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Book Review

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A Personal Review

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History, Philosophy and Science Teaching: A Personal Story is a captivating academic autobiography, published in 2021, by Michael R. Matthews, Australian philosopher of education, known for his contribution to the advancement of the use of history and philosophy of science to enhance science education. As Matthews chronicles his own intellectual and career trajectory, he ends up outlining the history of the research in History and Philosophy of Science and Science Teaching (HPS&ST). I began my own journey into HPS&ST around 2009, as I moved to Salvador, Bahia, Brazil, to pursue a PhD at the Graduate Program in Teaching, Philosophy and History of Sciences UFBA-UEFS[2] – after having already been well trained in the history and philosophy of science at the Federal University of Minas Gerais (UFMG) over ten years. In what follows, I endeavor to outline a personal review of Matthews' book: *History, Philosophy and Science Teaching: A Personal Story*.

I had the pleasure of meeting Mathews twice after beginning my journey into HPS&ST. Firstly, in 2010, at a time I was still a novice in HPS&ST research, on the occasion of the 1st Latin American Conference of the International History, Philosophy, and Science Teaching Group, which took place in Maresias, Brazil. A few years later, in 2012, in Boston, USA, when I was a Fulbright visiting scholar at STS MIT, I attended a colloquium at the Boston University's Center for Philosophy and History of Science, where Matthews gave a talk entitled "HPS&ST: Looking Back and Going Forward".

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[2] The Graduate Program in Teaching, Philosophy and History of Sciences – jointly hosted by the Federal University of Bahia (UFBA) and the State University of Feira de Santana (UEFS) (https://ppgefhc.ufba.br/en) – was established in Salvador, Bahia, Brazil. The Program was inspired and informed by what was happening around the world at the time, such as the initiative promoted by Michael Matthews and his colleagues in founding the International History and Philosophy of Science and Science Teaching Group (IHPST) in 1989. An account of the conception of this Graduate Program can be found in Freire JR., O. and Tenório R. M., 2001.

Born in Sydney, Australia, on 19 May 1948, Matthews was the only child of Alice Fitzpatrick and Robert A. Matthews. Having been raised in a traditional Irish-Catholic atmosphere, Michael R. Matthews had, from 1952 to 1964, a Christian Brothers education[3], first in a small parish school then as a 'scholarship' boy at the large Waverley College. Matthews kept his connection to Catholicism during his education at the University of Sydney (1965-69), through to his membership of the Newman Society. The Newman Society: Oxford University Catholic Society, founded in 1878, is Oxford University's oldest Roman Catholic organization, a student society named as a tribute to Cardinal John Henry Newman (1801-1890). Newman was the foremost nineteenth-century champion of Liberal or General Education. Newman's core liberal (or general) education convictions had a persistent influence on Mathews. During these formative years (1968-1975), Mathews was also involved in the Sydney Theological Studies Society – which he saw as a natural follow-up from the Newman Society.

Two important and long-lasting influences on Matthews from his early education and upbringing were the 'structure' of Thomism and the ideals of a Liberal or General Education. In an educational environment of specialization and fragmentation in times like ours, marked by Snow's 'Two Cultures' split, the 'structure' of Thomism offers a sense of unity to be sought (although in a completely different framework). In the late-2000s, Matthews' interest in the interplay between the 'grand schemes' of cultural worldviews and the 'piecemeal workings' of science (Chapter 8) also allude somehow to this Thomist heritage. The ideals, aims, and values of a Liberal or General Education, on the other hand, seemed somehow endangered by the influence of Constructivism in the 1980s, and Cultural Studies in the 1990s, in the philosophy of education (as he outlines in Chapters 7 and 9, respectively). Matthews opposed these tendencies, advocating a more Liberal Education instead (e.g.: Matthews 2020).

As outlined in Chapter 2, after completing compulsory physics, chemistry, biology, and geology in his first-year at the University of Sydney in 1965, Mathews took a two-year coursework in philosophy (1966-67), which he considered to have been a life-changing experience. The Sydney Philosophy Department's professors were, broadly speaking, committed to traditions of realism, rationality, science, and free inquiry, largely inspired by Glasgow-trained philosopher John Anderson[4] (1893-1962). Matthews was introduced to the philosophy of science as a consequence of this two-year coursework; Logic was taught in the first year and Logical Empiricism in the second. The Sydney Philosophy Department's embrace of realism, rationality and science sat comfortably with Matthews' experience of the Catholic Thomist-realist philosophical tradition. However, he was less at ease with the ontological materialism and ethical utilitarianism of the bulk of the staff.

Afterward, as he describes in Chapter 3, Matthews enrolled in the Diploma of Education (DipEd) at Sydney Teachers College (STC) in 1968, taking a course in Philosophy of Education taught by Anna Hogg (1910-2011), a Scottish Christian academic who had studied with Richard Peters at the London Institute of Education. Peters' ideal of education, taught in Anna Hogg's course, was comparable to the German ideal of *Bildung* and had a strong impact on Matthews. Matthews wrote, "Anna Hogg's philosophy course informed my teaching life" (Matthews 2021, 61). Here again, we find Matthews's appreciation and inclination towards an education inspired by the Enlightenment tradition that will guide his evaluation of a number of educational issues over the years, such as those mentioned

[3] Founded by Edmund Rice in Waterford, Ireland, in 1802, the *Congregation of Christian Brothers* is a worldwide religious community within the Catholic Church. Patrick Ambrose Treacy established the first permanent Christian Brothers community in Australia in 1868.

