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Joseph Priestley

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Alan Tapper

Edith Cowan University

Joseph Priestley’s range of intellectual interests was very great, even by the standards of the eighteenth century. He was a Dissenting minister, and his chief concerns were theological. His scientific work, for which he is now best known, occupied much of his remaining time. In addition, he wrote extensively on history, education, rhetoric, and politics.

In his day, Priestley was also a philosopher of some importance. He argued the case for materialism perhaps more cogently than did any British thinker before recent times. He presented determinism vigorously, with a focus on the central issue of the nature of causation. He speculated interestingly, following Roger Joseph Boscovich, on the nature of matter. He defended scientific realism against Thomas Reid’s Common Sense realism and against (as he saw it) David Hume’s phenomenism. He articulated, against Hume, a working scientist’s account of causation, induction and scientific progress. He defended the Argument from Design against Hume’s penetrating criticisms. His attempt to combine theism, materialism and determinism is audacious and original. He tried to show that such a system does not lapse into pantheism. As a political thinker, he distinguished usefully between civil and political liberty, and argued the case for extensive civil liberties. His liberalism is closely bound up with his account of historical progress. He was perhaps the most thorough British exponent of a Providentialist account of progress. His ultimate aim was to combine Enlightenment principles with a modernized Christian theism.

Three notable philosophers of his generation held him in some regard. One, Richard Price, was his lifelong friend, despite their very different moral and metaphysical outlooks. Thomas Reid, by contrast, had no liking for Priestley, but he was much occupied by Priestley's doctrines and his writings are often directed against him. More surprisingly, we find Priestley being complimented in the *Critique of Pure Reason* (1781) with the remark that he "knew how to combine his paradoxical teaching with the interests of religion." The paradox, Immanuel Kant says, is that of a man who, though "a pious and zealous teacher of religion," has striven to "pull down two such pillars of religion as the freedom and immortality of the soul (the hope of a future life is for him only the expectation of the miracle of a future resurrection)." Priestley, in Kant's judgment, "was concerned for the interests of reason, which must suffer when we seek to exempt certain objects from the laws of material nature, the only laws which we can know and determine with exactitude." Furthermore, Priestley's political writings had the dubious distinction of provoking the wrath of Edmund Burke. At the time of the American Revolution Burke and Priestley were philosophical allies; by the 1790s they had parted company, arguing opposite positions on the French Revolution, both with considerable force.

Priestley was born not far from Leeds in 1733. The family were Yorkshire Calvinists, or "Independents." His father was a cloth-dresser. His mother died when Joseph was still young, and he went to live with a childless aunt, Sarah Keighley, herself staunchly Calvinist, whose home was nevertheless a center for Dissenting ministers of all persuasions. As a young largely self-taught philosopher, Priestley's heroes were Locke, Newton and David Hartley. He was educated at Daventry Academy, where, he said, "the students were about equally divided upon every question of much importance, such as liberty and necessity, the sleep of the soul, and all the articles of theological orthodoxy and heresy; in consequence of which, all these topics were the subject of continual discussion." He was a very quick student in history, languages and the sciences, but his deepest early lessons concerned the value of tolerance and open argument.

The strict Calvinism of Priestley's circle taught that it was necessary to experience a "new birth" if salvation is to be obtained. Priestley found to his dismay that he lacked any such experience but he continued to consider himself a good Christian, which caused a rift with his aunt and his family and with his local parish. He continued

throughout life to cast off doctrines others thought essential to Christianity while yet retaining a deep attachment to the faith as he saw it. Unorthodoxy and controversy were his vocations; after an Arminian and an Arian period, he became eventually the chief exponent of Unitarianism in Britain. A deep intellectual and personal belief in divine Providence sustained him throughout; there is no sign that he was simply an intellectual in incomplete transit to deism, pantheism or agnosticism.

After six difficult years as an unknown Dissenting clergyman and school teacher, in 1761 Priestley was offered the position of tutor in languages and literature at Warrington Academy. In the 1760s Warrington was lively and prosperous, earning the title of the “Athens” of northern England. There he lectured on modern history, rhetoric, literary criticism and aesthetics. He first made his name as an author with three works: a textbook on English grammar, a study of the theory of language, and an essay on the aims and practice of education. At Warrington he found time to start a new career as an historian of science, beginning with a well-received history of discoveries in electricity, for which he conducted many experiments of his own. The project led him to membership of the Royal Society and to a friendship with Benjamin Franklin which lasted until Franklin’s death. It also set him on the path towards his brilliant experimental career.

