

The Enlightenment and Joseph Priestley's disenchantment with science and religion

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Abstract:

Joseph Priestley (1733-1804) is largely known for his discovery of oxygen or, as he called it, dephlogisticated air. He is less well-known as a minister, educator, and theologian. The established church of the day presented many challenges to Priestley because of its control functions in government, university education, and Christian belief. Priestley, influenced by the 18th century enlightenment principles of reason, justice and equity, made a significant contribution to the dissenting academies in England to the extent that an education in a dissenting academy was regarded by many as superior to that obtained at Oxford or Cambridge. France was the centre of 18th century chemistry but, for reasons to be outlined in the paper, Priestley resisted Lavoisier and his new chemistry. The paper demonstrates how Priestley's disenchantment with religion revolved very much around the role of tradition in the orthodox church and its relationship to the sacred text of scripture; and his disenchantment with French science arose from what he saw as a kind of scientism. The paper finally draws some implications of these issues for today.

Keywords: Enlightenment, Priestley, Hume, theology, science, disenchantment

Introduction

Priestley's aversion to ideas which had become fashionable in his day revolved around the way these ideas disempowered the individual. These issues exercised the mind of Priestley not only because he was interested

in pursuing truth but also because he vigorously opposed the State mandating religious belief. The State required adherence to the principles of the Church of England if an individual sought public office or an appointment to the Universities of Oxford and Cambridge, or, for that matter, sought admission as a student to these universities. According to Priestley, individuals should be free of any encumbrance to inquire into matters of religious belief and to form a pattern of belief consistent with their own conscience. Priestley's orientation here was consistent with Enlightenment thinking. Paradoxically, however, he opposed Enlightenment views such as those of the great Scottish philosopher David Hume which led to atheism. To Priestley, contentment and happiness for the individual could only be found in a belief in God and a future life. As far as science was concerned, Priestley was concerned with what he interpreted as the growing complexity of French science which was leading to increasing specialisation which meant that scientific knowledge was ceasing to be accessible by the general public. Priestley's ideal was that all members of the public participate in scientific discovery. Typical of natural philosophers of the 17th and 18th centuries, Priestley had broad intellectual interests. De Berg (2011) has recently described the intellectual tools Priestley employed across theology, education and chemistry and some of these tools will be of relevance to this study.

To understand Joseph Priestley and the context in which he operated a brief biographical sketch follows. An expansion of the following brief details of his life can be found in the definitive biography by Schofield (1997, 2004). Matthews (2009 pp. 932–933) also provides an overview of his life.

- He was born in Fieldhead near Leeds in England.
- He spent three years at a dissenting academy in Daventry.
- By age 19 he had studied nine languages.
- At age 22 he was appointed as the dissenting minister at Needham Market.
- In 1758 he commenced a school for girls and boys at Nantwich.
- In 1761 he taught languages at Warrington Academy.
- He taught oratory despite having a speech impediment.
- He became a good friend of Benjamin Franklin who encouraged him to take up natural philosophy.
- In 1772 he began experiments on different airs (gases).
- The Church of England disagreed with his Unitarian theology.
- He was a sympathetic observer of the French and American revolutions.
- Rioters ransacked and burnt his Birmingham home in 1791.
- He moved with his family to the USA in 1794.
- He greatly influenced John Adams and Thomas Jefferson.

- He wrote over 150 books and articles on theology, science, logic, education, politics, and oratory.
- He was known mainly for his discovery of oxygen and his persistent belief in the phlogiston model of combustion.

Although regarded as a heretic by the orthodox in church and state, he was treated with great affection by notable people such as Benjamin Franklin and Thomas Jefferson. The high regard Franklin had for Priestley can be gleaned from a letter he wrote to Benjamin Vaughan in 1788:

Remember me affectionately...to the honest heretic, Dr Priestley. I do not call him honest by way of distinction, for I think all the heretics I have known have been virtuous men. They have the virtue of fortitude, or they would not venture to own their heresy; and they cannot afford to be deficient in any of the other virtues, as that would give advantage to their many enemies...Do not however mistake me. It is not to my good friend's heresy that I impute his honesty. On the contrary 'tis his honesty that has brought him the character of heretic.

