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laborators, at the end, together with a chronology and an account of his academic career). Sabatier's Roman Catholic education helped him avoid Berthelot's scientific and academic position; he was no narrow-minded proponent of the dogmas of secularity and triumphant positivist scientism. His training at the *École Normale Supérieure* contributed to his eclectic culture and to his academic vocation. This background, coupled with his common sense, enlightened pragmatism, and nonpolemical attitude, helps us understand his positions on the great debates of the time—secularity, the atom question, discussions about energetics—and his relations with Parisian powers; Sabatier's views were original, not excessive, but firm.

The discovery of catalytic hydrogenation is set in the context of contemporary science, so that we understand its inner logic and progress: from inorganic chemistry (sulfurs, seleniures, metallic salts) to organic chemistry (hydrogenation of gaseous unsaturated hydrocarbons, nitrous derivatives, and nitrites through the catalytic action of reduced nitrogen, cobalt, iron, and copper at rather low temperatures) and general chemistry by means of the techniques of physical chemistry (spectroscopy, calorimetry, etc.).

We can evaluate Sabatier's contribution in critical historical perspective: a short history of catalysis since Berzelius, a survey of the evolution of the catalytic theory in the twentieth century, an analysis of the particularities of heterogeneous catalysis, and descriptions of the very common instruments used by Sabatier and the experiments he conducted are very useful. Moreover, Appendix 2 presents other scientific papers (Mond, Langer, and Quincke [1890], Sabatier and Senderens [1893], Moissan and Moureu [1896], and Sabatier and Senderens [1897]) in order to situate the novelty of Sabatier's discovery and to help us appreciate the genesis and fecundity of his chemical, a posteriori theory based on the hypothesis of intermediate compounds.

The economic consequences of this work were multidimensional. Unlike many French chemists, Sabatier was concerned with the industrial implications of his method. He registered a great number of patents and foresaw the main applications—nor did he consider it beneath him to advise manufacturers, mostly foreigners. Like François Grignard, another provincialist, with whom he shared the Nobel Prize, Sabatier saw his process quickly ap-

plied to the great chemical industry. For once, Germany—in the person of Richard Willstätter—was under French guidance in chemistry. The author examines the consequences of Sabatier's discovery in many fields of industry: fatty bodies, rubber, dyes, perfumes, oil, and synthetics.

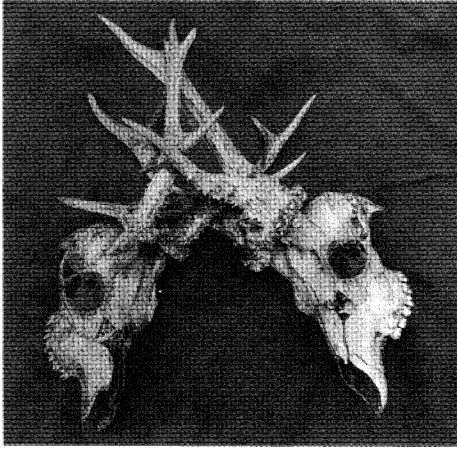
The founder of the modern school of catalysis was also the champion of French academic regionalism. He did not suffer from his exile in Toulouse, but took advantage of his distance from quarrels and rivalries to promote an important local academic center. A young professor at the Faculty of Sciences, he eventually served twenty-five years as dean. He endeavored to attract great professors, but most of them were fascinated by Paris, where research was more alive and salaries higher. He helped create the *Institut de Chimie* (1909), the *Institut d'Électrotechnique* (1907), and the *Institut Agronomique* (1909) and fought to support them financially. His never-ending efforts appear to have been fruitful, as the "pink town" became a famous multidimensional academic center, despite great disappointments, local troubles, a lack of concern on the part of the political powers, and the increasing woes of education and research after World War I.

This book reveals an unusual aspect of French chemistry; the author discusses many factors, so that we are in a position to measure the originality and far-reaching consequences of Sabatier's work.