Success as a lecturer and promise as a scientist did not satisfy Priestley’s deeper desire to be a Dissenting minister, and in 1767 he accepted an invitation to a chapel at Mill Hill, Leeds. In this period he wrote his most substantial political work, the *Essay on the First Principles of Government* of 1768, which is also his first philosophical essay. It is a defense of civil liberty, including the religious liberty of Dissenters, against John Brown’s proposal for a system of uniform state education devoted to producing a more law-abiding citizenry. Against this “Spartanism” Priestley was a convinced “Athenian,” and he mustered many of the arguments in favour of social and intellectual diversity later used by John Stuart Mill in *On Liberty*. Some have thought that Priestley’s *Essay on Government* prefigured utilitarianism because Jeremy Bentham recollected finding in it the phrase “the greatest happiness of the greatest number.” The phrase is not there, though Priestley does say that “the good and happiness of the members [of society], that

is, the majority of the members of any state, is the great standard by which every thing relating to that state must finally be determined.”

The *Essay*'s importance lies mainly in its restatement of a Lockean political philosophy of natural rights and in its clear distinction between political and civil liberty. Political liberty is “the power which the members of the state reserve to themselves, of arriving at the public offices, or, at least, of having votes in the nomination of those who fill them.” Civil liberty is “that power over their own actions, which the members of the state reserve to themselves, and which their officers must not infringe.” To leave man's “natural” condition and enter the state of society is to sacrifice part of one's civil liberty. The consent of the governed is “the only true and proper foundation of all governments subsisting in the world,” and any people has the right to recall a government which is deemed oppressive. There are no natural political rights, however. Political rights vary in place and time. No one form of government – from absolute monarchy to radical democracy – is naturally better than any other. Good government is not a matter of form but of the moderation of the rulers, of uniform laws, and of respect for civil liberties. Priestley regards the civil sphere as far more important than politics to a people's happiness, for it is in the civil sphere that truth is discovered, material progress is cultivated, and genuine religion is practiced. His later radicalism arose not from any marked philosophical change but from coming to think the British government immoderate and intrusive.

In 1773 Priestley was employed as the librarian and companion of Lord Shelburne, with much free time to pursue his scientific and other writings. It was in this period that he entered into the metaphysical disputes of his day. He began conventionally enough, setting out the case for ‘natural religion’ in his three volume theological primer, the *Institutes of Natural and Revealed Religion*. Priestley's theism is based on the Argument from Design. He sees nature as everywhere exhibiting order, and yet as not in any way self-ordering, since nothing we see in nature shows order arising naturally. The order must come from “outside,” and since it resembles human productions it must derive from intelligence, indeed a supreme intelligence. He reinforces this position with an appeal to the Cosmological Argument. Nothing in the *Institutes* suggested the controversies that were soon to follow.

Priestley's most remarkable philosophical work is his defense of materialism, which he wrote while with Shelburne. English philosophy had long been dominated by dualism. The few extant versions of materialism had almost no influence on Priestley's version. He admired Hobbes, but did not borrow from him. He discussed materialism with d'Holbach on a visit to Paris in 1774 – d'Holbach's *Systeme de la Nature* had appeared in 1770 – but the beginnings of his own version predates that visit; and his later defenses of the doctrine bear little resemblance to d'Holbach's. The French materialists of the 1770s were using materialism to attack Christianity; Priestley's intentions were to defend Christianity by making its metaphysical framework more intelligible, even if doing so entailed denial of free will and the soul.

Priestley's materialism rests on three main arguments, each of which bears interesting scientific connections. He first arrived at the doctrine in the course of defending the Lockean "Theory of Ideas" – the theory that all our perceptions are mediated to us by sensations – against Reid's "Common Sense" attack on that theory in his *Inquiry into the Human Mind* of 1764. Reid believed that Berkeley and Hume had destroyed the claim that ideas represent reality by showing that our sensations do not in fact resemble the qualities of external objects. From these assumptions Berkeley and Hume had concluded that we have no access to external reality, while Reid concluded that, as we do apprehend reality, we do so without the aid of the philosophers' fictitious ideas. Priestley's response, in his 1774 *Examination of the Common Sense philosophy*, was to reject the assumption that sensations or ideas must resemble their objects in order to represent them. For him ideas are not images, and the Theory of Ideas is not a theory of pictures in the brain. The Theory, he thinks, requires only that objects and ideas stand to each other as cause to effect.

