

Book Review

Women and Science in India Ed. by Neelam Kumar

Minna Salminen-Karlsson
Uppsala University, Sweden

This volume about women and science in India fills a void in the literature on women and technology outside the Western sphere. There are a number of volumes on gender and science and technology in India, but they normally deal with the mixed blessings of science and technology in the lives of rural women. This book takes up the middle class, highly educated Indian women who are not recipients but creators of the benefits of science.

It is somewhat difficult to conclude to which group of readers this volume is targeted. It certainly offers new knowledge to an interested Western reader, and the introductory chapter, giving some background about the Indian context is clearly directed to a reader not familiar with the Indian situation. However, some of the argumentative chapters seem to address an Indian audience. It should be stated that this review is written from a European perspective and, therefore, the most interesting contributions are those which most explicitly bring out the differences between the Western and the Indian context. They serve as an eye opener of our colonial past and of our colonial present in showing that Western ideas and practices are not always valid all over the world.

The book is divided in two sections, “Historical context” and “Contemporary experiences”, but it might have benefited from another ordering of the chapters. Some chapters complement each other, and could preferably be placed alongside each other. The book consists of a few issues, which are distributed in what sometimes seems as a haphazard manner.

- 1) Three chapters on women and medicine in the 19th and early 20th century India (Forbes, Burton, and Lal, of which the last chapter by Lal gives an overall background).
- 2) Women's conditions in scientific working environments. Sur writes a historical account of three women physicists in the middle of the 20th century, while Subrahmanyam and Gupta & Sharma base their studies on interviews with contemporary women scientists.
- 3) Three articles with statistics on women's educational attainment, employment and salaries and productivity in scientific professions by Poonacha, Kumar, and Duraisamy & Duraisamy. Poonacha uses statistics on educational attainment to criticize the Indian science policy. Kumar's article on the productivity of male and female scientists in India shows that the ranks of the female scientists do not correspond to their productivity.
- 4) Sagar's contribution discusses the issue of the privileged position of the women who work in science compared to other women, and puts forward the importance of taking other social categories, such as race, caste and religion into account.
- 5) Mukhopadhyay's article on the causes of women's low numbers in science in India and in the USA questions the explanatory power of the reigning Western theories about the issue in a different cultural context.

Thus, the book is not very coherent, including a number of issues and articles of different approaches with varying scientific quality. The authors are a mixture of scholars from different disciplinary backgrounds, some of them working in the USA and some of them in India. The introductory chapter, which could have been somewhat more extensive for the benefit of a Western reader, gives a short overview on the situation in India in regard to women's education, particularly science education, relating both to the quite progressive educational politics after independence, and the contrasting traditional views of a patrifocal society, which regards women's interests as secondary to men's. What is lacking in this introduction and in the book as a whole is a reflection of the cultural diversity of the Indian subcontinent. It is possible that this diversity is not apparent in the sphere of scientific institutions – but the

reader remains ignorant of whether this is the case.

Three of the four chapters in the historical section deal with medicine: the need for female doctors in the 19th and early 20th century India, where the separation of sexes was sharp and many women lived in various degrees of seclusion. Generally, it was agreed that the health needs of Indian women could be catered for only by female doctors. Lal and Burton touch the same issue in their respective contributions: The openings that the need for female doctors in India gave for Englishwomen, who at that time were starting to aspire to the medical profession. While Lal describes the Indian scene, Burton takes an English perspective. In the societal climate where women's aspirations to professions of status met huge resistance, the possibility to use the situation in the colonies was welcome. Stressing the need for women doctors in India downplayed somewhat the threat that female doctors were perceived to make to the medical establishment in England. However, English white women doctors did not suffice to ameliorate the situation of Indian women. One solution to this problem was training Indian women in medicine, grounding special educational programmes for them. Forbes accounts for this development and is critical of the fact that these women hospital assistants received training on a lower level than male medical school graduates. Thus, the three chapters on the history of the medical needs of Indian women present convincingly an interesting example of gender and colonialism.

