

► **Protecting America's Health: The FDA, Business, and One Hundred Years of Regulation**

PHILIP J. HILTS

Alfred A. Knopf, New York, 2003,
416 pp, \$26.95 hardcover
ISBN 0-375-40466-X



There is an urban myth in Canada that when a certain fast-food giant advertises that its hamburgers contain 100% Canadian beef, they are telling the truth... sort of. What they actually mean is

that of the minuscule amount of beef in the burger, 100% is from Canada. How much this belief is based on fact and how much on cynicism is up for discussion, but what is true is that up until the last century, there was little regulation regarding how a company could formulate and advertise food products. For example, if people were willing to buy your strawberry jam, it could be made almost entirely from apple peels and synthetic dyes. In the United States, it was really only with the establishment of a government bureau, the U.S. Food and Drug Administration (FDA), that anyone was able to impede shoddy practices, but as Philip Hilts describes in *Protecting America's Health*, even this was (and continues to be) an uphill battle.

Hilts's tale starts in 1863 with the exploits of Harvey Washington Wiley, an Indiana farm boy with academic stars in his eyes. Unbeknownst to even himself, Wiley represented something of a countermovement to the industrialization of the food industry in America, where the robber barons of their day were producing food products as quickly and cheaply as possible, even if it meant not using the best available ingredients. Wiley and his supporters worked within the structure of the U.S. Department of Agriculture to fight shoddy food practices, such as the dilution of milk with water or flour with chalk, and eventually even took

on the purveyors of "magic elixirs" that were little more than alcohol. Although these pernicious panaceas did little to cure what ailed you, they sure made you forget about your problems for a little while.

With the turn of the century and through the exploits of Wiley and journalists writing for various magazines, who smelled a good story rising from the nation's abattoirs, President Theodore Roosevelt signed into law statutes that protected Americans against some of the efforts of food and drug adulterers. This Pure Food and Drug Act eventually led to the formation of the department known as the FDA. As Hilts describes it, "A cadre of chemists and inspectors were thereby commissioned to ensure that, whatever economic theory dictated, businesses would provide unadulterated, uncontaminated food and potent and safe medicines."

Throughout the book, Hilts chronicles the various battles that were waged between big business, politicians, and FDA administrators, and the frustrations of bench chemists against their often-reluctant superiors, who sometimes seemed to fear more for their own jobs than the public well-being. He recounts some of the famous blunders of modern medicine, including a lengthy description of the thalidomide controversy, and describes the reluctance of some corporations, even in a time of war, to share the wealth for the sake of public welfare and produce compounds such as penicillin more cheaply.

About a third of the way through the book, Hilts ceases to talk about the role that the FDA played in ensuring food safety and instead focuses on the history of drug development and marketing in the United States. At times, his tangents are so extensive that the reader is hard pressed to remember that he or she is reading a history of the FDA. Furthermore, Hilts comes across as a little preachy in his presentation of the perpetual David-and-Goliath battles that are waged, taking one official to task for bowing too easily to administrative pressures from the Oval Office, while castigating another for being too bull-headed.

But aside from a few problems with the

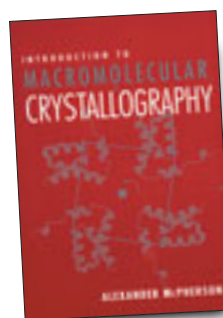
soapbox-style delivery, the book is well written and obviously well researched. Hilts presents a thorough analysis of the steps leading up to the founding of the FDA and the many controversies through which it evolved to become a world-renowned and respected organization. The book is an enjoyable read and will likely serve as an initial reference work from which many others will spring in the future.

—REVIEWED BY RANDALL C. WILLIS

Introduction to Macromolecular Crystallography

ALEXANDER MCPHERSON

John Wiley & Sons: Hoboken, NJ, 2002,
296 pp, \$69.95 softcover
ISBN 0-471-25122-4



The author of this introductory text is a well-recognized macromolecular crystallographer, who has previously written a must-read book on macromolecular crystal growth—*Crystallization of*

Biological Macromolecules, published in 1999 by Cold Spring Harbor Laboratory Press. In his newest book, McPherson turns his attention to the theory governing the single-crystal X-ray diffraction experiment central to the atomic resolution structure determination of biological macromolecules. As a hidden bonus, much of the discussion of diffraction physics is also applicable to small-molecule crystallography.

Introduction to Macromolecular Crystallography evolved out of McPherson's association with the highly regarded introductory protein crystallography course at Cold Spring Harbor Laboratory. This first edition has undoubtedly benefited from many revisions prompted by feedback from past students. The niche that this book successfully fills is

the need to provide aspiring crystallographers a solid grounding in basic diffraction theory and the fundamental concepts behind methods used to overcome the crystallographic phase problem. The author recognizes that many students interested in structural biology might lack strong physics and mathematics backgrounds. Thus, he takes care not to intimidate those uneasy about these subjects while providing what he believes to be “the minimum you need to know if you want to practice protein crystallography, and to understand why you are doing what you are doing.” McPherson introduces many of the key concepts through several formalisms, which reinforce each other while aiding the neophyte who might grasp one derivation more readily than the others. The book is heavily illustrated and makes generous use of optical transforms.

The book contains eight chapters. Chapter 1 gives a brief introduction to the material covered in later chapters. Chapter

2 describes the 3D periodicity of crystals, crystallographic symmetry, Miller indices, and the reciprocal lattice. Chapter 3 discusses the properties of waves in relation to the diffraction experiment, including the Fourier synthesis and representing waves as vectors or as complex numbers. Together, these initial chapters provide the basic tools required for understanding the diffraction experiment.

Chapter 4 is an in-depth discussion of diffraction, building the structure factor equation for diffraction resulting from two points through to the equation arising from diffraction from a protein crystal. It introduces the relationship by Fourier transform between structure factors and electron density, along with other standard crystallographic fare such as Bragg’s law, Friedel’s law, and anomalous scattering.

Chapter 5 investigates the way the crystal lattice symmetry is exhibited by its diffraction pattern and how to analyze this

pattern to determine a particular crystal’s space group and unit cell dimensions. Chapter 6 delves into the phase problem, describing on a basic level the methods for determining the phases required to calculate electron densities. Chapter 7 discusses locating heavy atoms by Patterson methods, which is often the first step required for the experimental derivation of phases. Chapter 8 provides an overview of the goal of the diffraction experiment, the interpretation of the electron density map.

Introduction to Macromolecular Crystallography is an excellent introductory text for the novice crystallographer, suitable for an upper-level undergraduate or an initial graduate course in macromolecular crystallography. It concentrates on providing the fundamental theoretical underpinnings necessary for understanding diffraction experiments without overwhelming the uninitiated. It is important to note that this book purposely shuns many practical tips and tricks of data collection, map interpretation, and refinement and thus should not be the sole book the novice crystallographer reads. It is also not intended as a reference book for the experienced crystallographer, but would be a fine choice if that crystallographer teaches the subject.

—REVIEWED BY TIMOTHY C. UMLAND
(Reprinted with permission from the *Journal of Proteome Research* 2003, 2, 222.) ■

► **moregoodreading**

A Question of Intent: A Great American Battle with a Deadly Industry

By David A. Kessler
PublicAffairs, 2001

The Legend of Pfizer

By Jeffrey L. Rondengen
Write Stuff Syndicate, 1999

Billion Dollar Molecule: The Quest for the Perfect Drug

By Barry Werth
Touchstone Books, 1995

Post-translational Modification of Proteins

By Christoph Kannicht (Ed.)
Humana Press, 2002