Reid's main contention had been that representation requires resemblance, but he had also been inclined to attack the claim that objects can cause ideas. Mind and matter, he says in the *Inquiry*, are so different that "we can find no handle by which one may lay hold of the other." He took this to show that perception is a process causally independent of its objects. Priestley seized upon it as showing Reid to be an occasionalist or unwitting idealist. In claiming this he is accepting Reid's suggestion that totally dissimilar substances cannot interact. But, he believes objects do produce ideas: he takes this as

given. It follows that ideas and objects must be of the same substance. And he rejects Berkeley's idealism because it supposes that every act of perception is produced by a divine intervention, which he regards as not consonant with the simplicity usually displayed in God's actions. Following this logic, Priestley had no alternative but to declare himself a materialist.

Underlying this debate is an issue about causal relations. We can contrast Priestley's view with that of his near-contemporary Hume, whom Priestley regarded as insufficiently acquainted with real science to have any useful opinions on the philosophy of science. Priestley agreed with Hume that causal relations contain regularities between events, but he denied that they are merely regularities. Causally related events are not for him thus "loose and separate": they are bound together by the productive agency of some mechanism. His rejection of interactionist dualism stems from its admitted inability to supply such a mechanism for interaction.

The second source of Priestley's materialism is to be found in his theory of matter, which he made a central theme of his 1777 *Disquisitions relating to Matter and Spirit*. Newtonian dualists such as Price, Reid and Andrew Baxter had urged that matter and mind are irreconcilable because one is intrinsically passive and the other intrinsically active. Priestley thought that talk of matter as a "dead and torpid substance" betrayed the influence of ancient Gnosticism, a religion which regarded matter as evil. According to the Newtonians, matter's apparent activity is to be wholly ascribed to the action of immaterial forces. But, Priestley asks, if matter is wholly powerless, then what use is it, and why suppose it to exist at all? He follows John Michell (a fellow scientist-clergyman) in likening the Newtonian theory of matter and force to a structure of material bricks and immaterial mortar in which the mortar is doing all the work. Priestley and Michell were themselves indebted to the Jesuit scientist Roger Joseph Boscovich, whom they had both met.

Closer scrutiny reveals some differences between Boscovich and Priestley. Priestley wholly accepted his insistence on the powerfulness of matter. Boscovich had reached this conclusion by arguing that the Newtonian account of mechanical impulse required finite velocities to be lost and gained in a single instant of time, thus violating the Leibnizian Law of Continuity. This argument is never mentioned by Priestley. For

him mechanical impulse may or may not be theoretically intelligible; his objection is that the Newtonians have not shown that it actually occurs. Rather, the phenomena show us clear instances of the action-at-a-distance of forces, and nothing that cannot be readily explained by forces. In his view, Rule One of Newton's "Rules of Reasoning in Philosophy" in the *Principia* (1687) – that "we are to admit no more causes of things than such as are both true and sufficient to explain appearances" – requires us to hold that matter consists of "powers of attraction and repulsion" and to do without the hypothesis of solid, impenetrable atoms.

For Priestley the great theoretical weakness of the atomic theory is that it can not account for the internal cohesion of the atom. He is attracted to Boscovich's theory of the microstructure of matter as infinite powers of repulsion located at dimensionless point-particles, but he treats that theory as no more than a valuable speculation. The theory is consistent with all data, but it lacks confirmation from experience or analogy. By contrast, the more general theory of matter as "powers of attraction and repulsion" does command assent, for simplicity and analogy count in its favour.

Priestley diagnoses the Newtonian notion of matter's passivity as arising from what we might term the "billiard table illusion." That billiard balls do not move without first being struck does not show that they are not powerful agents, for we forget that the table is level and that it thus neutralizes the balls' natural tendency to move downwards. The fact that bodies are sometimes in equilibrium only shows that sometimes their natural powers balance each other out, not that they have no natural powers. And, Priestley concludes, if they can have these natural powers, there is no reason in principle why they might not have others such as the power of consciousness.

