A feast for the mind and eyes

Nurminen, Marjo T.: *Sisters of Science. Learned European women from Antiquity to Enlightenment*. WSOY, 2008. 445 pages.

***Sisters of Science* is an important addition to the Finnish study of women's history as well as one of the first research-based works about the history of science written in Finnish that covers several countries, eras and branches of science. In the foreword, Marjo Nurminen manages to address two divergent audiences: the historian who is informed of the methodological discourse and the layperson who is blissfully unaware of it. The text is narrative and descriptive rather than analytical, and its achievement lies particularly in skilfully supplementing the great story of the history of science.**

Writing a non-fiction work is not unlike making a salad. A good end result requires fresh ingredients (current and competent research literature), some chopping and mixing (choosing, combining and structuring the material) and an attractive presentation. Ideally, the dressing will tie the various flavours together and turn the dish into something original.

The comparison is not meant to be dismissive. Writing a good non-fiction book is a very difficult skill to master, which is also demonstrated by the fact that *Sisters of Science* (2008) was not only a significant contribution to the Finnish study of women's history but also the first general account of the history of science written in Finnish, a research-based work that covers several countries, eras and branches of science. The book conveys its two key messages – that women have a place in the history of science and that science has its own social and cultural history – to the reader in a compelling and entertaining way.

Fresh ingredients

There has been a great deal of international research into the history of women in science published since the early 1980s. Marjo Nurminen is well acquainted with this literature and able to fully exploit it. It is gratifying to see that she seems to have used sources written in several languages other than English, although the way that the footnotes have been minimised according to the Finnish tradition makes it difficult to ascertain the origin of some materials. However, the chapter-specific bibliography increases the transparency of research and helps those interested find original research on the subject.

Roughly speaking, there are two types of historical study of women in science: one that highlights forgotten female scientists and one that attempts to explain the reasons for their marginalisation in

Western science. *Sisters of Science* leans towards the first research tradition. It throws into relief a group of players whose role is not known to the reference books on the history of science, much less to the reference books on world history. Although the work's subheading speaks of learned women, many of its subjects were not only scholars in possession of special information in a branch of science but also scientists who actively produced, evaluated and imparted information.

Nurminen examines 25 women ranging from Pharaoh **Hatshepsut** (about 1518–1468 BC) to **Marie Paulze Lavoisier** (1758–1836). The sample is, out of necessity, a drop in the ocean. *The Biographical Dictionary of Women in Science* (2000), for example, presents approximately 2,730 female scientists, hundreds of whom lived during the span of time examined by Nurminen. Nurminen does refer to other learned women in the text, and the book includes one hundred mini-biographies as an extra feature. The selectiveness works, because it has enabled the author to focus on the subjects in greater detail.

Why these women? The author does not address this question directly. There is certainly enough material available about them to write a good story. Coverage must have been another deciding factor: the cases are spread over different eras – ancient civilisations, Antiquity, the Middle Ages, the Renaissance and the 17th and 18th centuries – and many branches of science and scholarship. The case studies deal with masters of (in modern terms) chemistry, philosophy, mathematics, history, classical languages, midwifery, astronomy and botany.

The wealth of fields helps the reader notice the fluctuation and arbitrariness of the boundaries of what kind of science has been deemed appropriate for women in each era. For instance, chemistry, which has since been promoted to the league of the 'hard' sciences, was considered particularly suitable for women in the 1700s due to its association with cooking and herbal medicine. Many women also made their mark in mathematics, which is perceived as a fairly manly field today, possibly because mathematics could be practised at home without special facilities or equipment.

Successful mixing ratios

The chronological framing of *Sisters of Science* is clear: the book begins with ancient civilisations and ends in the early 1800s. The demarcation is intentional; the quantity of women in science has grown exponentially in the past 200 years, the field of science has expanded and scientific literature has grown more technical to the extent that it would be very difficult for one person to properly master several disciplines. The exoticism created by the temporal distance may also have brought the book more readers.

The structure of the book is equally straightforward: the women of science are presented in chronological order with one or two (and in one case three) women discussed in each section. The chapters of the book discuss their stories and achievements in the context of the science, culture and society of their era. Individualism is a traditional solution, but one that works, especially in a book aimed at a wide readership. However, I would not call the approach of this book microhistorical as Nurminen does, just because it focuses on individuals who can be considered exceptional or marginalised in certain respects.