Franklin 1788

Jefferson, in an endearing letter to Priestley in 1801, says:

Yours is one of the few lives precious to mankind and for the continuance of which every thinking man is solicitous.

Jefferson 1801

One could argue that there were enough enchanting symbols within the Christian religion of the 18th century and, as well, enticing questions in the chemistry of this period to satisfy even the most hungry of souls. Priestley, however, found much for disenchantment and it is this that led to some thinking of him as a heretic, albeit an honest heretic. His disenchantment with orthodox religion will now be briefly discussed.

Disenchantment with religion

Priestley was deeply concerned that many honest thinkers of the Enlightenment would be repelled by a Christian religion that drew heavily on tradition and what he perceived as superstition. Consequently he went to great pains to show that Christianity was a rational religion and that many of the superstitious icons and beliefs were a corruption of original Christianity. This is evident in the 1782 volumes of his 'History of the corruptions of Christianity' where he discusses such orthodox beliefs as the Trinity, the immortal soul, the atonement, and the efficacy of the Lord's Supper. Priestley uses the tool of *Reason* to highlight the irrationality of the belief; the tool of the *Scriptures* to suggest that the belief has no biblical support; and the tool of *History* to locate when the corruption was first likely embedded in Christian belief.

The doctrine of the Trinity provides an interesting example of Priestley's approach. According to him:

...the opinion of *three divine persons constituting one God* is strictly speaking an *absurdity or contradiction*... *three persons* possessed of all the attributes of divinity must be as properly *three Gods* as three persons possessed of all human attributes must be three men...and to say that [*three Gods*] are only *one God* is as much a contradiction, as to say that three men, though they differ from one another as much as three men can do, are not three men, but only one man.

Priestley 1812 p. 3

In addition to *Reason*, Priestley uses the witness of *Scripture* to disarm the Trinity doctrine. He quotes directly from Scripture such as Deuteronomy 6:4 'Hear, O Israel, the Lord our God is one God', and 1 Timothy 2:5 'For there is one God, and one mediator between God and men, the man Christ Jesus'. He uses these to support the view of the simple humanity of Christ and the existence of only one God, the Father, who sent Jesus on a special mission of salvation from death.

In addition to quoting Scripture Priestley gives study to the original Greek language to uncover the meaning of the original text and the context in which the text was written. This is the case with his treatment of John's gospel which had been used to support the Trinity doctrine, and in particular the divinity of Christ. Thus John's gospel, in Priestley's opinion, was written to counteract the philosophy of Gnosticism which maintained that:

Christ was a super-angelic being, who entered into Jesus at his baptism,....and Jesus had only the outward appearance of a man, and that he was incapable of feeling pain...

Priestley 1804 vol. III p. 11

Thus John's gospel was written:

to prove that Jesus and the Christ was the same person, and that Jesus had real flesh and blood, like other men, and was not merely man in appearance

Priestley 1804 vol. III p. 11

Greek words translated *life, light, grace, truth, only begotten*, and *word* in John's gospel were used by the Gnostics as names for the different emanations from a supreme being, but John uses these same words and applies them to Christ. Priestley maintains that the context in which the Greek word, *logos*, translated *word*, is applied to Christ in John's gospel is one which does not assert the divinity of Christ as a person but the divinity of that power by which Christ acted. A detailed study of church history convinced Priestley that the church fathers of the third century (AD) were the first to misrepresent John 1:3 as teaching the doctrine of the divinity of Christ, a doctrine clearly not espoused at the time of the apostles according to his notes on the gospel of John (Priestley 1804 vol III).

