The Public Image of Chemistry

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Singapore et al.: World Scientific Publishing, 2007

ISBN 981-277-584-9

INTRODUCTION

Of all the scientific disciplines chemistry seems to be particularly concerned about its public image. Indeed, popular associations with chemistry range from poisons, hazards, chemical warfare, and environmental pollution to alchemical pseudo-science, sorcery, and mad scientists. Despite repeated campaigns for convincing the public that chemistry would bring health, comfort, and welfare, chemists frequently meet with hostility in popular culture. As student enrollment numbers has been shrinking, chemistry departments have been closed in several countries. Also in humanist culture chemistry has a very low profile; philosophers in particular keep to their traditional neglect of anything related to chemistry. Of course, chemists have always been complaining about their low prestige, the lack of public acknowledgment of their achievements, and the misguiding popular associations with chemistry, such that we now have a long record of complaints of almost two centuries. More recently, in response to their public image, chemists have tried to launch slogans such as 'green chemistry' or even dropped the term 'chemistry' altogether and adopted more fashionable labels such as 'materials science', 'molecular science', or 'nanotechnology'.

Surprisingly or not, chemists have never translated their complaints into serious research programs to understand the public image of chemistry in its cultural and historical contexts. To be sure, chemical societies and, particularly, the chemical industry have commissioned many reports for promotional or marketing purposes. Yet, such reports usually scratch only on the surface and may well have recommended one or the other camouflage tactics. Even the recent boost of academic research in Public Understanding of Science (PUS) has virtually excluded chemistry and, instead, focused on topics such as 'Frankenfood' and genetic engineering. The failure to deal with chemistry in PUS studies is more serious than the traditional neglect in the humanities, because stereotypes of chemistry have dominated the popular image of science in general. Even the most feared image, the 'mad scientist', was originally a nineteenth-

century literary portrait of chemists, such as Mary Shelley's original Victor Frankenstein was, of course, a chemist. Thus, the present volume on the public image of chemistry also helps understand the public image of science overall and fills an important gap in understanding the relationship between science and society.

Today's public image of chemistry is certainly linked to recent explosions, to hazards and pollution. However it is deeply rooted in our culture, as it is the result of historical interactions between chemistry and society. Thus, the chapters of this volume investigate how the public image of chemistry has been shaped both by chemists in popularizing chemistry and by nonchemists in responding to contemporary chemistry in various phases. The result of this investigation is surprisingly more complex than we expected. Strictly speaking there is not a single image of chemistry in the public sphere but at any time a variety of images in continuous interaction. On the one hand, there are public self-images produced by chemists to promote their discipline. On the other, the popular images of chemistry in various mass media draw on different cultural sources and express both public expectations and fears of chemistry. As the production of popular images partially responds to the production of self-images and vice versa, both depend on each other. Thus the production of public images is negotiated between chemists and nonchemists in public institutions, and new images emerge in between. There is consequently a wide spectrum of public images, ranging from public self-images to popular images with mediated images in-between, all interacting with one another. With the additional historical dimension and the impact of particular events, from Nobel Prizes to toxicity scandals, the full complexity of the dynamics of the public images emerges.

While this volume cannot of course cover the full complexity of the issue, it does however provide for the first time an in-depth understanding of the historical origin and development of the public images of chemistry. Keeping in mind the gradual differences and interactions, the volume is divided into three parts devoted to popular images, self-images, and mediated images of chemistry in the nineteenth and twentieth centuries.

The first part on popular images focuses on representations of chemistry in fiction literature and movies – not surprisingly the mad scientists

figures prominently here. ROSLYNN HAYNES, one of the very rare English literature scholars with a background in chemistry, argues that since the early nineteenth century the popular figures of scientists in fiction have been shaped on the model of sinister, dangerous, and mad alchemists (Chapter 1). She points out that this figure embodies suppressed desires and fears of recurrent fascination. With a closer look at the history of science, JOACHIM SCHUMMER explains the origin of the mad scientist in nineteenth-century literature as a part of a literary response to the emergence of modern science in general and of experimental chemistry in particular (Chapter 2). In his quantitative analysis of scientists in twentieth-century movies, sociologist PETER WEINGART illustrates that chemistry has become the iconic discipline of the mad scientist (Chapter 3). Apart from these clichés, however, a more complex picture of chemistry in society has recently emerged, as PHILIP BALL shows in his analysis of contemporary American literature (Chapter 4).

