 'prodigiously pleased'. On the 11th, he held forth to the 'club' 'upon liberty no foundation for praise and blame', reverting to the subject at another club discussion on Christmas day, where 'I blew for necessity till the last departed' - all this amid much other reading (including a number of works on aspects of mathematics, among them Saunderson on infinities), endless talking, some alarming scientific experiments, and a rather startling succession of youthful high jinks. Thus an epoch in Priestley's life: introduced to the subject first in lectures and pursued through close reading - in Collins and then in Hartley - he became a necessarian, increasing both his 'disposition to piety' and his sense of liberation from ancestral Calvinism. 'Indeed, I do not know whether the consideration of Dr. Hartley's theory contributes more to enlighten the mind, or improve the heart; it affects both in so supereminent a degree'.³²

³² In Rutt, *Works*, I, 24. The preceding chronology of his exposure to Hartley is taken from Tony Rail and Beryl Thomas, 'Joseph Priestley's journal while at Daventry Academy 1754', *Enlightenment and Dissent*, 13 (1994), 49-113, an invaluable transcription of a single surviving fragment of Priestley's shorthand diary. The subject of necessity was not entirely new to Priestley when he came to Daventry; he had earlier upheld the libertarian side in a correspondence with Peter Annet, the deviser of the shorthand Priestley used. On all this, the illuminating discussion in

Priestley would not have been alone among Daventry students in his engagement with Hartley, though he may have outstripped them in enthusiasm.

To the more radical Cambridge latitudinarians and to undergraduates following in that path, a work that proposed to join Locke and Newton must have been irresistible, while the combination of devotional tone and scientific language of the second, apologetic volume with the physical underpinnings of the first was surely more than acceptable: it seems to have come as a kind of revelation. Anthony Page's article in this issue absolves me from giving any detailed attention to John Jebb, the consummate Cambridge Hartleian, whose university career was not helped with the university authorities by his being (as he put it) 'a little inclined' to the system of Hartley and Locke, which he repeatedly called to the attention of his pupils. Richard Watson, singled out for his promise while still an undergraduate and rising swiftly in university esteem to professorships of chemistry (of which he knew nothing prior to his appointment) and divinity, had in the 1760s served as moderator with Jebb, and if the seventy-six questions Watson takes from the moderator's book for 1762 were those or similar to those when Jebb and Watson were colleagues, Jebb would have had ample opportunity then to call attention to Hartley, as he would have done in the eagerly attended post-prandial disputations that Watson so admired.³³ While it is not demonstrable

Schofield, *Priestley*, ch.ii. See also the preface to *The doctrine of philosophical necessity illustrated* (1777), Rutt, *Works*, III, 458.

³³ *Anecdotes of the life of Richard Watson, Bishop of Llandaff* (Philadelphia, 1818), 10-32, esp. 22-5. Note Watson's amusing account of William Paley's dilemma in the first year in which Watson served as moderator. Paley had proposed as one of the questions for his act, *Aeternitas poenarum contradicit Divinis attributis*; when he came to Watson terrified because the master of his college insisted that the question be dropped, Watson's politic solution was to insert *non* before *contradicit*, though he was well aware that the original formulation would have been in keeping with the views of Archbishop Tillotson long before. Discretion may have kept Watson from subsequent acknowledgment of Hartley's contributions on such questions, but in a Cambridge atmosphere at one time not unlike that at Daventry, one cannot extrapolate from later silence to earlier ignorance.

that Wordsworth a few years later read the *Observations*, he could not have missed the general awareness, as is evidenced by the importance of association in his poetry; and, despite Jebb's misadventures, the *Cambridge University Calendar* for 1802 notes that Hartley was dealt with in university lectures and was still a subject of disputations for the B. A. degree.³⁴

No such silences surround Coleridge, and although his involvement with Hartley is well-known, a brief rehearsal may be in order. Everyone knows that in 1796 Coleridge named his first-born son after David Hartley: 'he first who marked the ideal tribes / Up the fine fibres through the sentient brain'. Thus *Religious Musings* on Christmas eve, 1794, giving poetic voice to the extravagant avowal a fortnight earlier in a well-known letter to Southey: 'I am a compleat Necessitarian - and understand the subject as well almost as Hartley himself - but I go farther than Hartley and believe the corporeality of *thought* - namely, that it is motion ...'³⁵

By the early years of the new century, however, reading, personal experience, and reflection were bringing Coleridge to visceral rejection of the mechanistic externalism he had once so admired. Hartley began to slip in his ranking of the great names of English thought, and by early March 1801 he declared to Thomas Poole that he had 'overthrown the doctrine of Association, as taught by Hartley, and with it all the irreligious metaphysics of modern infidels'. Yet in 1803 he could write to William Godwin proposing to preface a projected abridgment of Abraham Tucker's *The light of nature pursued* with 'an Essay containing the whole substance of the first Volume of Hartley, entirely defecated from all the corpuscular hypotheses - with new illustrations - & give my name to the Essay'.³⁶ It may be as well, given the accusations of plagiarism that have dogged Coleridge's reputation, that the project

³⁴ Ben Ross Schneider Jr, *Wordsworth's Cambridge education* (1957), 106-9, especially 109n, and 237-9.

³⁵ 11 December 1794, in E L Griggs ed., *Collected letters of Samuel Taylor Coleridge* (6 vols., Oxford, 1956-71), I, 74. Note immediately following this passage his use of Hartleian jargon to make a joke in commiserating with a friend who had got a thrashing.

³⁶ To Poole, 16 March 1801; to Godwin, 4 June 1803, *Coleridge letters*, II, 706, 949.

went nowhere, though it would have been interesting to see to what extent Coleridge's defecation would have differed from Priestley's surgery of thirty years earlier.

But early loves are seldom discarded completely, and in the *Biographia literaria* in 1817, the old affection for 'the excellent and pious Hartley' remained, and Coleridge continued to see value in the theological system in the second volume of the *Observations*, divorced from the psychological speculations of the first. For the psychology would reduce what Coleridge writes to mere motion of muscles and nerves, motion originating in passive external causes linked to everything that had ever existed.

Thus the whole universe co-operates to produce the minutest stroke of every letter, save only that I myself, and I alone, have nothing to do with it It is the mere quick-silver plating behind a looking-glass; and in this alone consists the poor worthless I!³⁷

Coleridge became a Romantic philosopher after leaving Cambridge; Jebb became a physician. Doctors, whose prominence among those early influenced by Hartley has been repeatedly noticed, must have appreciated the vast mustering of medical evidence and (if they were of a sufficiently flexible frame of mind) the sympathetic and frank discussion of the mechanisms of even the most intimate of physical processes in the passages that presumably led Mackintosh to complain that 'the influence of [Hartley's] medical habits renders many of his examples displeasing and sometimes disgusting'.³⁸ They may, too, have appreciated even more than non-professional readers Hartley's proof of association in the emerging automatism in learning to speak a language or to play the harpsichord or in the way a child develops, let alone the insights that would be more likely to draw the attention and admiration of a late twentieth-century reader, such as the remarkable passage on dissociation in dreams and the therapeutic effect of dreaming (I: 383-9).

³⁷ *Biographia literaria*, ed. James Engell and W J Bate (London and Princeton, 1984), chs. 5-7.

³⁸ *Dissertations*, 365.

It seems to me, as it has appeared to others, that a sense of the excitement that Hartley's first volume could bring to contemporary readers can be found by noting the congruence of some of Hartley's speculations with the findings of late twentieth-century neurophysiologists - making allowances for Hartley's writing in a pre-electrical, pre-chemical age - for example, his description of the way in which sense impressions are communicated by vibrations in the nerves to the brain in seeing and hearing ('...the Ear becomes, like the Eye, a Method of Perception suited to the Wants of a spiritual Being' I:234), in touch, taste, and smell, or by his hints at specialization of areas in the brain. So, too, the debate on the question (among others) on which J. R. Searle and his allies are today at loggerheads with a legion of opposing theorists of mind and consciousness - is the brain a computer? - is conducted in terms of an analogy that, *mutatis mutandis*, confers significant relevance on Hartley.³⁹

Fortunately it is possible to follow the rather detailed reactions of one doctor to his reading of Hartley. Benjamin Rush (1745-1813), the famous American physician, studied medicine at Edinburgh and in 1791 became professor of the institutes of medicine at the University of Pennsylvania. He was, in the words of an acute commentator, 'an eclectic. He took what he wanted and left what he did not like. Consistency was not his, for he was influenced in turn by deism, realism, and materialism.'⁴⁰ As one would expect

³⁹ The point of congruence between Hartley and present-day neurophysiology is made, though not developed, in C U M Smith, 'Hartley's Newtonian neurophysiology'. Compare this perfectly matter-of-fact passage taken from an article on pheromones I serendipitously encountered in the *Washington Post*, 28 July 1996: 'When we smell an odor such as coffee, the airborne chemicals responsible for the odor become attached to specific receptors in the nose. When a chemical odorant 'key' clicks into its receptor 'lock', an electrical activation signal is created. The signal then travels along a corridor of nerve fibers into brain centers that are responsible for higher awareness. In this way the initial receptor signal ultimately results in the conscious perception of smelling coffee'.

⁴⁰ I Woodbridge Riley, 'Benjamin Rush, as materialist and realist', *Johns Hopkins Hospital Bulletin*, xviii (1907), 89.

from a loyal son of Princeton, he held to the doctrine of the moral sense of the Scottish school, but in preparing his lectures for the professorship, for which he read Boerhaave, Haller, Hunter, Gregory, and Cullen 'and many small tracts upon physiological subjects', 'from none of them did I derive so many useful hints as from Dr. Hartley's treatise'⁴¹

In discussing somnambulism in his treatise on mental diseases, he quotes at length from Hartley, and his commonplace book is studded with references to points gleaned from the *Observations*. Thus,

All evils are cured by evil. Diseases cure each other, as gout and mania, dropsy, consumption, &c. Even remedies are nothing but the means of exciting new diseases. Whipping a dog prevents the effects of Nux Vomica (Hartley, p.51, Vol.I). What would be the effect of hot iron after swallowing poison?

Again, on the immoral tendency of Latin and Greek authors, he offers specific citation to Hartley, II, 238 and 454, mere passing mentions of lewd poets. In 1807 he began his course of lectures by recommending close attention to the diseases of domestic animals and their cures, his ninth and last point arguing that the differences between men and brutes is only one of degree and raising the prospect of mercy to be shown to them in the future world - a point he told his students he would never have raised,

were it not sanctioned by the name of a man whose discoveries in physiological, metaphysical, and theological science mark an era in the achievements of the human mind - I mean the great and good, I had almost said the inspired, Dr. Hartley,

from whose works he read a brief passage to justify his taking up the subject.⁴²

⁴¹ *The autobiography of Benjamin Rush*, ed. George W Corner (Princeton, 1948), 94.

⁴² Rush to John Adams, 31 Oct. 1807, in L H Butterfield ed., *Letters of Benjamin Rush* (2 vols., Princeton, 1951), II, 953-4, and the qualification in the following letter to Richard Peters, 28 November 1807. See also *Autobiography*, 351-2. The idea of a difference of degree rather than kind between men and animals was anathema to the Scottish philosophers.

Rush drew on associationist arguments in his late lecture on preventing drunkenness, where he noted the ancient pedigree of the idea and cited numerous instances, among them curing an addiction by adding a few grains of tartar emetic to rum. But he was persuaded by even larger Hartleian doctrine: 'I believe in a general and particular providence, having long been a disciple of Dr. Hartley. *All will end well.*' He often confronted his friend Priestley with his shift in his later years from belief in annihilation to belief in universal restoration, to which he himself was committed: 'General *letter* of Scripture against it, *tenor* in its favor....Universality expressed by *all* the earth, *all* nations, *all* families, *all* individuals, *all* flesh. See Hartley and Pistorius.' In 1811, Rush wrote to Thomas Jefferson to ask if he had yet had time since his retirement at Monticello to read the *Observations*. He praised it for having established 'an indissoluble union between physiology, metaphysics, and Christianity', but regretted its appearance a century or two before the world was prepared for it. There is, alas, no evidence that Jefferson ever did so.⁴³

Back across the Atlantic, towards the end of the first decade of the nineteenth century, Thomas Southwood Smith, who had been raised as a strict Baptist and was finishing his course in the Bristol Baptist Academy, lost his faith. He was guided through his crisis by Unitarian friends in Bristol, among them J P Estlin, minister at Lewin's Mead Chapel and Coleridge's longtime correspondent, and the physician Benjamin Spencer. Like Spencer, who had undergone a similar crisis a generation earlier, Smith went to Edinburgh to study medicine and, as well, to give a permanent foundation to the Unitarian congregation in that city. His thesis for the M D degree in 1816, dedicated among others to Thomas Belsham, whose lectures at Daventry and Hackney had been transformed into

⁴³ On drunkenness and the working of association, *An inquiry into the effects of ardent spirits on the human body and mind* (Philadelphia, 1811), 29-31, and *An oration delivered before the American Philosophical Society* (Philadelphia, 1786). On providence, to James Currie, 26 July 1796, *Letters*, 780; on universal restoration, *Autobiography*, 231, 342. Rush to Jefferson, 2 January 1811, *Letters*, 1074-5. The *Observations* seems not to have been in Jefferson's library. *Catalogue of the library of Thomas Jefferson*, E M Sowerby, comp. (5 vols., 1952).

a Hartleian textbook in 1801, was concerned with how trauma to the brain could lead to mental disease by disordering the vibrations. For the rest of his life, Southwood Smith remained fascinated by the problems of mental health, and his *Illustrations of the divine government* of 1816 and subsequent editions became not only one of the major Unitarian expositions of necessarian doctrine but an interesting blueprint for Smith's own career as a medical researcher, writer, and 'Benthamite' public servant.⁴⁴

Such detailed instances can give some sense of the reasons for Hartley's success with susceptible contemporaries and near-contemporaries, but others reacted very differently. One anti-Hartleian tradition that lasted almost as long as the life of Hartleianism itself was to be found north of the Tweed, with, I suspect, greater negative results than Coleridge's defection, which we remember so readily today. However favourably Thomas Reid responded to the structure and language of Hartley's book and to the attractiveness (by report) of his personality, he did not approve at all of Hartley's message. Although Hartley devotes much space to the Moral Sense, assigning to it components with which Reid probably did not disagree, like Hazlitt later, he could not accept Hartley's derivation of it. He was particularly severe on Hartley's use of hypothesis and conjecture, notably the speculation about vibrations, for which no evidence was offered.

It is a pity that a man of Dr. Hartley's knowledge and candour should have followed the multitude in this fallacious tract, after expressing his approbation of the proper method of philosophising, pointed out by Bacon and Newton. The last considered it a reproach when his system was called his hypothesis And it is very strange that Dr. Hartley should not only follow such a method of philosophizing himself, but that he should direct others in their inquiries to follow it.⁴⁵

⁴⁴ R K Webb, 'Southwood Smith: the intellectual sources of public service', in Dorothy Porter and Roy Porter, eds., *Doctors, politics and society: historical essays* (Amsterdam, 1993), 46-80.

⁴⁵ *Essays on the intellectual powers of man* (1785), in Sir William Hamilton ed., *The works of Thomas Reid, D D* (Edinburgh, 1845), I, 249-50 *et seq.* The reality about the role of hypothesis in seventeenth and

Reid's admiring successor, Dugald Stewart, was even more categorical. The mixture of fact and hypothesis (not in Hartley alone), he insisted, had brought the philosophy of mind into discredit. An explanation of association 'by certain supposed vibrations, or other changes, in the state of the brain; or to explain memory by means of supposed impressions and traces in the sensorium [is to] blend a collection of important and well-ascertained truths, with principles which rest wholly on conjecture'.⁴⁶ Somewhat later, the well-known metaphysician Thomas Brown remarked (rather sniffily) that 'it is chiefly in the southern part of the island, that the hypothesis of Dr. Hartley has met with followers; and his followers have generally been extravagant admirers of his philosophical genius, which, I own, seems to me to be very opposite to the genius of sound philosophy'. He notes Hartley's disclaimer of materialism but suggests that he had produced it in the minds of his followers 'as effectually as if he had himself believed and contended that the soul is a cube, or a cone, or some irregular solid of many sides'.⁴⁷

Hartley and his disciples may be counted as singularly unfortunate in that the encyclopædias of a knowledge-craving age were produced prominently, if not dominantly by Scottish enterprise. The first edition of the *Encyclopædia Britannica* (completed in 1771) does not mention Hartley and offers only a very rudimentary discussion of metaphysics and association of ideas, explaining the latter (under Metaphysics) by a curious reference to trains of motion in the animal spirits, 'which, once set a going, continue on in the same steps they have been used to;

eighteenth-century science, even Newtonian science, was far more complex than Reid could allow (Shapiro, *Probability*, 17, 44-61).

⁴⁶ *Elements of the philosophy of the human mind*, (3 vols., London, 1792-1827), I (1792), 11. On pp. 112-20, Stewart goes to considerable length to refute Hartley's explanation of habitual action. In his letter to Jefferson (see n. 43), Rush wrote: 'The Scotch philosophers of whom Dugald Stewart has lately become the champion abuse it in intemperate terms, but it is because they are so bewildered in the pagan doctrines of Aristotle and Plato that they do not understand it.'

⁴⁷ *Lectures on the philosophy of the human mind* (2 vols., Andover, Massachusetts, 1822), I, 147-8.

which by often treading are worn into a smooth path, and the motion in it becomes easy, and, as it were, natural'. The process may produce ideas in the mind, but if not, it may at least explain their following one another in a 'habitual train ... as well as it does to explain such motions of the body'.

In the third edition (completed 1797), Hartley gets a simple biographical entry with the sketchiest of allusions to the *Observations*, but the article on metaphysics, while showing the influence of the Scottish school, is highly favourable. His extrapolation from Newton's suggestion about vision to the other senses is said (XI, 486) to have been 'at least as probable as any which has yet been invented to account for the perception of external objects by means of the organs of sense'; and Hartley 'and his ingenious editor' have made the only significant advance on Locke in dealing with association of ideas. Anyone seeking truth, he continued (XI, 513), who recoils in disgust at the name of Priestley will only 'furnish him with a new proof of the doctrine which they reject'.

So favourable a judgment was not to be found again until well into the new century. Dugald Stewart's dissertation for the supplement to the fourth, fifth, and sixth editions of the *Britannica* (1824) has nothing to say about the theory of vibrations and most of the three pages he devotes to the Hartleian school are given over to King, Law, and Hartley's Genevan contemporary Charles Bonnet. Having nothing to add to what he has said elsewhere about Hartley's associationism, he concludes that Hartley's theory 'is fast passing into oblivion', its temporary popularity owing largely to Priestley's zeal and indefatigability. Mackintosh, as we have seen, followed suit in the seventh edition, and the rival Scottish encyclopædias rang the same tune. For the author of the entry on Hartley in the *Encyclopædia Edinensis* (1827), his doctrines 'have had their day, and the number of his followers is now probably very small'. The writer on physiology in Sir David Brewster's *Edinburgh Encyclopædia* (1830) found the doctrine of vibrations easier to understand than the rival hypothesis of animal spirits but 'entirely devoid of direct evidence' and irrelevant to the structure of the brain; hence it met 'with but few advocates when it was first proposed, and is now almost totally neglected, so that we

are reduced to the necessity of confessing our ignorance of the mode in which sensations are conveyed to the brain and are there rendered susceptible to the mind'. The judgment is echoed in the surprisingly long article on Hartley himself, where, despite his many virtues as a man, he is left, in a phrase adapted from Stewart, a metaphysical alchemist. By mid-century the Scottish philosophical outlook was dominated by Sir William Hamilton, and the article on metaphysics in the eighth edition of the *Britannica* (1860) was by Hamilton's English follower, H L Mansel, with yet another dismissal of Hartley. Small wonder that in soliciting the views of John Wilson, the famous contributor to *Blackwood's Magazine* and a controversial appointee to the chair of moral philosophy at Edinburgh, on his avowedly Hartleian entries on mental and moral philosophy in the English *Rees's Cyclopaedia*, the Unitarian minister Lant Carpenter wryly added 'if it be not heresy to controvert anything of Mr. Stewart's or Dr. Reid's'.⁴⁸

At the time of the publication of Stewart's *Dissertation* in 1824, however, another Scot, James Mill, was already at work on his *Analysis of the phenomena of the human mind* and had set his son, John Stuart Mill to reading Condillac and Helvétius and then what 'he deemed the really master-production in the philosophy of mind, Hartley's "Observations on Man"', which struck the younger Mill as 'a real analysis, and made me feel by contrast the insufficiency of the merely verbal generalizations of Condillac, and even of the

⁴⁸ Carpenter to Wilson, 2 Aug. 1820, in Russell Lant Carpenter, *Memoir of the Rev. Lant Carpenter* (London, 1842), 256, a reference kindly supplied to me by Mr. John Creasey. In addition to these long articles, which explicitly defend Hartley against the Scots, the list of Carpenter's publications in Appendix B notes his articles in the *Cyclopaedia* on education and language, while many smaller entries (including one on vibrations), perhaps from different hands, also expound Hartley's views. More surprising in this national confrontation is the brief but nuanced and favourable estimate of Hartley in the article on moral and metaphysical philosophy in the second volume of the *Encyclopædia Metropolitana* (1845); but any wonder at finding such a judgment in an impeccably Coleridgean and Anglican publication dissolves on noticing its authorship: it is by Frederick Denison Maurice, whose father, a Unitarian minister, was a notable Hartleian.

instructive gropings and feelings about for psychological explanations, of Locke'. He also read Berkeley, Hume, Reid, and Stewart, as inclination suggested, and, two or three years after, Brown's lectures on cause and effect. When the *Analysis* was published in 1829, it 'carried Hartley's mode of explaining the mental phenomena to so much greater length and depth'⁴⁹, and nearly forty years later the younger Mill's sense of obligation remained lively, although he thought that his contemporary Alexander Bain had taken Hartley's insight on the origins of the will to its fullest understanding.⁵⁰ With Bain, the neuro-physiological side of Hartley, expanded and reinforced by the researches of physiologists, was reimported into psychology, and the modern history of the discipline began.⁵¹ Orthodoxies can change quickly: the article on metaphysics in the ninth edition of the *Encyclopædia Britannica* was by G Croome Robertson, professor of philosophy at University College London and a prominent figure in the Mill-Bain school.⁵²

Space prevents consideration here of the most consistent school descending from Hartley and Priestley, the English Unitarians.⁵³ Among them, except for Belsham and Southwood Smith, the neurophysiological side of Hartley was little in evidence, but the associationism, necessarianism, and universal restoration were present in force. Consolidated in treatises by Thomas Belsham and Lant Carpenter, Hartleian doctrine was diffused through extensive discussion in the *Monthly Repository* over a quarter-century from 1806 and in the *Christian Reformer* for over nearly fifty years from 1815; both magazines were begun by Robert Aspland, a convert from the Baptists who, like Southwood Smith, was particularly tied

to the restorationist antidote to inherited Calvinism.⁵⁴ But the principal agent of diffusion was, without doubt, Manchester College in its years at York, from 1803 to 1840, where a generation of Priestleyan ministers and teachers was trained.

It is surprising that James Martineau - a product of Manchester College who had turned on Priestley, brilliantly, in articles in the *Monthly Repository* in 1833 that marked the beginning of his efforts to reconstruct Unitarianism on a transcendental and Romantic basis - scarcely noticed Hartley in his *Types of Ethical Theory*, published in 1885 long after his victory was established. He speaks of him only as introducing a 'refinement' in Utilitarian doctrine, though he can scarcely conceal his distaste for 'the Hartleyan (as I will call the psychologist of the Mill and Bain class)'.⁵⁵ In response to the efforts of Martineau and his allies, the 'Old School' mounted a new defense of Hartley, contributing to an increasing estrangement that led to a dramatic intradenominational clash in the 1860s.⁵⁶

By that time, Martineau's sister Harriet had rejected most of her Unitarian heritage for free thought and Positivism, but she

⁴⁹ *Autobiography of John Stuart Mill*, ed. J J Coss (New York, 1924), 48-9.

⁵⁰ John Stuart Mill to Rowland G Hazard, 16 November 1866, and to Alexander Bain, 6 December 1867, in Francis E Mineka and Dwight N Lindley eds., *The later letters of John Stuart Mill, 1849-73* (4 vols., Toronto, 1972) III, 1212, 1334.

⁵¹ R M Young, *Mind, brain, and adaptation*, ch. 3.

⁵² Croome Robertson's entry is reprinted as the first item in his *Philosophical remains*, ed. Alexander Bain (London, 1894).

⁵³ Another important omission is the necessarianism of William Godwin.

⁵⁴ Particularly noteworthy is the communication, 'Analysis of the idea of pleasure' in the *Repository*, vii (1812), 79-81, from Zero, couched in a proposition and two corollaries. It is hard not to tie that explicitly Hartleian structure to the publication of the Bath edition two years earlier. The communication is dated Glasgow, so it seems likely that it came from James Yates, a scholarly and dogmatic young Unitarian who was minister there and whose antiquarian instincts would have made the formal tribute irresistible. Also notable is the two-part article in the second series of the *Repository*, ii (1828), 293-8, 595-601, 'Remarks on some portions of Hartley's Rule of Life', by the Revd William Turner of Halifax, reviving a segment of the *Observations* that Priestley had omitted. On Carpenter, see above, pp.43 &44 and n. 48.

⁵⁵ *Types of ethical theory* (2 vols, Oxford, 1885, 3rd edn., 1889), II, 315-16. Like Martineau's other late books, this was based on lectures at the reoriented Manchester College in mid-century. He may well have been more severe in the lectures.

⁵⁶ The climax of this confrontation is dealt with in R K Webb, 'The limits of religious liberty: theology and criticism in nineteenth-century England' in Richard Helmstadter ed., *Freedom and religion in the nineteenth century* (Stanford, 1997), 120-59.

remained steadfast in the necessarianism she had taken up in the second decade of the century after reading Priestley's Hartley. She could still say of it in her autobiography, published in 1877 but written and put into print in 1855, that, 'amidst its monstrous deficiencies and absurdities, [there is] so much that is philosophically true, as well as holy, elevating and charming, that its influence might very well spread into all the events and experience of life, and chasten the habits and feelings, as it did in my case during a long series of years'.⁵⁷

She goes on to say something very odd. She had, she said, read the German, American, and English writers on the Romantic 'spiritual philosophy', but

I cannot at this hour look at the portrait of Hartley prefixed to his work, or glance at his strange Scholia, - which I could almost repeat, word for word, - without a strong revival of the old mood of earnest desire of self-discipline, and devotion to duty which I derived from them in my youth.

Here is Edward Tagart, minister at Little Portland Street, secretary of the British and Foreign Unitarian Association, Dickens's friend and for a time minister, and a leader of the beleaguered anti-Martineau forces, writing in a powerful defence of Locke and Hartley in the same year, 1855 (he could not have read her, and she would not have read him):

The angelic sweetness of [Hartley's] countenance is a strong recommendation of whatever he thought and believed. Who can look at the engraving of it without feeling it an argument in favour of his religious and amiable philosophy, presenting as it does a singular combination of feminine purity and grace with manly intellectual power? Heaven is reflected in its soft and ingenuous, yet bright and beaming intellectual expression.⁵⁸

Go back a generation or so. Harriet Martineau recalled that the great Unitarian minister Lant Carpenter, 'of the Locke and Hartley school altogether' would speak of Hartley (this would be around

⁵⁷ *Harriet Martineau's autobiography, with memorials by Maria Weston Chapman* (2 vols., Boston, 1877), I, 80-1.

⁵⁸ *Locke's writings and philosophy ... vindicated from the charge of contributing to the scepticism of Hume* (London, 1855), 144.

1820) 'as one who had the intellectual qualities of the seraphic order combined with the affections of the cherubic....' Go back yet again to 1804, to Gilbert Wakefield, another Cambridge radical who suffered for his beliefs: 'Who can look on the delightful image of [Hartley's] person, prefixed to his work, without powerful emotions of love and admiration for the original? His "human face divine" appears the residence of all that is good and great; it exhibits the intuition of genius, made venerable and lovely by a mixture of sweetness, modesty, gentleness, and complacency, beyond description'.⁵⁹ Wakefield notes the quarto edition of 1791, for which Hartley's portrait had been engraved by William Blake,⁶⁰ while the later raptures were more likely inspired by the engraving by J Heath, in the Bath edition of 1810. But surely all this physiognomic extravagance over three generations was owing to more than an engraver's skill, however touched with genius. I have no answer beyond a speculation that the totality of Hartley's work, in the middle of the eighteenth century as in the middle of the nineteenth, may have struck a chord of a sensibility that is not easy to find in the usual accounts of Georgian churchmanship and rational religion.⁶¹

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⁵⁹ *Memoirs of the life of Gilbert Wakefield* (2 vols., London, 1804) I, 78.

⁶⁰ See frontispiece to this volume.

⁶¹ Compare G S Rousseau, 'Nerves, spirits, and fibres: towards defining the origins of sensibility', in R F Brissenden and J C Eade eds., *Studies in the eighteenth century: papers presented at the third David Nicol Smith memorial seminar* (Canberra, 1976), 137-57; and Peter Gay, 'The manliness of Christ' in R W Davis and R J Helmstadter, eds., *Religion and irreligion in Victorian society* (London, 1992), 103-16.

**THE ENLIGHTENMENT AND A 'SECOND
REFORMATION': THE RELIGION AND PHILOSOPHY
OF JOHN JEBB (1736-86)**

Anthony Page

When the American Ambassador John Adams arrived in London in 1785, he told John Jebb that 'I have long wanted to Communicate with some of the enlightened Friends of Liberty here ... and I know of none who merit the Character better.'¹ This sense of Jebb's important role in the reform movement was echoed twenty-seven years after his death by the conservative author of *Literary Anecdotes of the Eighteenth Century*, who wrote that 'No name is better known among the advocates for Parliamentary Reform, than that of Dr Jebb.' Nichols characterised him as

much celebrated among the violent partisans for unbounded liberty, religious and political; and certainly a man of learning and talents, though they were both so much absorbed in controversy as to leave little among his writings of general use He was an active, enterprising, sincere, good natured man, but of rather too ardent a temper.²

The son of a well-off clergyman, Jebb spent the years from 1754 to 1776 at Cambridge University, where he earned a reputation as a learned biblical critic and teacher of Newtonian mathematics. However, his outspoken Whig sentiments and support for radical criticisms of George III's successive administrations made him unpopular with many influential figures in the University. Jebb's prominent role in the campaign to abolish the requirement that Anglican clergy subscribe to orthodox doctrine, and his repeated efforts to reform the academic curriculum made him detested by conservatives in the Church and University. This opposition,

¹ John Adams to John Jebb, 21 August 1785, Massachusetts Historical Society, Adams Family Papers. Many thanks to Wilfrid Prest, Damien Powell, Martin Fitzpatrick and R K Webb for their assistance and encouragement in the writing of this paper and my forthcoming thesis on Jebb.

² John Nichols, *Literary anecdotes of the eighteenth century* (9 vols., 1812-15), II (1813), 571-72, 711. Unless otherwise stated, London is the place of publication of works cited.

combined with the failure of his reform efforts and personal discomfort in formally professing a creed he had come to disbelieve, led to his resignation from the Church. He subsequently moved to London in 1776 to practise medicine and live among his Rational Dissenting friends.

Jebb was in the vanguard of the Real Whig and Commonwealthman political tradition, and in 1780 he became a leading organiser of the Association movement, with the aim of effecting parliamentary reform. Herbert Butterfield thought his *Address to the Freeholders of Middlesex* notable because it contained 'the extreme statement - indeed we might say the most comprehensive statement that was made at this time - of the doctrine and program of the Association, as the radical leaders understood it.'³ Jebb helped formulate the program that became the basis of nineteenth-century Chartism: annual elections, equal electorates, the secret ballot, abolition of the property requirement for MP's, payment of MP's, and universal manhood suffrage.⁴ With John Cartwright, he founded the Society for Constitutional Information, which distributed *gratis* short pamphlet sized extracts from 'constitutional classics' by Commonwealthmen such as Milton, Locke, and Trenchard, to help stimulate coffee-house debate on fundamental civil, religious and political rights. Jebb was a tireless agitator up until his death in 1786, and it was around him that the most radical advocates of reform gathered.⁵ While Jebb is referred to in studies of the religious, educational and political controversies of the day, he has yet to be the subject of an extended modern study.⁶

³ H Butterfield, *George III, Lord North and the People, 1779-1780* (New York, 1968), 191; E C Black, *The Association. British extra-parliamentary political organization 1769-1793* (Cambridge, Mass., 1963).

⁴ H T Dickinson, *Liberty and property: political ideology in eighteenth-century Britain* (1977), 220.

⁵ Caroline Robbins, *The eighteenth-century Commonwealthman*, (Cambridge, Mass., 1959), 376. This included a number of his former students, most notably Capel Lofft, John Baynes, the Unitarian minister John Disney, and Thomas Fyshe Palmer, who was transported to Australia for his radical activities in the 1790s.

⁶ The most substantial treatment so far is Naomi C Miller's entry on Jebb in the *Biographical dictionary of modern British radicals*; See my

In a valuable corrective to the Marxist and liberal interpretation of the eighteenth-century, revisionist historians have emphasised the social and political significance of the Anglican Church and the important relationship between theology and politics.⁷ We should, however, be careful to avoid a theological reductionism in which political, social and philosophical motives are neglected. Also, Jebb's radicalism cannot be explained simply as a rejection of Anglican orthodoxy.⁸ Debate over theology, ecclesiology and politics was fuelled by disagreement over how much the Anglican Church should be influenced by the critical, rationalist and humanist tendency of the Enlightenment. Jebb's radicalism was given impetus by his belief that Christianity and the Church of England should run with the breeze of the Enlightenment, and that to stay anchored to established doctrine and practice would mean eventual destruction by a rising tide of scepticism. In answering the denigration of the British reformers in the *Reflections on the Revolution in France*, Benjamin Bousfield held Jebb up as an example of 'the most disinterested patriot, the most benevolent philosopher, and the most conscientious theologian.'⁹ Primacy cannot be assigned to either the political, philosophical or theological dimension Jebb's thought - they were equally important and influential. That said, in this paper I want to discuss the philosophical disposition that accompanied Jebb's religion and politics. His Socinianism was fostered by an empiricist approach to

forthcoming University of Adelaide doctoral dissertation: *Enlightenment, religion and political reform in Britain: the life and work of Dr John Jebb (1736-86)*.

⁷ J C D Clark, *English Society, 1688-1832. Ideology, social structure and political practice during the ancien regime* (Cambridge, 1985).

⁸ J A I Champion, *The pillars of priestcraft shaken: the Church of England and its enemies, 1660-1730* (Cambridge, 1992), 19-20; See the contributions to *Albion*, 8 (1989); *British Journal for Eighteenth-Century Studies*, 15 (1992); Jeremy Black ed., *British politics and society from Walpole to Pitt, 1742-1789*, (MacMillan, 1990); Richard W Davis, 'The politics of the confessional state, 1760-1832', *Parliamentary History*, 9 (1990), 38-49.

⁹ Benjamin Bousfield, *Observations on the Right Hon. Edmund Burke's Pamphlet, on the subject of the French Revolution*, (Dublin, 1791), in G. Claeys ed., *Political writings of the 1790s* (8 vols., 1995), vol. 2, 96.

the Bible, and his enlightened optimism was rooted in the blend of Christianity and hedonist moral philosophy outlined in David Hartley's seminal *Observations on Man* (1749).

I

Science and scripture criticism

After nearly two years at the Whiggish Trinity College Dublin, Jebb completed his degree at Cambridge University in January 1757. He enrolled in Peterhouse College under the mastership of Edmund Law, who was one of the most outstanding representatives of Whig latitudinarianism at Cambridge and on the Episcopal bench in the first half of George III's reign. Law presided over an intellectual engine-house of enlightened thought and reform activity within the Anglican Church.¹⁰ Under Law, Jebb was educated as a latitudinarian in the cast of Benjamin Hoadly.¹¹ First and foremost a pamphleteer for the Whig cause, Hoadly did more than anyone to popularise the contractual theory of government, and shook the pillars of priestcraft from within the Anglican fold. His theology developed with his attempt to defend an Erastian view of the Church and undermine the scripture evidence for passive obedience. Despite rejecting the notion of the Church visible and championing reason and private judgement, Hoadly continued to defend subscription as a prudent, utilitarian measure.¹² From the late seventeenth century the latitudinarians had argued for

¹⁰ John Gascoigne, *Cambridge in the age of Enlightenment* (Cambridge, 1989); 'Anglican latitudinarianism, Rational Dissent and political radicalism in the late eighteenth century', in Knud Haakonssen ed., *Enlightenment and religion: Rational Dissent in eighteenth-century Britain* (Cambridge, 1996), 219-40.

¹¹ From a middle-class background in Nottinghamshire, Jebb's father was educated at Cambridge in the 1720s, and was granted a comfortable Church living in Ireland under the patronage of John Hoadly (1678-1746), Archbishop of Armagh, and younger brother of Benjamin.

¹² Benjamin Hoadly, *The original institution of government, discuss'd* (1710), and *The nature of the kingdom, or church of Christ* (1717); H T Dickinson, 'Benjamin Hoadly', *History Today*, 25 (1975), 348-55; D O Thomas, 'Benjamin Hoadly: the ethics of sincerity', *Enlightenment and Dissent*, 15 (1996), 71-88.

conformity to a broad church in which individuals could differ over unessential doctrines, or 'things indifferent'. However, as the eighteenth century wore on, this latitudinarian compromise came under increasing pressure from both a growth in heterodoxy and increasingly vocal demands that everyone - clergymen included - be allowed to publicly espouse their private judgement and not have to subscribe to an official doctrine. The demand for 'religious liberty' for the Anglican clergy came to a head with the publication of Francis Blackburne's enormously influential *Confessional* (1766) and the resulting Feathers Tavern petition to parliament (1772).¹³

Jebb's was a version of Christianity formulated in response to the Deist challenge of the early English Enlightenment. Peter Harrison has argued that English rationalists were the first to attempt an 'objective' anthropological study of 'the religions', which were 'cut to fit the new and much-vaunted scientific method.'¹⁴ Religion came to be seen as having a natural rather than a sacred history, and Christianity was left open to the criticism that its belated and partial revelation to humanity was inconsistent with the notion of a just and benevolent God.¹⁵ Rational Christians were forced to respond to the deistic theological monster they had helped create. Taking the existence of God for granted, Bishop Joseph Butler (1692-1752) famously recast the analogy between religion and nature in a pessimistic light, and defended the status of revelation by arguing that much of Nature was far from rationally comprehensible.¹⁶ In his *Theory of religion* (1745), a more confident Edmund Law claimed that the real issue was a lack of a universally equal understanding of either revealed or natural religion. He maintained that the basic principles of both may be grasped by everyone, but that there was a difference in the quality and refinement of that

¹³ Martin Fitzpatrick, 'Latitudinarianism at the Parting of the Ways: a Suggestion', in John Walsh, Colin Haydon, and Stephen Taylor eds., *From toleration to Tractarianism: the Church of England c.1689-1833* (Cambridge, 1993), 209-227.

¹⁴ P Harrison, 'Religion' and the religions in the English Enlightenment, (Cambridge, 1990), 2-3.

¹⁵ Matthew Tindal, *Christianity as old as the Creation* (1730).

¹⁶ Joseph Butler, *The analogy of religion and nature* (1736).

comprehension across various times, places, and stations in life. Reaffirming that revelation is essentially an extension of natural religion, with the added assurance of an afterlife, Law advanced the original thesis that our understanding of Christianity was constantly improving.¹⁷ The reason religious knowledge had not kept pace with natural philosophy, Law suggested, was because the principles of empirical science had not been fully applied to the study of religion.¹⁸ To achieve this he advocated close, critical and uninhibited study of the Scriptures in their original languages, combined with a free and candid exchange of ideas between students. This, he believed, would lead to agreement on the meaning of particular words, doctrinal disputes would come to an end, and a simple rational Christianity would stand revealed to all willing to look. Law was confident that he had answered the main deist objection, and that the way remained open toward an increasingly enlightened Christianity.¹⁹

Jebb embraced this confidence, and threw himself into the cause of purifying Christianity with reason. In the wake of Blackburne's *Confessional*, Jebb began to deliver lectures at Cambridge on the Greek New Testament. Openly acknowledging his Socinianism, these lectures caused a great stir within the university and were condemned by Thomas Rutherforth, the professor of Divinity. Jebb accused 'the majority of the heads of houses, and almost every prelate who has the least connection' with Cambridge of opposing

¹⁷ Leslie Stephen thought that Law's book was a 'reproduction of the well-worn arguments in favour of the partiality of revelation. ... however, [he] gives to it a peculiar turn which deserves a moment's notice.' *History of English thought in the eighteenth century* (1876, repr., Harbinger, USA, 1962), 344.

¹⁸ Edmund Law, *Considerations on the state of the world with regard to the theory of religion* (Cambridge, 1745), 182-84. Henceforth cited as *Theory of religion*. This work went through seven editions between 1745 and 1784, was translated into German in 1771, and was reissued in English in 1820.

¹⁹ Richard Brinkley, 'A Liberal Churchman: Edmund Law (1703-87)', *Enlightenment and Dissent*, 6 (1987), 6-11; R S Crane, *The idea of the humanities* (Chicago, 1967), 251-87.

the scientific study of revelation. As the 'pontifical powers' had once feared that

an inquiry into the operations of nature might shake down the philosophy of Moses, their lordships are alarmed, lest a mode of investigation, which succeeded so happily when the WORKS of God were the subject, might, if resolutely pursued in the case of his WORD, prove fatal to that system of theological opinions, which, for certain reasons ... they now so strenuously uphold.²⁰

Jebb asked those who doubted religious progress to consider the advances in 'our works of elegance and taste'. In everything, 'orthodox taste' was 'giving way to nature in her loveliest simplicity, though improved by all the powers of art.' Likewise, we 'also see monkish superstition retiring before the powers of industry and common sense.'²¹ Accordingly, he urged students of the Bible to 'make Newton our guide. Simplicity and magnificence in the works of God, the same to be searched for in the word'. He outlined four rules to guide his students throughout the course of the lectures:

- 1 attend to evidence not imagination.
- 2 admit no opinion of mine unless you think it supported by proper evidence.
- 3 hereafter reject any sentiment of mine if you perceive it false.
- 4 keep your mind open to evidence.²²

²⁰ John Jebb, *The works: theological, medical, political and miscellaneous*, ed. John Disney (3 vols., London, 1787), I, 54-5. The works hereafter will be referred to as, Jebb, I, Jebb, II, and Jebb, III. The first part of volume one is a separately bound and numbered 'Memoir of John Jebb' by John Disney which will be referred to as Jebb IM.

²¹ Dr. Williams's Library, Jebb Mss. IV. There are five volumes of Jebb's interleaved Greek New Testament and a volume of notes for his Theological Lectures in Dr Williams's Library. The pages are not numbered, but most citations from the interleaved Testament are from the first few pages of each volume where Jebb tended to write general notes.

²² Jebb Mss. IV. At the start of the fourth volume Jebb wrote the simple note: 'Newton - Locke - Law'.

In a note written in June 1770, he observed how in the past many philosophers had accepted facts without rigorous examination, and so had invented hypotheses to explain them which led to 'strange Doctrines' like the cycles and epicycles of Ptolemaic astronomy. Likewise, 'ill understood texts' were the bogus facts that gave rise to doctrines in religion such as 'the Trinity and Original Sin'. 'The reasonableness of an Hypothesis does not prove it true', he argued. Only through 'experiment in philosophy ... [and] critical knowledge of the Scriptures ... [does] nature and Scripture stand evidently disclosed to our view.' 'Search the Scriptures', Jebb urged, 'search facts [and] use Newton's rule of philosophising.'²³

Samuel Henley praised Jebb for entering in his prime upon endeavours which 'LOCKE and NEWTON, toward the close of life, regretted they had not earlier begun.' Where Francis Bacon had tried to 'strike off the shackles of the human mind' through 'the science of Nature,' Jebb was attempting to do the same 'in the study of Revelation.'²⁴ That such praise was not entirely overblown is attested by Theophilus Lindsey, who declared in a private letter, that 'of all persons I ever conversed with, [Jebb] has the most critical knowledge of the scriptures, and the best method of interpreting them.'²⁵ This is a considerable compliment when we consider that Lindsey counted Richard Price and Joseph Priestley among his close friends.

Jebb's method was adopted by the 'Society for Promoting Knowledge of the Scriptures'. Established at the Essex Street Unitarian church in 1783 by the likes of Lindsey, Price and Andrew Kippis, Jebb wrote most of the Society's outline of intention.²⁶

²³ Jebb Mss. IV.

²⁴ Samuel Henley, *The distinct claims of government and religion, considered in a sermon preached before the Honourable House of Burgesses, at Williamsburg in Virginia, March 1, 1772* (Cambridge, 1772), 'Dedication'.

²⁵ H M'Lachlan, *The letters of Theophilus Lindsey* (Manchester, 1920), 104.

²⁶ The original members of the Society were Theophilus Lindsey, John Disney, Andrew Kippis, Richard Price, Dr. Chandler, the lawyer, Michael Dodson, and the Rockinghamite Whig lawyer, John Lee. The Society stagnated through a lack of original or 'ingenious' essays. Its 'plan was

Maintaining that 'the word of God ... like the book of nature, lies open to us all', the Society aimed to help remove 'the cloud of human prejudices, which have so long obscured the heavenly light of truth', through an 'analytic' as opposed to the traditional 'synthetic' mode of inquiry. The Society would not accept essays 'written professedly in support of particular tenants or doctrines.' Contributors were to confine themselves to elucidating the rites, ceremonies, manners, or history of biblical times, or the language of the text. With a mind not 'warped in favour of any specific doctrine, or warmed with controversy', students of Scripture should sit down 'with the same calm and composed temper, with which we examine a passage in a Greek or Roman classic, whose genuine sense we are studious to explore.' The resulting correctly interpreted passages would, like 'a well-established experiment in philosophy', provide a sound empirical basis for the exercise of private judgement.²⁷

Jebb believed that if the intellectual trend of the Enlightenment was not harnessed to a 'Second Reformation', then a discredited orthodox Christianity would be left to rely entirely upon the support of political power in an increasingly sceptical and secular society.²⁸ The Reformation would only be complete when Christianity was stripped of the encrustation of past superstition.

While conservative Anglicans embraced many aspects of the scientific revolution, they tended to quarantine orthodox theology.²⁹

too circumscribed, and interfered too much with the larger, the more comprehensive, and more useful plan of the *Theological Repository*, at that time resumed by Dr. Priestley.' It wound up after producing two volumes of essays: Thomas Belsham, *Memoirs of the late Reverend Theophilus Lindsey, M.A....* (1812), 131-2.

²⁷ A Sketch of the Plan of the Society for Promoting the Knowledge of the Scriptures (1783), Jebb, II, 239-53.

²⁸ Jebb, III, 8.

²⁹ Richard G. Olson, 'Tory-High Church opposition to science and scientism in the Eighteenth Century: the works of John Arbuthnot, Jonathan Swift, and Samuel Johnson', in J G Burke ed., *The uses of science in the age of Newton* (California, 1983), 171-204; Larry Stewart, 'Samuel Clarke, Newtonianism, and the factions of post-revolutionary England', *Journal of the History of Ideas*, 42 (1981), 53-72.

Throughout the century, the heterodox were accused of allowing reason and philosophy to capture their minds at the expense of the Bible. It was a criticism that they tirelessly denied. Samuel Clark seems to have indicated why he made his Arian theology public in the form of a dense analysis of scripture when he wrote: 'the great objection against Men that think seriously and carefully about these things, is, that they are apt to adhere to their own Reason more than to Scripture: which is a most unjust Suggestion.'³⁰ The heterodox defence of their reading of the Bible reminds one of the Baconian rhetoric of Robert Boyle and the early 'Royal Society for the Advancement of Science'. Boyle argued that the Royal Society would discover and verify objective 'facts' through a carefully regulated collective process. Yet knowledge is never free from the attitudes and interests of its exponents. Boyle's programme reflected his social and religious prejudices: a 'fact' was something assessed by a group of gentlemen guided by the 'right reason' of a Christian.³¹ We can reverse this insight for the rational Christians of the eighteenth century: they genuinely thought that they were conducting an 'impartial examination' of God's word. Indeed, the 'Society for Promoting Knowledge of the Scriptures' was an undertaking that in some ways mirrored the Royal Society. Yet aside from their social and political prejudices, the theology of rational Christians was influenced by their Baconian search for the 'facts' of revelation, and by their engagement with the philosophical context of the Enlightenment. In order to establish breathing-space for science, Bacon had declared that religion and natural philosophy were separate and distinct types of knowledge. Rational Christians emphatically denied the distinction, and demanded that religion be treated like any other branch of science. In his criticism of Jebb's 'spirit of Protestantism', Edward Tew

³⁰ Samuel Clarke to John Jackson, 23 October 1714, cited in Stewart 'Samuel Clarke, Newtonianism, and the factions of post-revolutionary England', 58.

³¹ S Shapin and S Schaffer, *Leviathan and the air-pump: Hobbes, Boyle and the experimental life* (Princeton, 1985); Lotte Mulligan, "'Reason", "Right Reason", and "Revelation" in mid-seventeenth-century England', in Brian Vickers ed., *Occult and scientific mentalities in the Renaissance* (Cambridge, 1984), 103-23.

sneered at 'the pre-eminence being allotted to Reason, or as the Socinians affect to call it, Right Reason'.³² Conservatives realised that behind much contemporary heterodoxy lay the restless, unrestrained, and all-pervading critical attitude of the radical Enlightenment.

This is best illustrated by the three sermons Jebb's cousin and bitter opponent Samuel Hallifax preached at Cambridge in response to the Feathers Tavern petition. He condemned the 'airy pretensions to superior knowledge' or 'an overweening fondness for novelties, which seems to be an original frailty in some minds', and which meant that 'the teachers of false opinions have never failed of followers among the vicious or the vain'. John Disney identified such comments as personal abuse directed at Jebb.³³ In a clear rejection of Jebb's program of lectures, Hallifax observed that 'whenever the reapers of the word have given joyful expectations of a future harvest, the rank weeds of Heresy have secretly started up, and killed or stifled every cheerful hope of plenty.' In contrast to the 'modern innovators' within the Church (and in a clear reference to the works of Edmund Law), Hallifax asserted that the early Christians had

studied the sacred oracles, not as containing a rule of Science, but a rule of Life: they were more busied in exploring the methods, by which the Evil of Sin could be done away, than in amusing speculations about its Origin; and little attentive to the Theory of Religion, their whole attention was directed to the Practice of it, by *Repentance toward God, and Faith toward our Lord Jesus Christ*.³⁴

Hallifax proceeded to dismiss Socinianism and argue that many mysteries of religion were beyond the reach of rational scrutiny. Jonathan Clark uses these sermons to argue that conservative latitudinarians began stressing the *truth* of orthodox doctrine in

³² Edward Tew, *Resignation no proof. A letter to Mr J.: with occasional remarks on his spirit of Protestantism* (Cambridge, 1776), 35.

³³ Jebb IM, 34.

³⁴ Samuel Hallifax, *Three Sermons preached before the University of Cambridge, Occasioned by an Attempt to Abolish Subscription to the XXXIX Articles of Religion* (Cambridge, 1772), 3, 16.

response to the Feathers Tavern petition.³⁵ However, in general their argument was a negative one, stressing the validity of religious mysteries in light of the limitations of reason. Jebb attended the sermons and claimed that Hallifax's language in defence of the Trinity was much stronger than what appeared in print.³⁶ High Churchmen found it easier to ridicule the theology of rational Christians and assert the truth of orthodoxy, rather than systematically explain Anglican doctrine. Good examples of this are the witty and abusive pamphlets of the 'high and dry' Tory, George Horne, whom Hallifax congratulated in 1782: 'I think your manner of treating the wretched attempts of modern infidels is much more likely to do good than a grave and formal answer would be. Your irony is admirable; and most happily blended with solid and serious argumentation, so as at once to entertain and instruct your readers.'³⁷ Opposition to the reformers united conservative Whigs and Tories like Hallifax and Horne. According to the former, the petitioners were promoting a general contempt for 'religious obligations' that could be seen in

a motley multitude of grotesque and uncouth appearances: now clad in the flimsy vest of French philosophy and critique; now cloaked in the solemn garb of abstract speculation and enquiry; and now again, which is its usual form, in a disavowal of every moral principle, by an open and barefaced naturalism.³⁸

In his *Resignation No Proof: a letter to Mr. Jebb, with occasional remarks on his spirit of Protestantism* (1776), Edward Tew also hits on the root of the conflict: 'Learn Wisdom, say you, from the *material* world. Let but the sources of religious Truth be explored

³⁵ Clark, *English society*, 228-30.

³⁶ Apparently Hallifax declared that the Trinity 'were united though distinguished, distinguished though but one'. 'The expression was heard by hundreds', Jebb claimed, 'but, with many others of similar import, was not thought worthy of being retained in the printed copies.' Jebb I, 171n.

³⁷ Samuel Hallifax (Bishop of Gloucester) to George Horne, 12 June 1784, cited in Nigel Aston, 'Horne and heterodoxy: the defence of Anglican beliefs in the late Enlightenment', *English Historical Review*, 108 (1993), 908.

