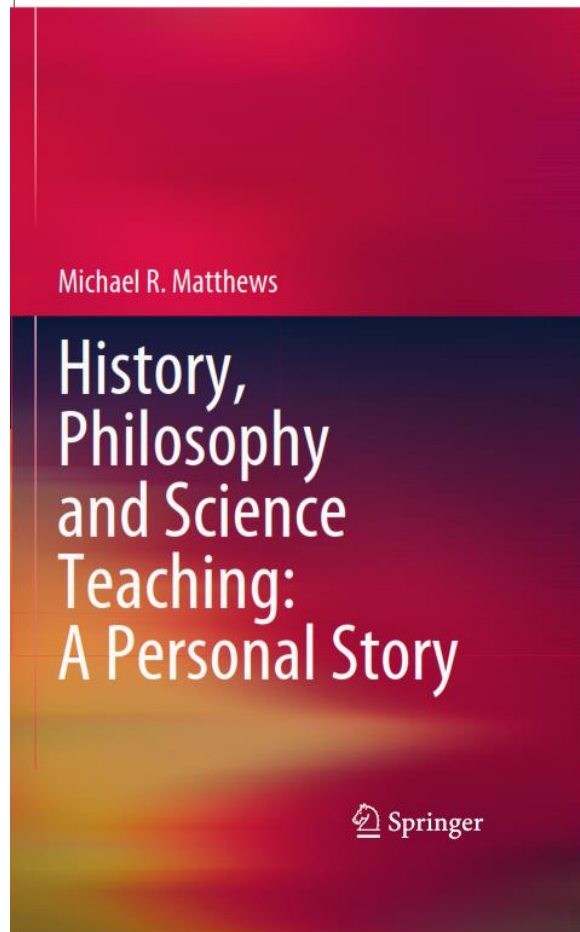


*History, Philosophy  
and Science  
Teaching:*

*A Personal Story*

**Michael R. Matthews**



<https://www.springer.com/gp/book/9789811605574?token=xRMtG7SJe4B2Ddd>

*This book is dedicated to my mother Alice Ellen Catherine Fitzpatrick (1908-1985). She was a rural Irish-Catholic convent girl, one of a family of fourteen raised on a property on the Talbragar River outside of Dubbo in central New South Wales. She married late, and I was an only child. Despite my father leaving home when I was twelve, and Alice being dependent upon precious little maintenance payments, her love, dedication and good management launched me on the educational journey recounted in this book.*

## Preface

This is an academic autobiography, not a personal one. There are elements of the personal, but mainly as they bear upon my intellectual and career trajectory, which was a move from classroom science teaching, to lecturing in philosophy of education, to lecturing and researching in science education. More particularly: from completing a science degree and teacher training at Sydney University, high school science teaching at Dulwich High School in Sydney, completing a double-honours degree in psychology and philosophy, teaching philosophy of education at Sydney Teachers College then at the University of New South Wales, completing a master's degree in history and philosophy of science, being Foundation Chair of Science Education at University of Auckland, and returning to science education teaching and research at UNSW until my retirement in May 2008. Thereupon I became, and have remained, an honorary associate professor in the School of Education.

I have written and edited a substantial amount on HPS&ST, including founding and editing for 25 years the Springer journal [\*Science & Education: Contributions from the History, Philosophy and Sociology of Science\*](#). I hope the charting of my own intellectual maturation and career, along with some elaboration of various scholarly arguments that arose along the journey, might be of use to other researchers, teachers, and students. In particular, I hope it might promote the inclusion of philosophy (both philosophy of science and philosophy of education) in science teacher-education programmes.

The book is not meant to be an overview or summation of contemporary HPS&ST research; it is an account of my transition into and development in the field. My own authored and edited publications provide a summation of that research. Details of the disciplinary arguments, and my own positions on them, can be read at length in the books, articles, anthologies referenced in this work, and that are listed on the UNSW [School of Education](#) website, and in the reference entries in this book. The 3-volume, 76-chapter [Handbook of Research in History, Philosophy and Science Teaching](#) (Matthews 2014) is the best place to start for an overview of the HPS&ST field.

In this book, issues and topics are picked out in as much as I have made contributions to them. Inevitably, it is an opinionated treatment. The conviction, however, is that my own personal story of progress from youthful Catholic adolescent and undergraduate science student, through a commitment to liberal education, and finally being a contributor to HPS&ST research - might have some value to others and perhaps illuminate some fundamental issues in the field.

