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ATG Interviews David R. Lide

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F or the past twenty years, Dr. Lide has been the Editor-in-Chief of the CRC Handbook of Chemistry and Physics and has been involved in several other reference book and database projects. After receiving a B.S. in Chemistry from Carnegie Institute of Technology in 1949, he went to Harvard where he earned an M.A. in Physics (1951), and a Ph.D. in Chemical Physics (1952). Dr. Lide has served many institutions: President of the Committee on Data for Science and Technology (CODATA) of the International Council for Science, President of the Physical Chemistry Division of the International Union of Pure and Applied Chemistry (IUPAC), Chairman of the IUPAC Committee on Chemical Databases, Chairman of the American Chemical Society Task Force on Scientific Numerical Databases, Chairman of the AIP Publication Board (1979-80), Chairman of the AIP Planning Committee for the Physics Vade Mecum, and Councilor of the American Physical Society, representing the Division of Chemical Physics.

Dr. Lide has served as a member of advisory boards of the Chemical Abstracts Service, Petroleum Research Fund, Engineering Information, Inc., National Materials Property Data Network, Chemistry Departments at Harvard and Princeton, as well as on panels of the National Academy of Sciences’ National Research Council. He was awarded National Science Foundation Senior Postdoctoral fellowships at University College London, in 1959-60, and the University of Bologna, in 1968-69. His awards include the Department of Commerce Gold Medal in 1969; the Samuel Wesley Stratton Award of NBS for research in microwave spectroscopy in 1969; a Presidential Rank Award of Meritorious Federal Executive in 1986; the Herman Skolnik Award in Chemical Information in 1988, and the Patterson-Crane Award of the American Chemical Society for Contributions to the Documentation of Chemistry in 1991. He was also designated a lifetime National Associate of the National Academy of Sciences, in 2003. Dr. Lide is the author of several books (Basic Laboratory and Industrial Chemicals, Handbook of Thermophysical and Thermochemical Data, Handbook of Organic Solvents, and Handbook of Data on Organic Compounds) and is the editor of a commemorative book, A Century of Excellence in Measurements, Standards, and Technology, published on the centenary of the National Bureau of Standards (National Institute of Standards and Technology). He is also co-editor of the 2002 edition of AIP Physics Desk Reference, published by Springer Verlag. He has been involved in the creation of electronic versions of the CRC Handbook of Chemistry and Physics and the database Properties of Organic Compounds.

Svetla Baykoucheva: You recently announced that you will be retiring as editor-in-chief of the “CRC Handbook of Chemistry and Physics,” after being in this position for 20 years. Referring to the quote above, did you have such feelings as awe and helplessness when you became the editor of this “iceberg?” How did you become interested in this job and how have your education, professional experience, and interests helped you maintain such an extraordinary quality of this publication?

David Lide: I do not recall feeling helpless when I became Editor in 1989, although it was clearly a big challenge. In fact, the book needed so much attention that I had the comfort of knowing that any change I made would be a noticeable improvement. The position was offered to me at a propitious time, when I was ready to take early retirement from National Bureau of Standards (NBS)/National Institute of Standards and Technology (NIST). It was a natural match to my background. My degrees were in chemistry, physics, and chemical physics, and I had spent 20 years in research in molecular spectroscopy, a field that straddles chemistry and physics. Also important was the time I spent as Director of the Standard Reference Data program at NBS/NIST. That program covered the full range of data from chemistry, physics, and material science, so I had at least a superficial knowledge of a great many areas of physical science. Finally, I had established the Journal of Physical and Chemical Reference Data as a joint venture of NBS, ACS, and AIP and had served as Editor for 16 years, so I had a fair exposure to the publishing business. I might add that, although I am retiring as Editor-in-Chief of the CRC Handbook, I will continue to be involved, especially with the electronic editions, for the next few years. I am pleased to be leaving the book in good hands with Mickey Haynes as the new Editor.

SB: Could you tell us a little bit about the history of the “Handbook?” How was it conceived, and who were the enthusiasts who started it?

