Antoine Lavoisier while in prison. [From the dust jacket of *Antoine Lavoisier*]

ministration, spokesman for the Academy of Sciences and its many committees, and sometime (surprisingly liberal) political theorist. Yet amidst Lavoisier's varied pursuits Arthur Donovan finds a career unified by two themes: an "18th-century version of positivism" based on reasoning by experiment, and a driving, almost ruthless ambition. Above all, concludes Donovan, Lavoisier "played to win."

Like the other popular biographies in this Blackwell series edited by David Knight (to date, works on Galileo, Newton, Henry More, Humphry Davy, and Darwin have appeared), Donovan's book blazes few new trails but rather provides an elegantly written synopsis of the existing scholarship on Lavoisier and on 18th-century France and its sciences. This is a biography overflowing with context. In rich detail we learn about the Order of Barristers, French royal finances and tax collection, the French government's campaign against Mesmerism, the manufacture of gunpowder, and of course about the political crises that culminated finally in the demise of the Old Regime. In more abbreviated fashion we learn about the practices and concepts of 18th-century chemistry that Lavoisier sought to transform.

Donovan's Lavoisier played his many public roles with the gestures of an 18th-century experimental physicist. From his teachers Jean Antoine Nollet and Nicolas Louis de Lacaille (both also renowned instrument-makers), Lavoisier learned that certain knowledge could be attained only via experimental reasoning based on precise instruments, analytic quantification, and restrained generalization. Hence did Lavoisier make the balance, the calorimeter, and the eudiometer the central fact-producing machines in his chemistry. He bragged to Benjamin Franklin that his *Elementary Treatise on Chemistry* (1789), by following the "torch of observation and experience," would "make chemistry appear quite like experimental physics." Likewise, Lavoisier tried to rationalize accounting procedures in the Company of General Farmers, the powerful tax-collecting group he joined in 1768. Later, as a member of the newly created provincial assembly in Orléans, Lavoisier sought to base his many proposals regarding refinancing public debt, welfare, wool production, or navigation on quantitative facts rather than political arguments. Just as in his chemistry Lavoisier tried to convert questions about theory into questions about experiments, so in his public life did he try to convert political issues into matters purely administrative.

If Lavoisier learned his method from Nollet and Lacaille, his ambition apparently came ready-made. Although this biography tells us little about the private Lavoisier, his personal relationships, or his self-understandings, Donovan's public Lavoisier was ruthlessly efficient. Whether it was his campaign for admission to the Academy, his marriage to the daughter of a senior partner in the Company of General Farmers, his astonishingly successful reform of national gunpowder production, or his well-known crusade for a new language of chemistry, Lavoisier invariably showed a sophisticated knowledge of available cultural resources that he then skillfully deployed to realize his goals. Only in the end did he misunderstand how profoundly French political culture had changed. Indeed, one of the puzzles left unresolved by this biography is whether Lavoisier simply lacked the political acumen to survive in the treacherous times of the Terror or chose martyrdom in allegiance to certain political principles.

"A cartoon of Benjamin Franklin brandishing the report of the royal commission on mesmerism and the mesmerists fleeing a disrupted seance." [From *Antoine Lavoisier*]

Donovan's portrait of the "other" Lavoisier powerfully melds the histories of a public figure, a nation, and its science. Of the half-dozen major biographies of Lavoisier written over the past half century, this one surely offers the most comprehensive and accessible account of the self-acclaimed founder of the Chemical Revolution.

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Other Books of Interest

Wissenschaftlicher Briefwechsel mit Bohr, Einstein, Heisenberg u.a. Scientific Correspondence with Bohr, Einstein, Heisenberg, a.o. WOLFGANG PAULI. Vol. 3, 1940–1949. Karl von Meyenn, Ed. Springer-Verlag, Berlin, 1993. lxiv, 1070 pp., illus. DM 216 or ÖS 1,684.80 or SFr 212. Sources in the History of Mathematics and Physical Sciences, vol. 11.

