new institutional arrangements that could. They looked to the German chemical industry and the state bureaucracy to help establish a new centralized research institution with government funding. By 1908 they had found support from Kaiser Wilhelm, who was looking for new ways to bolster his image. Instead of one centralized institution that could promote research in areas beneficial to industry and neglected in the universities, three different, privately funded chemical institutes were built as part of the Kaiser Wilhelm Society, established in 1910. Soon those promoting the new relationship between chemical research, government, and business were using the new institutes for war-related research.

Jeffrey Johnson analyzes these developments in terms of "modernization" and a variant he terms "conservative modernization." Scholars writing about modernization assume that science played a crucial role, but Johnson tries to investigate that role. For Johnson modernization concerns international competition and the increasing links among government, business, and science. Fischer, Nernst, and Ostwald noted the danger that Germany might fall behind other nations when they promoted their ideas for institutional reform. Johnson terms the eventual success of their efforts in the form of the Kaiser Wilhelm Society "conservative modernization" because institution-builders and their collaborators in business and government carefully shielded older institutions from newer ones. They insulated universities and professors from the new Kaiser Wilhelm Society, just as they protected the East Elbian aristocracy from the dangers of the modern world.

Solid evidence supports these points. To open up new research positions, reformers had to establish new institutions, since universities would not change their structures. Reformers relied on private funding because the state was unable to increase taxes without changing its organization and relationship to society and economy. The three chemical institutes and their directors had difficulties regularizing their relationships with the universities and the Berlin Academy of Science. The process of founding the institutes also represented a "Prussianization" of the institutes because they were insulated from universities in the other states of Germany. Moreover, the institutes provided research niches for oustanding scientists whose disciplines, religions, or genders prevented successful university careers. Otto Hahn and Lise Meitner come to mind. And international competition has indeed tied science increasingly to the military.

Although Johnson provides an exemplary description of the development of new science institutions, his key analytical devices do not work well. The concept of "modernization" is highly contested, especially among German historians. A common view that the history of Imperial Germany from 1890 to 1918 can best be explained by reference to feudal remnants preventing proper development through strategies including "conservative modernization" is more evaluative than analytical. It implies a proper path for change. Nor does it do justice to the complex negotiations that created new institutions linking the inside of science to a rapidly urbanizing and industrializing nation.

The dynamism of science in Imperial Germany may have resulted from the wide variety of science institutions, which, because they were partially insulated from one another, could make individual responses to their rapidly changing environments. Johnson quite nicely describes the addition of yet another institutional layer.

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" 'Science in Uniform': Fritz Haber (pointing) among the German gas troops, probably around 1916–1917." [From *The Kaiser's Chemists;* Max-Planck-Gesellschaft Photo Archive]

Books Received

Abstraction and Aging. A Social Psychological Analysis. Jason S. Lee. Springer-Verlag, New York, 1991. xii, 113 pp., illus. Paper, $39. Recent Research in Psychology.

Adolescence and Puberty. John Bancroft and June Machover Reinisch, Eds. Oxford University Press, New York, 1990. xiv, 303 pp., illus. $39.95. Kinsey Institute Series, vol. 3.

Channels, Carriers, and Pumps. An Introduction to Membrane Transport. Wilfred D. Stein. Academic Press, San Diego, CA, 1990. xiv, 326 pp., illus. $59.95.

Chaos in Classical and Quantum Mechanics. Martin C. Gutzwiller. Springer-Verlag, New York, 1990. xiv, 432 pp., illus. $39.95. Interdisciplinary Applied Mathematics, vol. 1.

Chaos II. Hao Bai-lin World Scientific, Teaneck, NJ, 1990. xii, 737 pp., illus. $76; paper, $34. Reprint with revisions, 1984 ed.

Contexts of Competence. Social and Cultural Considerations in Communicative Language Teaching. Margie Berns. Plenum, New York, 1990. xii, 185 pp., illus. $34.50. Topics in Language and Linguistics.

Counting Process Systems. Identification and Stochastic Realization. P. J. C. Spreij. Centrum voor Wiskunde en Informatica, Amsterdam, 1990. viii, 135 pp. Paper, Dfl. 38.50. CWI Tract 71.

Culture and Cognitive Development. Studies in Mathematical Understanding. Geoffrey B. Saxe. Erlbaum, Hillsdale, NJ, 1991. x, 212 pp., illus. $29.95.

The Dynamic Planet. W. G. Ernst. Columbia University Press, New York, 1990. x, 281 pp., illus. $30; paper, $17.

Educational Values and Cognitive Instruction. Implications for Reform. Lorna Idol and Beau Fly Jones, Eds. Erlbaum, Hillsdale, NJ, 1991. x, 470 pp., illus. $74.95.

Elements of General and Biological Chemistry. John R. Holum. 8th ed. Wiley, New York, 1991. xx, 537 pp., illus. $48.95.

Elements of Medical Statistics. F. Bisset Hawkins. Science History (Watson), Canton, MA, 1990. xxii, 161 pp., illus. $20. Resources in Medical History. Reprint, 1829 ed.

Forage in Ruminant Nutrition. Dennis J. Minson. Academic Press, San Diego, CA, 1990. xviii, 483 pp., illus. $89. Animal Feeding and Nutrition.

Mycoses in AIDS Patients. Hugo Vanden Bossche *et al.*, Eds. Plenum, New York, 1990. xii, 337 pp., illus. $79.50. From a symposium, Paris, Nov. 1989.

Neutral Proteases of Mast Cells. L. B. Schwartz, Ed. Karger, New York, 1990. viii, 165 pp., illus. $126. Monographs in Allergy, vol. 27.

Problems and Wonders of Chiral Molecules. Miklós Simonyi, Ed. Akadémiai Kiadó, Budapest, 1990. x, 400 pp., illus. $48.

Random Walk in Random and Non-Random Environments. Pál Révész. World Scientific, Teaneck, NJ, 1990. xiv, 332 pp. $38.

Serotonin Receptor Subtypes. Basic and Clinical Aspects. Stephen J. Peroutka, Ed. Wiley-Liss, New York, 1990. x, 236 pp., illus. $69.95. Receptor Biochemistry and Methodology, vol. 15.