³⁸ Hallifax, *Three Sermons*, 4-5

in the same manner with the Laws of Nature; and the same success, the same just and easy explication, will follow.' While he agrees with Jebb's lament over the imperfect state of Scripture knowledge, he disagrees with his solution. Scientific method cannot be applied to religion: 'No train of experiments whatever, no critical patience or attention, could ever have suggested to our minds those sublimer doctrines of our Religion, which nevertheless we are bound implicitly to believe.'³⁹ While conservative latitudinarians were thoroughly attached to Newtonianism as a bulwark of the Anglican establishment, they believed that an application of science to the mysteries of Christianity would threaten religious and political stability.⁴⁰ Heterodoxy was vigorously attacked as a symptom of the extensive application of rational criticism, a practice that potentially threatened the political, as well as the religious constitution of society.

II

Observations on Man

According to Henri Laboucheix, 'the philosophical culture of the reformers, with the exception of [Price,] Jebb or Priestley, was pretty scanty.'⁴¹ Like Priestley, Jebb was profoundly influenced by the materialist and determinist psychology contained in David Hartley's *Observations on Man*. When critics derided Jebb's pretence to having a 'superior system' and his mixing of philosophy with religion, they were referring to both his Socinianism and the accompanying determinist philosophy. In

³⁹ Edward Tew, *Resignation no Proof*, 56-7.

⁴⁰ F.C. Mather has written of the 'High Church Prophet' Samuel Horsley, whose 'attachment to the Church was never free from self', that 'Devoted though he remained to Newton's mathematics, Horsley was never a consistent Newtonian. He drew back abruptly when science started to encroach on the freedom of God's dealings with the soul': *High Church Prophet: Bishop Samuel Horsley (1733-1806) and the Caroline tradition in the later Georgian Church* (Clarendon, Oxford, 1992), 53-4.

⁴¹ Henri Laboucheix, *Richard Price as moral philosopher and political theorist*, trans Sylvia and David Raphael (Oxford, 1982), *Studies on Voltaire and the Eighteenth Century*, vol. 207, 36.

1793 Maximillian Robespierre declared that 'Man is good, as he comes from the hands of nature ... if he is corrupt, the responsibility lies with vicious social institutions.'⁴² Jebb was neither a Rousseauist nor a revolutionary, but he would have been inclined to agree with this statement, only adding that the hands of nature were attached to the God of Christian revelation.⁴³ Jebb believed that humans were rational machines, and part of a system designed by a just and benevolent God in which humanity as a whole was slowly and inevitably progressing toward intellectual and moral perfection. The rate of this progress depended upon the degree to which free enquiry and the candid expression of ideas was encouraged or retarded.

In the wake of Locke's sense based epistemology, free will and determinism became one of the most hotly contested issues in eighteenth century philosophy. While admiring Alexander Pope as a 'moral poet', Hartley was concerned that the *Essay on Man* insinuated that 'the divine revelation of the Christian religion was superfluous, in a case where human philosophy was adequate.'⁴⁴ He saw a danger in Christianity being pushed aside by moral philosophers, and sought to bring it back to rightful pre-eminence supported by a mechanistic account of the human mind.⁴⁵

Taking for granted that natural and revealed religion commanded the practice of virtue, Hartley decided early in his 'moral and Religious Enquiries' that 'the chief result of both Reason and Scripture ... is Universal Happiness in the most absolute sense ultimately.'⁴⁶ The doctrine of universal salvation was controversial,

⁴² Norman Hampson, 'The Enlightenment in France', in Roy Porter and Mikulas Teich eds., *The Enlightenment in national context* (Cambridge, 1981), 49.

⁴³ Ann Jebb enthusiastically welcomed the French Revolution and blamed the religious and political establishment for provoking the violent actions of the people: *Two Penny-worth of Truth* (1793), 11-12.

⁴⁴ David Hartley, *Observations on Man: his Frame, Duty and Expectations* [1749], (London, 1791), iv. Henceforth referred to as *Observations*.

⁴⁵ *Observations*, 'Preface', 6.

⁴⁶ W. B. Trigg, 'Correspondence of David Hartley and the Rev. John Lister', *Transactions of the Halifax Antiquarian Society* (1938), 234.

as many thought that it would encourage licentious behaviour and a disregard for morality. Hartley sought to demonstrate how the practice of virtue and the attainment of happiness were logically connected as a *necessary* consequence of the way God had designed human beings. In the words of one historian, Hartley was primarily a 'reconciler of competing philosophies: the philosophy of necessity and materialism, and that of Christian idealism.'⁴⁷ The *Observations* is set out in two parts: the first outlines the physical structure of the human 'frame', and how sense data is conveyed to the brain via vibrations along the nerves. Then Hartley shows how simple ideas produced in the brain by the senses are formed into complex ideas by a process of 'association'. This results in the various 'affections' or dispositions to which people are prone. In the second part Hartley discusses the moral implications of this view of human nature in relation to natural and revealed religion in a survey of the 'Duty and Expectations of Mankind.'⁴⁸

Hartley thought that simple ideas were formed in the brain through vibrations in the medullary substance of the spinal marrow and the nervous system. By this means, sensory stimulation causes ideas in much the same way that the vibration of a string produces noise. Where Lucretius made a distinction between *anima* and *animus* as separate and opposed substances, Jebb claimed that they were both 'functions of our corporeal frame' which cease when the 'whole machine' dies, in the same way that sound stops 'when the wire is broken'. 'Lucretius supposes the motion of the fluid to be from itself', Jebb continued, 'we, by impulse, and communicated vibrations from without.'⁴⁹ While Jebb accepted Hartley's theory of vibrations, the latter readily admitted that it was a speculative hypothesis which may be disproved without affecting the validity of his overall system. He only advanced the theory of vibrations as

⁴⁷ Barbara Bowen Oberg, 'David Hartley and the Association of Ideas', *Journal of the History of Ideas*, 37 (1976), 442.

⁴⁸ On Hartley see Basil Willey, *The eighteenth-century background: studies on the idea of nature in the thought of the period* (Boston, 1961), ch. 8; Jack Fruchtman Jr., 'Late Latitudinarianism: the case of David Hartley', *Enlightenment and Dissent*, 11 (1992), 3-22; David Spadafora, *The idea of progress in the eighteenth century* (Yale, 1990), ch. 4.

⁴⁹ 'Miscellaneous notes', Jebb, II, 46.

providing a plausible physical explanation for how the mechanism of association worked. When Priestley produced his edition of the *Observations* (1775) he thought fit to discard the theory of vibrations as detracting from the important discussion of necessity.⁵⁰

To refute the concept of innate ideas, Locke had argued that knowledge was formed by the association of ideas generated by sense experience. This became the starting point for the eighteenth-century discussion of psychology. John Gay (1699-1745), who was at Cambridge at the same time as Jebb's father, was among the first to argue that human beings possessed no innate moral sense. While David Hume was influenced by Gay's tract, he still thought of humans as possessing innate common moral sentiments. It was left to Hartley to produce the first comprehensive statement of associationism. The association of ideas, he argued, resulted in the experience of 'affections' or dispositions that could be ranked on a cumulative hierarchy that ascended from simple to more complex and refined: sensation, imagination, ambition, self-interest, sympathy, theopathy, and the moral sense. The first four were the most common and basic affections, while the latter three were only properly cultivated in a mature and rational mind. All were interrelated and generated through a purely mechanical process:

1 At base were the *simple ideas* generated by sensory experience: this was the raw data that entered the mind and was little different to that experienced by animals.

2 *Imaginative ideas* resulted from the perceived aesthetic quality of an object. As a scientific realist Hartley held a low opinion of imagination, and thought it most vivid and useful during the infancy of both individuals and society. Thus, the Bible was characterised by figurative language, as were the beliefs of American Indians and other 'primitive' societies. Hartley thought that the mature individual (or society) should not indulge in the pleasures of the imagination, the evidence of which he saw to be the close connection between the 'polite arts' and all manner of vice. However, while he criticised 'artificial beauty', he encouraged contemplation of nature, whereby the imagination could conjure up

⁵⁰ *Observations*, 298.

the vast complexity of God's creation.⁵¹ Indeed, he argued that 'To the study of the word of God must be joined that of his works. They are in all things analogous to each other, and are perpetually comments upon each other.'⁵²

3 *Ambition* was regulated by the praise or condemnation of others.

4 *Self-interest* was affected by the satisfaction or disappointment of our immediate desires and fears, and is divided into three categories: the most common is 'gross self-interest' under which is grouped the experience of sensation, imagination, and ambition. The pursuit of a more 'refined self-interest' is encouraged by the happiness experienced through friendship and indulging in compassion, sympathy, and religious thoughts. This in turn encouraged a 'rational self-interest' in which an 'abstract happiness' was affected by 'the hopes and fears relating to a future state.'⁵³

5 The affections of *sympathy*, compassion, mercy, and sociability were generated early in life through realising that your interests are connected to the fate of others, and that we can understand the pleasure or pain of a fellow creature. However, as one matures the self-interested aspect of sympathy is gradually replaced by a 'pure disinterested benevolence' according to which 'we must weep with those that weep, as well as rejoice with those that rejoice.'⁵⁴

6 *Theopathy* was the happiness derived from cultivating a love of God. Even more so than benevolence, the 'affections and actions enjoined by piety ... regulate, improve and perfect' the 'inferior classes of pleasure, viz. those of sensation, imagination, ambition and self-interest'. Pious reflection on God's goodness would strengthen ones ability to be virtuous, benevolent and spread the gospel. In thinking only of ourselves, Hartley observed, it is easy to become frustrated by a seemingly fruitless practice of benevolence, and begin to complain about the 'corruption and wickedness' of the world. But the pious individual who sees God 'as an inexhaustible fountain of love' will learn by His example to love enemies, as well as friends; the sinful and miserable, as well as

⁵¹ Willey, *Eighteenth-century background*, 142-4.

⁵² *Observations*, 494.

⁵³ *Observations*, 272-75.

⁵⁴ *Observations*, 284, 474-78.

the holy and happy; to rejoice and give thanks for everything he sees and feels, however irreconcilable to his present suggestions; and to labour, as an instrument under God, for the promotion of virtue and happiness, with real courage and constancy, *knowing that his labour shall not be in vain in the Lord.*⁵⁵

7 While powerful, the feelings of piety were not as strong as those of the *moral sense*, which was affected by the perception of 'moral beauty or deformity'. The moral sense was 'generated chiefly by piety, benevolence, and rational self-interest'. As a cluster of moral experience lodged in the mind which judges new sensations and ideas through 'association', the moral sense provided the immediate guide to behaviour. The moral sense

carries its own authority with it, inasmuch as it is the sum total of all of [the affections], and the ultimate result from them; and employs the force and authority of the whole nature of man against any particular part of it, that rebels against the determinations and commands of the conscience or moral judgement.⁵⁶

As such it was effectively 'God's vicegerent, and the forerunner of the sentence which we may hereafter expect from him.'⁵⁷ While the Scottish philosophers were claiming that the moral sense was an innate human quality, Hartley argued that it was mechanically produced by experience on the 'white paper' of the mind. As the moral sense is built up through the mechanical workings of the brain 'the reiterated Impressions of those Associations will at last make Duty itself a Pleasure, and convert Sin into Pain.'⁵⁸

Hartley believed he had shown how freedom could be exercised *within* a deterministic framework. He denied the existence of free will in the 'philosophical sense' that the mind has the 'power of beginning motion' and acting independently of circumstances, as it was inconsistent with God's infinite power and knowledge.⁵⁹ However, he allowed free will 'under certain limitations' if defined in the 'popular and practical sense', whereby the mind is free to

⁵⁵ *Observations*, 490.

⁵⁶ *Observations*, 293-4.

⁵⁷ *Observations*, 506.

⁵⁸ *Observations*, cited in Willey, *Eighteenth-century background*, 146.

⁵⁹ *Observations*, 348.

pursue that to which it is pre-disposed. This conception of free will entails no more than that 'voluntary and semi-voluntary powers of calling up ideas, of exciting and restraining affections, and of performing and suspending actions, arise from the mechanism of our nature.'⁶⁰ James Dybikowski has described this version of necessitarianism as *compatibilist*: 'to be free is not to be exempt from necessity, but only to have the power to act as one pleases, unconstrained by *external impediment*'.⁶¹ Or, in the words of Voltaire, 'your will is not free, but your actions are. You are free to act when you have the power to act.'⁶²

In his theological notes Jebb wrote that 'the scripture-language and meaning confirms Hartley's doctrine of free-will.'⁶³ While defending his theological lectures against the allegation of promoting 'fatalism', Jebb admitted to being 'a little inclined to the system of Hartley and of Locke', but assured his readers that he thought 'man is a moral agent in the strictest sense'.⁶⁴ His understanding of Hartley's concept of the will can be seen in his definition of three types of liberty: 'natural liberty' was a state of being free from physical defects and natural external restraints; 'political liberty' was freedom from the restraints of other men; 'moral liberty', however, resulted when 'I have the will to act, and am not restrained by the prevalence of bad habits, which pervert that state of mind from being followed by actions or muscular notions. In this sense, every vicious man is really, and without a figure, a slave.'⁶⁵ In effect, we are all slaves to circumstances and the morally degenerate are only acting in accordance with their cumulative experience. To exercise any degree of practical moral liberty, one had to be exposed to circumstances and education that would strengthen ones moral sense. Thus, when encountering bad

⁶⁰ *Observations*, 297.

⁶¹ James Dybikowski, review of Peter N Miller, *Joseph Priestley: political writings*, in *Enlightenment and Dissent*, 15 (1996), 117-27, at 125.

⁶² Voltaire, *Philosophical dictionary* (1764, repr. Harmondsworth, 1972), 278.

⁶³ 'Theological propositions', Jebb, II, 144.

⁶⁴ *A short account of theological lectures* (1770), Jebb I, 21.

⁶⁵ 'Theological propositions', Jebb, II, 146-7.

circumstances or tempted by self-indulgence, a well-developed moral sense would lead the individual to *rationally choose* the path of virtue.

As Elie Halévy wrote, 'it must be borne in mind that [Hartley's] aim was to show in the mechanism of the laws of nature the justification of Christian optimism.'⁶⁶ He avoided Hobbesian pessimism because he believed that a benevolent God could only have designed a system which naturally tends to generate human happiness. While happiness is not 'exactly proportioned to Virtue in the present life', Hartley believed that from the nature of things virtue was *in general* the safest and surest path to temporal happiness.⁶⁷ More importantly, the practice of virtue would be rewarded at the day of judgement. 'Born again' Christians would escape 'the purifying lake of fire, whose smoke ascendeth up ... for ages and ages'. The price of eternal happiness for sinners were the 'tortures that are prepared for them ... in order to fit them for pure and spiritual happiness, to burn out the stains of sensuality and self-love'.⁶⁸ Orthodox Christianity relied upon fear of eternal damnation to enforce moral discipline. Starting with a theology of universal salvation, Hartley claimed that a natural 'sensual selfishness' could mechanically transform into altruism, 'a perfect self-annihilation, and the pure love of God.'⁶⁹

The reputation the *Observations* attained owes much to the powerful effect it had upon a small but remarkably influential portion of the population, among whom we can number Joseph Priestley, Jeremy Bentham, James and John Stuart Mill, and Samuel Taylor Coleridge.⁷⁰ Francis Blackburne thought it a work 'to which ... Christianity is or will be more beholden, than to all

⁶⁶ Elie Halévy, *The growth of philosophic radicalism*, trans Mary Morris (1928), 7.

⁶⁷ *Observations*, 518-21.

⁶⁸ *Observations*, 565.

⁶⁹ *Observations*, 473.

⁷⁰ The last named his son David Hartley Coleridge; on the influence of Hartley's work see R K Webb, 'Perspectives on David Hartley', in this volume.

The books besides of the last two centuries.'⁷¹ Joseph Priestley wrote with respect to psychology: 'Something was done in this field of knowledge by Descartes, very much by Mr Locke, but most of all by Dr Hartley, who has thrown more useful light upon the theory of the human mind than Newton did upon the theory of the natural world.'⁷² More recently, Peter Gay declared Hartley the most inventive and influential psychologist of the eighteenth century.⁷³

Again and again in the printed and manuscript sources, Hartley's influence on Jebb emerges - in direct references and in the general tone of his language. Joseph Priestley derived much satisfaction from a meeting with Jebb's father because he had been 'the intimate friend of Dr Hartley',⁷⁴ and Edmund Law corresponded with the author of the *Observations on Man*. Thus, through the combined influence of Law and his father it is highly conceivable that Hartley's book came into the hands of Jebb at a young age. When he drew up principles of conduct to follow as a doctor, Jebb repeatedly vowed to read Hartley: he urged himself to 'Employ the whole of every Sunday in sacred study, in reading Hartley...', to 'read Hartley on ambition; and the proper and primary pursuits of man be diligently studied', and to act according to 'the three principles laid down by Dr Hartley, as the basis of right conduct, viz., piety, benevolence, and the moral sense.'⁷⁵ When Priestley dedicated his *Doctrine of Philosophical Necessity* to Jebb in 1777, he referred to 'our reverend master Dr Hartley' and hoped that as Jebb had,

⁷¹ Francis Blackburne, *The works, theological and miscellaneous ... with some account of the life and writings of the author, by himself; completed by his son Francis Blackburne ...* (7 vols., Cambridge, 1805), I, lxxviii; see also F. Blackburne to T. Lindsey, August 1770, Doctor Williams's Library, Mss. 12.52.98.

⁷² J T Rutt ed., *The theological and miscellaneous works of Joseph Priestley* (25 vols., 1817-1831), III, 26.

⁷³ Peter Gay, *The Enlightenment: an interpretation* (2 vols, New York, 1969), II, 181.

⁷⁴ Joseph Priestley to Theophilus Lindsey, 20 April 1772, in Priestley, *Works*, I, pt.1, 165.

⁷⁵ Jebb IM, 124-5, 136.

followed the great Hartley in his application to theological, mathematical, and philosophical studies, and also in his profession of the theory and practice of medicine, you will still pursue his footsteps, in applying the elements of all these branches of science to the farther investigation of the phenomena of the human mind.⁷⁶

It is often observed that Priestley developed a highly individual blend of science and theology. In part he dedicated this tract to Jebb in order to honour and publicise the latter's resignation from the Anglican Church. However, it is also evident that Jebb was one of the few people who wholeheartedly agreed with Priestley's philosophical stance. In his edition of Hartley's *Observations*, Priestley casually suggested that the soul was corporeal. The resulting storm of allegations that he was no better than an atheist encouraged him to write the *Disquisitions relating to Matter and Spirit* (1777). As most people were staggered by the determinist implications of materialism, Priestley attached the *Doctrine of Philosophical Necessity* as an appendix, to explain the mechanical nature of the human mind. In the 'Dedication' to Jebb, Priestley wrote an eloquent summary of their deterministic view of the world: 'Could we only, my friend, expand our minds fully to conceive, and act up to, the great principle asserted in this treatise, of the truth of which we are both of us convinced, nothing would be wanting for us to exert this, and every other effort of *true greatness of mind*.' 'We ourselves,' he continued,

complex as the structure of our minds, and our principles of action are, are links in a great connected chain, parts of an immense whole, a very little of which we are as yet permitted to see, but from which we collect evidence enough, that the whole system (in which we are, at the same time, both *instruments* and *objects*) is under an unerring direction, and that the final result will be most glorious and happy. Whatever men may intend, or execute, all their designs, and all their actions, are subject to the secret influence and guidance of one who is necessarily the best

⁷⁶ Joseph Priestley, *The doctrine of philosophical necessity illustrated, attached to disquisitions on matter and spirit* (2nd edn., 1777), xv-xvii.

judge of what will most promote his own excellent purposes. To him, and in his works, all seeming *discord* is real *harmony*, and all apparent *evil*, ultimate *good*.⁷⁷

Hartley's authoritative blend of universal salvation and necessity, adopted and developed by the likes of Priestley and Jebb, marked a distinctive version of rational English Christianity. It underpinned Jebb's move toward materialism and commitment to free inquiry. This in turn coloured his religious practice and gave impetus to his agitation for wide ranging reform.

III

Materialism

While Hartley formulated a materialist understanding of the mind, he did not reject the immortality of the soul. He left the question open, observing that proving matter to be 'endued with sensation' would not undermine the immortal nature of the soul.⁷⁸ Nevertheless, Priestley decided that the notion of an immortal soul could be discarded, and was surprised that Hartley had not done so.⁷⁹ Citing the contempt with which the soul was treated in Holbach's *Système de la Nature* (1770), Priestley concluded that 'the state of things is now such that it appears to me to be absolutely necessary to abandon the notion of a soul, if we would retain Christianity at all. And, happily, the principles of it are as repugnant to that notion, as those of any modern philosophy.'⁸⁰

Whether or not Jebb came to conceive of matter as active, by the early 1770s he had developed a physical explanation of the

⁷⁷ Priestley, *Doctrine of philosophical necessity*, vii-ix.

⁷⁸ Hartley, *Observations*, 303.

⁷⁹ 'Even Dr Hartley, who ascribes so much to matter ... supposes that there is something intermediate between the soul and the gross body ... But, great as is my admiration ... his language, in this instance, conveys no clear ideas to my mind, and I consider both his *intermediate body*, and *immaterial soul*, as an encumbrance upon his system.' Joseph Priestley, *Disquisition's relating to matter and spirit* (1777), 79.

⁸⁰ Priestley, *Works*, III, 214; Alan Tapper, 'The beginnings of Priestley's materialism', *Enlightenment and Dissent*, 1 (1982), 73-81; Alan Tapper, 'Priestley's metaphysics' (PhD. University of Western Australia, 1987).

resurrection. He thought 'the materiality of man ie. extension of the conscious principle [is] a point sufficiently clear', and found evidence of this ('a medical incident properly attested') in an article placed in the *Public Ledger* by the 'Society for the recovery of Persons apparently drowned'. In copying out the extract he added some revealing comments of his own: 'Persons may by immersion in water have every corporal faculty (I would add mental) totally suspended, so that they may be to all appearance (I would say *actually*) dead for a considerable time. And yet it may be in the power of Art to recover them.' This, Jebb thought, was 'a *real resurrection*'. In line with this sort of thinking, he saw no 'absurdity' in the idea that 'the particles of those who are left alive may compose with different organisation the future body'. This led him to note that

Chemistry shows great powers - no occasion for different matter - Christ perhaps now material - look around in nature, all material organisation and construction makes the difference between an oyster and a man, between a body in the womb and in life, so between a body in life and the next world.⁸¹

Jebb was tending toward a materialist interpretation of Christianity in which the resurrection of Christ and his fellow human beings was a physical process. He was not alone: Edmund Law acknowledged the validity of a materialist conception of the soul in 1774.⁸²

It is clear that Jebb did not accept the orthodox view of the soul. 'The breath of God', he thought, 'added to flesh and blood makes men live' and at death 'the breath (i.e. the soul) returns to God who gave it.' Rather than a spiritual substance, it was the 'added breath and heat' which made humans alive and conscious.⁸³ Such a view of the world was more eloquently expressed by Samuel Taylor Coleridge:

⁸¹ 47th lecture, note April 1, 1773, Jebb Mss. VI.

⁸² Edmund Law, 'Postscript', *Theory of religion* (6th edn., Cambridge, 1774).

⁸³ See notes for the 47th and 48th lectures, 'On promise of a Resurrection and the intermediate state of the dead', Jebb Mss. VI.

And what if all of animated nature
 Be but organic Harps diversely fram'd
 That tremble into thought, as o'er them sweeps
 Plastic and vast, one intellectual breeze
 At once the Soul of each, and God of all?⁸⁴

Jebb's description of God's breath providing the 'heat' of life reveals a mind searching for a purely physical explanation of everything. This lay behind his interest in the classical materialism of Lucretius.⁸⁵ The important point is that Jebb saw any duality between the material and spiritual realms effectively dissolve. In this vision matter and spirit are one and the afterlife is populated by physical beings, including a human Christ. Such a view of the world is truly Unitarian, in that there is no substantial divide between matter and spirit, the temporal and eternal, God and man, or between the comprehensible and incomprehensible.⁸⁶

IV

Free Inquiry

At the end of a discussion of religious doctrines, Hartley wrote:

It is a great insult offered to the truths of religion, to suppose that they want the same kind of assistance as impostures, human projects, or worldly designs. Let every man be allowed to think, speak, and write, freely; and then the errors will combat one another, and leave the truth unhurt.⁸⁷

God had ordered the world so that reason could (and should) seek out all those truths that bore any relation to individual and social conduct. Hartley thought it 'entirely useless ... to the promotion of piety and benevolence ... to form any creeds, articles, or systems of faith, and to require an assent to these in words or writing. Men are

⁸⁴ Samuel Taylor Coleridge, cited in J B Beer, *Coleridge the visionary*, (1959), 95.

⁸⁵ Jebb's references to Lucretius focus on his discussion of mind and body. See 'Theological propositions', Jebb, II, 146; Jebb Mss. VI, 'Theological lectures', lectures 38 and 44.

⁸⁶ See Yannis Planngesis, *Matter and spirit in Joseph Priestley's philosophical thought* (Thessalonika, 1991).

⁸⁷ *Observations*, 368.

to be influenced, even in respect of the principle doctrines of God's providence, a future state the truth of the scriptures, by rational methods only, not by compulsion.' While it, and was in the power of the magistrate to punish and restrict actions, opinions could not be so restrained. The irreligious can be made to 'appear to consent to anything, just as their interest leads them.' Hartley thought that this was the case with 'the great part of subscribers in all Christian communities. They have a mere nominal faith only'. More importantly, those who hold serious beliefs 'do proportional violence to these by performing a religious act out of a mere interested view.' Hartley thought even a subscription to the scriptures unnecessary. Diversity of opinion on speculative matters was inevitable, as evidenced by the failure of subscription to prevent the existing diversity within the Church. The solution was to abolish subscription and have preachers 'confine themselves to practical subjects.' 'If the scriptures cannot yet produce a true unity of opinion on account of our present ignorance ... how should articles do this?' No one had a right to make an article concerning an 'abstruse point' or 'metaphysical subtleties'. Rather, 'We are all bretheren; there is no father, no master, amongst us; we are helpers of, not lords over, each other's faith. If we judge from other branches of learning, as natural philosophy, or physic, we shall there find, that the pure evidence of the things themselves is sufficient to overcome all opposition, after a due time.'⁸⁸ As Jebb wrote, allow the exercise of reason free rein, and 'true religion beams with unclouded luster on the mind ... all is light, tranquillity and joy.'⁸⁹

Martin Fitzpatrick has argued that the *Observations on Man* helped undermine the traditional latitudinarian distinction between essential truths and 'things indifferent':

Hartley allowed no room for the distinction between speculative and certain truths. In effect, he adapted the Christian humanist belief that 'ideally all mans faculties may

⁸⁸ *Observations*, 513-15.

⁸⁹ Jebb, III, 178.

be fused in the pursuit of that goodness which constitutes the highest truth', to the new spirit of the scientific revolution.⁹⁰ Hartley himself tried to play down the radical implications of his philosophy and sought to justify obedience to *forms* of worship imposed by civil authority. Impressed with Hartley's work, Francis Blackburne also saw the implications for religious liberty: 'But he has joined *Necessity* and *Religion* together, - What of that? Ask the Church of England in her Articles.'⁹¹ In the words of Jack Fruchtman, Hartley convinced some 'in the following generation that moral authority resided in the individual's grasp of the world and in his ability to use his reason.'⁹² In supporting the power of reason to uncover all important and practical truths, Hartley's system supported the argument for unrestrained free inquiry, undermined the practice of subscription, and made the candid espousal of truth a central moral duty. In short, Hartley's *Observations* pricked the bubble of latitudinarian complacency and led some to become concerned with both *expressing* and *acting* upon their ideas.

V

Rational piety

Jebb's rational religion was in many respects closer to deism than to orthodox Christianity.⁹³ In this guise, Christianity loses its mystical aspects, and is reduced to an ethical code. But to say that Jebb's Christianity was *reduced* to a moral code implies that that it was less 'religious' than orthodoxy, Evangelical Christianity, and Romanticism. R K Webb has pointed to the neglected phenomenon of enlightened rational piety (of which he sees Jebb as an exemplar), observing that an Evangelical like Hannah More did not

⁹⁰ Martin Fitzpatrick, 'Latitudinarianism at the parting of the ways', loc.cit., 214, citing H Baker, *The wars of truth* (Cambridge, Mass., 1952), 93.

⁹¹ Blackburne, *Works*, I, lxxxviii.

⁹² Fruchtman Jr., 'Late latitudinarianism: the case of David Hartley', 22.

⁹³ Paul Hazard did not blink at calling Priestley 'a deist ... of the "enlightened Christianity" school': *European thought in the Eighteenth Century* (Harmondsworth, 1965), 137.

criticise religious rationalists for a lack of piety.⁹⁴ Jebb reminded his students at Cambridge that 'I have always earnestly exhorted you to consider religion as a science, which has for its proper object the culture of the human heart.'⁹⁵ From rational apprehension of a benevolent God 'arise those pious affections of gratitude and love, and upright conduct' that are our duty. 'This is true religion, the religion of the heart.'⁹⁶ While Christianity was supported by evidence that commanded rational assent, Jebb also asserted that the Gospel 'chiefly aims at our conversion, by the milder powers of persuasion, and a generous appeal to the uncorrupted feelings of the uncorrupted heart.'⁹⁷ Jebb was far from wanting a religion purged of emotion, and thought the stoic repression of all desires absurd, unnatural, and unreasonable.⁹⁸ Rather, he espoused a 'christian stoicism' in which happiness was pursued through imitation of Jesus, and disappointment was endured in the knowledge that future 'happiness' was accruing on God's balance sheet of reward and punishment. While their method and doctrine differed, Jebb's heart was no less warm than John Wesley's.⁹⁹ As Knud Haakonssen has neatly put it, 'for the Rational Dissenters who rejected original sin, self-betterment and piety were no longer a compensatory mission but a fulfilment of God's promise for the future.'¹⁰⁰

Nowhere is the influence of Hartley better illustrated than in Jebb's sermon *On the Spirit of Benevolence* (1773). He declared that 'the principle of unlimited benevolence' was 'the great

⁹⁴ R K Webb, 'Rational Piety', in Haakonssen, *Enlightenment and religion*, 290-91, 296.

⁹⁵ Sermon: *On the Spirit of Benevolence* (1773), Jebb, II, 5-6.

⁹⁶ Unpublished sermon on Proverbs 3:17, 'Her ways are the ways of pleasantness, and all her paths are peace', Jebb, II, 34.

⁹⁷ *Spirit of Benevolence*, Jebb, II, 11.

⁹⁸ 'Her ways are the ways of pleasantness', Jebb, II, 30-1.

⁹⁹ Jebb told the Methodists that he often defended them 'on account of your zeal for what you think the real doctrines of revelation But that you should oppose the scheme of abolishing a subscription to any human Articles whatsoever, I own, amazes me.' John Jebb, *General Evening Post*, 3 September 1772, in Dr Williams's Library, John Disney Mss. 87:II:118.

¹⁰⁰ Knud Haakonssen, 'Enlightened Dissent: an introduction', in *Enlightenment and religion*, 10.

characteristic of the religion of the Gospel.' Our love of pleasure, power, and praise, he suggested, 'are in a manner congenial with the human mind: they appear necessary movements in our frame.' These affections were entirely natural, and their highest state of satisfaction was found in promoting the happiness of others. Jebb pointed to the pleasure derived from making one's children happy, and to the kind of 'filial love' commonly expressed by the citizens of Sparta and Rome (though the latter was 'an almost antiquated passion'). While 'every social and disinterested affection is gradually formed in the heart, by a kind of mechanical process,' this process was augmented by the hopes and fears derived from revealed religion. At length, the heart comes to consider 'every increase in the happiness of others, as an addition of happiness to itself.' It follows from this that those blessed with the advantages of birth and education should work for the common good, as 'he that increaseth knowledge, increaseth sorrow, if he toileth only for himself.' 'Let not then the light of science shine inward only on thy self,' Jebb urged, 'let it radiate thy neighbour's footsteps with it's friendly beam: let it light him on his dark and dangerous way through the wilderness of life.' The pious heart should 'overflow with the milk of human kindness', and openly rejoice with the happy, while crying with the distressed.¹⁰¹

It would seem that this zealous rational piety prompted the ill-disposed David Williams to allege that Jebb 'harassed his friends with reveries'.¹⁰² Yet Jebb was only reflecting in a strong light the eighteenth-century revolution in sensibility which gathered momentum in the 1760s and 70s. Norman Fiering has traced the development of what he calls the notion of 'irresistible compassion', illustrated by Thomas Jefferson's declaration that 'Nature hath implanted in our breasts a love of others, a sense of duty to them, a moral instinct, in short, which prompts us irresistibly to feel and to succour their distresses'. According to Fiering, during the Enlightenment 'the trust in certain qualities of human emotion was unbounded, as impressive certainly as the more often noted trust in rational faculties.' This increasingly

¹⁰¹ Jebb, II, 1-26.

¹⁰² Cited in Dybikowski, *On burning ground*, 44n.

widespread doctrine reflected the optimism of the Enlightenment, and contributed to the humanitarianism that lay behind modern political radicalism.¹⁰³ Whether innate or formed by experience, belief in a natural disposition toward virtue and benevolence was a common feature of the Enlightenment.

Jebb blended Christianity and Enlightenment humanism into an exalted view of God's providence. He thought that true religion should dispel fear, and encourage trust in God and the ultimately benign nature of his providence. 'Religious awe weakens the mind' he declared - you should only fear giving offence to God, 'but be bold and intrepid in every other matter relating to religion.'¹⁰⁴ Substitute 'God' for 'Nature', and he was in essential agreement with the view expressed in the *Système de la Nature* (1770).¹⁰⁵ The atheist Holbach argued that traditional religions reflect a primitive personification of nature, and had caused much harm by preaching fear and superstition. 'Nature' dictated that humans were neither innately good or evil, but that virtue should be cultivated under rational laws to promote social happiness.¹⁰⁶ Jebb could agree with the anti-religious thrust of Holbach's work because he thought the philosophes were merely reacting to an irrational and despotic Catholicism. He on the other hand, as an English rational Christian, knew that true religion was 'intelligible to every sensible being'.

Every virtuous man is it's priest; errors and vices are it's victims; the universe its altar; and God the only divinity it adores. Morality is the sum and substance of this religion. When we are rational, we are pious; when we are useful, we are virtuous; when we are benevolent, we are righteous and just.¹⁰⁷

¹⁰³ Norman S Fiering, 'Irresistible compassion: an aspect of eighteenth-century sympathy and humanitarianism', *Journal of the History of Ideas*, 37 (1976), 195.

¹⁰⁴ 'Theological propositions', Jebb, II, 139.

¹⁰⁵ 'Theological propositions', Jebb, II, 168.

¹⁰⁶ William H Wickwar, 'Helvétius and Holbach', in F J C Hearnshaw, *Social and political ideas of some great French thinkers of the Age of Reason* (1930), 195-214.

¹⁰⁷ Sermon: 'God no respecter of persons', Jebb, II, 105.

Access to the simple revealed word of God contained in the Gospels only made one better equipped to practice rational piety. But if anyone should live in this manner, we pronounce him to be actuated by a 'principle of piety and benevolence', or, in other words, we attribute to him justly, whatever be his mode of faith, or outward worship, the honourable appellation of the 'religious man'.¹⁰⁸

In efforts to draw out and manifest the potential good in nature and society, Jebb saw himself as engaged in the practical, every-day worship of God. This attitude lay behind his criticism of the prevailing doctrine, liturgy and structure of the established Church. Jebb defined a Protestant as one whose 'chief characteristic is a mild, forbearing, tolerating spirit, which rises to zeal, when the sacred rights of humanity are invaded, under a pretence to orthodoxy.'¹⁰⁹

VI

Education Reform

Hartley's *Observations* placed great faith in the power of education, and can be listed among the numerous works calling for a reformation of manners.¹¹⁰ Priestley claimed 'the most important application of Dr Hartley's doctrine of the association of ideas is to the *conduct of human life*, and especially the business of *education*.'¹¹¹ In justifying universal salvation, Hartley claimed that a merciful father would not condemn an errant son to eternal misery, and that even the most hardened sinner was not beyond the reach of reform. 'For we are all alike in kind, and do not differ greatly in degree here. We have each of us passions of all sorts, and lie open to influences of all sorts; so as that persons A and B, in whatever different proportions their intellectual affections now

¹⁰⁸ Jebb, III, 198.

¹⁰⁹ 'Definitions', 3 March 1774, Jebb, III, 256.

¹¹⁰ Joanna Innes, 'Politics and morals: the reformation of manners movement in latter eighteenth-century England', in Eckhart Hellmuth ed., *The transformation of political culture: England and Germany in the late eighteenth-century* (Oxford, 1990), 57-118.

¹¹¹ Joseph Priestley, *Works*, III, 6.

exist, may, by a suitable set of impressions, become hereafter alike.'¹¹²

From this notion of individual improvement it was easily assumed that a parallel increase in 'public happiness' could be promoted. Jebb believed that 'true enjoyment is only to be found in acts of social love.'¹¹³ Succumbing to the narrow 'gross self-interest' of sensation, imagination and ambition divorced from the higher affections was an ever-present danger, particularly if encouraged by bad circumstances - like a gang of thieves or a royal court.¹¹⁴ It was the duty of the rational Christian to help weaker souls to develop their moral sense, and to promote, in every way possible, a physical and moral environment that would foster a virtuous society. Jebb's efforts to improve the standard of education at Cambridge must be viewed in light of Hartley's claim that the educator was potentially 'the Instrument of Salvation, temporal and eternal, to Multitudes.'¹¹⁵ Jebb believed that with knowledge comes the responsibility to act.¹¹⁶ This was given added urgency by Hartley's suggestion that in the days preceding the second coming, the torment 'brought upon us by our excess of wickedness' may be 'delayed, or alleviated, by reformations public and private'.¹¹⁷

It is not surprising that with the failure of the Feathers Tavern petition Jebb turned his attention to reforming the education provided to England's future clergy and governors at Cambridge. He argued that traditional forms of 'severe discipline' were not suited to producing 'a decent and regular deportment' in an enlightened age. The contemporary laxity among students stemmed from 'the denial of indulgence to a virtuous affection of the soul, ... a passion, productive of the most salutary consequences to the

¹¹² *Observations*, 556.

¹¹³ *Spirit of benevolence*, Jebb, II, 19.

¹¹⁴ In the words of Thomas Brand-Hollis, Jebb 'dreaded kings, from considering their education and the persons who frequent courts, where truth cannot enter.' Thomas Brand-Hollis, 'A Character of Dr Jebb', in Jebb IM, 233.

¹¹⁵ Cited in Spadafora, *The idea of progress*, 162.

¹¹⁶ *Spirit of benevolence*, Jebb, II, 21.

¹¹⁷ *Observations*, II, 565.

public welfare.'¹¹⁸ Rather than trying to stifle natural youthful passions, educators should harness them to literary and intellectual pursuits. 'I am inclined to prefer that mode of reformation,' Jebb wrote, 'which gently leads the minds of youth from the pursuit of each inferior gratification, by proposing to their view such objects as are truly deserving of their attention; which ... rouses to the practice of every manly virtue, by the animating prospect of reward.' He argued that in the period of youth,

the spirit of EMULATION is found in greatest force; it constitutes a motive, more generous than the selfish, sensual passions, which, according to the usual course of nature, prevail in earlier life; but less exalted than the fervent love of human kind, which is intended by the author of our being to be the incentive in maturer age.

Echoing Hartley, he claimed,

It has frequently been observed that the affections of the human mind rise by a necessary progress, in beautiful succession, each being introductory to affections of a nobler kind; that each has a limited time of acting ... and that if, in particular, the season, when the emulative affections most prevail, should be neglected, it will be in vain that we afterwards endeavour to impress the mind with the ardour of improvement, or to stamp it with the image of each sterling virtue.¹¹⁹

The age at which young men attend university was crucial in determining their lifelong development. If their ambitious affections were not directed toward literary pursuits and the cultivation of morality and religion at this age, Jebb argued, they would be condemned to a morally enfeebled life - a slave to narrow self-interest.

Conclusion

Once defined as an essentially French phenomenon, historians now view the Enlightenment as encompassing people in different

¹¹⁸ *Remarks upon the present mode of education in the University of Cambridge: to which is added, a proposal for its improvement* (4th edn., 1774), Jebb, II, 261, 263.

¹¹⁹ *Remarks upon education*, Jebb, II, 264-65.

national contexts, from various social backgrounds, and with diverse and often conflicting ideas. The 'common element lay more in *how* men thought than in *what* they thought.'¹²⁰ Clothed in garb fashioned from Hartley's *Observations*, Jebb was a zealous advocate for enlightened reform and individual religious and political rights in England.

Jebb's post-Cambridge career is suggestive of his developing thought and interests. Theophilus Lindsey often lamented that Jebb refused to join him as co-minister at Essex Street, and did not write in defence of Unitarianism. Instead, he chose to train as a doctor. Jebb was at pains to assure friends he still devoted each Sunday to religious study and attending the Essex Street chapel.¹²¹ But his remaining years were consumed by medical practice and political activity. As a doctor he could practise piety, contribute to the advancement of medical knowledge, and promote 'happiness'.¹²² Capel Lofft observed that medicine allowed Jebb to engage in 'what he ever valued most, usefulness to others in their sufferings and dangers'.¹²³

Jebb's enlightened religious and philosophical ideals made him a determined and idealistic political activist. While Christopher Wyvill (head of the Yorkshire Association) tried to build support for a limited reform of parliament, Jebb would accept nothing less than universal manhood suffrage and annual parliaments. After his death, Wyvill wrote that Jebb was

a man of great abilities, of extensive learning; eloquent in his writing and in debate; amiable for his candour and benevolence; exemplary for his piety, and the strict morality of his private life; and in his public conduct he maintained

¹²⁰ John Yolton ed., *Blackwell's companion to the Enlightenment* (Oxford, 1991), 1.

¹²¹ Jebb IM, 126-27.

¹²² *Select cases of the disorder commonly termed the paralysis of the lower extremities* (1782), Jebb, II, 391-452; Roy Porter, 'Was there a medical Enlightenment in England?', *British Journal for Eighteenth-Century Studies*, 5 (1982), 49-63.

¹²³ Capel Lofft, 'Biographical sketch of Dr Jebb', Jebb IM, 244.

truth with the intrepidity of a Martyr; and pursued the General Good with the ardour of an Enthusiast.¹²⁴

Jebb's enlightened and idealistic approach to politics is illustrated by his request that the Irish Volunteer's include the rights of full citizenship for Catholics in their reform platform. To overcome their reservations he pointed to a possible future when, with the absence of religious intolerance and 'under the influence of mild and equal laws, human industry shall be generally excited and encouraged.' In such a climate, he asked, 'is it not reasonable to conclude, that religious prejudices will also give away, and truth extend her salutary empire over the minds of men, in proportion as the light of science ... shall prevail?' Politicians of the day would fail in their 'bad purposes, through false conceptions of the human character', and it was a natural tendency toward virtue which had led the Americans to assert their independence when threatened by a corrupt regime. In this spirit, Jebb assured the Irish that 'Compliance with the obvious rules of justice, by allowing free scope to the virtuous energies of the mind, enables us to overcome obstacles apparently insurmountable, and leads to peace and happiness.'¹²⁵

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¹²⁴ Christopher Wyvill, *Political papers*, IV, 521n.

¹²⁵ *Letters addressed to the Volunteers of Ireland, on the subject of parliamentary reform* (1782), Jebb, II, 547-48.

SCIENCE, RELIGION AND THE FOUNDATIONS OF MORALITY IN ENLIGHTENMENT BRITAIN

*John Gascoigne**

In an age which has long been schooled in the need to avoid the intellectual promiscuity of confusing 'is' and 'ought' it is natural for us to regard science and ethics as inhabiting distinctly different realms. It is difficult, then, to recapture the view that found its clearest statement in the work of Aristotle and his numerous Western scholastic commentators up to the end of the seventeenth century that all fields of philosophical endeavour - whether metaphysics, natural philosophy or ethics - were indissolubly linked. That, in Aristotelian language, all phenomena, whether that of the human or the inanimate world, were informed by final causes which ultimately served to bring the True and the Good into fundamental harmony. But it was one of the avowed aims of the Scientific Revolution which overthrew the Aristotelian-based cosmology to cut itself loose from such final causes. For they were viewed as obstacles in the way of a properly focussed exploration of the way in which Nature actually was rather than the way it ought to be. Thus for Francis Bacon 'The Inquisition of Final Causes is barren and like a virgin consecrated to God produces Nothing'.¹

But the habits of mind which sought some fundamental unity in all fields of human understanding died hard and the impulse to link one's understanding of the natural world with one's conception of the Good was to continue into the eighteenth century - and, indeed, shows some signs of coming to life again in our own times.² For

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¹ J G Crowther, *Francis Bacon. The first statesman of science* (London, 1960), 70.

² As for example in recent writings about systems of virtue ethics, ecological theorising about the relations between humanity and nature or in the revival of forms of natural theology. Philosophers have also become increasingly wary of attributing apodictic factual status to any

eighteenth-century Britain the achievements of modern science were encapsulated in the work of Newton and so the search to find some bridge between science and ethics was largely linked to the larger issue of the reception of Newton's work. The object of this paper is, then, to examine the ways in which a number of notable eighteenth-century moralists attempted to enlist the vast prestige of Newton in constructing systems of ethics which, they argued, could marry the Good and the True.

I

In assessing Newton's philosophical impact it is natural to begin with Newton's virtual philosophical spokesman, Samuel Clarke (1675-1729), who fought the good fight on behalf of the Master when dealing with such foreign philosophical nuisances as Leibniz.³ In many ways Clarke the polymath - theologian, natural philosopher and classicist - kept alive in the increasingly uncongenial intellectual environment of the eighteenth century the more traditional view of knowledge as a seamless web which could not be readily hacked up into separate disciplines. This concern with maintaining the unity of knowledge revealed itself most obviously in his influential endeavours to demonstrate the consonance between Newtonianism and Christianity rightly understood. One aspect of this larger intellectual mission was the attempt to yoke together a Christian-based ethics with the structures of thought he derived from his close study of Newtonianism.

The central philosophical problem which Clarke faced in undertaking such a mission was to reconcile the tendency of the mechanical philosophy, even in its Newtonian guise, towards philosophical determinism with some conception of human liberty without which morality or, at least, Christian morality, was impossible.⁴ Appropriately one of the two propositions that he

field - for a discussion of this latter issue see Peter Railton, 'Facts and values', *Philosophical Topics*, xiv (1986), 6.

³ In this section I am drawing on some material from my forthcoming entry on Samuel Clarke for the *New Dictionary of National Biography*.

⁴ John Gay, 'Matter and freedom in the thought of Samuel Clarke', *Journal of the History of Ideas*, xxiv (1963), 85-105.

defended when he took his Doctor of Divinity degree at Cambridge was 'Without the Liberty of Humane Actions there can be No Religion'. The other indicated a similarly central strand in his overall *oeuvre*: 'No Article of the Christian Faith, delivered in the Holy Scriptures, is Disagreeable to Right Reason'.⁵ The defence of liberty was the thread that ran through all his philosophical works just as the defence of political and religious liberty - which he equated with the Whig Protestant Hanoverian establishment - was a central preoccupation of much of his theological writings.

'This Liberty, or Moral Agency', as his admiring first biographer, his fellow Low Churchman, Benjamin Hoadly, wrote 'was a Darling Point to Him'.⁶ He first addressed it directly in his first set of Boyle lectures which was revealingly entitled - *A demonstration of the being and attributes of God. More particularly in answer to Mr Hobbes, Spinoza and their followers. Wherein the notion of liberty is stated, and the possibility and certainty of it proved, in opposition to necessity and fate* (1704) - a work which was intended to deal with the foundations of natural religion by providing *a priori* philosophical reasoning to substantiate a belief in a benevolent Deity.

As historians such as Metzger⁷ and Jacob⁸ have shown, it was a work which played a major part in the early dissemination of some of the chief conclusions of the *Principia*, for Clarke's *Demonstration of the being and attributes of God* bears strong marks of his training in Newtonian natural philosophy. In the first place, Clarke, as befits a student of the *Principia mathematica*, sought to apply to metaphysics a mathematical, *a priori*, style of reasoning. As he wrote in the preface, the argument of the work is 'as near as Mathematical as the Nature of such a Discourse would allow'(p.i). Along with his mathematical method, Clarke also exhibited a more direct debt to Newtonianism with his attempt to

⁵ Benjamin Hoadly ed., *The works of Samuel Clarke* (4 vols, London, 1738), I, xvi.

⁶ *Ibid.*, I, ix.

⁷ Hélène Metzger, *Attraction universelle et religion naturelle chez quelques commentateurs anglais de Newton* (Paris, 1938).

⁸ M C Jacob, *The Newtonians and the English Revolution 1689-1720* (Hassocks, Sussex, 1976).

demonstrate that Newtonian science served to demonstrate the existence of an Intelligent Designer who both created and sustains the universe. He pointed, for example, to the demonstration in the *Principia* of the 'inexpressible Nicety' of the balance between the annual motion of the planets and the force of gravitation towards the sun as an instance of a directing Providence (pp.229-30).

As well as providing an instance of the shaping hand of the Creator at work in the universe the Newtonian conception of gravitation also served as part of his attack on philosophical systems which weakened the concept of human liberty which, as we have seen, underlay his conception of the whole nature of Christian morality. Thus he attacked the determinism which lay at the base of Spinoza's claim that matter was a necessary being without need of a Creator by arguing that 'if Gravitation be an Universal Quality or Affection of *All Matter*; then there is a Vacuum; (as is abundantly demonstrated by Mr. *Newton*;) and if there be a Vacuum, then Matter is not a Necessary Being' (p.49).

He returned to such issues a few years later in his controversy with the Deist, Anthony Collins, again invoking Newton in defence of his view that matter alone could not explain all aspects of Nature. For had not Newton demonstrated that gravity had no material cause thus underlining the folly of those '*Materialists* [who] would undertake to explain the phaenomena of Nature *Mechanically*, by the mere Powers of Matter and Motion'.⁹ Such an argument supported his more general thesis that matter alone could not explain such phenomena as human thought or, indeed, human free will and the moral choice that it made possible. Hence his attack on Collins's materialistic views of human nature as being 'totally destructive of Religion'.¹⁰

Having established the philosophical bases of human liberty, and hence of moral choice, in his first set of Boyle lectures in the second - *A discourse concerning the unchangeable obligation of natural religion, and the truth and certainty of the Christian revelation* (1705) - Clarke proceeded to examine in more detail the nature of morality and its relations with Christian revelation. True

⁹ Hoadly ed., *The works of Samuel Clarke*, III, 849.

¹⁰ *Ibid.*, 906.

to the traditions of natural law, Clarke was emphatic that morality accorded with the ultimate ordering of Creation rather than being the result of the arbitrary decree of God. Such a rationalistic conception of morality in some ways lent comfort to Clarke's Deistic opponents with their view that morality could be formulated without recourse to a notion of Revelation but, needless to say, Clarke dissented from such a position. Human beings, he urged, were too swayed by their passions or simply too preoccupied to arrive at an acceptable conception of morality through their own reasoning. Moreover, Revelation provided an essential element lacking in any system of ethics derived from reason: the assurance of reward or punishment in the next life.

In constructing the case for the truth of Christian Revelation, Clarke acknowledged that, in contrast to the arguments about the bases of natural religion in his first set of Boyle lectures, 'the same *demonstrative* force of reasoning, and even *Mathematical* certainty, which in the main Argument was there easy to be obtained, ought not here to be expected; but that such *moral* Evidence, or mixt Proofs from Circumstances and Testimony' (p.14). Clarke's preference, then, was plainly to defend both Christianity and morality by the deductive methods which he regarded as one of the glories of Newton's system. However, where necessary, he would also employ the empirical evidence which he derived from history and human experience. So, too, did Newton combine mathematical deduction with experimental data in the *Principia* while in the *Opticks* (which Clarke translated into Latin) he almost entirely based his work on an *a posteriori* resort to experience.

But, where possible, Clarke took the high ground of deductive certainty. Thus in his second Boyle lectures he closely linked the foundations of Christian morality with the basic premises about the nature of the Deity which he had established by *a priori* methods in the first Boyle lectures arguing 'That the Practical Duties which the Christian Religion enjoins, are all such, as are most agreeable to our natural Notions of God' (p.13). Indeed, he went so far as to draw a parallel between the processes of moral and mathematical reasoning arguing that 'The Reason which Obliges every Man in Practise, so to deal always with another, as he would reasonably

expect that Other should in like circumstances deal with Him; is the very same, as that which forces him in Speculation to affirm that if one Line or Number be equal to another, That other is reciprocally equal to it' (p.86).

