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Book Review

## Review of “Ethics of Chemistry: From Poison Gas to Climate Engineering” by Joachim Schummer & Tom Børsen, eds. World Scientific Publishing, Singapore, 2021

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### BRINGING THE ETHICS OF CHEMISTRY TO THE CLASSROOM AND THE EXISTENCE OF A DOMAIN OF KNOWLEDGE

Whoever has attempted to bring ethical discussions on chemistry to a student audience of chemistry and related fields knows of the problem: in contrast to the relatively robust bioethical literature, the literature of chemical ethics is poor, disconnected, and scattered all around the place even in rare cases that it exists. This is an interesting fact, especially if one considers the extended moral (and moralist) discussions over chemistry and its products, and that a great part of the bioethical challenges of the last forty years or so have been generated not by biology (or medicine) per se, but from their marriage to chemistry and its practices. The lack of ethics of chemistry literature dictates to the lecturer unprecedented levels of creativity and demands extra workload to be effective –and this, in times where ethics courses, in general, have become a necessity. It is this gap that the editors of this book (Schummer and Børsen, *Ethics of Chemistry: From Poison Gas to Climate Engineering*, World Scientific, 2021) have detected, and they strove to create a collection of case studies to cover it. In the introduction of the volume, the editors state teaching as the first aim of its existence –and add the establishment of the ethics of chemistry as an autonomous discipline in its own right.

While the first aim of the book is quite effectively achieved, the second remains wanting at the end –not by fault of the editors or the contributors, but due to the current external conditions of the selected domain of knowledge. The problem introduced in the introduction as the quest for the ethics of chemistry remains unresolved in the whole volume because it is rather fundamental. Due to the chronic underdevelopment of the ethics of chemistry, substantial living space has been taken over by other “ethics” and their discourses. Even in cases where the basic underdetermination of new chemical substances is what is causing the moral issue, the reader cannot avoid

thinking of these cases in terms of bioethics, ethics of technology, business and corporate ethics, or simply issues of public policy and law. Establishing the ethics of chemistry as a domain in its own right demands nowadays more than just offering cases where chemistry is the moral protagonist; calls also for a demonstration that chemistry is the primal and decisive protagonist, both on the level of problem and remedy –that the cases can and should be treated on this level.

In the intro of the volume, Schummer and Børsen do offer a brief introduction to ethics and ethics of chemistry (stressing the contrast with the ethics *in* chemistry), present their chosen classification of the subjects covered, and suggest how their volume should be used in the classroom. Their introduction to philosophical ethics is quite appropriate for the intended audience –undergraduate students of chemistry and related fields and, maybe, beginner teachers –and is well written and informative. Similarly, the categories in which the included studies are separated (Misuse and Misconduct, Unforeseen Local Consequences, Global and Long-Term Influences and Challenges, Challenging Human Culture, and Codes and Regulations) seem well thought and wisely chosen. What is however missing, is the crucial sub-chapter that would help the teacher justify the “ethics of chemistry” category of knowledge to the students –as opposed to bioethics, ethics of technology, business ethics, or just politics. The reply to the question “why ethics of chemistry, and not something else” could have been maybe articulated historically and philosophically. A short section of the introduction could explain to the reader that the wish-to-transform characteristic of our civilization, the wish-to-enhance and the means to do these, could be viewed as inheritances of alchemy and early chemistry, establishing thus the primacy of chemistry and its ethics vis-à-vis biology and industry (indeed almost as one of the editors does in later chapters). It’s not articulated in the introduction, however, and it is left somewhat hanging also in most of the 18 (otherwise superb) contributions. The editors opt instead for a short cultural history of chemistry (useful as an alternative organizing sub-chapter and principle for the essays), which does demonstrate why chemistry has a relatively bad name among the public –but not why it should have its own autonomous ethics discipline.