DL: It is fair to say that the Handbook of Chemistry and Physics started as a marketing tool for the Chemical Rubber Company, a Cleveland company that sold tubing, stoppers, glassware, and rubber aprons to local high schools and colleges. The head of the company enlisted a chemistry professor from Case Western Reserve University, William R. Veazey, to prepare a collection of reference data and recipes of interest to laboratory scientists. It amounted to 116 pages, followed by illustrated advertisements for the company’s products. This first edition of the Handbook of Chemistry and Physics appeared in 1913 and sold for $2.00. It was apparently successful enough to warrant a second edition in 1914, and the pattern of annual updates continued, with a few missing years, for the next 96 years.

As an amusing sideline, I invited Linus
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Pauling to write a Foreword for the Handbook a few years before he died. He described how he studied the Handbook in slack periods while he had a summer job during graduate school paving roads in Oregon. He attributed the beginning of his interest in chemical bonding to his speculations, from looking at Handbook tables, as to the reason for observed trends in physical and chemical properties.

SB: What is the process of producing each new edition? How many people are involved in it? Which institutions make an input (intellectual or financial) in it?

DL: As Editor-in-Chief I have had full responsibility for the content of the book — choice of topics, selection of data, and generation of the index. Each December, I send the new and revised sections, mainly in digital form, to CRC headquarters, where my files are converted to the CRC typesetting format. Their very efficient production group takes it from there, producing proofs for me to check and then assembling the old and new material to send to the printer. The books appear about six months after I submit the new material.

The new and revised tables come from two sources. First, I have assembled a group of experts in various fields who contribute to the book; about 30 of these are listed in the current edition, many from other countries. Some make a one-time contribution; others send regular updates every two or three years. I rely on the expertise of these contributors to select and evaluate the data, but I edit their submissions as needed to assure conformity to international recommendations on units, symbols, terminology, and chemical nomenclature. Secondly, I personally produce and update a number of tables in areas of science and clature. Secondly, I personally produce and update a number of tables in areas of science and clature. Secondly, I personally produce and update a number of tables in areas of science and clature. Secondly, I personally produce and update a number of tables in areas of science and clature. Secondly, I personally produce and update a number of tables in areas of science and clature. Secondly, I personally produce and update a number of tables in areas of science and clature.

SB: Being the editor of such a publication comes with a great responsibility, because so many scientists rely on the accuracy of the data in it. What is the process of verifying the data published in the “Handbook”?

DL: Quality control is certainly a top priority, and I feel this is what distinguishes the CRC Handbook from the voluminous data sources that one can find, especially on the Internet. As pointed out in the previous answer, I use as many data as possible from secondary sources in which I have confidence, sources in which the data have been verified by going through a variety of tests such as those developed by the Standard Reference Data program at NIST.

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These tests include correlating all the available experimental data with theoretical models and applying statistical techniques to flag outliers and choose best values. All the outside contributors have extensive experience in carrying out measurements in the areas they represent, and I rely on their judgment. Whenever space permits I include references to data sources, which permits users to trace numbers they have questions about. Many of the numerical data in the Handbook are archived in a database management system, which includes notes on the reasons for selection and for any changes made during a revision of a table. This system is also helpful in detecting keyboarding errors and inconsistencies between different tables — a flaw that is very annoying to users. For example, if a boiling point is given in degrees Kelvin in one table and degrees Celsius in another table, the software makes it easy to keep the two tables consistent. Also, I maintain a central database of preferred chemical names, formulas, and molecular weights, so that typos are minimized and names and other chemical identifiers are, with exceptions in special cases, kept consistent throughout the book. In spite of these efforts, users do report errors in the book, which provides valuable feedback. Many such reports are apologetic, pointing out that they really like the Handbook but just want to be helpful in reporting a typo. This is a good point to thank the management, and the entire staff, of Taylor & Francis/CRC Press for their dedication to producing the highest quality publication. They have been totally supportive of all the changes I wished to make in the Handbook.

SB: What were some of the boldest changes that you made in the “Handbook” through the years? What were the biggest challenges in your career as its editor? Do you remember something unusual that you had to deal with or a moment when you had to make a decision that would later prove to be of critical importance for the publication?