All Christian doctrines considered by Priestley to be corruptions of the original faith are given detailed historical treatment in order to trace the

origin of the corruption, the various forms the corruption took, and an account of the beliefs of the respected church fathers. This is nowhere better illustrated than in his 'History of opinions relating to the Lord's Supper'. Priestley observes that:

Zwingli was much more rational than Luther on this subject. For he...considered the bread and wine as no more than signs and symbols of the body and blood of Christ, and that we derive no benefit from the eucharist, except what arises from the recollection of the merits of Christ.....Calvin was much less rational. For he supposed that a certain divine virtue or efficacy was communicated by Christ, together with the bread and wine.

Priestley 1782 pp. 60–61

There was a belief amongst some in the church that people with a terminal illness could be healed by participating in the Lord's Supper and it was such beliefs that Priestley thought to be ultimately dangerous to Christian faith. While Priestley reacted against such over-belief in the efficacy of the Lord's Supper, he also strongly reacted against the unbelief of such Enlightenment thinkers as David Hume (1711–1776).

Priestley and David Hume

It was pamphlets such as Hume's 'Dialogues concerning Natural Religion' (1751) that prompted Priestley to write his 'Letters to a philosophical unbeliever' (1787). Priestley used the cause-effect principle and the design principle to argue that the universe must have come into being ultimately from an uncaused first intelligent cause called God. Hume, on the other hand, in the voice of Philo in the dialogue, questioned why one needed to resort to God as the uncaused first cause when matter itself could have been the uncaused first cause which had resident within itself the power to produce the universe as we know it. Here is Philo speaking:

'For aught we can know *a priori*, matter may contain the source or spring of order originally, within itself, as well as mind does; and there is no more difficulty in conceiving, that the several elements, from an internal unknown cause, may fall into the most exquisite arrangement, than to conceive that their ideas, in the great, universal mind, from a like internal, unknown cause, fall into that arrangement'.

Hume 1751 p. 56

The design principle was used by Priestley from the point of view of analogy to argue the case for God as the original designer and creator. His argument proceeds as follows:

...whenever we see a chair, a table, a house, or a book, we entertain no doubt but, though we did not see *when* or *how* they were made, and nobody gives us any information on the subject, yet that some man or other *did* make them.

Priestley 1787 p. 35

Hume places such a design principle in the mouth of his character, Cleanthes, who says:

'By this argument *a posteriori*, and by this argument alone, do we prove at once the existence of a deity, and his similarity to human mind and intelligence'.

Hume 1990 pp. 54–55

Hume then counters this argument in the words of Philo:

'If we see a house, Cleanthes, we conclude, with the greatest certainty, that it had an architect or builder, because this is precisely that species of effect, which we have experienced to proceed from that species of cause. But surely you will not affirm, that the universe bears such a resemblance to a house, that we can with the same certainty infer a similar cause, or that the analogy is here entire and perfect. The dissimilitude is so striking, that the utmost you can here pretend to is a guess, a conjecture, a presumption concerning a similar cause; and how that pretension will be received in the world, I leave you to consider'.

Hume 1990 pp. 54–55

Priestley freely admitted that his own arguments for the existence of God would not convince everyone because every argument or hypothesis has its '...respective weak side, which a man who has nothing of his own to risk [a reference to Hume] may more easily find, and expose'. (Priestley 1787 p. 125).

According to Richard Popkin, 'Priestley does not offer a well-argued or well-supported case' in his response to Hume, and 'does not seem...to advance on Hume though he was better versed in the actual work of theologians and natural Philosophers'. (Popkin 1977)

Priestley's (1787 p. 127) own assessment of Hume's 'Dialogue' was that, while it was 'ingeniously and artfully conducted', it did not advance the cause of truth, virtue, or happiness. Priestley seriously agreed with Hume's perhaps ironic statement that, 'To be a philosophical skeptic is, in a man of letters, the first and most essential step towards being a sound believing Christian', but while Hume, as far as we know, remained a skeptic, Priestley went further and embraced Christian belief with a fervor. In many ways, then, Priestley presents as an ambiguous character of the Enlightenment. Consistent with Enlightenment values he highlighted the importance of reason over tradition and superstition but at the same time he was a champion of Christian belief albeit what he termed rational Christian belief forged in the first century AD.

