

**Michael R. Matthews (ed.) *Mario Bunge: A Centenary Festschrift*, Springer, 2019.**

## **Preface and Acknowledgements**

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Although personal, it is worth telling a little of the story of how an Australian educator has had the good fortune to edit this festschrift for Mario Bunge, the renowned Argentine/Canadian physicist and philosopher. Hopefully the personal story has some wider, non-personal lessons for the better preparation of science teachers and the need for science-informed teaching of philosophy.

I first became aware of Mario Bunge's work in the early 1990s, twenty years after my appointment at the University of New South Wales and thirty years after beginning my own science, philosophy and education studies at the University of Sydney. For me, this is a clear case of being better late than never. I had been editing the Springer journal *Science & Education: Contributions of History, Philosophy and Sociology of Science* since its foundation in 1992.<sup>2</sup> In 1995 two researchers who I did not know, Martin Mahner and Mario Bunge, submitted a manuscript on 'Religion and Science Teaching' (Mahner & Bunge 1996a).

On account of the manuscript being so comprehensive, informed, clearly argued, and on a much-discussed and debated educational topic, I invited a group of six philosophers, theologians and educators to comment on it and for Martin and Mario to respond (Mahner & Bunge 1996b). We had a good deal of correspondence back and forth about the original submission, reviews, and the responses. The papers were aggregated into a journal special issue (volume 5 number 2, 1996) that was separately sold, widely read, and much cited. It introduced Mario to a wide international science teaching community, but especially to that segment concerned with the utilisation of history and philosophy of science in dealing with theoretical, curricular and pedagogical issues in science education. I subsequently published other papers of Mario's in the journal (Bunge 2000, 2003a,b, 2012a).

My own background prepared me to appreciate the initial Mahner and Bunge manuscript and to see its connection to a core theoretical issue in the teaching of science. After a Catholic schooling, I had completed a science degree at the University of Sydney (1965-67) during which time I was involved in Catholic student affairs, to the extent of being President of the university Newman Society. The staff and fellow-student members of the society had a significant intellectual and personal impact on my undergraduate years; they shaped that important and life-directing experience.

This was followed by a teacher education degree at Sydney Teachers' College (1968). There I did a semester course in philosophy of education, and this is where this autobiographical story connects with a larger, more objective lesson about philosophy in teacher education.

The course was taught by Anna Hogg who had completed her PhD in philosophy of education with Richard Peters at the, then famed, London Institute of Education. The entire course was based upon a detailed reading of the substantial, just-published book of Peters – *Ethics and Education* (Peters 1966). This 'theoretical' course was the most practical part of

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<sup>2</sup> An account of my 25 years of editorship is given in Matthews (2015b).

my teacher education; it was a course that shaped my entire educational trajectory. There is some parallel with Mario Bunge's oft-made remark that there is nothing so practical for physicists as good philosophy, and nothing so impractical as bad philosophy. More is the pity that such courses have now all but disappeared from Anglo-American teacher education programmes, being replaced by 'how to teach' and supposed psychology courses which mostly struggle to rise above passing fads (Hirst 2008). Teacher education has been dumbed down; in many places it is reduced to on-the-job training with barely a nod towards any disciplinary competence.

Peters' arguments, in the Analytic Philosophy tradition, were very simple; they were concerned with identifying the *process* of education and its *outcome*, namely the characteristics of an educated person (Peters 1967, 1973). For an educational process to be taking place - as distinct from just a teaching, training, indoctrinating, or coaching process - students should be learning something valuable, and the aim should be for them to understand, in the long term, what they are being taught; not merely to repeat what they are taught. Students being educated should end up with a cognitive grasp of the subject, how it all 'hangs together', how its truth claims are settled, and how it connects with other topics and subjects. Consequently, teachers aspiring to educate students need a good or deeper understanding of the subject matter they are teaching. And for this to happen, as was comprehensively argued by Israel Scheffler (Scheffler 1970, Matthews 1997), they need some appreciation of the history and philosophy of their subject, no matter what that might be - economics, history, mathematics, theology, literature, or anything else.

Apart from a *cognitive* requirement, for Peters, educational processes need to meet *moral* requirements; education needs to be conducted in an ethical manner. Students need to be respected, methods cannot be demeaning, discrimination cannot occur.

The hoped-for outcome of educational processes is the formation of an educated person. Such a person is characterised by *cognitive* qualities, namely a certain breadth and depth of knowledge; and by *moral* qualities as manifest in their life and decision making.

