

[Home](#) > Publications > [Interviews](#) > [Bader](#)

Chemistry and Art: The Incredible Life Story of Dr. Alfred Bader

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This interview was originally published in the *Chemical Information Bulletin* (Spring 2007, Vol. 59, No.1, pp. 11-12)

It is not very often that you have a chance to interview someone who has become a famous chemist and businessman and who also happens to be an expert on Old Dutch Masters. In 1951 Dr. Alfred Bader founded the Aldrich Chemical Company. For decades, chemists around the world have been tearing off the covers of the Aldrich catalogs carrying reproductions of beautiful paintings (often from Dr. Bader's personal collection) to decorate the walls of their labs. Articles on art history and alchemical paintings have also appeared in the Aldrich catalog, written (anonymously) by Dr. Bader. Studying art and writing about it has become a passion for Dr. Bader, who is now considered by art historians and art dealers an expert in the field of the Old Dutch Masters. He was named a fellow of the Royal Society of Arts in London. During his life, Dr. Bader was able to combine his career of a distinguished chemist and businessman with his passion for the fine arts.

The extraordinary life story of Alfred Bader began in Vienna, where he was born in 1924. He made it to England in 1938, to avoid Nazi persecution, but in 1940 was suspected to be a Nazi sympathizer and sent to an internment camp in southern Quebec, Canada. Queen's University in Ontario was the only educational institution to accept him after he was released from the camp. After getting a Bachelor's degree in engineering chemistry there, he went to Harvard, where he earned an M.S. and a Ph.D. in chemistry.

Dr. Alfred Bader and his wife Isabel visited the Washington, DC, area in the Fall of 2006. The visit was sponsored by the Office of NIH History and the American Chemical Society. During this visit, Dr. Bader gave three lectures. The first one was held at the University of Maryland and what we heard from him took many of us by surprise. He challenged two major beliefs that chemists have lived with for so many years. Generations of students of chemistry have been taught that two great discoveries—the structure of the benzene ring and the theory according to which the element carbon has four valences—were made by the famous German chemist August Kekulé.

Dr. Bader presented evidence that when Kekulé published his paper on the benzene ring, he had already seen similar models proposed by an Austrian chemist, Josef Loschmidt [1]. According to the legend, Kekulé came to the idea of this particular (ring) structure of benzene after dreaming of a snake eating its own tail. His theory was published in 1865—four years after Loschmidt had already proposed a similar structure, which he published in a little-known book. Dr. Bader walked us through the investigative research that concluded that another chemist, Archibald Scott Couper was the first to propose the theory of the tetravalence of carbon, but it was Kekulé who published it just a month earlier (in May of 1858) than Couper [2].

In his lecture at NIH, "History of Aldrich and Sigma-Aldrich, with Advice to Young Scientists," Dr. Bader gave this advice: "Find a niche to explore in order to become successful entrepreneurs." Dr. Bader also gave a lecture at the Royal Netherlands Embassy, which was celebrating the 400th anniversary of Rembrandt's birth. The topic of the lecture was "The Rembrandt Research Project and the Collector." This project was started in 1968 by a group of experts on Rembrandt for the purpose of investigating whether paintings attributed to the artist were actually painted by him. Some paintings that had previously been considered painted by Rembrandt were re-classified by this group as ones painted by his students. Understandably, the conclusions made by these experts caused many problems for museums and private collectors.

Dr. Bader's collection of paintings currently consists of 130 paintings, including five Rembrandts. He and his wife have donated 150 paintings to Queen's University, which has received many other donations from them, including the 15th-century Herstmonceux Castle in Sussex, England. To pay tribute to his numerous contributions, Queen's named a campus road "Bader Lane," initiated a number of Alfred Bader fellowships, and created three Bader Chairs: the "Bader Chair in Southern Baroque Art," the "Bader Chair in Northern Baroque Art," and one in Organic Chemistry. The Queen of England has honored him with the title "Commander of the British Empire." Dr. Bader is a generous donor to other educational institutions, providing scholarships and awards to chemical students in the United States, Canada, England, the Czech Republic (he has Czech roots), and other countries. He and his wife support "Project Seed," an ACS program for underprivileged students.

