A Life for Metallurgy. Metall met Professor Fathi Habashi in Quebec City, Canada

Fathi Habashi
METALL met Prof. Fathi Habashi in Quebec, Canada

METALL: Prof. Habashi, Let us bring you our congratulations. 80 years for metallurgy – a great success. We admire that you are still active for the world of nonferrous metals – at courses, seminars, conferences, books and publication. You are one of METALL’s most valuable authors due to your comprehensive knowledge about nearly all aspects of metallurgy. Can you tell our readers how it all begun? Where did you study? Who was your teacher?

HABASHI: I graduated in 1949 as a Chemical Engineer from Fouad Al-Awwal University, now known as Cairo University. I worked in the Egyptian chemical industry for few years then I decided to continue my studies abroad. It all began when I was a graduate student at the Institut für Chemische Technologie anorganischer Stoffe at the Technische Hochschule in Vienna [now Technische Universität Wien] in 1956 - 59, when Professor Hans Hohn was back from Canada and mentioned in one of his lectures the great advances in metal technology there. When I obtained the doctorate I went to the University of Vienna to do some radiochemical work under Professor Thomas Schönfeld.

METALL: Which steps has your professional way taken until now?

I read in one of the scientific journals that were regularly circulated to the research workers, that the National Research Council in Canada offers Postdoctoral Fellowships to graduates who recently obtained a doctorate. The offer was so persuading, for example, free transportation to and from Canada for the successful candidate and his family, pre-paid money to prepare for the trip, etc. I applied and was accepted. The idea of post-doctoral fellowship was created by the then NRC President E. W. R. Steacie (1900–1962), was meant to keep the average age of the research staff at NRC at a young level and to encourage scientists to emigrate to Canada. When I came to Canada in 1960 I joined the Extractive Metallurgy Division at the Mines Branch of Canada’s Department of Mines and Technical Surveys.

I started looking for the new technology that my professor mentioned in his lectures. I spent some time in the library looking for books to learn about the new technology. I did not find such a book; the only one that attracted my attention was a book entitled Extractive Metallurgy just published by Joseph Newton. The book was interesting to read but was very short for me. When I learned about the large Library of the National Research Council on Sussex Drive I went there looking for books on metallurgy. I found some very interesting ones but these did not fully satisfy me. I therefore decided to read journal articles and take notes eventually collecting enough material for a 300-pages book that I can produce after finishing my Fellowship. My fellowship ended and I had to return to Egypt but the political situation was very tense and I decided on the advice of my brother to extend my stay in North America. I took a teaching position at Montana School of Mines and I had to lecture on extractive metallurgy. The preparation of the book became for me mandatory.

Since I was asked to teach a course on thermodynamics and kinetics I had to expand my notes to include these topics. I therefore decided to have the book project to be in two volumes instead of one so that one volume will be devoted to the theory and the second volume devoted to the applications. Gradually, however, the hydrometallurgical notes became so large that I decided to prepare for publication volume one on General Aspects and volume two on Hydrometallurgy. The other volumes on Pyro- and Electrometallurgy should then wait when I have the time. I submitted my project to Gordon & Breach Science Publishers in New York since they were the publisher for the American Institute of Mining Engineers known as AIME. The project was accepted, the manuscript submitted, and I started proof-reading when I moved to the Extractive Metallurgical Research Division of the Anaconda Company in Tucson, Arizona. Volume 3 Pyrometallurgy was completed when I was at Laval University in Quebec City and I was giving a course on this topic. It was published also by Gordon & Breach in 1986. Gordon & Breach, however, was expanding too much in publishing highly specialized journals and finally went bankrupt. Volume 4 Amalgam and Electrometallurgy was
completed in 1996 when I had to substitute a colleague who went on sabbatical leave and I had to teach his course on electrometallurgy for one semester. I published it two years later.

**METALL:** What are the main topics of your research work?

**HABASHI:** When I was with Anaconda my work was mainly devoted to copper. At that time it was realized that chalcopyrite was the major copper mineral and pollution problems in the copper industry must be abated. Therefore, my research was to recover copper from chalcopyrite using nonpolluting technology. It became evident that elemental sulfur and not sulfur dioxide must be a product when treating chalcopyrite.

I was able to collect my work later in a book entitled Chalcopyrite. Its Chemistry and Metallurgy published in 1978. When I retired in 1996 I decided to publish my lecture notes in book form to make them available to students. In 1996 I published Pollution Problems in the Mineral and Metallurgical Industries, in 1999 Kinetics of Metallurgical Processes, and in 2003 Metals from Ores. An Introduction to Extractive Metallurgy. Another aspect of my research was to popularize extractive metallurgy and introduce it in a simple way to young people. Towards this goal I published in 1999 Mining and Metallurgy on Postage Stamps. I am not a philatelist but with the help of two colleagues who supplied me with replica of stamps I was able to write this book.

**METALL:** What changes did you see in metallurgy in your metallurgical life? We assume you were witness of great changes – new processes, new technologies, new furnaces but also changes in legislation, environmental protection, emissions and energy demand. How do you see metallurgy today? Has it still a chance in spite of all current challenges like high prices for raw materials (ore, scrap), energy, animosity for technology, and a lack of a metallurgical young generation?