MARIKA BLONDEL-MÉGRELIS

Helena Cronin. *The Ant and the Peacock: Altruism and Sexual Selection from Darwin to Today*. xiv + 490 pp., illus., figs., bibl., index. Cambridge/New York: Cambridge University Press, 1991. \$39.50.

In formulating his celebrated theory of descent with modification, Charles Darwin encountered more than his share of problems. Among these were the imperfection of the geological record, the extreme perfection of organs like the eye, the problem of cooperation (later identified as the problem of altruism), and the problem of apparently maladaptive ornamentation, which Darwin attributed to sexual selection. While Darwin could account for the first two to the satisfaction of many subsequent biologists (though it took acrobatic feats of explanation), the twin



*The skulls and antlers of two roe deer stags who became fatally entangled during a fight (reprinted from Cronin, *The Ant and the Peacock*).*

problems of altruism and sexual selection continued to plague both him and his followers. So problematic were these that they divided Darwin and his strongest supporter, Alfred Russel Wallace. Preoccupation with these problems continued well after Darwin and Wallace, though their relative importance to biologists fluctuated somewhat erratically over time. Given the curious vicissitudes of their history, and their obvious relation to perceptions of human social behavior, they deserve the close analytical attention of historians of science.

Helena Cronin's *The Ant and the Peacock* (the two organisms in the title symbolize the problems of altruism and sexual selection, respectively) offers the beginning of such a historical analysis. Cronin sees her book in ambitious terms: it is not a book about science, history, or philosophy, though she claims that it combines some of all three. Her historiographic perspective is unabashedly internalist, presentist, and whiggish. When it comes to the practice of history and the practice of science as they converge in the history of science, she argues confidently for following the more truthful claims of the most recent science. As she puts it: "When the history concerns science, there surely is reason to expect that the latest really is the best" (p. 4). *The Ant and the Peacock* is thus, for her, a story of the success and triumph of the "towering" modern Darwinian evolutionary theory and

how it solved the problems of altruism and sexual selection, "the two puzzles that had stubbornly resisted explanation" (p. 3) after Darwin. What made the resolution of these two problems possible, she argues, was the establishment in the 1930s and 1940s of the synthetic theory of evolution, which brought Darwin's selectionist framework within the fold of mathematical population genetics. Postsynthesis developments in evolutionary theory, mainly due to work in the 1960s of biologists like W. D. Hamilton, John Maynard Smith, and Richard Dawkins (whom she cites liberally), made possible the final resolution of these two problems.

The organization of Cronin's book follows logically from her historiographic position: the first section offers a history of Darwinism, written from a current understanding of neo-Darwinian theory (primarily from a Dawkinsian perspective); the second section is devoted to the subject of sexual selection; and the third takes up altruism. By far the most interesting and valuable section of the book for historians of science is the discussion of the differences between Darwin and Wallace on the issues of sexual selection and natural selection. The focus on Wallace, whose theoretical perspective is frequently neglected by historians, is especially welcome. This section also charts the fate of sexual selection alongside now-established historical events like the eclipse of Darwin and the restoration of selection theory in the wake of the evolutionary synthesis of the 1930s and 1940s. The section on altruism, which fails to place the problem within a historical framework, is not so interesting. Here Cronin argues that the solution to the problem of altruism became possible only after the development of game theory, which replaced explanations based on group selectionist arguments. Also disappointing, given her own sense of its "momentous advance" in Darwinian theory and its importance to the story she wishes to tell, is the lack of a substantive historical discussion on the "modern synthesis" of evolution in the first section of the book. Cronin's reason for this omission, which is based on her belief that "most aspects of this revolution are well recognised and have been documented and analysed" (p. 56), indicates that she could not be further from the contemporary debates among historians of biology.

While the book as a whole should be lauded for its ambition and its impressive control of

some of the most recent literature in the field of evolutionary theory and behavioral ecology, it also has more than its share of problems. These emerge from Cronin's choice of position in history, philosophy, and evolutionary biology. So unfortunate are her choices that each of her potential audiences will have an unfavorable reaction to some major feature of her analysis.