Priestley's third and main argument for materialism is a methodological one. He argues in the *Disquisitions* that in postulating a soul dualists are making the same mistake that the Newtonians make in postulating solid matter: both argue for an entity whose existence is not directly evident, and for which there is no indirect evidence which cannot be otherwise accounted for. Both thus fall foul of Newton's "universally received" Rules of Reasoning. Following Hartley he takes it that, as far as we can tell, states of mind are universally correlated with states of the brain, a proposition that none of his critics contested. In their *Free Discussion* of 1778 Price argued that Priestley's move from

correlations between body and mind to an identity theory is a fallacious one. Priestley replied that of course not all universal correlations are cases of identity – his claim is only that we must not postulate a theoretical entity such as the soul when the phenomena can be attributed to a known entity such as the brain.

Priestley had professed rigorous adherence to Newton's Rules, and required that his reasoning "be tried by this and by no other test." Reid was the only critic to take up this challenge. Priestley thought the Rules discriminated between acceptable and unacceptable hypotheses; Reid thought they proscribed hypotheses altogether. According to Reid, the clause in Rule One requiring causes to be "true" rules out any cause which is "barely conjectured to exist without proof." Priestley is more liberal: for him a hypothetical cause can be regarded as "true" if it is modeled on a real existent. Reid typically employs the "sufficiency" criterion to exhibit the "insufficiency" of some hypothesis, against those who would over-simplify the complexity of nature. Priestley typically contrasts "sufficient" with "superfluous," against those who would overpopulate our ontology. The crux of the disagreement is in their attitudes to analogy. Newton's Second Rule tells us that "to the same effects we must, as far as possible, assign the same causes." Reid adopts a strict interpretation of "same," and thus empties the Rule of analogical content. Priestley reads "sameness" as equivalent to "likeness"; for him science transcends the observable, on the basis of analogical inference from the observable. For Reid it was part of Newton's greatness that he refused to pronounce on the nature of gravity, and in that sense he discovered only the law of gravity, not its cause. In contrast Priestley's science does deal with the natures of things, and not just with the laws of their superficial phenomena. For him it is by analogy that we expand our ontology.

The application of Reid's principles to the mind is somewhat unclear. He has to treat the mind's immateriality as axiomatic. Priestley's principles apply more straightforwardly. He allows that mental phenomena are in some respects *sui generis*, and that they cannot thus be wholly explained by analogies; but he denies that these features are any better explained by dualism. We do not know exactly how the brain thinks, but then we don't know how magnets work. In both cases we should ascribe the power to its apparent source, and not to any hypothetical agent. Had the brain been demonstrably

incapable of performing the role require of it, then the method of analogy described by Rule Two could be used to enlarge our scheme of causes. But as it seems “sufficient” and is undoubtedly “true,” Rule One requires us to reduce our ontology. Not to follow this Rule is tantamount to supposing that “every particular substance to which any powers or properties are ascribed may have a separate soul also.” Rule One requires simplicity, but it does not entail reductionism. The brain’s powers reside in its structure or organization. Nature, in Priestley’s view, is a multi-leveled set of systems, in which different powers belong to different levels of organization. Simplicity does not reduce everything to physics.

Priestley’s determinism can be more briefly described, as it rests on one main argument, forcefully expounded in his *Doctrine of Philosophical Necessity* of 1777. The work was presented as an “appendix” to his materialism, and he thinks that materialism and determinism are mutually supporting, but he argues for determinism on independent grounds. Hume had been wrong, Priestley contends, to take the mechanism out of causation, but he was right to insist that causal relations are regular. They hold not essentially between single pairs of events, but between kinds of pairs of events. Causal relations are universal, law-like relations. This account of causation is, he argues, incompatible with libertarianism. If in the same circumstances I could on one occasion do X and on another occasion do Y, then it cannot be those circumstances that cause me to do either. But neither could my will be said to cause either action. Any self-determining power, “bearing an equal relation to any two different decisions, cannot be said to be the cause with respect to them both.” This dilemma has only two solutions. Perhaps neither the circumstances nor my will produces the action; in which case the action is “an effect without a cause,” and the libertarian must give up the doctrine that every event has a cause. Or it must be that such undetermined actions are impossible, and libertarianism itself must be abandoned.