**HABASHI:** In 1999 was my 50th anniversary of graduating from Cairo University and 40th anniversary graduating from TH Wien. This was a time to reflect on the changes in metallurgical technology that I have witnessed. I collected my impressions in a book entitled Extractive Metallurgy Today. Progress and Problems which came out in 2000. Of course I had to write about flash smelting that displaced the reverberatory furnace. continuous casting, the energy crisis, recycling of scrap, automation, etc. I have always been interested in history and Goethe’s words “Die Geschichte der Wissenschaft ist die Wissenschaft selbst” were my motto. On trying to read about the history of metallurgy I found that the multi volume work “Hüttenkunde in three volumes (First Edition 1920s, Second Edition 1950s)” was already out of date and out of print. In English there was Liddell’s “Handbook of Nonferrous Metallurgy” in two volumes (First Edition 1926, Second Edition 1945). This is not only out of date and out of point but was written in a redundant style with useless diagrams and pictures. Chemical engineers had Perry’s “Chemical Engineer’s Handbook” since 1934. It went through six editions and is a summary of all metals and metallurgists appreciate this comprehensive summary of all metals and metallurgical processes. In this way it is no wonder that the book is still out of print. How did you get the idea to make this book and how was it possible to find and coordinate all the co-authors?

**HABASHI:** I suppose you mean Handbook of Extractive Metallurgy. The story of this Handbook goes back to 1963 while I was working on my Principles of Extractive Metallurgy. At that time, it became evident that there was a shortage of a comprehensive reference works on extractive metallurgy. Although the idea of Principles was based on hydro-, pyro-, and electrometallurgy, there must be available a large reference volume or volumes describing all metals systematically. Viktor Tafel’s Lehrbuch der Metallhüttenkunde in three volumes (First Edition 1920s, Second Edition 1950s) was already out of date and out of print. In English there was Liddell’s Handbook of Nonferrous Metallurgy in two volumes (First Edition 1926, Second Edition 1945). This is not only out of date and out of point but was written in a redundant style with useless diagrams and pictures. Chemical engineers had Perry’s Chemical Engineer’s Handbook since 1934. It went through six editions and is a
very useful reference work. Physical metallurgists have an impressive collection of twenty volumes ASM Metals Handbook. Extractive metallurgy in thus lagging behind.

From time to time I used to read articles on metals in Kirk-Othmer’s Encyclopedia of Chemical Technology. I found them very useful. When I joined Laval University in 1970, and went back to teach extractive metallurgy I immediately contacted Wiley in New York, the publishers of Kirk-Othmer proposing a Handbook of Extractive Metallurgy by combining the different articles on metals in their encyclopedia. I visited Professor Donald F. Othmer (1904-1995) one of the editors of the Encyclopedia at the Polytechnic Institute in Brooklyn, New York to get his support. In spite of his favorable comments, Wiley refused categorically and the project became dormant.

Few years later, Wiley announced a new edition of Kirk-Othmer to be edited at their London Office. I tried again with this new editorial staff but was again rejected. In the meantime radical changes in publishing were underway in the late 1980’s:

- The German Encyclopedia of Industrial Chemistry known by its founder Fritz Ullmann became now available in English. Most of the articles were submitted in German but were translated in English because of the weak German market.

- Electronic scanners became available and young people became very clever in operating them.

These developments prepared the stage for considering the Ullmann articles on metals as the basis of a Handbook. A letter was sent to the editor-in-chief but no answer was received. Finally a telephone contact was established with Verlag Chemie in Weinheim. A tentative agreement was made after numerous exchange of letters by which I should prepare a sample chapter by scanning and editing an article the way I want it and estimate the cost of the work. I owe much of the credit to Jean François Morin a clever young student who has excellent knowledge in handling scanners and computers. While on a trip to France in November 1995, I paid a visit to Weinheim to discuss the proposal in more details. Finally, I got the approval and we started the work.

The Handbook was written by 284 authors. The staff at Weinheim had to contact all these to get permission to re-publish their work in the Handbook. In some cases this was not easy. Some authors passed away and they had to contact their inheritors, other’s retired and not able to update their work, others refused, others requested an honorarium. I had to personally write articles to replace those who refused; one of these was a long article on iron metallurgy. I had also to write few more that I felt missing from the original Encyclopedia. For example, articles on Copper (I) Sulfate, Titanium Compounds, Gallium Compounds, and Germanium Compounds. I also wrote the first 25 pages introduction entitled “The Metal Industry”. Preparing a List of Authors and identifying them with their addresses and their contribution was also not an easy job. Although most of the correspondence was done by the staff at Weinheim, still I received many letters and telephone calls that I had to answer. The Index was prepared with great ease - - thanks to the computer and those who can operate it intelligently.

In this Handbook metals, their history, properties, extraction technology, and most important inorganic compounds and toxicology are systematically described. They are neither arranged by alphabetical order as in an encyclopedia, nor according to the Periodic Table as in chemistry textbooks. The system used was according to an economic classification which reflects mainly the uses, the occurrence, and the economic value of metals. In November 1996, I received the surprising news that Verlag Chemie was purchased by Wiley!

**METALL:** Are you planning on making a new edition?

HABASHI: Yes, I am working now on a new edition that will be in six volumes instead of the original four.

**METALL:** Can you tell us your favorite metal?

HABASHI: My favorite metal is no doubt rhenium because I met its discoverers in 1955 and I wrote a small souvenir book about Ida Noddack whom I had interviewed in 1969.

**METALL:** Wishing you all the best and good health from all our readers and we hope to read many more articles by Fathi Habashi in the future.

HABASHI: Vielen Dank.