

The German Chemical Industry in the Twentieth Century. Edited by John E. Lesch. (Series: Chemists and Chemistry, Vol. 18). Kluwer Academic Publishers, London 2000. viii + 472 pp., hardcover £ 109.00.– ISBN 0-7926-6487-2

On March 20–22, 1997, a conference on “The German Chemical Industry in the Twentieth Century”, organized by Berkeley historians John E. Lesch and Gerald D. Feldman, was held at the University of California, Berkeley, and brought together an international group of historians and students of the industry to exchange their recent results and encourage new directions in research. The resulting book, consisting of 14 essays by 17 distinguished historians from the United States, Germany, Japan, Italy, and the UK, is Volume 18 in *Chemists and Chemistry*, described by the publisher, Kluwer, as “a series of books devoted to the examination of the history and development of chemistry from its early emergence as a separate discipline to the present day”. It serves as a natural complement to the two preceding volumes in the same series: *Determinants in the Evolution of the European Chemical Industry, 1900–1939. New Technologies, Political Frameworks, Markets and Companies* (edited by A. S. Travis, H. G. Schröter, E. Homberg, and P. J. T. Morris, Vol. 16) and *The Chemical Industry in Europe, 1850–1914. Industrial Growth, Pollution, and Professionalization* (edited by E. Homberg, A. S. Travis, and H. G. Schröter, Vol. 17), both being collections of essays from earlier workshops held in Europe.

During the twentieth century the chemical industry has produced a stream of products such as dyes, pharmaceuticals, photographic items, explosives, fertilizers, insecticides, synthetic rubber, fuels, fibers, and plastics that have not only impacted consumer economies, farms, war machines, and medical practices but have even altered the course of history. Although the development of the chemical industry has been an international process, the German industry has played a prominent and special role. Between the 1860s, when the first German synthetic dye companies were established, and the advent of World War I in 1914, the fine chemicals industry

occupied an important place in the economy, founded the earliest industrial research laboratories, and dominated international markets. During the twentieth century the German chemical industry played a strategic role in both world wars, served as an archetype and stimulus to other industries both in Germany and abroad, and emerged as a key player in today's global economy. A major component of the economic revival of West Germany after World War II was the recovery and renewed prosperity of the chemical industry.

Like Gaul, Lesch's book is divided into three parts, each one devoted to an area that has attracted some of the best recent scholarship on the industry. Some idea of the scope and breadth of the book can be gleaned from the following summary of its contents.

Part I, “Research and Technological Innovation”, deals with the technical and scientific component of the industry and its research and development sector, from which much of its economic and political importance is derived.

- “The academic–industrial symbiosis in German chemical research, 1905–1939” (42 pp.), by Jeffrey Allen Johnson (USA), traces the changing nature of this association from the creation of industry-supported research laboratories before World War I, through industrial sponsorship of organizations supporting chemical literature, educational institutions, and postdoctoral fellowships, to the impact of National Socialist policies.
- “Scientist and industrial manager: Emil Fischer and Carl Duisberg” (33 pp.), by Dietrich Stoltzenberg (Germany), utilizes the extensive correspondence between Nobel laureate academic chemist Emil Fischer and Carl Duisberg, a leader of Bayer, one of Germany's largest chemical companies, to elucidate a personal dimension of this symbiosis as embodied in their decade-and-a-half relationship, which began as business during the wartime mobilization of science and industry and blossomed into a deep friendship.
- “Losing the war but gaining ground: The German chemical industry during World War I” (31 pp.), by Margit Szöllösi-Janze (Germany), explores the major technological changes in

the industry during this period as products of both the state-regulated war economy and the activity of leading chemists who acted as mediators between industry and government.

- “The relationship of I. G. Farben's Agfa *Filmfabrik* Wolfen to its Jewish scientists and scientists married to Jews, 1933–1939” (23 pp.), by Peter Löhnert and Manfred Gill (Germany), considers the behavior of Fritz Gajewski, director of this technologically innovative component of one of Germany's leading chemical firms during the Nazi period; Gajewski successfully resisted pressure to dismiss Jewish employees, and after the firm was forced to do so in 1938, he continued to assist dismissed scientists and to support company scientists with Jewish family members until the war's end.
 - “Germany's synthetic fuel industry, 1930–1945” (70 pp., the book's longest essay), by Anthony N. Stranges (USA), studies in great detail the industrial research and development of synthetic fuels through World War II and analyzes the impact of government policies and commercial considerations; the hydrogenation of coal produced 95% of Germany's aviation gasoline and 50% of its total liquid fuel.
- Part II, “International Connections and Comparative Perspectives”, deals with the activities and impacts of the German chemical industry during the two world wars that made it not only a model but also a source for the development of chemical industries abroad by the direct transfer of patents, technical information, and physical plants to opposing nations.
- “Business strategies and research organization in the German chemical industry and its role as exemplar for other industries in Germany and Britain” (25 pp.), by Ulrich Marsch (Germany), discusses the ways in which the German chemical industry in the early twentieth century was perceived as a model by other industries in Germany and abroad, especially in Great Britain.
 - “Dominance through cooperation: I. G. Farben's Japan strategy” (41 pp.), by Akira Kudo (Japan), explores the efforts of I. G. Farbenindustrie to advance its interests in Japan in the context of the changing economic and political

circumstances of the interwar period; despite some difficulties, especially in attempts at direct investment, it was able to develop business operations in exports of dyestuffs and fertilizers and in licensing the Haber–Bosch process for the synthesis of ammonia.