If, as Clarke kept insisting, moral principles were inseparably intertwined with the overall ordering of Nature it followed that morality was something that was intrinsic to God's Creation rather than being imposed upon it by God. True to the anti-Calvinist tenor of his thought Clarke was strongly opposed to any voluntarist conception of morality as something imposed by the Will of God rather than being rooted in God's overall ordering of things. In his sermon 'Of the Goodness of God', he urged that 'Nothing therefore can be more absurd, than the doctrine which has sometimes been advanced; that *Goodness in God*, is not the same thing as *Goodness in Men*'.¹¹ Significantly, as a child this youthful prodigy was much exercised in wrestling with the proposition of whether or not God could lie.¹² For the mature Clarke the answer would be a ringing 'no' as evidenced by his argument in his second Boyle lectures 'that which is Holy and Good ... is not therefore Holy and Good, because it is commanded to be done; but is therefore commanded by God, because it is Holy and Good'. More simply he made the same point by declaring 'that Virtue and Vice are eternally and necessarily different' (pp.110, 116).

Clarke's conception of religion as embodying an eternal and unchanging morality implicit in the very laws of Nature was reinforced not only by his rejection of Calvinist voluntarism but also his resolute Protestant anti-sacerdotalism. Religion for Clarke was about morality rather than sacred rites. As he urged in his sermon on 'How to judge of Moral Actions': 'The *End and Design* of all Religion... *the ultimate View and Fundamental Intention of all religious Truths*, implanted in men either by Nature or Teaching; is the Practice of Virtue.'¹³ In Clarke's view, then, one of the marks of the divine origin of Christianity was that it had strengthened the significance of basic moral tenets by downplaying

¹¹ Hoadly ed., *The works of Samuel Clarke*, I, 91.

¹² J.P.Ferguson, *An eighteenth century heretic. Dr. Samuel Clarke* (Kineton, Warwick, 1976), 2.

¹³ Hoadly ed., *The works of Samuel Clarke*, I, 250.

the importance of the ceremonial aspects of religion. Thus in one of his sermons he proclaimed that 'All Positive and ritual injunctions whatsoever, can be but subordinate to the Practice of moral Virtues.'¹⁴

Like true natural philosophy, then, the path of true religion lay in discerning and following the laws which God had encoded into the very foundations of the universe. The true Newtonian Christian derived his religion from the Word of God as proclaimed in Scripture and the Mind of God as revealed in the ordering of the moral and natural world. Ironically, however, such a position was, as his Cambridge Whig colleague, Daniel Waterland, pointed out one likely to give intellectual sustenance to their Deistic counterparts. For if the positive duties of religion (such as the obligation to attend Divine Service) were as inferior as Clarke suggested to moral obligations what necessity was there for a religious establishment and, with it, a clerical estate enjoying the privileges of which Clarke himself was a beneficiary? Could not one simply derive moral principles from a study of the natural and human world without recourse to either Scripture or the teaching of the Church?

Waterland was prompted to make these very pertinent points in response to Clarke's posthumously published *An exposition of the church-catechism* (1729) in which Clarke returned to the theme that had run throughout all his theological writings: the subordination of church-imposed 'positive' duties to the moral duties ordained by the will of God as made manifest in Scripture and natural law. 'Tis the peculiar Excellency and Advantage of the Christian Religion', he wrote in this work, 'that it is not burdened, as the *Jewish* was, with a multitude of external *Rites and Ceremonies*.'¹⁵ For Waterland such a position challenged the clergy's claim to a divinely-sanctioned authority. By thus 'lay[ing] it down for a rule and a principle, that *positive* precepts or duties are never to be compared with *moral*', argued Waterland, Clarke had unintentionally given support to the rise of infidelity for 'Deism has sprung

¹⁴ *Ibid.*, I, 708.

¹⁵ Hoadly ed., *The works of Samuel Clarke*, III, 708.

up out of the same doctrine about *moral* and *positive* institutions'.¹⁶

But Clarke was dead when Waterland raised such objections and, in any case, Clarke would probably have been unmoved by objections to positions which lay at the very foundations about his views about the nature of religion and morality. In Clarke's scheme of things it was axiomatic that true religion was about moral rather than positive duties and confirmation for such a position could be found in the fact that God Himself had made known His Will through the laws of nature which governed both the realms of natural philosophy and morality. It was a parallel he spelled out in his revealingly entitled sermon, 'The Practice of Morality leads to the Practice of the Gospel', which took as its point of departure the familiar Clarkian tenet that 'The *Duty* and *Happiness* of natural Creatures, is the Practice of Righteousness and true Virtue, founded upon a Belief of the Being and Government of God'. By doing so human beings were partners in the divine plan 'by preserving the Harmony of the *Moral* World, in like manner as the Wisdom of his Government over the *Natural and Material* World is shown forth in the regularity of all its Motions'. By contrast, 'By Sin, Moral Agents oppose and bring disorder into this kingdom of God'¹⁷. Moreover, as he argued in another sermon: 'The Moral World, is of infinitely greater Importance: It is That, for the sake of which the material World was created; and without which, this beautiful and stupendous Fabrick of the inanimate Universe is Nothing.'¹⁸

For Clarke, then, something of the traditional parallel between the microcosm of man and the macrocosm of the universe had survived the corrosive effects of the Newtonian world-view in merging heavenly and terrestrial motion. Humankind could discern the Divine Will not only in the laws of the universe as a whole but also in the moral laws which ought to shape their ends. If human beings did not conform to such moral laws they were subverting the Divine economy not only within their immediate social sphere but

¹⁶ W. Van Mildert ed., *The works of Daniel Waterland* (11 vols. in 12, Oxford, 1823), IV, 99.

¹⁷ Hoadly ed., *The works of Samuel Clarke*, II, 231.

¹⁸ *Ibid.*, II, 28.

also in the universe more generally. Both natural and moral laws could be deduced from the evident will of God as revealed in both Scripture and the Book of Nature. The advent of the Newtonian philosophy was, in a fundamental sense, part of God's Revelation by making plain the Divine Presence in shaping the order and regularity of the universe thus exemplifying Clarke's basic premise that the moral and natural laws worked in harmony. To adapt the peroration of *The origin of species* of Charles Darwin who was reared on the traditions of natural theology that found their philosophical basis in Clarke: there is a grandeur in this view of nature with its confidence that whilst this planet has gone cycling on according to the fixed law of gravity it also conformed to larger designs which were embodied in the laws of morality. In short, Clarke still leaves the door open to some residual notion of final causes. So strong was the weight of this deeply rooted tradition of linking the Good and the True that it can also be found in other notable moralists of the English and Scottish Enlightenment even though they departed significantly from Clarke's attempt to deduce a system of Christian morality by the use of reason.

II

Not surprisingly, the problem of how to combine the Newtonian world-view with some conception of a universe that conformed to moral laws was a particular preoccupation of Newton's own university of Cambridge thanks in large part to the theological and scientific influence of Clarke. The general tenor of this continuing quest to link Newtonian natural philosophy and Christian ethics can be roughly and perhaps rather simplistically characterised by adopting two strategies: firstly, the Clarkian deductive methods which he had so admired in the *Principia* and, secondly, a more empirically based approach which was to draw more on the *Opticks* than the *Principia* and which also owed much to Lockean epistemology. The first approach meshed naturally with the natural law theorists such as Grotius and Pufendorf who were adapted to the needs of the Cambridge curriculum by figures such as Thomas

Rutherford.¹⁹ In doing so, however, such Cambridge moralists, like their Continental models, widened the scope of their discussion to include an account of how such an underlying set of natural laws manifested itself in the complexities of social and political reality. This was an exercise that involved a good deal of appeal to a *posteriori* reasoning from experience - an indication that the deductive and the experimental approaches were as often as intertwined in the study of ethics as they were in the study of nature. The second approach, which was more overtly linked to experience and experiment, took a more original path as instanced by the work of David Hartley (fellow of Jesus College, Cambridge, 1727-30) in attempting to move the basis of discussion away from the cosmic stage of Clarke and to focus more closely on the way in which the human mind worked.

Though Hartley painted on a smaller canvas than Clarke his intention was the same: to demonstrate the existence of a Divine Intelligence through revealing the laws by which it operated. Whereas Clarke attempted to discern such laws in the movements of the heavens and the moral ordering of human society Hartley took as his terrain the operation of the human mind. While Clarke largely looked to the principle of gravitation to justify the ways of God to Man, Hartley turned to the concept of association to reveal the order and simplicity of the way in which the human mind worked and hence its status as a divine construct.²⁰

In constructing his theory of association Hartley was plainly indebted to Locke's theory of the way in which human mind built up its ideas from the raw material provided by sensation and experience. But in helping to provide the physical mechanism by which Hartley linked external experiences with their effect on the human mind he turned to Newton's exposition of the effect of

vibrations on the human eye as outlined in Query 23 of the *Opticks*.²¹

A lesser known influence was the obscure Cambridge moralist, John Gay (1600-1745), who, like Hartley, linked associationism in psychology with utilitarianism in morals. As Hartley acknowledged it was Gay's *Preliminary discourse concerning the fundamental principles of virtue and morality* (1731) which 'put me upon considering the Power of Association'.²² For both Gay and Hartley the link between associationism and what was later called utilitarianism was, as Gay put it, that 'as pleasure and pain are not indifferent to him [the generic man], nor out of his power, he pursues the former and avoids the latter' and, consequently, 'that which he apprehends to be apt to produce pleasure, he calls *good*'.²³

It followed that actions could be categorised by the extent to which they contributed to the sum of human happiness thus laying the foundation for a system of utilitarian ethics. But though such a system of ethics eventually became most closely associated with the atheistic Bentham, for Gay and Hartley, as for their Cambridge disciple, William Paley, it was possible to place such a moral code in a theistic and indeed Christian framework. For Hartley and Gay the beauty of their *schema* was that it illustrated that the laws of natural philosophy, as instanced in the theory of association and its physical basis in vibration, could be shown to be closely intermeshed with a system of morality²⁴ - that, as Clarke had attempted to argue in a different manner, the True and the Good could be shown to be two sides of the same divinely-ordained coin. Utilitarianism provided a means by which to discern the direction in which God, the ultimate Good, wanted human beings to go.

²¹ H Guerlac, *Essays and papers in the history of modern science* (Baltimore, 1977), 161, and C U M Smith, 'David Hartley's Newtonian neuropsychology', *Journal of the History of the Behavioural Sciences*, xxiii (1987), 123-36.

²² M Webb, 'A new history of Hartley's "Observations on Man"', *Journal of the History of the Behavioural Sciences*, xxiv (1988), 203.

²³ E A Burtt ed., *The English philosophers from Bacon to Mill* (New York, 1939), 766-67.

²⁴ R Marsh, 'The second part of Hartley's system', *Journal of the History of Ideas*, xx (1959), 264-73.

¹⁹ John Gascoigne, *Cambridge in the age of the Enlightenment. Science, religion and politics from the Restoration to the French Revolution* (Cambridge, 1989), 127.

²⁰ Barbara Oberg, 'David Hartley and the association of ideas', *Journal of the History of Ideas*, xxxvii (1976), 441-54 and R Oldfield and Kathleen Oldfield, 'Hartley's "Observations on Man"', *Annals of Science*, i (1951), 371-81.

Hartley even hinted that the theory of association and its concomitant utilitarian morality provided a path back to humankind's first innocence. 'Association', he wrote in his magnum opus, *Observations on man* (1749), 'has a Tendency to reduce the State of those who have eaten of the Tree of Knowledge of Good and Evil, back again to a paradisiacal one' (p.83).

For association, with its progression from simple reactions to complex ones, provided a means of moral education as we are led from a childlike association of pleasure from immediate gratification to associate pleasure with altruistic actions. As the devout Hartley wrote: 'the great Business and Purport of the present Life, [is] the transformation of sensuality into Spirituality, by associating the sensible Pleasure, and their Traces, with proper foreign Objects' (p.214). By such means 'the sensible Pleasures and Pains must be transferred by Association more and more every Day, upon things that afford neither sensible Pleasure nor sensible Pain in themselves, and so beget the intellectual Pleasure and Pains' (p.82). In short, concluded Hartley using the language of Aristotelian causality, 'all the Things which have evident final Cause, are plainly brought about by mechanical means' (p.338).

III

In their different ways, then, both Clarke's system of Newtonian theology and Gay's and Hartley's theory of association sought to give an ethical and, indeed, Christian colouring to an essentially mechanistic conception of (in Clarke's case) the workings of the universe or (in Hartley's case) the working of the human mind. This same impulse to draw together the realms of natural and moral philosophy can be found, too, in the Scottish universities and, above all, at Glasgow, the home *par excellence* of moral philosophy in the first half of the eighteenth century. Indeed, it was to be one of the most striking features of the Scottish universities that, despite the dissolution of the traditional scholastic curriculum at the end of the seventeenth century, they maintained, in the changed intellectual conditions of the Enlightenment, something of that philosophical preponderance which had been a traditional

feature of European universities since the High Middle Ages.²⁵ One indication of the continuing philosophical vitality of the Scottish universities was the impulse to attempt to link the different branches of philosophy - most notably natural and moral philosophy - which elsewhere were allowed more and more to drift into separate intellectual abodes. As in England, the institution of an established church, with its close links with the universities, provided an intellectual environment in which there was a natural tendency to emphasise the consonance between Christianity and the fruits of the Enlightenment. In particular, it was the task of a professor of moral philosophy in the Scottish universities to defend the rationality of the ethical teachings of Christianity.²⁶ However, in Scotland where clerical control of the universities was weaker than in England this Christianising tendency was sometimes more lightly worn or, as in the case of Adam Smith, maintained only in a vestigial Deistic form.

Of the Scottish moralists by far the most influential was Francis Hutcheson, professor of moral philosophy at Glasgow from 1729 to 1746, who, by arguing for a fundamental moral sense, put British moral philosophy on a new footing. He also largely established the parameters within which the ethical debates of the Scottish Enlightenment were conducted.²⁷ True, Hutcheson owed some debt to Shaftesbury with his conception of an innate moral sense but Hutcheson refined and developed such a view arguing for an ethical consciousness which transcended the self-interest of the agent.²⁸ Thus Hutcheson talks of 'that *moral administration* we

²⁵ J Veitch, 'Philosophy in the Scottish universities', *Mind*, ii (1877), 74-91, 207-34.

²⁶ Alasdair MacIntyre, *Whose justice? Whose rationality?* (Notre Dame, 1988), 248-251.

²⁷ Richard Sher, 'Professors of virtue: the social history of the Edinburgh moral philosophy chair in the eighteenth century' in M A Stewart ed., *Studies in the philosophy of the Scottish Enlightenment* (Oxford, 1990), 96, and T Campbell, 'Francis Hutcheson: "Father" of the Scottish Enlightenment' in R.H. Campbell and A.S. Skinner eds., *The origins and nature of the Scottish Enlightenment* (Edinburgh, 1982), 167-85.

²⁸ Stephen Darwall, *The British moralists and the internal 'ought'* (Cambridge, 1995), 208-9.

feel within ourselves, that structure of our souls destined to recommend all those kind and generous affections which resemble the moral perfections of God'.²⁹

Though Hutcheson argued that 'We are not to imagine, that this moral Sense, more than the other Senses, supposes any innate ideas, Knowledge, or practical Proposition: We mean by it only a Determination of our Minds to receive amiable or disagreeable Ideas of Actions'³⁰ the tenor of his system of ethics departed from the tradition of moral philosophy deriving from the Lockean rejection of innate ideas. More markedly it diverged from the two other dominant moral philosophical paradigms which prevailed within Britain at the time: that of the hedonists represented by Hobbes and, more recently, by Mandeville - a view which Hutcheson dismissed as one that 'can never account for the principal actions of human life'³¹ - and that of the natural law theorists with their belief that God had impressed a moral order on the universe which humankind could discover. Along with his rejection of the natural law theorists went Hutcheson's dismissal of Clarke's rationalist attempt to deduce moral laws.³² Indeed, as a student at Glasgow in 1717, Hutcheson sent Clarke a letter criticising the centre-piece of Clarke's deductive system of religion and morality: the *a priori* proof for the existence of God.³³ By contrast, Hutcheson argued that the origin of moral behaviour is not external to humankind waiting to be discovered but rather internal deriving from a fundamental moral sentiment which precedes the

²⁹ Francis Hutcheson, *A system of moral philosophy, in three books* (2 vols, London, 1755), I, 114-15.

³⁰ Francis Hutcheson, *An inquiry concerning the original of our ideas of virtue or moral good*, in L A Selby-Bigge ed., *British moralists being selections from writers principally of the eighteenth century* (2 vols., Oxford, 1897), I, 83.

³¹ Francis Hutcheson, *Illustrations on the moral sense* ed. Bernard Peach (Cambridge, Mass., 1971), 117.

³² Henning Jensen, *Motivation and the moral sense in Francis Hutcheson's ethical theory* (The Hague, 1971), 68.

³³ William Scott, *Francis Hutcheson. His life, teaching and position in the history of philosophy* (Cambridge, 1900), 15-16.

exercise of reason.³⁴ A consequence of this position was that Hutcheson and his disciples were less inclined than Clarke or the natural law theorists to argue for a fixed and unchanging moral code and were more inclined to recognise that morality could be shaped by individual and cultural differences - thus providing an intellectual foundation for the social theorising that was so notable a feature of the Scottish Enlightenment.³⁵ Though Hutcheson based his moral philosophy on different premises than those which had hitherto largely prevailed within Britain, he and his fellow Scots retained the impulse to link moral and natural philosophy as sharing in a fundamental unity. In accord with the philosophical traditions of the Scottish universities Hutcheson attempted to link these two branches of philosophy by bringing to the study of moral philosophy the same attention to empirical evidence that had transformed natural philosophy,³⁶ devoting himself to what his Glasgow colleague, William Leachman, called 'the science of human nature and morality'.³⁷ For Hutcheson, too, drew his system of moral philosophy under the protecting umbrella of Newtonianism. Thus in his *An inquiry concerning the original of our ideas of virtue or moral good* he likens the principle of 'universal Benevolence toward all Men' to 'that Principle of Gravitation, which perhaps extends to all Bodys in the Universe; but, like the Love of Benevolence, increases as the Distance is diminish'd, and is strongest when Bodys come to touch each other'.³⁸ As with the English moral philosophers we have examined, the intellectual matrix which linked the two branches of philosophy was natural theology. For Hutcheson the moral sense was 'fixed for us by the AUTHOR of our Nature, subservient to the

³⁴ W Blackstone, *Francis Hutcheson and contemporary ethical theory* (Athens, Georgia, 1965), 41 and William Frankena, 'Hutcheson's moral sense theory', *Journal of the History of Ideas*, xvi (1955), 360.

³⁵ A L Donovan, *Philosophical chemistry in the Scottish Enlightenment* (Edinburgh, 1975), 54.

³⁶ J Rendall, *The origins of the Scottish Enlightenment* (London, 1978), 75.

³⁷ Darwall, *The British moralists and the internal 'ought'*, 243.

³⁸ Selby-Bigge, *British moralists*, I, 130.

Interest of the *System*³⁹ in the same way that Newton and his followers regarded gravitation as being implanted by the Creator to give direction to His Creation.

This assumption that moral and natural philosophy shared a fundamental unity was a well-worn theme within the philosophy schools of the eighteenth-century Scottish universities. Hutcheson's predecessor, Gershom Carmichael (Glasgow's inaugural professor of moral philosophy, 1727-29),⁴⁰ began his edition of Samuel Pufendorf's textbook on natural law with an assertion of the way in which the science of morality should keep pace with advances in the science of nature.⁴¹ Such a view that moral and natural philosophy were bound together was maintained not only by professors of moral philosophy like Hutcheson and Carmichael but also by natural philosophers like Colin MacLaurin (professor of mathematics at Edinburgh, 1725-46). For in his *An account of Sir Isaac Newton's philosophical discoveries* (1750) MacLaurin viewed philosophy as a seamless web of which the study of nature was a part — a part 'chiefly to be valued as it lays a sure foundation for natural religion and moral philosophy' (p.3).

At Marischal College, Aberdeen, the long continuance of the regenting system appears to have further reinforced the impulse to demonstrate the close integration of moral and natural philosophy. For the traditional regenting system involved one individual teaching all branches of philosophy - a system not abandoned there until 1753 (and not at King's College, Aberdeen until 1799) whereas it had been replaced by professorial teaching at Edinburgh as early as 1708. As Wood has shown, at Aberdeen it became

³⁹ Francis Hutcheson, *An essay on the nature and conduct of the passions and affections. With illustrations on the moral sense* (London, 1728), 117.

⁴⁰ On whom see J Moore and M Silverthorne, 'Gershom Carmichael and the natural jurisprudence tradition in eighteenth-century Scotland' in I Hont and M Ignatieff eds, *Wealth and virtue. The shaping of political economy in the Scottish Enlightenment* (Cambridge, 1983), 73-87 and J Moore and M Silverthorne, 'Natural sociability and natural rights in the moral philosophy of Gershom Carmichael' in V Hope ed., *Philosophers of the Scottish Enlightenment* (Edinburgh, 1984), 1-12.

⁴¹ Gershom Carmichael, *S. Puffendorfii de officio hominis et civis, juxta legem naturalem, libri duo* (Edinburgh, 1724), v.

almost a truism of moral philosophy teachers that it shared the methods and assumptions of natural philosophy.⁴²

In his 1720 graduation theses George Turnbull dwelt on this point invoking in support no less an authority than Newton himself who, in the 31st query of the *Opticks*, had written of the method of analysis and synthesis that 'if natural Philosophy in all its Parts, by pursuing this Method, shall at length be perfected, the Bounds of Moral Philosophy will be also enlarged'.⁴³ Later, in the 'Epistle Dedicatory' to his *Principles of moral and Christian philosophy* (1740), Turnbull once again affirmed that the Newtonian enterprise would contribute to the advancement of moral as well as natural philosophy describing his object 'to account for MORAL, as the great *Newton* has taught us to explain NATURAL Appearances'. For the order revealed by Newton in the natural world prompted the conclusion 'that the same admirable order shall prevail for ever, and consequently that due care will be taken of virtue, in all its different stages, to all eternity' (p.[i]). Newton himself, he pointed out in his preface, thought that the establishment of the true system of natural philosophy would bring with it 'the enlargement [of] Moral Philosophy' (p.iii).

In pursuing such a philosophical path Turnbull saw himself as following the lead of Hutcheson in viewing both natural and moral philosophy as being based on 'the same first principles' and being 'carried on in the same method of investigation, induction, and reasoning' (p.2). With a gesture towards the teleological assumptions that underlay the traditional conception of final causes Turnbull acknowledged the unity of philosophy arguing that 'when natural philosophy is carried so far as to reduce phenomena to good general laws, it becomes moral philosophy' (p.8). This same theme was taken up by his Aberdonian colleague, David Fordyce, who argued that moral and natural philosophy were linked not only by their ultimate goals but also by their methods. For, wrote Fordyce, '*Moral Philosophy* has this in common with *Natural Philosophy*, that it appeals to *Nature* or *Fact*; depends on Observation, and

⁴² Paul Wood, 'Science and the pursuit of virtue in the Aberdeen Enlightenment', in Stewart, *Studies*, 127-49.

⁴³ *Ibid.*, 131.

builds its Reasonings on plain uncontroverted Experiments, or upon the fullest Induction of Particulars of which The Subject will admit'.⁴⁴

Even that Scottish moralist, David Hume, from whom the famous distinction between fact and value - sometimes called 'Hume's law' - derives, was less inclined to keep these two spheres as rigidly distinct as some of his modern commentators suggest. True, in his *A treatise of human nature* there appears the classic passage:

In every system of morality, which I have hitherto met with, I have always remark'd, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surpriz'd to find, that instead of the usual copulations of propositions, *is*, and *is not*, I meet with no proposition that is not connected with an *ought*, or an *ought not*. This change is imperceptible; but is, however, of the last consequence. For as this *ought*, or *ought not*, expresses some new relation or affirmation, 'tis necessary that it shou'd be observ'd and explain'd; and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it.⁴⁵

But it has been argued that Hume was here attacking the attempts of moralists like Samuel Clarke or William Wollaston to construct a system of ethics on a rationalistic basis rather than attempting totally to distinguish the realm of moral philosophy from that of fact and observation.⁴⁶ Such an interpretation is consistent with his critique elsewhere in the *Treatise* of rationalistic ethics as when he writes that, 'tis impossible, that the distinction betwixt moral good

⁴⁴ David Fordyce, *Elements of moral philosophy: in three books* (1754) with a new introduction by John Price (Bristol, 1960), 7.

⁴⁵ David Hume, *A treatise of human nature*, with text revised and notes by P.H. Nidditch (Oxford, 1978), 469.

⁴⁶ W D Hudson, 'Hume on *Is* and *Ought*', in Chappell, *Hume*, 297, and Marie Martin, 'Hutcheson and Hume on explaining the nature of morality, Why it is mistaken to suppose Hume ever raised the "is-ought" question', *History of Philosophy Quarterly*, viii, no. 3 (1991), 277-89.

and evil, can be made by reason; since that distinction has an influence upon our actions, of which reason alone is incapable'.⁴⁷

Hume was in sympathy with Hutcheson in attempting to construct a system of ethics based not on *a priori* assumptions but on the facts of human nature and society - an area in which such scientific activities as observation and even experiment played an important role.⁴⁸ In this sense Hume himself breached the fact/value divide by drawing on empirical data about human behaviour to inform his discussion of the nature of morality.⁴⁹ Moreover, as one educated in the Scottish philosophical tradition, Hume naturally regarded his studies in natural philosophy as complementing his work in moral philosophy. He implies such a connection for example when he wrote in his 'A kind of history of my life' that 'I found that the moral Philosophy transmitted to us by Antiquity, labor'd under the same Inconvenience that has been found in their natural Philosophy, of being entirely Hypothetical, & depending more upon Invention than Experience'.⁵⁰

Hume, then, regarded the study of natural and moral philosophy as being intertwined though there remains the more fundamental issue of whether he considered morality as entirely a matter of human sentiment and convention and as therefore having no connection with any ultimate reality⁵¹ - though one could also make a case for Hume being sceptical of any such reality in any connection whether it be in the realm of ethics or natural philosophy. In short, did Hume not so much distinguish between 'is' and 'ought' as dismiss the category 'ought' altogether? As an admirer and follower of Hutcheson, Hume appears to attribute such

⁴⁷ Hume, *A treatise*, 462.

⁴⁸ David Norton, 'Hume, human nature, and the foundations of morality' in David Norton ed., *The Cambridge companion to Hume* (Cambridge, 1993), 149.

⁴⁹ Alasdair MacIntyre, 'Hume on "is" and "ought"' in V C Chappell ed., *Hume* (New York, 1966), 247.

⁵⁰ Norton, *The Cambridge companion to Hume*, 348.

⁵¹ Such for example is the view taken by Anthony Flew in 'On the interpretation of Hume', in Chappell, *Hume*, 283, or N Capaldi in 'Hume's rejection of "ought" as a moral category', *The Journal of Philosophy*, lxvi (1966), 126-37.

a view to Hutcheson as well as himself as when he wrote to him in 1740: 'I wish from my heart I could avoid concluding that since morality, according to your opinion as well as mine, is determined merely by sentiment, it regards only human nature and human life. This has often been urged against you, and the consequences are very momentous'.⁵² Such an entirely subjectivist view of morality has also been attributed to both Hutcheson and Hume by modern commentators such as Stafford but, although it has some plausibility for the arch-sceptic Hume, it is difficult to reconcile with the firmly theistic and even teleological framework within which Hutcheson constructs his moral system.⁵³

As in so many other ways so, too, in his ethical theorising Hume is both elusive and atypical in an age still saturated by the assumption that there was an ultimate reality which could be discovered by the methods of the natural philosopher and which had implications for the understanding of moral philosophy. In a period when Christian orthodoxy was under question but when theistic assumptions continued to shape the whole conduct of intellectual life it naturally followed that the study of Creation would lead to a better knowledge of the mind of the Creator and hence the nature of the Good as well as the True. In both eighteenth-century England and Scotland it was part of the mental furniture of Enlightenment culture that, in some sense, the rational processes that had produced Newton's great monument to the capacities of the human mind could and, indeed, should be used as a means of arriving at an understanding of that ancient problem: the nature of the Good Life. As the poet, Alexander Pope, put it in Epistle One of his *Essay on Man*: 'Account for Moral, as for Natural Things'.

It was a sentiment that had the blessing of the Master himself who, at the end of the *Opticks*, had urged natural and moral philosophers to follow the same methods for their ultimate goal was the same. 'For', wrote Newton, 'so far as we can know by natural philosophy what is the first cause, what power he has over

⁵² J Y T Greig ed., *The letters of David Hume* (2 vols., Oxford, 1932), I, 40.

⁵³ Martin Stafford, 'Hutcheson, Hume and the ontology of morals', *Journal of Value Inquiry*, xix (1985), 133.

us, and what benefits we receive from him, so far our duty toward him, as well as that toward one another, will appear to us by the light of nature'.⁷⁰ Despite the assault on final causes, then, there still remained a belief that in an ultimate sense natural and moral philosophy were both directed towards the discovery of the same reality. Thus the Enlightenment in its English and Scottish forms still regarded the Good and the True as belonging to the same intellectual universe nor did it construct quite as formidable a *cordon sanitaire* between Fact and Value as has become so engrained a part of the philosophical furniture of the twentieth century.

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⁷⁰ H S Thayer, *Newton's philosophy of nature: selections from his writings* (New York, 1953), 179.

METHODISM AND POPULAR SCIENCE IN THE ENLIGHTENMENT

Peter Lineham

Methodism played a role in the popularisation of science in the eighteenth century. There was in practice a close link between the Enlightenment view of experience and that of evangelicalism, and the spread of popular education through the Methodist magazines was paralleled by the growth in a technical language of debate through the theological controversies of the Methodist movement. There are also countervailing arguments which must be considered, in particular Methodists' heightened sense of spiritual realities which led them to concentrate on spiritual and occult explanations of events.

In many respects Methodism was caught in a paradox. It was acutely aware of the elements of human psychology but involved in a kind of reverse reductionism, using religious language but acknowledging theories of natural process that owed much to Locke and sensationalist psychology. There was debate within the Methodist tradition on these issues reflecting the Moravian - Arminian - Calvinist triangle within which Methodism emerged, as is evident by the values of the Antinomian extremists on the edge of the Methodist tradition. Overall what emerges is a more complex picture, reflective in part of the slow emergence of science in England, and of the rather restricted way in which the Enlightenment affected English intellectual and social life. It also reflects the complexities in the notions of science that enabled Methodism to love it and hate it.

In interpreting these issues, much depends upon what we mean by the Enlightenment. The portrait made familiar by Peter Gay of a virulently anti-Christian movement has come to look very different as a richer pastiche of German, Italian and English Enlightenments has been redrawn by recent historians. So the sharp contrast drawn by Gay between optimists and pessimists, Christians and unbelievers is being replaced by a more subtle picture of general changes to European thinking and language in the eighteenth century in which the Enlightenment itself is only one movement

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alongside Jansenism, Josephism and Cameralism.¹ Porter has described a world of benevolent optimism, of happiness and pragmatism, individualism and anti-traditionalism.²

Establishing Methodist participation in this more broadly based pattern of change is a challenging problem. It is a particular issue in eighteenth-century England, where much of the intellectual discussion focussed on politics and religion rather than science and philosophy. The debate can be traced through the broad framework of enlightened debates particularly of the Deists.³

The situation is not helped by the fact that Methodists in many ways pioneered the dispute between the Enlightened and the Christians. The Methodists consciously thought of the Enlightenment as the enemy, and many scholars have believed them. Margaret Jacob, for example with her overemphasis on the role of Freemasonry, is clear that Methodism was necessarily opposed to science because it was suspicious of Newtonian thought.⁴ And certainly the Methodists were sharp critics of the world she describes. Typically the Methodists were motivated by a fear of the negative and critical aspects of the Enlightenment, fearing that the power and authority of scripture was under threat.⁵ John Fletcher, the Anglican Vicar of Madeley whom Wesley designated as his successor, was capable of some harsh jibes at the expense of the *philosophes*, and in the years of the French revolution he was cited posthumously as describing the deaths of Voltaire and Rousseau in suitably judgemental terms. Voltaire, he commented, thought of the Devil on his deathbed, while Rousseau thought only

¹ See Robert Darnton, 'In Search of the Enlightenment: Recent attempts to create a social history of ideas', *Journal of Modern History*, xliii (1971), 113-132; Sheridan Gilley, 'Christianity and Enlightenment: an historical survey', *History of European Ideas*, I (1981), 103-21.

² Roy Porter, *English society in the eighteenth century* (Harmondsworth, 1982), 269-328.

³ See for example John Redwood, *Reason, ridicule and religion: the age of Enlightenment in England 1660-1750* (London, 1976).

⁴ Margaret C Jacob, *Living the Enlightenment: Freemasonry and politics in eighteenth-century Europe* (New York and Oxford, 1991), 220.

⁵ J D Walsh, 'The Anglican Evangelicals in the eighteenth century', in *Aspects de l'Anglicanisme* (Paris, 1974), 89.

of himself.⁶ The comment is reasonably funny, and also very self-satisfying for those who were convinced that the true colours of the Enlightenment had now at last become clear. Yet Fletcher had been educated in his youth by early enlightened scholars. His remarks therefore reflect the change of tone by the 1790s. For by the late eighteenth century revival and enlightenment gazed at each other down the barrel, hardened by the emergence of the Unitarian form of religion which symbolised enlightened reason to English evangelicals.

Fifty years earlier the situation was not so clear. Indeed, as scholars have increasingly argued, pre-Enlightenment empiricism lies close to the heart of the distinctiveness of the Evangelical revival. Willmer and more recently Bebbington have rightly emphasised the indebtedness of the Evangelicals to Locke's notion of experimental knowledge. Jonathan Edwards, the New England preacher, in expounding the notion of assurance of conversion from a simple sense of spiritual experience insisted that grace may be a felt sensation.⁷ Consequently it is quite misleading to describe the Revival as an anti-rational movement. While reason was not seen as adequate in itself, the early evangelical leaders were insistent that there was a sharp difference between their position and that of the enthusiasts. It lay in their balancing of reason with experience, by which they meant that there was an internal persuasion of the house, but it needed to line up with external evidence.⁸ Particularly striking was the impact of the influential Philip Doddridge who educated men of reason and sponsored revival movements. It was also the tone of a religious community founded on a pragmatic desire to be useful and successful.⁹ Wesley was in many respects

⁶ *Arminian Magazine*, xv (1792), 610.

⁷ D W Bebbington, *Evangelicalism in modern Britain: a history from the 1730s to the 1980s* (London, 1989), 47-50.

⁸ *Ibid*, 50-5.

⁹ W R Ward, 'The relations of enlightenment and religious revival in Central Europe and in the English-speaking world', in Derek Baker ed., *Studies in Church History, Subsidia*, ii, *Reform and reformation: England and the Continent c1500 - c 1750* (Oxford, 1979), 281-305; W R Ward, 'Orthodoxy, enlightenment and religious revival', 1982, reprinted in Ward, *Faith and faction* (London, 1993), 16-37.

an enlightened man, a man of sensibility, humanity, criticism and progress, an Arminian. His language reflects very much the eighteenth century shift from purpose to consequence and outcome as a mode of assessing validity. Certainly other forms of language remained familiar to him, but in particular his battle with Calvinism and with antinomianism have been seen as classic evidence of his enlightened and modern character. I have, however, some doubts about some of Bernard Semmel's reasoning on this point.¹⁰ Given the extraordinary variety of early Methodism and the equal vigour of its Calvinist and Arminian parts, it is doubtful whether its extremes - including grace and contract, enthusiasm and order, church, sect, movement and denomination - can really be attributed to the Arminianism of the revival. The Calvinist awakening deserves more study than it has received, bearing in mind that the American Great Awakening was almost entirely Calvinist. Moreover the antinomian strands in the revival, which beckoned it back to older issues of Puritanism, and placed the basis of assurance on quite different grounds from the believer's experience consciously represented an attempt to pull the revival in a more traditional direction.¹¹ Consequently later Methodist leaders worked hard to minimise the authority of experience, subjecting it to the discipline of the Methodist Society.

Methodist Belief in the Supernatural

The Methodists were at the opposite pole from the Deists in their view of the natural world. They constantly interpreted the world as the sphere of divine action; a divine action which they confidently interpreted and enjoyed. In particular this was how they interpreted personal experience. From the very beginning they were fascinated by the convulsions which overwhelmed some believers, and although in the end Jonathan Edwards' cautions prevailed, at a popular level convulsions were seen as evidence that God was

¹⁰ Bernard Semmel, *The Methodist revolution* (London, 1974). See in particular, 10-22.

¹¹ See P J Lineham, 'The Antinomian Methodists', in Malcolm Chase and Ian Dyck ed., *Living and learning: essays in honour of J F C Harrison* (Aldershot, 1996), 35-51.

doing something supernatural.¹² Perhaps this was linked to the view held by some that the non-Christian was demon-possessed and therefore conversion was a kind of exorcism.¹³ Certainly Methodists quite often reported cases of demonic possession, and saw the miraculous as the only way to deal with this kind of ailment (although as Walker has argued, it was possible to put exorcism in a different category from the miraculous).¹⁴ Similarly predictions and prophecies were sought out in the confidence that God was working out his purposes. Jedidiah Buxton of Derbyshire for example was cited because he had predicted his own death.¹⁵ A case of a miraculous gift of second sight was cited in one issue of the *Arminian Magazine*.¹⁶

The interest in healing was particularly high. Methodist preachers kept their ears open for news of authentic healers. The healing of Mary Maillard in 1693 through her private belief was seen as well worth recounting.¹⁷ John Bennet was very interested to find a case of a healer at Sandbich in 1748, and told to John Wesley about it. Within the month the news spread widely.¹⁸ More specifically religious cures were also described, even when the miraculous

¹² The story might be traced of how Cennick was cautious about convulsions where Wesley was enthusiastic. See John Cennick, 'Typescript ... Bristol' (Manuscript in Moravian Church House, London), 5-6. The concept of 'pangs of the new birth' was important - see *Anti-Methodism display'd* (London, 1739), 29.

¹³ *Dr Trapp try'd and cast, and allow'd to the 10th of May next to recant* (London, 1739), 47.

¹⁴ Among many examples one might cite from the Countess of Huntingdon's correspondence held in Westminster College, Cambridge, [A Preacher] to the Countess of Huntingdon, n.d. See also J Cennick, 'Typescript ... Bristol', 5-6. See D P Walker, *Unclean spirits: possession and exorcism in France and England in the late sixteenth and early seventeenth centuries* (Philadelphia, 1981), 67-73.

¹⁵ *Arminian Magazine*, viii (1785), 577-78.

¹⁶ *Arminian Magazine*, viii (1785), 586-88.

¹⁷ *Arminian Magazine*, xiv (1791), 532-38.

¹⁸ Methodist Church Archives, Manchester: John Bennet to John Wesley, 22 Oct. 1748; and John Bennet Diary, 4 Aug. 1748. See *Works of John Wesley, Letters II*, ed. Frank Baker (Oxford, 1982), XXVI, 329 [John Wesley to Charles Wesley, 15 Sept. 1748].

element was somewhat ambiguous. For example there is an account of a woman from Winchelsea who was praying for the Methodist preachers while in bed sick, when her faithfulness was rewarded with a vision of Christ and a healing of her ailments.¹⁹ John Wesley in effect operated a spiritual promotion agency that constantly circulated stories of spiritual activity.

The Methodists were very interested in remarkable cures. Yet this does not mean they were 'enthusiasts'. They seemed to respond in much the same way to the 'miracles of modern science' as they did to miracles that contradicted nature, and perhaps did not really understand the distinction. Adam Clarke reported as a miracle the regrowth of a woman's hair through electrical charges, and Methodists had no problems with such electrical experiments, only becoming uncomfortable when occult elements appeared as they did in Mesmer's theories.²⁰ Various types of cure are reported regularly in issues of the *Arminian Magazine* from the mid-1780s, some of these marvellously credulous; for example the cure for nervous disorders effected by a strong brew of tea.²¹ A seeming preoccupation with healing may reflect Wesley's growing concern with health at the latter stage of his long life, but his outrageous compendium of traditional cures, *Primitive Physic*, was first published in 1747, and contains a very extensive number of such remedies. It cannot just be said that Wesley was expressing the popular views of the day. There were many critics of his book, some theological like Augustus Toplady, and others medical like William Hawes, who reasonably described it as 'a farrago of absurd remedies'.²² The general character of his cures was a theory of 'sympathetic remedies', in which illness and cure were seen as intertwined, although he provided no classification of types of ailments. On the other hand they were offered as cures rather than magical potions (as many were in origin), and were described with no guarantee that they would work, and they offered a much safer approach to cures than bleeding and drugs.

¹⁹ 'A Sudden Cure', *Arminian Magazine*, xiv (1791), 488-9.

²⁰ *Arminian Magazine*, xiv (1791), 584-6.

²¹ *Arminian Magazine*, viii (1785), 327, *ibid*, ix (1786), 52-4.

²² William Hawes, *An examination of Mr John Wesley's primitive physic* (London, 1776), 57.

The Issue of Miraculous Validation

For those evaluating early Methodism, there was a hot debate about its authenticity, and this turned on ideas of external validation by miracles. For example in a sermon to the University of Oxford on 5 August 1739, John Wilder, the Rector of St. Aldate's in that city, dismissed Methodism partly because no miracles attested to its truth.²³ This view owed much to the historic view of the attestation of saints, but also the validation of Christianity itself by miraculous testimony - the issue to which Hume had turned his attention. Miracles were seen by many as a self-validation. So where were the Methodist miracles? Thomas Church, one of Whitefield's earliest critics, complained that all of his miracles recounted in his published journal were in fact all figurative.²⁴ Similarly another anonymous pamphlet complained of Whitefield's letter to the Bishop of London, that the only miracles he claimed were on souls whereas Jesus healed bodies.²⁵ While there were some apparently miraculous events, in the sense of anti-natural occurrences, but they were hardly sufficiently evident to provide the stunning proof of the validity of the revival that some demanded.

The conventional argument in defence of Christianity drew on the evidence of miracles. Ronald Finucane notes that the medieval church defined the characteristics of miracles as proceeding from God, against natural processes, the result of virtue not words, and serving to corroborate the Catholic faith. So the yearning for Methodist miracles reflected an ancient tradition of popular Christianity from the days of the conversion of Europe. As Finucane has well said:

Missionaries won converts by recruiting stronger charms, routing braver devils, and performing greater wonders with objects more powerful than rude idols. From Rome to

²³ John Wilder, *The trial of the spirits: or a caution against enthusiasm, or religious delusion* (Oxford, [1739]), 15.

²⁴ Thomas Church, *An explanation and defense of the doctrine of the Church of England concerning regeneration, works before grace and some other points relating thereto* (London, 1739), 61.

²⁵ *Mr. Whitefield's doctrines considered and confuted: and some consequences deduced from them* (Ipswich, 1741), 7-9.

Lindisfarne the powers of holy bones were recognised by the simplest Christians, innocent of theology, and for a thousand years these beliefs, though sometimes challenged, would dominate much of the folk Christianity of Europe.²⁶

In this respect Methodism reinvigorated a religious interest in healing and wonders which had been surrendered to the cunning men and wise women with the secularisation of the old medieval shrines.²⁷ But this reclamation of the old medieval justification required them to challenge the usual Protestant view of miracles.

The issue of the continuing possibility of miracles was in many respects a theological one. Protestantism had generally taken the cessationist view that miracles had ceased.²⁸ This it treated in various ways: the earliest Protestant generation seemingly confined miracles to the apostles, but by the eighteenth century it was customary to believe that miracles had gradually ceased to occur and were finally brought to an end in the Constantinian age.²⁹ D P Walker links this to the scientific spirit, and argues that the Puritans were therefore inclined to look for natural - in other words scientific - explanations for phenomena:

It makes it possible for a pious Christian to live in a world entirely devoid of any supernatural occurrences: the miracles in the Bible truly happened, but they happen no more; divine providence still rules this world, but only through normal, natural means. Such a world, I suggest, is favourable to the development of early modern science, which is searching for invariable laws of nature; the search can be pursued without upsetting any Anglican's religious convictions.³⁰

If this is the case, then the Methodist view of miracles seems rather strange. Certainly the English Enlightenment focussed a great deal of attention onto the possibility of miracles. The debate goes back to the discussion by John Locke, who was prepared to

²⁶ Ronald C Finucane, *Miracles and pilgrims: popular beliefs in medieval England* (Totowa, N.J., 1972), 24.

²⁷ Finucane, *Miracles and pilgrims*, 49-55, 201, 214-17.

²⁸ D P Walker, *Unclean spirits*, 66-73.

²⁹ Benjamin B Warfield, *Counterfeit miracles* (new edn., London, 1972), 6-9. Warfield was writing in opposition to modern faith healers.

³⁰ Walker, *Unclean spirits*, 73.

accept the role of miracles in attesting the mission of Jesus Christ, but was suspicious of them in other contexts.³¹ The English deists, notably Woolston and Annet, argued that the miracles in the gospel should be treated as allegorical accounts, while Hume argued that they were *a priori* impossibilities. In apparent contrast Conyers Middleton defended the biblical miracles yet launched a slashing attack on the post-apostolic miracles, every bit as fierce as Hume's (for after all Hume never dared to mention the miracles of Jesus).³² Gibbon's historical method owed far more to Middleton than to Hume. The orthodox defence espoused by Thomas Sherlock was that miracles could not be ruled out as contrary to the laws of reason and that they could be judged as reasonable by evaluating their factual claims.³³

The Methodist position in this debate is ambiguous. Wesley was very disturbed at Middleton's arguments, concerned that his arguments 'overthrow the whole Christian system'. In 1749 Wesley wrote and published a long open letter to Middleton, very alarmed by of his arguments, which seemed to him implicitly to criticize apostolic miracles as well. He insisted that there were sub-apostolic miracles. He argued that gifts like the gift of tongues could occur at any time at the discretion of Christ. Accepting Middleton's point that the corruption of the church under the Roman Empire explained the cessation of miracles, he carefully presented to Middleton an apologetic for the Christian faith which was not dependent upon miracles.³⁴ Similarly in answering complaints about Methodism in 1746, Wesley made only cautious claims for the evidence of miracles associated with the movement:

I acknowledge that I have seen with my eyes and heard with my ears, several things which, to the best of my judgement, cannot be accounted for by the ordinary course of natural

³¹ Colin Brown, *Miracles and the critical mind* (Grand Rapids, 1984), 46, citing Locke, *Third letter on toleration*, chapter 10.

³² See Colin Brown, *Miracles and the critical mind*, 64-72.

³³ Edward Carpenter, *Thomas Sherlock 1678-1761* (London, 1936), 245-250.

³⁴ John Telford ed., *The letters of the Rev. John Wesley, A.M.*, (London, 1931), II, 345, 365, 386-7. [Wesley to Dr Conyers Middleton, 4 Jan. 1748].

causes; and which therefore I believe ought to be 'ascribed to the extraordinary interposition of God'. If any man choose to style these *miracles*, I reclaim not.... I cannot account for ... these in a natural way. Therefore I believe they were ... supernatural.³⁵

And in further reflection he challenged the traditional Protestant cessationist view:

Yet I do not know that God hath anyway precluded himself from thus exerting the sovereign power, from working miracles in any kind or degree, in any age, to the end of the world. I do not recollect any scripture wherein we are taught, that miracles were to be confined within the limits either of the apostolic or the Cyprianic age; or any period of time, longer or shorter, even to the restitution of all things.

He went on to reject the application of I Corinthians 13:8 to the cessationist debate, and insisted, as did those in the seventeenth century about whom Walker writes, that miraculous insight was necessary to discern lying spirits.³⁶ Yet Wesley did not lay claim to miraculous gifts himself; if miracles happened, he had no personal experience of it.³⁷ Reading a book by John Lacy, the supporter of the French prophets, Wesley commented in 1750 that:

I was fully convinced of what I had long suspected: (1) that the Montanists in the second and third centuries were real, scriptural Christians; and (2) that the grand reason why the miraculous gifts were so soon withdrawn was not only that faith and holiness were wellnigh lost, but that dry, formal, orthodox men began even then to ridicule whatever gifts they had not themselves, and to decry them all as either madness or imposture.³⁸

³⁵ Wesley, *Principles of a Methodist farther explained*, in *The Works of John Wesley* (3 edn., London, 1872), VIII, 460.

³⁶ *Ibid*, VIII, 465.

³⁷ Wesley, *Letter to the Bishop of Gloucester*, 1763, I [2-3], in *Works of John Wesley*, XI, *The Appeals to men of reason and religion*, ed. Gerald R Cragg (Oxford, 1975), 468-80.

³⁸ John Wesley, Journal, 15 August 1750, in *Works of John Wesley*, XX: *Journals and Diaries III (1743-1754)* ed. W. Reginald Ward and Richard P Heizenrater (Nashville, 1991), 356-7.

The implication might be that if these circumstances were reversed then miracles would flourish. Perhaps this was not how he viewed it; Wesley probably felt that once the cessation had occurred it would not be reversed. As he commented in the *Farther Appeal to Men of Reason and Religion*, preachers ought to be like the apostles in many respects, but 'we cannot and therefore need not be like them in working outward miracles'.³⁹ Bishop Lavington recognised that Wesley made no claim to be a miracle worker, yet felt that there was prevarication in this, since Wesley allowed for 'partly non-natural' occurrences.⁴⁰ This may be explained by Walker's argument that Puritans wanted to retain some scope for the miraculous specifically for the casting out of demons.⁴¹ The Methodists seem to hold a similar position, accepting that God continued to reveal wonders and that in some specific instances there were occasions when the extraordinary event promoted faith. William Grimshaw, a leading Methodist clergyman, queried the assumption that miracles had ceased, and suggested the cause was the decline from vital Christianity in the Constantinian age.⁴² T. S-y in a tract defending the Methodists argued that inspiration from God that one was regenerated did not require miraculous attestation, and indeed could not be adequately demonstrated by miracles. In a later tract he insisted that it was unfair to require supernatural attestation to Methodism, since in fact it simply sought to revive primitive Christianity.⁴³ John Webb, a very early Methodist pamphleteer, insisted that miracles were of no service to the soul and were therefore insufficient validation of Methodist

³⁹ Wesley, *Further appeal to men of reason and religion*, part III, para. 9, in *Works of John Wesley*, XI, ed. Gerald R. Cragg, 296.

⁴⁰ Lavington, *The enthusiasm of the Methodists and Papists compared*, III (London, 1751), 32-3.

⁴¹ Walker, *Unclean spirits*, 67.

⁴² William Grimshaw, *An answer to a sermon late published against the Methodists by the Rev. George White* (Preston, 1749), cited in W. Myles, *Life of Grimshaw* (2 edn., London, 1813), 131-32.

⁴³ T. S-y, *A congratulatory letter to the Rev. Dr. Trapp: occasioned by his four sermons against enthusiasm* (London, 1739), 44-49; T. S-y, *A letter to the Rev. Dr. Trapp: occasioned by a late pamphlet* (London, 1740), 8-29.

claims.⁴⁴ The real miracle was that people were turning in faith to God and becoming the children of God.⁴⁵ This surely is a form of enlightened reasoning. Wesley himself entered the fray with a brilliant and innovative insistence that miracles in themselves could prove nothing, and even in the case of Christ, they did not do so.

Miracles ... are quite needless ... Nor are they so conclusive a proof as you imagine. If a man could and did work them in defence of any doctrine, yet this would not *supersede other proof*. For there may be terata yeudous, 'lying wonders', miracles wrought in support of falsehood. Still therefore his doctrine would remain to be proved from the proper topics of Scripture and reason. And those even without miracles are sufficient. But miracles without these are not. Accordingly our Saviour and all his apostles, in the midst of their greatest miracles, never failed to prove every doctrine they taught by clear Scripture and cogent reason.⁴⁶

Here speaks a man of the modern eighteenth century.

In effect the Methodists were instinctive empiricists. Their approach to apologetics reflected the Enlightenment preference for evidence from 'facts', albeit miraculous facts. They defended their role by pointing to the good that they had done for individuals and the community.⁴⁷ Whether one sees this as just enlightenment packaging of an essentially old-fashioned product is perhaps only a matter of personal preference. Henry Rack charges that:

[Wesley] ... appears a 'reasonable enthusiast': rational in form but enthusiastic in substance. He supported supernaturalist beliefs with empiricist arguments well beyond what Locke would have allowed in his more limited form of 'rational supernaturalism', which avoided Deism by allowing for the truths 'beyond' but not 'contrary' to reason:

⁴⁴ John Webb, *John Wesley's journal vindicated in a letter to Thomas Church* (London, 1745), 42-7.

⁴⁵ [Westley Hall], *An answer to a late charge against the Methodists and Moravians: the first part* (London, 1747), 44-5.

⁴⁶ Wesley, *Further appeal to men of reason and religion* part III, para 29, in *Works of John Wesley*, XI ed. Gerald R. Cragg, 311.

⁴⁷ For example [Westley Hall?], *An Answer to a Late Charge*, 13, 18.

such as a biblical revelation supported by miracles and prophecy, safely confined to the past.⁴⁸

This is a severe criticism of Wesley, but the problem is that it demands a 'pure' Lockean approach, and does not seem to allow for the full significance of the Methodist quest for experience. One should not, after all, assume that pure Lockean thought was widely known in the England of the period, and the ways in which Wesley appealed to the Bible and to miracle were not quite as old-fashioned as Rack suggests.