*Interviewing Dr. Bader for the *Chemical Information Bulletin* was a very unusual experience for me. Besides the fact that I was sitting next to someone who owns five Rembrandts, I was often frustrated with the answers I received to my questions. The most common answer from him was "You'll find the answer to this question in Chapter...of my book." The book he had in mind was his autobiography, "Adventures of a Chemist Collector" (London: Weidenfeld and Nicolson, 1995). I later sent him eight questions in writing that he was kind enough to answer. I am sure his reminiscences about chemistry, its future, and other topics will be of great interest to the readers of the *Bulletin*. In a tribute published in a recent Special Issue of the *Canadian Journal of Chemistry* (vol. 86, 2006) honoring Dr. Bader, Anne and Howard Alper wrote: "Alfred Bader, a true visionary, has had a profound effect on the way chemists do research."*

References

- [1] Wotiz, John H. (ed) (1993) *The Kekulé Riddle: A Challenge for Chemists and Psychologists*. Glenview Press, Vienna, IL.
- [2] Dobbin, Leonard (1934) *The Couper Quest*. *J. Chem. Educ.* 11, 331

This interview was conducted in the Fall of 2006.

SB: Your life, achievements, and the recognition for these have been extraordinary. Of all the different things and passions that you have been through in your life, from lab research to becoming the founder of the largest and most profitable company for research chemicals in the world today, what have you found most rewarding and why?

AB: I would like to answer this question on two levels. Professionally, it is the accomplishment of a dream. In September 1967 I wrote in an advertisement: "We can say with the prophet that we have dreamed a dream: to be the chemists' chemist, to save scientists throughout the world millions of man hours by having synthetic building blocks and reagents readily available; to become the world's most competent supplier of organic chemicals. We hope to accomplish this dream." We have accomplished that dream.

On a personal level, meeting Isabel and marrying her has been the most rewarding. She is a wonderful person, has improved me so very much, and together we have been able to help many people.

SB: In your lecture at the NIH you advised young chemists to find a niche for entrepreneurship. With chemical and pharmaceutical companies merging and forming even bigger companies, isn't Sigma-Aldrich now similar to what Kodak used to be in the 50s for start-ups like Aldrich and how can start-ups compete and survive today, even if they find a niche?

AB: I hope that Sigma-Aldrich now is totally different from what Kodak used to be in the 50s. Kodak focused on photography, and the fine chemicals business was almost incidental. Kodak left it altogether when real competition arose. To Sigma-Aldrich, supplying research tools of all kinds promptly and in high quality is all important. For a start-up to compete with Sigma-Aldrich, [it] would be very difficult, but I suggested that young entrepreneurs find a niche and that is



Alfred Bader with Madeleine Jacobs,
Executive Director and Chief Executive Officer
of the American Chemical Society.
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Chem. Eng. News, October 23, 2006, 84(43), p 65.
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certainly possible today. During the last years I have helped a number of these—for instance, JRD in England, supplying fluoroaromatics, and Fluorous Technologies in Pittsburgh. The early years are difficult but success is possible.

SB: You have answered many questions during your presentations at the University of Maryland, NIH, and the Royal Netherlands Embassy in October, 2006. Are there questions that you would have liked people to ask you and that you have not discussed in your book?

AB: A key question that should be asked by a young entrepreneur is "what are the essentials for success once you have found a niche." They are:

- Treat your customers well. Every question should be answered promptly.
- Try to find the ablest employees and treat them well. In that I often failed at Aldrich in its early days because we were short of cash.
- Try to keep venture capitalists away as long as you can, because most want to invest and control.

