

Edited by Jan Apotheker and
Livia Simon Sarkadi

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European Women in Chemistry

With a Foreword by Nicole Moreau



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The Editors

Dr. Jan Apotheker

University of Groningen
Department for Chemistry Education
Nijenborgh 4
9747 AG Groningen
The Netherlands

Dr.habil. Livia Simon Sarkadi

Budapest University of Food Technology
and Economics
Department of Applied Biotechnology and
Food Science
Muegyetem rkp. 3
1111 Budapest
Hungary

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Foreword

"A book about Women in Chemistry, what a strange project: how could so few women bring something to chemistry?" I anticipate that this will not be an uncommon reaction to the publication of the book "European Women in Chemistry". It is true that there are not many world-famous women chemists. To look at the place given to women in science, let us have a look at Nobel laureates, who are among the most prominent scientists: between 1901 and 2010, the Nobel Prizes for Sciences and the Prize in Economic Sciences were awarded to 612 laureates, of which 17 were women. And if we now consider the chemistry Nobel laureates, the Nobel Prize in Chemistry has been awarded to 159 laureates, among which 4 were women (1911, Marie Curie, field of nuclear chemistry, "*in recognition of her services to the advancement of chemistry by the discovery of the elements radium and polonium, by the isolation of radium and the study of the nature and compounds of this remarkable element*"; 1935, Irène Joliot-Curie, field of nuclear chemistry, "*in recognition of their synthesis of new radioactive elements*"; 1964, Dorothy Crowfoot Hodgkin, field of biochemistry, structural chemistry "*for her determinations by X-ray techniques of the structures of important biochemical substances*"; 2009, Ada Yonath, biochemistry, structural chemistry, "*for studies of the structure and function of the ribosome*").

Why so few? First, because people were convinced that Science was rigorous and rational and women were supposed to be weak and irrational. As a consequence, women scientists have been systematically excluded from doing serious science; they generally encountered their family's – mostly father's – resistance to their studying. "*apprenez-leur qu'il doit y avoir, pour leur sexe, une pudeur sur la science presque aussi délicate que celle qu'inspire l'horreur du vice*" (tell them that their sex must have for science as much a sense of decency as that inspired by the horror of vice) (Fénelon, traité de l'éducation des filles, 1687). Furthermore, as women were excluded from the high schools that prepared men for university, if they wanted to learn science, they had to hire tutors. This explains why the few scientifically educated women were, for a long time, encountered mainly in the rich and intellectual classes of society.

Anyway, as far as chemistry is concerned, men can do chemistry, but women do the cooking. With regard to chemistry-like activities performed by women, they were often associated with perfumes, ointments, poisons and, as a consequence, with witchcraft. Consequently, we can assume that many women who knew the

properties of plants (the first natural product chemists), were often victims of obscurantism and burned as witches...

A look at the destiny of women chemists shows that their lives were seldom plain ones, and that most of them had difficult or extraordinary fates. This is probably one of the reasons for the great influence these women had, and still have, for example as models for young people – and not only girls. Indeed, it is much more exciting to try to identify oneself with an out-of-the-ordinary-person, than with one having an uneventful story; and as, at least some years ago, most women chemists had uncommon stories, it is not surprising that they are considered by students as better models than male chemists. They campaigned for more vocational opportunities such as the right to vote and a state-supported secondary and higher education for girls. They certainly succeeded in the latter cause and, thanks to their struggle and determination, by the beginning of the 20th century women in several countries were finally accepted into Universities. Now, even if some discrimination against women in science still exists, women chemists must cope with this and understand that their future depends more on what they want to do themselves than on what others want. By doing this, they will show once more their determination and how strong-willed they can be.

*Nicole Moreau
Charenton, France*

Preface

One of the reasons for 2011 being chosen as the International Year of Chemistry is the centennial commemoration of the Nobel Prize awarded to Maria Skłodowska-Curie. This centenary led to the idea of a book to show the range of female chemists active across Europe in what many would suggest is still a male-dominated profession.

The chapters cover women from alchemical times up to the 19 and 20th centuries when women gained access to higher education. The individual subjects were suggested by EuCheMS member societies and a final decision was taken by the editors; as in any such selection there are other subjects who might have been included. Indeed it is hoped that the book will initiate discussion and debate about this.

The stories demonstrate both the range of activities of female chemists and just how difficult it was for them, and female scientists in general, to develop rewarding careers. Unfortunately, in most European countries this situation only began to change after 1960. Until this date the vast majority of women chemists experienced great problems in securing an academic career despite their excellent quality.

In this book we have focused on academic careers. Other careers of women that have a chemical background have not been included. Otherwise Margaret Thatcher, Angela Merkel and other politicians with a chemical background would certainly have been included.

Nowadays there are several scholarship programs to encourage female scientists, both at European and national levels. There are also networks for women scientists to share experiences and offer support to students and young scientists starting out on their career paths.

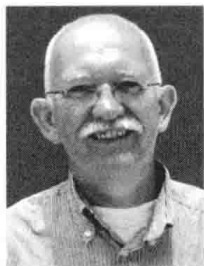
The editors hope that you will enjoy reading the different stories about female chemists from different countries, with different backgrounds. It is not intended to be a book to finish in one reading, rather it is a book to inspire young women to consider a career in chemistry. It should, however, not only be read by women; male chemists should ask themselves how their careers would have developed had they been faced with the same obstacles. Teachers of chemistry in secondary and tertiary education would also benefit from reading this book so that they can ensure that the opportunities for a career in science are not inadvertently directed at their male students.