It is a mistake to see the Methodists as the 'enthusiasts' of the eighteenth century. Enthusiasm is surely technically the position that constant divine interventions lie in the very nature of the world. Now it is certainly true that the Methodists spoke in an unashamed way about their knowledge of God, and typically they called this an 'experimental knowledge of God'.⁴⁹ Bishop Lavington in his famous comparison of Methodism and Catholicism noted with some justification (and a good deal of exaggeration, typical of the reaction of the educated to any popular movement) that this Methodist self-confidence could encourage some quite bizarre behaviour.⁵⁰ But this is very different from the emphasis on the miracles that occurred at Saint-Médard in Paris at the tomb of Francois de Paris in 1731-32.⁵¹ Even more relevantly, the Methodists can be contrasted with the French prophets who had caused great excitement in various parts of England in the first decade of the century.⁵² The influence of this group certainly prepared the way for the arrival of the Methodists. But Methodists were in fact cautious about the label of enthusiasm. They wanted a faith that was rational. They were convinced that orderly experience was essential. The typical Methodist sought to

⁴⁸ Henry D Rack, *Reasonable enthusiast: John Wesley and the rise of Methodism* (Philadelphia, 1989), 388.

⁴⁹ For example *Arminian Magazine*, xiii (1790), 366.

⁵⁰ Lavington, *The enthusiasm of the Methodists and Papists compared*, III, 1-74.

⁵¹ See B Robert Kreiser, *Miracles, convulsions and ecclesiastical politics in early eighteenth-century Paris* (Princeton, 1978).

⁵² Hillel Schwartz, *The French prophets: the history of a millenarian group in eighteenth-century England* (Berkeley, 1980).

distinguish faith from enthusiasm, false from true assurance.⁵³ Even Howel Harris, labelled by a modern biographer 'the last of the enthusiasts' firmly denied that he would ever set immediate inspiration over the word of God.⁵⁴

Methodist Views of Natural Processes

Much of the complexity of the Methodist view lay in their ambiguous reaction to natural theology. They believed that the scholarly research into the Bible was built on very dubious foundations. Since, in the opinion of writers like John Newton and Thomas Haweis, two noted evangelical clergy, all truth could be learned from the plain meaning of the Bible, there was clearly no need for science, for natural theology had never been capable of establishing the truth. However there is some evidence that others appreciated the natural theology of William Paley, so long as they could use it as additional evidence in support of their revealed sources of truth. But the real problem with natural theology was its failure to recognize the blindness of the fallen mind that meant it could not reason by reason alone. John Venn declared in 1789 that he would rather save souls than sift salt, and faced with these alternatives, the issue was clear.⁵⁵ Nineteenth century evangelicals divided more sharply on the same issues, some very comfortable with all useful knowledge, others increasingly suspicious of science.

The Methodist world-view hinged on belief in particular providences. For the believer unusual sequences of events were the constant evidence of the presence of God and of his especial care for his own redeemed children. There is no clearer example of this than the original epitome of Methodist experience, the *Journal* of George Whitefield, the publication of which from 1739 instructed and inspired many people into the evangelical experience.

⁵³ See for example J Doves of London to John Wesley, 4 Aug. 1774, in *Arminian Magazine*, x (1787), 105-6.

⁵⁴ Aberystwyth: National Library of Wales, Trevecka Letter 1695: Howel Harris to Edmund Jones, 7 Sept. 1747.

⁵⁵ References from an unpublished paper by David Bebbington, delivered at the Anglo-American conference of historians, Institute of Historical Research, London, July 1996.

Whitefield saw himself as playing an apostolic role, experiencing the constant miraculous workings of providence in ensuring the fulfilment of his God-given mission to recommence primitive Christianity in England.⁵⁶ Critics constantly remarked upon this feature of Whitefield's world-view, and urged a greater emphasis on duty than upon responding to ecstasies.⁵⁷ But who were the traditionalists in this debate? Haddon Willmer in an influential essay noted that the evangelical doctrine of providence was important because of their rejection of the new theology of Deism. He noted that more popular and extreme magazines like the *Evangelical Magazine* were much more extreme on the subject than that model of evangelical Anglican decorum and prudence, the *Christian Observer*.⁵⁸ This prudential spirit with its emphasis on fulfilling the duties of one's station is not characteristic of all Methodists. It is their emphasis on the unpredictability of experience that makes Methodists unscientific given the eighteenth-century notion that science explored the regularities of nature. They were more interested in the exceptions. This fascination with exceptions was common enough for example on the pages of the *Gentlemen's Magazine*. The *Arminian Magazine* quoted with approval the view of an author named Goad that nature is at work infused with regularities, and particular providences are the evidence of a double providence, in which miraculous timing does not contradict the regularity of events. While some events are necessary in the philosophical sense, others are contingent, and others (so the author alleged) are 'mixed'.⁵⁹ This comment was one of several attempts by Wesley to defend Arminianism as a philosophical system, in which voluntarism and self-causation could somehow fit within a logical universe. If the concept seems a little confused, Wesley's desire to preserve consistent causation alongside a rejection of predestination is significant. There were

⁵⁶ *George Whitefield's journals* (new edn., London, 1960), 41, 43, 47, 70, 105.

⁵⁷ T G, *Remarks on the Reverend Mr. Whitefield's journal* (London, [1740]), 11, 28-32.

⁵⁸ Haddon Willmer, 'Evangelicalism 1785 to 1835' (unpublished University of Cambridge Huslean Prize Essay 1962), 81-108.

⁵⁹ *Arminian Magazine*, i (1778), 289-302.

moreover, other Methodist positions on predestination, and it would not be right to assume that the majority of the first generation of Methodists was Arminian.

Another factor was the Methodist sense of wonder. Methodists on the whole subscribed to an apologetic not uncommon in the eighteenth century in which the marvel of God's grace was foreshadowed by the marvels of nature, and reverence for the natural instilled reverence for the supernatural. The Moravian John Gambold was spurred by earthquakes to reflect in this way upon nature.⁶⁰ Such reflections were pious attempts to understand creation. Sometimes the Methodist desire to prove that creation has purpose and meaning seems rather strained and exaggerated; a popular apologetic in which nature is without tension and competition. The *Arminian Magazine* quoted that well-known work, *The Wisdom of God in Creation* and attacked Buffon's *Natural History*, in an attempt to answer questions about the goodness of God in creation.⁶¹

One may argue that the essential view of Methodists was astonishment at the extraordinary qualities of the world they lived in. The delighted account of the restoration of a gentleman from drowning by R. Hall which described how hot bottles were used to warm him is not unlike equivalent accounts in the *Gentleman's Magazine* (and some favourite Methodist stories probably came from this secular source).⁶² It is significant in this account that there is no mention of the agency of prayer. Overall, Methodists delighted in any visible evidence of a world in which they sensed the presence of the divine.

Methodists and Natural Philosophy

Great care is needed in definitions of Enlightenment science. Much of the discussion about the emergence of modern science in recent years has accepted - perhaps too willingly - Frances Yates' views

⁶⁰ For example John Gambold, *The reasonableness and extent of religious reverence: a sermon preached at the Brethren's Chapel in Fetter-Lane on the afternoon of the fast-day, Feb. 6, 1756* (London, 1756), 15-18.

⁶¹ *Arminian Magazine*, v (1782), 490-2, 542-8 among other references.

⁶² *Arminian Magazine*, xv (1792), 102-3.

on its link with hermetic traditions. It may indeed be true that the influence of Newton and the empirical tradition is the crucial advance, along with the general adoption of the method of hypothesis and evidence. Furthermore one needs to distinguish eighteenth century science from the profound changes to the concepts of cosmology in the seventeenth century and the sharp changes in the biological sciences awakened by the issue of hypothesising origins in the nineteenth century. So wherein lay the breakthrough of the eighteenth century? In many respects it lay in the practical and experimental sciences and in the application of science to technology and industry. Its concern was with performance and experimentation, and rejecting occult explanation. About this Methodists had no qualms.

The view of creation adopted by the Evangelicals was a conventional one. Some Methodists were attracted to the theory of catastrophism, and in fact the modern creationist view has a fascinating precedent in a Methodist explanation of how people arrived in America.⁶³ The Methodist view of reason has been the subject of some extensive discussion in recent years. Isabel Rivers argues that when as a theologian Wesley insisted that reason had its limits in establishing truth, he is allowing the value of the modern philosophical method but subjecting it to the confines implied in the phrase 'according to Scripture, reason and experience'.⁶⁴ But she also notes that even an author like Shaftesbury was not without appeal to evangelical writers.⁶⁵

As for the specific Methodist view of science, much of the research done has focussed on Wesley's views. There are those for whom Wesley is the classic contradiction of the Enlightenment, the primitive and old fashioned medieval man. A recent series of papers by J. W. Haas have interpreted Wesley on the contrary as sympathetic to science. The evidence cited certainly indicates that Wesley enjoyed in this, as in many fields, being the broker and

⁶³ *Arminian Magazine*, xv (1792), 548-51.

⁶⁴ Isabel Rivers, *Reason, grace and sentiment: a study of the language of religion and ethics in England 1660-1780*, I (Cambridge, 1991), 227-34.

⁶⁵ Isabel Rivers, 'Shaftesburian enthusiasm and the Evangelical revival' in Jane Garnett and Colin Matthew ed., *Revival and religion since 1700: essays for John Walsh* (London, 1993), 21-39.

interpreter of a specialist literature to general readers.⁶⁶ His curious *Wisdom of God in Creation: A compendium of natural philosophy* published in five volumes first in 1765 and reissued in 1784 from extracts from the works of many sources (with only a preface and conclusion which were truly original), he defended in the *London Magazine*. He had compiled it in his leisure hours because no one else had sought to translate scientific ideas into popular terms. He cheerfully admitted his blunders in the work, but upheld its value nevertheless.⁶⁷ Haas fails adequately to ponder the profound difference between the enlightened critique of theology and Wesley's willingness to evaluate scientific writers in theological terms. He did not in any sense accept the integrity and independence of science or see it as an independent way of knowing. Moreover the categories which Haas employs - science and antiscience - are themselves clumsy and ambiguous. For notions of science were being stretched in the Enlightenment period, moving from static to dynamic models. Wesley's notions of science or, as he termed it, natural philosophy, were in this sense very Baconian, although certainly his *Compendium* was prefaced by an essay 'On the Gradual Improvement of Natural Philosophy' in which he first praised and then devalued the significance of what science taught.⁶⁸ His authorities, as another letter reveals, were scarcely contemporary:

11. In Natural Philosophy you have a larger field. You may begin with a 'Survey of the Wisdom of God in the Creation.' This contains the substance of Ray, Derham, Niewentyt, 'Nature Displayed,' and all the other celebrated books on the subject. You may add that fine book, Mr. Jones's 'Principles of Natural Philosophy.' Thence you will easily pass to the Glasgow abridgment of Mr. Hutchinson's Works. The abridgers give not only all his sense, but all his spirit. You

⁶⁶ J W Haas, 'John Wesley's views on science and Christianity: an examination of the charge of antiscience', *Church History*, lxiii (1994), 378-92.

⁶⁷ Wesley, 'A letter to the editor of the London Magazine', 1765, in *Works of John Wesley* (3 edn.), XIII, 394-400.

⁶⁸ Wesley, 'On the gradual improvement of natural philosophy', in *Works of John Wesley* (3 edn.), XIII, 482-7.

may add to these, the beautiful tracts of Lord Forbes; and if you would go a little farther, Mr. Baker's ingenious 'Treatise on the Microscope.'⁶⁹

In a sermon Wesley went further and condemned natural philosophy for feeding the spirit of novelty, although in another sermon he advocated it as a healthy recreation.⁷⁰ Yet John Wesley had every reason to be interested in the theory of how to interpret nature, as a scholar and as a defender of the Christian revelation. John C English has brilliantly shown how Wesley was cautious about the Newtonian system. He did not completely reject it, praising Newton's genius in observing the laws of nature, yet preferring the Cartesianism standard in the Oxford of his day, somewhat attracted to (although by no means adopting) Hutchinsonianism, which seemed more theologically orthodox.⁷¹ His own education had been conservative and yet not without some awareness of seventeenth century science, and he advocated that all ministers should have some awareness of natural philosophy as an apologetic tool.⁷² The enormous importance of Locke has been appropriately emphasised by many contemporary Wesley scholars, and rightly so. Yet Wesley was above all a practical man, eager to identify 'useful knowledge'. His *Practical Physic*, curious as that work seems to modern readers, was in fact essentially a compendium of any kind of practical knowledge which might be useful to his readers; illustrating how unworried he was by the need for consistency. But science was not of great importance to him, as

⁶⁹ Wesley to Miss L, in *Works of John Wesley* (3 edn.), XII, 260 [Letter CCXX].

⁷⁰ *Works of John Wesley* (3 edn.), VI, 487 [Sermons series 2: Sermon LXXVIII 'Spiritual Idolatry': para 13]; *ibid*, VII, 49 [Sermons series 3: Sermon LXXIX 'The More Excellent Way' Pt. V para 5].

⁷¹ John C English, 'John Wesley and Isaac Newton's "System of the World"', *Proceedings of the Wesley Historical Society*, xlviii (Oct. 1991), 69-86. See Nehemiah Curnock ed., *Journal of John Wesley* (London, 1938), V, 149 [Journal for Wed. 9 Oct. 1765].

⁷² *Works of John Wesley* (3 edn.), X, 570, 580 ['An Address to the Clergy', I.I.2]. See John C English, 'John Wesley's studies as an undergraduate', *Proceedings of the Wesley Historical Society*, xlvii (May 1989), 35-7.

is evident from the curriculum of his beloved school at Kingswood.⁷³

Perhaps the most significant way in which Wesley stood against the attitude of the day was in his very limited view of the scientific method. Wesley had no place for hypotheses in his view of reason; evidence was the only guide. 'I undertake barely to set down what appears in nature; not the cause of the appearances', he wrote, and therefore disavowed the search for purpose. This is obvious again and again in his method of combating his opponents, constantly quibbling over words, denying that he had drawn certain implications, insisting that when he described miracles he had no certainty of their significance. Henry Rack in his recent biography has perhaps made too much of this; the portrait of Wesley as a sceptic trying to believe but never quite succeeding seems designed for modern audiences rather than fairly reflecting the complexity of this man of faith, experience and reason.⁷⁴

Ordinary Methodist People and the Spread of New Ideas

Such were the views of Wesley. But Wesley was only one person, and his views need to be kept in proportion alongside the Methodists. The contradictory values present within Wesley were present in ordinary Methodists to an even higher degree. Curiosity about the natural world and acceptance of some of the ordinary views of the Enlightenment, or more correctly Lockean psychology and philosophy were no doubt common, but the larger factor was a reinvigorated belief in a world of religious realities and occult possibilities. Repeatedly investigators of popular Methodism have noted the reinvigoration of a world of dramatic interference with the ordinary laws of nature. They have observed in different ways and with different emphases how Methodism held and charmed the people in their parish context, investing the world of their hopes and fears with realism and intense seriousness.⁷⁵ It is precisely this

⁷³ Rack, *Reasonable enthusiast*, p. 358. See *Works of John Wesley* (3 edn.), XIII, 366 [A Plain Account of Kingswood School', para. 13], for a brief reference to natural philosophy on the curriculum.

⁷⁴ See Rack, *Reasonable enthusiast*, 348-9, 544-50.

⁷⁵ See for example James Obelkevitch, *Religion and rural society: South Lindsey 1825-1875* (Oxford, 1976), 259-312; Arnold Rattenbury,

aspect of Wesley's approach to medicine that was so popular; on his travels he searched out popular remedies and used the modern media of the printing press to circulate critical accounts of them, thus communicating at once an anti-enlightened and an enlightened message. This certainly deserves comparison with the studies of Robert Darnton and French scholars of the *livres bleues*, with their combination of traditional themes and enlightened language.⁷⁶

Yet we must also recognize the anti-enlightenment enthusiastic aspects of the Methodist movement in its early years. There was a surprising survival and continuity with the extremes of seventeenth century antinomian opinion in the movement. Bebbington points to the survival of such views in Gadsbyite Baptists. There were many other antinomian Methodists.⁷⁷ It is in this context that there was a revival in a kind of intuitive interest in a very interactive relationship between supernatural forces and the natural world, which led to interest in occult experimentation. Despite the arguments of Keith Thomas about the decline in magic from the eighteenth century it seems clear that among Methodists there was no real sense of a division between the divine and the natural spheres. Interest in manipulation of the one from the other revived with the tone of the new revival. This could be dressed up as a kind of scientific approach. One view of science was to see it as a discovery of new powers and new forces - the kind of Hutchinsonian ideal. There are many examples of this in the period.⁷⁸ This expectation that the borderline between nature and

'Methodism and the tatterdemalions', in Eileen and Stephen Yeo ed., *Popular culture and class conflict 1590-1914: explorations in the history of labour and leisure* (Brighton & Atlantic Highlands, 1981), 28-61. Rack has very nicely emphasised the same point in *Reasonable enthusiast*, 431-36.

⁷⁶ Robert Darnton, *Mesmerism and the end of the Enlightenment in France* (Cambridge Mass., 1968); Paul J Korshin ed., *The Widening Circle: Essays on the Circulation of Literature in Eighteenth Century Europe* (Philadelphia, 1976), especially Darnton's essay.

⁷⁷ Bebbington, *Evangelicalism in modern Britain*, 55-7; Lineham, 'The Antinomian Methodists', 35-51.

⁷⁸ P J Lineham, 'Restoring Man's Creative Power: the Theosophy of the Bible Christians of Salford', Ecclesiastical History Society, *Studies in*

the supernatural was not a tidy boundary led to an expectation of the miraculous, and led to experiments to find ways in which there could be more frequent experiences of the supernatural in ordinary life.

It is in this world, not in a world of high enlightenment, that Methodism can be seen as a full participant.⁷⁹ For Methodism did not contribute to the Enlightenment, but it was active in Enlightenment England, and can scarcely be conceived as commencing in any other setting. And for this reason neither the view that it was anti-Enlightened nor the view that it aided the spread of science are fully persuasive. Methodism belonged to the world of the people. It was to be many years before enlightenment science found much support in that setting.

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Church History, xix, *The Church and Healing*, ed. W J Sheils (Oxford, 1982), 207-24.

⁷⁹ David Hempton, *Methodism and politics in British society 1750-1850* (London, 1984), 21-3.

**'THE REVOLTING PROPOSITIONS OF
NEWTONIAN MECHANICKS'
NATURAL PHILOSOPHY AND THE TRIAL OF WILLIAM
FREND**

Kevin C Knox

*A thousand tongues have echoed Granta's Fame,
But who shall speak her follies and her shame?
Curve leagu'd with curvoids rusty falchions wield,
And Calculation shakes her Gorgon shield,
And Wit and Wisdom their lost sons deplore,
Whelm'd in the depths of analytic lore.
The stern divan, on demonstration bent,
Brook not that aught suspend the firm intent.
History is trash, and Criticism a curse,
And sage Philosophy, a babbling nurse.
Fancy disgusts: scarce Truth herself can please:
Not Newton charms them in the mask of ease ...
Anon., *The caldron, or follies of Cambridge. A satire*¹*

In 1803, Thomas Spence, irrepressible reformer and multimedia guru, produced his *Important trial*, an account of the court proceedings revolving around his seditious pamphlet, *The restorer of society to its natural state*. In the *Important trial* he advocated what he had promoted for over two decades in a medley of chapbooks, pamphlets, satiric handbills, graffiti campaigns, journals, prints and trade tokens: a different kind of knowledge that would lead to the common ownership of land and, eventually, a glorious millennium. Using his 'queer lingo' - a phonetic orthography devised to help level society - Spence insisted that in

¹ Anon., *The caldron, or follies of Cambridge. A satire* (Cambridge, 1799), 5-6. Research for this article was made possible by a Social Sciences and Humanities Research Council of Canada Postdoctoral Fellowship and a fellowship at the William Andrews Clark Library in Los Angeles. I am grateful also to both the Humanities Research Centre at the Australian National University and the California Institute of Technology.

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order to guarantee the arrival of this future bliss, Britons would need a new 'Nutün ĩn dhē Nāteūrāl Würlđ'²

How, or what kind of, 'Newtonian' Spence expected this 'new Newton' to be is difficult to determine. Of the many types of 'Newtonianisms' that were formulated in the eighteenth century, Spence would have been familiar with the predominant one which comprised half of the 'holy alliance' between natural philosophy and Anglicanism.³ Yet Spence was certainly no friend of the Church of England. Indeed, he supposed that the Anglican Church would have to be dismantled before his Spensonia - 'a country in Fairy Land situated between Utopia and Oceania' - could come about.⁴

The happy citizens of the neo-Harringtonian Utopia would be 'a 'siěntĭffk Pepl ĩn ěvre thĭng' because they would be acquainted with the enlightened philosophies that issued from the pens of such reformers as Joseph Priestley, Thomas Paine, John Locke and William Frend. Excerpts from the writings of these

² See Thomas Spence, *The important trial of Thomas Spence* (London, 1803), 4. See also Spence, *The restorer of society to its natural state, in a series of letters* (London, 1801). For utopian visions, see Spence, *A description of Spensonia* (London, 1793), and Spence, *The constitution of Spensonia; a country in Fairy Land situated between Utopia and Oceania* (London, 1803).

³ For the many brands of Newtonianism, see R E Schofield, 'An evolutionary taxonomy of eighteenth century Newtonianisms', *Studies in Eighteenth Century Culture*, 7 (1978), 175-92. For Newtonianism and the Anglican church, see Simon Schaffer, 'Comets & idols: Newton's cosmology and political theology', in *Action and reaction*, ed. Seeff and Theerman (Newark, 1993), 206-31; Richard Yeo, 'Genius, method, and morality: images of Newton in Britain, 1760-1860', *Science in Context*, 2 (1988), 257-284. See also, Steven Shapin, 'Of Gods and Kings: natural philosophy and politics in the Leibniz-Clarke disputes', *Isis*, 72 (1981), 189-215.

⁴ Spence, *Important trial*, 4. See also his *Description of Spensonia*, and *Constitution of Spensonia*. For accounts of Spence and Spenceans, see Marcus Wood, *Radical satire and print culture, 1790-1822* (Oxford, 1994); Iain McCalman, *Radical underworld: prophets, revolutionaries and pornographers in London, 1795-1840* (Oxford, 1993); Olivia Smith, *The politics of language, 1791-1819* (Oxford, 1984).

figures, as well as such eminent *philosophes* as Volney, D'Alembert, Voltaire and Rousseau, had graced the pages of Spence's eclectic-but-focused journal, *Pig's meat, or lessons for the swinish multitude*.⁵ Whilst the works of Priestley, Paine, Locke and the *philosophes* are still celebrated today as emblems of progress, less renowned are the diverse publications of William Frend, onetime fellow of Jesus College, Cambridge. Nevertheless, Frend's 1793 *Peace and union*, extracts of which were reprinted in the first volume of *Pig's meat*, occasioned great ferment and discord in England, despite the pamphlet's conciliatory and irenic sounding title. Just two months after Spence was committed for selling Paine's *Rights of Man*, Frend was asked by a fierce judge to answer for his Jacobinical principles.⁶

The 1793 trial of William Frend in the Vice-chancellor's court of Cambridge University, along with the failed Unitarian petition of 1792 and the destruction of Priestley's laboratory in 1791, signalled the increasing antagonism with which reformers and dissenters would have to cope during the 1790s. The aim of this paper, however, is not to survey this mounting hostility; rather, this article uses the events surrounding Frend's trial to illuminate the relations between natural philosophy, Dissent, radical reform and Newtonianism in late-Georgian Cambridge and London. Although Frend was tried for 'defaming the Anglican church', all of these things were discussed in the courtroom. Moreover, as a Cambridge mathematician, outspoken Unitarian, member of the London Corresponding Society and, as his son-in-law, Augustus De Morgan, identified him, the 'last of the learned anti-Newtonians', Frend is an ideal candidate to illustrate these links.⁷

In the first section I recount some of the processes by which Cambridge's professors and tutors made Newton their emblem of

rationality. In discussing some of the problems that they encountered in 'Newtonianizing' Cambridge, I concentrate on the scientific demonstrations that they exploited to make their idiosyncratic reading of Newton compelling. The remainder of the paper focuses upon William Frend's demonstrations against this form of learning, especially in relation to his attempts to launch other reforms. In the second section I discuss Frend's demonstrations against Church, Crown, Parliament and university. In order to recapture the interconnections between Frend's scientific and socio-religious campaigns, I pay particular attention to his relationship with Joseph Priestley. For, as Martin Fitzpatrick's studies of Joseph Priestley remind us, studies of natural philosophy in Hanoverian England need also to consider the pervasive idioms of Christian progress and prophecy.⁸ To chart the continuing struggle to represent Newton during the Napoleonic Wars and the Regency years, the final section examines some of the interfaces between enlightened natural philosophers and some of the 'lower' forms of culture in this period. For, as Iain McCalman has convincingly argued in his *Radical underworld*, attempts to tease apart the 'sober, strenuous and heroic aspects' of reform from the popular, lunatic, prophetic and saturnalian works of ultra-radicals and visionaries are misguided.⁹ This entails that 'low' commentaries on Newton, however seemingly eccentric to us, could not be ignored unconditionally by the country's scientific elite, and thus might help to explain some of the conflicting evaluations of Newton in the early nineteenth century, especially Augustus De Morgan's move to separate genius and morality in his treatment of the 'Great Man'.

Demonstrating Newton

By the time that William Pitt 'the Younger' left Pembroke College and the tutelage of George Atwood in 1780, the extraordinary

⁵ Thomas Spence, *Pig's meat, or lessons for the swinish multitude* (3 vols., London, 1793-96).

⁶ William Frend, *Peace and union recommended to the associated bodies of republicans and anti-republicans* (St. Ives, 1793).

⁷ Augustus De Morgan, 'Obituary of William Frend', *Memoirs of the Royal Astronomical Society*, xii (1842), 458-465. For Frend's life and career, see Frida Knight, *University rebel: the life of William Frend* (London, 1971).

⁸ Martin Fitzpatrick, 'Joseph Priestley, politics, and ancient prophecy', *Enlightenment and Dissent*, 10 (1991), 104-9.

⁹ Iain McCalman, *Radical underworld*, 234. See also his ' "New Jerusalem": prophecy, dissent and radical culture in England, 1786-1830', in Knud Haakonssen ed., *Enlightenment and religion: rational dissent in eighteenth-century Britain* (Cambridge, 1997), 312-35.

reputation of Newton seemed secure. The tutors, moderators, professors and divines of Cambridge seemed univocal in their praise of the great man. They affirmed that the mathematical fluxions and Newtonian natural philosophy with which undergraduates were bombarded provided two indispensable ingredients for English gentlemen, regardless of the kinds of work (or leisure) they would pursue after their departure from the university: it helped the young scholar to reason according to demonstrable axioms and it divulged to him the office of the Creator.¹⁰

Yet making Newton's *Opticks* and *Principia* essential components of university education had not been without bothersome, and often seemingly insurmountable, obstacles. Whilst Newton and his 'honest disciples', such as William Whiston, Samuel Clarke and William Stukeley, portrayed themselves as revivalists of the true, ancient philosophy, neither the meaning nor the value of Newton's programme was readily manifest to many Britons. However, to others, especially high churchmen, the programme of these early Newtonians clearly represented infidelity.¹¹ In the first half of the eighteenth century, Cartesians, Hutchinsonians and Bishop Berkeley launched substantial missiles at Cambridge's famous *alumnus*. Both Cartesians and Hutchinsonians condemned a cosmology that posited a universe that was mostly empty, whilst Hutchinsonians added that Newtonians had utterly misinterpreted

¹⁰ For the rigours of the undergraduate curriculum, see Henry Gunning, *Reminiscences of Cambridge* (2 vols., London, 1854), I, *passim*. See also John Gascoigne, 'Mathematics and meritocracy: the emergence of the Cambridge mathematical tripos', *Social studies of science*, 14 (1984), 547-84.

¹¹ For Whiston, see James Force, *William Whiston: honest Newtonian* (Cambridge, 1985). For Stukeley, see Stuart Piggott, *William Stukeley, an eighteenth-century antiquary* (Oxford, 1950). For Clarke see, for example, James Ferguson, *Dr. Samuel Clarke: An 18th-century heretic* (Kineton, 1976); Larry Stewart, 'Samuel Clarke, Newtonianism, and the factions of post-Revolutionary England', *Journal of the History of Ideas*, 42 (1981), 53-7; Stephen Snobelen, 'Caution, conscience, and the Newtonian reformation: the public and private heresies of Newton, Clarke and Whiston', *Enlightenment and Dissent*, 16 (1997), 151-84.

Genesis. And whilst other Tory churchmen like Jonathan Swift belittled Newton and the experimental philosophy through the medium of satire, George Berkeley's attack on the inconsistencies within the Newtonian calculus appeared devastating to many philosophers.¹²

Meanwhile, a number of substantial attacks upon the Newtonian philosophy came from within the university. As early as 1699, the reverend Richard Marsh, citing the 'wonders' of Newton's cometography, dismissed the *Principia* as a 'vain Romance'. Suspecting (correctly) that Newton's work would be appropriated by Unitarians, he protested that in the Mosaic account of Creation he met 'with no *Laws of Gravity*'.¹³ Aiming to protect Britons from the clutches of atheists, deists, Arians, and Socinians such as 'Mr. Hobs, Mr Lock, and Mr Spinoza,' Clare Hall's Robert Greene developed his own philosophy of 'nothing else but action' in the 1710s. Despite taking issue with Greene, St. John's John Edwards chimed in with the worry that Newtonian gravity was theologically suspect since it threatened the 'dependence of nature on God.'¹⁴

¹² George Berkeley, *De Motu and The Analyst*, ed. D M Jesseph (Dordrecht, 1992). For Berkeley's attacks, see Geoffrey Cantor, 'Berkeley's "The Analyst" revisited', *Isis*, 75 (1984), 668-83. For Hutchinsonianism, see John Hutchinson, *Moses's Principia* (London, 1725); see also Geoffrey Cantor, 'Revelation and the cyclical cosmos of John Hutchinson', in *Images of the earth*, ed. L Jordanova and Roy Porter (St. Giles, 1979), 3-15. For satiric attacks upon the new philosophy, see, for example, J Swift, 'Meditations upon a broomstick' and 'Gulliver's Travels', in *The works of the Reverend Dr. Jonathan Swift*, (19 vols., Dublin, 1768).

¹³ Richard Marsh, *The vanity and danger of modern theories: a sermon preach'd in Cambridge, 1699* (Cambridge, 1701), 3-4, 9.

¹⁴ Robert Greene, *The principles of natural philosophy* (Cambridge, 1712), and *The principles of the philosophy of the expansive and contractive forces* (Cambridge, 1727); for later disciples of Greene, see John Byrom, *Private journal and literary remains*, ed. R. Parkinson (3 vols., Manchester, 1854-7). For Edwards, see John Edwards, *New discoveries of the uncertainty, deficiency, and corruptions of human knowledge and learning* (Cambridge, 1714). For problems relating to Newton at the varsity, see John Gascoigne, *Cambridge in the age of enlightenment* (Cambridge, 1987), 164-74.

Most of these attacks upon the Newtonian philosophy are well-known, and I shall not rehearse them further. Nevertheless, Cambridge scholars realized that these antagonistic sentiments needed to be answered. Giving anti-Newtonians his tuppence worth, James Jurin, in a direct response to Berkeley's *Analyst*, assured Britons that 'geometry [was] no friend of infidelity'. Both Nicholas Saunderson and his successor in the Lucasian chair, John Colson, gave more tangibility to the calculus in order to muffle Berkeley's complaints. As Colson boasted, he had made 'the Doctrines of Fluxions ... not only the object of Understanding, but of sense too, by making them actually to exist in a visible and sensible form.' Similarly, the chemico-statical experiments that Stephen Hales advanced in the 1720s rendered Newtonian philosophy more tangible: Hales's *Haemostatics* and *Vegetable Staticks*, in which he evinced the intricate nature of elastic forces in animal and vegetative bodies, added more weight to arguments about the existence of attractive and repulsive forces. The manifestation of these divine, aerial forces and their correspondence to algebraic manipulations was particularly vital during a time in which Newtonian mathematics was increasingly coming under attack.¹⁵

Even after these successful rejoinders, the triumph of Newton was not inevitable. As John Gascoigne has shown in a number of excellent studies, the university's senior gownsmen toiled hard throughout the eighteenth century to turn their unique version of Newton's works into the one that literate Britons would come to take for granted.¹⁶ From the 1770s to the Regency, Newton's

¹⁵ [James Jurin], *Geometry no friend of infidelity: or, a defence of Sir Isaac Newton* (London, 1734). Nicholas Saunderson, *The elements of algebra, in ten books* (London, 1740). John Colson (ed.), *I. Newton, the method of fluxions ... with a perpetual comment*, (London, 1736), 266. Stephen Hales, *Vegetable staticks* (London, 1727); and Hales, *Statical essays: containing hamastaticks; or, an account of some hydraulick and hydrostatical experiments made on the blood* (London, 1733).

¹⁶ See, in particular, Gascoigne, 'Politics, patronage and Newtonianism: the Cambridge example,' *Historical Journal*, 27 (1984), 1-24; 'The Universities and the Scientific Revolution: the case of Newton and Restoration Cambridge', *History of Science*, 23 (1985), 391-434;

advocates in Cambridge manufactured an assortment of texts, tracts, sermons, journal articles and demonstration devices to communicate these scientific and Anglican messages. Their mission was tripartite: to quash the attempts of deistic French *philosophes* to appropriate Newton's natural philosophy, to eradicate lingering doubts concerning Newton's heterodoxy, and to demonstrate that through Newtonian eyes one could view clearly the business of the Perpetual Worker in nature and the world politic.¹⁷

To make this perpetual labour evident, Samuel Vince, Plumian professor of astronomy and experimental philosophy, produced three influential works, *Observations on deism*, *Observations on gravitation*, and *A confutation of atheism*, all of which exploited celestial mechanics to confirm that a 'superintending Providence' governed terrestrial events. Likewise, in maintaining that Anglican doctrines found 'their fittest soil in the most enlightened understanding' of Cambridge, Samuel Cooper boldly asserted that the varsity's natural philosophers, 'like Newton with the prismatic glass', had managed to catch a 'glimpse of the DIVINE MIND'. In order to ward off Humean sceptics and materialists, the university's sixth Lucasian professor of mathematics, Edward Waring, exploited mechanical principles and mathematical reason in his *Essay on human knowledge* to prove that 'the soul is immaterial, and consequently immortal'. His successor, Isaac Milner, in the homophonously titled *Essay on human liberty*, asserted that the 'established principles of Experimental Philosophy' vindicated the crucial doctrine that 'immaterial substances are essentially different from material ones'.¹⁸

'Anglican Latitudinarianism and political radicalism in the late eighteenth century', *History*, 71 (1986), 22-38; 'From Bentley to the Victorians: the rise and fall of Newtonian natural theology', *Science in Context*, 2 (1988).

¹⁷ For the links between Newton and the world politic, see, for example, Larry Stewart, *The rise of public science* (Cambridge, 1993); Margaret Jacob, *The Newtonians and the English Revolution* (Hassocks, 1976); Schaffer, 'Comets & idols'; Gascoigne, *Cambridge in enlightenment*; Shapin, 'Of Gods and Kings'.

¹⁸ Edward Waring, *An essay on the principles of human knowledge* (Cambridge, 1794), 43, 48-9; Samuel Cooper, *The necessity and truth of*

Demonstration devices and lecture-room showmanship were also used to convey these messages, particularly matter's inherent lethargy and the necessary existence of incorporeal substances. George Atwood, in order to render the university's specific interpretation of the Newtonian matter transparent, developed his own (now eponymous) machine that enabled undergraduates to see passive material bodies move by way of demonstrable forces. On the other hand, Samuel Vince exploited dozens of off-the-shelf instruments in his lectures to fortify the concept of passive matter and active forces. As Jacksonian professor of natural philosophy, Milner complained that the purchase of such items would send him to the poorhouse; yet, with lecture fees he quickly multiplied his investment.¹⁹

Notwithstanding the commanding eloquence of their written words, and despite the mechanical devices that apparently spoke for themselves, several interrelated problems tainted these demonstrations. Although university philosophers did not want to be construed as either vulgar showmen or mere machine minders, they nonetheless used the *same* demonstration devices as itinerant lecturers. In many ways they found themselves in competition with itinerant showmen like 'Sieur REA Sen' who, for half a crown, offered his Cambridge audience 'Philosophical, Mathematical, and Mechanical AMUSEMENTS', not to mention a host of 'Astonishing, Wonderful, Surprising, and Unparalleled DECEPTIONS & RE-

the three principal revelations, demonstrated from the gradations of science (Cambridge, 1777), 4-5, 14-16; Samuel Vince, *Confutation of atheism from the laws and constitution of the heavenly bodies* (Cambridge, 1807), 44-5; *Observations on deism* (Cambridge, 1805), 3; *Observations on the hypotheses which have been assumed to account for the cause of gravitation from mechanical principles* (Cambridge, 1806). Isaac Milner, *Essay on human liberty* (London, 1824), 11-12, 75. For a list of scientific books published by late-Georgian dons, see Christopher Wordsworth, *Scholae academicae: some account of studies at English universities in the eighteenth century* (London, 1968), 410-17.

¹⁹ Mary Milner, *Life of Isaac Milner* (London, 1842), 14-15, 70. For Atwood's machine, see his *A treatise on the rectilinear motion and rotation of bodies* (Cambridge, 1784); see also, Simon Schaffer, 'Machine philosophy: demonstration devices in Georgian mechanics', *Osiris*, 9 (1993), 157-182.

CREATIONS', including the unforgettable 'enchanted lemon.'²⁰ Except for the spellbinding citrus, these philosophical amusements in Cambridge's Black Bear Inn would have been familiar to any student who had attended lectures by the university's professors of experimental and natural philosophy. Whilst Milner's lectures were remembered as little more than magic-lantern shows, Samuel Vince titillated his students with his whopping electrical machine, Thunder House, whirling table, 'Pretty large coated [Leyden] Jar', and 'Magic Picture'.²¹

The use of these machines by Cambridge's lecturers is indicative of the hazy line between entertainment and enlightenment. As Barbara Stafford argues in her *Artful science*, 'The hazardous and contested boundary between serious and spurious forms of culture mirrored the larger ambiguities of what it meant to be a professional or a "mechanic" during the eighteenth century.'²² Further problematicizing this boundary was the 'mechanical' background of so many of Cambridge's senior gowmsmen. Unlike previous generations, these professors, tutors and fellows had depended upon their success in mathematical examinations to elevate themselves from their artisanal backgrounds to their privileged status.

As John Gasgoigne has explained in his studies of the university, these were the years during which Cambridge increasingly represented itself as meritocratic. It was argued that even those who had been connected at one time to 'Meane and Frippery

²⁰ For Sieur Reasen, see British Library Playbill 937.f/8(7).

²¹ For Vines's apparatus, see Cambridge University Library, University Archives MS o.xiv.255. For Milner's lectures, see Gunning *Reminiscences*, I, 236-38. For the dons' desire to separate themselves from vulgar mechanics, see, for example, Isaac Milner, 'Reflections on the communication of motion by impact and gravity', *Philosophical transactions of the Royal Society*, 68 (1778), 344-78. For the theological import of display, see Simon Schaffer, 'The consuming flame', in *Consumption and the world of goods*, ed. Roy Porter and John Brewer (London, 1993), 489-536. For scientific shows of the period, see Richard Altick, *The shows of London* (London, 1980).

²² B M Stafford, *Artful science: Enlightenment entertainment and the eclipse of visual education* (London, 1994), 73.

Trades' could rise to positions of eminence if they evinced their mastery of mathematics in the annual Senate House examinations. As Gascoigne has also pointed out, few professors argued that an undergraduate needed to spend three years manipulating symbols simply to appreciate Newton's angle on the design argument; but they did claim that this protracted period of mathematical study was required to discover those who would serve the government and Church well: 'A judicious prosecution of the science of mathematics and natural philosophy', said Isaac Milner in his defence of the tiresome months that undergraduates spent imbibing geometrical demonstrations and the calculus, 'is among the very best preparatives to the study of theology in general, and of Christianity in particular.' Referring to Pitt's mathematical aptitude, Milner added, 'I never yet heard that he found the habit and accuracy & method, which in those subjects is indispensable, to be ... an Incumbrance [*sic*] or Obstruction to sound reasoning in practical matters.'²³

Even Gilbert Wakefield, who as a freshman identified Euclid as 'the OLD CARPENTER' eventually repented, admitting that compared to 'mathematical philosophy, ... classical lucubrations are mean and grovelling, undignified and destitute of beauty'.²⁴ Regardless of religious leanings, the general consensus by the 1780s was that the study of natural philosophy at Cambridge was a good thing. What caused disensus was the question, 'What particular philosophical system or systems should the professorate advocate?'

Demonstrating against Newton

Late-Georgian Unitarians seemed rather ambivalent about Sir Isaac Newton. The curmudgeonly Charles Babbage - who most likely refused to sit his final exams at Cambridge because of Unitarian scruples - called the *Principia* 'a mill stone around the necks' of gownsmen, but later felt 'deeply grateful for the honour' of

²³ Gascoigne, 'Mathematics and meritocracy'; Gascoigne, 'From Bentley to the Victorians'. Isaac Milner, *Strictures on some of the publications of the Reverend Herbert Marsh, D.D.* (London, 1813), 228. Milner's comments on Pitt in Isaac Milner to William Pitt, 7 Nov., 1791: Cambridge University Library MS Add.6958.1016.

²⁴ Gilbert Wakefield, *Memoirs* (London, 1792), 100-1.

occupying the 'chair of Newton'.²⁵ During his years as a contumacious Unitarian, Samuel Taylor Coleridge argued that the *Principia* and *Opticks* made the mind 'a lazy Looker-on'. The father of David Hartley Coleridge boldly wrote to Thomas Poole that 'the souls of five hundred Sir Isaac Newtons would go to the making up of a Shakespeare or a Milton.' In a letter to his pantisocratic cohort, Robert Southey, he called Newton a 'very puny agent'. Yet this temerity was short-lived; two years later he begged Poole to torch the letter, whilst towards the end of his life he called Newton a 'great genius'.²⁶ In admitting the greatness of the *Principia* and *Opticks* but downplaying the author's creativity, Joseph Priestley's ambivalence is captured in one sentence: 'Could we have entered into the mind of Sir Isaac Newton,' he speculated, 'and have traced the steps by which he produced his *great works*, we might see *nothing very extraordinary* in the process.'²⁷

As a co-founding member of Royal Astronomical Society with Babbage, a friend of Blake, a tutor of Coleridge and a contributor to Priestley's re-translation of the scriptures, William Frend was well-placed to understand this ambivalence. As an undergraduate under the tutelage of William Paley, however, Frend seemed to value fully the regimen of Newtonian mathematics, mechanics and natural theology (although he would later agree with his former tutor in his appraisal in the 22nd chapter of *Natural theology* that celestial mechanics was not being particularly well-suited in

²⁵ Charles Babbage, *Passages from the life of a philosopher* (London, 1864; 1994), 18-29. Babbage's Unitarianism in Harvey Becher, 'Radicals, Whigs and conservatives: the middle and lower classes in the analytical revolution at Cambridge in the age of aristocracy', *British Journal for the History of Science*, 28 (1995), 405-26.

²⁶ S T Coleridge to Thomas Poole, 23 March, 1801; Coleridge to Southey, 12 August 1801; Coleridge to Poole, 14 October, 1803. See letters 388, 409 and 525 in E L Griggs (ed.), *The collected letters of Samuel Taylor Coleridge* (5 vols., Oxford, 1956), II, 709-10, 751-52, 1011-16. Coleridge's later judgement of Newton in Coleridge, 'Table Talk' (1830), in H J Jackson (ed.), *Coleridge: Oxford authors* (Oxford, 1985), 596.

²⁷ See Priestley, *Autobiography*, ed. Jack Lindsay (Bath, 1970), 125; emphasis added.

Trades' could rise to positions of eminence if they evinced their mastery of mathematics in the annual Senate House examinations. As Gascoigne has also pointed out, few professors argued that an undergraduate needed to spend three years manipulating symbols simply to appreciate Newton's angle on the design argument; but they did claim that this protracted period of mathematical study was required to discover those who would serve the government and Church well: 'A judicious prosecution of the science of mathematics and natural philosophy', said Isaac Milner in his defence of the tiresome months that undergraduates spent imbibing geometrical demonstrations and the calculus, 'is among the very best preparatives to the study of theology in general, and of Christianity in particular.' Referring to Pitt's mathematical aptitude, Milner added, 'I never yet heard that he found the habit and accuracy & method, which in those subjects is indispensable, to be ... an Incumbrance [*sic*] or Obstruction to sound reasoning in practical matters.'²³

Even Gilbert Wakefield, who as a freshman identified Euclid as 'the OLD CARPENTER' eventually repented, admitting that compared to 'mathematical philosophy, ... classical lucubrations are mean and grovelling, undignified and destitute of beauty'.²⁴ Regardless of religious leanings, the general consensus by the 1780s was that the study of natural philosophy at Cambridge was a good thing. What caused disensus was the question, 'What particular philosophical system or systems should the professorate advocate?'

Demonstrating against Newton

Late-Georgian Unitarians seemed rather ambivalent about Sir Isaac Newton. The curmudgeonly Charles Babbage - who most likely refused to sit his final exams at Cambridge because of Unitarian scruples - called the *Principia* 'a mill stone around the necks' of gownsmen, but later felt 'deeply grateful for the honour' of

²³ Gascoigne, 'Mathematics and meritocracy'; Gascoigne, 'From Bentley to the Victorians'. Isaac Milner, *Strictures on some of the publications of the Reverend Herbert Marsh, D.D.* (London, 1813), 228. Milner's comments on Pitt in Isaac Milner to William Pitt, 7 Nov., 1791: Cambridge University Library MS Add.6958.1016.

²⁴ Gilbert Wakefield, *Memoirs* (London, 1792), 100-1.

occupying the 'chair of Newton'.²⁵ During his years as a contumacious Unitarian, Samuel Taylor Coleridge argued that the *Principia* and *Opticks* made the mind 'a lazy Looker-on'. The father of David Hartley Coleridge boldly wrote to Thomas Poole that 'the souls of five hundred Sir Isaac Newtons would go to the making up of a Shakespeare or a Milton.' In a letter to his pantisocratic cohort, Robert Southey, he called Newton a 'very puny agent'. Yet this temerity was short-lived; two years later he begged Poole to torch the letter, whilst towards the end of his life he called Newton a 'great genius'.²⁶ In admitting the greatness of the *Principia* and *Opticks* but downplaying the author's creativity, Joseph Priestley's ambivalence is captured in one sentence: 'Could we have entered into the mind of Sir Isaac Newton,' he speculated, 'and have traced the steps by which he produced his *great works*, we might see *nothing very extraordinary* in the process.'²⁷

As a co-founding member of Royal Astronomical Society with Babbage, a friend of Blake, a tutor of Coleridge and a contributor to Priestley's re-translation of the scriptures, William Frend was well-placed to understand this ambivalence. As an undergraduate under the tutelage of William Paley, however, Frend seemed to value fully the regimen of Newtonian mathematics, mechanics and natural theology (although he would later agree with his former tutor in his appraisal in the 22nd chapter of *Natural theology* that celestial mechanics was not being particularly well-suited in

²⁵ Charles Babbage, *Passages from the life of a philosopher* (London, 1864; 1994), 18-29. Babbage's Unitarianism in Harvey Becher, 'Radicals, Whigs and conservatives: the middle and lower classes in the analytical revolution at Cambridge in the age of aristocracy', *British Journal for the History of Science*, 28 (1995), 405-26.

²⁶ S T Coleridge to Thomas Poole, 23 March, 1801; Coleridge to Southey, 12 August 1801; Coleridge to Poole, 14 October, 1803. See letters 388, 409 and 525 in E L Griggs (ed.), *The collected letters of Samuel Taylor Coleridge* (5 vols., Oxford, 1956), II, 709-10, 751-52, 1011-16. Coleridge's later judgement of Newton in Coleridge, 'Table Talk' (1830), in H J Jackson (ed.), *Coleridge: Oxford authors* (Oxford, 1985), 596.

²⁷ See Priestley, *Autobiography*, ed. Jack Lindsay (Bath, 1970), 125; emphasis added.

demonstrating the existence of the Creator). The examiners at the Senate House valued Frend's proficiency in these disciplines, and in 1781 he was awarded a fellowship at Jesus College.²⁸

Jesus College was the centre of Cambridge's Dissenting network, housing Felix Vaughan, William Otter, Robert Tyrwhitt and Gilbert Wakefield. A generation before, the college had housed David Hartley, with whom Frend, Coleridge and Priestley identified strongly. Along with other fellows and Cambridge *alumni* such as George Dyer, John Disney, Robert Plumtre, John Michell and Theophilus Lindsey, the nexus of Cambridge Unitarians waged a campaign for substantial reform both within and without the university. Following John Jebb's lead, they advocated the abolition of the Test Acts and Thirty-nine Articles, as well as a revitalization of the Senate House examinations.²⁹

Part of this crusade for reform hinged upon claiming Sir Isaac Newton as one of their own. For the most part, discussion of the possibility of Newton's heterodoxy had been suppressed at Cambridge, but Unitarians realized that the cachet associated with his name could lend weight to their endeavours to reform the Church. They were unable to produce definitive proof of his heresies, as Newton had been successful at concealing his beliefs; but they knew that Newton's closest allies had irked high churchmen with theologically suspect writings concerning the Saviour. Lindsey, for instance, used Samuel Clarke's reformed book of prayer in his services in London's Essex Street Chapel, whilst Dyer, in his history of the university, noted that Whiston's 'curious prattling Memoirs ... clearly prove, that some of his learned friends at Cambridge were little more orthodox than himself: as to Sir Isaac Newton, he must be considered as a *silent*

²⁸ For the fellowship and friendships of Frend, see Knight, *University rebel*, passim. For the appraisal of Paley, see Frend to Augustus De Morgan, September [?], 1829; Cambridge University Library MS Add. 7887.16. For the daily regimen of mathematics, see Gunning, *Reminiscences*, I, 72-100.

²⁹ For the Dissenting network, see, for example, Nicholas Roe, *Wordsworth and Coleridge, the radical years* (Oxford, 1988), 84-117.

dissentient.³⁰ In defending Priestley from the High Church George Horne, Lindsey speculated that the confidentiality of Newton's manuscripts could be attributed to his Arianism. Despite his inability to access these manuscripts, Lindsey felt there existed strong 'evidence of him having been a strict Unitarian.'³¹

Meanwhile, after resigning from the Anglican church in 1787, Frend started a publishing crusade in which he entreated Churchmen, placemen, MPs and the aristocracy to consider the entire overhaul for which Jebb had urged. Like Jebb, he tethered the appeal for university reform to a general demand for politico-religious reform. These pamphlets, however, not only reiterated Jebb's call for change, but the writings of John Horne Tooke and Joseph Priestley also. In 1786, Horne Tooke, onetime resident of Jesus College, had published the first volume of his *Diversions of Purley*. The argument of the book - as represented in a dialogue between himself, his patron and the master of Jesus - was that hierarchical, elitist views of language had helped to drive a cultural wedge between the orders of society. Frend particularly appreciated his theory of linguistic 'ruins' and 'winged words', which collapsed traditional linguistic hierarchies in order to damn the pneuma-tological metaphysics of the higher orders.³²

After thorough readings of the *Opticks*, Boscovich and Boyle in the 1780s, Frend was coming to see the significance of Priestley's natural philosophical researches in relation to theology.³³ As Isaac Milner affirmed in his *Essay on human liberty*, the experimental

³⁰ George Dyer, *History of the university and colleges of Cambridge* (2 vols., London, 1814), I, 121n.

³¹ Theophilus Lindsey, *Vindiciæ Priestleianæ: an address to the students of Oxford and Cambridge* (2 vols., London, 1788-90), I 63-64. Lindsey's Unitarianism and his use of Clarke's reformed prayer book are discussed in G M Ditchfield, *Theophilus Lindsey: from Anglican to Unitarian* (London, 1998).

³² John Horne Tooke, *Ἐπεὰ Πτροεντα, or, the diversions of Purley* (2 vols., London, 1786-1805). David Hartley, *Observations on Man* (London, 1749).