The fourth of the historical articles is Sur's account of three women physicists' lives in the middle of the 1900s, and is sketched against an account of gender and schooling in middle and upper class India in the first part of the 20th century. This general part of her contribution is particularly valuable, stressing the importance of women's education in the middle and upper class nationalist movement. Sur's account of the three individual women gives some insight in the problems of women who tried and sometimes succeeded in having a career that was both Western, modern and high status, while at the same time following the traditional gender norms. The fates of these highly educated women physicists are not very different from the fates of their Western counterparts at that time (and even today) – struggling to receive the scholarly degrees that their accomplishments should have entitled them

to, changing fields to find a more favourable working environment, abandoning career for husband, and even committing suicide.

Subrahmanyam's article based on interviews with women at the science departments at the University of Madras, is a continuation to Sur's article. It is an account of hardships well known to many Western female scientists: discrimination in appointments, sexual harassment, unequal treatment at the workplace and problems with work-family balance. The hardships encountered by women in science in India are, in Subrahmanyam's description, harsher and more open than in most Western scientific contexts, but the list in itself is similar. In addition, Indian women scientists appear to have a distinctive problem with notably greater restrictions of geographical mobility and behavioural repertoire than their male colleagues. However, they seem to have fewer problems with child care than their Western colleagues, mostly because of the close relationships in the extended families. As Subrahmanyam's description shows similarities in the Western and Indian situations, at the same time as she uses patriarchy as an explanation to the hardships of Indian women scientists, the article opens up for reflections on the degree of patriarchy also in Western societies, particularly in scientific communities.

Gupta & Sharma's article is, in part, parallel to Subrahmanyam's, though their interview study was made in four universities, instead of one. In general, they found the same problems, even though they stress the work-family problem more than Subrahmanyam does. What they add to Subrahmanyam's article is the section on how female scientists react to all the hardships. These reactions are also familiar from earlier Western research: exhaustion, lowering ambitions, and redefining success. Gupta and Sharma show some interesting figures on how women older than fifty-five years produce notably more than younger women, in particular internationally.

Kumar's study of the research productivity of Indian scientists, comparing women's and men's scientific productivity gives a statistical compliment to the interview studies, in giving an argumentation in numbers for the discrimination of women scientists in Indian research environments. While Subrahmanyam and Gupta & Sharma show what is happening in the daily organizational practice, Kumar shows the results

of this practice, in her sample of men and women scientists from eight science institutions. She shows that only 3.6 percent of the women, compared to 18 percent of the men in this sample are full professors and goes on to compare their productivity. Kumar finds that women in the assistant and full professor ranks actually produce more (when median and not mean productivity is measured) than their male colleagues, with no indication that their productivity would be of lower quality. This, once more, supports the Western findings that women have to be more productive than men to reach equal recognition. Kumar discusses her data in the light of earlier research both in the Indian context and in the Western research context on women's careers in the academia. She shows convincingly how women's research productivity is not enough to make them climb on the academic ranks the same way as men, and accedes to the results of Subrahmanyam and Gupta & Sharma on organizational discrimination of women in scientific environments.

Poonacha writes about the gender gap in higher education in India. She gives some figures about the gender gap in higher education in general, unfortunately mostly before the mid-1990s, as a background to a critical account on education and science policies in India, and a short summary of the feminist science studies' critique of the masculinity of science. The critique of the Indian science policy is the most interesting contribution of this article. It does not explicitly deal with women but gives a review on the increasing commercialization of science and education, arguing that this development makes it more difficult to create or even sustain societal equality and thus, to close the gender gap in education and science.

Duraisamy & Duraisamy present more detailed statistics on women's enrolment in scientific and technical education and labour markets, with latest figures from 1999-2001. What emerges from these detailed statistics is that women are the losing part when it comes to employment figures and salary levels in all scientific fields, but that there are differences between the fields, with science, engineering and agriculture being the most unfavourable for women, while medicine is much more gender equal. There are even geographical differences, with the participation of women in science and technology fields being more common in the Southern part of India. It would have been interesting

to read some hypotheses of why this might be the case, as well as other reflections on the anomalies in the data.

