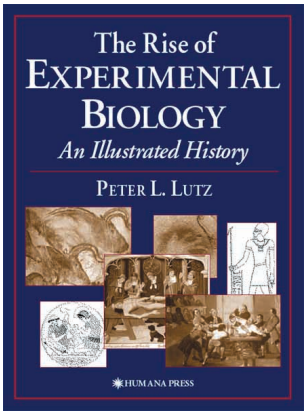
Back to the beginning

The Rise of Experimental Biology: An Illustrated History

By Peter L. Lutz

The Humana Press (2002) pp. 216. ISBN 0-89603-835-1 $59.50



A stated aim of this book is to provide students of biology with an historical context for their science, to make them aware, in the author's words, "*of the background of trials and struggles, brilliant insights, well-meaning mistakes, or entrenched conservatism and dogmatism that are all factors in building and developing testable and rational explanations for Life*." Peter Lutz has succeeded admirably in this objective, and has given us a highly readable and attractive book that is both informative and entertaining.

In relatively short, pithy and generously illustrated chapters, Lutz tells the story of biological discovery from the prehistoric cave painters and their intriguing and naturalistic portrayals of their prey animals, on through the major contributions by the Mesopotamians, the Egyptians, the Greeks, the Romans, the Arab world, and the European periods from the Middle Ages, to the Renaissance, the Enlightenment, and into the modern era. His account makes clear that the growth of biological knowledge was by no means a smooth progression, but rather a highly erratic one that advanced rapidly at certain times and then stagnated or regressed as societies favored orthodoxy or mysticism over curiosity and rationality. The book does an excellent job in tracing the development of ideas, and introducing us to the remarkable individuals who were the scientific giants of their times.

The title of the book uses the word 'experimental' but the rise of this aspect of biology was painfully slow. For most of human history, the concept of hypothesis testing was unknown and biological 'facts' were based on superstition, observation, reason or slavish concession to authority. Even the Greeks, who achieved the highest level of scientific sophistication of the ancient world, favored reason and discourse over the 'unreliable' evidence of the senses, and would likely have mistrusted the modern experimental approach. These ideas are most closely associated with Plato, whose ideas dominated and inhibited scientific progress for a thousand years. Plato's student, Aristotle, broke from his master and favored observation and the collection of data but his ideas were unfortunately lost to the West until the Arabs re-introduced them in the 13th century. Moreover, Aristotle himself was not an experimentalist, perhaps due in part to the absence of tools for making quantitative measurements. Until the Renaissance, physiological thought was dominated by the Greek tradition, elaborated by later figures such as Galen from the Roman period. This historical context makes us marvel all the more at the pioneering work by 17th and 18th century scientists, like Harvey, Boyle, Hooke and Lavoisier, who, following the iconoclastic lead of predecessors such as Bacon and Paracelsus, finally added 'experimental' to the study of biology. Not until page 90 of his book, almost exactly half way through, does Lutz describe the revolutionary studies of William Harvey on the circulation of the blood published in 1628. When this reviewer read again the clear experimental descriptions by Harvey from *De Motu Cordis* and the extraordinary 167 word sentence summarizing his work, there was a strong urge to rise and cheer. The preceding 90 pages had described brilliant and imaginative insights by a fascinating cast of characters, but never an experiment in the modern sense.

Of course, even the work of Harvey and those that followed him did not immediately overturn the authority of the Church and entrenched scientific wisdom. Not until the 19th century and the Darwinian revolution does the scientific world largely escape from these bonds. But surely another lesson from this book is that this battle is still being waged within the general population. Superstition, distrust of the scientific method, adherence to ancient authority, while perhaps not as prevalent now as in the Babylonian empire, are still very much with us.

A further explicit lesson from the book that has considerable relevance to the contemporary world is that biological knowledge and its applications are not independent of the societies in which they exist; societal mores can influence biological thought and biological knowledge can in turn influence society in both positive and negative ways. While this theme is implicit throughout the book, Lutz includes a chapter near the end that directly addresses this topic entitled 'Physiology Abused' and that includes, among other examples, the embrace of social Darwinism that led to the Eugenics movement and, ultimately, to the Holocaust. Like good history generally, this volume informs us about where we have come from but also provides important lessons about the present and guidance for the future.

As mentioned earlier, this book can provide a valuable historical survey for students, particularly for those who assume that the dawn of experimental science dates from the earliest citations of the on-line databases. But it will also be profitable reading for their professors, and can be appreciated and understood by a broader readership as well. An appropriate addition on the office bookshelf or for the home library, it is a volume that can be savored in small chapter-sized bites or devoured by an avid reader in a single sitting. Some may simply wish to leaf through and enjoy the illustrations. However it is read, it is a most valuable contribution and both an accessible and timely introduction to the history of biology.

Donald C. Jackson
Brown University