the new standards for judging the value of anesthesia and replaced the more ideological and universalistic approaches of natural and heroic doctors.

According to Pernick, the conservative physicians viewed patients through the lens of individualism. Since patients had different pain thresholds, conservative physicians tailored their use of anesthetics to the needs of individual patients. Women, for example, were supposedly more sensitive to pain than men and therefore needed anesthesia in surgery more often. Blacks and Indians supposedly had a higher pain threshold than whites and could endure surgery without the relief of anesthesia. Similarly, wealthy, educated, native-born Americans could endure less pain than poor, uneducated immigrants. Hidden behind the apparent rationality and moderation of conservative physicians' approach to pain and anesthesia were a host of value judgments about women, children, blacks, Indians, immigrants, and the poor. This should not be surprising since the conservative physicians Pernick studies were typically white, American-born, highly educated wealthy men from Eastern cities. In reality, these privileged physicians' approach to pain was as much an expression of their elitism as it was of the individualism or diversity Pernick identifies. Moreover, this elitist approach to pain reflected the moralism of Victorian-American culture as much as it did the utilitarianism of the era.

One of the strengths of *A Calculus of Suffering* is that it includes women physicians in its analysis. Most medical histories have ignored women, and in the past decade a separate historiography of women physicians has emerged. Pernick begins to take the next step by integrating women into the mainstream of medical history. He argues that the advent of anesthesia promoted the entry of women into surgical practice because anesthesia made surgery less brutal, more refined, and therefore less shocking to feminine sensibilities. But what primarily enabled women to become physicians, and later surgeons, was the availability of medical institutions that would train them. For most 19th-century women physicians this meant the separate women's medical schools and hospitals founded because male-run medical institutions were closed to them. At the same time that 19th-century women physicians professed moral superiority based on their womanhood, in their daily practice they strove for professional equality with men, practicing essentially the same conservative medicine as their male colleagues. Though the discovery of anesthesia may have permitted women to preserve their feminine sensibilities as surgeons, their quest for professional equality with male doctors and pursuit of the highest professional standards were the more enduring reasons for their becoming surgeons.

In the final analysis, *A Calculus of Suffering* is an ambitious and provocative book. It will provide stimulating reading to historians, physicians, and anyone seeking to understand the relationship between medicine and society in American history.

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Pierre Duhem

Uneasy Genius. The Life and Work of Pierre Duhem. STANLEY L. JAKI. Nijhoff, The Hague, 1984 (U.S. distributor, Kluwer, Hingham, Mass.). xii, 472 pp., illus. $65.50. International Archives of the History of Ideas, 100.

Most writers of biography have strong feelings about the subject of their work. Stanley Jaki, professor of physics at Seton Hall University, is no exception. His biography of the physicist, philosopher, and historian of science Pierre Duhem (1861–1916) is a tendentious and empathetic work in which he takes up the cudgels for Duhem against both Duhem's old enemies and alleged new adversaries. Unfortunately, Jaki's crusade leads him into claims and generalizations that often are misleading and unreliable, including the theme that Duhem has been given scant attention. In making this claim, Jaki himself ignores some important literature of the last ten years, including publications by Niall Martin. Still, the biography remains a book to be read because of its detailed and accurate chronology of Duhem's life and publications and its factual portrayal of French scientific institutions with which Duhem was associated. In addition, the book provides character sketches of Duhem that demonstrate the personal traits that combined with well-known ideological factors to block his road to a prestigious chair in Paris.