I was an immediate convert to these ideals of Liberal Education and absorbed the view that if I were to be a good teacher in that tradition, I needed to improve my own subject-matter education and be more conscious of the ethical dimension of education, and act accordingly both in the classroom, the staffroom, and in the profession. These were simple and obvious implications of Peters' argument.

Consequently, while I was a young high school science teacher and energetically supporting educational ventures in the school (debating, General Studies classes, visiting speakers, etc), I returned to Sydney University and completed part-time degrees in philosophy, psychology and education. To teach a discipline meant you had to know something about it, and about how students learn.

The Sydney Philosophy Department was arguably the best in Australia; some staff thought it was the best for a considerable distance beyond Australia. Among its more science-orientated faculty were Alan Chalmers, David Armstrong, David Stove, Michael Devitt and Wallis Suchting. All valued science and clear argument; they decried obfuscation, weasel words and slogans. Suchting was a philosophy teacher who became a close friend. I was privileged to be able to publish a number of his papers in the early years of my editorship of *Science & Education* (Suchting 1992, 1994, 1995). They are among the most philosophically informed and sophisticated papers to appear in a science education journal, or indeed in any education journal.

The Sydney philosophy faculty were writing on many of the questions that Mario Bunge was working on, but the work was done in parallel worlds, with little if any cross fertilisation. The exception was Mario's early awareness of David Armstrong's materialism and psychoneural monism that he faulted for its 'inexactness and radical reductionism'

(Bunge 2016, p.213). Characteristically Mario knew more about Sydney philosophers than they knew about him. The disjunct can retrospectively be seen by the fact that a course on Causality that I completed in the early 1970s was taught without reference to Mario's groundbreaking book on the subject (Bunge 1959). My own philosophical education proceeded without awareness or benefit of Mario's herculean contributions to so many fields in which I was taking an amateur interest: he did not figure in philosophy of science or philosophy of mind courses.

I was appointed as a lecturer in philosophy of education first at Sydney Teachers' College (1972), then at University of New South Wales (1975), having special responsibility for teaching philosophy to trainee science teachers. There are general issues about philosophy of education with which all teachers need to engage; but there are also disciplinary-specific philosophical matters with which they should engage. This was the beginning of my teaching and writing on how the history and philosophy of science could inform theoretical, curricular and pedagogical issues in science teaching. The constant refrain in my courses was that history and philosophy did not have to be brought into the science classroom, it was already there. HPS was there whenever inquiry was conducted, experiments were done, observations made, instruments used, causes listed, explanations given, laws related, models elaborated, when names such as Galileo, Newton, Boyle, Dalton, Darwin, Mendel, Einstein, Bohr, Heisenberg, Schrödinger mentioned, or scientific-technological controversies were discussed. Teachers just had to know something about philosophy and history in order to bring it to student awareness and engage them.

In contrast the Sydney University Psychology Department was immersed in the Behaviourism of the time. The Head of the department used to only half-jokingly declare that 'I would like to study human beings, but what do they tell us about rats?' So, the empirical thesis of my honour's year was a study of 'The Safety-Signal Account of Bar-Press Avoidance Learning'. This, decades later, gave me grounds for appreciating Mario's dismissal of behaviourism as philosophically ill-informed 'brainless psychology'. The theoretical thesis was an aspect of intentions as causes of behaviour, a routine topic in philosophical psychology of the time.

Unbeknown to me, Mario had for decades been writing in these fields. He simply embodied all the liberal education ideals; he was at once a philosophical physicist and a scientific philosopher.

Our paths almost crossed at Boston University in 1978. I had gone to the Boston University Centre for History and Philosophy of Science for my first sabbatical leave. The Philosophy Department had stellar quality staff, including Michael Martin, Robert Cohen, Marx Wartofsky, Joseph Agassi and Abner Shimony. All were committed to science, and to illuminating the connections of science with its history, and its philosophy. This commitment is manifest in volume after volume of the *Boston Studies in Philosophy of Science*, first published in 1963 by Reidel, then Kluwer, then Springer.

While there I had the good fortune to take a graduate course on Marxism with Cohen and Wartofsky, and a Galileo-based course on philosophy of science with Shimony. Like Bunge, Cohen and Shimony were jointly professors of physics and philosophy; and both shared Bunge's commitment to defending the Enlightenment project against its detractors. It was a profound lesson to see how Shimony, a significant contributor to contemporary quantum theory (Myrvold & Christian 2009), and to philosophy (Shimony 1993a,b) devoted an entire graduate course on philosophy of science to just careful reading and elaboration of Galileo's *Dialogue Concerning Two Chief World Systems* (Galileo 1633/1953).