Kumar finds in her sample that very few women scientists come from rural backgrounds, compared to almost half of the men scientists. It is only Sagar who explicitly touches the privileged position of women in science, in this case female physicians, compared with other Indian women. Her article is divided in two separate parts. The first part shows the distribution of female doctors into different medical specialities, in India as well as in the USA. The differences in this data are used as a foundation for reflections on how the choice of certain specialities is not inherent in women's nurturing nature, as it sometimes is claimed in India, but is dependent on societal and cultural factors with variation between societies. However, the main message of the article is the argumentation that other aspects than gender, such as caste, class, religion and race have to be taken into account, and this argumentation is built on the Western feminist medical historical narrative on how women have been marginalized as healers from the 16th century on. Sagar argues that this has not only been done by men, but also by women from upper classes in relation to women from lower classes, in India as well as in the West. A concentration on one issue and on the Indian scene would decidedly have sharpened the message of this contribution.

Mukhopadhyay's article, where she examines the explanatory power of Western ideas about the gender gap in professions of science, engineering and technology (SET) in an Indian context is of great importance to those researchers and activists who work on the issue. She shows how, statistically, the gender gaps in SET education look similar in the West and in India, but how they have totally different explanations, to the extent that the questions in an American questionnaire about images of women and mathematics are unintelligible for Indian respondents. In her Indian sample Mukhopadhyay found no perceptions of women as less competent or confident in SET than men, but instead other constraining factors which prevented women from pursuing SET education. These factors are related to the patri-focality of the Indian society. In short, the Western explanations take the individuals and their psychological characteristics as a starting point when explaining why girls do not

choose SET, while the explanations in the Indian context are to be found, not in the individual, but in economic factors and, first and foremost, in the preferences of the collective, most often family where she belongs. The family, in turn, is embedded in the patrifocal culture, with a preference given to boys' education, and a certain anxiousness for co-education, making it difficult for girls to pursue subjects where interaction with boys is unavoidable. However, in the patrifocal society, a SET education with high status can also be an advantage for a girl, as it increases her value for the family status and as a marriage partner. Mukhopadhyay shows convincingly how the Western explanatory frame for the gender gap in SET has hardly any power in another cultural context. And because it does not work there, Mukhopadhyay questions its monopoly status even in the USA, asking whether it is not possible that even in this individualistic society collective aspects are more important than the prevailing theories assume.

The historical development of the globalization of science and technology in relation to women's position in those fields can be seen as the overarching theme of the book. Some of the contributions refer to the feminist critique of the common scientific practices and organizations as a starting point for reforming the practices of science. In a general the volume is a description of what kind of problems women have to grapple with to be able to be included in the creation of science in India. The descriptions of the 19th century medicine show how globalization in the form of colonialism played a role for a certain fraction of English women physicians, as well as a fraction of Indian women in accessing the male dominated world of medical science. Most of the contemporary descriptions show how the practices and institutional environments of science, as they have been formed in the West and spread all around the world, carry with them a gender organization which disadvantages women who want to take part in the development and advanced use of science. As shown in the volume, these disadvantages have a contextual flavour created by the gender order in a particular societal environment, which in the case of India means that Indian women scientists to a certain extent seem to have a hard double burden in forcing both the scientific gender order and the societal gender order which appears to be more restricting in India than in many Western countries. However, the

overall impression after reading the book is one of globalization: as women academics and scientists we all try to grapple with gender inequalities in the same global scientific system as our female colleagues in India.

Biographical Note: **Minna Salminen-Karlsson** is assistant professor at the Department of sociology and Centre for Gender Research at Uppsala University, Sweden. Her research area is gender and technology, particularly technology education and gender in high-tech organizations.