Many writers on French science have remarked the anticlerical and republican milieu that made it difficult, if not impossible, for conservative and devout Catholic scientists like Duhem to make headway in French educational institutions during the early Third Republic. Duhem was royalist in his political sentiments and a supporter of the antirepublican and anti-Semitic movement associated with Action Française. Though Jaki lamely apologizes for the anti-Semitism, he shares Duhem's hostile attitude toward the secularizing leaders of the Third Republic, among them Marcellin Berthelot, whom Jaki describes indulging in extravagant restaurant dinners while other Parisians starved during the Prussian siege of 1870. (We are told that Duhem threatened his small daughter with a photograph of Berthelot when she was naughty.) When Duhem's nephew became secretary to Léon Bourgeois, president of the French senate and a republican anticlerical, Duhem wrote a letter renouncing family relations with the young man. Asked by George Sarton to collaborate in the founding of the history of science journal *Isis*, Duhem declined once he learned of Sarton's association with Freemasonry.

These and other anecdotes add up to a portrait of Duhem as a man of arrogance, "cool passion" (p. 87), imprudence, and sarcasm, who amused his friends by mimicking others and enraged his colleagues by taking uncompromising positions in disputes. Jaki concedes that there was a "touch of pride" in Duhem's character, otherwise "splendid like a shining armor" (p. 173). Jaki attributes Duhem's motivations in physics, philosophy, and history, as in politics, to an integrity that required standing up for the truth. Yet Jaki never hints that those opposing Duhem in such matters might have had similar motivation. Rather, Jaki focuses on personal ambition for advancement in the French educational hierarchy as the probable motivation inspiring those who criticized or ignored Duhem's work, an explanation that most clearly will not work for those who were not French.

Educated at the Catholic Collège Stanislas and the Ecole Normale Supérieure, Duhem taught physics initially in Lille and Rennes. He held the first chair of theoretical physics in France, created for him at the University of Bordeaux in 1895. He trained doctoral-level students and wrote prodigiously in thermodynamics and physical chemistry, with his name later becoming attached to some fundamental relations (the Duhem-Margules equation and the Gibbs-Duhem equation). A staunch antimechanist and antiatomist, he opposed Maxwell's electromagnetic theory and the "modern physics" associated in France with Paul Painlevé, Jean Perrin, Paul Langevin, and the Curies. Duhem often has been identified with the positivist tradition, an

identification Jaki proposes to jettison in favor of "commonsense realism." Jaki argues, correctly I think, that Duhem's epistemological views on physical theory and his historical interests emerged as a function of his ongoing work as a physicist. As Jaki stresses, Duhem's aim for physical theory was a classification of experimental facts that, changing progressively with time, would move from an artificial to a natural classification reflecting ontological reality or truth in the formalism of mathematics.

Duhem made fundamental contributions that have decisively influenced views in the history and philosophy of science. His refutation of the possibility of a crucial experiment is an example of his innovations in epistemology. In the history of science, he discovered medieval mechanics and developed a persuasive argument against the conception of 17th-century "scientific revolution." His historical work described the slow and continuous development of mechanics and put Leonardo da Vinci at its midpoint. Jaki has argued elsewhere (*The Origin of Science and the Science of Its Origin*, 1978) Duhem's claim that the crucial step in the birth of science was the rejection in the Middle Ages of the astrological and organismic worldview of the Greeks. Thus, modern science began when the Bishop of Paris condemned 216 Aristotelian propositions in 1277. In fact, several generations of students of the history of science have focused on this thesis as one of the principal interpretations of the origin of science. Duhem's work continues to provide stimulating debates in the history and epistemology of physical theory, and herein lies the genius, however uneasy, of his legacy.

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Some Other Books of Interest

Possums and Gliders. ANDREW SMITH and IAN HUME, Eds. Published in association with the Australian Mammal Society by Surrey Beatty, Chipping Norton, N.S.W., Australia, 1984. xvi, 598 pp., illus., + plates. $52. Based on a symposium, Armedale, Nov. 1983.

