

Clarkson University Common Conversations Resource Guide

Pandora's Lab: Seven Stories of Science Gone Wrong – Paul A. Offit M.D.

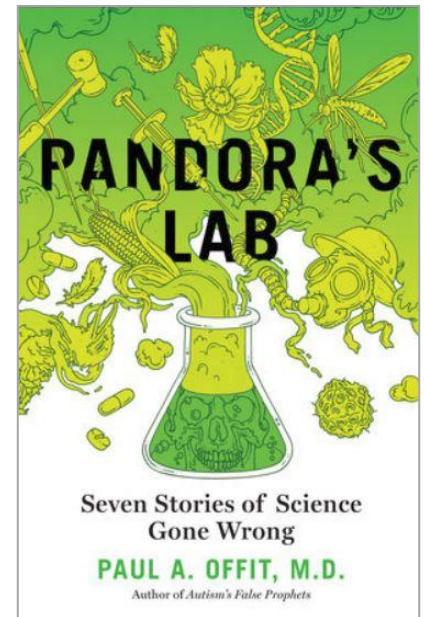
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Summary

What happens when ideas presented as science lead us in the wrong direction?

History is filled with brilliant ideas that gave rise to disaster, and this book explores the most fascinating—and significant—missteps: from opium's heyday as the pain reliever of choice to recognition of opioids as a major cause of death in the U.S.; from the rise of trans fats as the golden ingredient for tastier, cheaper food to the heart disease epidemic that followed; and from the cries to ban DDT for the sake of the environment to an epidemic-level rise in world malaria.

These are today's sins of science—as deplorable as mistaken past ideas about advocating racial purity or using lobotomies as a cure for mental illness. These unwitting errors add up to seven lessons both cautionary and profound, narrated by renowned author and speaker Paul A. Offit. Offit uses these lessons to investigate how we can separate good science from bad, using some of today's most controversial creations—e-cigarettes, GMOs, drug treatments for ADHD—as case studies. For every "Aha!" moment that should have been an "Oh no," this book is an engrossing account of how science has been misused disastrously—and how we can learn to use its power for good.



The Author: Paul A. Offit M.D.



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About The Author

- [Paul A. Offit, MD](#)
Biography and resume of the author; book reviews; links to interviews.
- [Science 'Gone Wrong' Can Teach Us](#)
National Public Radio (NPR) review and commentary of Pandora's Lab.
- [Pandora's Lab Podcast](#)
A 'You Are Not So Smart' podcast, 2017. Dr. Paul Offit discusses how we can get better at catching scientific mistakes before they happen and mitigating the harm once Pandora's Lab has been opened.
- [Straight Talk MD: Paul Office discusses Pandora's Lab with host Frank Sweeny \(audio\)](#)
- [Science Gone Wrong \(Offit interview on KCUR radio\) \(audio\)](#)
Paul Offit on KCUR radio discussing science gone wrong. (first 25 minutes of clip).

Learning from the Past

Paul Offit offers some lessons learned from "science's dark past".
He applies these in chapter 8 to a variety of modern-day inventions.

1. It's all about the data.
2. Everything has a price; the only question is how big.
3. Beware the zeitgeist.
4. Beware the quick fix.
5. The dose makes the poison.
6. Be cautious about being cautious.
7. Pay attention to the little man behind the curtain.

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Chapter 1: God's Own Medicine

- [A Multifaceted Analysis of Oxycodone Addiction \(article\)](#)
Published in the *International Journal of Mental Health and Addiction*, 2017.
- [The Changing Face of Heroin Use in the United States: A Retrospective Analysis of the Past 50 Years \(article\)](#) An investigative article published in the *Journal of the American Medical Association (JAMA) Psychiatry*, 2014. It examines the veracity of anecdotal reports about the use of heroin following opiate addiction.
- [Unintended Consequences: Why Painkiller Addicts Turn to Heroin \(video article\)](#) A CNN brief report.
- [How One Sentence Helped Set Off the Opioid Crisis \(podcast\)](#) A Marketplace "Uncertain Hour" podcast.

