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Joseph Priestley: Scientist, Theologian, and Metaphysician, by E.N Hiebert, A.J. Ihde, and R.E. Schofield

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E.N. Hiebert, A.J. Ihde, R.E. Schofield, *Joseph Priestley: Scientist, Theologian, and Metaphysician*. New Jersey: Associated University Presses, Inc., 1980. 120 pp. $12.00.

Review by Robert J. Snyder

On August 1, 1774, Joseph Priestley isolated dephlogisticated air, better known as oxygen. Nowadays Priestley tends to be remembered not so much for his discoveries, even less for his political and theological writings, but rather as a life-long believer in phlogiston. In remembering him thus we do scant justice to a scientist, teacher, historian, essayist, political theorist, and political activist. This injustice was remedied somewhat at the Ninth Atlantic Regional Meeting of the American Chemical Society, held in Wilkes-Barre, Pennsylvania on April 23-26, 1974. One of the special events during the meeting was the Joseph Priestley Symposium commemorating the bicentennial of the discovery of oxygen by Priestley. Three recognized authorities on the life of Priestley — Erwin N. Hiebert of Harvard University, Aaron J. Ihde of the University of Wisconsin, and Robert E. Schofield of Iowa State University — presented papers at the symposium. These three papers constitute *Joseph Priestley: Scientist, Theologian, and Metaphysician* and fill a void in our understanding of the life and work of the discoverer of oxygen.

The lead article by Hiebert, "The Integration of Revealed Religion and Scientific Materialism in the Thought of Joseph Priestley," attempts to establish that Priestley's scientific philosophy was deeply rooted in his philosophy of religion. A major portion of

his lifetime efforts was devoted to arguing for the synthesis of natural science and revealed religion that would be intellectually acceptable and rationally true. Hiebert's main theme is that Priestley was a dyed-in-the-wool historian, incapable of considering any subject without examining it in its historical context.

Priestley's view of the world was that religion and science were compatible domains. The scientific discovery of the works of God in nature was harmonious with an historically sound interpretation of the word of God. For Priestley there was a natural partnership between the "word of God" and the "works of God." Priestley was not the only seventeenth- and eighteenth-century scientist to see compatibility between science and religion, but his prolific writing on the bearing of religion on science makes him particularly worth studying. By focusing on Priestley's religious career and writings, Hiebert attempts to show that Priestley's scientific philosophy (or natural philosophy, as it was then known) was firmly rooted in his philosophy of religion, and that Priestley integrated his conception of revealed religion with his belief in scientific materialism.

In his *Disquisitions Relating to Matter and Spirit* published in 1777, Priestley sets the tone for many of his subsequent theological writings. What Priestley had to say about the relationship of matter and spirit was illuminating, controversial, heretical, and, according to him, biblically sound. It had generally been accepted at that time that there were two distinct kinds of substance in human nature: matter and spirit. For Priestley it was absurd to maintain that two substances that have no common property could be capable of intimate connection and mutual action. Priestley's system was based on a conception of man as wholly material; the human mind was nothing more than a modification of matter. This scientific materialism of Priestley was consistent with his anti-trinitarian concept of Christ. In *Disquisitions* Priestley argues that "if man has a soul distinct from his body, Christ, who in all other respects, appeared as man, could not have had a soul which had existed before his body; and the whole doctrine of the pre-existence of souls (of which the opinion of the pre-existence of Christ was a branch) will be effectually overturned." Priestley concludes that materialism, socinianism (anti-trinitarianism), and philosophical necessity "are

equally parts of one system, being equally founded on just observations of nature, and fair deductions of the scriptures." Interestingly, though, Priestley believed in the bodily resurrection, or, as he would say, in a matter-spirit resurrection. If death is the decomposition of the body, then the resurrection corresponds to the recomposition of the indestructible particles of matter.

In addition to *Disquisitions Relating to Matter and Spirit* Hiebert feels that to understand the underlying motives of Priestley's theology, one must examine his two-volume *History of the Corruptions of Christianity*, published in 1782. In this work Priestley attempted to uncover, by historical analysis, the true, original context of Christianity. By showing, historically, from the original sources, the unfounded nature of the Trinity, the Virgin Birth, original sin, and other fundamental Christian doctrines of the time, Priestley hoped to demonstrate that most contemporary views had been corrupted from their original, pure, genuine, rational form. The original gifts of God to man were interpreted by Priestley to have been transformed into the corrupted consequences of modern religion. Priestley believed that he was performing the role of a messenger carrying out God's plans to reveal the corruptions of Christianity and to re-establish the pure revealed Christianity. Priestley's interpretation of how the Virgin Birth became a corrupt doctrine of Christianity reveals the criterion by which he distinguished the pure original form of Christianity from the corrupted form. Priestley believed that how Christ came into the world is unimportant and serves no purpose to his mission. What is important is what he taught while in this world and what he did and suffered, as proof of the authority by which he taught. Thus, Priestley rejected the doctrine of miraculous conception as serving no purpose in the history of Christianity. But consistent with his philosophy of necessity, Priestley was optimistic for the Christianity of the future. He concluded that the natural process of history would eventually draw all men to Jesus Christ.

Hiebert offers considerable evidence for his main contention that Priestley's scientific and religious beliefs were joined in a theology that depended on the evidence provided by history, as interpreted by Priestley. Hiebert reveals Priestley to be both a devastating critic of current Christian doctrine and a zealous

defender of what he understood as the original revealed Christianity. Priestley is seen to be a skilled, imaginative experimenter intent on integrating the true revealed religion with the scientific materialism of the age.