Priestley’s main critics, Price and Reid, took up opposing lines of attack. In his *Free Discussion* with Priestley, Price contended that causation is not a unitary concept, and that a different kind of causation operates in the human sphere from that which reigns in nature. Natural causes are law-like; human causes are not. For him motives are both the final causes and the occasions of our actions, but they are not coercive: we are the

agents, not them. Against this Priestley contends that our conception of causation is not shaped by the kinds of substances to which it applies: the concept must be one and the same in all cases, whether human or natural. He claims that the will can no more be said to determine actions than the motion of the air can be said to determine the direction of the wind. We know the motion of the air does not cause any particular wind simply by understanding the concept of causation. He concludes that Price's ontological considerations do not divide the concept into two different kinds of causation.

Unlike Price, Reid accepted that Priestley's conception of causation does lead to determinism, and (in his 1788 *Essays on the Active Powers of the Human Mind*, though with little mention of Priestley) he directed his attack against that conception. He argued that all real causation is free conscious agency, whether human or divine, and that natural causes are only the superficial appearances of regularity occasioned by the hidden operation of conscious agents. He attacked Priestley's conception mainly on the grounds that it cannot account for accidental generalizations, such as the alternating succession of night and day. If all regular relations are causal relations, then night and day must be causally related. Priestley regards regularities as part of the causal relation and also as evidence of causation. Regularities point to the existence of a mechanism which is in turn the explanation of the regularity. Science advances from the regularities to the mechanism by experimentally analyzing the "proximate cause." He gives as an example his own discovery of why frequently breathed air is fatal to animal life: experiment shows that in being breathed the composition of the air is changed. This is only a partial explanation but it can in principle be extended towards a complete account of the matter. It is not clear whether or how on his view it would be possible to investigate a regularity and discover no intervening proximate mechanism, so it must be said that he offered no criterion for detecting universal accidental generalizations.

In 1780 Priestley left Shelburne, in part because his philosophical controversies were beginning to embarrass his patron. He returned to his clerical career, in charge of Birmingham's prosperous "New Meeting", where he was also surrounded by a flourishing scientific and industrial culture in which he felt perfectly at home. Both friends and foes, however, tried to persuade him that philosophy was not his forte. In a sense he did modify his course at this time; little more was said about materialism

thereafter. His next work, the *Letters to a Philosophical Unbeliever* of 1780, took up again the defense of the Argument from Design, against that most vigorous critique of the Argument, Hume's *Dialogues concerning Natural Religion*, published posthumously in 1779.

The *Dialogues* attacks the Design Argument in a great number of ways. One of Hume's contentions is that the origins of life and order are necessarily unknowable because the history of the universe is a single, unique event, and no part of the universe can be used as a model by which to explain the whole. More generally, the "slow and deliberate" steps of science can never enable us to reach cosmic conclusions. Priestley thinks that analogical reasoning, following Newton's Second Rule, is strong enough to bridge these difficulties. He admits that a genuine singularity would be inexplicable, but denies that the Creation is an entirely singular event. The Deity, he says, "is to be placed in the general class of intelligent and designing agents, though infinitely superior to all others of that kind."

However, on Priestley's account of the Rules, analogy only has a constructive role when the known resources of science have been exhausted. If materialism is sufficient to account for consciousness, why isn't naturalism sufficient to do the same for the order of nature? Hume had argued that nature contains many principles of order, and cites as examples "instinct," "vegetation" and "generation." He sets up the principles of life in opposition to the Design theorist's model of reason as the basic source of order. "The world," says Philo (Hume's skeptical spokesman), "plainly resembles more an animal or a vegetable than it does a watch or knitting-loom." "A continual circulation of matter in it produces no disorder: a continual waste in every part is incessantly repaired: the closest sympathy is perceived throughout the entire system: and each part or member, in performing its proper offices, operates both to its own preservation and to that of the whole."

In Priestley's view, however, it is these very features of life – its orderliness and mutual adjustment – that demand some sort of external explanation. Hume had foreseen this kind of reply, and he accused it of begging the question: both reason and life are equally principles of order in nature, and it is arbitrary to give one priority over the other. Priestley makes two suggestions as to why life cannot be "sufficient" for the task Hume

requires of it. In the first place, even if we suppose life to have been eternal, this will not explain how the various species came to be so well adapted to their physical environments. Secondly, he claims that even the power of reproduction is only superficially a process in which life brings order out of disorder. Reproduction is itself possible only because of the intricate mechanisms plants and animals possess for their own procreation. He denies then that plants and animals do bestow order and organization on their offspring, and ascribes that ordering power to their reproductive apparatus. In thus distinguishing between the power of life as such and the power of reproduction he is trying to show that it is not him but Hume who begs the question.