The ghost of this problem of living space for ethics of chemistry is haunting the greatest part of the book, more apparent in some cases and less in others. When presented with the emblematic case of thalidomide, for example, students tend to deal with it in terms of clinical trials and regulations, even though the issue had indeed been created by chemical underdetermination. The treat-

ment of the subject by Ruthenberg in Chapter 6 is historically accurate and ethically solid, but, in the end, the reader is left with the impression that the average student is right to perceive the subject as one of medicinal ethics and public policy –and not primarily as a chemistry story. When presented with the Agent Orange story in the classroom, students tend to deal with it as a case involving primarily company and government. Jacob and Walters offer an excellent piece on Agent Orange in Chapter 7, discussing the responsibility of the chemist at the point of invention, and deploying Schummer’s older argument that, since the first synthesis is the causal step for the existence of a substance, the chemist is somehow responsible for it. And yet, it is clear (and visible to most students) that this attribution of responsibility – even without moral judgment – would be practically ineffective and even have adverse effects in the production of new chemical substances. Since a synthetic chemist wouldn’t know the adverse effects of a substance at the point of invention, and since these effects can be wholly investigated by a multitude of researchers of different fields (inside the company, or generally after publication, which, yes, means proliferation, but transparency too), the subject becomes once again an issue of company and government (the latter argument is appropriated from a student assignment of the year 2016, to make a point). Similarly, while a chemist might as well participate in the steering of a company (indeed historically, chemists were more often also businesspeople than any other scientific group), the decisions of a company are more often treated by business ethics and law than anything else. This is even admitted on the very title of Chapter 5, by Eckerman and Børsen on the lessons from Bhopal. Are such cases, cases in ethics of chemistry? If yes, it has to be demonstrated how, and why.

Thankfully, the case for an ethics of chemistry becomes clearer and more persuasive in other chapters of the book. The piece of Schummer on “chemists playing god” (Chapter 16) and the ambitions to create artificial life is significantly closer to mark in the quest for ethics of chemistry since it establishes the historical background linking current bio-scientific practices (and hopes) to chemical and alchemical views of centuries before, as well as the link of the current reactions to chemical products to religious views of the past. Such argumentation would have been of use in the introduction too –establishing chemistry as ethically and historically more fundamental than either biology or industry. Schummer’s piece again on the ethics of chemical weapons research (Chapter 3) does offer a case where the aforementioned responsibility at the point of the invention makes absolute sense: it is indeed involv-

ing a chemical decision and leads not only to the attribution of responsibility but also to heavy moral judgment. Contakes and Jashinsky follow a similar path in their contribution concerning the case of napalm and their criticism of the “just” war thinking (Chapter 4). That the two pieces are related to chemical warfare has of course something to do with their clarity of argument and effectiveness: weapons research is one of the few domains where the chemist knows beforehand (or, at least has good reasons to suspect, unless of course, he is too naïve) the aims, purposes, and potential uses of the substances that he or she is synthesizing –having thus clear responsibility for their existence and effects. However, the careful reader might become a bit uneasy reading exactly these cases –at least, if the subject of establishing an ethics of chemistry is dear to him or her. Do these stories mean that autonomous ethics of chemistry is possible only in a few special cases where the chemical underdetermination is canceled by the explicit a priori stating of the aims of the research?

On the level of creating a useful collection of case studies and essays for the classroom, the volume is absolutely and straightforwardly successful. The introduction offers all the basic knowledge that would be necessary to a student for an early engagement with the subject of ethics: basic philosophical terms are clarified, applied ethics is introduced, and the material of the book is logically and usefully organized. While the chapters form units, they can be read fully independently from one another –a characteristic that would make this volume extremely useful to every teacher. Furthermore, the cases are arranged in more than one way (a fact well thought to satisfy different categories of teachers or different types of courses): they can be viewed as cases according to topics, cases according to the cultural history of chemistry, and cases according to the fields of chemistry. It is imaginable that thus the volume might be of use also for students far removed from the study of chemistry –even for students of the humanities that might want to learn more about the moral challenges presented by the practice of one of the most transformative crafts of our (post-)modern world.