- “German chemical firms in the United States from the late nineteenth century to the post-World War II period” (37 pp.), by Mira Wilkins (USA), discusses the complexities of the interactions between German and American companies which competed and cooperated, and it emphasizes the major effects of the two world wars.
- “German chemicals and American politics, 1919–1922” (24 pp.), by Kathryn Steen (USA), concludes Part II. Part III is devoted to “The Industry since 1945”, and consists of the following articles:
 - “The Richard Willstätter controversy: The legacy of anti-Semitism in the West German chemical industry” (20 pp.), by S. Jonathan Wiesen (USA).
 - “Capacity losses, reconstruction, and unfinished modernization: The chemical industry in the Soviet Zone of Occupation (SBZ)/GDR, 1945–1965” (39 pp.), by Rainer Karlsch (Germany).
 - “The dynamics of industry structure: The chemical industry in the U.S., Western Europe, and Japan in the 1980s” (34 pp.), by Ashish Arora (USA) and Alfonso Gambardella (Italy).
 - “I. G. Farben revisited: Industry and ideology ten years later” (8 pp.), by Peter Hayes (USA).
 - “Gravity and the rainbow-makers: Some thoughts on the trajectory of the German chemical industry in the twentieth century” (9 pp.), by Raymond Stokes (UK).

This book is meticulously documented with material from archives and correspondences as well as published sources, and it includes numerous tables and figures. A detailed (22-page) index facilitates the location of information.

The German chemical industry is a source of challenge and insight for anyone wishing to understand the history of the twentieth century. Consequently, this scholarly but eminently readable book will be of great interest to historians of

modern Germany, of science and technology, of business, of politics, and of economics.

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Place of Science in a World of Values and Facts. Edited by *Loucas G. Christophorou*. Kluwer Academic, New York 2001. 300 pp., softcover \$ 39.50.—ISBN 0-306-46580-9

A more suitable title for this book would have been “Proud To Be A Scientist”. After 31 years in an obviously fulfilling career, a senior scientist sums up his experience. Dr. Christophorou, after spending the first part of his career at Oak Ridge National Laboratory and at the University of Tennessee, transferred to the National Institute of Standards and Technology in Gaithersburg, Maryland. An expert in the study of electron–molecule interactions, he is a low-energy physicist.

Whenever the author’s beliefs are rooted in first-hand knowledge, this makes for powerful statements which one can embrace enthusiastically: science is the honor of mankind—it does not answer to the needs of society—it works autonomously and almost independently of society—modern economies build on technical innovation—technology is rooted in science—small science is unjustly neglected—bureaucratization of science is bad—there is a growing sociological split between true scientists and mere science workers—being a scientist can turn one into a better person—induction and deduction are both called for—hi-tech communication is the people’s ultimate means of civil disobedience. A good part of the book amounts to a “self-portrait of a happy scientist”. To give its flavor, let me quote from the author’s description of the inductive method in the physical sciences: “There was only the scientist observing nature passionately, fighting with himself and the limitations of his interrogating technique, contemplating the meaning of his observations, and carefully but boldly edging toward the truth. A beautiful intimate dance with mystery!” (p. 94).

Chapter 1 introduces the scales of space and time, spanning some 30 to 35 orders of magnitude. Chapter 2 calls for respect of the ecological balances on Planet Earth. Chapter 3, the longest, is a narrative of physics from Greek antiquity till Richard P. Feynman. Chapter 4 deals with elementary particles and some of the instruments of physics. Chapter 5 presents the main principles of research, such as pragmatism and parsimony. Chapter 6, about the scientist and the science worker, argues in the manner of Boris Pasternak that “gregariousness and mass mentality are the refuge of mediocrity”. Chapter 7 is a plea for basic science and for small science. Chapters 8–11, waxing philosophical and religious, are wordy, unoriginal, and dispensable.

Physics enjoys its hegemony over much of the history and philosophy of science. Likewise this book treads once again the Galileo–Newton–Einstein route, and it concerns itself with physical laws and the nature of time and space. Such dominion of physics translates into a sister science such as chemistry being viewed as a colony. The scientism of the author is only matched by his elitism as a physicist.

Too many physicists, outsiders to chemistry, translate their axiomatic reducibility of chemistry to physics into an unwarranted belief that chemistry has indeed been reduced to physics. Christophorou is no exception. The naive ignorance of chemistry, typical of some physicists (would they tolerate the converse behavior on the part of chemists?), occasionally shows its dull gleam: “Wohler (sic) discovered urea in 1828” (p. 68); “by the early 1930s ... chemistry was being understood through physics” (p. 103).

The title given to this book, *Place of Science in a World of Values and Facts*, deserves comment. Unattractive because too flat, it is nevertheless informative, both with respect to some of the subject matter (a weak tract for the unity of science and religion) and with respect to the writing style, too often made of trite statements. These are not even wrong, even though often the opposite assertion would be no less true. Some examples: “The laws of physics will have to be modified if they are to account for the phenomena of life” (p. 256); “lan-