bility by noting Blackmur’s defense of the "provisional imagination," according to which a critic "must imaginatively adopt a writer's belief, such as Yeats's magic or Eliot's Anglicanism, in order truly to appreciate his work." She observes that "Blackmur believed that he could approach an understanding of Adams as an artist by a 'rehearsal' or creative imitation of the structural 'values' of Adams' great works." But in this book Blackmur's appropriation of Adams's belief is not provisional; there is little creative imitation; he not merely rehearses, he duplicates. Blackmur in some sense, then, became Henry Adams, and the more deeply Adams displaced Blackmur's sensibility, the more nearly impossible it became for him to finish the book.

The key to this identification is the motif of failure in Adams, whatever the evidences of success in Adams's outward life. Some implication of that experience of failure took possession of Blackmur and haunted him throughout the lifelong project of writing this book. Whether the sense of failure had something to do with Blackmur's complicated career at Princeton it is difficult to say. Blackmur lacked any formal education and did not even graduate from high school. He thus had a troubled relationship with the English Department and eventually attained his professorship by way of the Creative Writing Department. In any case, this sense of failure in Adams appears to account for Blackmur's preoccupation with King Richard's Prison Song, which gets a chapter to itself.

The story of the prison song of Richard Coeur de Lion first showed up in the diary of John Quincy Adams in 1830, where, musing on his despair after being defeated in his re-election bid for the presidency, John Quincy identified himself with the defeated king in André Grétry's opera Richard Coeur de Lion (1784). There the minstrel sings to the former King in prison: "O, Richard, O, mon Roi! / L'univers t'abandonne." Henry Adams became obsessed with this passage in his grandfather's diary, went to a performance of the opera in 1891 as "an act of piety to the memory of my revered grandfather," and mobilized his friends to find for him the medieval original of the song, which he later reprinted in the Chartres volume.

Just as John Quincy, turned out of the presidency, found in King Richard's prison song an objective correlative for his own failure and rejection, so Henry found in the song the expression of his own defeat and despair. Further, the way that Blackmur preoccupies himself with this song suggests that he too appropriated it, in some obscure way, as the expression of a personal sense of inadequacy and rejection. King Richard and Richard Palmer Blackmur were thus on some level one with Henry Adams in their sense of despair and abandonment.

I confess to not knowing enough about Blackmur the man to anchor these observations in the facts of his biography, but they seem warranted by the striking features of this peculiar study that he could never finish. With respect to Adams, it is clear that he dealt with his unhappiness by cultivating the stoic's indifference to both pleasure and pain. Toward the end of his life he repeated the wisdom of his old teacher Gurney, who said to him that "of all moral supports in trial only one was nearly sufficient. That was the Stoic." And he remarked that "Marcus Aurelius would have been my type of highest human attainment." Blackmur's struggle with this book suggests that this moral support was largely denied him.

— Reviewed by James W. Tuttleton

**Pierre Duhem**

(1861-1916)


IN THIS BOOK, Father Stanley L. Jaki tells
the story of Pierre Duhem (1861-1916), the brilliant French physicist who was also a philosopher and historian of science. Duhem's relevance is that he promulgated a view of physics which was fully aware of its modern theoretical and mathematical developments and yet which viewed scientific theories as mathematical constructs whose aim was to accommodate the laws of physics rather than to describe the essence of the inner processes of physical nature. Because of this, he suffered the fate of many theorists who develop a new idea, that is, he was made to fit a class of like-minded thinkers who had come to similar views.

Duhem is usually classed among the late nineteenth-century "Positivists," who are not to be confused either with the positivistic movement founded by Comte or the later (and still influential) school of "Logical Positivists," founded in Vienna and characterized by such men as Schlick and Carnap. Instead, Duhem is classed with men who like himself were practicing physicists, namely Ostwald and Mach, who also came to the conclusion that physical theories were not to be seen as descriptions of reality, but rather as "short-hand" notations used by physicists to classify or to summarize experimental evidence. These men were more aware of the history of physics than their colleagues, and thus aware of the many different ways that scientific evidence and empirical laws could be explained by different theories.