Chapter 2: The Great Margarine Mistake

- [The War on Margarine \(article\)](#) From the Foundation for Economic Education, 2002.
- [The Butter Wars: When Margarine Was Pink \(article\)](#)
A brief history of the introduction to Margarine from *National Geographic's* "The Plate". Includes a video of Eleanor Roosevelt's Margarine commercial!
- [A Guide to Trans Fats \(article\)](#) A brief NPR Health article.
- [The Scientific Case for Banning Trans Fats \(article\)](#)
A *Scientific American* article, 2014. "The inventors of the margarine-making process won a Nobel Prize. Now we know that its byproduct is deadly."
- [FDA's Proposed Ban of Trans Fat in Processed Food \(podcast\)](#)
A podcast from *The Federalist Society*. The Food and Drug Administration (FDA) has taken the first step to effectively ban trans fat from processed food. What is the legal authority for this action and are there legal arguments against the FDA moving forward in the proposed manner? What are the policy arguments for and against this action to eliminate "artificial" trans fat from the food supply? Could other aggressive actions against "unhealthy" ingredients such as caffeine, sodium and sugar be on the horizon?
- [The Trans-Fat Ban: Food Regulation and Long-Term Health \(article\)](#)
A *New England Journal of Medicine* brief perspective article, 2014. Includes audio interview with Dr. Kelly Brownell.

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- [Dietary Fat Intake and the Risk of Coronary Heart Disease in Women : 20 Years of Follow-up \(article\)](#)
An *American Journal of Epidemiology* research article, 2005.
- [Trans Fat Is \(Almost\) Out of Your Food. Here's What's Going on \(video article\)](#)
A short Bloomberg report, 2017.

Chapter 3: Blood From Air

- [How Do You Solve a Problem Like Fritz Haber? \(podcast\)](#)
A *RadioLab* podcast. How do you square the idea of a bad person who does great good? Or a good person who does terrible harm? Sam Kean introduces us to the confusing life story of Fritz Haber.
- [22nd April 1915: Chlorine Gas Attacks Marks start of 2nd Battle of Ypres \(podcast\)](#)
A *HistoryPod* podcast. A brief review of the history of this battle and first effective use of gas in WWI.
- [Fritz Haber's Experiments in Life and Death \(article\)](#) From the Smithsonian.com, 2012
- [Fritz Haber: Jewish Chemist Whose Work Led To Zyklon B \(article\)](#) A BBC Radio 4 report, 2011.
- [Chemical Warfare Agents \(article\)](#) Published in the *Journal of Pharmacy and Bioallied Sciences*, 2010.

Chapter 4: America's Master Race

- [The Forgotten Lessons of the American Eugenics Movement \(article\)](#) From the *New Yorker*, 2016.
- [Harvard's Eugenics Era \(article\)](#) A feature article of *Harvard Magazine*, 2016. When academics embraced scientific racism, immigration restrictions, and the suppression of "the unfit".
- [The Supreme Court Ruling That Led to 70,000 Forced Sterilizations \(podcast\)](#)
From NPR radio show *Fresh Air*. In 1927, the U.S. Supreme Court decided, by a vote of 8 to 1, to uphold a state's right to forcibly sterilize a person considered unfit to procreate. The case, known as *Buck v. Bell*, centered on a young woman named Carrie Buck, whom the state of Virginia had deemed to be "feeble-minded." Author Adam Cohen tells *Fresh Air*'s Terry Gross that *Buck v. Bell* was considered a victory for America's eugenics movement, an early 20th century school of thought that emphasized biological determinism and actively sought to "breed out" traits that were considered undesirable.

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- [The Twins of Auschwitz \(article/videos\)](#) From *BBC News Magazine*, 2015. A history and personal stories of twins who were the focus of Mengele's experiments at Auschwitz. Includes video interviews with survivors.
- [This Simple Puzzle Test Sealed the Fate of Immigrants at Ellis Island \(audio\)](#)
A short audio report from *NPR's All Things Considered*.
- [The Stanford-Binet Test \(interactive test\)](#) The Stanford-Binet test is an examination meant to gauge intelligence through five factors of cognitive ability. These five factors include fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing and working memory. Both verbal and nonverbal responses are measured. Each of the five factors is given a weight and the combined score is often reduced to a ratio known commonly as the intelligence quotient, or IQ
- [The Nuremberg Laws \(article\)](#)
From the US Holocaust Memorial Museum. A brief history of these laws and their significance.

Chapter 5: Turning the Mind Inside Out

- [Prefrontal Lobotomy: The Surgical Relief of Mental Pain \(article\)](#)
From *The Bulletin of the New York Academy of Medicine*, 1942.
- [Frontal Leukotomy & Related Psychosurgical Procedures in the Era Before Antipsychotics \(1935-1954\): A Historical Review \(article\)](#) This article provides an overview of the history of psychosurgery as a treatment for psychiatric illnesses. The author reviewed articles describing psychosurgery between 1935 and 1954 in order to summarize surgical techniques, clinical indications for surgery, patient selection, complications, and outcome.
- [Engines of Our Ingenuity: Lobotomy \(audio\)](#) An audio article from the University of Houston.
- [Autism: How Unorthodox Treatments Can Exploit the Vulnerable \(article\)](#)
From *The Guardian* newspaper, 2015. A diagnosis of autism can make it tempting to turn to alternative treatments. But weighing up the scientific evidence is crucial - and potentially life-saving
- [Unorthodox Therapy in New Orleans Raises a Concern \(podcast\)](#) An *NPR All Things Considered* podcast, 2006. In the wake of Hurricane Katrina, hundreds of well-meaning mental health professionals descended on the Gulf region to assist a traumatized population. For the most part, these people did a tremendous amount of good. But some mental health workers are using untested therapies — and that is prompting concern. One controversial treatment is thought field therapy, which is being used to aid victims of Katrina in New Orleans.

