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Gendered Innovations in Science and Engineering edited by Londa Schiebinger

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REVIEW

This edited volume, with contributions from many prominent figures, is a welcome addition to the growing literature on gender, science and engineering. As a leading researcher in the field, Schiebinger is well qualified to bring together such a work. Given that there is a burgeoning literature base, what can this volume say that is new? Its novelty lies in accepting that many attempts to develop a more gender inclusive science and engineering rest on liberal feminist bases. Rather than criticising and abandoning its liberal roots, *Gendered Innovations* looks to positive gendered transformation which have occurred and are occurring within the sciences. The style of the book is upbeat and positive. In itself this represents a step change in writing on the gender 'problem' in sciences and engineering. The contributors to the volume are well aware of continuing problems of women's under representation in technical fields and know that it is naïve to proffer easy solutions. Nevertheless, they offer positive ways in which science can and has changed. These examples can act as exemplars for further work. Importantly, one of the volume's goals is to influence policy, in particular, to influence the USA'S NSF (National Science Foundation) towards requiring state funded science research to integrate gender analysis into research design.

Schiebinger introduces the book by signalling the importance of the knowledge dimension. Yes, the numbers and institutional problems have to be fixed but so too does the knowledge. Although commentators have

focused on the consequences of excluding women, how has this affected human knowledge? This sets the scene for the book's contributors to focus on 'fixing the knowledge' with a recognition that the knowledge must be fixed for the numbers to be fixed.

Richardson's discussion of sex determination genetics demonstrates just such an example of how the knowledge may be fixed. The long standing model of genetic sex determination focused on a single 'master gene' on the Y chromosome. Challenges to the traditional model resulted in a new model which recognizes the contribution of male and female genetic production on the determination of sex. Richardson documents the ways in which gender criticism was a significant epistemological resource in the revision of this area of genetic theory.

Conkey describes the way in which a research programme became 'irrevocably engendered' through the research of archaeologist, Olga Soffer on the Ice Age, ceramic artefacts and, in particular, the famous 'Venus' figurines. Rather than seeing these as purely goddess or fertility figures, Soffer uncovered a history of lost technologies - coiling, plaiting and weaving. Similarly, Hager uncovers stereotypical biases in prehistoric artefacts in relation to the sexing of prehistoric skeletons. Large robust specimens tend to be regarded as male while diminutive specimens are designated female. So ingrained is the bias that 90% of Australian Aboriginal skeletons are regarded as male.

Fortmann et al. describe ways of combining gender analysis with more traditional research methodologies, namely participatory approaches in environmental sciences.

Kwan takes a novel approach towards geographic information systems, showing how they can give quantifiable evidence of the spatial restrictions of women's lives. Also describing the influence of gendered analysis on design, Weber discusses the re-design of aeroplane cockpits. Her conclusion echoes that of Temm in her description of Volvo's concept car for women, namely that technological devices designed for women improves the design for everybody.

Urry's chapter on physics and astronomy stands in contrast to the innovative and thoughtful collection of positive examples related in earlier chapters. To argue that 'gender does not affect results in physics, astronomy and mathematics' runs contrary to the development of feminist and wider social and philosophical developments in science and technology studies of the last two or more decades which argue convincingly that all the sciences are shot through with social, cultural and gender influences. By allowing gender analysis in the life sciences whilst assuming that physical sciences and mathematics are not amenable preserves an artificial purity which is not borne out by history. Unfortunately, such a position threatens to undermine

the rationale of the book.

Given so many examples of where gendered and feminist analysis have provided real insights, there are no *ab initio* reasons why we should stop short at the physical sciences. Notable examples of the way that feminist analysis can be understood in the physical sciences include Elizabeth Potter's (2001) *Gender and Boyle's Law of Gases* and Sharon Traweek's (1988) *Beamtimes and Lifetimes*. Importantly, the final chapter address policy issues. Their inclusion is welcome in a volume with explicit political aims.

This is an important volume with some genuinely innovative and exciting examples of gender innovations and with realistic policy aspirations. Its authorship (and possibly readership) is largely based on the USA. Nevertheless it provides a model for ways in which gendered innovations can be identified in other parts of the world and in other sciences.

REFERENCES

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