³³ Records of Frend's reading whilst at Jesus College are found in the Old Library's *Borrowing Book, 1783-91*, Jesus MS B.15.14. I thank Frances Willmoth for bringing this to my attention.

philosophy could be related directly to 'the essence of vice and virtue'; but contrary to the use of electrical machines and pneumatic pumps by Milner and Vince, Priestley reckoned that these devices would give England's Quality 'reason to tremble' since they evinced nature as a sphere of activity: phenomena that had once been attributed to incorporeal substances were now described as a product of chemical, electrical and thinking powers. He believed that his materialism, substantiated largely through chemical analysis, demonstrated to Anglicans that their peculiar form of worship depended upon symbols which did not refer to real things. As such, Priestley determined that crucial Anglican tenets such as Trinitarianism were less plausible. Obfuscation, not benevolent Cambridge reason, perpetuated these malevolent myths.³⁴

Like Horne Tooke and Priestley, Frend concluded that Cambridge's politico-religious power hinged on an erroneous conception of nature and the disingenuous mystification of symbols. In his earlier pamphlets he outlined how priests 'err grievously' in using words like 'Trinity[,] a Latin word, not to be found in Scripture.' In doing so, the clergy invested themselves with mysterious powers, which they further multiplied by using 'idle tales ... about Ghosts in church yards' and other 'phantoms of ... imaginations.'³⁵ Eventually, Frend would come to see that the principal cause of this clerical disingenuity was Newtonian mathematics and forces. His later writings honed in on infinitesimals, negative numbers and immaterial forces, all of which he insisted were used to maintain authority over lesser-read Britons. According to Frend, the analogue to the corrupt mysteries

³⁴ Milner, *Essay*, 75. For Priestley's comments, see *Experiments and observations on different kinds of air* (3rd edn., Birmingham, 1790), I, preface. For Priestley's chemical politicking, see, for example, Jan Golinski, *Science as public culture: chemistry and enlightenment in Britain, 1760-1820* (Cambridge, 1992); Simon Schaffer, 'Priestley's questions: an historiographic survey', *History of Science* xxii (1984), 151-83.

³⁵ Frend, *Address to the inhabitants of Cambridge* (Cambridge, 1788), 3-7. See also his *Considerations on the oaths required by the University of Cambridge* (St. Ives, 1787).

of the Church of England could be detected in Cambridge's Newtonian textbooks. Frend was convinced that the time-serving mathematicians of Cambridge had made mysteries out of Newtonian fluxions in order to usurp power: 'stagger'd at Newton's revolting propositions', Frend considered that Newton's works had 'led men astray from the pursuit and acquisition of true knowledge.'³⁶

Both Lindsey and Priestley admired Frend's pamphleteering. Lindsey, punning upon Priestley's *Letter to Pitt* (1787) in which he derided the Prime Minister's universities as 'pools of stagnant water', commended Frend's 'recent movement of the waters to prevent stagnation'.³⁷ Priestley took it upon himself to distribute Frend's publications in Birmingham and Manchester.³⁸ To eliminate what Frend deemed the 'idle inventions of metaphysical divines,' Priestley asked the Jesus College mathematician to join him in the production of a new translation of the scriptures. This new uncorrupted version, which I have described elsewhere as an endeavour to 'dephlogisticate the Bible', would reflect the materialists' aim to eschew mystery by expunging words like 'ghost' and 'Trinity.'³⁹

Although their restoration of the scriptures was one of the casualties of the 1791 Birmingham riots, both Priestley and Frend continued their pamphleteering.⁴⁰ Both faced mounting hostility. As early as 1776, the year after Priestley edited, and appended essays to, Hartley's *Observations on Man*, Joseph Berington asked him, 'why do you not, as a *metaphysician*, aim to rise above the

³⁶ William Frend, *What is an album?* (n.d.) Cambridge University Library MS Add.7886.300.

³⁷ Lindsey to Frend, Cambridge University Library MS Add.7886.146; see J. Priestley, *A letter to the Right Honourable William Pitt* (2nd edn., London, 1787), 38.

³⁸ Priestley to Lindsey, 4 May, 1789; Dr Williams' Library MS.12.45.

³⁹ Kevin C. Knox, 'Dephlogisticating the Bible: natural philosophy and religious controversy in late-Georgian Cambridge', *History of Science*, 34 (1996), 167-200.

⁴⁰ Frend, *Reply to the secretary, S.P.C.K.*: cited in H Coulthurst [?], *Extracts from writings in the name of William Frend; by a friend to the established Church* (Cambridge, 1793), 36.

visible world of matter, where you may discover the existence and reality of other beings, whose ethereal forms cannot be confined in a tub of water, or a basin of quick-silver; nor be extracted by friction from a globe of glass; nor in fine be analysed by all the powers of chymistry?⁴¹ A decade later, George Horne was more blunt. Evoking Priestley's 'theological laboratory', the Oxonian master berated 'Dr. Phlogiston': 'You have given the world much fixed air: let it have some fixed principles.'⁴² Two years later, in 1789, another friend of the Church suggested that Priestley needed a dose of humility: 'Sir Isaac Newton ... never pretended to any knowledge about the essence of God or his mode of existence. But, perhaps, your vanity and presumption may be occasioned by your improvements in experiments, and the great facility with which you analyze an ounce of air.'⁴³

In 1793, with the fear of Jacobinism at its height, Frend published his *Peace and Union*, in which he derided 'the sophistry of priestcraft', demanded an extension of suffrage and denounced the war with France.⁴⁴ In response, the master and fellows of Jesus condemned the 'incorrigible' Frend for 'degrading ... the Established Church.' Soon after, twenty-seven senior members of the university determined that his radical pamphleteering needed to be terminated. The '27' - whom Frend referred to as the 'cubicks', punning on their Trinitarian biases and the Lucasian professor's 'mysterious' cubic equations - brought Frend to trial in the university's Senate House, charging him with transgressing the same ancient statute that had resulted in William Whiston's expulsion. Despite the great support for him from most of the university's junior members, and despite the incompetent method by which he was tried, his prosecutors contended that they had demonstrated the threat Frend posed to the Anglican Church, the

⁴¹ See Joseph Berington, 'Remarks on Dr. Priestley's *Experiments on air*', in *Letters on Materialism and Hartley's theory of the human mind, addressed to Dr. Priestley, F.R.S.* (London: 1776), 220-1.

⁴² [George Horne], *A letter to the Reverend Doctor Priestley by an undergraduate* (Oxford, 1787), 3.

⁴³ 'A Volunteer', *A letter to Dr. Priestley: or, a volley of random-shot, discharged [sic] at him* (London, 1789), 22-3.

⁴⁴ For the sophistry of priestcraft, see Frend, *Peace and Union*, 26.

State and the university. They demanded that he recant his sinful writings or that he leave Cambridge.⁴⁵

Although the *Gentleman's magazine* reported that Frend had been 'cavilled at by a knot of scribbling Parsons', the closing speech by Isaac Milner, the university's Vice-chancellor and thus the trial's judge, emphasized the gravity of Frend's transgression.⁴⁶ Milner, whose first great 'extravagance' in life had been the purchase of 'a rather splendid seal, bearing a finely-executed head of Sir Isaac Newton,' had for years desponded over those who dared cross swords with Sir Isaac: in despatching with the mathematical heresies of D'Alembert, for example, he explained that disaster was always near when one 'venture[d] to differ from Sir Isaac Newton'. Two decades later, during the fierce controversy over the British and Foreign Bible Society, Milner railed against Frend's cousin, Herbert Marsh. Marsh, said Milner, had followed 'the dangerous and fanciful levities of Des Cartes' instead of the 'sound principles of the Newtonian philosophy.' Similarly, Frend had endangered 'the very existence of the University' with his 'bold and indecent attack'.⁴⁷

Frend's closing address, and his subsequent account of the court proceedings, enabled him to air complaints about Cambridge's allegiance to Newtonianism. Reminding Milner of his suspect genealogy and former life as a Yorkshire weaver, he suggested that as a 'mechanick ... the manners of a gentleman and the taste of a scholar are not to be expected'. Frend concocted a story about the corruption of learning, the ensuing corruption of power, but the eventual triumph of individual reason. In doing so, he echoed Priestley's belief that history showed Britons that natural philosophy could be the primary engine of reform, and agreed further that the misuse of nature had been a primary source of political corruption. After applauding Boscovich for bringing

⁴⁵ For an account of the trial, see Frend, *An account of the proceedings in the University of Cambridge* (Cambridge, 1793).

⁴⁶ *Gentleman's Magazine*, 64 (1794), 206.

⁴⁷ For Milner's seal, see Mary Milner, *Life of Milner*, 8. For Milner's strictures, see, 'On the Precession of the Equinoxes', *Philosophical transactions*, 69 (1779), 505-26, 526, and *Strictures*, 212. For Milner's speech, see Frend, *Account*, 163-74.

matter to life, he concluded, 'Some may chuse to explore with Newton, [whilst] others may steer between the principles of Leibnitz and our immortal philosopher, and build a theory, which errorneous [*sic*] as it may seem, does not want advocates among the most intelligent mathematicians.' He finished by likening his courtroom experience to a failed laboratory trial: 'As to trials of this sort, I look on them as publick benefits; they may be compared to experiments in natural philosophy, and serve to show what progress the public mind has made in the investigation, and how far it is prepared for the reception, of truth.'⁴⁸

The 'last of the learned anti-Newtonians'

Frend's expulsion from the university strengthened his resolve to evince the corruptions upon which Cambridge thrived. London afforded safe ramparts from which he could snipe at the 'absurdities', 'mysteries,' and 'revolting propositions' that fueled Oxbridge. With its 'member unlimited' in the form of the London Corresponding Society, the metropolis also offered to Frend a multitude of new allies, ranging from peers to paupers. For instance, Charles Pigott showed his support for the ex-Jesus mathematician when in his 1795 *Political dictionary* he defined 'Vice-chancellor' as 'a man, second only in iniquity, who takes care that students shall be so involved in mathematics ... that they can find no time to investigate subjects of greater import.'⁴⁹ 'Citizen' Frend also found support from John Thelwall, Francis Place, Major Cartwright, Thomas Hardy, William Godwin, John Horne Tooke, and Francis Burdett, as well as Thomas Spence.

Upon his removal from Cambridge to London, his greatest ally became Baron Francis Maseres, Cambridge's fourth Wrangler in 1752, FRS from 1771 and from 1773 Cursitor Baron of the Exchequer. In 1758, whilst angling for the Lucasian chair, he published his *Dissertation on the use of the negative sign in algebra* in which he pounced upon the 'nonsensical unintelligible jargon' of Newtonians. As a Unitarian, Maseres, like Frend,

⁴⁸ Frend, *Account*, v, lii-liiii, 160-61.

⁴⁹ Charles Pigott, *A political dictionary, explaining the true meaning of words* (London, 1795), 187.

scoffed at mystery, whether in religion, law or mathematics: 'It is by the introduction of needless difficulties and mysteries into algebra (which for the most part take their rise from the supposition of the existence of quantities *less than nothing*)', Maseres griped to the Royal Society, 'that algebra ... has been rendered disgusting'.⁵⁰

During his residence in the Inner Temple, Frend joined Maseres' crusade against the use of negative numbers and 'all that distinguishes algebra from arithmetic'. Whilst Maseres supplied an appendix to Frend's *Principles of algebra*, Frend contributed his 'Remarks on the Number of Negative and Impossible Roots' to the Baron's *Tracts on the affected algebraick equations [of] Newton*. In the tract he condemned the spurious use of the cubic equations by Cambridge's mathematical professors, as he did in 1798 in his unsuccessful attempt to prevent Isaac Milner from assuming the recently vacated Lucasian chair: echoing Berkeley's condemnation of 'fugitive ideas' he cried, 'negative numbers are abortions, and impossible roots are unnatural crimes.'⁵¹ In his *Principles of algebra*, Frend compared this 'criminal' form of mathematics to Trinitarian doctrine:

After seeing that so able a mathematician as Monsieur Clairaut could be so far blinded and puzzled by the strange doctrine of negative quantities (unnecessarily introduced into the otherwise clear and simple Science of Algebra, or

⁵⁰ See Francis Maseres, *A dissertation on the use of the negative sign in algebra* (London, 1758), 2; *Tracts on the resolution of affected algebraick equations* (London, 1800); *The moderate reformer* (London, 1791). Maseres 'disgust' cited in Robert Ludlam, *The rudiments of mathematics* (Cambridge, 1785), 7.

⁵¹ Frend, 'Remarks on the Number of Negative and Impossible Roots in Algebraick Equations,' in *Tracts on the Resolution of Affected Equations by Dr Halley's, Mr. Raphson's and Sir Isaac Newton's Methods of Approximation*, ed. Francis Maseres (London, 1800). Frend, *Letter to the Vice-chancellor of the University of Cambridge* (Cambridge, 1798), 13; See also 'Farther remarks on St. John', *Gentleman's Magazine*, 70 (1800), 92-96. Here Frend comments, 'There is ... no danger to modern [i.e. orthodox] theology from the mathematical knowledge taught at Cambridge, for the mathematicians who have swallowed the notions, that a quantity may be less than nothing ... are not likely to be shocked at the dreams of Athanasius, or the tenets of [Anglican Priests]'.

Universal Arithmetick) ... it is surely high time for every true lover of this science, who is zealous for the honour of its purity and perspicuity, to exclaim as the good Archbishop Tillotson did with respect to the Athanasian Creed, 'I wish we were fairly rid of it!'⁵²

Despite Newton's espousal of this 'strange doctrine', Frend understood that his authoritative name would remain a polemical resource for reformers - even those who were not well-educated - in their efforts to undermine the *status quo*. For instance, those who harboured antipathy towards the established church continued to circulate rumours of his heterodoxy. Other English reformers of the 1790s followed the *philosophes'* construction of Newton, arguing that their scientific hero would continue to help eradicate superstition and demonstrate the benefits of secularization. Meanwhile, the *Conjuror's Magazine*, a popular astrological journal which demonstrated how political reform was inscribed in the heavens, used an exquisite engraving to assure readers that their marvellous claims rested upon Newton's *oeuvre*. The magazine's elaborate frontispiece depicted a dutiful astrologer relying simultaneously upon astute observation and Newton's *Principia*, Bacon's works and the *Philosophical Transactions*. During the protracted furore surrounding Richard Brothers' apocalyptic revelations, supporters and detractors alike marshalled Newton's *Observations upon the prophecies*, as well as Whiston's works, to lend weight to their positions.⁵³

⁵² William Frend, *Principles of algebra* (London, 1796); cited in John Kelley, *Algebra: a modern introduction* (Princeton, 1965), 51.

⁵³ *The Conjuror's Magazine, or, Magical and Physiognomical Mirror* (London, 1791-95). *The conjuror's magazine* is discussed in Patrick Curry, 'Astrological literature in late eighteenth-century England', in *History and astrology: Clio and Urania confer*, ed. Annabella Kitson (London, 1989), 243-52. For Brothers and prophecies, see, for example, James Bicheno, *Explanation of scripture prophecy* (West Springfield, 1796), 9; Bicheno, *Restoration of the Jews* (London, 1800), 9-11; Shirley Woolmer, *Remarkable prophecies ... strikingly set forth by Sir Isaac Newton* (Exeter, 1794); [Lewis Richards ?], *Prophetic conjectures ... extracted from Sir Isaac Newton* (Blatimore, 1794); W C Oulton, *Sound argument dictated by common sense* (Oxford, 1795), 46-8.

Newton nonetheless remained a villain to many of Britain's marginalized subjects. Whilst Samuel Taylor Coleridge was penning his condemnations of Newton, William Blake famously imagined Newton to blow the trump of the last doom. For the spiritually uplifted Blake, Newton had 'prescribe[d] ways of making the world heavier', whilst 'the Newtonian is oppressed by his own Reasonings & Experiments'.⁵⁴ Although his namesakes - Cambridge's Thomas Young and the social reformer Robert Young - wanted 'to extend, improve, and more firmly establish, the grand superstructure of the Newtonian system', Joseph Young set out to 'refute' Newtonianism. After reading the 'celebrated Doctor Priestly [sic]', Young realized that attraction was the 'most palpable absurdity', whilst endorsement of the vacuum was 'unpardonable'.⁵⁵

Others tracked a middle course: those who chose this *via media* often applauded Newton's perspicacity, dogged persistence and inventiveness, but denied his omniscience. Contributors to the *Conjuror's Magazine*, for example, qualified Newton's greatness by blending Paracelsianism, Boehmenism, Swedenborgianism and 'Dee-ist' alchemy with the lessons of the *Principia*, *Opticks* and *Observations upon the prophecies*. Similarly, the physician William Belcher combined mysticism with extracts from Newton, Hartley and Beddoes in his *Intellectual electricity, novum organum of vision, and grand mystic secret* in order to promote his 'rational metaphysics'. Metropolitan readers could also poke their heads into Robert Harrington's 1796 *New system on fire and planetary life*, which conceded Newton's 'immortality' but attacked his

⁵⁴ William Blake, 'Europe: a prophecy'; Blake to T Butts, 11 Sept., 1801; Blake to R Phillips, 14 Oct., 1807, in Geoffrey Keynes ed., *Blake: complete writings* (London, 1966), 237-44, 809, 865.

⁵⁵ Thomas Young, *Outlines of experiments and inquiries respecting sound and light* (London, 1800). Robert Young, *An essay on the powers and mechanism of nature* (London, 1788). Joseph Young, *New physical system of astronomy; in which the physical system of Sir Isaac Newton, is examined, and presumed to be refuted* (New York, 1800), v-vi, 9-11.

'forced and arbitrary' system of 'imaginary principles'.⁵⁶

In the end, Frend followed this *via media* as well. Like Priestley, he appreciated the changes that Newton had effected, both in terms of experimental philosophy and in terms of his efforts to separate ecclesiastical and civil power. Hence, when Frend's efforts to reform Cambridge failed, he admonished the dons' dogmatic ways: 'Had the university been always of the same mind with the twenty-seven, ... in vain would Newton have set aside the theories of ancient philosophy.'⁵⁷ Similarly, Frend was happy to teach artisans such as Francis Place and Thomas Hardy the Newtonian philosophy; but he was always quick to qualify the value of this tuition: 'Stupid People! They will look to the gravitation theory, and maintain the legitimacy of Newton's hypothesis, merely because the calculations founded upon it reconcile the appearances of nature.' To the end, Frend considered Newton's *Principia* 'as a very beautiful mathematical romance'.⁵⁸

Choosing this middle course did not entail that university philosophers should be exonerated from their freakish, romantic ontology. In his Rabelaisian burlesque of the trial, published in the *Gentleman's Monthly Miscellany*, he cynically proclaimed, 'the science of *nothing* is taught in the best manner in the university, to the great edification and improvement of all the youth in the land.'⁵⁹ Despite the intransigence of Cambridge's Anglican conspirators, Frend remained optimistic, expounding to readers of

⁵⁶ William Belcher, *Intellectual electricity, novum organum of vision, and grand mystic secret* (London, 1798). Robert Harrington, *A new system on fire and planetary life* (London, 1796), 14-17.

⁵⁷ Frend, *Account*, 160

⁵⁸ For Priestley's applause of Newton's politics, see Joseph Priestley, *Present state of Europe compared to the ancient prophecies* (Philadelphia, 1794), 48. For the *Principia* as romance, see Frend, *What is an album?*. For the stupid people, see Frend, *Memoirs of a goldfinch* (London, 1819), 40n. For tuition of Place, see Place, *Journal*, British Library MS Add.35142 ff. 68-75. For discussions of Newton with Hardy, see the Hardy-Frend correspondence, Cambridge University Library MS Add.7887.39.

⁵⁹ William Frend, 'Pantagruel's decision of the question about nothing', *The Gentleman's Monthly Miscellany*, 1 (1803), 269-73.

the *Gentleman's Magazine* that 'Athanasian theology and Cambridge mathematicks are very much on par; but, in spite of divines, students will consult their Bibles for the Word of God, and common sense and experiments for the truths of mathematicks and natural philosophy.'⁶⁰ Whilst in his 79th year, he wrote to De Morgan of his expectancy that 'the figment $\sqrt{-1}$ will keep its hold among the Mathematicians not much longer than the Trinity does among the Theologians.'⁶¹

In many ways Augustus De Morgan inherited Frend's critical yet pragmatic approach to algebra, pedagogy, and politics. After leaving Cambridge on account of his Unitarianism, he was befriended by Frend and married his daughter. Frend was also instrumental in securing for De Morgan the professorship of mathematics at London University, the 'godless institution on Gower Street'.⁶² Like his father-in-law, De Morgan chortled at the disputes over symbology: 'We know that the inventors of our symbols attached very little importance to them: and would have stared in wonder if they had been told that these trumpery tricks of abbreviation would one day have a philosophy of their own'. In response to George Peacock's claim that algebra was merely 'the science of suggestion', De Morgan moaned that algebraic symbols were now 'bewitched, and running about the world in search of meaning.'⁶³

⁶⁰ Frend, 'Farther Remarks', 95.

⁶¹ Frend to De Morgan, 22 June, 1836; Cambridge University Library MS Add.7887.29.

⁶² See Anon., 'Obituary of A. De Morgan', *Astronomical Society Monthly Notices* xxxii (1871-2), 112-19, 114. For other treatments of De Morgan's life see S E De Morgan, *Memoir of Augustus De Morgan* (London, 1882); and De Morgan, *Miscellaneous Writings*, Watson Library, UCL MS.Add.163. De Morgan usually called himself a 'Christian unattached', but his wife deemed him a Unitarian: see *Memoir*, 36.

⁶³ De Morgan, 'On the Early History of the Signs + and -', *Cambridge Philosophical Society*, 11 (1864), 203-212, 210. Peacock and De Morgan's review cited in Joan Richards, 'Augustus De Morgan, the history of mathematics, and the foundations of algebra', *Isis*, 78 (1987), 7-30, 13-14.

De Morgan spent forty years constructing meaning for symbols, especially Frend's bugbear, negative and imaginary numbers. Moreover, like Frend and Priestley, he *re*-placed Newton in British history as part of his vision of the place of scientists in the social order.⁶⁴ This relocation of Newton was opposed to - and indeed, prompted by - David Brewster's gushing biography of 1831, which presented the *Principia's* author as saint and marvel: whilst the 'splendour of his reputation' eclipsed former philosophers, 'the moralist [could] trace the lineaments of a character adjusted to all the symmetry of which our imperfect nature is susceptible.' Though his 'amazing discoveries' were the product of a genius that Britons could never emulate, Brewster affirmed that they could aspire to his noble character.⁶⁵

De Morgan's reformulation of Newton was also informed by Francis Baily's 1835 *Account of Flamsteed*, which asserted that Newton had shafted the Astronomer Royal. To quell the unpalatable idea that Newton acted immorally by appropriating Flamsteed's work, Cambridge's William Whewell evoked Newton's 'extraordinary powers of mind' to suggest that the Greenwich astronomer was incapable of comprehending the full significance of his own observations. Like the 'rash and cowardly' Descartes, Flamsteed 'was no philosopher.'⁶⁶

De Morgan was soon active in this growing debate, writing to Frend, 'I have been reading [Baily's *Flamsteed*] pretty diligently, and am much amused by it.'⁶⁷ He agreed with Baily that Flamsteed

⁶⁴ See De Morgan, 'Review of *Novum Organum Renovatum*', *Athenæum*, 8 (1859), 43. See also Richards, 'Augustus De Morgan', 21-2. See also Paul Theerman, 'Unaccustomed role: the scientist as historical biographer', *Biography*, 8 (1985), 145-62, 145.

⁶⁵ David Brewster, *The life of Isaac Newton* (London; 1831), 1-3. For Brewster, see Richard Yeo, 'Genius, method, and morality,' 266-67, 275-76.

⁶⁶ Baily, *Account of Flamsteed* (London, 1835); Whewell, *History of the inductive sciences*, (3 vols., London, 1836), II, 198.

⁶⁷ De Morgan to Frend, Sept., 1835: Cambridge University Library MS.Add.7887. The main products of De Morgan's activity include 'Newton', (1846), 'A short account of the controversy on fluxions', (1852), 'Review of Brewster's *Memoirs*', (1855), 'View of Leibniz's

deserved better: he also plunged into the Royal Society's manuscripts to convalesce the ailing reputation of Leibniz. *Newton: his Friend: and his Niece*, in which De Morgan excavated the great man's personal history, was his response to the suppression by biographers of 'weaknesses, errors, and even crimes.' For De Morgan, Newton was no 'dry automaton', but a man with whom one could empathise: 'Newton, of whom wrong may be admitted, Newton, who must be defended like other men, and who cannot always be defended, is a man in whom to feel interest, even when we are obliged to dissent from his eulogist.' This gave De Morgan an opportunity to sever morality from intelligence:

The scientific fame of Newton ... gave birth to the desirable myth that his goodness was paralleled only by his intellect. That unvarying dignity of mind is the necessary concomitant of great power of thought, is a pleasant creed, but hardly attainable except by those whose love for their faith is insured by their capacity for believing what they like. The hero is all hero, even to those who would be loth [*sic*] to pay the compliment of perfect imitation. ... But we live in discriminating days, which insist on the distinction between intellect and morals.⁶⁸

To undermine the coupling of moral guidance and intellectual acumen, De Morgan reflected on Newton's anti-Trinitarianism and demoted him from the status of genius to 'sagacious'. Like Coleridge's comparison of Newton to Shakespeare, he regarded Newton's discoveries 'more like a book-keeping operation than the poetical process of fable.'⁶⁹ Finally, he evoked Newton's Janus-faced politicking as a member of the Convention parliament: 'he had not within himself the source from whence to inculcate high and true motives of action upon others; the fear of man was before

character', and 'The character of Newton', (1858). See De Morgan, *Essays on the life and work of Newton* (London, 1914).

⁶⁸ A De Morgan, *Newton: his friend: and his niece* (1885, repr. London, 1968), 140-41, 150-1. The study centred on the long controversy, inflamed by Voltaire, that Newton had prostituted his niece, Catherine Barton, to Charles Montagu in order to secure patronage.

⁶⁹ Cited in Yeo, 'Genius, method and morality', 268.

his eyes. His mind has been represented as little short of god-like; and we are forced upon proof of the contrary.'⁷⁰

* * * * *

Simon Schaffer has described the eighteenth-century battle to represent Newton (and to be his *bona fide* representatives) as an ironic contest: although Newton tried to restore true religion by expunging idols, his texts functioned like idols throughout the century. Moreover, since the 'real meaning' of his natural philosophy was radically underdetermined in these texts, the struggle to represent Newton, and therefore the relation between the natural and moral worlds, continued into the nineteenth century. Thus, in the midst of the 1812 Bible Society controversy, Frend's cousin, Herbert Marsh, accused Milner of distorting Marsh's position because he had 'totally mistaken the meaning of Sir Isaac Newton'.⁷¹

In his 1829 *Signs of the times*, Thomas Carlyle lamented that his age had produced no Newton, who 'by silent meditation' discovered 'the system of the world'. The decline of science in England was due to the replacement of Newton by someone else, who 'behind whole batteries of retorts, digesters, and galvanic piles imperatively "interrogates Nature".' Others, however, reckoned the scientific deterioration had been caused by Newtonian myopia. Imagining a place of higher learning in the metropolis to rival Oxbridge, Charles Kelsall deplored this dogged adherence: 'The genius of Newton, like the great whirlpool in the Norwegian seas, appears at Cambridge to bury nearly every energetic mind in its vortex'. When this higher place of learning did take form as London University, De Morgan made it clear in his introductory address that as professor of mathematics he would do battle with this vortex: 'I do not look at a Newton, a Lagrange, or an Euler, of whom one country produces few; but the knowledge of the many, who are to direct the exertions of their fellow-countrymen.'

⁷⁰ See De Morgan, *Newton and his niece*, 142.

⁷¹ For Newton as idol, see Simon Schaffer, 'Comets and Idols'. For misunderstanding Newton, see Herbert Marsh, *Reply to the strictures of Isaac Milner* (Cambridge, 1813), 26.

London University, along with the Society for the Diffusion of Useful Knowledge, Mechanics' Institutes and even his father-in-law's textbooks, promised emancipation from 'a listless dependence on the arm of the state.'⁷²

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⁷² Thomas Carlyle, *Signs of the times* (1829); in *Selected writings*, ed. Alan Shelston (London, 1971), 65. Charles Kelsall, *Phantasm of an university* (London, 1814), 33. De Morgan, *Remarks on elementary education* (London, 1830), I, 23-4.

THE MYSTERY OF COUNT CAGLIOSTRO: ALCHEMY, PROPHECY AND THE END OF THE ENLIGHTENMENT

Iain M^cCalman

In early 1789 the coffee-houses and salons of Western Europe were agog with news that the world's most celebrated alchemist, mesmeric-healer and 'Grand Cophte' of Egyptian freemasonry, Count Alessandro di Cagliostro, had been captured in Rome by the Papal Inquisition. After a protracted series of interrogations, trials and, some said, tortures, he was sentenced at the personal intervention of the Pope to life imprisonment in Spain's most inaccessible mountain fortress. A detailed exposé of Cagliostro's life by the Inquisitor's official notary and biographer, Lucia Berberi, soon circulated Europe in numerous translations. It propounded the Papal case against the Cophte and claimed through his own confession to put an end definitively to a question which had exercised some of the greatest minds of the age.¹ Over the previous decade Cagliostro's figure had become familiar through scores of engravings, paintings, marble busts, snuff boxes and porcelain mugs;² his fantastic feats had circulated in pamphlets, treatises, plays, broadsides, and novels all over France, Britain, Switzerland, Germany, the Hague, Russia, Italy and Poland. But who really was he? Was he a saint, scientist, prophet or charlatan? How true were the fabulous stories of his exotic Eastern origins, his mysterious wealth, his spectacular cures, his alchemical transformations, his chilling prophecies?

This question obsessed Goethe for several years until he eventually laid it to rest by making a pilgrimage from Naples to Palermo in 1787 to interview Cagliostro's relatives³ and then, like

¹ M Berberi, *The Life of Joseph Balsamo, commonly called Count Cagliostro ... translated from the original proceedings at Rome by Grier of the Apostolic Chamber* (Dublin, P. Byrne, 1792).

² Reproductions of some of these can be seen in Grete de Francesco, tr. Miriam Beard, *The power of the charlatan* (New Haven, 1939), esp. 216-21.

³ For a fascinating discussion of the formative aesthetic as well as intellectual impact of this trip, see Stephan Oettermann, *The panorama*.

Catherine the Great of Russia before him, wrote a play exposing *Der Gross-Kophta* as a charlatan; Schiller in his unfinished Gothic novel, *The Ghost-Seer*, had been less clear-cut in his conclusions. Like the famous Swiss scientist, Johann Caspar Lavater, he found himself convinced by Cagliostro's extraordinary powers even if uncertain of his true identity.⁴ And these were only a few of the men and women who had in the previous decade similarly argued over whether Cagliostro was a redeemer of mankind or a masonic revolutionary dedicated to the destruction of throne and altar? Or was he simply a charlatan? London-based Bourbon spy and master smut-monger Théveneau de Morande wrote a series of newspaper exposés of 1786-7 citing Parisian police records to suggest that Cagliostro was really a Sicilian imposter, pimp, blackmailer, and wife-beater named Joseph Balsamo, who had left a squalid trail of victims, debts and prison sentences behind him.⁵ Berberi's Inquisition biography confirmed de Morande's claims by citing Balsamo's own confession, supported by detailed testimony from his poor Palermo family, and particularly from his Catholic penitent wife, Feliciania (alias Seraphina).

Persuasive though the Inquisition account was, it did not put an end to the mystery of Count Cagliostro. The nature of his engima, perhaps, altered. Now people speculated less about who he was than how he had constructed himself. Thomas Carlyle posed the question most brutally. How had this oily, unprepossessing, ill-educated quack managed to transform himself into the mighty Cophte? How had a babbling buffoon who could not string together a coherent sentence managed to dazzle Europe's most

History of a mass medium (New York, 1997), 7-13.

⁴ Johann Friedrich von Schiller, *The ghost-seer, or The apparitionist*, (London, 1800); on Lavater's response to Cagliostro, see Constantin Photiadès, *Count Cagliostro. An authentic story of a mysterious life*, trans. K S Shelvankar (London, 1932), 27-8.

⁵ De Morande's exposés are contained mainly in the *Courier de L'Europe*, August-Dec. 1786, and there is correspondence between Cagliostro and de Morande in the *Morning Chronicle* over the same period, and justificatory correspondence by Cagliostro, in the *Public Advertiser*, August-September 1786. Cagliostro gathered his replies to de Morande in *Lettre du Comte de Cagliostro au peuple Anglais pour servir de suite à ses mémoires* (London, 1786), 4-92.

distinguished intellectuals, scientists, bankers, cardinals, ministers and monarchs? To Carlyle and many other hostile commentators Cagliostro's magical transformation and sustained imposture raised fundamental questions about the pliability of the persona, the potency of the human imagination and the fallibility of the Enlightenment project of reason. Looking back, Carlyle saw the second half of the eighteenth century not as the age of reason but as the age of gullibility and quackery.⁶ But not everyone who contemplated Cagliostro's career was so hostile. Radical artists like William Blake saw the Grand Cophte rather as an inspirational and revolutionary figure, an embodiment of the social energies, spiritual forces, and aesthetic principles that we now call Romantic.⁷

This essay argues that the debate about the true character of Count Cagliostro, and about how such a man might have invented and sustained his miraculous identity, had profound intellectual implications for its own age and for how we understand that age today. In various ways the Cagliostro enigma cut to the heart of the cultural, political and social upheavals that engulfed Europe at the turn of the century. Intellectual historian Robert Darnton has seen Anton Mesmer's late eighteenth-century cult of animal magnetism as the harbinger of the end of the Enlightenment in France:⁸ across the channel in Britain, however, it was Joseph Balsamo alias Don Tischio, alias, Colonel Pelligrini alias Count Cagliostro, Grand Cophte, alchemist, mason and prophet, who sounded the change.

⁶ Thomas Carlyle, 'Count Cagliostro in Two Flights' [1833], *Critical and Miscellaneous Essays* (5 vols, London, 1898), iii, 253-9, 270-75.

⁷ William Blake, 'The French Revolution. Book the First', *Poetry and Prose of William Blake*, ed., Geoffrey Keynes (London, 1967), 167. For a persuasive case that Blake is referring to Cagliostro, see Marsha Keith Schuchard, 'Blake and the Grand Masters (1791-4). Architects of Repression or Revolution?' Paper presented at the conference on 'William Blake 1794/1994', St. Mary's College, Strawberry Hill, 14 July 1994, 6-7.

⁸ Robert Darnton, *Mesmerism and the end of the Enlightenment in France* (Cambridge, Mass., and London, 1968), esp. chaps. 3-4. For the case that mesmerism did not exercise the same influence in Britain, see, Patricia Fara, 'An Attractive Therapy: Animal Magnetism in Eighteenth-Century England', *History of Science*, 33 (1995), 138-45; Roy Porter, '"Under the Influence". Mesmerism in England', *History Today*, 35 (Sept. 1985), 22-9.

I

How was it possible for the Sicilian street Arab, Joseph Balsamo, to transmogrify himself into a dazzling new identity of Count Cagliostro, alchemist-mesmerist and Grand Cophte of Egyptian Masonry? One school of thought saw him as simply the most recent of a long line of European adventurers and con men-magicians who had developed a cunning repertoire of tricks, illusions, and forgeries for skinning the gullible of their money.⁹ Carlyle pointed to Balsamo's formidable apprenticeship in criminality and charlatanism; as a boy he had learned a patina of chemical knowledge and alchemical lore from the Benfratelli Friars of Castligerone; he had kept company with prostitutes, forgers and sharpers in the slums of Palermo and Rome, where he had learned to divine spurious treasure, to secrete gold ore in his crucible so that it appeared to be transmuted from mercury and sulphur, and to forge lottery tickets, engravings and even oil paintings. Casanova claimed to have been shown a credible forgery of Rembrandt done by Balsamo. He had also bumped into Joseph and his beautiful young wife Feliciana in Aix-en-Provence, posing as poor Christian pilgrims - one of many clerical, military and aristocratic identities that the pair had assumed in different European cities. Having himself nearly succumbed to the charms of Balsamo's girlish, flaxen-haired wife, Casanova saw her as the key to Balsamo's criminal success.¹⁰ Independent testimony supported this assessment: time and time again Balsamo had used her as a honey-trap, sometimes to spring a blackmail demand on a pious London Quaker, sometimes to extract money and favours from rich European nobles and clergy in exchange for sex. Feliciana had herself become so polished a performer that despite being completely illiterate she had managed to convince some of the most worldly and cynical of *ancien régime* courtiers that she was indeed Seraphina Cagliostro, angelic wife of an Eastern count.¹¹

⁹ Francesco, *Power of the charlatan*, 159-226.

¹⁰ W R H Trowbridge, *Cagliostro. The splendour and misery of a master of magic* (New York, 1910), 37-9.

¹¹ *Ibid.*, 204-7; Phitiades, *Count Cagliostro*, 73-8.

Actually a Polish exposé of Cagliostro dating from the early 1780s still regarded him as a relatively clumsy mountebank, most of his efforts at divining treasure, salting crucibles, priming mediums, and summoning spirits had apparently tended to backfire. The author recommended he study the illusionist techniques of the great French stage magician Comus, and perhaps improve his act by teaming up with a ventriloquist.¹² Always ready to heed improving advice, Cagliostro went one better by forming a partnership in London during 1786-7 with the famed French émigré artist and maestro of stage effects, Philippe Jacques de Louterbourg.¹³ By this means, claimed the scurrilist de Morande, Cagliostro imported sophisticated illusionist technology into his seances, including magic lanterns, coloured phosphorous flares, and eerie moving images. De Louterbourg also painted for him a series of occultist masonic studies designed to arouse and awe initiates into the Cophte's projected Egyptian Rite lodges which he intended to establish at London and Basle. Would-be male and female adepts were represented overcoming ordeals with Mercury, Cronos, and sundry serpents, before being ushered into an illuminated temple of Egyptian Masonry. By way of reciprocation, Cagliostro instructed de Louterbourg and his wife in healing and alchemical knowledge, and also promised to undertake their personal regeneration, a strong incentive for Phillippe whose young second wife was said to be the most beautiful woman in England.

The sexual chemistry between the De Louterbourgs and Cagliostros was certainly an enhancing factor in the partnership:¹⁴ Alessandro and Seraphina presented themselves as exemplary cases of such rejuvenation. She was said by many to look like a young angel, while Cagliostro professed to have temporarily frozen

¹² Trowbridge, *Cagliostro*, 149-50.

¹³ On de Louterbourg, see Rudiger Joppien, *Philippe Jacques de Louterbourg, RA, 1740-1812* (London County Council, Kenwood, 1973); Morton D Paley, *The apocalyptic sublime* (New Haven and London, 1986), 51-70; Christopher Baugh, *Theatre in focus: Garrick and de Louterbourg* (Cambridge, and Alexandria, VA, 1990), esp. 21-51.

¹⁴ Given Goethe's obsession with, and detailed knowledge of, Cagliostro's history, it is possible that he used the Cagliostros and de Louterbourgs as inspiration for his brilliant *Elective affinities*.

himself in middle age, despite having personally witnessed Biblical scenes and travelled the globe for many centuries. Though he probably borrowed the idea of such longevity from charlatan predecessors, nobody made better use of it. Shrewdly, Cagliostro tapped one of the most deeply-entrenched and pervasive tropes of European culture, the myth of the Wandering Jew. Since at least the seventeenth century legends had proliferated of this magical figure, most often represented as a shoemaker named Ahasuerus who had supposedly struck Christ on the way to Calvary and so been condemned to live forever until freed by the second coming. Claimants to the position had proliferated over the centuries, most of them boasting those two useful alchemical secrets, the elixir of eternal life and the philosopher's stone for transmuting metals into gold.¹⁵ Madame la Motte, a dazzling con woman herself, claimed that Cagliostro had derived some of his best ideas from the seventeenth-century Italian alchemical adventurer, Joseph Borri, who also, as it happens, ended up in the fortress of St Angelo, courtesy of the Inquisition.¹⁶ However the colourful polemicist M. de Luchet thought that Cagliostro had learned most of his quackery from a contemporary precursor, the brilliant mystical star, Count St Germaine, a Turkish Jew who claimed to have been present at the Canaan wedding feast. De Luchet reported that Cagliostro had taken the trouble to visit St Germaine for professional advice, then carefully retraced his precursor's well-trodden mystical circuit through Strasbourg, Lyons, and Bordeaux.¹⁷

True or otherwise, there is no doubt that Cagliostro made many visits to these same occult hot-spots: they were European cities where successive currents of cabalistic mysticism met and mingled since the beginning of the century. The theosophical spiritualism of Zevi, Pasquali, St Martin, and Swedenborg, the primitivism of

¹⁵ George K. Anderson, *The legend of the Wandering Jew*, (California, 1965), esp. 128-31; Brian Stableford, ed., *Tales of the Wandering Jew* (Cambridge, 1991), 6-7.

¹⁶ *Réponse pour la comtesse de Valois la Motte, au mémoire du comte de Cagliostro* (Paris, 1787), 19-20.

¹⁷ Trowbridge, *Cagliostro*, 200-1; Berberi, *Life of Joseph Balsamo*, 61-3, 93-5, 145-69; see also, Charles Mackay, *Extraordinary popular delusions and the madness of crowds*, (London, 1841), 230-1

de Gebelin and Rousseau, the millenarianism of the Avignon prophets, the new magnetic healing systems based on freeing up the body's flows of imponderable fluid: all these cults paved the way for the advent of Count Cagliostro, occult bricoleur.¹⁸ Common to most of their adherents was a yearning to move beyond the five senses, to peer out of Plato's cave, to transcend the rational and material, to restore a fabled harmony between the corporeal microcosm and the celestial macrocosm. Fresh speculative fads extolling the invisible powers of de-phlogisticated airs, magnetic ethers, electrical currents, or physiognomic contours had endowed the occult with the credibility of science. Fashionable Lords and Ladies convulsing and swooning around Mesmer's *baquet* or seeking sexual enhancement on James Graham's magnetically powered Celestial Bed were only two better-known examples of a European-wide phenomenon.¹⁹ Thomas Carlyle believed that social and economic dislocation in the latter part of the eighteenth century generated both this spate of restless adventurers armed with regenerative promises as well as the credulous human fodder on which they fed - he saw Cagliostro as only the last and most egregious of these money-hungry quacks. The Inquisition on the other hand blamed the success of the Sicilian imposter, as well as the larger eruption of occultism which carried him to prominence, on the moral degeneracy of societies which had abandoned the certainties of Catholic faith in favour of Protestant and deistical fatuities. Only in Papal Rome had Cagliostro's persuasive powers faltered; only there had he met his final nemesis.²⁰

II

¹⁸ For an excellent analysis of this occult milieu, see Clarke Garrett, *Respectable folly. Millenarians and the French Revolution in France and England*, (Baltimore and London, 1975), esp. chs 1, 5.

¹⁹ On this occult scientific milieu, see Darnton, *Mesmerism and the end of the Enlightenment, passim*; on Graham, see esp. Roy Porter, 'Sex and the Singular Man: The Seminal Ideas of James Graham', *Studies on Voltaire and the Eighteenth Century*, 228 (1984), 3-22.

²⁰ Berberi, *Life of Balsamo*, 'Preface', iv-vi.

However hostile, most of Balsamo's contemporary biographers noted a defining and transformative moment in his imposter career at the point when he had alighted on his most enduring and successful identity as Count Cagliostro, Grand Cophte of Egyptian Masonry. It had happened by a series of chance conjunctions during his second visit to London of 1776-7. Like his first visit of 1772, when he had touted for work as bespoke painter and blackmailer, the second stay had been short-lived. This time his pose as Colonel Pelligrini of the Prussian army, alchemical predictor of lottery tickets and manufacturer of beauty balms and sexual stimulants, was sufficiently persuasive to attract a gang of local swindlers and imposters even more predatory than himself. Their legal machinations, combined with the clamours of his creditors, resulted in several stints in the King's Bench gaol and eventually to a characteristically precipitous return to continental Europe. But in 1777 Balsamo carried with him two portentous additions to his repertoire: he had been initiated into the Esperance Lodge of Scottish Rite Freemasonry at O'Reilly's tavern in Soho,²¹ and he had bought from a London bookseller an obscure manuscript by one George Cofton which claimed to unfold the mysteries of freemasonry's lost Egyptian Rite.²² With the help of these two assets he was able to construct himself into Count Cagliostro the Grand Cophte and to embark on a decade-long evangelizing magical mystery tour of Europe which over the next decade elevated him to fame and riches.

In retrospect we can see that Egyptian freemasonry supplied him with three vital attributes that he had previously lacked: a place in a powerful social movement; a distinctive ideology of change; and a compelling personal identity. Although the Esperance Lodge was not in itself prestigious, being mainly a recruiting ground for expatriate artisans and lowly artists, it gave Cagliostro an entrée

²¹ *Lettre du Comte de Cagliostro au peuple Anglais*, 83-4; Constatin Photiades, *Count Cagliostro*, 95-6.

²² The identity of George Coston remains unclear. One suggestion was that he was a former Catholic priest. Henry Ridgely Evans, *Cagliostro and his Egyptian Rite of Freemasonry* (Washington, 1919), 13-15, points out that the details of the Rite closely resemble those devised by the Continental mystic and Martines Pasquali.

into freemasonic affiliates all over Europe. Now he was assured of a network of connections in each city that he entered.²³ Moreover, notwithstanding Carlyle's cynical claim that these Lodges were self-selected gatherings of the gullibles of every city, they included a heavy representation of prosperous citizenry. It was through freemasonic networks that Cagliostro derived his most assured source of income. Masonic bankers such as Sarazin in Switzerland, Kornmann in Lyons, the Boas brothers in the Hague and the Goldsmids in Britain provided the credit which underpinned his deliberately ostentatious life-style. Masonic cardinals like Louis Rohan, princes like the Duc d'Orléans, and artists like de Louthembourg became generous sources of gifts, loans, and patronage. In joining the tide of freemasonry which was sweeping Europe - Paris alone had some 10,000 members by 1789 - Cagliostro, the lone adventurer, was able for the first time in his life to experience the psychic and social benefits of participating in a collectivity.

Furthermore, the Egyptian Rite gave Cagliostro an unexpected edge within the turbulent and fissiparous politics of European freemasonry itself. His discovery of masonry in the 1780s came at a time of sharp internal struggle between different rites, factions and tendencies of the movement - between Ancient and Modern Rites, Scottish Jacobite and pro-Hanoverian Lodges, and between myriad speculative and occult groupings.²⁴ The body of Egyptian doctrine, ritual and imagery which Cagliostro elaborated into a written manual with the help of a young scientific-literary disciple, enabled him to mount a significant bid for leadership within this confused scene. His new Rite tapped deep primitivist and Rousseauist yearnings by claiming to return to the movement's pure and forgotten origins, those ancient pyramids of Egypt from whence all European learning had sprung. Ancient Egypt also gave

²³ On the social power of both Continental and British Freemasonry during this period, see Margaret C Jacob, *Living the Enlightenment. Freemasonry and politics in eighteenth-century Europe* (New York and Oxford, 1991), esp. chs. 2-3.

²⁴ I am indebted to Marsha Keith Schuchard for allowing me to make use of her unpublished paper, 'Lord George Gordon and Cabalistic Freemasonry: Beating Jacobite Swords into Jacobin Ploughshares', esp. 26-30.

Cagliostro a rich body of symbology and performative ritual to add to the masonic triangles, Death's heads, compasses and general panoply of catchy Masonic imagery. His own logo of an arrow-pierced snake devouring its own tail proved attractive enough to find its way into Wolfgang Amadeus Mozart's latest opera, 'The Magic Flute'.²⁵ Always the bricoleur, Cagliostro happily blended Egyptian mythology, Hebrew cabalism, and Christian hymnody.²⁶ And always the opportunist, he rapidly exploited orthodox masonry's resistance to the admission of women by launching a female branch of the Egyptian Rite, with Seraphina as its high priestess, Isis.²⁷

Whether his version of masonry carried a wider political agenda as well is less clear. The Inquisition believed him a deist, citing evidence that he had been initiated into Weisphaupt's fanatical revolutionary Illuminati in an underground cave at Frankfurt. They also claimed that he had possessed a ribbon embroidered with the initials L P D, which supposedly stood for 'Lilium Pedibus Destrue' and signified his mission to crush the Bourbons underfoot.²⁸ True or otherwise, he undoubtedly became increasingly entangled in anti-Bourbon politics after his unwitting involvement in the Diamond Necklace affair of 1785 and subsequent nine months imprisonment in the Bastille. When he fled to exile in London in 1786 he was already a Parisian mob hero who rapidly found himself appropriated, willy-nilly, into a series of anti-Bourbon and radical causes on both sides of the channel. The radical mason and lawyer Duval d'Épresmesnil used the Count's complaints against the Bastille governor, Marquis de Launay, to launch a wide-ranging legal attack on *ancien régime* repression.²⁹ The wily regal claimant, Duc d'Orléans, took care to include Cagliostro in his own anti-Bourbon machinations on both sides of the channel. And in London

²⁵ Jacques Chailley, *The Magic Flute unveiled. Esoteric symbolism in Mozart's masonic opera* (Rochester, Vermont, 1992), 59, 77, 121.

²⁶ Evans, *Cagliostro and his Egyptian Rite*, 15.

²⁷ Photiades, *Count Cagliostro*, 184-6.

²⁸ Berberi, *Life of Joseph Balsamo*, 164.

²⁹ *Memorial for Count Cagliostro, Plaintiff, versus Maître Chesnon ... Commissary in the Châtelet of Paris, and Le Sieur de Launay, ... Governor of the Bastille* (London, 1787).

the British royal princes and their oppositionist Whig associates fêted him as means of embarrassing George III. Finally and fatally, mad Lord George Gordon, Britain's most dangerous politico-religious enthusiast decided to become Cagliostro's ardent champion. Gordon penned in Cagliostro's name a series of libellous public attacks on Marie-Antoinette and her political faction which aroused the ire of both British and French governments.³⁰ No wonder the Bourbons ordered Théveneau de Morande, their most rabid hired pen and smut-monger, to savage the Count in print.³¹ And though Cagliostro probably had no intention of associating politics with his subsequent masonic campaign to establish the Egyptian Rite in London, friendship with Gordon and the remorseless attentions of the *Courier de L'Europe* inevitably aroused conservative fears. His mission was rejected not only by orthodox Modern masons, but also by fearful Swedenborgians who were otherwise strongly pre-disposed to sympathize with his Egyptian Rite.

Although Cagliostro ultimately managed to establish only one institutionalized mother Lodge within Europe - located in the mystical heartland of Lyons - the Egyptian Rite nevertheless served him well. It both gathered him a Europe-wide following and furnished him with an alluring identity as an Oriental mystic. Such a role was tailor-made for him. Like so many Sicilians, he seems to have had Moorish-Jewish origins: his swarthy colouring, strange gutter patois, social blunders, puzzling obscurity, frequent disencampments and restless travels all became evidence of mysterious and exotic origins. Neither could his transmogrification have been better timed; he caught the popular Orientalist vogue at

³⁰ See, Iain McCalman, 'Lord George Gordon and Madame La Motte: Riot and Sexuality in the Genesis of Burke's *Reflections on the Revolution in France*', *Journal of British Studies*, 35 (July, 1996), 343-367.

³¹ On de Morande, see Robert Darnton, 'The High Enlightenment and the Low-Life of Literature in Pre-Revolutionary France', *The literary underground of the old regime* (Cambridge, Mass., and London), 1-40; Simon Burrows, 'A Literary Low-Life Reassessed: Charles Théveneau de Morande in London, 1769-1791', *Studies in the Eighteenth Century 10. Papers from the David Nichol Smith Memorial Seminar*, eds. Ian Higgins and Gillian Russell, *Eighteenth Century Life Special Issue*, 22 (Feb., 1998), 76-94.

its peak, the cult of Egyptian learning and style had reached beyond the domain of scholar-philosophes to become a cult of Egyptomania.³² In 1788 *Aladdin* became a pantomime smash hit in France, evidence of how far Galland's dazzlingly successful translation of the *Arabian Nights* had percolated into popular culture. *Aladdin's* slightly more highbrow equivalent was the almost equally successful edition by M. Lidiard of *The life of Sethos*, which significantly appeared in the libraries of two of Cagliostro's most ardent artist supporters, Richard Cosway and Phillipe de Louthembourg.³³

Cagliostro had only to insert himself into these romantic narratives. The learned judges of the Paris Parlement, who examined him in 1785, might snigger at his fantastic Oriental dress and extravagant self-representation as a mystical Eastern wander, but when his trial brief elaborated this romance, it sold like hot cakes. His tale of obscure African princely origins, early rearing as a Muslim under the name of Acharat, instruction by an alchemical sage, and eventual Christian re-education with the Knights Templar of Malta, might seem laughingly fantastic to modern scholars, but it rang true to many contemporary readers. From *Aladdin* to Acharat was only a short step.³⁴ By the late 1780s the Parisian trial brief had become a bestselling politico-literary genre.³⁵ Cagliostro's Eastern tale joined the erotic-gothic romance of Jeanne la Motte and scores of other legal *chroniques scandaleuses* in the booksellers

³² Julie F Codell and Dianne Sachko Macleod, eds, *Orientalism transposed. The impact of the colonies on British culture* (Aldershot and Brookfield, Vermont, 1998), esp. Introduction and chs. 3; Saree Makdisi, *Romantic imperialism. Universal empire and the culture of modernity* (Cambridge, 1998), esp. ch. 5.

³³ M. Lidiard, *The Life of Sethos. Taken from the private memoirs of the ancient Egyptians* (London, 1782); *Catalogue of very curious, extensive and valuable library of Richard Cosway...8 June 1821* (R. Stanley, London, 1821), no. 507, 31; Phillipe Jacques de Louthembourg, *A catalogue of all the valuable drawings, sketches, seaviews, and studies ... [and] library of scarce books* (Peter Coxe, 18 June 1812), no 49, 107.

³⁴ Phitiades, *Count Cagliostro*, 201-2.