For historians, the easy acceptance of the historiographic position she adopts will invalidate many of the arguments Cronin makes. So too will the absence of such historical conventions as footnotes, her casual use of historical sources, and her irregular mode of citation. Philosophers of science, who have done their best to move away from purely theoretical accounts to view the practice of science as other than, or in addition to, the development of high theories, will find her theory-dominated philosophy similarly invalidated. Evolutionary biologists will be especially uncomfortable with Cronin's choice of science. Though many will entertain her historical arguments, few will share her confidence that these two problems have been satisfactorily resolved. Given, too, her casual dismissal of the critique of the adaptationist program (which would surely wreck her own adaptive story) and her eager, unpoliticized acceptance of sociobiological theories, especially of the Dawkinsian variety (Cronin states that reading his *The Selfish Gene* [Oxford, 1976] caused her to "cross her own Wallace line"), this book is sure to draw heavy fire from many of the biologists closest to the science. Other audiences that might have been attracted by the topic, such as students of science studies and cultural studies, will be put off by Cronin's unshaken belief in the transcendence of scientific knowledge. And, finally, historians who follow the literature of science and gender will find the lack of attention to gender (as well as race and class) in her analysis depressing at best, given the overtly social and sexual features of the problems. (They would, however, have an analytic field day with Cronin's language and chapter titles like "Do Sensible Females Prefer Sexy Males?" and "Males for Darwin, Females for Wallace?")

All these shortcomings are a shame, for many readers will be so distracted by their negative reactions that they will overlook Cronin's interesting insights and her lucid exposition of two especially complex biological subjects. Cronin deserves praise for the fine

job she does in convincing readers to turn their fullest historical attention to the problems of altruism and sexual selection and to do so in a manner felicitous to science; but though her combination of history and philosophy with evolutionary biology is commendable, her own position with regard to each of these makes for an especially explosive combination that will not be well received by historians of science.

VASSILIKI BETTY SMOCOVITIS

L. S. Vygotsky. *The Collected Works of L. S. Vygotsky*. Volume 1: *Problems of General Psychology*. Including the volume *Thinking and Speech*. Edited by **Robert W. Rieber** and **Aaron S. Carton**. Translated with an introduction by **Norris Minick**. Prologue by **Jerome S. Bruner**. (Cognition and Language.) x + 396 pp., indexes. New York/London: Plenum Press, 1987. \$49.50.

L. S. Vygotsky. *The Collected Works of L. S. Vygotsky*. Volume 2: *The Fundamentals of Defectology (Abnormal Psychology and Learning Disabilities)*. Edited by **Robert W. Rieber** and **Aaron S. Carton**. Translated with an introduction by **Jane E. Knox** and **Carol B. Stevens**. (Cognition and Language.) xii + 349 pp., bibl., indexes. New York/London: Plenum Press, 1993. \$49.50.

René van der Veer; Jaan Valsiner. *Understanding Vygotsky: A Quest for Synthesis*. xii + 450 pp., illus., tables, bibl., indexes. Oxford/Cambridge, Mass.: Blackwell, 1991. \$39.95.

The collected works of the innovative Russian psychologist L. S. Vygotsky (1896–1934) appeared between 1982 and 1986. That edition, in Russian, comprises six volumes dealing, respectively, with the theory and history of psychology, general psychology, child development, the handicapped child, child psychology, and the Vygotsky legacy. So far two volumes have appeared in English translation. The first contains Vygotsky's treatise *Thinking and Speech*, as well as lectures on perception, memory, thinking, emotions, imagination, and motivation. The volume also contains a prologue by Jerome Bruner (pp. 1–16) and the translator's introduction (pp. 17–36). The second volume covers abnormal psychology and learning disabilities. It is introduced by the translators' essay "Vygotsky