Both Mach (on whom Einstein relied for his early views of physical theory) and Duhem wrote histories of mechanics in which they detailed the development of Newtonian mechanics and criticized its basic assumptions. This was no mere historical exercise but was forced on late nineteenth-century physics by the development of such fields as electrodynamics and thermodynamics, which the mechanistic models and basic laws of Newtonian mechanics could not explain. Their view of what the physicist accomplished when he put forward a theory allowed, therefore, for the contingency of theoretical explanations, and put a buffer, as it were, between the reality that the physicist was trying to deal with and his theories, which tried to explain it.

Duhem differed from the positivists of his day in two important respects. First, he was a faithful and ardent Roman Catholic at a time when the official policies of the French Third Republic were blatantly hostile to the Catholic Church and when membership in the Church could deprive a teacher or a professor of preferment or promotion in the highly centralized French system of higher education. Second, Duhem made a profound discovery about the history of physics that sharply challenged the "official view" of scientific development and its relationship to the Church in medieval times. This discovery designates Duhem as perhaps the greatest of historians of science and far exceeds in importance his actual scientific work, which was in the field of thermodynamics.

Duhem's discovery was simply that Galileo, whose discoveries marked him as the founder of the modern science of mechanics, had a number of predecessors who had anticipated his great discoveries, the earliest of whom worked at the University of Paris in the fourteenth century. There was, in fact, a rich vein of scientific work which had been done in the Middle Ages and which Duhem was the first to discover and reveal in a series of detailed and comprehensive studies, including multi-volume works on the scientific legacy of Leonardo da Vinci and the history of cosmological theories from ancient to modern times. No longer, then, could modern disciples of the Enlightenment and the Renaissance plausibly claim that modern science stood in opposition to all that the medieval Church had stood for, for priests such as Jean Buridan and Nicholas Oresme (later Bishop of Lisieux) had provided the scientific spadework on which the scientific "revolution" had been built.

Duhem argued forcefully that there was a "continuity" between medieval science and modern science. The discoveries of the predecessors of Galileo and of the
characteristic of continuity in the development of science had more than historiographical implications; it had religious, cultural, and even political implications, implications of which Duhem was very aware. It was Duhem's vocation to have made this important discovery, the final implications of which are just now being drawn out.

Father Jaki's book is a long, richly detailed study in two parts, the first part being a biographical account in seven chapters, the second part consisting of three long chapters devoted to Duhem's work as a physicist, philosopher, and historian of science. The book reflects Father Jaki's usual comprehensive scholarship and acute insight into those areas where science and theology meet. It also gives a full picture of the character and work of the "uneasy genius" who is the subject.

There is a large degree of sympathy between the subject of this book, Pierre Duhem, and its author, Father Jaki. Both men are learned scholars in the fields of physics, history of science, and philosophy; both are strong Catholics quite willing to declare their faith in the face of scientistic prejudice; both are scholars who have worked at an extraordinary rate to produce a large corpus of scholarly work whose amount of detail, learned references, and acuteness of insight make them formidable intellectual presences; and both do not suffer fools gladly.

Clearly Father Jaki's stance in this book is that of a man who is writing about his hero; indeed, Father Jaki discloses that he was instrumental in having a plaque placed on the house in Bordeaux in which Duhem lived and wrote for the last sixteen years of his life. Because the book is the only full-length biography and one of the few studies of Duhem's work available in English, it will remain a necessary volume for any future scholarship on Duhem, as well as on collateral topics including nineteenth-century positivism and the relationships between science, religion, and politics.

Father Jaki views Duhem's life and the course of his posthumous reputation as a kind of tragedy: this is an interpretation that events will bear out only to a point. It is true, as Father Jaki indicates, that Duhem was denied a post at a university in Paris and that his work as a physicist and historian were often deliberately overlooked by powerful colleagues with whom Duhem was in conflict over scientific or religious matters. More personally, Duhem's marriage lasted only a few brief years since his wife and a new-born child died in the second year of his marriage, leaving him with a young daughter, Helene.