Having a philosophy course begin with the texts and achievements of the great scientists was a lesson taken into my subsequent teaching of the subject to trainee teachers; it is an approach that well resonates with science teachers (Matthews 1990). Pre-service and

in-service teachers can be bewildered and impatient with reading the standard big names in philosophy of science, but not with reading the scientists whose methodologies and achievements were being disputed. They are reduced to spectators watching the prominent philosophers – Nagel, Hempel, Kuhn, Popper, Lakatos, Toulmin, Laudan, Feyerabend – debate about the scientists, but not knowing what the scientists ever wrote or achieved. This is akin to geology students studying rocks but never picking one up; or students reading about experiments but never conducting one. Mach and Dewey were right about the importance of experiential learning. Again, this is something that from the outset Mario has affirmed: to philosophise about science, it helps to have practiced science; to interpret the history of science, it is helpful to have read the texts.

One outcome of this Boston University leave was my source book on *The Scientific Background to Modern Philosophy* (Matthews 1989). This was compiled so that philosophy students might see that the history of philosophy is not a long disciplinary soliloquy, but rather a long dialogue with the science of the time. A second outcome was the commencement of my pendulum motion studies; and detailing how history and philosophy can enrich its teaching (Matthews 2015a, chap.6). Both outcomes were of a Bungean kind, but did not benefit from his work, as I had not at that point read any of it. Unfortunately, Bunge's work was rarely read in even the best Anglo-American philosophy programmes. More is the pity.

Bunge also went to Boston University in 1978 but arrived after I had left. While there, among other things, he clashed with Stephen Jay Gould over the latter's account of species as individuals, and of species rather than populations evolving (Bunge 2016, pp.219, 285-86). An excellent photo of Marx Wartofsky, Joseph Agassi and Bunge by Charlie Sawyer is reproduced below. A trio of exceptional philosophers, with Wartofsky (1928-97) sadly dying early.<sup>3</sup>

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<sup>3</sup> For some of Wartofsky's illuminating studies of the interplay of science and philosophy see Wartofsky (1968a,b, 1976). For Agassi's contributions to the subject see Agassi (1964, 1968, 1975, 1981, 2013).



Frontmatter Photo 2: Marx Wartofsky, Joseph Agassi, Mario Bunge. Boston University, 1969. (Charlie Sawyer, photographer)

For the two years 1992-93, I was Foundation Professor of Science Education at The University of Auckland. This was a tumultuous couple of years because the country's science education, including National Curriculum writing and examinations had been taken over by Waikato University constructivists with support from University of Auckland postmodernists. I was involved in debates up and down the country, on radio, TV and newspapers, defending realism, rationality, reason, and liberal education (Matthews 1995). It was clear that all the big national issues in science education were at base philosophical issues; it was a case, again, of bad philosophy having unfortunate educational and national consequences. The constructivist establishment embraced and promoted relativism, idealism, irrationalism (called localism), and the multi-science thesis.

As just one of scores of examples of the practical ill-effects of this philosophy, at the University of Auckland completion of an anthropology course on Maori science was deemed to satisfy the science requirement for trainee elementary teachers, and the science requirement of the university's General Education programme. But this policy decision raises the question: Is Maori science, science? This was a philosophical matter of great consequence. Unfortunately, faculty, administrators and students were poorly prepared to grapple with it. There could have been social, political, or cultural reasons for the anthropology allowance, but these were not argued; instead the epistemological claim was made that Maori science was science. A consequence was that overwhelmingly, Maori

students avoided science, and this fed on down through the school system. Philosophical decisions had consequences.

Again, unbeknown to me Mario was publishing on these very subjects at the very time of the New Zealand debates (Bunge 1991a,b, 1992, 1993, 1994). His arguments could have greatly enlightened discussion, but they simply were not read; neither inside nor outside of philosophy. New Zealand was fortunate in having good local philosophical defenders of realism, rationality and universalism – in particular Robert Nola (Nola 1988, 2003) and Alan Musgrave (Musgrave 1993) – but these also were not read by educators nor were they invited on to national curriculum committees. The whole experience underwrites Mario's life-long conviction that philosophy is important, and needs be seriously attended to. There are unfortunate personal, cultural and social consequences of embracing faulty or discredited philosophy. In the New Zealand case, the effects reached all the way up to the National Science Curriculum.