We would like to acknowledge the various people from Wiley who helped so much in getting this book together. The EuCheMS Presidency, who initially suggested a book on this topic, and all the authors who contributed to this book, are to be thanked. Without their support, encouragement and enthusiasm the project would not have been possible. Particular thanks are due to Professor Nicole Moreau (President of IUPAC) who has written a foreword to the book.

Jan Apotheker

Livia Simon Sarkadi

About the Editors



Jan Apotheker is a lecturer in Chemistry Education at the University of Groningen. After obtaining his academic degrees from the University of Groningen in Biochemistry, he taught chemistry at a local secondary school for 25 years. One of his prime responsibilities as lecturer is the training of teachers in all levels of education. He is also involved in the organization of outreach activities both from the university and on a national scale. He is a member of the steering committee 'New Chemistry' that is currently developing a new chemistry curriculum for secondary education in the Netherlands. Jan is the Royal Dutch Chemical Society board member for education, an IUPAC Committee Member for chemistry education, and a member of the EUCHEMS division for chemistry education.



Livia Simon Sarkadi is a Professor of Applied Biotechnology and Food Science at the Budapest University of Technology and Economics, Hungary. Since 1980, she has taught biochemistry, food chemistry, and food analysis. She has supervised a number of PhD, BSc and MSc students. Besides being an author and co-author of many scientific papers, she wrote a textbook on Biochemistry. She is a member of the Editorial Board of International Journals (European Food Research and Technology, Food and Nutrition Research). She has been the Chair of the Food Protein Working Group of the Hungarian Academy of Sciences since 1996 and is currently the Chair of the EuCheMS Food Chemistry Division, and an elected member of the EuCheMS Executive Board.

List of Contributors

Jean-Pierre Adloff
Société chimique de France
250, Rue Saint-Jacques
75014 Paris
France

Katharina Al-Shamery
University of Oldenburg
Fak. V, IRAC
Postfach 2503
26111 Oldenburg
Germany

Didier Astruc
Société chimique de France
250, Rue Saint-Jacques
75014 Paris
France

Susanne Bartel
University of Oldenburg
Fak. V, IRAC
Postfach 2503
26111 Oldenburg
Germany

Christiane Bonnelle
Société chimique de France
250, Rue Saint-Jacques
75014 Paris
France

C.W. Mineke Bosch
University of Groningen
Faculty of Arts, Modern Hist.
Postbus 716
9700 AS Groningen
The Netherlands

Marco Ciardi
University of Bologna
Department of Philosophy
Via Zamboni 38
40126 Bologna
Italy

Danielle M.E. Fauque
Société chimique de France
250, Rue Saint-Jacques
75014 Paris
France

Miriam Focaccia
University of Bologna
Department of Philosophy
Via Zamboni 38
40126 Bologna
Italy

Carl G. Gahmberg
University of Helsinki
Dept. of Chemistry
A.I. Virtasen aukio 1
00014 Helsinki
Finland

Jean-Pierre Genet
Société chimique de France
250, Rue Saint-Jacques
75014 Paris
France

Sally Horrocks
University of Leicester
School of Historical Studies
University Road
Leicester, LE1 7RH
United Kingdom

Henryk Kozłowski
University of Wrocław
Faculty of Chemistry
F. Joliot-Curie 14
50-383 Wrocław
Poland

Katalin Nyári-Varga
Hungarian Museum for Science
and Technology Budapest
Kaposvár u. 13 -15
1117 Budapest
Hungary

Marianne Offereins
Jodichendreef 40
3984 JT ODIJK
The Netherlands

István Próder
Hungarian Museum for Science
and Technology Budapest
Kaposvár u. 13 -15
1117 Budapest
Hungary

Pekka Pyykko
University of Helsinki
Dept. of Chemistry
A.I. Virtasen aukio 1
00014 Helsinki
Finland

Maria Rentetzi
MPI for the History of
Science
Boltzmannstr. 22
14195 Berlin
Germany

Renate Strohmeier
Uni-Klinik Frankfurt
Gynäkologie und Geburtshilfe
Theodor-Stern-Kai 7
60590 Frankfurt am Main
Germany

Brigitte van Tiggelen
Voie du Vieux Quartier 18
1348 Louvain-la-Neuve
Belgium

Éva Vámos
Hungarian Museum for Science
and Technology Budapest
Kaposvár u. 13 -15
1117 Budapest
Hungary

Annette B. Vogt
MPI für Wissenschafts-
geschichte
Boltzmannstr. 22
14195 Berlin
Germany

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Maria the Jewess

Marianne Offereins

■ Maria the Jewess was an alchemist who probably lived in Alexandria, Egypt, in the first or the third century. Although no facts are known about her life, there are many references to Maria in ancient texts. Because alchemy was a secretive science, perhaps to protect its practitioners from persecution, it was not uncommon for alchemists to write under the name of a deity or a famous person. Maria wrote under the name of Miriam the Prophetess, sister of Moses.

Fragments of her work, including one called the *Maria Practica*, are extant in ancient alchemical collections. She also may have been the author of *The Letter of the Crown and the Nature of the Creation by Mary the Copt of Egypt* which was found in a volume of Arabic alchemical manuscripts, translated from the Greek. In this work the major theories of Alexandrian alchemy are summarized and several chemical processes described including the manufacture of colored glass. Maria was often quoted by other early alchemists, particularly the Egyptian encyclopedist and alchemist Zosimos of Panopolis (third or fourth century), the alchemist and writer Olympiodoros (fifth or sixth century) and Michael Maier (seventeenth century). Zosimos states that Maria was the first to prepare copper burnt with sulfur, the 'raw



Maria the Jewess

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