

## Special Issue

# ETHICS OF CHEMISTRY, Part 1

### *Editorial*

Philosophy of science arose from debates among scientists about the right method of pursuing true knowledge at times when modern science was only in its infancy. The epistemological heritage is still reflected in the corresponding terms in French, *épistémologie*, and in German, *Wissenschaftstheorie*. Another root derives from the meaning of philosophy, as in ‘natural philosophy’, which was used to denote the physical sciences still in the nineteenth century before it was split off and received its particular metaphysical meaning. Yet, besides epistemology and metaphysics, philosophy has many other branches from which reflections on science are useful. One such branch is ethics, such as chemistry is a branch of the sciences. Thus, from a systematical point of view, ethics of chemistry is a proper part of philosophy of science, whether or not any of the nineteenth-century classics said anything meaningful about that. It is that systematical background against which ‘philosophy of chemistry’ receives its full meaning. Since HYLE is devoted to philosophy of chemistry, we open a discussion on ethics of chemistry with this special issue. (For a comprehensive list of topics, see our Call for Papers at: [http://www.uni-karlsruhe.de/~ed01/Hyle/Hyle6/cfp\\_ethics.htm](http://www.uni-karlsruhe.de/~ed01/Hyle/Hyle6/cfp_ethics.htm))

The present issue provides a first series of five papers to be followed by a second series in the next issue. They comprise a large variety of topics, ranging from ethical theory to applied ethics and professional ethics. Not surprisingly, the pursuit of chemical knowledge and its relations to moral values, laboratory practice, technical application, the market, and professional duties come into focus. I am particularly happy to present a collection of external and internal perspectives on chemistry from both the U.S.A. and Europe.

GIUSEPPE DEL RE has taken the introductory part with his “Ethics and Science”. Starting with a brief survey of philosophical ethics, he investigates moral values that should guide the pursuit of scientific knowledge in chemistry. Even if issues arising from technical application and scientific fraud are put aside, the pursuit of pure knowledge can have an impact on nature and society and thus cannot be considered morally neutral. With reference to Plato, he argues that the three values truth, justice, and beauty (harmony) should guide the choiceworthiness of scientific research projects. Since the increase of knowledge is a moral duty that is not without risks, scientists take particular responsibility.

JOACHIM SCHUMMER provides a systematic account of “Ethics of Chemical Synthesis”, being that branch of science that changes the material world by producing new substances. He argues that chemical synthesis is by no means morally neutral, nor simply justified by freedom of research. Instead, chemists are responsible for everything caused by their creations. While this makes synthesis as an end in itself a questionable activity, synthesis for destructive purposes, as in chemical weapon research, is categorically wrong. Furthermore, synthetic efforts for the benefit of humanity must consider the full scope of possible negative effects and meet a standard of justice in order to be judged morally right.

Synthetic chemistry is scrutinized also in PIERRE LASZLO’s “Handling Proliferation”. He argues that the prevailing pursuit of mere know-how, instead of scientific knowledge, leads to moral degeneration, since cognitive and moral values are connected. Thus, if chemists perform uninspired variations of well-known synthetic procedures in order to increase technical know-how, they commit a kind of chemical plagiarism. The result is the enormous proliferation of substances, which, from the knowledge point of view, is a kind of pollution. Opposed to that, he makes a plea for scientific knowledge and creativity as primary values in chemistry, besides common standards of morality.

In his “Gifts and Commodities in Chemistry”, JEFFREY KOVAC analyses the tensions arising from academic chemistry being placed at the interface between the free sharing of knowledge (gifts) and the commercialization of knowledge (commodities). He argues that recent trends towards commercialization affect both pure fundamental and use-inspired basic research. Problems not only originate from the patenting of knowledge; striving for commercial success can also undermine scientific objectivity, peer review, and educational obligations, leading to conflicts of interest and of commitment. In addition, it goes at the expense of socially useful research projects and, thus, calls for moral research ideals.

BRIAN P. COPPOLA expands on the conflict between being both a chemistry professor and an entrepreneur. His “The Technology Transfer Dilemma. Preserving morally responsible education in a utilitarian entrepreneurial academic culture” first provides a historical account of recent developments in the U.S.A. Since faculty members have been allowed and encouraged to found their own companies for the transfer of know-how to the market, conflicts between professional obligations and commercial interests have tremendously increased, which particularly affects the duties of higher education. He argues for the establishment of safeguards with strict criteria in order to ensure morally responsible education.

*Joachim Schummer, Editor*