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Chapter 6: The Mosquito Liberation Front

- [DDT: A Brief History and Status \(report\)](#) A report from the Environmental Protection Agency (EPA). Includes links to more detailed fact sheets and reports on DDT.
- [And No Birds Sing: Rachel Carson and Silent Spring \(podcast\)](#)
A BBC podcast that looks at the explosive impact of Rachel Carson's 1962 book *Silent Spring* and its role in the growth of the environmental movement.
- [Silent Spring at 50: a Comparison Perspective \(podcast\)](#)
An Environmental History Resources podcast that explores the significance of *Silent Spring* with Mark Wilson, a PhD candidate at the University of Northumbria in Newcastle, England. Mark has written a study which compares the response to *Silent Spring* in the US and Britain.
- [Pesticide Residues in Food \(report\)](#)
A World Health Organization (WHO) fact sheet about pesticides used against pests (including DDT) and their toxicological effects. Includes links to additional information resources on this topic. 2018
- [The Fog Truck! \(video\)](#)
- [JFK Press Conference August 29, 1962 \(audio\)](#)
An archival audio clip from the John F. Kennedy Presidential Library and Museum. As mentioned in the text (p. 169), President Kennedy answers questions from the press regarding the scientific investigation into the side effects of pesticides like DDT (at 26.47).
- [EPA Decides Not to Ban A Pesticide \(podcast\)](#) An *NPR All Things Considered* podcast. Reveals the EPA decision not to ban the pesticide chlorpyrifos, despite scientific evidence of risk.

Chapter 7: Nobel Prize Disease

- [Linus Pauling Nobel Prize \(fact page\)](#)
Biography and noted achievements of Pauling on the Nobel Prize page.
- [The Linus Pauling Papers \(articles\)](#)
From the National Institutes of Health and National Library of Medicine. Biographical information and links to detailed information on much of Pauling's research, including his promotion of vitamin C.
- [Linus Pauling: High Does Vitamin C is a Cure for Cancer! \(video\)](#)
Linus Pauling was a great scientist who was one of few people who won double Nobel Prize, for chemistry in 1954 and peace in 1962. But, unfortunately he was very wrong on the claims of vitamin C therapy.

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- [Vitamin C in the Prevention and Treatment of Cancer \(video\)](#)
From the Lindau Nobel Laureate Meetings. Pauling's speech on his research on vitamin C and cancer.
- [How Linus Pauling Duped American Into Believing Vitamin C Cures Colds \(article\)](#)
From vox.com. Includes links to research sources that background the history.
- [The Duesberg Phenomenon \(article\)](#) From *Science Magazine*, 1994. A report reflecting a 3 month investigation by the magazine into Peter Duesberg's claims that HIV is not the cause of AIDS.
- [10 Scientific Arguments Why HIV Cannot Cause Aids \(video\)](#)
A clip from "HIV=AIDS: Fact or Fraud?" including an interview with Duesberg. DISCLAIMER: Duesberg's claims have been proved incorrect by in depth research.
- [Luc Montagnier Nobel Prize \(fact page\)](#)
Biography and noted achievements of Montagnier on the Nobel Prize page.
- [Luc Montagnier and the Nobel Disease \(article\)](#)
From Sciences-Based Medicine blog by David Gorski, 2012.

Other Stories and Reports

These topics were not specifically addressed in Pandora's Lab but offer stories, experiences, and food-for-thought to spark discussion of *good ideas gone wrong*.

- [When Great Scientists Got It Wrong \(podcast\)](#)
An *NPR Science* podcast. An interview with Mario Livio, author of *Brilliant Blunders: From Darwin to Einstein*, who outlines some colossal errors committed by scientific greats.
- [Breaking News \(podcast\)](#)
A *RadioLab* Podcast discussing new technology that allows for voice-editing in videos much like Photoshop for photos. Talk about creating fake news!
- [Broken Windows \(podcast\)](#)
An *NPR Science* podcast. How a theory of crime and policing was born, and went terribly wrong.
- [Creature Comforts \(podcast\)](#)
An *NPR Hidden Brain* podcast about the power of touch and affection in our lives.