The main 'take home' lesson is that science education, at all levels from classroom teaching to university research, is enhanced if teachers and researchers have competence and interest in both HPS *and* philosophy of education. This is because both disciplines make unique and indispensable contributions to the numerous, and unavoidable, theoretical, curricular, and pedagogical issues that occupy students, teachers, curriculum writers, examiners, and government policy makers.

The history and philosophy of science is on every page of every science curriculum and textbook, it does not have to be brought into a classroom, it is already there. The words 'law', 'theory', 'model', 'explanation', 'evidence', 'confirmation', 'hypothesis', 'prediction', 'falsification', 'experiment', 'observation', 'measurement', and a host of other philosophically rich and connected words are found everywhere. They just need to be

recognised and elaborated upon as is suitable to the occasion. So too the names ‘Archimedes’, ‘Galileo’, ‘Newton’, ‘Darwin’, ‘Boyle’, ‘Hook’, ‘Lavoisier’, ‘Dalton’, ‘Darwin’, ‘Mendel’, ‘Mach’, ‘Einstein’, ‘Bohr’, ‘Curie’, ‘Crick’, ‘Watson’, ‘Heisenberg’, ‘Mendeleev’ occur in all science programmes. The life, times and achievements of the scientists can likewise be elaborated upon, as the occasion allows. This might involve teacher digressions, student essays, debates, dramatic enactments, and other pedagogical procedures. Sometimes *internal* history where experiments and theory change might be emphasised, at other times, *external* history where the commercial or cultural context of the science might be stressed. The purpose of these elaborations is to have students better understand science; and become more interested in and appreciative of the history.

Likewise, the philosophy of education underpins nearly all decisions that teachers make in their dealings with students, in their own classrooms, in staffrooms, and collegially as a school group. Awareness of both fields is a mark of professionalism; of being an educator, not merely a teacher or a coach. The latter have their own important standards to meet, but educators have additional ethical and cognitive ones.

The challenge of the present time is that just as philosophical matters are increasingly written into science programmes (for instance, explicit attention to the nature and methodology of science), and into the responsibilities of teachers (for instance, to address different social and ethical dimensions of science) - the core disciplines of philosophy of education and HPS are disappearing from teacher education programmes. And, indeed, from many university programmes. Bad enough that the space is left empty, but worse when it is filled with imitation philosophy, ideology and faddism.

## **Recognition and Acknowledgements**

I am pleased that my scholarly work has been publicly recognised. This is personally satisfying, but more importantly such recognition is testament to the importance of HPS&ST research in science education.

Over the decades I have been invited to give lectures and short courses in departments of physics, philosophy, and education at 40+ universities in 30+ countries. Many lasting friendships and cooperative work came from these engagements. Along with invited lectures there have been numerous presentations at science education, philosophy of education, and HPS conferences.

It is worth relating that the largest audience I have ever spoken to was in 2017 at Haimen Secondary College in Hangzhou, China. There were 1,035 heads of school science departments in attendance. The lecture, on ‘HPS&ST: An Overview’, was simultaneously translated, not through earphones but with Chinese characters scrolling down in lines on two huge screens either side of the stage. They clearly wanted to learn about western HPS. So also, Tsinghua University took Bob Cohen’s library of 23,000 books and established the ‘Robert S. Cohen Philosophy Library’. There are ‘in-principle’ plans for Beijing University to do the same with Mario Bunge’s library. The Chinese have problems but they do not have any postmodernist aversion to science.

In 2007 I was asked by Fabio Bevilacqua, Vice President of the Division of History of Science and Technology ([DHST](#)) of the International Union of the History and Philosophy of

Science ([IUHPS](#)), to become President of the Division's Teaching Commission (TC). Despite the efforts and earlier achievements of Jaroslav Folta (Technical University of Prague), Alistair Duncan (Loughborough University) and Horst Remane (Martin Luther University) the TC was exhausted and had basically ceased to function. With diligent assistance from Peter Heering and others, during my two terms as president, it came back to life and achieved a certain amount, including supporting different conferences, being host of the HPS&ST Newsletter, and setting up a useful website. It put pedagogy on the agenda of both the DHST, and later the DLMPS, divisions.

In 2010, two years after my retirement as a full-time staff member at UNSW I was awarded the '[Joseph H. Hazen Education Prize for Excellence in Education](#)' of the US History of Science Society. The prize citation reads:

More than any other single individual, Michael Matthews deserves credit for instilling the History (and Philosophy) of Science in Science Education.

