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Povijest kemije
[History of Chemistry]

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We are currently witnessing a revival of interest in broader aspects of the ideas that originate from chemistry. They comprise redefinition of chemistry as a science with an original conceptual system, philosophical aspects of chemistry, relationships between chemistry and related sciences (physics or biology), chemical epistemology, and especially a historical view of the developments of exact scientific disciplines. The position of any history of science is not only to compile a chronological list of chemists and discoveries. Moreover, the philosophy of chemistry (and even more the history of chemistry) is chemistry itself. History of science is a metascience that has the role to explain how discoveries happened and under which conditions, from which ideas of other sciences, from which original concepts, and under which social and practical circumstances. Such a study of the history of science that is deeply involved in other disciplines, and in philosophy, is extremely stimulating for developing new mental constructions, concepts, theories and designs. Following these directions, serious publications about the history of chemistry, regardless of whether they are review articles, original scientific papers, books or textbooks, must include all these aspects, and satisfy all these requirements. Because of such high requirements and standards, the appearance of a new successful work in this field is not an everyday event.

Povijest kemije (History of Chemistry) is a book written by Professor Drago Grdenić about the history of chemistry that satisfies exactly such a role. Although its first application is to serve as a textbook, the work is much more. In its 20 chapters and 900 pages, the publication deals with all historical aspects of chemistry. The initial sections discuss two basic origins from which chemistry emerged as an autonomous science – technology and philosophy. The author pointed out that the most important factor that triggered the development of chemistry is experiment. Practical work of ancient (proto)chemists on attempting to mimic natural processes is the background

of all chemical methods and concepts. From the simple and correct explanation of early Greek philosophy in introductory chapters, we can learn how it stimulated development of chemical ideas. Grdenić discusses and gives an original interpretation of the appearance of two aspects of human activities, *i.e.*, science and technology. In describing the Alexandrian protochemistry, the author explains how the ancient technology practice under the pressure of philosophical concepts was split into two future directions: fundamental and applied science (philosophy). In spite of the fact that the mainstream development of modern chemistry started with protochemistry in Alexandria, and was transferred through Arabian culture to Europe, the impact of other cultures, such as Indian or Chinese, cannot be disregarded. The author respected this evidence and devoted two chapters to these Asian chemical traditions and their influence on the later development of modern chemistry.

Discussion about these historical and philosophical sources of chemistry is undoubtedly the most interesting contribution of this work, and it takes up almost half of the book. The second half consists of a series of chapters dealing with the development of most important chemical concepts: elements (Chapter 10), phlogiston theory (Chapter 11), Lavoisier's scientific revolution (Chapter 13), atoms and molecules (Chapters 14 and 15), and structural theory (Chapters 16 and 17). Histories of specific branches, such as organic, inorganic, and physical chemistry, are presented in chapters 16–19. The last chapter is entitled *Unified Chemistry* (Ujedinjena kemija) and deals with electronic aspects of chemistry, influence of quantum mechanics, and new reconstruction of chemical theory developed in the works of Linus Pauling. An extra section is added about the diffraction methods.

As we can see from the contents of the book, this work is mainly a history of classical chemistry. It does not discuss modern development of organic chemistry, notably the theories of reaction mechanisms. For instance, the name of Roald Hoffmann is not in the Index. Terms such as physical organic chemistry or reaction mechanisms are missing in the subject index as well. However, in spite of this, the work is one of the magisterial texts not only about the history of chemistry, and about philosophy of chemistry, but it also contains very interesting analyses of the sociology of science (chemistry). Many

important discoveries are explained within the framework of social circumstances. Biographies of famous chemists are embellished by intriguing notes about their lives: we recognize them not as impersonal intellects but rather as interesting human beings with souls and temperaments of their own. From this aspect, I recommend this book not only to students and academic scholars, but also to the wider intellectual public. Evidently, a book that is so full of new ideas and concepts stimulating to all readers,

chemists, historians and philosophers of science cannot be written by an author who is exclusively a cool historian. Behind this text stands a real chemist-experimentalist with a life experience in science and encyclopaedic erudition, such as Professor Grdenić. Unfortunately, this work is still only in Croatian, and not useful to international readers, but we hope that its English translation will appear soon!

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