DL: When I became Editor, the book was in poor shape. It had grown considerably in size over the previous decade, but in a rather uncontrolled fashion. Some topics were duplicated in different parts of the book, other important topics were omitted. The content was not organized in a logical way; the index was poor; and the typography varied widely. In my first edition I decided to take the book apart and reassemble the 350 plus tables in a coherent structure. So I created 16 sections covering areas such as Fluid Properties, Biochemistry, Nuclear Physics, Geophysics, etc., and I placed related tables together. I have kept this same structure, although I would probably do it a little differently today. When I restructured this first edition, I dropped many tables that seemed of little importance or were badly out of date. However, I failed to appreciate the diversity of the Handbook user community and received many complaints about the deleted tables. I quickly restored some of these after suitable updates. Of course, the creation of an electronic version has alleviated this problem. We have scanned over 50 of the older tables and placed them in the Internet and CD-ROM editions; in the future, any table that is dropped from the print version will be kept in the electronic versions.

Other changes have been made in a more incremental fashion. In recent years I have broadened the coverage of topics outside the traditional areas of chemistry and physics, such as biochemistry and geophysics. I have added more general references to help guide users to data that do not appear in the Handbook, and have added an appendix listing Websites that contain reliable data. I have also added more redundancy to the index.

SB: Could you tell us something about yourself — what your professional and personal interests have been? How did you balance your responsibilities for the “Handbook” with your working on other books?

DL: Well, my professional career has been divided into two phases of roughly 20 years each — laboratory research, management, and publishing. I found research in molecular spectroscopy very satisfying; this period resulted in over 90 papers, many of which still get citations. Managing the Standard Reference Data program at NBS was satisfying in a different way. It led me to make contacts in many other fields of science, and I became heavily involved with international organizations such as IUPAC and CODATA. In the third period I was able to translate some of my previous experience into books and databases that I hope are helpful to the scientific community as a whole. Although the Handbook was my major task during this period, I was able to put out four other books for CRC Press, including the seven-volume Handbook of Data on Organic Compounds with Bill Milne. I also co-edited the AIP Physics Desk Reference in 2003, and in 2001 I edited a book commemorating the centennial of the founding of NBS/NIST.

SB: The “Handbook” has been an indispensable resource for chemists, chemical engineers, and other professionals in related fields. How has the electronic format improved users’ experiences?

DL: Creation of an electronic version of the CRC Handbook has occupied much of my time since 2000. In bulk, the Handbook is tiny compared to classic print references such as Beilstein that have been converted to electronic form, but the diversity of the material in the Handbook presented a different kind of challenge. A large part of the chemical data in the book has been merged into a database format that provides the usual database functions — multiple types of searches, sorting, merging, and export. These capabilities enable the user to generate customized tables, avoiding the need to page through the book. I believe these features have been well received, although feedback is limited. There is still much work to be done, since each of the 351 tables has its own format, and a layout for nuclear physics is obviously very different from that for physical constants of organic compounds. So this is still a work in progress.

I was at the Taylor & Francis/CRC booth at the ACS Washington meeting in August and was happy to demonstrate the electronic version of the Handbook.

SB: How is the “Handbook” competing with other resources such as CrossFire Beilstein, CrossFire Gmelin, SciFinder/STN, which also provide information about the chemical and physical properties of chemical compounds? For which questions would users rather go to the “Handbook” (print or electronic) than to these other resources?

DL: I feel the Handbook serves quite a different need from massive databases such as Beilstein, Gmelin, the Cambridge Structural Database, and the like. We cover an extremely broad range of properties and materials, and we try to focus on the systems that users are most likely to be interested in. We also tell the user where to look for further information if the question is not answered in the Handbook. Thus the Handbook, both print and electronic, is designed to be a convenient first entry point for anyone looking for information but not familiar with the specialized information sources (or anyone who cannot get access to them). This is the niche that the Handbook has occupied for almost a century, and we hope to maintain it.

SB: In your opinion, how will people find information about the chemical and physical properties of chemical compounds in the future?

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I n September of 1989, Hurricane Hugo made landfall in South Carolina. The result was a devastating crisis. The next month, waiting for the third game of the much-anticipated “Bay Bridge” World Series (Giants vs. A’s) to begin, I was caught in yet another natural disaster that precipitated a major crisis — the Loma Prieta Earthquake, which caused major devastation around the Bay Area. Even now, even the slightest unexpected shaking sensation takes me right back to those terrifying moments almost twenty years ago. These two natural disasters brought about situations that I think of as “big crises” — serious kinds of events resulting in direct and dire consequences, but of an acute nature and a limited time span.