The chapters are fairly self-contained, which makes it easy to divide the book into convenient portions for reading. However, their disjointed nature leaves the task of finding the themes that bind the case studies together to the reader. For instance, one thing that caught my attention several times throughout the book was how resourcefully these women with a passion for science utilised their often limited range of operation, observing the stars from the roof of their home or studying insects

in the garden, among other things. Their positions as outsiders made the lives of female scientists harder, but on the other hand it made them do and see things in unique ways that diverged from the mainstream. This phenomenon is also known outside science: the sound of singer and composer **Barbara Strozzi** (1616–77) and the paintings of **Artemisia Gentileschi** (1593–1652/53), for example, distinguish them from the mainstream in a distinct but intangible way.

Despite the minimal horizontal and longitudinal connections between cases, Nurminen works hard to mesh the stories vertically into the science and society of the period. She is quite successful at contextualisation. Thanks to what a reviewer for Helsingin Sanomat magazine (29 Oct 2008) called 'macrohistorical babble', the book becomes a competent general account of the history of science that is also suitable as a university textbook.

It is hardly surprising that over a journey through several millennia, one may cut a few corners too many. For example, Nurminen categorically states that midwifes were almost entirely replaced by physicians by the 18th century (197). In what sense? Certainly not in numbers. There were no trained physicians in Finland at the start of the 18th century and only about a dozen by the end of the 18th century, despite the tens of thousands of women of childbearing age. Western European countries did not have many more physicians in proportion to the population. If 18th-century mothers had any professional help with childbirth, that helper was most likely a midwife.

Attractive presentation

As a book, *Sisters of Science* is quite an attractive package. The layout is elegant and there are many illustrations. The text is delightfully clear and pleasant to read, neither dry nor droll. Even the most peculiar systems are explained accessibly and interestingly. The artwork is stunning. The illustrations are beautiful, plentiful and informative. The solution for captions is practical and works quite well: the descriptive part is below the illustration and the reference information is listed at the end of the book. However, there is one puzzle: since the publisher chose to invest this much in the book's layout and general appearance, could it not have invested in one more proof-reader to eliminate the typing errors that detract from what is otherwise such a polished work?

And the dressing?

The foreword to *Sisters of Science* is a masterpiece of scientific communication. Nurminen manages to address two divergent audiences: the historian who is informed of the methodological discourse and the layperson who is blissfully unaware of it. The former recognises the foreword's references to such current topics as the archaeology of knowledge, the contingency of historical events, intersectionality and the constitution of gender in power relations. However, the author does not alienate the layperson with technical terminology. Many thesis writers could learn from Nurminen's example: even wide-scale and complex matters can be explained understandably as long as the writer is thorough and makes an effort.

Nevertheless, there is something about the foreword – or rather, the relationship between the foreword and the chapters – that I wish to address. While describing methodological ideals, the author accidentally promises too much. Her stated aim is to change the history of science instead of merely adding to it, to 'make visible and understand the built-in cultural mechanisms which have been used in an effort to exclude women from scholarship and practising sciences' and to strive to 'analyse and further parse the cultural values, rules and practices that upheld the dominant gender system'. (18) Despite its indisputable merits, the book does not quite achieve these goals. The text

is narrative and descriptive rather than analytical; it does not identify any mechanisms of exclusion, and its achievement lies particularly in skilfully supplementing the great story of the history of science.

Sisters of Science raises many important questions about the relationship between gender and science and gives material for answering those questions, but the task of formulating the answers is left to the reader. The most central of these questions is naturally why women have been marginalised in the history of Western science. For my part, reading Nurminen's book confirmed my view that the key to solving this question lies in understanding the fundamentally collective nature of practising science. Research and science can be created only in places where and only to the extent to which the scientist can connect to networks formed by people, books, instruments, etc.; the networks in which information defined as scientific is produced, transferred, tested, questioned and approved. These networks are fragile and ever-changing. For various reasons, it has been tremendously difficult for women to connect to these networks and very easy for women to fall out of them.

The history of science forms its own network. As long as the nodes of this network hold scientists who firmly believe that women cannot create anything truly meaningful in science, many female scientists, no matter how proficient or noteworthy, will be excluded from the annals of science. There have been many such historians. For this reason alone, books like *Sisters of Science* are important.

---

8 May 2009 Heini Hakosalo <firstname.lastname@oulu.fi> FT, University Lecturer, University of Oulu, Department of History

This review was published at a website for historians.
http://agricola.utu.fi/julkaisut/kirja-arvostelut/index.php?id=1480