The Australian Mammal Society celebrated its 25th anniversary with a symposium, and this large-format volume printed on glossy paper and including 22 colorplates commemorates the event. The volume opens with a foreword by John Calaby and a brief taxonomic introduction by Smith discussing the current classification of the possums, gliders, and koala, formerly lumped as Phalangeridae, into more numerous families. The first set of symposium papers, grouped under the heading Evolution and General Biology, covers subjects ranging from molecular and cytological relationships through survival and reproductive strategies (eight papers). There follow groups of somewhat disparate papers reporting or reviewing research on members of the various families: Phalangeridae (ten papers), Pseudocheiridae (11 papers), Petauridae (seven papers), Burramyidae (six papers), Tarsipedidae (four papers), and Phascolarctidae (the koala; one paper). Finally, a group of ten papers deals with matters bearing on conservation and management. Some of the papers include résumés in Spanish. A 15-page key and field guide and an index conclude the volume. The papers in the volume were refereed prior to publication, and the volume has been published without any financial guarantee from the Society.—K.L.

Primate Evolution and Human Origins. RUSSELL L. CIOCHON and JOHN G. FLEAGLE. Benjamin/Cummings, Menlo Park, Calif., 1985. x, 396 pp., illus. $29.95.

This volume is a compilation of 44 papers by numerous authors that appeared in other books or in journals from 1961 to 1983. The papers, which are presented "in mostly unedited form," are grouped under seven headings: Primate Origins; Evolution of Prosimians; Anthropoid Origins and New World Monkeys; The Evolution of Old World Monkeys and Apes; *Ramapithecus* and Human Origins; Early Hominids; and Diverse Approaches in Human Evolution. Within each group the papers are arranged more or less chronologically "to show how the debates and opinions on primate evolution have evolved," and the compilers have provided a brief introduction to each group. There is a combined bibliography of almost 2000 items, but an index has not been provided. The endpapers of the book give a chart of major events in primate evolution and a map showing sites of major fossil finds.—K.L.

Books Received

Andean Ecology and Civilization. An Interdisciplinary Perspective on Andean Ecological Complementarity. Shozo Masuda, Izumi Shimada, and Craig Morris, Eds. University of Tokyo Press, Tokyo, 1985 (U.S. distributor, Columbia University Press, New York). xxxii, 550 pp. $44.50. Papers from Wenner-Gren Foundation for Anthropological Research Symposium no. 91. From a symposium, Cedar Cove, Fla., May 1983.

Anger and Hostility in Cardiovascular and Behavioral Disorders. Margaret A. Chesney and Ray H. Rosenman, Eds. Hemisphere, Washington, D.C., 1985. xvi, 294 pp. $39.95. Series in Health Psychology and Behavioral Medicine. From a workshop, Menlo Park, Calif., Jan. 1983.

The Arts at a New Frontier. The National Endowment for the Arts. Fannie Taylor and Anthony L. Barresi. Plenum, New York, 1984. xvi, 271 pp. $29.50. Nonprofit Management and Finance.

Infection, Immunity, and Blood Transfusion. Roger Y. Dodd and Lewellys F. Barker, Eds. Liss, New York, 1985. xxvi, 464 pp., illus. $68. Progress in Clinical and Biological Research, vol. 182. From a symposium, Washington, D.C., May 1984.

Injury in America. A Continuing Public Health Problem. National Academy Press, Washington, D.C., 1985. xii, 164 pp., illus. Paper, $15.95.

Inorganic Chromatographic Analysis. John C. MacDonald, Ed. Wiley-Interscience, New York, 1985. xiv, 450 pp., illus. $65. Chemical Analysis, vol. 78.

Inorganic Solid Fluorides. Chemistry and Physics. Paul Hagenmuller, Ed. Academic Press, Orlando, Fla., 1985. xvi, 629 pp., illus. $99. Materials Science and Technology Series.

Insights into Personal Computers. Amar Gupta and Hoo-min D. Toong, Eds. IEEE Press, New York, 1985. xii, 380 pp., illus. $29.50.

Integrated Optics. H.-P. Nolting and R. Ulrich, Eds. Springer-Verlag, New York, 1985. x, 242 pp., illus. $27.50. Springer Series in Optical Sciences, vol. 48. From a conference, Berlin, May 1985.