SB: You have lived and traveled in many countries in Europe and North America; you had unique opportunities, through the positions you have had and your personal interests, to see many aspects of life in these countries. What was it like to be a scientist in the 50s and the 60s? Was there more idealism in doing science than it is now? Was there something more prestigious to be a scientist than it is now? And was it the competition between the two worlds that made science so important then? How has science endeavor changed since then and what motivated people then and what motivates them today to go into science and subject themselves to working in smelly labs and sweat over manuscripts?

AB: I don't think that it was so very different to be a scientist fifty years ago than it is today. I still speak to many great chemists in North America and Britain and see real enthusiasm for research now as I saw it then. What has changed is the esteem in which chemistry is held. Ask the man on the street what first comes to mind when he heard the word chemistry. In 1950, it would have been penicillin and nylon, longer life through chemistry. Today it is pollution and global warming. Our chemical societies have not done as good a job as they could and should have. The situation is most serious in Britain where a number of universities have actually closed their chemistry departments—Kings College, Queen Mary College, and Exeter University. Recently, their five star chemistry department was almost closed down by the University of Sussex. Such adverse publicity has of course discouraged some able youngsters from studying chemistry.

SB: For chemists who have always believed that Kekulé was the one who first recognized that carbon is tetravalent and also proposed a theory, according to which benzene forms a ring, it is quite shocking to learn from your presentations that, in fact, other people—Archibald Scott Couper and Johann Josef Loschmidt, respectively, were the first to have these ideas, but their contributions remained unknown. Why are you so passionate about this issue—are you on a mission to re-write the chemistry books?

AB: I would simply like the truth to be known. There is almost certainty that Couper submitted his manuscript on the tetravalence of carbon before Kekulé did. And there is absolute certainty that Loschmidt illustrated over a hundred circular aromatic structures in his book of 1861, five years before Kekulé's paper. And Kekulé saw this book no later than January 1862 when he wrote about it to Erlenmeyer. Am I on a mission to re-write chemistry books? Well, if wanting the truth to be known is being on a mission, yes.

SB: You are supporting many young scientists through your foundation. What do you see as the biggest challenges today in attracting young people to go into science?

AB: Isabel and I are not supporting young scientists through our foundation, but through personal gifts. The biggest challenge in attracting young people into chemistry lies in convincing them that chemistry is essential to progress. Sadly, almost ridiculously, chemistry has become a dirty word, yet where would we be, whence could we progress without chemistry?

SB: When you mention the Aldrich catalog to scientists, they remember the beautiful paintings by old masters on the covers of these catalogs that many of us used to tear off and put them on the walls in the labs. Could you tell us about your tastes in art and what you have in your collection?

AB: My favorite paintings are Dutch 17th century, my favorite painter is Rembrandt, and my favorite subjects are Biblical. I was very happy when Dr. Jai Nagarkatti, the CEO of Sigma-Aldrich, asked me recently to suggest paintings from my collection for Aldrichimica Acta covers.

Isabel and I are leaving our collection to my alma mater, Queen's University in Kingston, Ontario. Later this year the University will publish a catalogue of that collection, part of which is already in Kingston.

SB: The 2006 Nobel Prize for Chemistry was awarded to Roger D. Kornberg, a biochemist at Stanford University, for figuring out the way in which information in the DNA of a gene is copied to provide the instructions for building and running a living cell. Aren't they giving a second Nobel Prize for Biology and Medicine and not having one for Chemistry this year? Science is becoming more and more interdisciplinary, but isn't chemistry losing ground and becoming a sub-discipline of Molecular Biology and Biochemistry?

AB: Chemistry, biochemistry and molecular biology are indeed closely interrelated. But you could not have biochemistry or molecular biology without chemistry, though you can of course have chemistry without biochemistry and without molecular biology. Chemistry is the backbone and I am not concerned when a great biochemist wins the Nobel Prize for Chemistry.