How did chemists respond to the public challenge of being related to mad scientists? The second part provides five case studies of chemists developing a popular image of their discipline. In the early nineteenth century, chemists were still busy with establishing chemistry as an independent discipline, which they did by strongly engaging with the public. For instance, Humphry Davy in England, as DAVID KNIGHT shows in Chapter 5, popularized chemistry through public lectures with spectacular experiments. And Justus von Liebig in Germany, as MARIKA BLONDEL-MÉGRELIS argues in Chapter 6, published popular books and articles on chemistry in which he argued that chemistry is both the most useful and the most fundamental of all sciences. Later in the nineteenth century, when chemistry grew mature both academically and industrially, popular chemistry books tried to make chemistry appear more attractive in order to cope with the increasing workforce demand, as ERNST HOMBURG points out in Chapter 7. These books eventually created the public chemistry image of some wondrous, magic technology. When, after World War I, chemistry's reputation was particular damaged, because of research and deployment of chemical weapons, U.S. chemists responded with an influential popularization project. By analyzing its images and text, ANDREW EDE illustrates in Chapter 8 how the wondrous chemist-magician moved to the level of a benevolent god in a white lab coat who

nourishes and takes care of his people. Strangely enough, the more chemists felt the need to popularize their discipline, the more did they employ elements of magic and literary clichés, including those of the mad scientist, which they disliked on the other hand. Moreover, in current visual images that chemists use to portray themselves, their discipline, and the chemical industry, they frequently and unknowingly employ visual stereotypes fraught with negative connotations, as JOACHIM SCHUMMER and TAMI SPECTOR argue in Chapter 9. For instance, the favorite pose of a chemist, *i.e.* a person hold up a flask and gazing at it, was for centuries a symbol of quackery and fraud before chemists assumed it as their visual icon.

In the twentieth century, professional science journalists and mediators made all possible efforts to go beyond the conflict between the popular images produced by nonchemists to caricature or mock chemistry and the self-images chemists use to promote their discipline to the public. The first two chapters of part three discuss the creation of such images in institutions that were built to mediate between science and society. MARCEL LAFOLLETTE's study of the emergence of science journalism in the 1930s (Chapter 10) illustrates the difficult negotiations and compromises between professional supply of information and public interest and demand that eventually result in chemical 'news' worth broadcasting. PETER MORRIS provides a similar account of the institution of science museums throughout the twentieth century with an additional emphasis on the competition between the disciplines to be displayed. Compared to the sometimes aggressive campaigns launched by chemical communities, science museums seem rather shy in their displays of chemistry. In many cases chemistry is given a modest place in exhibitions. Our volume concludes with PIERRE LASZLO's reflection in Chapter 12 on how the self-image of chemists has changed since the mid-twentieth century as a result of internal scientific and organizational developments as well as external environmental and societal challenges.

For today's chemists interested in improving their public image, it might be surprising to learn that such efforts have been undertaken for more than two centuries. However, neither the issues that chemists are concerned with nor the approaches to popularize chemistry are totally new. The lack of success of these strategies suggests that, rather than re-

peating the same old mistakes over and again, it would be wiser to pause for a moment, take lessons from history, and reflect more carefully on the complex relationship between science and society.

Among the many lessons one could draw from the history, one is particularly obvious. Rather than shaping an adequate image of chemistry, chemists have frequently preferred to react to what they considered as public prejudices against chemistry and to adopt a defensive attitude. Instead of making efforts to present the dual face of chemistry – a natural science and a set of technologies – they enrolled publicists to market their new synthetic products. For instance Du Pont's famous slogan, "Better things for better living… through chemistry", initially aimed at erasing the image of chemistry as an agent of death resulting from the company's participation in chemical warfare during World War I. However, it helped create an image of chemistry as a new style of life, where consumption is the indicator of technological progress and civilization. And when public questions grew more critical, they frequently responded with exaggerated promises of technological, if not magical, progress, even if nobody would listen. Most often their responses only confirmed and even reinforced public prejudices against chemistry.

As this volume makes unmistakably clear, the public image is a very complex social and cultural phenomenon at the interface between various publics, scientists, and mediating institutions. Working on public images thus requires sensitivity and detailed cultural knowledge, which chemists, eager to improve their image, might not always be aware of.

This volume makes a start in developing the cultural knowledge and sensitivity required to understand the meanings of public images of chemistry. It does so by drawing on scholarship rather than on complaints and the wisdom of public relation. Its twelve chapters are written by experts from philosophy, history of science, literature studies, sociology, and chemistry from eight countries. They invite chemists to reflect on their public image and the role they have played therein as well as humanists and social scientists to work on a crucial and much neglected issue of the science-society relationship.

Many of the chapters are based on contributions to two conferences: *The Public Images of Chemistry in the 20th Century* by the Commission for the History of Modern Chemistry (CHMC) in Paris, France, 17-18

September 2004; and a session on 'Contexts of Popularization' at the *5th International Conference on the History of Chemistry* in Lisbon, Portugal, 6-9 September 2005. Additional papers have been invited to complement the scope. Most of the chapters have been published before in 2006 and 2007 in serious of special issues of the journal *HYLE: International Journal for Philosophy of Chemistry* (www.hyle.org). Putting them all together now, we can firmly say that this is the first comprehensive volume on the public image of chemistry.

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