This third volume of Wolfgang Pauli's scientific correspondence contains as many letters—some 500—as the first two volumes together. It covers the years Pauli spent in the safe haven of the Institute for Advanced Study in Princeton during the Second World War and the first few years following his return to the Eidgenössische Technische Hochschule in Zurich in 1946. It is the first volume for which von Meyenn gets full editorial credit, though he has effectively carried the full editorial burden from the inception of this project some 20 years ago. It is, also, the first volume in which a significant fraction (roughly half) of the letters are in English. Indeed, it is interesting to see this language not merely being used by Pauli himself with his American correspondents—this he had already begun to do in the mid-1930s—but also displacing German in his correspondence after the war with Bohr and with nearly every other Danish, Swedish, and Dutch correspondent. Pauli's wartime America is not that familiar to historians of physics: it is a lonely world, the world left behind as the Americans, and all but the most recent emigrés, were drawn off to war research.

Very different are the postwar years covered by this volume. From his post in Zurich, Pauli kept in touch with all that was happening in fundamental theory in the United States as well as in Europe. Particularly extensive is the correspondence about the theoretical developments prompted by Lamb's experiment on the fine structure of the hydrogen spectrum: the new quantum electrodynamics. From the summer of 1947 to the end of 1949, roughly a hundred letters touch to some extent, centrally or en passant, on the "Lamb shift" and all that followed from it, thus providing a sort of source book complementary to S. S. Schweber's comprehensive history (reviewed on p. 1888).

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Concepts in Virology. From Ivanovsky to the Present. BRIAN W. J. MAHY and DMITRI K. LVOV, Eds. Harwood, Langhorne, PA, 1993 (distributor, International Publishers Distributor, Brooklyn, NY). xii, 438 pp., illus. $90 or £59. From a symposium, St. Petersburg, Russia, Sept. 1992.

Though the term "virus" was not coined until 1898, the origin of the field of virology can be traced to the isolation by Dmitri Ivanovsky of the causative agent of tobacco mosaic disease, which was reported to the Imperial (Russian) Academy of Sciences in St. Petersburg in 1892. A symposium held in that city to mark the centennial of the event has given rise to the present book. The volume begins with a series of five "historical reports," all of which include comment on the work of Ivanovsky and of his contemporaries Adolf Mayer in Germany and Martinus Beijerinck in the Netherlands, fellow pioneers of work on tobacco mosaic virus. In the opening report Lvov gives an account of the history of virology in Russia, where after a flourishing era for Russian science the field was laid waste as a result of the activities of "a small, but well organized and financed group of international terrorists" in 1917. He then reports on the revival of the field through studies of smallpox, orthopox, rabies, and other viruses in the 1920s and after and ends with a plea for international cooperation to offset current economic hardships. One of the first-noticed features of the tobacco mosaic virus was that it could pass through bacteria-proof filters, and in an account of studies of fowl plague (influenza A) virus Mahy discusses filtration and other techniques. In other papers in this section of the book M. H. V. Van Regenmortel recounts the use of tobacco mosaic virus in studies of the molecular basis of virus antigenicity, M. C. Horzinek describes the work of recent decades on positive-stranded enveloped RNA viruses, and V. V. Mesyanzhinov and B. S. Singer discuss bacteriophages as "empowering viruses" for molecular biology. The remaining 34 papers in the volume are devoted, in about equal measure, to "old and new" (including reemerging) virus infections; viral hepatitis; influenza; arthropod- and rodent-borne viruses; "general virology"; and control of virus infections. In addition to laboratory studies on such topics as glycoproteins, genetic sequencing, replication, and mechanisms of pathogenesis, coverage is given to issues of epidemiology, vaccine development, and therapeutics. The authorship of the book is international, with contributors representing Russia, various western European nations, Israel, Australia, Korea, and the United States. A subject but not a name index is included.

Katherine Livingston

Genetics and Evolution of Aging. MICHAEL R. ROSE and CALEB E. FINCH, Eds. Kluwer, Norwell, MA, 1994. vi, 314 pp., illus. $150 or £100 or Dfl. 250. Contemporary Issues in Genetics and Evolution, vol. 3. Reprinted in part from *Genetica*, vol. 91, no. 1–3.

