

diagnosis, treatment with effective combination therapy and chemoprevention in pregnancy.

What lessons can be gained from the Italian experience that are relevant to malaria control today? There are many, but the main one, I think, is that malaria can be controlled successfully, even in the most extreme situations. What's needed is an integrated approach — rather than reliance on a single tool — based on sound epidemiological knowledge, supported

by an effective rural healthcare and educational programmes, and with a high level of political and financial support. These are demanding requirements, but the Italian story described in this important book shows what will be needed if malaria is to be controlled effectively in Africa today. ■

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## Life under the microscope

### The Egg and Sperm Race: The Seventeenth-Century Scientists Who Unravalled the Secrets of Sex, Life and Growth

by Matthew Cobb

Free Press: 2006. 352 pp. £17.99. Published in the US in August by Bloomsbury.

#### Jane Maienschein

A lecturer in the life sciences, Matthew Cobb is enchanted by science and its powers of discovery. He was studying insect behaviour and communication when he became intrigued by the seventeenth-century Dutch microscopist Jan Swammerdam. Disappointed that few people knew of Swammerdam's research, Cobb sought to make it better known. This book is the result.

*The Egg and Sperm Race* — or *Generation* as the US edition is called — is about seventeenth-century research on sperm, eggs and fertilization. That research primarily involved insects and a few other organisms, but not humans. After the early explorations of sex

and fertilization in other species, it took another 150 years to put together a coherent story about reproduction generally, and even longer to do more than surmise that humans are reproductively pretty much like other mammals. Only in 1828 did Karl Ernst von Baer first report seeing mammalian eggs, and only in the 1840s did researchers observe the merging of egg and sperm cells. Researchers worked out some of the processes of cell division, and by 1900 had just begun to understand the role of the nucleus and chromosomes in development. But it was not until the late 1970s, with *in vitro* fertilization, that researchers even began to be able to observe fertilization and cell division.

The story is about adventures in science, by researchers who were passionate about their work and at times highly competitive and even combative. Science is not a straight-line path to knowledge, Cobb writes, but rather “takes strange detours, finding itself temporarily trapped in unexpected dead ends”. He

adds: “Mistakes play a fundamental role in shaping the form of science — when they reveal themselves, they require new theories to explain why they are in fact mistakes. This gap between theory and reality provides the space for knowledge to develop.” These are central themes: science makes progress, but not directly or predictably; and science is done by people who have idiosyncratic quirks and convictions.

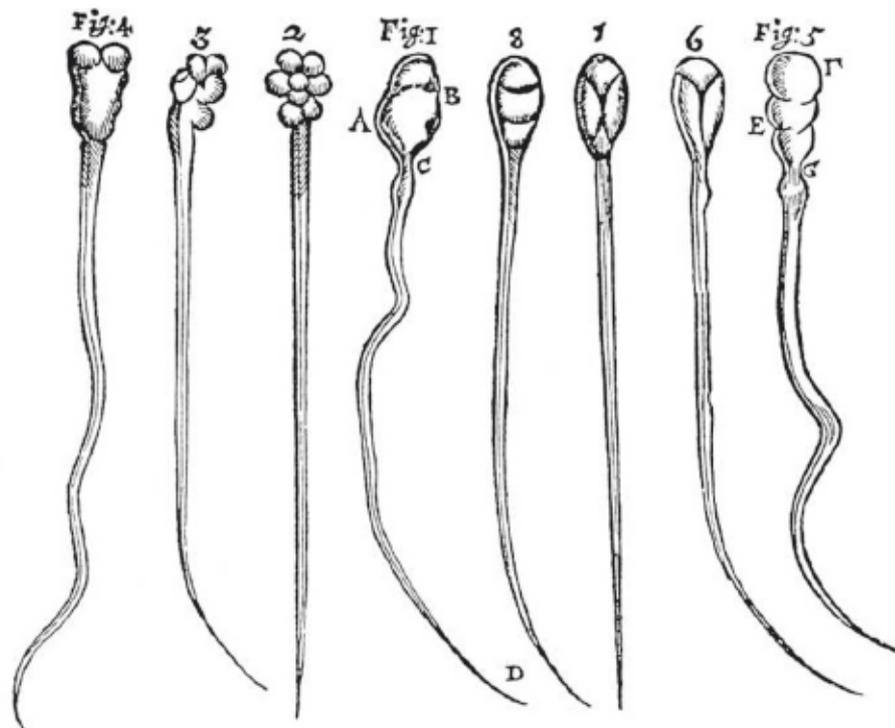
Neither of these themes is new to historians and philosophers of science, but they continue to surprise many scientists. Even scholars who have written extensively about the history of embryology (including myself) have not always done a good job of making these ideas available to a wider public, nor have they pulled together these particular episodes in one place. Therefore, Cobb's exuberant story is welcome. Much of the ground he covers is familiar only to professional historians of science, not to those working in the scientific traditions discussed here.

Cobb makes the science accessible. Who will not, for example, be delighted to picture the Pitti Palace in Florence as surrounded by wonders of “rotting flesh, buzzing flies and wriggling maggots” — ripe for studying whether flies come from other flies or spontaneously from the rot? Or to learn of debates and battles for primacy as Nicolaus Steno, Swammerdam and a cast of others jostle like schoolboys to establish who will be best friends with whom in a given year.

The book also does a wonderfully engaging job of presenting research on sperm, eggs and fertilization that drew on methods of dissection, observation and experimentation. Cobb's lively stories make the process of scientific discovery and adjudication approachable and intriguing. The title of the British edition is clearly intended to evoke fun-filled images of the egg-and-spoon races of school days and country fairs. Even though the book is not really about a defined ‘race’, and even though the seventeenth century actually brought only the very first steps in understanding generation, the book is welcome because Cobb has so much fun showing us how the story of sexual reproduction in animals began to be put together. His website ([www.egg-and-sperm.com](http://www.egg-and-sperm.com)) contains a rich collection of additional illustrations and information.

My only quibble is that Cobb too easily evaluates past science as a ‘mistake’, even while acknowledging that it made sense in its context. Why consider it mistaken, then, rather than the best explanation in the circumstances? It is neither necessary nor helpful to judge science in this way. That said, Cobb's approach and enthusiasm are infectious. More history of science should be this enticing and accessible. ■

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Seminal work: sperm from rabbits and dogs, drawn by Antonie van Leeuwenhoek in 1678.