Priestley had not only to defend his theism against Hume – he also had to defend it, as it were, against himself. Price, and later Samuel Taylor Coleridge, contended that materialism and determinism are in some sense inconsistent with belief in a transcendent Deity, and they tend towards Spinozistic pantheism.

Priestley's materialism was based not only on methodology, but also on the problem of interaction and the theory of matter. The theological counterpart of the problem of mind-body interaction is the problem of "how an immaterial being, not existing in space, can create, or act upon matter," a difficulty so great that he concludes we must regard God as being in some sense a material being. He observes that this solution leads to a further difficulty, for we are being required to suppose that nature is somehow filled by an infinite material substance. Here Priestley turns for help to the Boscovichian hypothesis: on the theory of forces and powers, solidity and impenetrability are not essential to matter, and the interpenetration of substances becomes a possibility. God, then, is quite literally a Being "in whom we live and move and have our being," to quote one of Priestley's favorite Biblical phrases.

This position might be called a monism of attributes – everything is material, even in some sense God. Some of Priestley's critics and commentators, from Coleridge onwards, have ascribed to him a monism of substance; somehow his quite strenuous opposition to this version of monism has gone unremarked. The opposition to pantheism could hardly be more explicit:

[F]or the same reason that the maker of the table ... must be different from the table, it is equally manifest that the maker of the myself, of the world, and of the

universe ... must be a being different from myself, the world, or the universe; which is a sufficient answer to the reasoning of Spinoza, who, making the universe itself to be God, did, in fact, deny that there was any God.

The analogy central to the Argument from Design entails the ontological distinction between maker and made. Spinoza of course rejected Design because he rejected final causes, which he took to be incompatible with determinism, and because he thought the Design theory involved God employing means to achieve ends, which he took to be an impossible mode of operation for a perfect Being. Priestley, on the other hand, saw no difficulty in reconciling final causes with determinism or in God employing means to ends, so long as in all cases the causal relations are regular.

Priestley also thought that pantheism could be refuted without recourse to the Argument from Design. This we see in his *Additional Letters to a Philosophical Unbeliever* of 1782, written in reply to Matthew Turner (who wrote as “William Hammon”; he had given chemistry lectures at Warrington Academy when Priestley was there). Turner espoused a pantheism in which God is identical with the “forces of nature.” Priestley objects that this hypothesis of an intelligent, self-designing universe is “contrary to any analogy in nature.” He recognizes that Turner’s intelligent material universe bears some resemblance to his own conception of a thinking brain; but, he says, the analogy is not a good one, for the universe lacks the homogeneity we find in the brain. This rejoinder is surprising, for it is precisely the Design Argument’s contention that the universe is not disjointed but is in fact an harmonious and simple structure.

Priestley also considers the question of whether, if human intelligence resides in a brain, God too, though distinct from the universe, must “have in him something resembling the structure of the brain.” He rejects this suggestion, contending that “The divine mind ... may be intelligent, in common with the mind of man, and yet not have the visible and tangible properties, or any thing of the consistence of the brain.”

Many things have common properties that are very dissimilar in other respects. If we had known nothing elastic besides steel, we might have concluded that nothing was elastic but steel, or something equally solid and hard; and yet we find elasticity to belong to so rare a substance as air....

The claim here is that analogies are sometimes misleading. Priestley's argument here is *ad hoc*. Analogy does suggest that elastic objects are somehow steel-like, and the analogy of materialism does likewise suggest that God has a brain. Even so, his main objection to pantheism still stands, the argument that the analogy of human creativity suggests God is to be to the world as Maker to made.