"The genetics of aging is Janus-faced, looking in one direction to gene function, molecular biology, and cell biology, looking in the other direction to fitness, population genetics, and evolution," write the editors in the opening chapter of this volume. To further the task of integrating these perspectives, Rose and Finch put together a special issue (1993) of the journal *Genetica* that included 22 papers that had been subjected to review and revision prior to publication. Now, in the hope of providing a work that will " 'breathe' somewhat more than the special issue . . . could," they have produced this collection in which the journal papers are augmented by four contributions solicited to provide personal perspectives on issues not fully covered in the original publication. The opening section of the book, offering "general perspectives," comprises the three original papers by Rose and Finch, Charlesworth, and Bell and a new contribution in which A. G. Clark discusses mutation-selection balance and the evolution of senescence. The second section, on diversity of aging, likewise includes a new paper, D. E. L. Promislaw and M. Tatar on the potential of a comparative approach to the subject, in addition to the original papers dealing, respectively, with *Saccharomyces cerevisiae*, plants, *Caenorhabditis elegans*, and crustaceans. A third section reprints the eight original papers on aging in *Drosophila*. The two further additions are found in the fourth and final section, a total of nine papers devoted to mammals. In one of the new contributions R. Holliday discusses the relationship between longevity and fecundity and reports that the predicted inverse relationship is confirmed by a survey of eutherian mammals. In the other A. Richardson and M. A. Pahlavani discuss the evolutionary implications of the reported relationship between caloric restriction and increased life-span in rodents.

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Books Received

Applications of Heuristics and Biases to Social Issues. Linda Heath *et al.*, Eds. Plenum, New York, 1994. xx, 343 pp. $55. Social Psychological Applications to Social Issues, vol. 3.

Biological Monitoring. An Introduction. Shane Que Hee, Ed. Van Nostrand Reinhold, New York, 1993. xx, 650 pp., illus. $69.95.

The Biology of Tardigrades. Ian M. Kinchin. Portland, London, 1994 (U.S. distributor, Ashgate, Brookfield, VT). xii, 186 pp., illus. $65 or £40.

Bioprocess Production of Flavor, Fragrance, and Color Ingredients.. Alan Gabelman, Ed. Wiley, New York, 1994. xiv, 361 pp., illus. $64.95.

A Colour Atlas of Tomato Diseases. Observation, Identification and Control. D. Blancard. Manson, London, and Wiley, New York, 1994. iv, 212 pp. $89.95. Translated from the French edition (Paris and Limoges, 1988).

Culture Clash. Law and Science in America. Steven Goldberg. New York University Press, New York, 1994. xiv, 255 pp. $29.95.

Homologous Recombination and Gene Splicing in Plants. Jerzy Paszkowski, Ed. Kluwer, Norwell, MA, 1994. xii, 385 pp., illus. $162 or £107 or Dfl. 275.

Immunotoxicology and Immunopharmacology. 2nd ed. Jack H. Dean *et al.*, Eds. Raven, New York, 1994. xxii, 761 pp., illus. $135. Target Organ Toxicology Series.

International Directory of Primatology. 2nd ed. Lawrence Jacobsen and Raymond Hamel, Eds. Wisconsin Regional Primate Research Center, Madison, WI, 1994. Unpaged. Spiral bound, $15.

International Handbook of Phobic and Anxiety Disorders in Children and Adolescents. Thomas H. Ollendick, Neville J. King, and William Yule, Eds. Plenum, New York, 1994. xiv, 496 pp. $75. Issues in Clinical Child Psychology.

Introduction to High-Temperature Superconductivity. Thomas P. Sheahen. Plenum, New York, 1994. xviii, 580 pp., illus. $59.50. Selected Topics in Superconductivity.

Molecular and Biomolecular Electronics. Robert R. Birge, Ed. American Chemical Society, Washington, DC, 1994. xii, 596 pp., illus. $139.95. Advances in Chemistry Series, 240. From a symposium, New York, Aug. 1991.

More Mathematical People. Contemporary Conversations. Donald J. Albers, Gerald L. Alexanderson, and Constance Reid, Eds. Academic Press, San Diego, CA, 1994. xviii, 375 pp., illus. Paper, $39.95. Reprint, 1990 ed.

Multilingual Dictionary of Agronomic Plants. S. Rehm, Ed. Kluwer, Norwell, MA, 1994. x, 286 pp. $120 or £80 or Dfl. 200.

The Poetics of Mind. Figurative Thought, Language, and Understanding. Raymond W. Gibbs, Jr. Cambridge University Press, New York, 1994. x, 527 pp. $59.95; paper, $18.95.

Polymer Science and Engineering. The Shifting Research Frontiers. National Research Council. National Academy Press, Washington, DC, 1994. xii, 180 pp., illus. $34.95.

Population and Environment. Rethinking the Debate. Lourdes Arizpe, M. Priscilla Stone, and David C. Major, Eds. Westview, Boulder, CO, 1994. viii, 352 pp. Paper, $29.85. Based on a workshop, Coyoyoc, Mexico, 1992.