³⁵ See Sarah Maza, *Private lives and public affairs. The causes célèbres of Prerevolutionary France* (Berkeley, Los Angeles, and London, 1993), esp. chs. 3-4.

barrows of the Palais Royale. The Grand Cophte's disciples also made some lurid additions to the story, to the point where Cagliostro's childhood comes to sound like a sizzling precursor of that Victorian pornographic classic, *The Lustful Turk*. Even the hard-nosed Inquisition biographer accepted a remarkably large portion of the Cophte's Eastern romance.³⁶

Equally surprising is the grudging concession in the Inquisition memoir that something remarkable had happened Balsamo's charlatan personality when he turned himself into the Grand Cophte. There is a sense that some inner change had occurred which affected Cagliostro's subsequent personality and behaviour in unexpectedly impressive ways. To Carlyle, too, Balsamo achieved a new plane of perfection as an imposter when he adopted the role of Cagliostro. It was as if he had obtained a neo-Platonic ideal of the perfect or master quack.³⁷ Reading between the lines of Carlyle's unremitting hostility, we can see a groping recognition that Cagliostro had located in himself an identity which liberated a range of latent talents and, perhaps, ideals as well.

Although Stephen Greenblatt has associated the idea of self-fashioning with the Renaissance, contemporary awareness of the concept must surely have had to await Locke's demolition of the idea of innate personality and its replacement with a more fluid, empirical and experiential psychology. By the 1780s actors like David Garrick were moving beyond stylized performance towards a naturalistic immersion in the character which was to culminate in Edmund Keene's brooding early nineteenth-century romantic roles.³⁸ And, as the Paris inquiry into mesmerism of 1785 observed, physicians and scientists were simultaneously discovering the extraordinary powers of the imagination to influence physical states of being. In short, Cagliostro, like other contemporary mesmerists and practitioners of spectacular natural philosophy, chanced on the potent psychic powers of suggestion, both for practitioner and patient alike.

³⁶ Berberi, *Life of Joseph Balsamo*, 9-12.

³⁷ Carlyle, 'Count Cagliostro', 55, 295-318.

³⁸ J W Donohue, *Dramatic character in the English Romantic Age* (New Haven, 1970), 189-280.

Cagliostro undoubtedly knew that his patent wine of Egypt, beauty balms, and elaborate rejuvenation regime were bogus; Rey de Morande, one of his most ardent disciples, was shattered to discover his chemical duplicities as late as 1787.³⁹ But the Cophte had also seen that these same spurious nostrums sometimes worked. His reputation and riches were built on some astounding practical results: he healed the Prince Soubise when qualified doctors had abandoned hope and he somehow made the banker Sarazin's wife fertile after years of despairing barrenness. Like other successful mesmerists, Cagliostro came to realise something of his own magnetism, especially as conveyed through the power of the gaze. The otherwise sceptical Madame d'Oberkirch described his eyes as a mixture of 'flame and ice'.⁴⁰ He was quick to discern, too, that children made especially suggestible subjects: use of pre-pubescent *pupilles* or *colombes* in his spiritualist *séances* became a Cagliostro trademark. Seraphina told the Inquisition that on occasion these children had contacted the spirits without prior contrivance, something which she could only explain by her husband's satanic powers.⁴¹

Eyewitness accounts of his Masonic ceremonies also observed his artistry as a theatrical director, choreographer, and creator of special effects. Even his opaque and incoherent masonic oratory showed a keen insight into the psychology of audience reception: the Inquisition conceded that the obscurity of Cagliostro's masonic rhetoric had the paradoxical effect of stimulating the interpretative creativity of his listeners. It was they who imposed meaning on his unintelligibility.⁴² Other critics were equally puzzled by the changes that appeared to come over his behaviour when he took on the persona of Cagliostro. Abbé Georgel conceded that wherever he travelled Cagliostro devoted immense time and energy to healing the poor without payment. The Inquisition interrogators were likewise puzzled and irritated by his stubbornly resolute defence of the ethical ideals of his Egyptian Rite movement. Berberi reported that 'he did not fail of being still faithful to his character, and true

³⁹ Photiades, *Count Cagliostro*, 225.

⁴⁰ Trowbridge, *Cagliostro*, 202.

⁴¹ Berberi, *Life of Joseph Balsamo*, 194

⁴² *Ibid.*, 63-4, 186, 191.

to his attachment to whatever was *marvellous*.⁴³ Although the con man Balsamo might initially have contrived his masonic identity in a cynical spirit, the lofty utopian ideals that went with it seem to have imposed new thresholds of shame on him. By acting as an altruistic healer of the poor, he perhaps came genuinely to believe in his own regenerative talent and mission. Thomas Mann's literary confidence man Felix Krull finds himself identically trapped and ennobled by his assumed persona.⁴⁴

III

With hindsight we can see that the process of metamorphosis from Sicilian petty criminal to Grande Cophte pushed Cagliostro into a trajectory that anticipated or paralleled that of the earliest Romantics. Quacks were proto-moderns who had always, as Carlyle pointed out, to work 'in the infinitude of the Unknown': their key medium was wonder.⁴⁵ Cagliostro excelled in the world of the workshop and the fancy bazaar - that barrage of metropolitan sense impressions and spectacular showmanship which so troubled Wordsworth in 'The Prelude'.⁴⁶ The Cophte and his ilk were drawn to bricolage and the blurring of categories. They were skilled in social camouflage and the construction of multiple identities, in self-advertisement and consumer persuasion, and they operated usually in a liminal half-world between the polite and the popular.⁴⁷ Cagliostro's explorations of Oriental mythology and Hebraic primitivism, of psychic interiority and human irrationality, of the pliability and polysemy of the self, and of imaginative symbolism and suggestibility: all these gestured towards Romanticism (and even the postmodern). His mission to regenerate mankind through

⁴³ Ibid., 97

⁴⁴ Thomas Mann, *Confessions of Felix Krull confidence man*, (London, 1997), esp. 84-115.

⁴⁵ Carlyle, 'Count Cagliostro', 296.

⁴⁶ William Wordsworth, *The Prelude (text of 1805)* (Oxford, 1970), book VII, 108-24. On London's show and spectacle milieu, see Richard Altick, *The shows of London* (Camb., Mass., and London, 1978), esp. chs 2-16.

⁴⁷ For the best study of the psychology and social character of the charlatan, see Francesco, *The power of the charlatan*.

mobilizing occult, erotic, and holistic energies aligned him closely with a contemporary Romantic artist like William Blake.

Romanticism's debt to Cagliostro proved greater in death than in life. Involvement in the French Revolution and Inquisition repression ensured his literary immortality both as an occult villain and an underground hero.⁴⁸ In each role his life seemed to exemplify key tropes of Romanticism. By becoming an alchemical magus, an *ancien régime* victim, a revolutionary prophet, and a credible embodiment of the legendary Wandering Jew, Cagliostro both vitalized the Ahasuerus myth and shifted its reigning depiction in a decisively Romantic direction. Didactically Enlightenment versions of the Jew as historian, world traveller, and natural philosopher took on, in Cagliostro's reconstruction, a more mysteriously Oriental, magical, and prophetic cast.⁴⁹ And when Abbé Barruel provided the French Revolution with its chief conspiracy theory based on the machinations of masonic Illuminati, Cagliostro's career became part of the evidence. He was also rapidly absorbed into the demonology of British anti-Jacobin fiction. Modern critics seem not to have noticed that a flood of conservative British gothic, similar to Germany's *Sturm und Drang* fiction, paved the way for British Romanticism. The shadowy Cophte proved perfect for the role of a revolutionary and libertine magus. Such considerable, if dissimilar, talents as Maria Edgeworth and Charlotte Dacre experimented with Cagliostroan mystic figures.⁵⁰ Turncoat Robert Southey identified occult enthusiasm as Britain's revolutionary threat. His 'Curse of Kehama' (1810), Coleridge's glittering-eyed 'Ancient Mariner' (1798), and Wordsworth's wistful 'Song for the Wandering Jew' (1800) incorporated tormented Cophte figures into the emerging Romantic repertoire. But Cagliostro's apotheosis as a figure of romantic terror came in the opening year of the Victorian era with his

⁴⁸ See, Antoine Faivre, ed., *La Franc-Maçonnerie Templière et Occultiste au XVIIIe et XIXe siècles* (Paris, 1970).

⁴⁹ Anderson, *Legend of the Wandering Jew*, esp. 128-31, 148-90; Stableford, ed., *Tales of the Wandering Jew*, 6-7.

⁵⁰ M O Grenby, "'The Anti-Jacobin Novel: British Conservatism and the Literary Response to the French Revolution'", Edinburgh University, Phd thesis, Edinburgh University, nd.[1996]?, esp.222ff. and Appendix, 309ff.

prophetic role in Thomas Carlyle's history, *The French Revolution*. Here the 'Grand Cophte' was made to stand for the whole restless, meretricious spirit of revolutionary modernity.⁵¹

His impact was hardly less at the other end of the politico-literary spectrum. For a time after their partnership de Louthembourg stopped painting altogether in order to run a Cagliostrean healing clinic for the London poor.⁵² Consequent riots ended that phase, but his discipleship bore fruit in a series of powerful spiritualist paintings of the late 80s. Works like 'The Opening of the Second Seal' (c.1788) and 'The Deluge' (1789) helped bring into being a new Romantic genre of the apocalyptic sublime which reached its zenith with the epic works of John Martin and J M W Turner.⁵³ A line may also be traced back from the latter through artist John Varley to the circles of Swedenborgian artists and seekers whom Cagliostro had courted in 1786-7. Blake and Sharp in London and their literary friends, 'Hurricane' Gilbert and George Cumberland in Bristol,⁵⁴ produced engravings, poems, and novels which celebrated Cagliostro as an occult hero. Shelley's encounter with Christian Schubart's *Der ewige Jude* and perverse reading of Barruel inspired him to write a sequence of poems which transformed the Hebrew-Oriental wanderer into a defiant resister of spiritual and political tyranny:

Thus have I stood, - through a wild waste of years
Struggling with whirlwinds of mad agony,
Yet peaceful, and serene, and self-enshrined,
Mocking my powerless Tyrant's horrible curse

⁵¹ Thomas Carlyle, *The French Revolution* (1837, Oxford and New York repr., 1989), esp. 'Finis', 451-3.

⁵² Mary Pratt, *A list of a few cures performed by Mr and Mrs de Louthembourg at Hammersmith Terrace, without medicine. By a lover of the Lamb of God*, (London, 1789).

⁵³ Paley, *Apocalyptic sublime*, esp. chs. 1, 3, 5-6; see also, Iain McCalman, 'Mystagogues of Revolution: Cagliostro, de Louthembourg and Romantic London', in *Romantic metropolis*, eds. James Chandler and Kevin Gilmartin (Cambridge, forthcoming).

⁵⁴ George Cumberland not only visited Cagliostro when he was imprisoned by the Inquisition in Rome, but also collected a number of his works which are now held in the Rare Book Room of the Australian National University Library, Canberra.

With stubborn and unalterable will.⁵⁵

Mary Shelley used fragments of both Cagliostro and the Wandering Jew when assembling her doomed scientist, Frankenstein, and his tormented monster. And her ultra-rationalist father, William Godwin, revealed a fascination with the legend and Cagliostro's brilliant career by writing *St Leon* (1799), a fictional exploration of the alchemical dream which showed the imagination as capable of generating uncanny physical and psychic effects.

By the mid nineteenth century the process of convergence between the life of the Grand Cophte and the ancient legend on which he had based his impersonated identity was complete. By then Cagliostro had ceased to be an underground Romantic rebel and had become an object of nostalgic romance. Commercially-minded popular writers on both sides of the channel were resuscitating, amplifying and merging his fantastic story with that of the occult legend he had so brilliantly mobilized. Caroline Norton's *The undying one* (1830), Bulwer Lytton's *Zanoni* (1844), Eugene Sue's *Le juif errant* (1844-5) and Alexander Dumas' *Joseph Balsamo. Memoirs of a physician* (1846-8) carried the mysterious story of the Grand Cophte and Seraphina to new audiences which continue to this day. Though Dumas managed to write only two novels of a planned thirty volume Cagliostrean saga, he compared the Sicilian con man with the greatest Romantic of all: 'I come from the East', declaimed his Balsamo, 'led, like the shepherds by a star, which foretells a second regeneration of mankind. Tomorrow I begin my work.... I ask twenty years to destroy an old world, and make a new one....'⁵⁶

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⁵⁵ Percy Bysshe Shelley, 'Queen Mab, a philosophical poem with notes', *Shelley's poetical works*, ed., Thomas Hutchinson (London, Oxford and New York, 1970), 791-2.

⁵⁶ Alexandre Dumas the Elder, *Joseph Balsamo (The memoirs of a physician)*, (1846-8, London and Glasgow, nd.), 36-7.

'IN THE GLASS OF HISTORY': THE NATURE AND PURPOSE OF HISTORICAL KNOWLEDGE IN THE THOUGHT OF JOSEPH PRIESTLEY.

*Martin Fitzpatrick**

Joseph Priestley was a historian before he became a practising scientist. Indeed, his scientific career began rather late, and its success and enormous creativity owe more to the nature of Priestley's genius than to a deliberate attempt to carve out a career as a scientist. He saw his work in natural philosophy as intimately related to his work in metaphysics and theology. Whereas the trend in the Enlightenment was towards the developments of separate disciplines, usually involving their professionalisation, Priestley's various activities were all part of a singular endeavour to understand the workings of God. We have quite rightly been reminded that 'Priestley the scientist ought not be considered without consideration of Priestley the theologian,' and that our understanding Priestley as a scientist is dependent on this.¹ Priestley himself believed that he held a completely coherent view of the world, yet he left us with a difficult task of reconstruction. The reasons are at least twofold. One is that Priestley the scientist, unlike Priestley the theologian, made theoretical assumptions which are rarely spelled out. The other is that the consequences of the Newtonian revolution were still being felt and worked out. Christianity, obviously, was pre-Newtonian and so too was its attitude towards time and space. The language of theology was that of the closed, finite universe. The reappraisal of ideas about the universe created immense difficulties for those who wished to be progressive in their natural philosophy *and* theology. Not least of the problems was how to adjust notions of theological and historical time. Priestley's theology was premised on the possibility of recovering the true nature of early Christianity; if we need to understand Priestley the theologian to understand Priestley

* I am grateful to Dr. Mark Philp for his constructive comments on an earlier version of this paper.

¹ Robert E Schofield, 'Joseph Priestley. Theology, physics and metaphysics', *Enlightenment and Dissent*, no.2 (1983), 69-81 at 71.

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the scientist, we must also understand the nature of Priestley's commitment to the historical endeavour in order to understand Priestley as a theologian. In what follows I shall try to understand the ways in which Priestley understood the past, and how they fitted into his mission to provide a new but unified view of God's world, and historic Christianity.

* * * * *

The first thing to note is that right to the end of his life Priestley remained committed to a belief in both general and particular providence and this was linked with a belief in the coming millennium. The second is that the language in which this was couched often seemed like that of a secular believer in indefinite progress and in perfectibility. For instance he wrote, late in his life,

...as appearances in nature, and in the structure of the world, furnish an unquestionable proof of a wise and benevolent author, the present imperfect state of virtue and happiness does, as such, afford some evidence that this *is* the infant state of our being; and is therefore an argument, and a promise, as we may say, of future good.²

This might appear to suggest that it is natural knowledge which fortifies his religious optimism. Historical knowledge on the other hand has the potential to undermine that optimism, for it provides plentiful evidence of the limitations of both man and nature:

If we be asked why the wise and benevolent author of nature permitted the rise and long continuance of the most absurd and abominable systems of polytheism and idolatry to prevail so long in the world, or why he should suffer so much vice and misery to exist in it at present; why mankind should be afflicted with war, pestilence, and famine, and be subject to such distressful accidents as lightning, hurricanes, and earthquakes, we can only say with Abraham of old, (Gen. xviii. 25) that the *maker and judge of the earth will do what is right*; and therefore that all these evils, repugnant as they seem to our ideas of benevolence, may hereafter appear

² J Priestley, *Socrates and Jesus Compared* (London, 1803), 32.

to have been the best methods of promoting general and lasting happiness.³

Conversely, historians could not always account for the way good occurred in the world. Priestley argued that not even Gibbon had been able to explain satisfactorily why Christianity spread so rapidly in the Roman Empire.⁴ As Gibbon himself argued, with a certain self-protection in mind, historians were limited to explaining the secondary causes of events.⁵ Priestley believed that, historians and philosophers were hampered by their adherence to the view that 'no effect is produced without an adequate cause'.⁶ For him, it required Christian faith and understanding to interpret the course of history. Why then does history loom so large in his works?

At one level the answer to this can be found clearly enough; Priestley himself explained the importance and values of historical understanding in his *Lectures on history and general policy*.⁷

³ Ibid., 31-2.

⁴ Ibid., 57-8; *An history of the corruptions of Christianity* (2 vols., London, 1782, Garland repr., 1974), II, 443-66.

⁵ Gibbon had, at the opening of his famous fifteenth chapter, made clear his desire to free his history from providential explanations and to account for the 'rapid growth of the Christian church' in secular terms. *The history of the decline and fall of the Roman Empire* (9 vols., 1776-87, new edn., London, 1808), II, 103-4.

⁶ *History of the corruptions of Christianity*, II, 443.

⁷ The syllabus of these lectures which he gave at the Warrington Academy was published in 1765, but the lectures themselves, no doubt including Priestley's maturer reflections on the history, were not published until 1788. In a letter to Theophilus Lindsey in late 1770, Priestley refers to taking his advice against publishing his 'Lectures'. However, it is unclear what these lectures were; Priestley talks of resuming them in the summer, and of wanting to have them printed for the use of his 'class', and even of publishing them anonymously. His only publication with 'lectures' in the title is his *Lectures on history and general policy* but at Warrington he also gave lectures on English history and English law. Robert E Schofield ed., *A scientific autobiography of Joseph Priestley, 1733-1804. Selected scientific correspondence, with commentary* (Cambridge, Mass., and London, 1966), 82-3, Priestley to Lindsey, 23 Dec. 1770; Robert E Schofield, *The Enlightenment of Joseph*

Without historical knowledge progress in the past must have been very slow, for it provided the only means by which one age could learn from another:

It was requisite ... in order to the improvement of human kind, and of human conduct, and to give mankind clear and comprehensive views of their interest, together with the means of promoting it, that the experience of some ages should be collected and compared, that distant events should be brought together; and so the first rise, entire progress, and final conclusion, of schemes, transactions, should be seen, as it were, in one unbroken view, with all their connexions and relations....

... without history, the advantages of our rational nature must have been rated very low; and the more complete, the more exact, and comprehensive is our furniture of historical facts, the more materials of knowledge, and consequently of *power* and *happiness*, are we possessed of. For Lord Bacon has justly remarked, that "knowledge is power;"...⁸

Historical knowledge was crucial for the pursuit of natural knowledge. In part, this was function of its role as a means of bringing scientists up to date, empowering them in that sense. In his *Proposals for printing by subscription, the histories and present state of discoveries relating to vision, light and colours*, 1 Feb. 1771, Priestley wrote of the advantages of the historical method.

The historical method, adopted in this work, has many obvious advantages over other, being particularly calculated to engage the attention of the reader, and communicate useful knowledge with the greatest ease, pleasure and certainty; and the subject of the present volume, which will contain the discoveries that relate to *vision, light, and colours*, will, perhaps, be as generally entertaining as any thing within the compass of philosophy.

Priestley. A study of his life and work from 1733 to 1770 (University Park, Pennsylvania, 1998), 126-7.

⁸ *Lectures on history and general policy; to which is prefixed, an essay on a course of liberal education for civil and active life* (2 vols., London, 1793), I, lect I, 52-3.

This was something more than appealing to an audience of the polite, cultivated gentlemanly amateurs, although he offered the assurance to potential subscribers that he would make every effort to make the mathematics 'perfectly intelligible' and the narrative 'pleasing and interesting'. His more serious intent was indicated by his statement that he aimed

to bring into a moderate compass, and to digest into an easy method, an account of every real improvement or discovery in science, in such a manner as shall enable the philosophers of the present age to resume, and pursue the inquiries of their predecessors, to the greatest advantage.⁹

Indeed it was to Priestley's own advantage, for writing the histories played a key role in his own scientific education. As Frederick Gibbs noted, his project for a history of experimental philosophy preceded his own original contributions. For Priestley it was the ideal method for teaching himself. Establishing the facts and letting them speak for themselves was a familiar if rather old-fashioned approach to historical knowledge in the eighteenth century, but in the hands of Priestley it was more than a historical method, and much more significant than a utilitarian short-cut to knowledge; for him, the process of uncovering and making sense of what one knows and of extending current knowledge were inextricably related. It was a natural process of 'unfolding' the laws of nature and of the naming and arranging of knowledge as it merged to view.¹⁰ Equally it was related to a sense of future progress. Thus Priestley, who had a real sense of civil society, and the knowledge it possessed, being in its infancy - a view confirmed by his own success in researching and writing the history of some of the key areas of natural knowledge in a relatively short space of time - became deeply wedded to the idea of being self-taught, and of ranging freely through the natural sciences.

⁹ Schofield ed., *A scientific autobiography of Joseph Priestley*, 75-79.

¹⁰ Priestley writing in 1786, cit., without attribution of location, by F W Gibbs, *Joseph Priestley* (London, 1965), 168. For the importance of 'facts' in Priestley's natural philosophy, see John G McEvoy, 'Enlightenment and Dissent in Science: Joseph Priestley and the limits of Theoretical reasoning', *Enlightenment and Dissent*, 2 (1983), 69-82.

But it carried with it problems and difficulties. Bishop Burnet in his *History of my own time*, had portrayed his task as 'to lay open the good and the bad of all sides and parties'.¹¹ The pretence was objectivity, but at least in conventional historical writing the interpretative approach of the writer was relatively difficult to conceal. Reading Burnet, it soon becomes obvious that he was a staunch Whig. This is much less so of natural knowledge. Priestley with his free ranging investigations seemed to be laying eggs in a totally disorganised way. No wonder some thought that there was no pattern to his thought at all. The historian of late eighteenth-century science, Lord Brougham, citing Priestley's collaborator, James Watt, described Priestley's experimental approach as 'random haphazarding'.¹² Priestley contributed to such a view by 'expressed disdain for theory' and his preoccupation with 'facts'. Thus while more recent commentators have been anxious to find a method and theory in his apparent dabbings, they have been plagued by the difficulties of the enterprise, for Priestley, in the accord with the tradition of eighteenth-century Baconianism, is never explicit about his theoretical assumptions.¹³

Unhelpful as Priestley is to his interpreters, his science is not derived from a naive factual antiquarianism and/or experimentalism. As Robert Schofield has noted, his 'disdain for theory' does not mean that 'he had no theory'.¹⁴ Moreover, his Baconianism was not idiosyncratic. Indeed, it belonged to a conceptual scheme with deep roots. These have been examined by A C Crombie in his *Styles of scientific thinking in the European tradition*. Priestley may have been surprised to find himself not only in the company of Lucretius but also of St. Augustine of the

¹¹ Osmund Airy ed., *Burnet's History of my own time* (2 vols., 1724 & 1734, new edn., Oxford, 1897), I, pref., xxxii.

¹² Henry, Lord Brougham, *Lives of philosophers of the time of George III* (London and Glasgow, 1855), 80.

¹³ Schofield ed., *A scientific autobiography of Joseph Priestley*, 133-4. The best guide to the various readings of Priestley's theoretical concerns can be found in several papers in A. Truman Schwartz & John G McEvoy eds., *Motion toward perfection the achievement of Joseph Priestley* (Boston, 1990).

¹⁴ Schofield ed., *A scientific autobiography of Joseph Priestley*, 134.

De Trinitate. They were interested in creation as a natural process, in the evidence of unity in diversity, of the co-operation between reason and necessity in the development of the world. It was an approach which would greatly appeal to Priestley. His belief in a purposive universe, in the participation of God in the workings of nature, led him to adopt this sort of approach. Described by Crombie as the 'genetic method or method of historical derivation', for its Greek exponents the method depended on 'the antecedent belief that the causal historical process of nature and mankind in which the past could be inferred from observations of present regularities, and the present could likewise be explained as a development of that past brought about by natural law.' In early modern hands, he argues, the approach integrated the 'two distinct aspects of the method of historical derivation: the diagnostic or descriptive and the demonstrative or causal'. The aim was to understand the causes of change, of progress and regress, and especially of diversification, whether of organisms, societies or mentalities. 'The twofold process of reasoning was then, first the diagnosis from common characteristics of a common source [in which historical evidence could be deployed], followed by the postulation of causes to account for diversification from that source.'¹⁵

These aspects can be found in Priestley's historical work. In describing the attraction of the history of science for Priestley, Gibbs points to the multi-faceted yet integrated nature of this genetic method, though he does not describe it as such. By combining natural history, the study of the uniformity and diversity of nature, and human history, evidence for the working of divine providence, it was able to show 'the powers of Nature being discovered and directed by human skill' in a positive and pleasing light, for the focus was upon improvement and progress.¹⁶

The inspiration for Priestley was undoubtedly Bacon as it was for so many enlightened thinkers. He followed Bacon in stressing

¹² A C Crombie, *Styles of thinking in the European Tradition. The History of argument and explanation in the mathematical and biomedical sciences and the arts* (3 vols., London, 1994), III, 1553-6; it should be noted that this is a bald summary of a rich argument.

¹⁶ Gibbs, *Priestley*, 24-5.

that the knowledge gained from recovering the true history of nature and mankind would not give man Faustian powers rather it would restore true science and morality. It would show that truth and utility were one and the same thing, and that reason and revelation were in harmony.¹⁷ In this wonderful world, the true end of knowledge was 'for the glory of the Creator; and the relief of man's estate'.¹⁸ Such a view would be re-iterated in many of Priestley's works. Indeed he was anxious to remind his readers that the pursuit of science without a view to these more exalted ends was potentially corrupting.¹⁹ He was also concerned to stress that he made no distinction between the pursuit of natural knowledge and other forms of knowledge, for the underlying purpose was the same. He refused to listen to critics and well-meaning friends who wanted him to stick to science. He could write that natural philosophy and theology together 'make us understand the great system of nature'.²⁰ He therefore stood out against the contemporary trend for science to become a self-contained, self-sustaining activity. He was equally hostile to misappropriation of theology for secular purposes, being deeply critical of modern variants of millennialism which were not properly founded in scripture, and a genuine understanding of historical Christianity. When Volney presented a picture of the world regenerated by reason in his *Les ruines ou méditations sur les révolutions des empires*, Priestley was sharply hostile to (and fearful of) this militant attack on Christianity, which was portrayed as an 'allegorical worship of the sun'.²¹ In response, Priestley reasserted the factual historical basis

¹⁷ Crombie, *Styles of thinking in the European Tradition*, III, 1583-6.

¹⁸ Bacon, *Advancement of learning* (1605), i (Works, iii), 294., cit Crombie, III, 1583.

¹⁹ Priestley followed Hartley in recommending that 'we must make frequent intervals and interruptions; else the study of science, without a view to God and our duty, and from a vain desire of applause, will get possession of our hearts'. *The history and present state of electricity, with original experiments* (London, 1767), xx-xxii.

²⁰ *Experiments and observations relating to various branches of natural philosophy* (Birmingham, 1786), preface, v-xxiii, cit Gerald M. Moser, *Seven Essays on Joseph Priestley* (State College, Pennsylvania, 1994), 45.

of Christianity, and his belief that Volney's project for the transformation of government and society through enlightenment was flawed for the spirit of infidelity and the pursuit of science were antithetical.²² Yet, as noted, the pursuit of science could itself lead one astray. It was history, and the historical method which alone could provide the true basis for optimism.

Historical basis of optimism:

It has been noted that there is something rather paradoxical about the optimism and reformism of Priestley given that it rests on the notion that we are 'the passive product of circumstance'.²³ Recently, Peter Miller has suggested that Priestley's determinism diminishes the significance of human action.²⁴ Erwin Hiebert also

²¹ Volney attacked the special claims to inspiration and infallibility of all religions, showing both the common elements in different religions and explaining their difference in terms of circumstance, geography and personality. See C F Volney, *The ruins or, meditations of the revolutions of empires: and the law of nature ...* (1793, trans C F Volney & Joel Barlow, Paris, 1802, repr New York 1990), 111.

²² *Ibid.*, 153-162. See, Brian Rigby, 'Volney's Rational Apocalypse, *Les Ruines ou Méditations sur les Révolutions des Empires*,' in Francis Baker, Jay Bernstein, Peter Hulme, Margaret Iversen, Jennifer Stone eds, *1789: Reading, writing, revolution* (University of Essex, 1982), 26-29. Priestley had taken this position earlier in his *The institutes of natural and revealed religion* (1772-74, 2nd edn. 1782), in J T Rutt ed., *The theological and miscellaneous works of Joseph Priestley* (25 vols., 1817-1831), II, 68, and in his *Letters to a philosophical unbeliever, Part One* (1780, Rutt, IV, Garland, repr., 1983), 317-21. He repeated them in his *Letters to Mr. Volney, occasioned by a work of his entitled ruins, and by his letter to the author* (Philadelphia, 1797), 10-11, cit. C Garrett, 'Joseph Priestley, the Millennium and the French Revolution', *Journal of the History of Ideas*, xxxiv, no.1 (Jan-Mar, 1973), 55. Volney, like Priestley was an exile in America, but was deported under the Aliens Bill of 1798, which was designed against him, and which also temporarily threatened Priestley's domicile in America.

²³ Isaac Kramnick, *Republicanism and bourgeois ideology. Political ideology in late eighteenth-century England and America* (Ithaca and London, 1990), 85.

²⁴ Peter N Miller ed., *Joseph Priestley, political writings* (Cambridge, 1993), xvi: argues that once Priestley became a materialist and determinist

was puzzled by Priestley's 'argument that attempts to correlate causality and Necessarianism'.²⁵ The puzzle occurs in the way that, on the one hand Priestley makes it clear that we are not self-determining agents; we are all subject to the same laws of nature:

I apprehend that proof enough is advanced that every human volition is subject to certain fixed laws, and that the pretended *self-determining* power is altogether imaginary and impossible.²⁶

On the other, that the future lies in our own hands:

the Necessarian believes that his own dispositions and actions are the necessary and sole means of his present and future happiness; so that in the most proper sense of the words, it depends entirely upon *himself* whether he be virtuous or vicious, happy or miserable, just as much as it depends upon the farmer himself sowing his fields and weeding them, whether he will have a good crop; except that in favour of the doctrine of necessity where *morals* are concerned, his endeavours in the former case are much more certain in their effect than the latter: which view of things cannot but operate to make him exert himself to the utmost in proportion to his regard for his own happiness, his success being certain in proportion to his exertion of himself. With this exertion he cannot miscarry, but without it he must, unless the laws of nature should change, be inevitably

under the influence of Hartley, he 'could no longer campaign for philosophical or intellectual liberty on the grounds of its correlation with actual human liberty. Liberty could be advocated only as part of a project to bring about the perfection of God's world, one in which the fulfilment of the divine plan, rather than human action, was important.' See the discussion by Mark Philp of necessarianism and perfectibility in which he explains their inter-relationship and shows how essential intellectual liberty was to such notions both for the theistic Priestley and the secularly minded Godwin: *Godwin's Political Justice* (London, 1986), 89-95.

²⁵ Erwin N Hiebert, 'The Integration of Revealed Religion and Scientific Materialism in the Thought of Joseph Priestley', in Lester Kieft and Bennett R Willeford Jr. eds, *Joseph Priestley, scientist, theologian, and metaphysician* (Lewisburg and London, 1980), 42.

²⁶ *Disquisitions relating to matter and spirit* (1777, revis. and enl. 1782), Rutt, III, 220, cit Hiebert, loc. cit, 38.

miserable. As far as any system of faith can induce men to cultivate virtuous principles and habits, this doctrine of necessity must do it.²⁷

Philosophically, there are ways round this problem. Priestley himself found it difficult to see the problem as Price found in his public debate with him published as *A free discussion of the doctrines of materialism, and philosophical necessity* (1778).²⁸ In

²⁷ *The doctrine of philosophical necessity illustrated* (1777), Rutt, III, 534-5, cit. Hiebert, loc. cit., 42-43.

²⁸ J. Priestley, *A free discussion of the doctrines of materialism, and philosophical necessity, in a correspondence between Dr. Price and Dr. Priestley...* (London, 1778, Garland repr. 1978), 158-161. Price was worried by Priestley's belief that even acts of wickedness could be seen as part of the providential plan. He asked him whether he could 'believe easily that in all those crimes which men charge *themselves* with, and reproach *themselves* for, God is the agent; and that (speaking philosophically) *they*, in such instances, are no more *agents*, than a sword is an agent when employed to commit murder? Priestley's response was that 'It does require *strength of mind* not to startle at such a conclusion; but then it requires nothing but strength of mind'. This is not all of Priestley's answer, for in his *Illustrations of some particulars in the Disquisitions on matter and spirit*, (appended to the *Free discussion*), 296-313, 312-313, he accepted that those who understood fully the doctrine of necessity will understand 'that strictly speaking, *nothing goes wrong*' and therefore for such cognoscenti there would be no need for 'repentance, confession or pardon', but this was given to the very few. Those who could fully understand their conduct in the great scheme of things had achieved such a harmony between God's intentions and their own behaviour that they had achieved perfection, and so union with God's will, and would dwell in His love. Only associationism could make this coherent, because it embodies within it a doctrine of personal progress. In that way the achievement of higher degrees of perfection will be associated with the increasingly consistent understanding that this world is God's world and that we are fulfilling His Will. We need to be strong minded in the sense that the great majority of us have an inadequate understanding of God's will, and our associations still give rise to feelings 'of shame, remorse, and repentance'. We need strength of mind to be necessarians because we do find it difficult to believe that 'our evil dispositions come from God, as well as our good ones, and that all things that exist, ultimately considered, equally promote the divine purposes'.

response to Price's charge that necessarianism relieved men of the responsibility for their own actions, Priestley declared that,

To me it seems sufficient, that men be *voluntary agents*, or that motives, such as hopes and fears, can influence them in a certain and mechanical manner, to make it in the highest degree *right*, and *wise* in the Divine Being to lay such motives before them, and consequently to place them in a state of moral discipline, or a state in which rewards and punishments are distributed, so as to correspond to certain characters and actions. By this means, and by this means only, can his great object, the happiness of his intelligent offspring, be secured.

He went on,

No necessarian denies that, in a sufficiently proper sense, men have a power over their own actions, so that they can do what they please; and that without this power they could not be accountable beings, or the proper subject of rewards or punishments'.²⁹

James Dybikowski has recently argued, in a review of Miller's edition of Priestley, that Priestley's account like that of Anthony Collins, whose *Philosophical Enquiry Concurring Human Liberty* first convinced Priestley of necessarianism, is *compatibilist*, that is, it accepts that 'to be free is not to be exempt from necessity, but

Even 'after we are convinced that God is really and truly the author of *all things*, without distinction, we shall ascribe evil to him only in an unsteady and confused manner...'

²⁹ *A free discussion of the doctrines of materialism and philosophical necessity*, xx-xxi, xxiv-xxv. Price's reservations about the effect of Priestley's Unitarian metaphysics were expressed in a letter to Lord Monboddo in which he considered Priestley's 'system as most dangerous in its tendency'. W B Peach and D O Thomas, eds., *The Correspondence of Richard Price* (3 vols., Cardiff and Durham, N.C., 1983-1994), vol. 2: *March 1778 - February 1786*, D O Thomas ed., (1991), 87, Price to Lord Monboddo, 11 Dec. 1780. Priestley on the other hand believed that the consequence of the doctrine of philosophical liberty was that it led to the notion that men could act without motive: 'exactly in the degree in which we suppose the mind *not* to be determined by motives, in that very degree do rewards and punishments lose their effect, and a man ceases to be a proper subject of moral discipline': *A free discussion...*, xxi.

only to have the power to act as one pleases, unconstrained by external impediment.³⁰ This enables one to understand Priestley's emphasis on civil and political liberty, and his general emphasis on the role of liberty in bringing about progress. In that sense, Robert Nisbet is right to see his historical vision as a key feature of his view of progress 'as freedom'.³¹ But since we are trying to understand Priestley's view of the way change occurs through history, there are two further points to make about necessarianism, namely that if we are not our own self-directed agents for doing good, we are God's instruments. Thus in talking about the need for the repeal of the Test and Corporation Acts, Priestley says, 'It is a great work which needs to be done' and continues, not by asserting that the Dissenters will effect that reform through their own actions, rather, he continues, 'and Divine Providence, which we see is gradually reforming abuses, and bringing good out of all evil, will be at no loss in finding proper instruments for the purpose'.³² Furthermore, the more knowledge we have, the more we begin to act as if we are self-directing, self-motivating agents. We also have the greater prospect of self-improvement. We might therefore say that through knowledge we act in a more purposeful way as God's agents.³³

³⁰ J. Dybikowski, review of Peter N Miller ed., *Joseph Priestley: political writings*, in *Enlightenment and Dissent*, no. 15 (1996), 117-127, at 123.

³¹ Robert Nisbet, *History of the idea of progress* (London, 1980), 200-201.

³² *Letter to Mr. Pitt* (1787), Rutt, XIX, 129. Priestley, of course, had no doubt that the Dissenters were acting as God's instruments in campaigning for repeal.

³³ *An examination of Dr. Reid's inquiry into the human mind on the principles of common sense...* (London, 1774), lii-liii: 'when the different impressions nearly balance one another, the ideas, or motions of the brain, interfering with and checking one another, some sensible space of time intervenes before the final determination to pursue any particular object, or to use any particular method of gaining the object takes place. To this state of mind, when we observe it, we give the name of *deliberation*, and to the determination itself, that of *will*. But still that motion, or connected train of motions, will take place which is the most intimately connected

Seen in this way, necessarianism did not diminish the significance of human action, nor the importance of human responsibility. In contrasting necessarianism with Calvinism, Priestley asserted that although the two schemes agreed 'that the future happiness or misery of all men is certainly fore-known and appointed by God', they differed profoundly in the way that end was accomplished for the Calvinist was the passive recipient of God's will, the necessarian was an active agent in its accomplishment, and so necessarianism unlike Calvinism was conducive to virtue.³⁴ One is reminded here, of his curt dismissal of the doctrine of passive obedience in his *Essay on the first principles of government* in which he asserted that one should not be discouraged from acting to procure reform on the ground that 'The powers which be are ordained of God', for what man effects through his own efforts is ultimately willed by God. Thus 'the powers which will be' will also be ordained of God.³⁵

with, and dependent upon the state of mind, or impressions, immediately previous to it.'

It will readily be concluded from this that the more extensive are the intellectual powers, that is, the greater is the number of ideas, and consequently their association, the oftener will this case of *deliberation*, or *suspence*, occur. Brutes are seldom at loss what to do, and children seldom; so that to explain their actions we have hardly any occasion for the use of the terms, *deliberation*, *volition*, or *will*; the ideas of every pleasurable and painful object being immediately followed by one particular definite action, proper to secure the one and avoid the other; the tendencies to other actions having never interfered to check and retard it. Now it can only be during this state of deliberation, and suspence, that we have the opportunity of perceiving, and attending to what passes within our own minds; so that a considerable *compass of intellect*, a large stock of ideas and much experience, are necessary to this reflection, and the knowledge that is gained by it.'

³⁴ *The doctrine of philosophical necessity illustrated* (1777), Rutt, III, 534-5, cit Hiebert, loc. cit., 42-3. In his *An examination of Dr. Reid's inquiry*, pref. xv, Priestley argues that Arminianism is consonant with necessity.

³⁵ *An essay on the first principles of government* (1768, 2nd edn, London 1771), 27.

So we might say that for Priestley not only were free-will and necessity compatible but that through the growth of knowledge man himself learns to act in a more purposeful way as God's agent. Such a view can be confirmed by Priestley account of earlier less enlightened ages. In his *An essay on a course of liberal education for civil and active life* (1764), he contrasted the situation at the beginning of the early modern period when 'none but the clergy were thought to have any occasion for learning' and, in consequence, progress was 'very slow', the result of 'accidental concurrence of circumstances' rather than of 'human wisdom or foresight' and men were 'passive and blind instruments of their own felicity', with the situation in his own time when statesmen were informed about the world around them, and the sources of wealth, power and the felicity of nations much more understood. It so happened that Priestley was not satisfied with the level and nature of education for those intending to engage in a civil and active life, but the contrast between man being ignorant and a passive subject of providence, and modern man who is knowledgeable and who shapes his future is clear enough.³⁶

Some further insight, though perhaps not that which we would hope for, into Priestley's attitude towards human instrumentality can be gained by his philosophical analysis of truth.

Truth

Priestley categorises truths into universal propositions proved through induction from 'particular facts', or by analogy, and truths which are self-evident or rationally demonstrable.

Priestley's view of induction is Humean in that it depends on the observation of regularities rather than upon a notion of cause and effect.³⁷ All those things we experience are indicative of God's order and will in the world, and do not depend upon a common

³⁶ The *Essay* is prefixed to *Lectures on history and general policy*, I, 2-4.

³⁷ See Richard H Popkin, 'Joseph Priestley's Criticisms of David Hume's Philosophy', in his *The high road to pyrrhonism*, ed. Richard A Watson and James E Force (1980, Indianapolis and Cambridge, repr. 1993), 213-226, in which he concludes that despite his criticism, Priestley's theory of causation was little different from that of Hume.

sensical view of causation. This account fits neatly into his Hartleian belief in the association of ideas:

The proper *proof*, therefore, of universal propositions, such as ... that milk is white, that gold is yellow, or that a certain degree of cold will freeze water, consists in what is called an *induction of particular facts*, of precisely the same nature. Having found, by much and various experience, that the same events never fail to take place in the same circumstances, the *expectation* of the same consequences from the same previous circumstances is necessarily generated in our minds, and we can have no suspicion of a different event, than we can separate the idea of *whiteness* from that of the other properties of *milk*.³⁸

In the case of truths learnt by means of analogy: here the circumstances of events are not identical but bear a strong resemblance to previous circumstances, and the proof grows stronger the more we find facts 'of the same or similar nature'. Many historical truths are like this. Indeed, Priestley could have used the opportunity to iterate his belief in the relationship between church establishments and corruption of truth. It might have gone something like this: with the Emperor Constantine's conversion to Christianity, Catholicism became the established religion of the Roman Empire. The importation of Greek thought into Christianity by his tutor Lactantius and others corrupted Christianity, creating a fallacious orthodoxy. The establishment of the church enforced that orthodoxy and perpetuated the corruption. The same link between church establishments and the unwillingness to allow any challenge to orthodoxy however construed can be invariably observed in subsequent establishments of religion. However, Priestley, for once, chose a non-contentious example: he uses that of milk being nourishing - since the milk of the animals we know

³⁸ *An examination of Dr. Reid's inquiry into the human mind on the principles of common sense*, xl-xli. It should be noted that Priestley did not believe that this view of causation undermined the case for a first cause. See his *Letters to a philosophical unbeliever* (1780), esp. Letter XIII. For the prevalence of Newtonian style associationism in the Enlightenment, see D A Rees, 'The Enlightenment and its Background; Some Features', *Enlightenment and Dissent*, no. 13 (1994), 22-5.

is nourishing, then 'we think it probable that the milk of any strange animal will be nourishing'.

In the case of self-evident truths or rationally demonstrable truths 'subject and predicate appear, upon comparison, to be, in reality, nothing more than different names for the same thing'. They include 'all equations, or propositions relating to number and quantity'. If these are not self-evident they can be demonstrated: that the three internal angles of a right angled triangle are equal to two right angles requires demonstration, but once demonstrated the idea that subject and predicate are the same becomes fixed. The same is true of syllogisms; once one becomes familiar with a syllogism 'the subject and predicate of the proposition to be proved unite, and coalesce immediately, without the help of the *middle term*; in which case the conclusion is as instantaneous as a simple judgement.' What is especially instructive is that Priestley gives as examples of syllogistic reasoning religious beliefs, and here we see the invasive nature of his religious commitments:

I may see no natural connection, for instance, between this life and another: but firmly believing that the declarations of Jesus Christ have the sanction of divine authority, which I know cannot deceive me; the moment I find that he has asserted that there will be a resurrection of the dead to a future life, it becomes an article of my faith; and not the least perceivable space of time is lost in forming the two syllogisms, by which I conclude, first, that what Christ says is true, because he speaks by commission from God; and secondly, that the doctrine of the resurrection is true, because he has asserted it.

Although this excursus through Priestley's analysis of truth may not appear especially relevant to the understanding of his attitude towards historical facts and explanation, we can see that there are potential problems in his notion of truths of reason, because they are informed by a notion of rationality which can be traced back to his belief in God, the rationality of His universe and the existence of His authentic revelation. But to make things more complicated, we cannot simply be guarded about his notion of rationality and make a distinction between that and evidentially based truth. Priestley's notion of truth brought the rational and inductive aspects

together in his associationism, and alert us to the potential difficulties of unpicking the various elements in his approach to the past:

In fact, both *propositions* and *syllogisms* are things of *art* and not of *nature*....

The word *truth*, and the idea annexed to it, is also the child of art, and not of nature, as well as ideas annexed to the words *proposition* and *syllogism*. Ideas coalesce in our minds by the principle of association, these associations extend themselves, and ideas belonging to one word are transferred to another, without our giving any attention to these mental operations or affections.³⁹

It goes without saying that this is a view of causation and truth profoundly influenced by David Hartley's associationism. We must never forget that Priestley was bold enough to assert that 'Dr. Hartley ... has thrown more useful light upon the theory of the mind than Newton did upon the theory of the natural world'.⁴⁰ His version of Hartley's theory of ideas, allowed him to combine a sophisticated empiricism, which does not rest upon a belief in a real material world, with rational assumptions that coherence is guaranteed by God's ordering of the world, and a theological acceptance that some at least of these rational truths had been revealed not by science but by scripture.⁴¹ Such an associationist theory of ideas had important consequences for the way Priestley

³⁹ All these quotations from the 'Introductory Observations' to *An examination of Dr. Reids inquiry into the human mind on the principles of common sense*, xxxvii, - xlvi. Priestley does go on immediately to say, that 'But when these processes have taken place in our minds, we are capable of observing them, as well as the ideas which are the subject of them; and we give names to these mental processes just as we do the affections of things without ourselves'. Cf. Hartley, *Observations on man his frame, his duty, his expectations* (1748, fifth edn. in 2 vols, Bath & London, 1810), I, 336-46.

⁴⁰ *Ibid.*, 2. Also, *Institutes of natural and revealed religion*, Rutt, II, 257.

⁴¹ *Disquisitions relating to matter and spirit*, Rutt, III, 229, cit., Hiebert, loc.cit., 39: Priestley's great objection to Reid lies in his belief in the existence of an external world on commonsensical ground. *An examination of Dr. Reid's Inquiry into the Human Mind...*, lx-lxi.

perceives historical knowledge and for the way he constructed an overall interpretative framework.

For Priestley historical knowledge was no different from any other kind of knowledge; he made no distinctions between natural knowledge and moral knowledge. History which many had seen as contributing only to the latter, could help to provide us with ideas which would by accumulation help us to grow in understanding of all aspects of God's world. Here one is reminded of Hartley's argument that 'it is a practical error of great importance to suppose that such kind of historical evidences [i.e. 'the concurrent independent evidences in the grand points of history ... such as the conquests of *Alexander* and *Julius Caesar*...'] are inferior to mathematical ones. They are equal, as far as we have any thing to do with them; i.e. can judge of them, or be influenced by them. All future facts depending on them have as good a basis, as those depending on mathematical evidences'.⁴² One might add that mathematics could be deployed as a useful tool in historical assessment. In his *Lectures on history and general policy*, Priestley cited a formula devised by Hartley for illustrating the worth of independent and dependent witnesses of an event, which indicated the strength of independent and relative weakness of dependent evidence. Here both mathematics and history were partners in the quest for knowledge and understanding.⁴³ Although the beginning and the end of that quest was religious, as with Hartley, for '... religion comprehends, as it were, all other knowledge, advances, and is advanced by all ...',⁴⁴ history plays a crucial role in advancing knowledge. In providing experimental evidence of man in the infancy of his understanding and of the way he had developed, it is a crucial source for learning which ideas are associated and which are not. Since that is not a matter necessarily of logic, the historian needs to be open-minded and should not begin with preconceptions of what should be studied.

An important consequence of such a set of concerns was an extraordinarily catholic and original attitude towards historical

⁴² David Hartley, *Observations on man*, I, 376.

⁴³ *Lectures on history and general policy*, I, 104-5, drawing on Hartley *Observations on man*, I, 347-350.

⁴⁴ Hartley, *Observations on man*, I, 366-8, 379-80.

study, embracing within its scope subject matter which even today would be regarded as progressive:

true history, being an exhibition of the conduct of divine Providence; in which every thing has, perhaps, infinite relations and uses, is an inexhaustible mine of the most valuable knowledge. Works of fiction resemble those machines which we contrive to illustrate the principles of philosophy, such as globes or orreries, the uses of which extend no farther than the views of human ingenuity; whereas real history resembles the experiments made by the air pump, the condensing engine, or electrical machine, which exhibit the operations of nature, and the God of nature himself, whose works are the noblest subject of contemplation to the human mind, and are the ground work and materials of the most extensive and useful theories.⁴⁵

Priestley was not interested in causation in a conventional historical sense; he is interested in association. Only through deliberation upon our knowledge do we develop hypotheses, and just as we can identify in our experience those associations which are false, so too we can learn which associations in the past had been evil. Indeed Priestley describes history as 'anticipated experience'. At the same time, he does distinguish levels of historical understanding, which are analogous to simple and complex experiences.⁴⁶ History can give simple pleasure and / or complex understanding. Thus, he categorised the general use of history into:

⁴⁵ *Lectures on history and general policy*, I, Lecture 1, 45-6. Note Hartley, in writing of Civil History, had a similar broad view of history in which a variety of disciplines could all throw light on Civil History: 'It is manifest that the discoveries of natural historians, astronomers, linguists, antiquaries, and philosophers of all kinds have brought great light and evidence upon this branch of knowledge within the last two centuries; and are likely to do so more and more.' *Observations on Man*, I, 375.

⁴⁶ Hartley noted that one reason why historical facts had not been considered on a par with mathematical certainty, arises in part from 'the complexness of the historical proofs, which require time and consideration to digest them...' *Observations on man*, I, 376.

1. History serves to amuse the imagination, and interest the passions in general.
2. It improves the understanding.
- And
3. It tends to strengthen the sentiments of virtue.⁴⁷

Within this hierarchy we find an incredible range of historical information, and an amazingly comprehensive introduction to sources and historiography. His experimental approach found expression in the rich deployment of evidence in his teaching. His students learned about the Petty Bag Office, the red-book of the Exchequer and Dugdale's *Monasticum Anglicanum* [Lecture XXXI], were reminded of the value of the labours of antiquarians and chroniclers, of the importance of oral tradition and of the evidence to be derived from coins and medals [Lects. IV, VI & XXV], and gained an understanding of siege warfare from a model of fortifications [Lect. XIX].

This range did not arise solely from Priestley's immense sense of curiosity, although no doubt that played its part. His organisation of his lectures is schematic and deliberate, and students were reminded that the approach being taken to the subject matter of history was comprehensive and extensive [Lect. XIII]. They were also made aware of the central importance of historical knowledge. He noted for example that, 'An accurate and extensive knowledge' of all branches of science 'cannot be attained without some knowledge of history. Indeed their aid is mutual...' [Lect. XIII, 197-8]

Of course, a good deal of attention is paid to what we would describe as secular progress in the arts, sciences, in government and society. He valued material progress highly: 'The more conveniences men are able to procure themselves, the more they have it in their power to enjoy life, and make themselves and others happy' [vol.II, Lect.LIV, 269]. However, happiness is not assured from such progress, and that is not because of a conventional

⁴⁷ Ibid., 43-4. This today would be regarded as a case of plagiarism from David Hume, 'Of the Study of History', in his *Essays, moral, political and literary* (1777), ed. Eugene F Miller (revised edn. Indianapolis, 1985), 565. Priestley was extremely reluctant to grant any of Hume's works merit, regarding him as much inferior to Hartley, but conceded, 'his *Miscellaneous and Political Essays* always pleased me'. *Letters to a philosophical unbeliever*, Letter XIV, 411.

religious valuation of the spiritual over the secular. On the contrary, Priestley allows himself a fascinating discourse on the importance of *mores* in disciplining man's selfish tendencies:

The sources of general happiness in a state must not always be looked for in such striking circumstances, as government, religion, laws, arts and commerce, though an attention to these be allowed to be the most essential in a well regulated state.... We must not infer that because men's liberty and property are secure, and in a way of being advanced, that therefore they are *happy* [vol.II, Lect. LV, 278-9].

'History and experience', demonstrated the importance of civility and good manners were essential in disciplining man's wild nature and in contributing to the happiness of individuals and of communities.' The ancients did not practise true politeness and so they 'had but little enjoyment of society'. Priestley had read Montesquieu, and like him believed a key feature of 'the politeness of any people' was 'the treatment of women...' [ibid.,286].⁴⁸

But even more interesting is the way he glossed Montesquieu to explain how manners operated to civilise man.

