Book Review

Jeffrey Kovac: *The Ethical Chemist: Professionalism and Ethics in Science*, second edition, New York, NY: Oxford University Press, 2018, 232 pp. [ISBN: 9780190668648]

by Janet D. Stemwedel

Those of us from philosophy departments who teach science students sometimes forget that students in the sciences do not generally share the humanities' culture of poring over texts. For many science students, the reason to purchase the textbook is because that's where to find the problems one must work to master the material. The chapters of expository writing around those problems are seldom read by students unless they yield clues about how to find the solutions. From the perspective of a chemistry student, an ideal textbook might be mostly problems to work and guidance for working them, with just enough narrative to motivate the importance of learning how to engage with the problem space and with pointers for where best to learn more should one want to do so.

Jeffrey Kovac's second edition of *The Ethical Chemist: Professionalism and Ethics in Science* is a textbook that meets these desiderata without skimping on any of the essential components a professional philosopher or ethics specialist might want. Kovac offers a concise overview of the project of being an ethical chemist, grounded in the history of chemistry as a profession and in philosophical considerations about both ethics and science. The book's five main chapters sketch the basic terrain of ethical frameworks (in Chapter 2, 'Ethics, Morals, and Ethical Theory'), make the case for understanding the chemist's ethical responsibilities in the context of the proper functioning of chemistry as a professional community (in Chapter 3, 'Professionalism and Ethics in Chemistry'), identify the central virtue Kovac sees as underlying ethical scientific practice (in Chapter 4, 'Reverence and Ethics in Science'), describe the particularity of chemistry as a scientific field (in Chapter 5, 'Unique Ethical Issues in Chemistry'), and offer an accessible approach to thinking through the ethical dimensions of the various situations a chemist might encounter (in Chapter 6, 'Ethical Problem Solving'). It should be noted that Kovac covers all this ground, very ably, in a mere 63 pages, before

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presenting a set of 78 well drawn cases, many accompanied by useful commentaries, and eight pages of well-curated references.

Kovac's discussion of ethical theories is clear and accurate, a concise presentation that includes tantalizing pointers to bigger philosophical questions and to literature where these questions are considered in more depth. The reader is not forced down any of these rabbit holes, but the book makes them look inviting and provides excellent references to aid the reader who chooses to explore them. Similarly, the sketch of historical moments in the emergence of science (and of chemistry in particular) as a profession, and of key insights from the philosophy of science into the goals and methods of science, provide just the right level of detail to ground the importance of ethics for chemists. Kovac's handling of this material displays a strong familiarity with the philosophical terrain and a solid grasp of which philosophical currents are most relevant to the project the book undertakes. This is no small feat for a chemist, though Kovac's almost lyrical prose might fool the reader into thinking it is effortless.

The discussion of ethical frameworks is not exhaustive (nor could it be, in a spare chapter of 10 pages), but it provides a set of four that are useful, individually and in combination, across a wide variety of decision-making domains. Kovac himself is clearly a fan of virtue ethics, and he devotes a chapter to describing the scientific virtue of reverence, a virtue displayed in behaviors that "involve core values such as the importance of truth telling and respect for human life that are essential to the existence of human civilization" (p. 39) and which contrasts with the vice of hubris. He does not, however, downplay the value of the other frameworks he describes; each plays a role in the third step of his four-step approach to ethical problem solving (*define the problem, collect data, analyze the data, find a resolution*), an approach which echoes the steps students may recognize from process oriented guided inquiry learning (POGIL). Like any good chemist, Kovac recognizes the value of having multiple tools at the ready. In the manner of a master teacher, he lays out strategies for problem solving in ways his students are likely to find familiar – even if they have never thought to apply these familiar strategies to the domain of ethical decision-making.

Complementing this philosophically grounded ethical content, Kovac offers a deftly drawn portrait of the duties that flow from professionalization, whether they are duties focused on building reliable knowledge (and synthesizing new materials), or on interacting productively with other members of one's professional community, or on engaging responsibly with the larger society in which chemists are embedded. The reader is given reasons to care about being ethical that feel like they originate from within scientific practice, rather than being imposed from without, a strategy that seems likely to get even skeptical readers on board. Moreover, Kovac's descriptions help

the reader see the connection between individual agency and community structure – even as the community's norms and practices are recognized as subject to change over time – and how both matter to a scientist's ability to behave ethically. This discussion never feels bogged down in the details, but neither does it shy away from recognizing significant complexities – for example, the significant differences in scientific focus, material conditions, and freedom in decision-making across academic and industrial settings, and even across different subfields of chemistry.

Even without the excellent framing and motivation offered in its first six chapters, *The Ethical Chemist* would be hugely valuable as a case book illuminating the range of situations in which chemical practitioners have to navigate ethical choices. The cases address questions that arise in academic settings and industrial settings, within relationships that include varying levels of mentoring, collaboration, and competition, touching on issues of how data are collected and analyzed, how results (and uncertainties) are communicated, how credit and accountability are apportioned, and how risks are weighed. For a number of the cases, Kovac presents multiple variants of a situation, sometimes changing one or two factual details, sometimes presenting the case from the perspective of different interested parties. Not only does this help convey the ways that our understanding of the facts might shape our ethical decisions, but it is a clever hook to engage an audience that has some experience varying parameters in experiments and using the results to draw larger conclusions. Many of the cases are followed by commentaries that provide guidance for useful ways to think through the ethical dimensions of the scenarios. These often include descriptions of the real-life challenges or constraints that flow from scientific competition and from power gradients across relationships in workplaces and training environments. None of these commentaries present 'the answers' to the questions posed in the cases. Rather, they convey the complexities that may be relevant to finding defensible responses.

Kovac is clear in conveying that ethical decision-making is not always easy. He reminds the reader that "difficult ethical problems, like difficult design problems, often call for coping rather than solving" (p. 62) and that summoning the moral courage to enact an ethical decision can be challenging. However, he makes a persuasive case that facing these challenges matters, and that to fail to do so is to risk weakening the entire scientific enterprise.

Among the most admirable qualities of this book is how attentive and inviting it is to multiple audiences – chemistry students at different educational levels, chemists working in different sectors of the economy, those learning how to be chemists and those involved in training and mentoring other chemists. Each of these audiences will find Kovac's discussion anchored to things they know while also connected to material that is likely to

be new to them. Each is invited to reflect on the bigger picture questions of what kind of human activity science is, what makes it succeed, and what kinds of practices make that success more or less difficult to attain. The cases and commentaries present enough different kinds of scenario that each reader is bound to find cases with protagonists whose situations are similar to their own. At the same time, the cases and commentaries are so compelling that each reader is likely to be drawn into cases whose protagonists occupy quite different positions or face quite different situations. This sets up the kind of imaginative perspective-taking that is likely to strengthen empathy for others in one's scientific community, and indeed to help readers feel the strength of Kovac's claim that our individual decisions should be made in a way that recognizes how our fates are entangled.

In short, *The Ethical Chemist: Professionalism and Ethics in Science* offers a valuable resource for any chemist or chemistry student with an interest in recognizing and navigating the ethical terrain of their field. Moreover, it invites its readers to be reflective about the everyday decisions in their work, both from the point of view of chemical practice and in the context of the wellbeing of the human community.

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