To this latter purpose, the part of the volume concerning the cases where chemistry is challenging human culture might be crucial. Admittedly, there could have been more chapters included here –both for interested chemists and non-chemists. After all, it is chemistry that it is about, and it is hardly impossible to think of another discipline that has been more challenging, improving and disrupting, to the human routines the last two centuries (to the point that, in most European languages, the word “chemical” is commonly deployed as the oppo-

site of the word “natural”). As it is, the section contains three contributions: the “playing god” of Schummer (Chapter 16, mentioned already), Vishnubhakat’s “normative molecule” concerning patents and DNA (Chapter 17), and Birkholm’s Ethical Judgement on chemical psychotropics and nootropics (Chapter 15). Vishnubhakat does an elaborate job in presenting a case study of the Myriad Genetics lawsuit (a case that had caused noise concerning who can patent what and to what extent in the biotech and medical genetics world and is often discussed in bioethics courses and, presumably, in intellectual property courses). He demonstrates clearly how and why DNA is a special case, and why the application of patent legislation and norms of property might cause significant complications (the extended experience of the author in chemistry, law, and patents makes for an excellent read). At the end of the piece, however, the reader is left with the question of whether the special position of the DNA in the chemical ontology, makes it indeed a too special case.

Birkholm on the other hand presents an interesting case on chemical psychotropics applying his three-step model to raise the question of responsibility for their effect on population and culture. The broad, captivating, and well-informing piece is examining a serious issue with potentially disturbing social repercussions: psychotropics’ use has expanded through the years, leaving the domain of traditional treatments and colonizing everyday life, in dangerous and culture-altering ways. Indeed, it could be even claimed that psychotropics and nootropics cannot even be classified as pharmaceutical substances anymore. They are instead means of enhancement, intervention, and standardization (which is almost to be expected in a culture so focused on the “realization of one’s potential” and “self-invention”). The return to Aristotle’s *Epistēmē* and *Phronēsis*, with *Phronēsis* being the most valuable of the intellectual virtues, had been an appropriate return to the Greek roots of ethics, and most welcome, and the proposed three-step model seemed useful. Still, however, the expansion of the pharmaceutical companies’ responsibility for the problem examined, to the individual employees of these companies left some argumentation to be desired (especially since it was built up by an analogy to the individual accomplices of the Third Reich).

The sections of the volume that would be of immediately visible value to students of chemistry were of course those involving misuse and misconduct (first thematic section, chapters 2-4) and codes and regulations (last thematic section, chapters 18-19). The first section contains the two pieces on chemical weaponry (discussed earlier) and a piece of Stemwedel on scientific misconduct. She

chooses to present a fictional case (“the case of the Finitely Reactions”, which has however tantalizing similarities to known real cases) to be able to control the setting, the conditions, and the known variables of her case. Her strategic choice proves correct (indeed, the narrative of real cases of misconduct can never be complete: the perpetrators have no motive to share their information with ethicists), and offers the reader an ethical chapter that reads as good prose. That at the end of each part of the drama, the reader is confronted with the appropriate ethical questions has an excellent teaching effect. The ethical analysis of the drama is complete and well written, ideal for students of science (and the fact that the protagonist of the story is called Anna Bijou can be taken to be a bonus to the reader). For teaching purposes, it would be helpful if this particular section of the volume had a bit more weight, and contained a couple of scientific misconduct cases more, similar to the one of Stemwedel. Similarly, the section of codes and regulations would have benefited from some case studies of relevant controversies and violations and their treatment.

Concluding this review, it should be stressed that this book constitutes a step forward on both fronts that its editors stated as aims. On the front of creating teaching material for classes on ethics of chemistry, it comes to fill an unquestionable gap, collecting high-quality pieces that would function pedagogically with a broad array of students. It is imaginable that chapters of this book will find their way into classes of ethics of chemistry, corporate ethics, history of science, cultural studies of science, science and society courses, climate science, law, and, of course, philosophy of science; and that is a major strength of this volume. On the other hand, this very strength on one front brings with it a weakness on the other. The very fact that the volume can be useful so broadly, and far away from chemistry and its students, demonstrates a problem of breathing space for the domain of ethics of chemistry. Historically, there is always a time lag between the naming of a new disciplinary domain –which constitutes a claim of existence –and the actual recognized existence of it, in academic circles and beyond. In the between, the discipline has to grow, achieve its means of communication and vocabulary of expression, and receive an organizational structure –and the ethics of chemistry is not there yet. It is of vital importance however that ethics of chemistry does indeed get there (even as a latecomer), and this volume is a step in the right direction. Meanwhile, and until the ethics of chemistry gets there, I know that I’ll be using this *Ethics of Chemistry* in my courses.