Another kind of crisis is the less drastic variety that arises in the course of day-to-day events. These kinds of crises, while in some cases more significant on a personal level, are less severe in absolute terms. We can, therefore, think of “cri ses” in two tiers: the big crises, such as those following major disasters, and then the daily “crises” that punctuate our daily lives. When dealing with the latter, it can help to keep in mind the former. No doubt the Charleston-bound in 1989 had this perspective going into the conference.

In November, the Charleston Conference went on as scheduled even as the city recovered from Hugo. Janet Flowers summarized a number of sessions at the conference for the “And They Were There” feature of the April 1990 issue of ATG.1 Several of the first sessions she covered in her ATG article are interesting, as they dealt with increasing serials prices, shrinking print runs of university press monographs, peer review and copyright, and the role of vendors in the distribution of scholarly communication. These elements make up a large part of the well-known formula resulting in “the crisis in scholarly communication.” I should note that at no point does Flowers directly invoke the serials crisis in her summary, though gets very close when concluding that collaboration is the key to tackle “the issues facing us as we attempt to manage an exponential increase in scholarly output in a time of shrinking resources.” Reading this conference summary, I thought immediately of the crisis in scholarly communication as there has been an (ongoing) one since before I started in libraries. And, to put it all in perspective, the literature on the subject recedes into the early 1970s, at least — demonstrating that there has been a crisis since before I was born.

Clearly, things have been far from ideal in scholarly communication for a long time and from many perspectives. But I have become uncomfortable with the idea of “the (ongoing) crisis” within this context — as have many others. More than a decade ago, for example, Sanford G. Thatcher had already observed that the “crisis” was something more of a “chronic illness.”2 The situation with academic serials and monographs has definitely caused a great deal of (ongoing) anxiety within the scholarly community. It is, however, more a crisis of the second tier, if “cri sis” is even the right word: we are looking not at swift and terrible disaster, but a slow eroding loss of libraries’ ability to provide stable, long-term access to certain (but not all) content. The lingering situation in scholarly communication has implications for everyone involved, including authors, publishers, vendors, and librarians. This situation suggests the possibility of “disastrous” consequences for scholarship, and I do not want to imply that such a situation is less important than it is for everyone involved.

But what are we talking about when we use the word “crisis”? To pull a few choice phrases out of the Oxford English Dictionary’s definition of the word, components of a crisis may include a “turning-point for better or worse;” “marked or sudden variation;” “critical point in the course of events;” “decisive stage in the progress of anything;” and a “decision.” Now, the OED notes, a crisis might also mean “times of difficulty, insecurity, and suspense in politics and commerce.” While the elements constituting the crisis in scholarly communication might create a time of difficulty or insecurity, it is worth noting that there is no indication that a crisis is a time of prolonged difficulty or insecurity. A crisis is clearly a definitive moment.

I am not dismissing the potential harm caused by runaway serials pricing, the uncertain future of the academic monograph, or other difficulties imposed by the troubling economics of scholarly communication. But reflecting back on all the challenges posed by the changing market for academic publishing, all of us here in 2009 should have the lessons of the communication crisis firmly in mind — as well as a thought for those greater crises that help keep everything in perspective. The program for the 2009 Charleston Conference shows that we have experienced a shift vis-à-vis electronic resources. We are now facing not only uncertain and rapidly changing pricing models, but variable modes of access, numerous content delivery platforms, and complicated archival challenges. To top it all off, we are now somewhere in the middle of the most dire budget situations that many of us have ever seen. The increase in scholarly output and shrinking resources we are managing in 2009 go well beyond what the scholarly community faced back in 1989. Is this shift to e-resources an expansion of the serials crisis? Is it an entirely new crisis? An additional crisis? I would answer “no” to all three of the questions above. We have come to the point where there is no crisis. For starters, we have passed that “critical point in the course of events” where we are uncertain about the future of e-resources in academic libraries. A quick glance through the program for this November’s conference confirms that; the consensus is that we have arrived (at last) in a completely new environment. Our emerging dialog concerning change here in 2009 does not suggest a continuation of the rhetoric from the preceding communication crisis, either, but rather something much more positive and energetic. To pull some select words out of the upcoming conference session titles, we are “leveraging,” “reconfiguring,” “implementing,” “following-up,” “facing,” “assessing,” “moving,” and “partnering” while dealing with great uncertainty and unease. This is important to note, because it is clear now that things are not going back to the way they were (a long time ago). We must come to