Absolutely to eradicate vices and acquire virtues, is not to be expected from the bulk of mankind. It is happy, therefore, when, from a sense of decency and honour, they learn the art of preserving the appearance of virtue. For if that appearance be habitual, and uniform, it will have nearly the same effect in society; though the virtues themselves would enable a person to contribute to the happiness of others with far less pain and mortification to himself [vol.II, Lect LV, 280].⁴⁹

This a Hartleian type of programming oneself and society to virtue.

Informing almost all aspects of his *Lectures on history and general policy* is his concern to learn the means for mankind's

⁴⁸ Priestley's evidence at this point comes from Voltaire's *Le siècle de Louis XIV* (1751), although Montesquieu had made a similar point (*De l'esprit des lois* (1748), bk.19, ch.XIV) in relation to the improvement of manners and mores of the Russians under Peter the Great through bringing women to court.

⁴⁹ Montesquieu counselled against disturbing the manners of a nation in order to make them more virtuous. *De l'esprit des lois*, bk.19, chs.5, 6 & 11.

improvement and to understand human nature. Thus towards the end of his lectures (67 in all), in summing up, he points to all the various trends which were conducive to making 'a nation *happy populous and secure*.' These include the growth of knowledge in natural philosophy, in medicine, in geography, and material improvements. Then, rather abruptly, he turns from discussing the value of improvement such as draining marshes, clearing forests and building canals, 'and the spirit of improvement of all kinds, which now prevails in many parts of the world' to declare:

The only object of attention I shall endeavour to point out more particularly is *the knowledge of human nature*, which may be viewed in a variety of lights, and to considerable advantage in the glass of history.

Experience and self-examination may assist us in adjusting the general theory of the human mind. But it is in history alone that we can see the strength of its powers, the connexion of its principles, and the variety to which individuals of the species are subject, together with many other particulars, equally curious and useful to be known, by a person who is desirous thoroughly to understand this very important and interesting subject [Vol.II, Lect LXV, 425-6].

Thus we return to a conception of explanation which is genetic, but which has a specific necessarian and Hartleian context. Priestley indeed sees his historical investigations in terms of Hartleian style inductivism: 'In some respects, history bids fairer for determining the connexion, dispositions, and situations of the human mind, than any reasoning *a priori*' [LXV, 427-8]. Indeed, despite the immense richness of his historical teaching, it has at its heart a concern for human nature and the improvement of the human mind. Of course, it does not entirely escape *a priorism*, of which more later. His methodology might be broadly described as inductivism which resists sceptical conclusions, posited as it is on a rationality which fortifies and is fortified by belief. Hence that crucial passage in the introduction to his *Essay on the first principles of government*:

In this state of things [of more perfect society], it requires but a few years to comprehend the whole preceding progress of any one art or science; and the rest of a man's life, in which his faculties are the most perfect, may be given to the

extension of it. If, by this means, one art or science should grow too large for an easy comprehension, in a moderate space of time, a commodious subdivision will be made. Thus all knowledge will be subdivided and extended; and *knowledge*, as Lord Bacon observes, being *power*, the human powers will, in fact, be enlarged; nature, including both its materials, and its laws, will be more at our command; men will make their situation in this world abundantly more easy and comfortable; they will probably prolong their existence in it, and will grow daily more happy, each in himself, and more able (and, I believe, more disposed) to communicate happiness to others. Thus, whatever was the beginning of this world, the end will be glorious and paradisaical, beyond what our imaginations can now conceive. Extravagant as some may suppose these views to be, I think I could show them to be fairly suggested by the true theory of human nature, and to arise from the natural course of human affairs.⁵⁰

The logic of this would have been to abandon privileged stages in man's progress, notably the millennium.⁵¹ The uncertainty we have in interpreting Priestley's comments on heavenly and millennial paradisaical states is indicative of the fact that in practice he does in some respects follow that logic. Indeed it might appear that through his method he has effectively evolved a secular idea of progress, or at least an idea of progress which was free of theological constraints, rather as Turgot had done earlier in the century. But if there is a measure of truth in that, he does not put forward a coherent secular theory of how progress occurs of the sort elaborated by Turgot and Condorcet, nor does he provide a Scottish-style account of the stages of man's development, nor a

⁵⁰ *Essay on the first principles of government*, 3-5.

⁵¹ I am mindful of the fact that, in another context, Priestley was willing to argue for a future state based on the analogy from nature, and even to suggest that there might be a future state even though there may be no God. However, if the future state of *this* world is to be paradisaical, there would be no expectation for an other-worldly future state; the wish for such a state for Priestley forms part of the 'evidence of the thing wished for'. *Letters to a philosophical unbeliever*, Letter VIII.

Smithian-style doctrine of unintended consequences. Despite his rhetoric, his true theory of human nature does not require progress to arise out of the natural course of human affairs since the understanding we gain through our quest for knowledge is of God's ways, and the natural course of human affairs cannot in itself account for all of man's progress, the rhythm of progress being irregular and often apparently arbitrary. Both his view of human nature and of causation in history rested on assumptions about Divine intentionality and the tactics of Providence.⁵²

Priestley's exemplification of the syllogism has alerted us to the fact that his account of rationality rests not only on the notion that God is the God of reason, but also on the belief that He has communicated some of His thinking to man by means of sacred revelations. Thus, while open-minded in his view of the range and scope of historical study and understanding, Priestley was prepared to depart from strict standards of historical induction. Certain truths were unquestionable, and would help in the deployment of historical evidence. This is especially true, though not exclusively, for early history. Hartley wrote:

He that would search into the first ages of the world, must take the scriptures for his guide, lay down the truth of these as unquestionable, and force all other evidences into that position. This seems to have been the method taken by Sir Isaac Newton in his Chronology, and which at last unfolded to him the proper method of detecting and correcting the mistakes in the ancient technical chronology of the *Greeks* by itself.⁵³

⁵² The closer events appeared to be reflecting God's revealed will, then the more Priestley was given to thinking in terms similar to Smith or Condorcet. Thus in 1798 he wrote, 'Whatever be the view of the French in taking possession of Egypt, I rejoice in it; as it must lead to a happy revelation in all that part of the Turkish dominions which includes Palestine and may eventually contribute to the restoration of the Jews. This, I am informed, is also one of their projects, tho' certainly not with a view to the fulfilment of the prophecy, and it is on that account a favourable circumstance. Birmingham Record Office, Timmins Collection, MS 73499, Priestley to Dr. Ross, 6 Dec. 1798 (transcript).

⁵³ *Observations on man*, I, 375.

This might at first be seen as a weakness arising from the erroneous privileging of certain evidence, but one which does not fundamentally alter the method or view of causation being deployed. But Priestley's *a priorism* does not simply operate at the edge of his historical account; it does not merely privilege revealed truth. It profoundly limits the scope for secular explanation of epochal events. For, although he argues that the evidence convinces us that this is God's world, and that Christianity is a true historic religion, he goes on to assert that we can be confident that there is a divine intent behind the worst happenings, happenings that cannot be understood in plain historical terms, and even to assert that the less we can explain things in historical terms, then the more likely it is that they are part of God's hidden purpose. *A priorism*, moreover, may take over not only when, apparently, the evidence breaks down, it can, beguilingly, rest upon an evidential basis. Priestley believed in the doctrines asserted by Christ, not because they were credible in themselves, though he believed that, too, but because Christ's credibility, his 'extraordinary authority', has already been demonstrated evidentially.⁵⁴ This is entirely in accord with his exemplification of syllogistic reasoning noted earlier.

Generally speaking, Priestley allows a much more expansive role for historical explanation in treating of modern history, for in modern times change was effected less by particular providence than by men acting in the general course of affairs as God's instruments,⁵⁵ but even then historical explanation often has to give way when events of major significance occur:

Though ... the hand of God be really in everything that happens, and that is recorded in history, our attention is more forcibly drawn to it in great events, and especially in things which happen in a manner unexpected by us.

How can we help acknowledging the hand of God when we see great and important events brought about by seemingly trifling and inconsiderable means; or by means which seem to have little or no relation to the end; as when

⁵⁴ *Socrates and Jesus compared*, 40, 48-9; *An examination into Dr. Reid's Inquiry into the Human Mind*, xlv.

⁵⁵ *An essay on a course of liberal education* (1764), prefixed to *Lectures on history and general policy*, I, 3.

our king James and both houses of parliament were rescued from destruction, by a letter which a conspirator sent with a view to save one of the members of the House of Lords for whom he had a friendship?⁵⁶

In this respect, there is little difference between Priestley's treatment of secular history from that of Christianity. The more difficult it is for us to provide a historical explanation for events and opinions based on evidence, the easier it becomes for us to accept that they are divinely organised and inspired.⁵⁷ Here we might therefore find it useful to discuss Priestley's treatment of historical Christianity.

Christian History

An important consequence of associationism was that Priestley, in his search for the sources of early Christian doctrine, contributed considerably to our understanding of the early evolution of doctrine. For example, German Higher Critics in the nineteenth century were influenced by his analysis of the sources for the doctrine of the virgin birth.⁵⁸ The corollary of Priestley's quest for pristine Christianity was that he had to explain how true ideas had been corrupted, that is, he had to show how true ideas had become

⁵⁶ *Lectures on history and general policy*, I, Lecture III, 79-80; Priestley added that even more convincing evidence of the hand of Providence was in events which were planned to happen one way and turned out the opposite, instancing how Cesare Borgia planned to follow his father Alexander VI as Pope, but that they were both poisoned by wine intended 'to have taken off their enemies.' *Ibid.*, 81. Borgia survived the poisoning, but was crucially indisposed at the time his father died.

⁵⁷ M Canovan, 'The Irony of History: Priestley's Rational Theology', *The Price-Priestley Newsletter*, no.4 (1980), 20, gives as an instance from Priestley's *A comparison of the institutions of Moses with those of the Ancient Hindoos*, in which she notes that Priestley argued that 'Moses' institutions ... were so different from those of other contemporary nations that their origin cannot be explained historically; he therefore concluded that they must be the fruit of direct inspiration.'

⁵⁸ For an extended discussion of this point see T P Letis, 'From Sacred Text to Religious Text: An Intellectual History of the Impact of Erasmian Lower Criticism on Dogma as a Contribution to the English Enlightenment and the Victorian Crisis of Faith', University of Edinburgh PhD., 1995.

associated with false ones. In consequence he became, in our terms, a fine historian of ideas. Such qualities can be seen in his discussion of baptism. He argued that baptism had initially been a rite which was no more than the solemnisation of becoming a Christian and of the determination 'to live as becomes one'. Later in the age 'immediately following that of the apostles', the promise of the pardoning of sin, which accompanied the resolution to a virtuous life, was attached to the rite itself: 'in general it seems to have been imagined that this *sanctifying virtue* was in the *water*, and in no other part of the ordinance as administered by the priest'. Having come to believe that the water was actually washing away sin, other superstitious practises were added to the ceremony of baptism, with the adoption of special baptismal robes, giving the baptised person baptised milk and honey, or salt to taste, abstaining from washing for the rest of the day, adding exorcism to the ceremony and so on.⁵⁹ Thus Priestley was able to show how the later doctrine and practice of baptism had strayed from the early one. One can see how for the purpose of his project for the recovery of pure Christianity, he had become formidably erudite. Yet, if this led Priestley towards an historical understanding of early Christianity, this was not his purpose.

Margaret Canovan is right to point out that although Priestley's outlook led him to seek to understand how early Christians thought, it nevertheless assumed that a more historically accurate account of early Christian ideas would in itself reveal an eternal truth rather than a better understanding of historically conditioned truth. Thus, following our example, an understanding of how baptism was first practised, will tell us how it always ought to be practised. In an article in which she expertly explores the irony of Priestley adopting an historical approach to uncover something conceived to be ahistorical, Canovan has traced the failings of Priestley's historical method to his rationalist conception of the truth. For Priestley, she argues, 'truth had always been the same - pure, simple and rational - it had been hidden from a human race whose

⁵⁹ *History of the corruptions of Christianity*, II, 66-90, cit. at 67, & 79-80; Priestley explained that '*salt* was used as a symbol of purity and wisdom; and that exorcism took its rise from the Platonic notion that evil daemons hovered over human souls, seducing them to sin' (84).

views continually developed in complicated and irrational ways; and although Christianity had supposedly been revealed for the benefit of men, the very fact that it was eternal had caused it to be lost in the mazes of historicity - until a few men in the eighteenth century were granted the grace of standing outside history in order to find it again.⁶⁰

Canovan suggests that Priestley might have found a way out of the impasse if he had followed Lessing in developing a progressive notion of religion, accepting, that is, the doctrines as revealed to the early church as true for that age, but which could be re-interpreted for a more developed and knowledgeable culture of the eighteenth century.⁶¹ She notes that Priestley had suggested that education itself was a process of being taught things which were only fully understood in adulthood, and argues that this type of thinking could be have been applied to his understanding of Christian history. However, this aspect of Priestley's associationism which might have led to a progressive notion of religious truth, was eclipsed in his search to recover pristine Christianity by that which sought to root out false associations and establish correct ones. Paradoxically, this was in part a result of a historically minded outlook, of Priestley's belief that history provided anticipated experience. Priestley could not accept a Lessing-style solution because he knew too much of the history of the early Church to accept that the doctrines which it evolved were actually revealed doctrines. He could not simply take the doctrines of the Trinity, of the Atonement or of the Virgin birth as revealed and argue that their true or truer meaning would dawn on later ages. For Priestley, those things which he learnt from 'lower criticism' of revealed texts, in which the different scriptural sources were traced and scrutinised and interpreted in the light of ideas prevailing at the time, had consequences for doctrine. In that sense, he dignified historical knowledge. Rather than secularising the texts, he

⁶⁰ M. Canovan, 'The Irony of History: Priestley's Rational Theology', *The Price-Priestley Newsletter*, no. 4 (1980), 23.

⁶¹ Canovan, 'Irony of History', 23, cites Lessing's, *Education of the human race*, in which he argues that doctrines like the Trinity and Original Sin, 'When they were revealed, they were certainly no truths of reason, but they were revealed in order to become such'.

sacralised historical knowledge, the central importance of which can be seen in his view of faith and of re-birth:

faith is the belief of the gospel, or of those historical facts which are contained in the writings of the evangelists, and that the *new birth* is that change of character and conduct which is produced by that belief.⁶²

It is probably unfair, therefore, to conclude, as Canovan does that 'although he had a highly developed sense of historical growth, which his Dissenting forebears had lacked, the eventual result of his work was to lead 'Rational Christianity' into a cul-de-sac'.⁶³ Priestley's biblical scholarship was critical in the development of Rational Dissent, and some of his weaknesses are those of the Enlightenment historians generally, a belief in the uniformity of human nature, and the universality of truth, and of Enlightenment theologians in particular, the belief that Christianity was essentially a reasonable religion founded upon historically verifiable revelation, and capable of being more fully understood.⁶⁴ The real problem for Rational Dissent was that Priestley was not followed by others equal to his genius, and therefore capable of wrestling with his legacy. Moreover it is potentially misleading to suggest, as Canovan does, that, 'Priestley, carried away by his desire to disentangle pure truth, had stripped it of relevance to almost any time at all'.⁶⁵ Not only was that untrue for Rational Dissenters, who increasingly modelled their beliefs on Priestley's findings, but also there is some point to Priestley's argument that orthodoxy was maintained by powerful worldly religious establishments which sought to limit the challenge of new ideas. Just as Rational Dissenters favoured freedom believing that that would improve the ordering of society, so Priestley believed that by reducing the doctrinal content of belief and emphasizing Christ's moral teaching

⁶² *An history of the corruptions of Christianity*, I, 266.

⁶³ Canovan, 'Irony of history', 24.

⁶⁴ See Henry Allison, *Lessing and the Enlightenment. His philosophy of religion and its relation to eighteenth-century thought* (Ann Arbor, Michigan, 1966), esp. ch.3; and for Priestley's location amongst his British contemporaries, David Spadafora, *The idea of progress in eighteenth-century Britain* (New Haven and London, 1992), 321-380.

⁶⁵ Canovan, 'Irony of history', 24.

that would make religion more not less relevant. Priestley, of course, believed that the truths which he uncovered in being eternal were eternally relevant to all ages. Canovan contends that the unbelievers had a point in asking 'what was the use of a revelation which had practically never been revealed to anyone.'⁶⁶ Priestley does have something of an explanation if not a totally satisfactory answer. Just as enlightened historians tended to blame the ills of mankind on institutions, so too did Priestley, as we have noted, tend to blame them in religious terms on established churches. But this meant that in some instances he believed that the doctrines of the Churches were not representative of what people actually believed. Thus certain truths were held irrespective of the churches, and were universal. Reason and experience could be deployed in favour of such views. He says of the doctrine of the atonement:

there is no reason to believe that any of the human race, if they be left to their own natural unperverted apprehension of things, will ever fall into such doubts and uncertainties as all mankind are sometimes represented to be involved in. On the contrary, that God is a merciful being seems to have been a favourite opinion of all mankind in all ages; except in some religious systems in which the object of worship was not the true God, but some being of a low and revengeful nature, like the most capricious and depraved of mankind.

We have seen in the Old Testament, that the Jews had never any other idea than that God was placable on repentance. We find no other sentiment in Job, or his friends, and certainly no other among the Ninevites, or among the Jews of later ages, as the books of the Apocrypha, Philo, Josephus, and all their later writings, testify. We also see nothing of any other opinion in the doctrine of the Hindoos or other oriental nations.⁶⁷

So alongside the view that Priestley was undertaking a purification of a corrupt religion was the belief that man had never

⁶⁶ Canovan, 'Irony of History', 23.

⁶⁷ *History of the corruptions of Christianity*, I, 165-6. Priestley noted that one of the problems of his associationist necessarianism was that it was difficult even for the most enlightened to believe that God was the origin of evil. See fn. 28..

been entirely corrupted. One also can see how, although his historical approach was shot through with problems, it led to an open-minded attitude to all religions. He followed with interest the distinguished researches into ancient Persian and Indian religions of his friend Sir William Jones, and he himself would contribute to the development of what we would now call comparative religion.⁶⁸

Reflecting on Priestley's historical endeavours in attempting to free Christianity from its corruptions, we see, in some respects writ large, the essential elements of his approach to historical knowledge and of the way it might be used. In concluding his *An history of the corruptions of Christianity*, Priestley specifically reminds the reader that his religion was not progressive, rather it was 'a *progressive reformation* of a corrupted religion that is pleaded for'.⁶⁹ But this was not straightforward primitivism, the search for the key to unlock true ancient knowledge. Priestley undoubtedly wants to restore the purity of doctrine to a few simple, rational truths and is anxious to protect the universal validity of revelation but he also accepts that knowledge grows incrementally and that applies to historical knowledge as well as other forms of knowledge. This is the aspect of Priestley, which as John Passmore has noted appears to be moving towards a theory of progress as natural development. This is the Priestley who argued that 'it is a universal maxim, that the more liberty is given to every thing which is in a state of growth, the more perfect it will become.'⁷⁰ To a degree a reconciliation can be effected by arguing that the primitivist dimensions applied only to doctrine and morals, but it is well to remember that Priestley does not make clear distinctions between categories of knowledge. While it is true that Priestley maintained that as we grow wiser, the more we understand that the essential truths of existence are simple,⁷¹ he also believed that the

⁶⁸ See Spencer Lavan, *The Unitarians and India: a study in encounter and response* (Beacon Press, 1977), 17-20.

⁶⁹ *History of the corruptions of Christianity*, II, 483.

⁷⁰ John Passmore, *The perfectibility of man* (London, 1970), 210-11; Priestley, *Essay on the first principles of government*, 258-9.

⁷¹ See, *Institutes of natural and revealed religion*, Rutt, II, 25, 'Strictly speaking, there are no more than two just and independent rules of human

sum of knowledge will grow, that this will lead to greater understanding of God's ways, and enable us to act more effectively as instruments of His will. Indeed, both the primitivist and progressive elements of his thought are encompassed within his perfectionism. It is this which attracted Condorcet and led him to regard Priestley as a pioneer of the doctrine of the indefinite progress of the human species. But whereas that led Condorcet towards utopianism, it led Priestley towards a cosmic optimism. Through the proper accumulation of knowledge and understanding we coming to see things as God would see them. We gain not simply God-like understanding but we gain unity with His will. This is the ultimate goal of his gradualism; it is the religious progress of the mind. It explains why Priestley says so little about the improvements which he expects to occur in the world/and coming millennium. As Priestley put it in his 'Illustrations of Some Particulars in the Disquisitions on Matter and Spirit',

The improvement of our natures, and consequently the advancement of our happiness, by enlarging the comprehension of our minds, chiefly by means of a more distinct view of God in all things, and at all events, is, in its own nature a gradual thing.

However, although it did lead to a belief in change and progress occurring incrementally and favoured a genetic type of historical explanation as analysed by Crombie, it was so theologically based that it led to a certain indifference to explanation, which inhibited the development of sophisticated ideas of historical causation.⁷² Thus Priestley suggested as a maxim of historical criticism that change usually occurred gradually and that history 'which represents such changes as having been made gradually, and by

conduct, according to the light of nature, one of which is obedience to God, and the other a regard to our own real happiness; for another rule, which is a regard to the good of others, exactly coincides with a regard to the will of God...'

⁷² The genetic method was common to philosophic historians who shared the associationist epistemology derived from Locke. See the suggestive paper by Michel Baridon, 'Philosophic Light and Gothic Gloom', in Jennifer J Carter & Joan H Pittock, *Aberdeen and the Enlightenment* (Aberdeen University Press), 218-37, esp. 230-2.

easy steps, is always the more probable on that account'.⁷³ Yet he was too ready to abandon the notion that great changes were prepared and had major causes.⁷⁴ When talking about revolutions in affairs and about doctrine, he all too easily fell back on Divine Providence for an explanation. Since he believed that very few could understand the workings of providence, he himself was also prepared to give up rational explanation for the divine tactic of history. Too close an historical understanding may indeed carry dangers for it could divert attention away from the primary cause of all things, and strengthen the tendency to regard secondary causes as primary causes which Priestley sees as part of the human condition.⁷⁵ Only the special individual, 'the most perfect of our race' and then only occasionally, could,

lay himself open to the genuine feelings, of the necessarian principles; that is, that he can *see every thing in God, i.e.* in its relation to him. Habitually, and constantly, to realize these views, would be always to *live in the house of God, and within the gate of heaven, seeing the plain finger of god*

⁷³ Canovan, 'Irony of History'; 21, fn.13.

⁷⁴ In his *History of the corruptions* (II, 483-4) there is quite a startling switch from arguing that the reformation of Christianity would be 'gradual and progressive' to suggesting that 'perhaps' the alliance between church and state would have to come to an end for the 'grossest corruptions' to be eliminated. That would require 'the fall of the civil powers', would and be accompanied by 'convulsions in the political world'. This abrupt reformation would be the fulfilment of prophecy, of the expectation of the Lord's Prayer rather than the result of a historical process.

⁷⁵ *Illustrations of Some Particulars in the Disquisitions on Matter and Spirit*, appended to *A free discussion of the doctrines of materialism and philosophical necessity*, 308: 'The whole doctrine of *second causes* being *primary* ones, is certainly a mistake, though a mistake that all imperfect beings *must* be subject to. Whatever, therefore, is built upon that mistake can have no place in a truly philosophical system.' Conversely one might observe that a historical system which falls back on primary causes when it cannot explain secondary causes is thereby impoverished. It was, however, relatively common feature of Whig history and an almost inevitable result of pride in Britain's special heritage and achievements. See J W Burrow, *A liberal descent. Victorian historians and the English past* (Cambridge, 1981), 30-31.

in all events, and as if the angels of God were constantly descending to earth, and ascending to heaven before our eyes. Such enlarged and exalted sentiments are sometimes apparent in the sacred writers, and also in the histories of christian and protestant martyrs; but the best of men, in the general course of their lives, fall short of this standard of perfection.

In falling short of such an ideal, we need to guard against losing 'sight of God', against exalting human agency and in a sense becoming entrapped in history. We need to be aware of our tendency to 'look no higher than ourselves, or beings on a level with ourselves', and to 'find ourselves involved in a thousand perplexities, follies and vices...'⁷⁶

Just as scientists need to pause in their pursuits, and reflect on the primary cause of all things, so to do historians. Lord Acton lectured on historical study as emancipation from the immediate present, from the pressure of the air of ordinary life.⁷⁷ It would be tempting to describe Priestley's view as the reverse of that; the study of history emancipated us from the weight of the past. But I am not sure that that is quite the right way to understand his position. Canovan, it is true, has suggested that the truths he garnered from history are ahistorical in that they are not related to any particular time or circumstances. If this is so, then one does need to be very careful as to what this means; they are not truths which disappear in an otherworldly aether. It is true Priestley cautions against '*idolizing ourselves and the world*',⁷⁸ but the world he looks forward to is a material world. When we become more perfect we do not turn our backs on the world. In becoming more perfect, we realise that all our improvements do not derive from ourselves but from God. Priestley like Hartley talks of the annihilation of the self. But the humility we learn, tells us that it is God who is '*working all our*

⁷⁶ *Illustrations of Some Particulars in the Disquisitions on Matter and Spirit*, 303-6.

⁷⁷ Lord Acton, 'On the study of history; in his *Lectures on modern history* with intro. by Hugh Trevor-Roper (1906, London, repr. 1963), 18.

⁷⁸ '*Illustrations of Some Particulars in the Disquisitions on Matter and Spirit*', 306.

good works in us and for us'.⁷⁹ Self-annihilation then does not take us out of the world into some sort of timeless mystical state. Priestley's God works through history, through time, He participates in His creation. In that sense, the truths we learn from anticipated experience are not ahistorical in the sense that they exist outside history, outside time. They are very much like religious variants of the lessons of philosophic history.

* * * * *

That is in a sense where my musings began, with the new infinite universe of Newton. Hartley, being the Newton of human nature, also introduced man to the idea of endless improvement. The problems which both he and Priestley had, were not so much with the inability to secularise their vision, rather it lay with their inability to free it from a world-view which was derived from the corrupt ages, which Priestley so lovingly studied, of a finite universe, of a God who created the universe at a given time, and who in due course would bring it to an end. Priestley was caught in a vicious circle. Historical knowledge ultimately could not help him for wherever historical explanation proved inadequate, theology and metaphysics took over. Associationism could not help him because it refused to discriminate between different categories of truth. Philosophical necessity might have helped because it did recognise a distinction between popular and philosophical language. Unfortunately it privileged the latter; not only could philosophers explain things more rationally than ordinary folk (a fair assumption), but they could provide reasons where ordinary evidence broke down. This Leibnizian style principle of sufficient reason was perhaps at its most harmful in the interpretation of the sacred texts. In crucial areas, *a priorism* undermined the development of an appropriately historical and imaginative response to the texts. This was especially true of the wilder revelatory texts. As Canovan notes, 'Biblical prophecies ... were to be regarded as authentic if they had been wholly or partly fulfilled, and if it could be shown that they had been written prior to the events they purported to predict - conditions which Priestley

⁷⁹ *Ibid.*, 313-4, see also 304-5.

believed to be fulfilled by all the major scriptural prophecies'.⁸⁰ Moreover, that authenticity was to be understood in prosaic literalist ways, which were quite inadequate for the understanding of some of the prophetic writings.⁸¹

Priestley's approach to historical knowledge undoubtedly embodied some of the problematic beliefs of enlightened history, but his historical writing, and incredibly creative teaching, would have been more significant had he not lived in flexible time worlds. Yet it is not easy to see how he could have avoided altogether the problems I have delineated. His own philosophy and theology were so constructed as to embody the notion both of sameness through time and of many possible phases or levels of time. It is perhaps not surprising that it is often difficult to know whether Priestley is referring to an evolutionary progress on earth, a dramatically inaugurated millennium, or heaven, when he owed so much to the scientific mysticism of his mentor David Hartley, whose views on time were expressed in the following sublime statement:

There is not an atom perhaps in the whole universe, which does not abound with millions of worlds; and, conversely, this great system of the sun, planets, and fixed stars, may be no more than a single constituent particle of some body of an immense relative magnitude &c. In like manner, there is not a moment of time so small, but it may include millions of ages in the estimation of some beings; and, conversely, the largest cycle which human art is able to invent, may be no

⁸⁰ Canovan, 'Irony of History', 17. Priestley did not accept Moses' account of the Creation because he could not have witnessed it at first hand. Priestley's criteria for accepting the authenticity of revelation were similar to those which had been used to defend the veracity of miracles against the Deists earlier in the century. See Arthur Ashley Sykes, *An essay on the truth of the Christian religion: wherein it's real foundation upon the Old Testament is shewn* (2nd edn., London, 1755), xvii-xviii. I am grateful to James Dybikowski for drawing my attention to this work. It was highly valued by some Rational Dissenters. John Disney published memoirs of his life and writings in 1785.

⁸¹ See my 'Joseph Priestley, politics and ancient prophecy', *Enlightenment and Dissent*, 10 (1991), 104-109.

more than the twinkling of an eye in that of others, &c. The infinite divisibility and extent of space and time admit of such infinities upon infinities, ascending and descending, as make the imagination giddy, when it attempts to survey them.⁸²

Of the three thinkers selected by Condorcet as the first and most illustrious proponents of the doctrine of the indefinite perfection of the human species, Turgot, Price and Priestley, it is Priestley who comes closest to the notion of progress as a natural process, and to the idea of an indefinite mundane future. Indeed, it is possible to derive such notions from Priestley by ignoring his reversion to providentialist explanations wherever he is unable to find plausible historical explanations, more especially as he believed in the ultimate rationality of God's world. That would, however, be to ignore something perhaps more important, namely his appreciation of the unpredictability of the historical process, of the way in which small events may have large consequences. Indeed, for Priestley himself, not only did his monism, necessarianism and Unitarianism, make it impossible for him to break out of a world in which time was ordained by God and was not fixed by man's measurement, and in which the past, present and future could only be imperfectly understood by man, but his sense of history reinforced his religious commitment to such a world.⁸³

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⁸² Hartley, *Observations*, II, 257.

⁸³ Condorcet, *Esquisse d'un tableau historique des progrès de l'esprit humain*, ed. J.H. Prior (Paris, 1970), 165-6.

PAINE AND SCIENCE

Mark Philp

I

In the last ten or twenty years Thomas Paine has been the subject of several biographies and many studies of his political, social and, less commonly, his religious thought. These works, my own contributions included, tend to treat Paine's more scientific writings as of little intrinsic interest and as symptomatic of his ability to see the world as an easily legible text, open to one's common sense, the reading of which could only be obscured by the fraudulent doctrines of organised religion and the hereditary system. For Paine, men established society to furnish their wants and harmonize their interests, but these benign origins were lost through the corruptions of hereditary government and the attempt to establish authority over individual beliefs. The example of the American Revolution, and the shock it sent through the states of Europe, demonstrated, he believed, that it was only a matter of time before this system of imposture would be unmasked and the order overthrown, to be replaced by a system of open, democratic government. Once freed from the interference and predations of kings and courtly politics, commerce would meditate between nations to harmonize their interests and produce a global order of enlightenment and reason.¹ Science and its progress is clearly symptomatic of this process of enlightenment, but there is nothing in Paine's political writings to suggest that it has a special role.

This view is often associated with a tendency to treat Paine's comments on scientific matters with a certain amount of condescension. The man was an autodidact, he had little formal training, and was largely ignorant of scientific method and mathematics; his scientific interests were superficial, and he

¹ See Paine's *Letter to the Abbe Raynal* in volume II of *The life and major writings of Thomas Paine*, ed. Philip S Foner (2 vols., New Jersey, 1948) [Foner's edition is hereafter cited as either CW I or CW II]. Note that this view post-dates Paine's writings on the American Revolution, which are marked by a sense of American exceptionalism. See my *Paine* (Oxford, 1989), chapter 2.

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adopted scientific terms and models as metaphors - not because he wanted to convey the conceptual content of their original use, but because he wanted to reap the cachet of their scientific status with an audience whom he sought to persuade, by appeals variously to science, reason and common sense, to sweep aside the old orders of superstition and imposition.

Indeed, his interests in science might easily be dismissed as driven by more deeply held theological commitments - not least because his most extended treatment of the central concerns of eighteenth century science comes in Part One of his *Age of Reason* where it provides a deist text of nature as an alternative to the biblical tradition of Christianity, against which Paine inveighs. For Paine, 'God speaketh universally to man' - not in a particular natural language, but in a universal language of nature:

The Creation speaks a universal language, independently of human speech or human language, multiplied and various as they be. It is an ever existing original, which every man can read. It cannot be forged; it cannot be counterfeited; it cannot be lost; it cannot be altered; it cannot be suppressed. It does not depend upon the will of man whether it is published or not; it publishes itself from one end of earth to the other. It preaches to all nations and to all worlds; and this *Word of God* reveals to man all that is necessary for man to know of God.²

He goes on to appeal to the eternal principles of the world which we have come to recognize through geometry, trigonometry and astronomy as the true 'soul of science': 'It is the structure of the universe that has taught this knowledge to man. That structure is an ever-existing exhibition of every principle upon which every part of mathematical science is founded.'³

The Almighty Lecturer, by displaying the principles of science in the structure of the universe, has invited man to study and imitation. It is as if He had said to the inhabitants of this globe that we call ours, "I have made an earth for man to dwell upon, and I have rendered the starry heavens

² Thomas Paine, 'Age of Reason', CW I, 482-3.

³ CW I, 489.

visible, to teach him science and the arts. He can now provide for his own comfort, AND LEARN FROM MY MUNIFICENCE TO ALL, TO BE KIND TO EACH OTHER.”⁴

What need, on Paine’s account, for a text, cobbled together from the mythological scribblings of past pretenders to knowledge, when we have before us the order of the universe which reason and science reveals to us. Seen in this way, Paine’s science seems wholly driven by his theological interests - it is an expression of faith rather than expressing the objective detachment of the true scientist.⁵

Paine’s deism is also easily linked to his commitment to common sense.⁶ He was a man who knew his own mind and had a secure

⁴ CW I, 490.

⁵ We can recognize this kind of reductionism in I Bernard Cohen’s comment, in his recent work on the place of science in the political thought of Jefferson, Franklin, Madison and Adams, that ‘Political creeds are always ultimately based on religious beliefs or political or social philosophies, a set of general beliefs or axioms from which particular deductions are derived.’ From this premise it would be tempting to jump to the conclusion that, for Paine at least, (a man whose scientific activity is too negligible for Cohen’s notice), the basic axioms were religious, and that science had neither a foundational place in Paine’s thought, nor even the role of an independent variable - being wholly reducible to the religious motives which drove his creed. Indeed, this is the line that Jack Fruchtman Jr. essentially takes in his *Thomas Paine and the religion of nature*, in which Paine’s scientific interests are almost wholly ignored. Paine’s deism might explain his interest in and enthusiasm for science (although he was largely out of his depth since he lacked any formal training), and it would also explain his more general understanding of the role of reason and his belief in the progressive enlightenment of mankind and the growing pressure towards rationally ordered political and economic systems which can harmoniously coexist. See I Bernard Cohen, *Science and the founding fathers* (New York, 1995) and Jack Fruchtman Jr., *Thomas Paine and the religion of nature* (Baltimore, 1993).

⁶ There are considerable difficulties in grasping quite what Paine meant by ‘common sense.’ These are well illustrated in Fruchtman’s discussion of the concept in his *Philosophy and the religion of nature*. Fruchtman argues that ‘Common sense was the means by which the mind understood the way that the heart felt about reality. It had nothing to do with abstract reasoning or metaphysical concepts. It was wholly empirical because it

sense of his place in the world, and who applied his common sense to matters of politics, economics, religion and the study of nature, and came up with a coherent, although perhaps not always very subtle, body of belief about the given order of the world. His confidence in his common sense seems unshakeable: as he announced in his *Age of Reason*, ‘My mind is my own church’, and ‘it is necessary to the happiness of man that he be mentally faithful to himself ...’⁷ But that belief, and his sense of its sacrosanct quality seems to be still more deeply grounded in a faith in God’s beneficent construction of the world. Drawing on a loose understanding of the Newtonian system as evidence of a beneficent order, he appropriated scientific evidence and argument, and, more generally, the study of nature, as confirming instances of this faith. Moreover, this sense of the naturalness and givenness of the order of the universe allowed him to interpret deviations from this order as a function of ignorance and superstition - results of the imposture of established religion and the hereditary system. In such a system there is little room for refutation, since every deviation at the level of politics and society has an explanation, and every feature of creation is treated as evidence of a first cause and His design.

was based on sensory perceptions’ (p. 21). Given this account it is not surprising to find that Fruchtman nowhere discusses Paine’s scientific interests, the impact of Newtonianism on his thought, or even the lectures of Martin and Ferguson. Another way of construing common sense, following Beattie, would be to see it as signifying ‘that power of the mind which perceives truth, or commands belief, not by progressive argumentation, but by an instantaneous, instinctive, and irresistible impulse; derived neither from education, nor from habit, but from nature; acting independently on our will, whenever its object is presented, according to an established law, and therefore not improperly called *Sense*; and acting in a similar manner upon all mankind, and therefore properly called *Common Sense*.’ James Beattie, *Essays*, ‘On the nature and immutability of truth, in opposition to sophistry and scepticism’ (Edinburgh, 1776), 26-7. That is, the intuitive grasp that we have on natural and moral truths, which fit together in a harmonious whole unless distorted by some external force or corruption.

⁷ CW I, 464.

The only idea man can affix to the name of God is that of a *first cause*, the cause of all things. And, incomprehensible and difficult as it is for a man to conceive what a first cause is, he arrives at the belief of it from the tenfold greater difficulty of disbelieving it.... everything we behold carries in itself the internal evidence that it did not make itself...and it is the conviction arising from the evidence that carries us on, as it were, by necessity to the belief of a first cause eternally existing, of a nature totally different to any material existence we know of, and by the power of which all things exist; and this first cause man calls God.⁸

This belief can be seen as the unifying theme throughout Paine's work, providing a consistent, simple, and unsophisticated touchstone for his commitments, and allowing him a clarity of vision which is able to sweep away, mentally, if not practically, the old order of ignorance and superstition, priestcraft and hereditary dogma. His deism, his confidence in an ordered universe, and his insistent appeal to the judgment of the common man, personify a populist version of the rationalism and optimism which it has been traditional to associate with the Enlightenment.

Why buck such trends in the interpretation of Paine's scientific activity? One reason for doing so is that few commentators on Paine have attempted to take Paine's scientific interests seriously.⁹ One explanation for this is that the evidence we have of his activity is not extensive; there are a few papers, mainly concerning his bridge, and a number of letters, and there are the comments in his *Age of Reason*, but little more. There is also, however, a more

⁸ CW I, 484.

⁹ Although this needs moderating for Conway and Aldridge, and especially for Harry Hayden Clark: see, Moncure D Conway, *The life of Thomas Paine* (London, 1909); A O Aldridge, *Man of reason: the life of Thomas Paine* (London, 1959); and Harry Hayden Clark, 'An historical interpretation of Thomas Paine's religion', *University of California Chronicle*, xxxv (1933), 56-87. Among those scientists who have attempted to do so, there has been a conspicuous lack of historical sensitivity, see for example, J G James's 'Thomas Paine's Iron Bridge Work 1785-1803', *Newcomen Society Transactions*, 57 (1987-8), 189-221.

general problem in knowing how seriously to take his scientific pretensions since we need to have both some understanding of what he was trying to do and some sense of how what he was trying to do relates to the standards of thinking and experimentation practised by his contemporaries. Only once we have reached that point can we really make much estimate of the weight of his activity, and, more centrally, of its relationship to his political (and religious) thought). Since those writing about Paine have often been most attracted by the democratic and egalitarian thrust of his writing, it is easy to see why these more complex contextual judgments might be skirted, and his scientific writing rather ignored. Moreover, there are, I will argue, a number of more subtle methodological problems concerning the nature of belief and the relationship between experience, experiment, axioms, and foundational commitments, which complicate inquiry into Paine's scientific understanding and its relationship to his other beliefs.

I have no wish entirely to overturn the picture I have sketched of Paine's beliefs. But I want to suggest that we might profitably seek to refine and complicate it, and I will also indicate why we might be advised to pay more attention to Paine's scientific interests than has been customary. In doing so, I hope I can claim to be following the recommendation of at least one of Paine's friends and contemporaries, Joel Barlow, who issued the injunction that 'The biographers of Paine, should not forget his mathematical acquirements and his mechanical genius.'¹⁰

II

Paine's Scientific Education

We know rather little about Paine's early years and his formal education. He attended a local grammar school until the age of thirteen, but left to work as a staymaker with his father here were conspicuous only by their failure. He eventually became an excise man and tobacconist and in 1772/3 went to London to present a petition to Parliament asking for an increase in excise wages. In doing so he neglected his profession, his business and his wife, and

¹⁰ Moncure D Conway, *The life of Thomas Paine* (London, 1909), 99.

when he returned he had been sacked by the customs service, bankrupted in business, and found his relationship with his wife irretrievably broken down. Having settled his affairs, he returned to London in 1774, obtained letters of recommendation from Benjamin Franklin, and boarded ship for the new world. Although there is not much in this to impress us with Paine's education, the period he spent in London stands out as a major turning point in Paine's life, both practically, because it is at this time that he makes Franklin's acquaintance, and intellectually, because it is the period in which he receives what scientific education he has. In his *Age of Reason*, Paine describes himself in the following terms:

The natural bent of my mind was to science. I had some turn, and I believe some talent, for poetry; but this I rather repressed than encouraged, as leading too much into the field of imagination. As soon as I was able I purchased a pair of Globes, and attended the philosophical lectures of Martin and Ferguson, and became afterwards acquainted with Dr Bevis, of the society called the Royal Society, then living in the Temple, and an excellent astronomer.... After I had made myself master of the use of the globes and the orrery, and conceived an idea of the infinity of space and the eternal divisibility of matter, and obtained at least a general knowledge of what is called natural philosophy, I began to compare - or, as I have before said, to confront - the eternal evidence those things afford with the Christian system of faith.¹¹

¹¹ CW I, 496 and 498. Paine does not date this connection. Following Clark, Keane's recent biography suggests it must have been when Paine returned from one of his sea voyages, having run away from his father's business - dating it to the mid 1750s. But Keane admits that Bevis was not then resident in the Temple, and it is equally likely that the whole of this experience in fact belonged to the later period of residence when representing the excisemen's cause. Both Martin and Ferguson lectured in London both in 1757-8 and in 1772-3. See John R. Milburn, 'The London evening courses of Benjamin Martin and James Ferguson, eighteenth century lecturers on experimental philosophy,' *Annals of Science*, 40 (1983), 437-55, and A Q Morton, 'Lectures on natural philosophy in London, 1750-1765: S C T Demainbray (1710-1782) and the 'Inattention'

But what does Paine's scientific education mean in practice? What was involved in mastering the use of the Globes and the Orrery, in conceiving an idea of the infinity of space, and in obtaining at least a general knowledge of natural philosophy?

Benjamin Martin lectured in the winter of 1772-3 at his premises, number 171 Fleet Street, on Mondays, Wednesdays and Fridays at 6.30 p.m. Admission was one shilling per lecture (rather than having a course fee).¹² The lecture course ranged over Electricity, and its application in medicine; the nature, properties and generation of air; the air pump; properties of light, optics; the Orrery; hydro - statics and hydraulics; pendulums, clockwork mechanisms; geography and the globe; the celestial globe and magnetism. Ferguson also lectured that winter, although his lectures were somewhat disturbed by family difficulties. He lectured daily (except Sundays) at 7 p.m. for a course of twelve

of his countrymen', *British Journal of History of Science*, 23 (1990), 411-34.

Moreover, Paine also mentions, elsewhere (CW II, 1162), the influence of George Lewis Scott, (an eminent amateur mathematician, and one time tutor to George III) whom Paine most likely met when Scott was a member of the excise Board and when Paine was in London in 1772-3. It was Scott who introduced him to Franklin. I doubt much rests on exactly when Paine first attended the lectures, but most of the evidence points to the later rather than the earlier period. What we do know is that the impact of Paine's scientific interests can be detected in even the earliest pieces written on his arrival in America in 1774/5, and they remain a common theme subsequently throughout his life - see for example his 'Useful and entertaining Hints', signed *Amicus* (Feb 10, 1775), which uses the collections of minerals and fossils in the Philadelphia Library Company, as the starting point for a peroration on the interconnection between science and industry, and on the largely untapped potential for mineralogical exploration and exploitation in America, coupled with a proposal for using the intellectual resources of the American Philosophical Society to examine samples of earth and minerals so as to facilitate knowledge of their potential - supplementing 'the defective knowledge of the individual' from 'the common stock' - and giving a new spring to agriculture and manufactures. CW II, 1024-5.

¹² See Milburn, 'The London evening courses of ... Martin and Ferguson', op cit.

lectures, also at a shilling a lecture. The course was roughly similar, with more emphasis on the use of the Orrery, and with a more systematic approach to the topics than his rival. Martin, the more entrepreneurial of the two men, also sold equipment but both men designed their own equipment for the experiments they performed. They also published various works on the use of globes, on Newton's Astronomy, on mechanics, and so on. Ferguson was a Fellow of the Royal Society (and of the American Philosophical Society), and was granted a small annual pension by George III in 1760.

In his recent work on Science and the Founding Fathers, I Bernard Cohen distinguishes two central types of scientific activity handed down from Newton: the study of mathematical laws and principles and their application to rational and celestial mechanics, including the study of the motions of the planets; and, secondly, the experimental and largely non-mathematical study of the world - covering things like Newton's own work on optics, but also including any form of practical experimentation or collection and classification of phenomena. The lectures given by men like Martin and Ferguson were almost entirely concerned with the non-mathematical side of rational and celestial mechanics, with occasional excursions into experimentation, and there is little evidence that the lectures covered the mathematics of mechanics. Ferguson describes himself as being taught arithmetic, decimal arithmetic and algebra, and the elements of geometry, but having this education disrupted after a short while, and he was described by a contemporary as being ignorant of geometry and incapable of recognising a geometrical proof.¹³ Clearly, mathematics was central to Newton's work on celestial mechanics - the development, for example, of the mathematics of the *Principia* is centrally

¹³ The comment on his lack of mathematical skill is made by Charles Hutton, *Tracts on mathematical and philosophical subjects* (3 vols., London, 1812), III, 379, also cited in the *Dictionary of National Biography*. Ferguson's own, *A short account of the life of James Ferguson written by himself* (London, 1826), confirms that his mathematical training never really took off - and the annexed sequel comments that 'his mathematical acquirements were, however, but superficial, and of algebra he understood little beyond the notation.' 24.

concerned with the analysis of tangents to circles, areas under curves and points in motion on a curve - all fundamental tools for measuring ellipses and planetary motion. But none of this appears in Ferguson's or Martin's popular works, nor in their published lectures. Rather, their account of planetary motion is given largely in mechanical terms, together with some account of forces which act on matter, such as gravitation, attraction and compulsion. Martin was certainly better versed in the complexities of Newtonian geometry and calculus, although he did not pretend to have a complete command.¹⁴ Their forte lay much more centrally in the practical demonstration of rational and celestial mechanics.

Paine clearly invested a good deal, practically and intellectually in these lectures. Attending them was not cheap, and he also purchased a 'pair of globes'. Martin advertised a range of such equipment. Manual Orreries were £2.12.6, those with wheel work, £8.8.0. Large Orreries sold for as much as £150. Globes ranged from Senex globes of 28" diameter in Mahogany frames for £35 (see fig i), through to smaller globes with cheaper frames, to 3" globes in a case for 10 shillings - although these latter would have been the least useful for the more precise type of calculation an aspiring student of astronomy would have wished to attempt. To have attended enough lectures to have reached a degree of familiarity with the concepts and methods of the new natural philosophy would then have involved a significant outlay on Paine's part. It is possible that he came to London with some reserves derived from the tobacconist business and from his excise work - it also possible that he drew on the money allocated as expenses by the excisemen whose case he was representing.¹⁵ But,

¹⁴ B. Martin, *The Philosophical Grammar, or View of Modern Philosophers* (London, 1735), vii: 'Sir Isaac's Principia are all enveloped, not only from the common Ken, but from the general Tribe of mathematicians themselves'. But see his discussion of Conic Geometry in B. Martin, *The General Magazine of Arts and Sciences*, XLV (London, June 1758), and his *A new and comprehensive system of mathematical institutions agreeable to the present state of Newtonian mathesis* (2 vols., London, 1759). For illustrations of instruments (figs i-vi), see p.244 et seq.

¹⁵ James, 'Thomas Paine's Iron Bridge', claims that Paine squandered £500 which the excisemen had collected for their campaign, but there is

certainly, he seems to have been prepared to devote a significant sum to his interests.¹⁶

What evidence is there that he retained anything he learnt in these lectures? The purchase of the globes might be thought to be little more than a scientific affectation, but this ignores the extent to which the globes were seen as providing problems for resolution. Martin's own *An Essay on the Nature and Superior use of Globes* (1758) ends with a range of problems for resolution, and while these were clearly aimed at the education of young minds, they give a good indication of the kinds of exercises which Paine could have undertaken with them (see fig ii¹⁷): finding the longitude and latitude of a place; calculating distance and bearing; calculating the place of the sun, its declination, ascension, altitude, and time of rising and setting; setting comparative times for different places; identifying the length of the night in different parts of the globe; and so on. Although the same type of problem is not set for the celestial globe, the text covers similar types of issues with respect to identifying the visible constellations and planets. Very similar problems are also discussed in Ferguson's lectures; but Ferguson also includes a detailed account of, and set of problems designed for, the celestial sphere.¹⁸

The Orrery is a good deal more complex (fig iii and iv). The more sophisticated forms could cost a great deal of money, but Ferguson's (fig iv) is a simpler version for showing the diurnal and

no evidence that Paine received that sum, and Oldys, his hostile biographer could only rise to accusing him of having secreted £30. See Moncur Conway, *The life of Thomas Paine*, 12-15.

¹⁶ This is a further indication that this 'education' must have been at the later of the dates, since he would have been in no position to support such expenditure when in his late teens.

¹⁷ See also the discussion of fig ii in Ferguson's *Astronomy explained on Sir Isaac Newton's principles and made easy to those who have not studied mathematics* (2nd edn., London, 1757), 79-81.

¹⁸ James Ferguson, *Lectures on select subjects in mechanics, pneumatics, hydrostatics, and optics: with the use of the globes and the art of dialling* (London, 1760). See especially 278-306 and 312-29 and material on rectification of the globe (includes Harvest moon - for which Ferguson was renowned). Also, see the discussion of the Armillary sphere, 329-33 (see fig v).

annual motions of the Earth and her Nodes.¹⁹ The more complex versions sought to demonstrate the movements not only of the earth, moon and sun, but also the movements of Mercury and Venus in relation to them. It seems unlikely that Paine would have purchased an orrery, but he doubtless had access to one during the lectures and they would have played a central part in describing the motions of the planets within the solar system - most crucially, they sought to *show* how the planetary system worked, by reproducing its motions and relations mechanically. The development of a facility, through the use of an orrery, mechanically to reproduce the motions of the planets might not have been a necessary condition for an understanding of celestial mechanics, but it might have been a sufficient one - and one which allowed the student to dispense to a considerable degree with the more mathematical foundations developed in the *Principia*. There is some evidence that Paine saw things in this way from his comments in his *Age of Reason* about the way that the use of mechanical apparatuses substitutes for the 'invisible agency by which all the component parts of the immense machine of the universe have influence upon each other and act in motional unison, without any apparent contact, and to which man has given the name attraction, gravitation and repulsion ... the humble imitation of teeth and cogs.'²⁰

The mastery of the globes and orrery should, then, be associated with a pretty good understanding of the principles of astronomy and celestial mechanics. Indeed, since it is doubtful that he had access to Ferguson's or Martin's work when writing the *Age of Reason* (Paine always claimed that it was written without access to the Bible - and it is doubtful that other books would have been easier to obtain²¹), his recall of the basic principles of the solar system is impressive. His account centres on astronomy, especially in the section on The Plan and Order of the Universe,²² in which he details, the character of the Solar System, the tilt of the earth, the relation of the planets and the distances between them, the extent of

¹⁹ See Ferguson, *Astronomy*, 263-4.

²⁰ CW I, 489.

²¹ See Paine's account of the circumstances under which he wrote Part I, in the Preface to Part II, CW I, 514.

²² CW I, 500-503.

the known solar system, the nature of the stars and the probability of the existence of a plurality of worlds.²³

There is also evidence that Paine had some independent grasp on the system. On Ferguson's account, not only was the solar system evidence of God's beneficent design, but God remained an active interventionist agent. He suggests, for example that the Moon is nearer the earth than formerly, and that her orbit of earth will diminish over time, 'and therefore, she must come to earth at last; unless that Being, which gave her a sufficient projectile force at the beginning, adds a little more to it in due time.'