A more vigilant editor might have struck out the opening clause. Prize recipients have included Gerald Holton, James Rutherford, Jane Maienschein, Stephen Brush, Robert Hatch, Paul Farber, Falk Riess, Graeme Gooday, Sally Kohlstedt and Michael Osborne. To be placed in their company is an honour.

In 2011, the Division of the Logic, Methodology and Philosophy of Science ([DLMPS](#)) of the IUHPS was itself investigating the establishment of a Teaching Commission. I proposed to them that as students mostly experience the history and philosophy of science as conjoint disciplines, and as the pedagogical issues are common, there should be an Inter Divisional Teaching Commission (IDTC) rather two separate commissions. This was agreed to by DLMPS Council and I became the initial president.

In 2015 the [International History, Philosophy and Science Teaching Group](#) initiated a 'Distinguished Achievement Award' I was honoured to be its first recipient. Generously, the notation read:

In 1989 Michael Matthews successfully brought together historians, educators, philosophers, and sociologists from around the world to engage in friendly, scholarly discourse at what became the first IHPST conference. Since then IHPST conferences have been held biennially. His early efforts to ensure the sharing of multiple, diverse perspectives set the tone for IHPST which can still be seen today with the friendly and collegial nature of the group. Michael ensured that the group met every other year at the Biennial Conference and that this conference rotated to various parts of the world. Under his direction IHPST's journal, *Science & Education*, flourished during his 20+ years as editor. Michael Matthews impact on the IHPST group is immeasurable.

The subsequent recipients were Ian Winchester (2017) and Fabio Bevilacqua (2019).

Closer to home, in 2019 I was honoured by election as a Fellow of the [Royal Society of New South Wales](#) (FRSN) for my contribution to HPS&ST research.

Of lasting importance for the HPS&ST field is the continuation of the monthly [HPS&ST Newsletter](#). This commenced as a printed and mailed 'publication' in the lead-up to the 1987 Tallahassee conference and is now web-based, with its Contents table and hyperlink being sent directly to an incrementally growing group of about 9,500 emails, and to various science

education and HPS lists. This just ticks away, month-by-month keeping a wide international community of scholars informed about relevant books, journal articles, conferences and other news. The assistance of Paulo Maurício in Lisbon in maintaining the website and in aggregating publications, and of Nathan Oseroff-Spicer in London with formatting the newsletter and seeking out Opinion Pieces, is beyond invaluable.

I am grateful to Nick Melchior, the Springer Australasian editor who, after receiving positive external reviews of an extended essay-draft of this book, provided a contract for its completion. Along with founding and editing for 25 years the Springer journal *Science & Education*, this is my ninth [Springer](#) book. In my over 30 years of dealings with them, they have been a remarkably professional, competent, and conscientious publisher.

I, and more particularly readers, have a special debt to two friends who carefully page-by-page read drafts of the evolving manuscript, making most valuable suggestions about structuring the text; and making punctuation corrections down to the placement of commas, semicolons and colons. Readability has been significantly enhanced by the keen eyes and literary craft-skills of Paul McColl, a retired physics teacher, and Michael Howard, a history graduate and retired lecturer in public policy.

What is clear in this personal story is that I benefited enormously from wonderfully learned philosophy teachers, and then from gifted HPS&ST colleagues. This was my great good fortune. I have an obvious philosophical debt to philosophers and friends who are no longer among us: [Wallis Suchting](#), [Robert Cohen](#), [Marx Wartofsky](#), [Abner Shimony](#), [Mario Bunge](#), [Ernan McMullin](#), [Israel Scheffler](#) and [Michael Martin](#). And I have learnt a great deal from many other philosophers and educators who, pleasingly, are still with us and have been mentioned and cited in this work.

This is an intellectual, not a personal, autobiography. Thus, many important personal and family milestones have not been mentioned though details of the Fitzpatrick family, and of my Christian Brothers schooling, have been given in order to better situate my story. Just as I have had a fortunate academic and scholarly life, so too I have been blessed to have had a fortunate and happy family life.