My 'at a distance' relationship with Mario moved to a personal one in 2001 when Marta Bunge accepted a Visiting Fellowship in the UNSW School of Mathematics. Mario, who travelled with her, asked me if he might be attached as an Honorary Visitor to the School of Education. The six months that he and Marta spent in Sydney were very happy and productive for both of them and for my own family, who shared many times and occasions with them. Mario describes this period in his *Memoirs* (Bunge 2016, pp.371-75). Incidentally, given Mario's reputation for combative argument, the administrative staff said after he left: 'Mario was the most polite visitor that the School of Education ever had'. He was unflinching in his courtesy and consideration of the office staff.

Mario's UNSW sojourn laid the foundation for two decades of personal friendship and collaborative work, including the publication of two thematic issues of *Science & Education*. The first issue was devoted to appraisals of his accounts of Quantum Theory (vol.12 nos.5-6, 2003); the second issue appraised his Systemic Philosophy (vol.21 no.10, 2012).

My own contribution to science education debates had independently, but in a much scaled-down form, mirrored Mario's eight-decade long defence of realism, rationality and science; and his criticisms of constructivist epistemology, idealist ontology, and pseudoscientific pretence (Matthews 1998, 2009, 2015a, 2018, 2019a).

In 2015 having again met Mario and Marta, this time at their Montreal home, when he was 95 years, and seeing him in such good health, spirits and with his ever-lively mind functioning so well - the prospect of him celebrating his 100<sup>th</sup> birth was very real. Thinking ahead, this was something that I thought should be suitably celebrated by the academic community – it is a rare enough event for anyone to reach five-score years, much less for an academic to be still writing and publishing as the occasion draws near (Bunge 2012 a,b, 2013, 2016, 2017, 2018).

In late 2016 I contacted Lucy Fleet, a Springer philosophy editor who had overseen some of Mario's earlier Springer publications, including his *Matter and Mind* (Bunge 2010) and his absorbing and informative *Memoirs of a Philosophical-Scientist* (Bunge 2016), and proposed the idea of a Centenary Festschrift to suitably mark the occasion. Lucy was enthusiastic and after internal discussion and external review, Springer accepted the idea and issued a contract for the volume to appear in the *Boston Studies in the Philosophy of Science* series. There followed almost two years of advertising, soliciting, letter writing, reviewing, settling on accepted contributions, and structuring the volume. It was Lucy's immediate enthusiasm that set the festschrift project in train, and that has subsequently guided it through to fruition. The number, variety and quality of papers finally published well testify to the international esteem in which Mario is held. Hopefully this festschrift will contribute a little to enhancing that esteem and appreciation.

Returning now to the beginning of these remarks. If this volume does have merit and does make a positive contribution to philosophy, then it needs be recognised that the volume was only possible because fifty years ago philosophy was included in the science teacher education programme at Sydney Teachers College (Matthews 2019b). Would that more teacher education programmes valued and included philosophy (Colgan & Maxwell 2019); and that more teacher educators might thus have the good fortune of meeting, learning from, and working with first-rate historians and philosophers of science such as Mario Bunge.

Understandably the festschrift project has taken a great deal of - happily given - editorial work and time. In the final stage I have received the wonderful assistance of a team of friends and colleagues who have copyedited all final submissions, with most having been copyedited twice by different readers. Copyediting used to be a routine part of all major publishers' operations. It no longer is. Doubtless this collection will have typos, missing references, poor punctuation, and unclear sentences, but without the heroic labours of the following there would have been so many more of them giving irritation to readers: Don Allen (Texas A.&M. University), Robert Carson (Montana State University), John Forge (University of Sydney), Ron Good (Louisiana State University), Walter Jarvis (University of Technology, Sydney), Jim Mackenzie (University of Sydney), Mitch O'Toole (University of Newcastle), Stuart Rowlands (University of Plymouth), Roland Schulz (Simon Fraser University), Wendy Sherman-Heckler (Otterbein College), Roger Wescombe, Kay Wilson, and Robyn Yucel (La Trobe University).

Paul McColl - a retired Australian science teacher, a graduate of the University of Melbourne, and part-time lecturer at La Trobe University - warrants special thanks for the large number of chapters he meticulously read and corrected whilst meeting tight deadlines. Would that all authors and editors could have such assistance as I have had.

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