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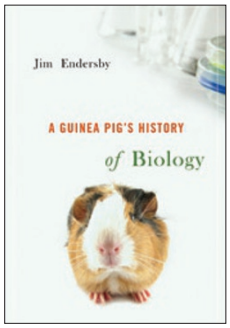
A cultural historian's history of biology



A Guinea Pig's History of Biology

By Jim Endersby

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Reviewed by Lynn K Nyhart

Open this book to its table of contents, and you think you know what you are getting. A dozen chapter titles announce the Latin name of an organism, followed by a provocative subtitle hinting at its significance for the history of biology ("*Passiflora gracilis*: Inside Darwin's greenhouse" and "*Drosophila melanogaster*: Bananas, bottles, and Bolsheviks," for example). Are you a zebrafish specialist? An *Arabidopsis* aficionado? You might be inclined to jump straight into the chapter on your organism. (*C. elegans* scientists will be disappointed—it claims no chapters.)

Go ahead and dip in—but if you start over from the beginning, you will be much more richly entertained. This is not, in fact, a dozen separate histories of experimental organisms, but a fascinating cultural history of modern biology built around their intertwined stories. Each chapter extends well beyond its eponymous organism, as Jim Endersby, a lecturer in History at the University of Sussex, situates each organism and its associated people in a broader narrative of the development of biological ideas and practices—especially those surrounding heredity and evolution—from the early nineteenth century (with a quick look back to Aristotle) to the present. For example, the chapter on hawkweeds (*Hieracium auricula*), though subtitled "What Mendel did next," is substantially devoted to what Mendel did first and where his questions came from, reaching back to Linnaeus' ideas about plant hybridization and bringing the story back up to Mendel's time via ideas of plant sexuality and cell theory.

Focusing on organisms allows Endersby to go beyond their purely scientific significance, strolling through broader cultural and natural histories that lend the book great readability and charm. We are treated to a brief history of glass manufacturing in England, essential to the development of greenhouses, and therefore to botany; a linguistic and anthropological excursus on the guinea pig; and a discussion of why indigenous South Africans never domesticated the quagga (nasty creatures much like other zebras, which "not only bite, they refuse to let go"). By way of their connection with fruit flies, we learn a surprising amount about the history of the banana. Such excursions make this book pleasurable as bedtime reading.

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Despite the light and often humorous handling of his material, this is not history of biology 'lite'—although he skates over many scientific details, Endersby gives the reader a good sense of the key players, the different questions scientists have asked about heredity and evolution, and the paths scientists have forged through fieldwork, mathematics and experiments in lab and garden to answer those questions. He also has some more serious analytical points to convey. Perhaps the most interesting one comes out indirectly: the way scientists work with organisms has changed dramatically since the mid-twentieth century. The quagga, passionflower, human, hawkweed, evening primrose and guinea pig, which carry most of Endersby's story up through the evolutionary synthesis of the 1930s and 1940s, were not conceived of as 'models' illuminating larger questions; to address big theoretical issues, one had to build up a base of comparative research. Only with T. H. Morgan's *Drosophila* group did a new way of organizing biological investigation emerge, with whole communities focused on specific organisms (though Endersby makes an intriguing case for the evening primrose *Oenothera lamarckiana* as a slightly earlier model-organism-that-might-have-been, had it turned out to demonstrate the view of nature its advocates hoped for).

Morgan's group established the basic features of the successful 'model organism' approach—a small but open community devoted to sharing problems, solutions, stocks of material and instructions on how to handle them, all organized around an organism generous in yielding up the information scientists sought from it. (As the chapter on maize shows, some organisms have remained more recalcitrant.) But it was the phage group around Max Delbrück that became the model 'model organism' community consciously emulated by later biologists—notably, the leaders of the *Arabidopsis* and zebrafish research communities, as Endersby shows (drawing on interviews that represent the most original and valuable research in the book).

The ground shifted with the phage group in other ways as well. The rise of molecular biology has allowed nineteenth-century dreams of intervening for genetic improvement to be carried out in new ways: the *Arabidopsis* and zebrafish communities are now hoping not just to study nature but to change it, in potentially radical ways, for human (medical and agricultural) benefit. This is a fundamental change whose effects we are still just beginning to absorb.

Endersby's book ends squarely in the present, arguing that the history of biology tells us not only that science is always changing, but also that understanding today's scientific truths cannot provide us with much guidance on how we should intervene in nature (and when not to), because these are political and moral decisions unresolvable by science. Although his entire book has shown how the practices of scientists are deeply shaped by their cultural and social surroundings, it is still unsettling to be left with the idea that skating over the science is okay, because the science is going to change soon anyway, and citizens must make decisions as best they can. But that is the take-home message. How to deal with it? Enjoy this book, and then pass it on to a nonscientist relative or friend, and talk about it with them. In doing so, you will build a bridge and act as a citizen-scientist in the best sense of the word.