The Intellectual and Social Organization of the Sciences. Richard Whitley. Clarendon (Oxford University Press), New York, 1985. x, 319 pp. $34.95.

Introduction to Physical Anthropology. Harry Nelson and Robert Jurmain. 3rd ed. West, St. Paul, Minn., 1985. xx, 610 pp., illus. Paper, $26.95.

An Irish Beast Book. A Natural History of Ireland's Furred Wildlife. James Fairley. Illustrated by Raymond Piper. 2nd ed. Blackstaff Press, Dover, N.H., 1984. xii, 334 pp. Paper $8.95.

Mass Spectrometry of Heterocyclic Compounds. Q. N. Porter. 2nd ed. Wiley-Interscience, New York, 1985. xxvi, 966 pp., illus. $250. General Heterocyclic Chemistry Series.

Proceedings of the Fifteenth Lunar and Planetary Science Conference. (Houston, March 1984.) American Geophysical Union, Washington, D.C., 1984 and 1985. Two volumes. viii, 853 pp., illus. $100; paper, $70. *Journal of Geophysical Research*, vol. 89 and vol. 90 (supplements).

Proceedings of the Second Symposium on the Geology of the Bahamas. (San Salvador, Bahamas, June 1984.) James W. Teeter, Ed. College Center of the Finger Lakes, Fort Lauderdale, Fla., 1984. vi, 296 pp., illus. Paper, $16.

Progress in Medical Radiation Physics. Vol. 2. Colin G. Orton, Ed. Plenum, New York, 1985. xviii, 254 pp., illus. $45.

Psychiatry. The State of the Art. P. Pichot *et al.*, Eds. Plenum, New York, 1985. Vol. 1, Clinical Psychopathology: Nomenclature and Classification. xxvi, 1122 pp., illus. $125. Vol. 2, Biological Psychiatry, Higher Nervous Activity. xxiv, 961 pp., illus. $95. Vol. 3 Pharmacopsychiatry. xxii, 860 pp., illus. $87.50. Vol. 4, Psychotherapy and Psychosomatic Medicine. xx, 533 pp., illus. $65. From a congress, Vienna, July 1983.

The Psychology of Childhood Illness. Christine Eiser. Springer-Verlag, New York, 1985. x, 212 pp. $27.

The Role of Design, Inspection, and Redundancy in Marine Structural Reliability. D. Faulkner *et al.*, Eds. National Academy Press, Washington, D.C., 1984. viii, 579 pp., illus. Paper, $34.50. From a symposium, Williamsburg, Va., Nov. 1983.

Safeguarding the Atom. A Critical Appraisal. David Fischer and Paul Szasz. Jozef Goldblat, Ed. Stockholm International Peach Research Institute, Solna, Sweden, and Taylor and Francis, Philadelphia, 1985. xx, 243 pp. $29.

Safety of Dams. Flood and Earthquake Criteria. National Academy Press, Washington, D.C., 1985. xviii, 276 pp., illus. Paper, $16.50.

Satellite Oceanography. An Introduction for Oceanographers and Remote-sensing Scientists. I. S. Robinson. Horwood, Chichester, England, and Halsted (Wiley), New York, 1985. 455 pp. $59.95. Ellis Horwood Series in Marine Science.

Science and Politics. The Herbert Spencer Lectures 1982. Vernon Bogdanor, Ed. Clarendon (Oxford University Press), New York, 1984. viii, 120 pp., $16.95.

Treatise on Heavy-Ion Science. D. Allan Bromley, Ed. Plenum, New York, 1985. Vol. 5, High-Energy Atomic Physics. xx, 498 pp., illus. $79.50. Vol. 6, Astrophysics, Chemistry, and Condensed Matter. xxii, 429 pp., illus. $69.50. Vol. 7, Instrumentation and Techniques. xxiv, 471 pp., illus. $79.50.