While the greater portion of Priestley's life was devoted to the ministry and to writing on religion and religious history, Priestley established his reputation as a chemist by a series of experiments carried out in England during the 1770s. In 1774 Priestley made his most important contribution to science, the discovery of "dephlogisticated air" by heating a sample of mercuric oxide confined over mercury in a glass tube and using a lens to concentrate the sun's rays. In Priestley's words: ". . . the air would neither extinguish a candle nor inconvenience a mouse. . . . The feeling of it to my lungs was not sensibily different from that of common air; but I fancied that my breast felt peculiarly light and easy for some time afterwards. Who can tell that, in time, this pure air may be fashionable article of luxury. Hitherto only two mice and myself have had the privilege of breathing it." The discovery of oxygen by Priestley forever linked his name to that of Antoine Lavoisier, and their inter-relationship is the subject of the second article, "Priestley and Lavoisier" by Aaron Ihde. Lavoisier adopted as the central element in his new view of chemistry the gas that Priestley had discovered. Lavoisier's new chemistry contained some of the ideas that chemists nowadays accept as fundamental concepts of nature: matter is composed of simple elements, matter is conserved during chemical changes, and so on. Nevertheless, while Priestley was a man noted for his radical religious and social views, he was never able to bring himself to accept the new chemistry that Lavoisier created around oxygen, and, in fact, occupied the last years of his life in America writing in opposition to it.

Ihde offers many details about what Lavoisier discovered about oxygen and why Priestley refused to believe in these findings. Lavoisier's chemistry involved much more than the abandonment of the phlogiston concept and its replacement by the concept of air as being a mixture of gases, one of which was oxygen. Priestley was a qualitative scientist responsible for many of the key observations; Lavoisier interpreted these observations and added a more quan-

titative understanding of nature in his creation of a new chemistry. Oversimplification of the facts blurred by the passage of time has led to the conclusion that Priestley was blindly stubborn in refusing to convert to the new chemistry, and that Lavoisier was an experimental genius and intellectual giant. However, as Ihde explains, the principal reason for Priestley's refusal to accept the new chemistry lay in the shortcoming of the new chemistry itself. Based on Priestley's own views of the nature of matter and his qualitative chemical experiments there was no compelling reason to accept the explanations provided by the new chemistry. The failure of Priestley to convert is made understandable within the context of the times.

For those readers interested in the history of science this second article will be the most enjoyable of the book. Using the journals, notes, and communications of Priestley and Lavoisier, Ihde brings to life the feeling of what it was like to be involved in science at the end of the eighteenth century. Using pictures of the actual apparatus used by Priestly and Lavoisier for their study of gases, Ihde recreates the experiments each man performed in such vivid detail that even the reader with no background in chemistry cannot but be enthralled by the investigative genius of the two men.

The third article, "Joseph Priestley and the Physicalist Tradition in British Chemistry," by R.E. Schofield, traces the evolution of Priestley's scientific theories by examining his early education in science and metaphysics and his later writings on non-scientific subjects. Beginning with the work of Robert Boyle in the late seventeenth century, British chemists were attempting to explain chemical phenomena in physical terms, that is, in terms of size, shape, and motion of the fundamental particles of which the world was made. Sir Isaac Newton and his followers added the concepts of forces of attraction and repulsion between particles to the fundamental parameters of physicalist chemistry. However this mechanistic view of the natural world had its opponents: since experiments could not be performed on the fundamental particles, and, hence, their size, shape, and various forces of attraction could not be determined, of what use were they in providing explanations of chemical phenomena? Questions concerning the make-up of these fundamental particles were being asked, questions of the ultimate divisibility or indivisibility

of matter, so that by the time Priestley began his chemical experimentation in the 1770s there was a fairly well established view that chemistry was very different from mechanics, and chemical phenomena should not reduce to mathematical calculations of mechanical principles. For what reason then did Priestley adopt, in the midst of an anti-mechanistic view of chemistry, a scientific viewpoint more than forty years out of date — the physicalist approach of Stephen Hales, Newton, and the so-called Father of British Chemistry, Robert Boyle?

Schofield suggests that the physicalist theory of matter allowed Priestley to connect his formal scientific studies with another element of his education, the study of metaphysics. John Rowning, in his *Compendious System of Natural Philosophy* published in parts from 1734 to 1743, interpreted the forces of attraction and repulsion between natural bodies as a manifestation of the continued action of God in the universe. This combination of science and metaphysics convinced Priestley that the most important problem in natural philosophy was the investigation of the relationships among matter, force, and spirit. This concern, however, does not show up at this time in any of his published works in science, but rather shows up repeatedly in his metaphysical and theological writings. It is in these works that Priestley explicitly outlines his theory of matter: that God, in creating matter, had fixed only certain centers of attractions and repulsions, these centers being free to move indefinitely carrying their spheres of attraction and repulsion along with them. Matter could be subdivided to near infinity leaving a part containing many centers. Matter is thus resolved into nothing but an agency of the Divine Being. Although there is nothing new in his theory of matter — it is just a refined version of the physicalist model of matter — Priestley's version did have metaphysical and theological implications. And, according to Schofield, the theory and its consequences had much to do with Priestley's reluctance to accept the new chemical theory of Lavoisier. Thus, Schofield argues, Priestley's chemical researches are to be distinguished from those of his contemporaries, in their successes as well as failures, by his continuation of the physicalist tradition of chemistry.

Neither the lifestyle nor the scientific, philosophical, theological,

or political thought of Joseph Priestley can be easily characterized. However, Hiebert, Ihde, and Schofield have presented a colorful and imaginative picture of this extraordinary man — the patron saint of American chemistry — and have thus contributed significantly to the history of science.