maticians were more likely to engage in the newer, less prestigious discipline of applied mathematics, an area of shortage after the Second World War. Another strength of this book is its illustration of a chronic fault line tension among interviewees between female-identified teaching and male-identified research. This was informed by gendered career options as women were inevitably steered towards teaching in women's colleges while research universities sought men. Many of Murray's interviewees expressed regret, even shame, that they had failed to do much research and most felt that their potential for research had not been taken seriously. One female mathematician even wonders whether women are actually capable of conducting research in mathematics at the same level as men (p. 46).

Murray raises these interesting points but fails to develop or analyse them in much depth. The reasons for this continuing gendering of mathematics, and particularly mathematical research, as male is barely addressed. A cultural and historical analysis of why women and mathematics are configured as opposites, and why studying mathematics could be threatening to a woman's femininity, would have been useful to illustrate the uniqueness of the difficulties that mathematics presents as a discipline for women. Many of the problems that interviewees faced as recounted by Murray are equally applicable to any field – for example, the unfair application of anti-nepotism laws, denial of career progression and training because women are a 'bad investment', and the need to privilege a husband's career and family. Nevertheless, this is a very thought-provoking book which, in telling and celebrating some very remarkable women's lives, opens up as many questions as it answers.

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Jean-Paul Pier (ed.), **Development of Mathematics 1950–2000.** Basel, Boston and Berlin: Birkhäuser, 2000. Pp. x + 1372. ISBN 3-7643-6280-4. DM 298.00 (hardback).

During the last fifty years mathematics has gone through a spectacular process of growth and specialization. In terms of quantity, the shift has been from the 4472 books and articles reported on by *Mathematical Reviews* in 1948 to the over eighty thousand of 1997. In qualitative terms, branches and sub-branches have multiplied, though with varying degrees of success and fruitfulness. Emblematic of this phase has been the virtual disappearance of the figure of the universal mathematician, someone able to make significant contributions across the borders of the main areas of research. Figures like Hilbert and von Neumann seem to have no parallels in the hyper-specialized panorama of the late twentieth century. This unprecedented situation has created new problems for the historian of mathematics. Writing the recent history of this discipline indeed requires the ability to survey a wealth of fields, bringing to the surface their connections, and selecting those general trends that seem to be the most significant. Few attempts of this kind have been made, and this book is one worthy of particular attention.

The book is structured as a collection of essays, mostly written by the very protagonists of post-war research. These are followed by interviews, a list of international prize-winners, titles of contributions to international congresses and major periodicals and a bibliography of the history of mathematics relative to the period 1950 to 2000. Due to the variety of possible connections that can be established between the essays, a neutral alphabetic order has been adopted, leaving readers free to choose their favourite path. In the introduction, a 'map' can be found that shows some of the most relevant connections between the different topics, a device commonly used to visualize the complex relations between the areas of modern mathematics.

Going through these essays, the historically minded reader can identify certain very general trends in the recent development of the discipline, for instance the shift of emphasis from 'pure mathematics' and from the key notion of 'structure', which dominated research and teaching between the 1950s and the 1970s, to those of 'interaction' and 'model'. Roughly speaking, Bourbaki and the 'new maths' didactic movement of the 1960s can be seen as emblematic of the first phase, where mathematics was primarily conceived of as the science of abstract

structures, and its practice founded in set theory. Instead, in the last decade, research has been increasingly informed by the image of mathematics as the science that produces models to simulate empirical situations, and whose unity is grounded in the interactions between its various branches rather than in some specific theory. In some of the essays, reference is made to the construction of models for branches of physics, like quantum physics, statistical physics, turbulence, percolation or dynamic systems. The two-way interaction between mathematics and the empirical and the social sciences emerges most clearly in the essays on informatics, where the creation of discrete mathematics, the computer-assisted proofs and the possibility of performing 'mathematical experiments' are treated. The complexity of these forms of interaction emerges also in a few essays dealing with models for the life sciences. Unfortunately, no specific essay is devoted to mathematical modelling and simulation for finance, a rapidly growing field of interaction between mathematics and the social sciences, and one that should have deserved more attention.

Indeed, it is obvious that topics could have been selected according to different and equally legitimate criteria. As for the single essays, one should consider that the authors are practising mathematicians, who have in most cases contributed to the research that is being described. Their accounts are in some respects idiosyncratic and partial, and it could not have been otherwise. Also, in most cases the general perspective is substantially teleological. The relevant results, theorems and techniques are presented in a fashion that relegates the historical dimension to the mere dating of each contribution. With few possible exceptions, the aim of the author is to sketch the state of the art in the field, rather than connecting technical change to broader conceptual shifts, or to clarify why and how certain schools or individuals established their own research priorities. This takes us to a last but crucial remark. The book is not intended for the broader audience of historians of science but for those with university training in mathematics. Contributors address explicitly their essays to the 'non-specialist mathematician', someone who may not be familiar with the most important methods and results in each field but who can go through their formal presentation.

Yet, in spite of its historiographical limits and limited accessibility, this book is a veritable mine of information, a welcome presentation of very recent themes and technical developments and, ultimately, an indispensable work of reference for anyone interested in the history of recent mathematics.

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Lorenzo Magnani, **Philosophy and Geometry: Theoretical and Historical Issues.** Western Ontario Series in Philosophy of Science. Dordrecht, Boston and London: Kluwer Academic Publishers, 2001. Pp. xix + 249. ISBN 0-7923-6933-5. £59.00, $88.00 (hardback).

The author covers much ground in the philosophy of geometry. Epistemological issues are covered, such as the nature and status of foundations, and the relationship between geometry and space (where I would have expected more discussion of intrinsicality); but intuitional features are also treated, such as the role of geometrical or spatial thinking in trying to recognize a person's face, and even cultural manifestations such as the Jewish Sefirot tree with its ten nodes and twenty-two links. For philosophy he takes most sustenance from Kant, especially concerning the notion of intuition; Peirce, with his notion of abductive inference (similar to the later theory of fallibilism of Popper, whose apparatus of falsificationism could be profitably deployed); Poincaré and the status of conventionalism in geometry (but only Poincaré's popular books are considered); and Husserl on the phenomenology of attention directed to specific objects of enquiry. Various modern authors in these streams are also included, for example Thom and the theory of catastrophes. It is a pity that the author misconstrues Frege's philosophy as claiming that mathematics was reducible to logic (p. 59); in fact, he covered only arithmetic and related topics, and held a different philosophy of geometry.

While the author's range of knowledge is