

# BOOKS

## Phage and the Origins of Molecular Biology

edited by John Cairns,  
Gunther S. Stent, and James D. Watson

Cold Spring Harbor Laboratory of  
Quantitative Biology .....\$12.50

Reviewed by Gerald Fling, division of  
biology.

A number of the men associated with the rise (and fall) of bacterial genetics have put together these accounts of their experiences. The book is dedicated to Max Delbrück, Caltech professor of biology, who, by all accounts, was the central figure in the unfolding drama and in whose laboratories at Caltech new ideas were hatched and new workers trained. Their work ultimately resulted in an explosion of knowledge and a new field.

The contributors write about how they got new ideas and tested them. They tell of the interplay between colleagues and of their own experimental losses and gains. Each man is revealed as a central figure in the chase, competing with himself and his colleagues and with nature and the unknown. Each suffers unexpected and ignominious pratfalls, occasionally overtaking the quarry and experiencing deep satisfaction, only to find that the quarry is off again in a new direction, presenting new roads and hazards to be overcome.

The personal glimpses of the scientists at work in Cold Spring Harbor and Pasadena are many. G. W. Beadle, whose recollections are limited to the rise of biochemical genetics, tells how, in 1930, he and Sterling Emerson talked about buying a balance, costing about \$10, but were certain that Thomas Hunt Morgan, then chairman of the biology division, would not approve such an expenditure.

In 1954 André Lwoff found that "the California Institute of Technology, poor as many American institutions often are, could not afford to buy a microforge" and was "kindly persuaded" by Beadle, then chairman of the division of biology, that he and Renato Dulbecco should build themselves one, which they did. Lwoff goes on with a charming account of his work on the induction of bacteriophage.

Dulbecco describes the role of dichondra grass in his development of the tissue culture plaque assay for cell-killing animal viruses—and refers enviously to Jean Weigle's short-cut method for incubating cultures. Weigle had a habit of stuffing a few petri dishes inside his shirt as he set off for a desert

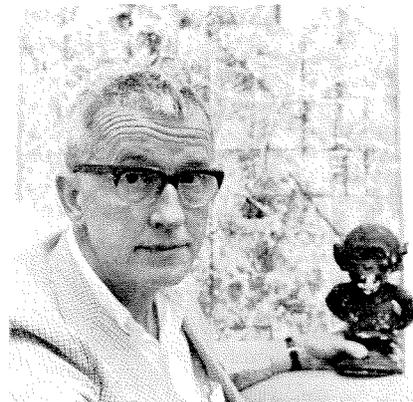
camping trip, transferring them to his sleeping bag at night, and reading the results the next morning.

R. S. Edgar discloses that the phage mutant *amber* was named for Harris Bernstein's mother—amber being the English equivalent of the German Bernstein. Niels K. Jerne tells why he was not attracted to Pasadena, the desert, or rock climbing and recalls James Watson's "characteristic way of producing a succinct, unambiguous answer to any question: 'It stinks.'" In a trip by auto across the country with Werner Reichardt, Jerne observed that the "bedbug threshold in the U.S. lay at six dollars for a double room."

For most of these men Max Delbrück was "conscience, goad and sage." As sage, Delbrück urged incorporation in experiments of what he called "the principle of limited sloppiness." As goad, he confined Seymour Benzer, Matt Meselson, and others to rooms in the Kerckhoff Marine Laboratory until they had written the papers he felt they should write. The typing was contributed by Mrs. Delbrück. He once held this reviewer incommunicado in a local printing house until the necessary editorial services were performed and the book, *Viruses 1950*, was put to bed. His critical insights are vividly expressed. After reading a draft of Benzer's paper on fine structure he said the author had "delusions of grandeur," and advised Benzer to stop writing papers, or at least to underline what was important. He called James Watson's literary style "turgid" and rewrote his paper before submitting it to the National Academy. "I don't believe a word of it," he said of George Steisinger's results concerning genetic circularity in the T4 phage.

The bacteriophage group has grown from eight in 1947 to hundreds today. Delbrück predicted to Weigle that his friends, to honor his 60th birthday,

Max Delbrück



would produce a *Festschrift* of papers that had been rejected by every journal. Instead they have produced this book of very readable accounts of their historic discoveries, enlivened by a collection of stories about the founding of the phage group, its interactions, folklore, and operating methods. The accounts are expertly done, often with wry humor, which the general reader as well as the specialist in the field may find happy reading.

If Harry Rubin's speculation is correct—that most of the glories of bacterial virology lie in the past—at least we have in print a good part of the background story told by the people who did the work and achieved the glory.

## Men, Machines, and Modern Times

by Elting E. Morison

The M.I.T. Press .....\$5.95

Elting Morison, historian, and now Sloan Fellows Professor of Management at MIT and chairman of the Social Studies Curriculum Program of Educational Services, Inc., came to Caltech in 1950 to give a series of Athenaeum lectures. This book is the result: One of the lectures, "Gunfire at Sea: A Case Study of Innovation," not only forms the opening chapter; it sets the theme that is developed in all the chapters that follow.\*

"A Case Study of Innovation" describes the disorder created in the United States Navy when an officer discovered a new way to fire a gun at sea. Morison's subject here, and throughout this book, is change—the nature of technological change, the reaction and resistance to it, and how to solve the problem of easy and rapid transition from the old to the new in a world where radical change is the steady state.

"The interesting question," according to Morison, "seems to be whether man, having succeeded after all these years in bringing so much of the natural environment under his control, can now manage the imposing system he has created for the specific purpose of enabling him to manage his natural environment."

Morison applies himself to this sober problem in a series of lively essays, replete with absorbing anecdotes and interesting historical examples.

\* "A Case Study of Innovation" (*E&S*, April 1950) became the most popular article this magazine has ever run. Requests for reprints still come in today.