The adoption of Christian belief would appear to involve more than intellectual argument if Priestley's own life and assessment of Hume is taken into account. To Priestley, virtuous living ultimately led to true happiness in this life and a future life and was central to the Christian message.

He defined virtue as:

...that disposition of mind and that course of conduct arising from it, which is best calculated to promote a man's own happiness, and the happiness of others with whom he is connected.

Priestley 1787 p. 106

Priestley always linked the great Enlightenment values of freedom to think and inquire for oneself with virtue, as seen in his description of the aims and objectives of the new college in Hackney.

And it is the great object of this institution to remove every bias the mind can lie under, and give the greatest scope to true freedom of thinking and inquiry. And provided you be intelligent and virtuous men, and good citizens, it will be no cause of regret to the friends of this institution, if, with respect to religion, or politics, you adopt systems of principles, and maxims of conduct, very different from theirs.

Priestley 1794 p. ix

So while Priestley was prepared to strongly defend Christian belief over and against unbelief, he defended the right of individuals to choose unbelief provided, in the case of young minds, they approached their education with intelligence and virtue.

While Priestley, in the minds of some scholars, did not provide good enough rational arguments to counter Hume's atheism, he was nonetheless highly regarded for his intellectual strength. While he was viewed by the churchmen of his day as a Christian heretic, he was known to possess the graces and virtues of a Christian gentleman. This is well borne out in a description of Priestley given by the daughter of Samuel Galton who was a successful Birmingham businessman and loyal friend of the Priestley's:

[He was] the father of discoveries on air, a man of admirable simplicity, gentleness and kindness of heart, united with a great acuteness of intellect. I can never forget the impression produced on me by the serene expression of his countenance.

Hartley 1971 p. 16

Although disenchanted with a religious system that removed people's opportunity to think for themselves, he was, however, enchanted with the capacity of Christian belief to bring joy and support inquiry into the laws of nature.

Priestley and chemistry – disenchantment with science

It is difficult for us living in the 21st century with our particular atomic and sub-atomic picture of matter to understand a view of matter that existed prior to Dalton's theory in the 19th century. To Priestley, matter had the property of extension in space but not the properties of solidity and inertness. Matter had been given certain *powers* at the hand of the Creator but Priestley was not consistent in the terms he used to describe this property of matter. He used the terms 'principle', or 'element', or

'power', or 'causative agent' to refer to the special properties presented by matter to the investigator. These terms were used for *heat, light, electricity, magnetism, attraction, repulsion, acidity, alkalinity* and *inflammability*. The name *phlogiston* was used sometimes for the principle of *inflammability*, and sometimes for the principle of *alkalinity*. The exact nature of these *powers* was not clear but they did serve as causative agents in Priestley's understanding of nature in terms of a deterministic chain of cause and effect.

It is clear that Priestley saw great value in using the cause-effect tool of thinking in attempting to understand the properties of substances. He uses it in explaining the relationship between an earth and its corresponding metal in these words:

Thus we say that the union of phlogiston to a particular kind of earth is the cause of its becoming a metal.

Priestley 1794 p. 3

A metal is the effect of the corresponding cause of adding phlogiston to an earth. This kind of thinking enabled Priestley to unify much of the chemical knowledge of the time. The combustion of all metals in air was regarded as a process of removing phlogiston (cause) to produce the corresponding earth, or calx (effect) as it was sometimes called. Substances like coke were seen as rich in phlogiston because when heated with a calx the corresponding metal was produced. That is, heating removed phlogiston from coke and transferred it to the calx (earth) to produce the metal. It is helpful to compare Priestley's understanding of combustion with that which emerged from Lavoisier's considerations of this matter. In the case of the production of the metal from the ore:

Priestley: Calx + Phlogiston (from charcoal) $\xrightarrow{\text{heat}}$ Metal

Lavoisier: Metal oxide + Carbon $\xrightarrow{\text{heat}}$ Metal + Carbon Monoxide

