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## Book Review

***Pandora's Lab: Seven Stories of Science Gone Wrong* by Paul A. Offit, MD, National Geographic, Washington, DC, 2017, [287 pp.]**

This eclectic book is written for a popular audience and does not focus on anesthesia. However, there are insights into the histories of opioids, placebo-like phenomena, psychosurgery, and informed medical consent. Author Paul A. Offit is a clinician-scientist who often weighs in helpfully on thorny questions in public health, medical journalism, and medical regulation (Figure 1).

Offit has an interesting premise that was inspired by an exhibition at the Franklin Institute in Philadelphia: 101 Inventions that Changed the World. Inclusion of gunpowder and the atom bomb prompted Offit to mull over inventions that negatively changed the world. His seven finalists were inventions with severe negative consequences that are persistent and had elements of surprise. The book title thus invokes the Greek myth of Pandora, who opened a gift container of unanticipated woes.

Chapter one considers opium. According to Offit, William Osler dubbed the stuff to be “God’s own medicine” in the early 1900s. Offit summarizes the history of opium in a succinct but informative way. Points of interest are diverse, including the mention of laudanum in the Harper Lee novel *To Kill a Mockingbird*, a Pulitzer Prize winner of 1961.

In 1898, Heinrich Dreser and Felix Hoffmann “heroically” achieved Pandora status. They came up with heroin as a medication that was not habit forming. Indeed, it could treat morphine addiction. Offit unfolds that saga and brings the reader to oxycodone, which became notorious after release in 1996 as extended-release OxyContin. The account has good detail, and I learned, for instance, that oxycodone is derived from the thebaine in opium rather than from the morphine therein. Offit points to the OxyContin label for the relevance of Pandora. It promised delayed absorption “to reduce the abuse liability.”

Offit identifies multiple Pandoras in his opiate chapter. In another example, he goes over plausible arguments in the 1980s in which opioids were proposed to be underutilized in the “war on pain,” and he spells out problems that ensued because of the denunciation of “opiophobia” at that time. Anesthesiologist Jane Ballantyne is cited as an early detector of the Pandora aspect of the well-intentioned call for increased opiate therapy.<sup>1</sup>

Each of the Offit chapters concludes with an Aesopian moral. Unlike Aesop, Offit relies on rich data. His take-home lesson from the history of opioids is that innovations were often introduced without adequate testing.

The other chapters deal with trans-fat as a toxic component of supposedly heart-healthy margarine, the Haber process for obtaining nutrient nitrogen from air, eugenics, lobotomy, the banning of the insecticide DDT, and vitamin excesses.

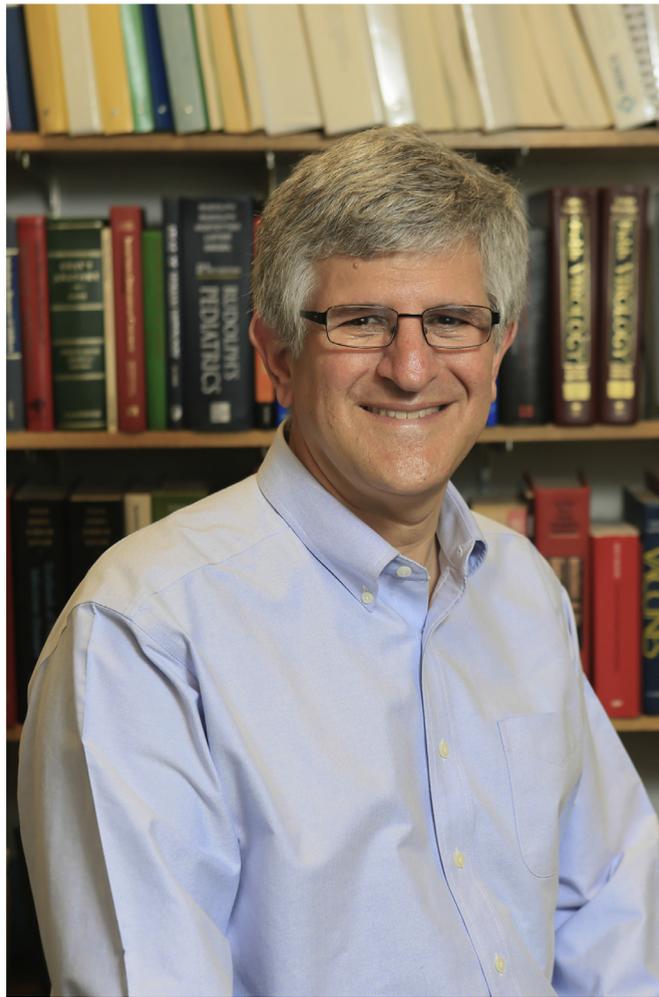
The present world population would not be possible without the Haber process. In the early 1900s, Fritz Haber converted atmospheric nitrogen to ammonia, and the process was industrialized by Carl Bosch. The ammonia was then suitable for production of agricultural fertilizer, thus expanding the potential world population. The process also renders nitrogen suitable for the synthesis of gunpowder and high explosives. The Haber story is of relevance to anesthesia history because of Haber’s role in the creation of the massive German chemistry industry that generated many artificial drugs. Those drugs included anticholinesterase agents, and Haber was an advocate of chemical warfare. His Nobel Prize of 1918 was controversial indeed.

The sad but Nobel-garnering early history of psychosurgery is of anesthesia interest. Furthermore, it is related to the development of anesthesia-facilitated electroconvulsive therapy of major depression.

One of the reasons I enjoy the Offit book is that the author seems to share my impression that the Nobel Prizes offer a great window into medical history. His chapter on megavitamin promotion is entitled “Nobel Prize Disease.” The chapter focuses on Linus Pauling, who garnered the Chemistry Prize in 1954 and the Peace prize in 1962. The best works of Pauling were meticulous, but Offit argues that the brilliant scientist succumbed to argument by authority. Perhaps so, and Offit details unintended harms of the Pauling-fueled megavitamin industry. Offit also mentions that, on the basis of little data, Pauling came up with an unrealistic model for the structure of the DNA molecule. I was reminded that Pauling wrote much on a highly imaginative mechanism of inhaled general anesthesia.<sup>2–5</sup> Largely on the basis of xenon anesthesia, he proposed that general anesthetics change the microcrystalline state of water.

The last sentence of the book is simple enough. Offit writes, “In the end, although we hold on to the hope of a better life through science, we need to approach all scientific advances cautiously and with eyes wide open—and make sure that we learn from our mistakes and aren’t simply paralyzed by them.” I suppose we all know as much in theory. In practice, this goal has been difficult, perhaps, I wonder, because of placebo-like phenomena. The beauty of this book is that it brings together diverse examples as lessons. It does so in a coherent and captivating manner.

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**Fig. 1.** Paul A. Offit, MD, is Maurice R. Hilleman Professor of Vaccinology and Professor of Pediatrics at the Perelman School of Medicine at the University of Pennsylvania. He is Chief of the Division of Infectious Diseases and the Director of the Vaccine Education Center at The Children's Hospital of Philadelphia. He co-invented the lifesaving rotavirus vaccine known as RotaTeq. In addition to his technical publications, he has written numerous popular books and articles about vaccination and about problems in alternative medicine. His writings evince historical scholarship. He co-authored the screenplay for the 2016 film entitled *Hilleman: A Perilous Quest to Save the World's Children*. That documentary is about the vaccine pioneer for whom Offit's endowed professorship is named.

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