Duhem's scientific work, while conducted on a high level, was doomed not to have a significant influence because he had "backed the wrong horse" when he chose thermodynamics rather than electrodynamics as his field. For it was the work of Maxwell and radiation researchers which would bring about the discoveries of relativity and quantum mechanics that characterize twentieth-century physics. Duhem thus found himself in mid-career a widower, in Bordeaux rather than Paris, with a dwindling number of doctoral candidates to guide.

But the severities of the world are often the mercies of Providence, at least as far as Duhem's career was concerned, for at the time that Duhem was being denied advancement as a physicist, he was turning his attention to the history of physics, where his discoveries were so monumental that even an educational bureaucracy unfavorably disposed to both Duhem's scientific vision and his religious views could not deny him recognition. (He was made a Corresponding Member of the French Academy, at least in part because of his historical research.) Also, Duhem occasionally made trouble for himself, as, for instance, when he rejected a "feeler" to see if he would consider a Chair in Paris for the History of Science. "I am a physicist, not a historian," he replied. And yet it would be as an historian and a philosopher of science that Duhem would be best remembered and have the greatest influence.

Father Jaki spends all of the seventh
chapter on Duhem's posthumous reputation, citing how quickly his influence declined after his death. He devotes much of the last three chapters of his book to describing reactions, largely negative, to Duhem's work, including even doctoral dissertations in the United States. Father Jaki's solicitude for Duhem's reputation leads him to exaggerate the degree to which Duhem is unfairly ignored by present-day historians and scientists. He implies that Thomas Kuhn, well known for having introduced the term "paradigm" into discourse about scientific development, took ideas from Duhem without giving him credit, and cites scholars who have noticed close resemblances in the writings of both men. Father Jaki overlooks the fact that Kuhn, like Duhem, is both a physicist and an historian of science, so that a parallelism between their thought could be expected. Kuhn himself cites as direct influences on his thought the writings of Annales Meyer, Helene Metzger, and E. Meyerson, all of whom were directly influenced by Duhem and who publicly acknowledged his work. These influences would plausibly provide an explanation of "parallel passages" of strikingly similar expression between Duhem's *The Structure and Function of Physical Theory* and Kuhn's *The Structure of Scientific Revolutions*.

Just how well-known and available Duhem's writing is currently is indicated by the fact that at one medium-size research university (Brown University), no less than eighteen of Duhem's works are available in the library, either in French or English, plus two texts about Duhem (including the volume under review), and that a fifteen-page selection from Duhem is found in the well-known anthology of readings in the philosophy of science edited by Arthur Danto of Columbia University.

Still, Father Jaki is largely correct in saying that Duhem does not yet receive the credit he is entitled to, and the example of Kuhn's lack of acknowledgement is a valid one. Although Kuhn is undoubtedly indebted to Duhem's original research, the influence comes to Kuhn only indirectly, through people who do acknowledge and who have read him. The reason for this seems to be, as Jaki says, that to acknowledge fully what Duhem has accomplished for the historiography of science is to have to face also his claim that modern science is as much a child of the high Middle Ages as scholastic philosophy and Gothic architecture. The resistance to this claim by two influential historians of science, Alexander Koyre and George Sarton, may explain Duhem's eclipse. Duhem's claim has both an epistemological and an historical dimension, for his positivism denies scientific theories the status of real explanations which might otherwise put them in conflict with the claims of revealed religion. Of course, the irony is that Duhem's positivism also makes it somewhat easier to understand how received scientific truths can change. Philosophers and historians who readily grasp Duhem's latter point often want to avoid the implications of the former. Hence we have the peculiarity of Duhem's status: tremendous and undeniable influence combined with the status of a non-person.

Ultimately the question is not how much the origins of science owe to the Middle Ages, but whether religion and science are by their very natures competing methods of understanding and dealing with reality. In his historical arguments Duhem claimed that the "warfare between theology and science" need never have happened. Father Jaki's book is a noble and notable effort to promote that point of view by defending the dedicated scholar who first discovered its intellectual basis. In effect two visions of the intellectual history of the West clash in the seemingly arid controversy about the predecessors of Galileo in the fourteenth century.

— Reviewed by John C. Caiazza