Heating a metal in air was understood as follows:

Priestley: Metal – Phlogiston $\xrightarrow{\text{heat}}$ Calx

Lavoisier: Metal + Oxygen $\xrightarrow{\text{heat}}$ Metal Oxide

Priestley understood the calx to be resident within the metal. All that was needed was to release the phlogiston from the metal and the calx would be the result. The idea of chemical combination had to await the revolution led by Lavoisier. In the case of the addition of acid to a metal (for example, zinc + acid gives a zinc salt plus hydrogen) producing inflammable air (hydrogen), Priestley understood the inflammable air as coming from the metal rather than from the acid. The acid was the agent capable of releasing inflammable air already in the metal. One can understand why inflammable air was sometimes thought to be phlogiston since it was also thought to be resident in the metal.

Some have questioned why Priestley, rationalist in theology and education, clung to a belief in phlogiston when it was beginning to be displaced by Lavoisier's oxygen theory of combustion. It is not as though

Priestley was unfamiliar with Lavoisier's work because he had visited Lavoisier's laboratory in Paris and himself described Lavoisier's model of combustion as follows:

On the contrary, Mr Lavoisier and most of the French chemists, are of opinion, that there is no such principle, or substance, as phlogiston; that metals and other inflammable bodies are simple substances, which have an affinity to pure air, and that combustion consists not in the separation of any thing from the inflammable substance, but in the union of pure air with it.

Priestley 1794 p. 128

This articulates well the differences between Priestley's and Lavoisier's understanding of chemical change.

It appears that one reason why Priestley was reluctant to accept the oxygen principle was his strong belief in what has become known as Occam's Razor.

It is one of the principal rules of philosophizing to admit no more causes than are necessary to account for the effects...In other words, we must make no more general propositions than are necessary to comprehend all the particulars contained in them.

Priestley 1794 p. 3

In addition, Brock claims that,

Priestley's objections to Lavoisier's chemistry were often, indeed, usually, perfectly valid...For example, in the decomposition of mercuric oxide Priestley consistently got less mercury back than he started with. In any case, he observed, Lavoisier's pretence of measuring to four or five places of decimal was pure window dressing. To this Lavoisier replied that expensive and superior apparatus was needed to achieve precision which, of course, was anathema to Priestley's democratic approach to chemical experimentation.

Brock 2008 p. 75

While Priestley could see some benefits in the new French theory he refused to accept the oxygen theory while experimental anomalies existed. In fact he admitted that, 'the phlogistic theory is not without difficulties', but he objected to the use of elaborate, expensive equipment, and the excessive precautions and computations associated with Lavoisier's work (Priestley 1803). Priestley thought that the excesses of the French work were more likely to lead to 'opinion' rather than 'real knowledge'. In Priestley's opinion the use of simple apparatus by a large number of common citizens to generate simple facts would prove much more beneficial to the cause of truth than a science of theoretical ideas generated by a few experts. This idea fitted well with Priestley's democratic view of science as well as of citizenship. McEvoy suggests that Priestley's liberal individualism was probably one of the main reasons for his continued rejection of the French work:

Priestley's liberal individualism convinced him that no man ought to surrender his own judgment to any mere authority, however respectable; and it encouraged him to use all his energies to oppose the uncritical entrenchment of Lavoisier's opinions among his scientific contemporaries.

McEvoy 1983 p. 57

Scholars have found it interesting to compare the scientific approaches of Priestley and Lavoisier. Lavoisier's approach to writing accounts of his experiments is suggestive of carefully pre-planned objectives and a rigorous approach to measurement and the recording of results. Priestley's approach was to record a story of what failed, what worked, how many times he tried an experiment, and a record of serendipitous events along the way. Brock notes that,

Priestley's practice was to write literary 'cookery books' that encouraged everyone to participate, urging that by repeating or conducting their own experiments, men and women could draw their own conclusions rather than having conclusions handed down to them by specialists and experts.