From the beginning of university, I had pleasing, happy, but chaste friendships with different fine women. Intimate relationships with women began in 1970 when I was 22 years of age. My friendship with Margaret Jolly, an anthropologist, was of special significance. In 1982, aged 34 years, I was introduced to and over-joyed to marry Margaret McHarg, a vivacious school counsellor and social worker. In 1983 our daughter Clare Alice, now a science teacher, was born. She did outstandingly well at school and could have entered any university programme but chose to be a science teacher. She had the same success through her science degree, additionally playing in the Australian Universities women's basketball team. In 2006 she married Luke Musgrave (coincidentally, from a Catholic Dubbo family who well knew the circumstances of the early Fitzpatrick family). They have four delightful children, my grandchildren: Joshua, Eleanor, Noah and Hugo. My marriage to Margaret did not last but, pleasingly, our post-marriage life, parenting, and grandparenting has very happy and rewarding.

In 1988 I had the good fortune to marry Julie House and we have been happily and productively married for 33 years. Julie enrolled in Sydney University five years after me. She studied English, Anthropology and Philosophy; did teacher training at Sydney Teachers



College; became an English teacher in Malaysia; a craft coordinator and business manager in a Hmong refugee camp in northern Thailand; an art and craft manager at Yirrkala aboriginal settlement in east Arnhem Land in the Northern Territory; and a finance-manager/accountant in her family's 100+ year old, mid-sized manufacturing-business. We had known each other since the early 1970s, enjoying a wide circle of common friends.

We have two daughters. Alice, born 1991, who completed degrees in Arts and Commerce, and half a Science degree at Sydney University, and is enrolled in a master's degree in Data Analytics at UNSW. She is a highly regarded teacher of English to migrants and doing very well rising through the grades in Brazilian Jujitsu. Our second daughter, Amelia, born 1996, commenced a mathematics and history degree at Sydney University, and ended majoring in mathematics. She has joined the very small pool of Australian high school maths teachers who have degrees in mathematics. She is now teaching at a small Catholic school in Darwin where half of the students in her classes are Aboriginal or Torres Strait Islands children. Pleasingly, discipline and class management is just not an issue.

Through the efforts of all of us - Margaret, Julie, Luke, my three daughters and me - we have maintained close, warm and caring relationships. This is greatly abetted by Clare, Luke and children living in the delightful coastal village of Minnamurra. We have a holiday house in the same riverside street in which Margaret also lives. A great deal of time is spent together.

Needless to say, all of the writing, editing, organising, conferencing, and travel time that has gone into the HPS&ST work documented in this autobiographical story, has impinged on family life. Had the work not been done, assuredly there would have been more time for family matters. This is a common enough tension for everyone. I hope my own family are forgiving of this.

## About the Author

**Michael R. Matthews** is an honorary associate professor in the School of Education at the University of New South Wales. He has degrees in Geology, Psychology, Philosophy, History and Philosophy of Science, and Philosophy of Education. He has taught in high school, teacher's college, and university. He was Foundation Professor of Science Education at the University of Auckland.



His books include *The Marxist Theory of Schooling: A Study of Epistemology and Education* (Humanities Press 1980); *Science Teaching: The Role of History and Philosophy of Science* (Routledge 1994); *Challenging New Zealand Science Education* (Dunmore Press 1995); *Time*

*for Science Education: How Teaching the History and Philosophy of Pendulum Motion can Improve Science Literacy* (Plenum Publishers 2000); *Science Teaching: The Contribution of History and Philosophy of Science* (Routledge 1994a, 2015); *Feng Shui: Teaching About Science and Pseudoscience* (Springer 2019).

His edited books include *The Scientific Background to Modern Philosophy* (Hackett 1989); *History, Philosophy and Science Teaching: Selected Readings* (Teachers College Press 1991); *Constructivism in Science Education: A Philosophical Examination* (Kluwer Academic Publishers 1998); *Science Education and Culture* (with Fabio Bevilacqua and Enrico Giannetto) Kluwer Academic Publishers 2001); *The Pendulum: Scientific, Historical, Philosophical and Educational Perspectives* (Springer 2005); *International Handbook of Research in History, Philosophy and Science Teaching* (Springer 2014).

He was Foundation Editor of the journal *Science & Education*; he has published scores of journal articles and book chapters in science education, philosophy of education and the history and philosophy of science; he has contributed to major Education encyclopaedias and handbooks.

He was Foundation President of the International History, Philosophy and Science Teaching Group; was President of the Interdivisional Teaching Commission of the Division of History of Science and Technology and Division of Logic, Methodology and Philosophy of Science of the International Union of History and Philosophy of Science; and received the Joseph H. Hazen Education Prize of the US History of Science Society. Outside of education, he was elected as the first ever Independent alderman of the Council of the City of Sydney.

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