BOOKS & ARTS

Lessons from Italy

How malaria affected, and was controlled in, Italy in the past century has important messages for today.

The Conquest of Malaria: Italy, 1900–1962
by Frank M. Snowden
Yale University Press: 2006. 288 pp.
£25, $40

Brian Greenwood

Much has been written about the biology of malaria but little about its social and economic impact. Frank Snowden has drawn on neglected Italian sources to produce a detailed account of the protracted struggle to bring malaria under control in Italy. *The Conquest of Malaria* is an important contribution to the malaria literature.

Snowden, a historian, uses contemporary accounts to illustrate the devastating social and economic consequences of malaria in Italy 100 years ago. On the eve of the First World War, life expectancy in malaria-endemic areas of Italy was only 22.5 years, less than in the least-developed countries today. Malaria was primarily a disease of the poor and was particularly severe among migrant agricultural workers and Sardinian miners who lived in appalling conditions.

Snowden points out that the detailed statistics available on numbers of cases of malaria and malaria deaths provide only a partial picture of the impact of the infection. It was widely recognized at the time that it had a major adverse effect on the economy, contributed to the impoverishment of southern Italy and was probably a contributor to emigration. Through both its direct and indirect effects, malaria may, at its peak, have caused as many as 100,000 deaths per year in Italy.

Malaria thrives during periods of turmoil, so it is not surprising that some of the gains in control of the disease made by the time of the First World War were lost during the period of the conflict. Troops and civilians involved directly in fighting in the Veneto region suffered badly, but malaria also surged elsewhere. Snowden attributes this to the return of infected soldiers to susceptible communities, shortages of antimalarial drugs, breakdown in rural health services and, less plausibly, to the 1918 influenza epidemic. During the Second World War, there was again an increase in cases of malaria for similar reasons, but with an additional, more sinister, explanation. Before retreating, the occupying German army flooded the Pontine Marshes, where malaria had previously been controlled, with salt water to create the brackish conditions that favour the breeding of the mosquito *Anopheles labranchiae*, the main malaria vector in the area. This attempt at biological warfare was successful, resulting in an epidemic of malaria in 1944–46.

STUDIO PATELLIANI/CORBIS

Italians faced a malaria epidemic at the end of the Second World War after the German army withdrew.

The description of the ways in which malaria control in Italy evolved over time provides many important messages for today. At the beginning of the twentieth century, quinine was seen as the main control tool. Its widespread use was highly successful in reducing malaria mortality but less efficacious in reducing the number of cases. This is not surprising as quinine does not prevent relapses of the malaria parasite *Plasmodium vivax* or kill gametocytes. There was resistance to its use in some areas because of suspicions over the intentions of employers and the government who provided it free. Provision of rural dispensaries, which provided general care as well as malaria treatment, and rural schools helped to overcome these concerns.

After the First World War, vector control started to receive more attention and became a key component of an integrated malaria control programme in the Pontine Marshes that was undertaken by the fascist government. Snowden outlines the political motivation for this successful programme, which allowed 60,000 people to be settled in an area that had previously been largely uninhabitable. After the Second World War, the insecticide DDT became the primary control tool, and its use led to the elimination of local malaria transmission in Italy in 1962. However, this success was built on an enormous amount of background knowledge and experience in malaria control gained during the previous 60 years.

Could this excellent book have been improved in any way? Snowden uses specific events to illustrate general principles but it is sometimes difficult to know how these relate to the overall picture prevailing at that time, and a figure or two summarizing the chronology of events would have been useful. Some more maps would also have helped, for example to show regional differences in incidence rates. Snowden gives a good account of the biological aspects of the story and I found only a few, minor technical points with which I disagree. However, I think he is unfair to the World Health Organization (WHO) in implying an overreliance on the use of insecticide-treated bednets in current malaria control programmes; the WHO also advocates early

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 Unravelled 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) 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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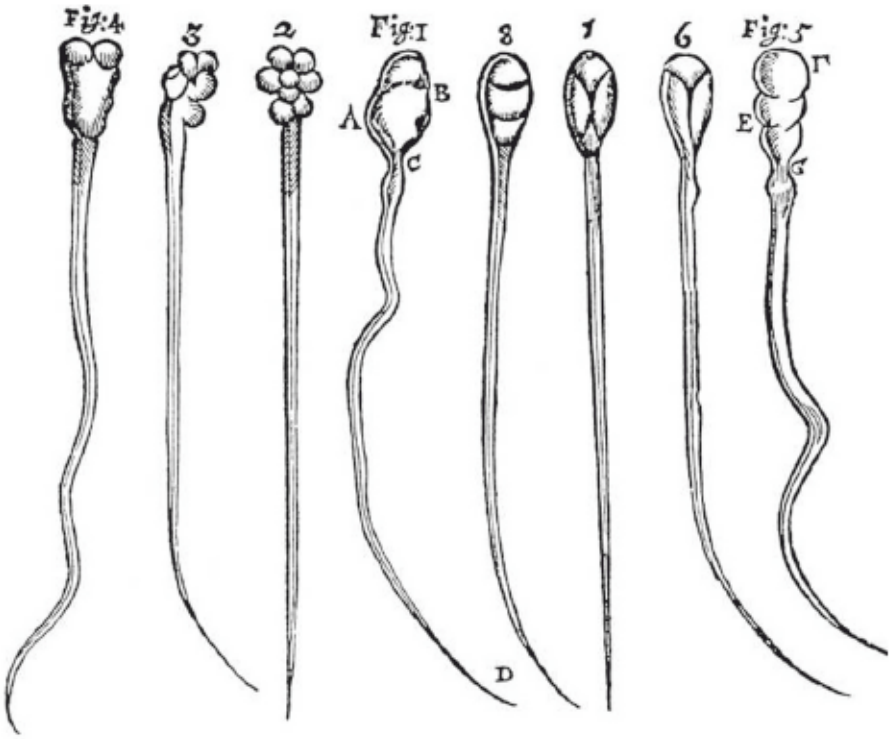

Seminal work: sperm from rabbits and dogs, drawn by Antonie van Leeuwenhoek in 1678.