Here we have a strong philosophical argument against the eternity of the World. For, had it existed from eternity, and been left by the Deity to be governed by the combined actions of the above forces or powers, generally called Laws, it had been at an end long ago. And if it be left to them it must come to an end. But we may be certain that it will last as long as was intended by it's Author, who ought no more to be found fault with for framing so perishable a work, than for making man mortal.²⁴

Paine's position diverges from Ferguson's on this point. The *Age of Reason* does not envisage a continually interventionist God, but a single first cause whose design of the celestial order is such as to

²³ While the last might be thought to be an eccentric addition to a comparatively conservative science by Paine, it is worth comparing Ferguson's comments in his *Astronomy explained upon Isaac Newton's principles...*: 'What an august! what an amazing conception, if human nature can conceive it, does this give of the works of the creator! Thousands of thousands of suns, multiplied without end, and ranged all around us, at immense distances from each other, attended by ten thousand Worlds, all in rapid motion, yet calm, regular, and harmonious, invariably keeping the paths prescribed them, and these Worlds peopled with myriads of intelligent beings, formed for endless progression in perfection and felicity. If so much power, wisdom, goodness, and magnificence is displayed in the material Creation, which is the least considerable part of the Universe, how great, how wise, how good must HE be, who made and governs the whole.' Ferguson, *Astronomy*, 5.

²⁴ Ferguson, *Astronomy*, 61-2. (See also Lectures 44-5 on the importance of God's intervention as a result of a combination of planets in the same quarter of the heavens disturbing their motions through mutual influence.)

require no further intervention. In this respect, Paine's reading of Newtonian mechanics is one which is substantially more rationalist and deist in its implications than was that of many of his contemporaries (Anglican circles, for example, seem to have avoided drawing deist conclusions in their interpretation of Newton's account!). But this variance does suggest that Paine was not simply parroting the arguments of those who lectured to him. He advances a view of the order of the system of the universe which has mathematical realism at its core:

Man cannot invent anything that is eternal and immutable; and the scientific principles he employs for this purpose must be, and are of necessity, as eternal and immutable as the laws by which the heavenly bodies move ... The scientific principles that man employs to obtain foreknowledge of an eclipse, or of anything else relating to the motion of the heavenly bodies, are contained chiefly in that part of science which is called trigonometry ... In fine, it is the soul of science; it is an eternal truth; it contains the *mathematical demonstration* of which man speaks, and the extent of its uses is unknown ... It is the structure of the universe that has taught this knowledge to man. That structure is an ever-existing exhibition of every principle upon which every part of mathematical science is founded.²⁵

In contrast, then, to Ferguson, Paine seems to be working with a conception of the natural order as fundamentally ordered by immutable mathematical principles. Within that system the development of human knowledge is a function of the discovery of those principles and their rigorous application to phenomena in the world. While God creates this immutable order, Paine is working with a more Platonist conception of that role and the creation than was Ferguson.

This suggests that Paine learnt a good deal on the celestial mechanics side. But there is also evidence that he attended to the details of their accounts of such things as the nature of matter. In a note to Jefferson, Paine refers to a conversation of the previous evening in which Jefferson had argued that Newton's principle of

²⁵ CW I, 488-89.

gravitation would not explain, or could not apply as a rule to find the quantity of the attraction of cohesion. Paine's comments are perfectly well informed. In his *Lectures on Select Subjects*, Ferguson identifies five properties of matter of which the fifth is attraction, of which there are four kinds - cohesion, gravitation, magnetism and electricity. Ferguson defines the attraction of cohesion as that by which small parts of matter are made to stick and cohere together, and he cites a range of implausibly connected examples of cohesion, including sugar or sponge drawing up liquid, flat oiled surfaces of marble sticking together, and drops of mercury running together. Paine tries to distinguish between attraction and cohesion and to suggest that cohesion is best understood as a mechanical interlocking of parts of matter, leaving attraction as a quality of matter acting at a distance from the visible presence of matter. Although Paine's similes for explaining the difference are rather quaint, and tend to the anthropomorphic, the thrust of his point is one about qualities of matter and, in eighteenth century terms, he makes an intelligible stab at an important concept.

On balance then, although there is not a huge amount of evidence concerning Paine's grasp of the material covered by Martin and Ferguson, what evidence there is suggests that Paine probably did have a pretty good grounding, less in the mathematical principles of mechanics, than in arguments concerning celestial motion. Although Joel Barlow clearly did rate his mathematical understanding, there is nothing in his writing to demonstrate the extent of this grasp.²⁶

This does not settle the issue of the nature of the relationship between science and religion for Paine. I return to this in my

²⁶ There is however little to justify James's claim that Paine's pretensions to mathematical knowledge were 'mere window dressing' ('Thomas Paine's iron bridge,' 209). James's claim relies on an inference from a single comment in Gouverneur Morris's diary, which reports Paine asking his advice on calculating the angle of the arch of his bridge. Taken in the context of the Diary as a whole, and given Morris's rather ambivalent attitude to Paine, the comment is innocuous and cannot be used to support such a sweeping claim. See Gouverneur Morris, *A diary of the French Revolution*, ed. B. C. Davenport (2 vols., London, 1939), I, 607.

concluding comments, but, as an interim comment, we can suggest that Paine, like many of his scientifically informed friends contemporaries found in the axioms, methods and principles of Newtonian astronomy a system with which they could make coherent sense of the universe they inhabited. That understanding included a number of straightforward factual claims about the movements of the planets, together with explanatory accounts which linked those factual statements in a way that secured them as robust elements within an overall framework - for some, that framework remained heavily influenced by traditional theology, but not for Paine. In contrast he seems to have taken the framework as a form of complex orrery - a system, which required a first cause, but which, once in motion, provides an order which allows us perfectly to predict and understand the fundamental elements of the natural world, with no further reference to God. Within that frame, then, the activities of observing and recording evidence and explaining phenomena, could be done wholly in accordance with the principles of that science. To this extent it was able to hold religious and mythological explanation at the borders of what was a practically and conceptually rich paradigm. While God sets up the order of the world, his lack of continuous intervention gives scientific inquiry a degree of autonomy and allows that inquiry to be driven by wholly or largely secular concerns. The ultimate appeal to a first cause does not, then, mean that Paine's scientific interests are driven by or reducible to his religion. Indeed, the impression that God plays a prominent role in his understanding arises in part from the fact that his comments on science and the solar system are made in the context of his deist attack on the Christian religion - an attack which was, admittedly, motivated by a concern that 'in the general wreck of superstition, of false systems of government and false theology, we lose sight of morality, of humanity and of the theology that is true.'²⁷

²⁷ CW I, 464.

In many ways, it seems much more likely that his scientific education might have had some effect upon his religious thinking - since it provided him with a core of evidence, factual claims and propositions which carried their own authority by their predictive and explanatory power. To be introduced to this way of experiencing the world, and to be taught how to make the explanation work for himself (through the exercises for globes and orrery), was to be taught a method for arriving at knowledge against which neither opinion nor authority could stand. It is an appeal to the authority of reason, experimentation and evidence. If that were the true kernel of Thomas Paine's education, rather than the knapsack of homespun philosophy picked up while being buffeted by the experience of repeated failure in mid eighteenth century England, we might expect both that it would have a powerful impact on his writing, and that taking this line might offer a rather different perspective on his political writing than is customarily given. Not least, it might be thought to give both a degree of rigour and an evidential grounding to the core of his 'common sense' which departs significantly from the more informal understanding of that faculty with which most of Paine's contemporaries worked. It might do this, but it is worth reflecting, firstly, that there is no evidence that Paine's understanding was any more sophisticated than the average member of the educated middling orders, and secondly, that even if this is what Paine took from his brush with science it is clear that a great many of his contemporaries did not - finding it eminently possible to remain committed Christians and Newtonians! Moreover, as I discuss in my concluding remarks, we need to be extremely careful about the assumptions such claims make about the interconnection between scientific and other types of activity.

III

Experimentation and the study of nature

Thus far I have discussed Paine's interest in the more theoretical parts of science or natural philosophy, but eighteenth century science was not simply a set of particular beliefs, it also involved a set of practices and methods which embodied principles by which

true and false statements were distinguished, proofs established and evidence gathered. Moreover, there were many different areas of scientific activity, within which individuals might specialise. Paine was actively involved in practical experimentation, the construction of models, the testing of hypotheses, and the building of tools and machinery. Although he corresponded with and met such eminent scientists of his day as his lecturers, Sir Joseph Banks, Scott, Franklin, Jefferson, Rittenhouse etc., he was not, for the most part discussing with them the intricacies of infinitesimal fractions and the fundamental theorem of the calculus. But this does not seem to have mattered greatly. Paine's letters to Jefferson, the person to whom the great bulk of his extant correspondence on scientific matters is addressed, concern only rarely the more abstract aspects of natural philosophy (such as the attraction of cohesion); they more commonly focus on practical experimentation and the design of machines - and, of course his bridge.

One way of discussing the difference between the more mathematical and astronomical side of science and the more experimental is that between the deductive and the inductive. The deductive, for which the more mathematical and geometrical work provided the model, begins with certain axioms and sets out to establish, by logical means, certain conclusions. Its paradigm case in the eighteenth century is Newton's *Principia*. The inductive uses experience and experimentation and seeks to derive generalisations which can then be subject to further testing; and it is more Baconian in form - Newton's *Opticks* is also a model for such inquiry. Although it is important to recognize these two elements in the scientific activity of the mid-eighteenth century, it would be a mistake to think of them as clearly and consistently distinguished in the manuals of popular science. Compare, for example, Benjamin Martin's discussion of the use of hypotheses in science with the entry on 'Hypotheses' in Croker's *Complete dictionary of arts and sciences* (1765). Croker holds that only axioms and propositions derived from the nature of things are acceptable as the basis for scientific activity, and that the hypothesis has no role to play. Martin, on the other hand, in *The philosophical grammar, or view of modern philosophy* (1735) defends their use against those 'who will receive no system of philosophy, but what is wholly

founded on Mathematical Experiments and Demonstrations.' Nonetheless, there is a good deal of slippage in the terms with which experimental activity is discussed - and it is not surprising that, despite these seemingly disparate positions, the two works are in full agreement on the four fundamental rules for the construction of explanations for phenomena (probably because, as Croker acknowledges, the propositions derive from the third book of Newton's *Principia*).

I We must take Care to admit no more Causes of natural Things, than what are true, and sufficient to explain their Phaenomena.

II We must observe always to assign the same clauses for the same Natural Effects.

III Those Qualities which cannot be increased or diminished, and agree to all Bodies in which Experiments can be made, must be adjudged the Properties of all Bodies in General.

IV Propositions and Conclusions, deduced from actual Experiments, must be esteemed true and accurater, notwithstanding any *Hypotheses*, or received *Suppositions*, to the contrary, and must be insisted on 'till some other phaenomena, either render them more accurate, or liable to exception.

It is not difficult to recognize these principles at work in Paine's own activities. In 1783, he was in Princeton with Washington, close to a creek which was reputed to be capable of being set on fire. Paine, Washington and one or two others rowed out into the river and, holding lighted cartridge paper over the surface of the water, disturbed the mud at the bottom of the river, thereby releasing bubbles which subsequently caught fire. The next time Paine was in Philadelphia he mentioned the experiment to David Rittenhouse. The two hypothesized that 'any combustible matter (vegetable or otherwise) that underwent a decomposition either by fire or water in a confined space and in a manner so as not to blaze would be inflammable and would become flame whenever it came into contact with flame.'²⁸ Paine and Rittenhouse then conducted a series of experiments to test the hypothesis that the

²⁸ CW II, 1063.

destruction of flammable material by heat (sawdust in a sealed gun-barrel, placed in a furnace), without flame would result in the production of flammable gas.²⁹ This is by no means a trivial or eccentric discussion. In 1774 Benjamin Franklin had written to Joseph Priestley about the raising of a flame on the surface of water - and his account is not dissimilar to Paine's - moreover, it records that a letter on the issue was read to the Royal Society in England in 1765. Interestingly enough, Franklin had no hypothesis about why there is a flame, and was unsuccessful in raising a flame in various attempts in England.³⁰

Franklin and Paine's experimental and scientific interests met on other occasions. There is correspondence between Franklin and General Charles Lee in 1776 about stockpiling arms in case of war, in which Franklin expressed the hope that bows and arrows would also be laid up since these had numerous advantages. A little over a year later Paine wrote to Franklin suggesting the development of 'fire arrows', of an iron construction - and he claimed that he and Rittenhouse were collaborating on a test model. Similarly, in 1785, Paine wrote to Franklin to describe his experiments to produce a smokeless candle, created by a bore running through the centre of the candle.³¹ On January 1st 1786 John Hall, the craftsman and mechanic whom Paine employed on his bridge, wrote in his diary: 'Mr Paine went to dine with Dr Franklin today; staid till after tea in the evening. They tried the burning of our candles by blowing a gentle current through them. It greatly improved the light. The draught of air is prevented by passing through a cold tube of tallow. The tin of the new lamp by internal reflections is heated and causes a constant current. This is the Doctor's conjecture.'³²

It is worth comparing this process of testing and experimentation with Paine's occasional bouts of inductive generalisation. In a letter to Jefferson in Paris in September 1788, he proposes a method for estimating the loads of timber which may be gained from a tree.

²⁹ CW II, 1062-3.

³⁰ *The writings of Benjamin Franklin*, ...ed. with a life and introduction, by Albert Henry Smyth (10 vols., New York, 1905-7), VI, 226-8.

³¹ CW II, 1025.

³² Conway, *Life of Thomas Paine*, 340.

He bases his calculation by drawing a parallel between a tree and a fountain (see fig. vi):

It is evident that no more water can pass through the branching tubes than pass through the trunk. 2nd, that admitting all the water to pass with equal freedom the sum of the squares of the diameters of the two first branches must be equal to the square of the diameter of the trunk...etcetera (so that)... the solid content of the whole will be equal to the cylinder (fig. 2) of the same diameter of the trunk and height of the fountain.

By considering a tree as a fountain, with 'the sap ascending in capillary tubes like the water in a fountain ... no more water will pass through the branches than pass through the trunk.' Paine asks us to

consider the branches as so many sub-divisions of the trunk as they are in the fountain, and their contents are to be found by some rule with the difference only of a pyrimidian figure instead of a cylindrical one. Therefore to find the quantity of timber (or rather loads) in the tree, figure 3d. Draw a pyramid equal to the height of the tree as Fig. 4th, taking for the inclination of the pyramid, the diameter of the bottom, and at any discretionary height above it which is as 3 and 2.

As sensible men should never guess, and as it is impossible to judge without some point to begin at, this appears to me to be that point, and by which a person may ascertain near enough the quantity of timber, and loads of wood in any quantity of land, and he may distinguish them into timber, wood and faggots.³³

The letter might seem surprising, since, if we follow Paine in comparing the areas of the circles created by dissecting the trunk and the branches we might expect him to use the formula πr^2 . The calculation, however, works equally well with the diameter squared. This is not to say that the calculation is flawless - it makes a number of assumptions - not least that the rate of capillary action is the same throughout, and that the proportion of the trunk and branches through which water passes are in ratio to their size, and

are invariable across types of tree. But, while Paine's account seems rather bizarre, it is in many ways a perfect example of inductive reasoning. There must be some proportion between the size of a trunk and its branches, just as there must be some proportion between the width of a trunk and the height it can support. What Paine does is to assume a set of ordered and proportional relations and then apply the model of a fountain (thereby making the assumption that the single most important activity of the trunk and branches is the dispersion of moisture). It might seem that the account is seriously flawed since, although it is designed to indicate the proportions of different qualities of wood, Paine nowhere explains at what point the trunk begins branching, nor why there should be a constant ration of length between the different parts of a tree. But, in fact, Paine makes no such assumption. The observer has to measure the ratios, but Paine's method indicates not the length of different qualities of wood, but, once one knows the length, the quantity of that type of wood. As such, it is a perfect example of Paine's use of induction, based on a mechanical model of a natural phenomenon, filled out with additional empirical detail.

In 1801, Jefferson was also treated to letters concerning the possibilities of driving mechanical power by the use of gunpowder,³⁴ on the finishing of walls to make them secure against the weather, and on his success in constructing carriage wheels on the basis of concentric circles, as opposed to cutting the rim across the grain - 'They are equally as firm as if they were a natural production and handsomer than any wheels ever yet made. But the machinery I have invented, and the means I used, to bring them to this perfection I cannot describe in a letter.'³⁵ In 1805 he was writing about his design for improving his new house; the following year he was proposing an explanation for the incidence of yellow fever, and at the end of his life he produced pieces on fortification, the use of gun boats and the difficulties in proposals to prevent the harbour of New York being reached by enemy ships.

³³ CW II, 1035.

³⁴ CW II, 1047-50.

³⁵ CW II, 1425.

Moreover, and most importantly, he spent the best part of seven years of his life designing and then trying to bring to realisation his iron bridge project, first in America and then in Europe. The bridge was distinctive in being constructed from wrought iron, in drawing on the shape of a spider's web, and in being designed to cross large distances without the use of piers. The Bridge dominated Paine's life between 1785 and 1792 - he designed various models, making several in wood. One was constructed from 1" sq wood, with each piece 12.5" long - from which he constructed a model of 13 feet - 'what weight it will bear, as it cannot be ascertained without breaking it, I am unwilling to put to an experiment. Four men have been on it at one time, without the least injury to it, or sign of any.'³⁶ Paine then hired the English forgerman, mechanic and inventor, John Hall, to assist him in constructing a sizeable metal model with which he hoped to convince the Pennsylvania Assembly to build a 400ft bridge across the Schuylkill. The Assembly proved reluctant to build the bridge (it would have found it extremely costly to do so as no existing iron works was capable of producing the quantity of metal the design required), and Paine took the models over to Europe, and showed them to the French Academy of Science (although not to the *Corps des Ponts et Chaussées* - reputedly a much more demanding body with considerably greater expertise than the Academy), which was very much interested, in part because of a spate of proposals for iron bridges in France and the development of a range of models, some similar to Paine, by French engineers.³⁷ He also applied successfully for a patent in England and collaborated with one of the foremost iron works in England (Thomas Walker of Rotherham) to produce a substantial model of the bridge with a 90 foot arch - constructed from three tons of iron, and bearing a load easily of double that weight. On Paine's account, the model attracted a good deal of attention, not least from Sir Joseph Banks and members of the Royal Society 'who appear as much pleased as

³⁶ CW II, 1027.

³⁷ See J. G. James, 'Iron Arched Bridge Designs in Pre-Revolutionary France', *History of Technology*, 4 (1979), 63-99.

if they had an interest in it',³⁸ and from those who paid to walk across it when it was finally erected in a field between Paddington and Marylebone in the summer of 1790. More sceptical accounts have pronounced the exercise a flop, with the bridge seeming flimsy, subject to rust, and having to be taken down prematurely because the wooden abutments gave way. James, a leading expert on early iron bridges, is openly hostile to Paine's attempt - suggesting that he borrowed many ideas from the French and that his bridge was 'ill-conceived and represented a retrograde step in the erratic advance of iron bridge technology.' On the other hand, he does concede that this 'should not be allowed to obscure the equally incontrovertible fact that he played an important role through his publicity of the topic and his ability to persuade backers to erect a full-sized example from which others better qualified than he could draw practical lessons.'³⁹ Despite James's technical expertise, there is a sense that he operates with a wholly teleological account of technological progress, where the heroes are those whose work is justified *ex post facto*, and the failures are those whose work is not. More especially, with respect to Paine, even if we do not believe that he made a major contribution to progress in bridge building, we should still recognize that there is ample evidence that it was an area of interest and expertise within which he made a contribution *by the standards of that practice*. That is, while his financial arrangements may have been maverick, his enthusiasm rather amateurish, and his design, in the last analysis, flawed, we need to recognize that he was recognized as a serious contributor to the field. James asks too much, and concedes too little. While Paine's bridge never forged a river, there seems little doubt that he contributed to demonstrating the value of iron as a material for bridging large rivers without the use of piers. To do so it seems clear that he would have had to have at least some basic mathematics and geometry. What he lacked, because everyone else did, was a science of materials to allow him the better to assess the weight of the iron he would need to use. On the other hand, it is

³⁸ W H G Armytage, 'Thomas Paine and the Walkers: and early episode in Anglo-American co-operation', *Pennsylvania History*, 18, (1951), 27.

³⁹ James op cit., 218.

also true that the systematic production of high quality iron on a large scale allowing a precise knowledge of its weight-bearing and susceptibility to uneven expansion and contraction, was still in the future.

There remains a broader issue of how seriously to take all this activity. Is it significant that Paine wrote about scientific matters predominantly in his correspondence with Franklin and, more frequently, Jefferson? Is this a case of Paine trying to sustain his standing with two central figures in America by appealing to a common interest in scientific inquiry? I doubt it. One reason we have these letters is that Jefferson and Franklin kept them - one can only speculate about others written and lost (although we know that there are more than we have to Joseph Banks, George Scott and others). Moreover, there is nothing I have found in the correspondence of Jefferson, Franklin, or others to suggest that they had anything other than a genuine interest in, and respect for Paine's proposals.⁴⁰ Jefferson was certainly critical of some of them. He wrote to Paine expressing doubts about some aspects of the design for alterations to his house, but he does so in a manner which we cannot regard as condescending.⁴¹ Similarly, there is no evidence that Franklin, Washington, Jefferson or other senior figures of the revolution and the scientific community in America, with the possible exception of Morris, had anything other than a genuine interest in Paine's ideas. On the methodological principle of charity we have to accept that they took Paine's ideas every bit as seriously as he did.

IV

Science, experiment and politics.

What, then, can we say about the relationship between Paine's scientific activities and interests and his politics, and his religion? Should we see his scientific understanding as shaped by his religious beliefs, and, perhaps, above all by his sense of the

⁴⁰ Gouverneur Morris, on whose judgment James relies, is certainly not an enthusiast for Paine, but nor does he suggest that Paine is incompetent (indeed, James rather exaggerates his hostility to Paine).

⁴¹ CW II, 1057.

sufficiency of individual conscience in religion, politics, and science? Should we play down Paine's knowledge and expertise in astronomy, and celestial mechanics, and play up his experiments and inventions, so as to indicate that science was, for Paine, an extension of common sense rooted in experience? We might feel justified in doing this, but there are at least three other ways in which Paine's activities might be read.

In the first, science becomes much more central to understanding Paine's politics. This account begins with celestial mechanics and induction. For all the theist conclusions drawn from the movements of the planets - with respect to the providential ordering of nature, and the role of God as a first cause - the idea of a systematic order to nature knowable through human reason and subject to practical demonstration and mathematical proof, can be seen as having an extraordinarily powerful effect on Paine, demonstrating to him the power of inductive reasoning. On this view, his reading of common sense is one shaped by his belief that nature provides the basis for a moral geometry, which begins from the axioms of the equality of individuals and the absence of divinely ordained authority. That sense of moral geometry is best captured by Jefferson:

We hold these truths to be self-evident: that all men are created equal; that they are endowed by their creator with *inherent and inalienable* rights; that among these are life, liberty, and the pursuit of happiness: that to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or abolish it...⁴²

This inductive pattern of reasoning, which we can see in evidence in Paine's writing throughout his life, worked in a very different way to the traditions of political discourse in England in the 1790s. Hence the radicalism of the *Rights of Man*, and hence the reluctance among those attracted to radicalism wholly to endorse

⁴² 'A Declaration by the representative of the United States of America, in general Congress assembled,' in *Thomas Jefferson: Writings*, ed. Merrill Peterson (New York, 1984), 19.

Paine's principles, which were recognized as foreign to the particular rights of free-born Englishmen to which it was customary to appeal. Paine's position on rights was axiomatic and universal, not empirical and local: in this he may well have drawn inspiration from outside the customary sources of popular political discourse in England, and one major source might have been the model of reasoning he found at work in the lectures of Ferguson and Martin and among the scientists with whom he worked in the New World.

A second way of understanding the impact of Paine's scientific interests is to see scientific activity as giving him a purchase on the world which is of a fundamentally different order from that to be gained in politics. The rigorous formulation of propositions and their testing, in some cases against evidence, in others through the deployment of models and machines, allows the development of a set of propositional attitudes which are fundamentally orientated on the one hand to states of affairs in the natural world, and on the other to criteria of consistency and coherence between propositions. In contrast, political discourse is saturated with semi-propositional beliefs - (the distinction is Dan Sperber's).

Propositions are either true or false. Sets of propositions are either consistent or inconsistent. Propositions, as opposed to sentences or utterances cannot be ambiguous and hence true in some interpretations and false in others. Yet some of our so-called beliefs have several possible interpretations and we can hold them without committing ourselves to any of their interpretations.... Many of our thoughts are what we might call semi-propositional, they approximate but do not achieve propositionality.⁴³

Sperber's suggestion (albeit advanced in a rather different context) is that rather than treating all beliefs as of equivalent standing, which is the route relativism takes, we can distinguish between beliefs made up from factual statements and true and consistent propositions, and beliefs whose content is semi-propositional because it is ambiguous, unclear, and subject to a

⁴³ Dan Sperber, *On anthropological knowledge* (Cambridge, 1985), 50-1, see also 53.

variety of interpretations, and thus cannot be said to be either true or false. Paine's scientific 'education', and his practical experimentation would have offered him a rigorous method for formulating and testing propositions. To put science at the core of Paine's later life would be to bring to the fore his rootedness in a way of understanding the world which is propositional, evidentially established and insistent upon coherence - one which, as a result, cuts through an understanding of the world based on authority (religious or secular) or on force and fraud. Throughout Paine's writing, one consistent device is the debunking of symbolic practices and semi-propositional attitudes around authority, in favour of strictly propositional statements:

Mr Burke talks about what he calls an hereditary crown as if it were some production of Nature; or as if, like Time, it had the power to operate, not only independently, but in spite of man; or as if it were a thing or a subject universally consented to. Alas! it has none of those properties, but is the reverse of them all. It is a thing in imagination, the propriety of which is more than doubted, and the legality of which in a few years will be denied.⁴⁴

Can we take this as evidence that natural science drove Paine's thinking, or should we just see it as a rhetorical strategy? - even if that rhetoric is itself driven by an understanding of the character of evidence, reasoning, ideas and grounded belief which derives from a model of scientific understanding. What is a king, but a man; and what is the Bible but the product of men. Statements need to be purged of their illusion and muddling, and distilled into a rational kernel of factual propositions. As a way of proceeding among his contemporaries in late eighteenth century political discourse - not least as a way of proceeding against Burke, the method is extremely powerful - clear thought reveals that the emperor has no clothes.

On this second view, the methodological training which encourages Paine to break down ideas into sets of coherent factual propositions plays a much more formative role than the

⁴⁴ *Right of Man* (1791), in M Philp ed., *Thomas Paine: Rights of Man, Common Sense and other political writings* (Oxford, 1995), 172-3.

experimental side of his various scientific inquiries. The third position I want to discuss recognizes that this second account has its limits and it resists the view that Paine should be understood as trying to found a political science. The axiomatic propositions upon which his political creed is based are hardly straightforwardly factual - the view that all men come equally from the hand of God is not an obvious candidate for a straightforward factual proposition. Did Paine realize this? Was he attempting to apply standards of rigour and clarity to the social and political world which mirrored those used in science? Or has he a sense of the different character of the activities, so that his application is knowingly metaphorical? This is a difficult judgment to make, but there are grounds for thinking that Paine did know the difference between a factual proposition and a rhetorical move. His scientific thinking may have informed his political rhetoric, but what drove that rhetoric was, above all, the desire to dethrone religious and political authority by appeals to the experience and aspirations of the middling ranks and artisan classes of society. The essential equality of individuals, then, can be seen both as a type of axiom, and as a powerful rhetorical weapon against the status quo. But we need not think that Paine saw the axiom as having the status of a scientific proposition.

What about Paine's experiments? One thing to which we should be alert is the multiplicity of areas of inquiry in which he worked - indeed, one source of the impression that Paine was a dabbler is precisely his apparent willingness to have a go at whatever attracted his fancy. There is something in this: when we look in detail at the relatively sparse remains of his scientific work, it appears to be eccentrically diverse in character. Indeed, we might also be drawn to the conclusion that, whatever his education in Newtonian science, his practical approach lacks any unifying methodological principles. This would be a mistake. There is a good deal of variation in his writing - and variation both in the level of expertise and in the extent to which he relies on induction or deduction in approaching a subject. But two factors may contribute significantly to this. One is the extent to which such methodological eclecticism is present in a good deal of the work of Paine's acquaintance; the other is that methods must by necessity be

adapted to their object of study. Different features of the natural world and universe are differentially open to empirical inquiry, inductive generalisation, and the formulation and testing of hypotheses. Eighteenth century science is best understood, then, not as a single activity, but as a loose group of activities, which hang together more or less tightly because of a shared attitude towards establishing statements as valid by reference to inductively generated models, by appealing directly to states in the world (evidence), or by demonstrating their consistency with other statements. Seen in this way, one implication for the translatability of Paine's scientific interests to the world of politics or religion, is that although we can detect a general disposition to establish an axiomatic base for generalisation together with an insistence on clarity and determinateness of propositional content, the connection between the very different areas of activity is likely to be a loose one. That is, in contrast to the tendency to reductionism in the study of Paine - bringing his science down to an extension of common sense, or treating it as a function of his religious commitments, or treating his scientific activity as foundational - I am suggesting that there may be no single foundation for Paine's thinking. His beliefs in politics, religion and science might have elements in common because of the extent to which he was impressed by the way that a broadly scientific approach could open up the natural world to coherent understanding, but rather than insisting on linking everything back to this common core, we should recognize that the impact of his scientific education on his other inquiries is of a limited character. There are strict limits to which a scientific attitude can clear up the terminology and practice of politics, and perhaps still stricter limits on the extent to which it can resolve theological issues - and there is nothing in Paine's work to suggest that he believed otherwise. If that is the case, then we should expect there to be only limited possibilities for generalising from one field of activity to another - a view which helps explain how many others who wrote on science in this period might have held quite markedly different beliefs on politics or religion. The determinateness of scientific knowledge, simply does not spill over into other areas of activity - indeed, even within science there are quite marked differences in the type of knowledge achievable.

The drive in scientific activity is towards unambiguous statements of testable content, albeit with different areas of science drawing on induction and deduction to different degrees. This is not to say that all scientific statements are true - only that truth in the form of unambiguous factual content and consistency is what they track - and what they track in the late eighteenth century. As I have suggested, one way to identify connections with Paine's politics would be to recognize a similar type of pressure in his political writing. Clearly, such an interpretation can be given - the desire to disambiguate, to clarify, to work inductively from axiomatic principles, and, equally, a sense of experimentation in political affairs, by which ideas might be tested (albeit, the real experiment is always America for Paine, and he has real doubts as to its translatability - although less so between 1789 and 1798). But, on the account I have sketched there are strict limits to the extent to which this recognition allows us to explain Paine's political or theological writing in relation to his scientific work, because of the inherent recalcitrance of the subject matter to the type of rigorous analysis and testing which Paine rightly believed could be applied to the natural world.

On this reading, when Paine writes: 'What Archimedes said of the mechanical powers, may be applied to Reason and Liberty: *Had we, said he, 'a place to stand upon, we might raise the world.'* The revolution in America presented in politics what was only theory in mechanics'⁴⁵ - we should not take him to be using science as a model, rather it functions as a metaphor or analogy. When he uses thirteen sections in his bridge (the number of states in the Revolution) we should not think that he is politicising his science so much as adding a rhetorical flourish or garnish to what is essentially a mechanical experiment. Clearly, in some cases the connections seem closer - as in the attack on established religion in his *Age of Reason*. But here, the account of the order of the universe is offered as an alternative to the pretensions to authority upon which religious world view is founded. And the attack works as a confession of faith based on reflection and experience, rather

⁴⁵ Thomas Paine: *Rights of Man...*, ed. Philp, 210.

than as a (wholly implausible) claim about the inevitability of deism for anyone holding a Newtonian view of the world.

Science might have afforded Paine's thinking a certain methodological rigour, but it would be greatly to exaggerate to claim that this method was unproblematically translatable across the wide range of subjects on which Paine wrote - politics, economics, theology and so on - or, indeed, that Paine believed it was translatable. We are left then with a much more fractured picture of his activity than is customary: a view in which science has its own domains, but which do not determine his religious, political or other beliefs. This more fractured view can be discomfiting. It is easy to see why commentators are attracted to the idea that there must be some common core that holds all these different beliefs and activities together. But by refusing to endorse views which reduce Paine's activity to science, or which identify deism as the underlying force behind his *oeuvre*, or which insist on the fundamental character of Paine's common sense, I am also rejecting the idea that such a common core of method, ideas, or beliefs, must exist (whether for Paine or for us).⁴⁶ Men and women more generally, process information differently in different contexts, demand higher or lower standards of rigour, and assess their responsibilities differentially between activities. Although there are indications that Paine's scientific understanding has some influence on his political and religious thinking, through the use of analogies, similes and models, and through the application of certain methodological principles, the differences between the various types of activity must be recognized, and the allusive and metaphorical character of the references must be acknowledged. If we are then thrown into doubt about what holds these different practices and fields of knowledge together and makes them cohere, the best answer we can give is that it is their shared, social character which allows their social reproduction and which enables men and women to negotiate those boundaries and hiatuses by which we can sometimes be shocked. With respect to Paine, it is puzzling to encounter his conviction of an afterlife in which virtue

⁴⁶ That is, I deny that it must exist - although it may. Which will depend on the details of each particular case.

will be rewarded and vice punished;⁴⁷ or his complete silence on women, his relative silence on the issue of slavery,⁴⁸ his failure to discuss the Irish or the Indian questions, or his almost complete lack of comment on the Federal Constitution and the Federalist debates, save for the gloss given in *Rights of Man Part Two*, Chapter IV. In each case, we are encouraged by his other works to expect something different, but in each case we make the mistake of thinking that Paine's intellectual, emotional, social and political worlds are seamlessly connected, and that he too can make such apparently obvious connections.⁴⁹ These points at which we sense a fissure or gap in Paine's beliefs do not indicate that his thought is incoherent. Rather, they show that he does not share our world view, nor our way of holding together the different bodies, types and subjects of belief which he held. In his own time, among his contemporaries, many of these fissures may have been unrecognized because the boundaries between the various domains of belief and practice were tacitly shared and, as such, negotiated unproblematically. But this tacit sharing also allows for moments

⁴⁷ 'My Private Thoughts on a Future State' in *The Age of Reason*, ed. J M Robertson (London, 1910), 123

⁴⁸ See Letter to Anonymous, March 16, 1789, CW II, 1285-6, in which he despairs of seeing an end to the infernal traffic in Negroes; and there are two comments about the immorality of slavery in a long letter written to Jefferson in 1805, reserving his greatest wrath for Liverpool and its conduct of the slave trade and referring to a plan of Jefferson's for making slaves tenants on plantations (CW II, 1458, 1462, 1464). His very early piece in the *Pennsylvania Journal*, 'African Slavery in America', has been rejected as authentically Paine's by A O Aldridge in *Thomas Paine's American Ideology* (New Jersey, 1984), 289-91. Indeed, although Aldridge insists that Paine did speak out on the subject, he also claims that the most explicit defence is in an obscure Poem written during the French Revolution.

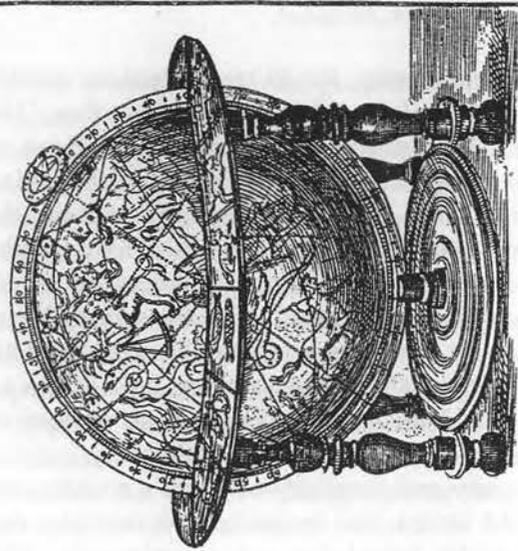
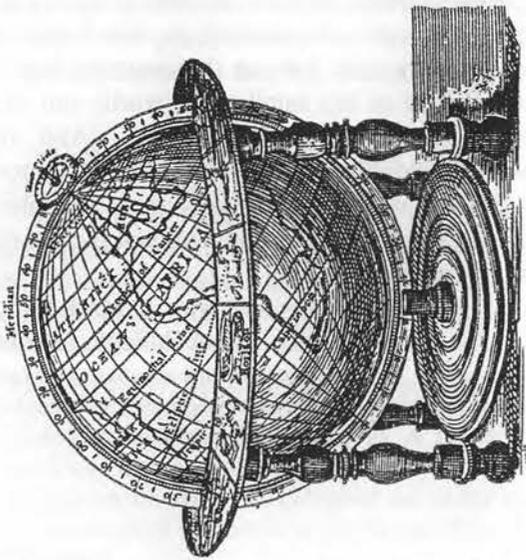
⁴⁹ This is not to suggest that we cannot find ways of explaining these silences. We might, for example, suggest that Paine avoided discussing slavery because the institution sits badly with his endorsement of the American system of government. But we need to be very careful not to allow our interpretation of Paine's beliefs to lead us into thinking there were self-evident implications of his doctrine which he should have recognized and which raise a problem of how to explain his failure so to do.

of transgression - as when Priestley, for all his rationalism and his scientific work, is recorded by John Adams commenting that 'The ten crowned heads of Europe were the ten horns of the Beast in Revelation, and "the execution of the king of France is the falling off of the first of those horns."' ⁵⁰ Paine similarly exploits the rhetorically powerful move of transgression - in which, for example, the tacit conventions concerning the religious implications of the Newtonian world-view can be challenged. But transgression can work in either direction - by deploying scientific language to attack religious belief, or vice-versa, while Paine seems to have drawn on the more rigorous types of knowledge to construct his critique of politics, Burke might be said to have worked the other way.

For all the apparent unity and simplicity of Paine's position, we fail to grasp his world unless we recognize the multiple and fragmentary character of his knowledge and commitments. The significance of his scientific activity, then, is not that it allows us more fully to appreciate the core of rationalism which drove Paine's political and religious thought, but, on the contrary, that it can help us see the complexity of his intellectual world and the multiple character of its domains of knowledge. And in recognising this, we can also recognize that the world in which men and women thought and acted was a substantially more complex and fragmented one than is captured by our conventional picture of the period as one of Enlightenment.

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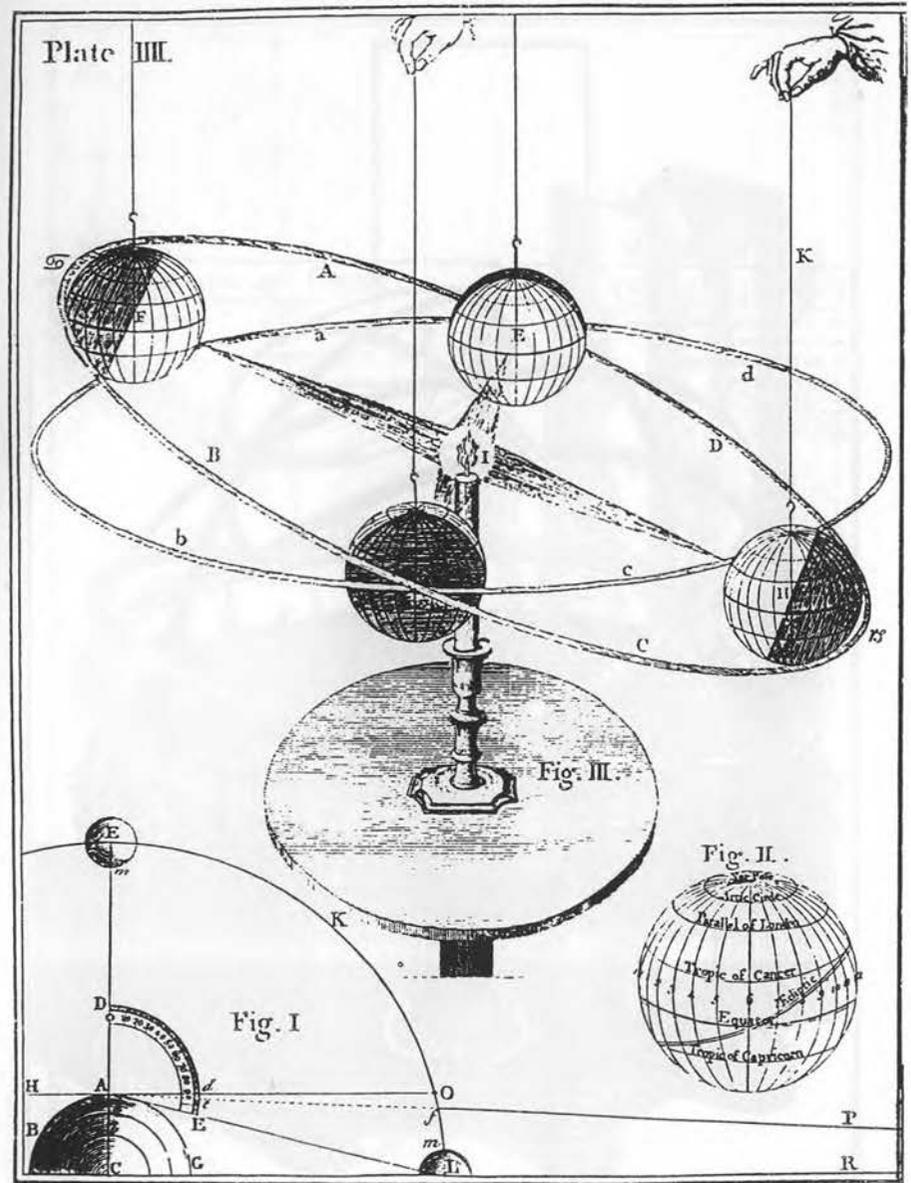
⁵⁰ Clarke Garrett, *Respectable Folly: Millenarians and the French Revolution in France and England* (John Hopkins, Baltimore, 1975), 133.



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Figure i Globes made by Richard Cusilee from J. Harris, *The Description and use of the Globes and the Orrery* (London, 1757) pp. 30-1, see also T Wright, *The Use of Globes or the General Doctrine of the Sphere* (London, 1750), i, and 74-5.



J. Ferguson delin.

Figure ii Exercises in globes: from *J Ferguson's Astronomy explained on Sir Isaac Newton's principles and made easy to those who have not studied mathematics* (2nd edn., London, 1757), 72-3. The plate is mistitled, it should be Plate IV

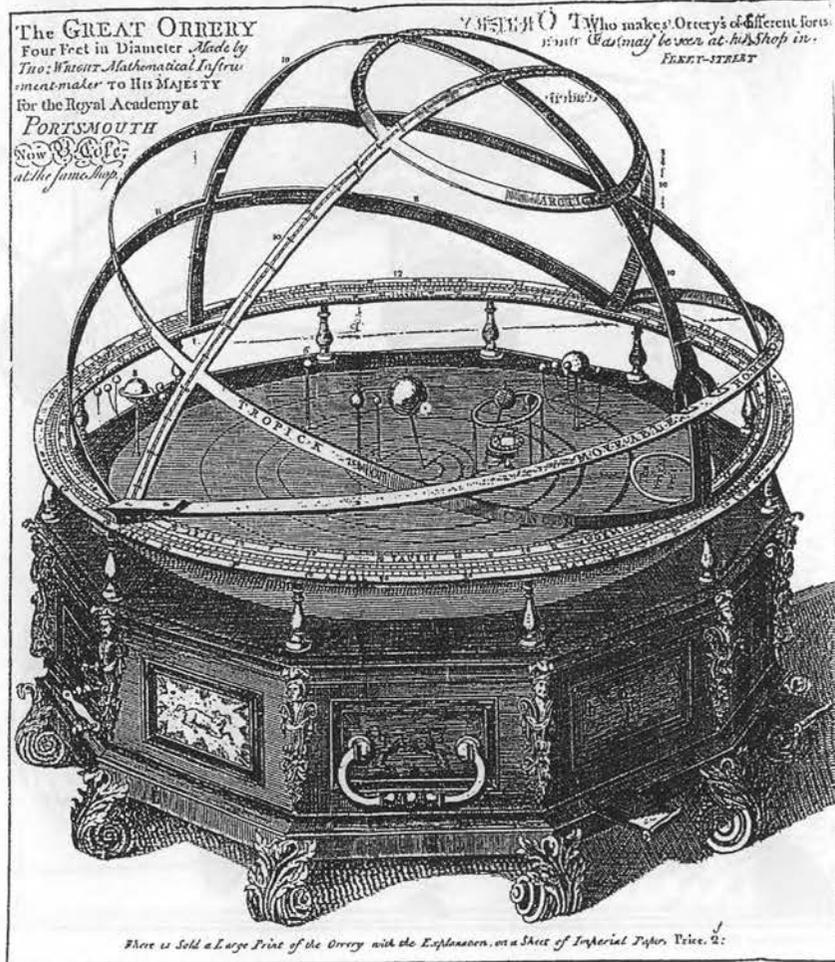


Figure iii The Great Orrery made by Thomas Wright: from J Harris, *The description and use of Globes and Orrery*, i.

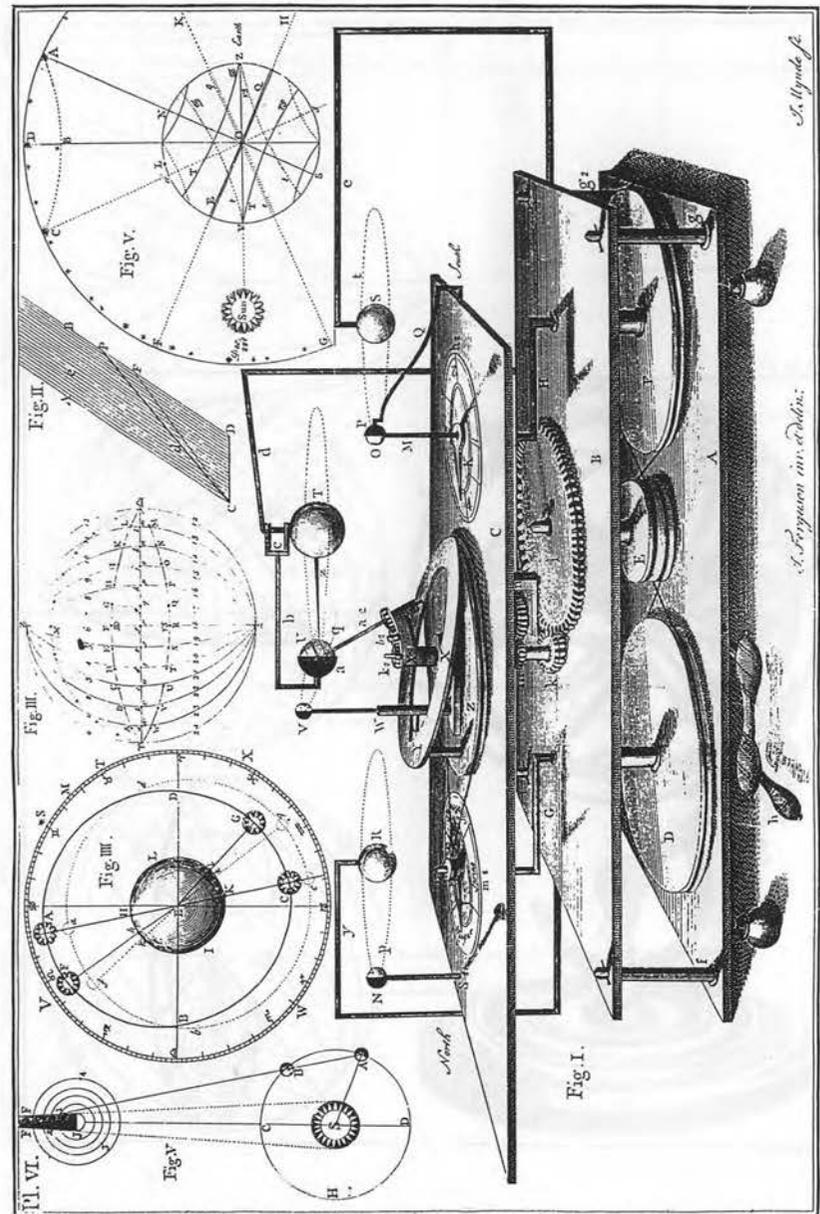


Figure iv Simple Orrery: from J Ferguson, *Astronomy explained on Sir Isaac Newton's principles and made easy to those who have not studied mathematics* (2nd edn., London, 1757), illustration 14-15, discussion, 263-4.

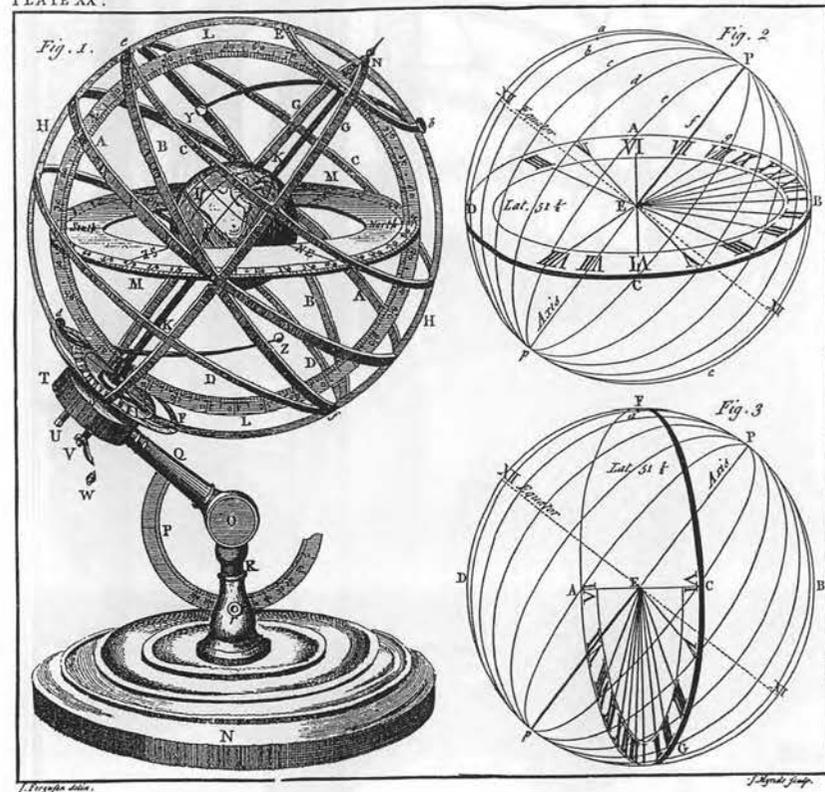


Figure v Armillary Sphere: from James Ferguson, *Lectures on select subjects in mechanics, pneumatics, hydrostatics, and optics: with the use of the globes and the art of dialling* (London, 1760), 246-7.

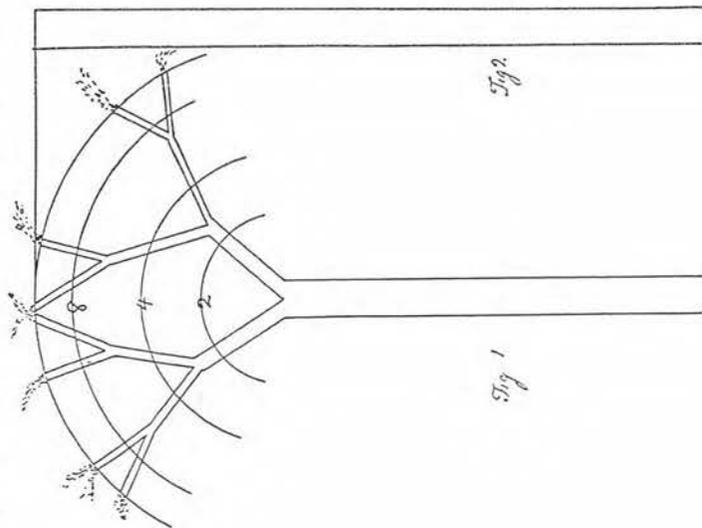
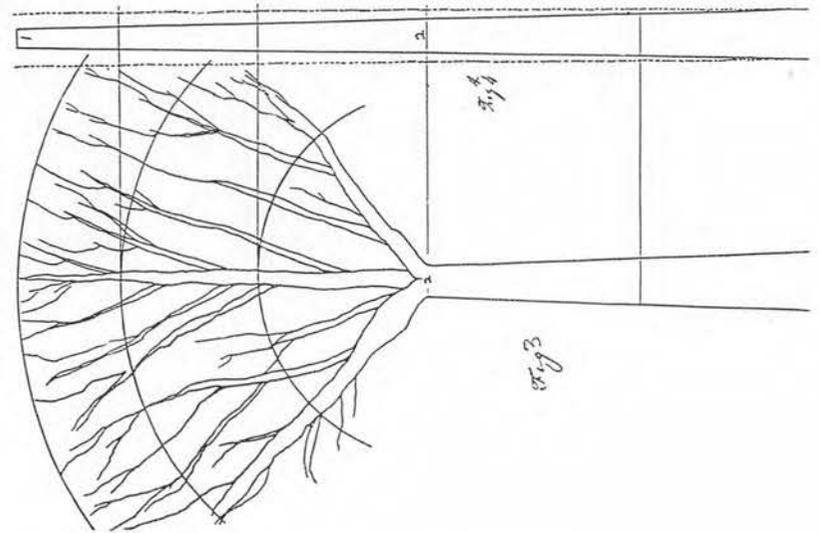


Figure vi *Tree and fountain*: from *The life and major writings of Thomas Paine*, ed. Philip S. Foner (2 vols., New Jersey, 1948), II, 1035.