Late in life Priestley encountered an evolutionary rival to his theism. It came from Erasmus Darwin (Charles Darwin's grandfather), in the 1801 third edition of his *Zoonomia*. Darwin resembled Hume in that he thought of the biological order as having been generated by a primordial living principle. He postulated what he called "molecules with formative aptitudes" as the chief agents in reproduction and the driving-force in the generation of new life-forms. Priestley's very last scientific experiments were directed against the doctrine of spontaneous generation that he thought Darwin's evolutionary hypothesis entailed. (The results were published after his death in the *American Philosophical Transactions* of 1809.) Darwin, he thought, had attributed to his "particles" just the same sort of impossible spontaneity that the libertarian assigns to free-will; he had given no account of how these particles are supposed to work. He denied that what Darwin called the "lower" forms of life are essentially simpler forms: on his view all species are highly complex, and all their complexities are finely adjusted to their environment.

Priestley's general position, then, is that naturalism fails to make sense of biology. If we follow Hume we must ascribe to life itself powers which belong only to the level of life's components. If we follow Erasmus Darwin we must invent a mechanically impossible entity to bridge the gulf between the non-living and the living. Since both these moves fail, we are forced to postulate an intelligent Creator, following the analogy of human creativity. In the case of the mind, Newton's Rules favour a reduced ontology; in the case of nature, an expansion.

For a time Priestley's contemporaries were either greatly repelled or attracted by his combination of politics, religion and philosophy. Burke's *Reflections on the Revolution in France* of 1790, which attacked Priestley and Price with considerable vehemence, and the Birmingham Riots of 1791 – in which a "Church and King" mob destroyed his home and his library – are both monuments of the hostility he inspired in

some. A cartoon of the day labeled “Dr Phlogiston, the Priestley politician or the political priest” depicted him as an enraged firebrand standing on a tract called “Bible explained away,” waving a “Political sermon,” and with his “Essays on Matter and Spirit” protruding from one pocket. This antagonism led to his emigration to the United States in 1794, where he was for a short time feted as a democratic hero but soon after attacked as a French Revolutionary sympathizer.

Yet to the young English radicals of 1790 Priestley was a hero: this admiration appears in figures as diverse as Coleridge, William Wordsworth, Charles Lamb, William Hazlitt, William Godwin, Mary Wollstonecraft, Jeremy Bentham and James Mill. But, as Leslie Stephen observed, this enthusiasm was “swept away by stronger currents.” In a world starting to become divided between English Christian conservatism and French radical atheism, Priestley’s ambition had been to put the most “advanced” Enlightenment ideas into the service of a rationalized though heterodox Christianity, under the guidance of the basic principles of scientific method. In this he had little success. Some of his admirers moved towards Romantic philosophy and Christian orthodoxy, others towards atheism and empiricism. By the turn of the century, Priestley’s influence had dwindled to the narrow stream of rational Unitarians. He died in 1804, at his home in Northumberland, Pennsylvania.

Since his death Priestley’s philosophical reputation has been meager, for two obvious reasons. His combination of materialism, determinism and theism has appeared paradoxical. Leslie Stephen, for instance, described it in his *History of Thought in the Eighteenth Century* (1876) as “an unnatural alliance,” and declared that his methods of thought “would, if consistently applied, destroy the last citadel of supernaturalism.” Further, his remarkable versatility has aroused suspicion. As Stephen put it, he “possessed one of those restless intellects which are incapable of confining themselves to any single task, and, unfortunately, incapable in consequence of sounding the depths of any philosophical system.”

Priestley’s life was one of perpetual disputation. He always regarded controversy as a service to truth, and it was his custom to answer every objection his critics could propose. When his arguments led him to seemingly paradoxical conclusions, he held to the arguments rather than reject the premises from which he started. As a counter-balance

to Leslie Stephen's dismissive judgment, we can end by noting the opinion of Hazlitt, expressed in his 1829 essay "The Late Dr. Priestley." Priestley, he said, "was certainly the best controversialist of his day, and one of the best in the language"; and, he added, "in boldness of inquiry, quickness and elasticity of mind, and ease in making himself understood, he had no superior."

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Many of Priestley's non-scientific papers and letters were destroyed in the Birmingham Riots. Collections are to be found in the Dr. Williams Library, London; Dickinson College, Pennsylvania; the American Philosophical Society Library, Pennsylvania; and the Royal Society, London. See also the careful "Select Bibliography" in Robert E. Schofield, *The Enlightenment of Joseph Priestley. A Study of His Life and Work from 1733 to 1773* (University Park, Pennsylvania: University of Pennsylvania Press, 1997).