Brock 2008, p. 66

While one must admire Lavoisier's insights and rigour, Gillispie (1960) has noted that, 'Perhaps there is always a danger that it will impoverish inquiry to elevate the logic of existing science into precepts of method'. In fact Gillispie's summing up of the contributions of Priestley and Lavoisier is pertinent.

Chemistry profited, therefore, from the curious, the almost symbiotic relationship between Priestley and Lavoisier, however unwelcome to both. If Priestley's lack of theoretical taste disqualified him from understanding his discoveries, Lavoisier's lucidity disqualified him from making them. By his own program, combustion, calcination, and respiration, all involved fixation of something from the atmosphere. Lavoisier knew where to look, but not what to look for. Thus in this essential instance did all his method prove incompetent as an instrument of discovery. For it was Priestley who told him.

Gillispie 1960 p. 218

Conclusion

We know that there were elements of the Christian religion and Natural Philosophy that absolutely captivated Joseph Priestley. He was enamoured with virtuous living which he considered had a rational basis in his Christian faith. He also enjoyed having the opportunity to inquire into nature and to discover the laws by which she behaved. Priestley's disenchantment with religion and science had to do with their institutionalisation. The fact that the State and parliament required adherence to the articles of faith of the Church of England for admission to public office or the Universities of Oxford and Cambridge grieved Priestley. As far as he was concerned individuals should be free to inquire into matters of religious belief on their own account and should be encouraged

to do so. Priestley was also concerned with the increasing specialisation of science and its increasing reliance on complex equipment and advanced mathematical procedures. This is why he rejected what he saw as the increasingly institutionalised French science.

As far as Priestley was concerned, all individuals should have the opportunity to inquire into nature and this task should not be left to a few specialists. His Enlightenment task, if you like, was to free the individual to participate in it as far as belief and discovery was concerned. This is partly why he was seen to be supportive of the revolutionary efforts in France and America.

Priestley believed that educating humanity in Enlightenment values would ultimately bring it to perfection and the great future life for which God had created it. Now two hundred years later one might be tempted to consider Priestley's Enlightenment task to have been too optimistic. We have lived through two world conflicts and national conflicts which do not appear to be abating. In addition, institutional church attendance has continued to decrease since 1900 reflecting the growing public disenchantment with institutional religion, a disenchantment prefaced two hundred years ago by Priestley himself. For example, in the UK from 1968 to 2009, Anglican church attendance on a Sunday decreased from 1,606,000 to 826,000 respectively (Church Society 2011). There are segments of our society, however, that are experiencing spiritual growth but in a non-traditional sense. Shane Claiborne (2006), for example, describes a radical approach for growing caring Christian communities in the inner cities.

In spite of the great developments in science over the last one hundred years, the percentage of year 12 students studying science at high school has continued to decrease (Ainley, Kos & Nicholas 2008). In Australia the trend from 1991 to 2007 has been; biology 35.9% to 24.7%; chemistry 23.3% to 18%; physics 20.9% to 14.6%; and geology 1.3% to 0.8%. While the increasing options available to students is partly responsible for the trend, students have found it increasingly difficult to engage with science. In other words, there has been a level of disenchantment with science as a field of study. This disenchantment has spread to society in general. For example, the growth of the alternative medicine industry could signal a growing disenchantment with orthodox scientific medicine. In 1995, 39% of GP's in England provided access to complementary and alternative medicines for their patients and in 2001, the figure had grown to 50% (Thomas, Coleman & Nicholl 2003). What can be made of these trends? Can Priestley and his Enlightenment values offer any assistance in dealing with these issues?

While many leaders of the church would disagree with Priestley's theological conclusions, and while the scientific establishment has shown how wrong Priestley was in his understanding of chemical reactions, Priestley's emphasis on encouraging the individual to personally inquire into matters of religious belief, to make any Christian commitment one of their own, and to seek ownership of scientific knowledge, cannot but be applauded. Those involved in science education and Christian witness can bear testimony to this in spite of the challenges these goals present.

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