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- [Genetic Engineering \("Biotech"\): use of science gone wrong \(article\)](#)
Thought piece published on the Cornell University eCommons.
Even if genetic engineering does not lead to unforeseen mutations and runaway alien varieties, the disruptions to balances in nature are predictable— a genetic characteristic always results in an end product or products in the organism, substances which nature assimilates gradually over time. By natural selection, nature eliminates its mistakes. Without allowing for natural corrections, biotechnology places us above nature.
- [Radium Girls: the Dark Times of Luminous Watches \(article\)](#)
A CNN news and photo article about the great discovery and dangerous use of radium.
- [Powerful 'Gene Drive' Can Quickly Change an Entire Species \(podcast\)](#)
An *NPR Your Health* news report. A genetic engineering technique raises hopes for eliminating diseases, such as malaria. But it is also sparking fears of unintended consequences if delicately balanced ecosystems are disrupted.
- [Science in Service to the Public Good \(Ted Talk\)](#)
We give scientists and engineers great technical training, but we're not as good at teaching ethical decision-making or building character. Take, for example, the environmental crisis that recently unfolded in Flint, Michigan -- and the professionals there who did nothing to fix it. Siddhartha Roy helped prove that Flint's water was contaminated, and he tells a story of science in service to the public good, calling on the next generation of scientists and engineers to dedicate their work to protecting people and the planet.
- [The Death and Afterlife of Thalidomide \(audio\)](#)
A *New York Times* audio Retro Report about the drug thalidomide.
- [The Rise, Fall and Subsequent Triumph of Thalidomide: Lessons Learned in Drug Development \(article\)](#)
A research article published in *Therapeutic Advances in Hematology*, 2011.
- [What Doctors Don't Know About the Drugs They Prescribe \(Ted Talk\)](#)
When a new drug gets tested, the results of the trials should be published for the rest of the medical world -- except much of the time, negative or inconclusive findings go unreported, leaving doctors and researchers in the dark. In this impassioned talk, Ben Goldacre explains why these unreported instances of negative data are especially misleading and dangerous.

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- [Where Good Ideas Come From \(Ted Talk\)](#)
People often credit their ideas to individual "Eureka!" moments. But Steven Johnson shows how history tells a different story. His fascinating tour takes us from the "liquid networks" of London's coffee houses to Charles Darwin's long, slow hunch to today's high-velocity web.
- [Ethical Riddles in HIV Research \(Ted Talk\)](#)
A woman in sub-Saharan Africa is part of a cutting-edge HIV clinical trial -- but she can't afford a bus ticket to her health clinic, let alone the life-saving antiretrovirals she'll need. Boghuma Kabisen Titanji asks an important question: How can researchers looking for a cure make sure they're not taking advantage of the people most affected by the pandemic?
- [How Augmented Reality Could Change the Future of Surgery \(Ted Talk\)](#)
If you're undergoing surgery, you want the best surgical team to collaborate on your case, no matter where they are. Surgeon and entrepreneur Nadine Hachach-Haram is developing a new system that helps surgeons operate together and train one another on new techniques -- from remote locations using low-cost augmented reality tools. Watch the system in action as she joins a surgeon in Minnesota performing a knee surgery, live on her laptop from the TED stage in New Orleans. As Hachach-Haram says: "Through simple, everyday devices that we take for granted, we can really do miraculous things." (This talk contains graphic images of surgery.)
- [How Amazon, Apple, Facebook and Google Manipulate Our Emotions \(Ted Talk\)](#)
The combined market capitalization of Amazon, Apple, Facebook and Google is now equivalent to the GDP of India. How did these four companies come to infiltrate our lives so completely? In a spectacular rant, Scott Galloway shares insights and eye-opening stats about their dominance and motivation -- and what happens when a society prizes shareholder value over everything else. Followed by a Q&A with TED Curator Chris Anderson. (Note: This talk contains graphic language.)
- [20 Years After Dolly the Sheep Led the Way - Where is Cloning Now? \(article\)](#)
From *Scientific American*, 2016. Includes insights on ethical questions surrounding cloning.
- [Berkeley Blog: Good Science Gone Wrong? \(article\)](#)
- [Room for Debate: Is Artificial Intelligence Taking Over Our Lives? \(news discussion\)](#)
From *New York Times* Opinion Pages. A variety of perspectives and opinions about AI and whether or not it makes our lives better.
- [A Brewing Problem \(article\)](#) From *The Atlantic* magazine, 2015. The inventor of K-Cups and the Keurig coffee brewer regrets the idea.