[4] John Anderson (1893-1962) was a Scottish philosopher who occupied the chair of Challis Professor of Philosophy at Sydney University from 1927 to 1958, an exponent of 'empirical philosophy' and campaigner against the influence of religion on all levels of education.

regarding the influence of Constructivism (in the 1980s) and Cultural Studies (in the 1990s) in the philosophy of education. Furthermore, at about this period, Matthews began his involvement in the Philosophy of Education Society of Australasia (PESA).

In 1969, Matthews began teaching science at Dulwich High School (where he taught until 1972). Matthews undertook two further part-time studies at Sydney University while teaching in school: a MEd degree in Philosophy of Education (1969-1973) and a double-honors BA degree in Psychology and Philosophy (1969-1973). Pavlovian-Skinnerian Behaviorism dominated the Sydney University Psychology Department and the psychology honors' degree involved both a practical (empirical) and a theoretical thesis. Matthews's theoretical thesis was a 200-page study of *Causality, Intentions and the Explanations of Behavior*.

Moreover, two classes Matthews took at the philosophy department in 1972, both taught by Wallis Suching (1931-1997), had lasting impacts. The first class was on David Hume (shedding light on Matthews' interest in causation for his theoretical thesis in Psychology), the second was on Marxist philosophy. As Matthews informed us: "History of Science and Marxist epistemology fitted well together" (Matthews 2021, 113). Wallis Suching was also in charge of the 1973 'Thomas Kuhn Seminar' where Matthews and his colleagues studied the 1970 edition of Kuhn's work: *The Structure of Scientific Revolutions*.

In studying both empirical science (psychology) and philosophy of science, Matthews could notice some philosophical naiveties behind the behaviorist research and the teaching program he was enrolled in. It seems to me, as a reader, that this was a fortunate choice. The importance of studying philosophy of science while studying science couldn't be clearer. "What was clear to me in studying philosophy and psychology in parallel was how diminished psychology was by its failure to engage with philosophy, and how detrimental this was for the education of students", Matthews wrote (Matthews 2021, 73).

Matthews was offered an appointment as a lecturer in philosophy of education at Sydney Teachers College (STC) in mid-1972 (a position he held until 1974) (Chapter 4). He taught courses such as 'Ideology, Society and Schooling' and 'Christianity and Marxism'. Matthews took a stance on a number of contentious issues related to debates around 'radical education', a hot topic of the time, which was not a cost-free indulgence, as Matthews did not get tenure at STC.

In 1974, an advertised lectureship in philosophy of education at the University of New South Wales (UNSW) caught Matthews' attention. Matthews took the position in 1975 and stayed at UNSW, with a brief interlude as Foundation Professor of Science Education in Auckland (1992-1993), until his retirement in 2008. As he explains in Chapter 4, it was during this time that his professional concern with HPS&ST questions was sparked. A sabbatical year at the Boston University's Center for Philosophy and History of Science in 1978 marked a watershed moment.

Robert Cohen (1923-2017) and Marx W. Wartofsky (1928-1997), who founded the Center in 1960 as an offshoot of the Institute for the Unity of Science (the American transplant of the historic Vienna Circle), were there and had an important influence on Matthews' trajectory thereafter. Michael Martin (1932-2015), an analytic philosopher of science, was also part of the staff. Abner Shimony (1928-2015), however, may have been even more influential in leading Matthews' research interests down two different directions. Due to a course on Galileo taught by Shimony at the Boston University's Center for Philosophy and History of Science, Matthews was motivated, after returning to Australia, to write a thesis on Galileo's Physics, enrolling in an honor MA degree in HPS at the University of Sydney (between 1979 and 1985) and, about a decade after his MA in HPS, this same research interest would inspire Matthews to bring his Pendulum Studies to fruition (as he details in Chapter 7). Moreover, Shimony (and, to some extent, Cohen who gave him volume 6 of the Boston

Studies Series[5] on Ernst Mach (Cohen and Seeger 1970)) drew Matthews' attention to the work of Ernst Mach (1938-1916) as a kind of forerunner of the area of HPS&ST, a topic Matthews would later explore in more depth (Matthews 1989, 1990, 2019a). Matthews also admired Shimony for his defense of the Enlightenment project in science education (see Shimony 1997).

Matthews gave that talk I mentioned I attended in 2012, in Boston, at the Boston University's Center for Philosophy and History of Science, entitled "HPS&ST: Looking Back and Going Forward".[6] Like a cycle that completes itself, Matthews began his talk by acknowledging the instrumental role played by the Center for his own trajectory and concluded it by mentioning the upcoming enormous 3-volume 2014 *International Handbook of Research in History, Philosophy and Science Teaching* (Matthews 2014). "Through Robert Cohen, Marx Wartofsky, Michael Martin, and others I was introduced to the 'Boston University Style' of history and philosophy of science. The 'Style,' exemplified in the *Boston Studies in Philosophy of Science* series, was characterized by its diversity" (Matthews 2000, ix). It was also during the same period of his MA in HPS that Matthews had an important political interlude as alderman on Sydney City Council from 1980 to 1985 (Chapter 5).

Matthews' sabbatical at the Boston University Center for Philosophy and History of Science was of instrumental significance, but only after a second sabbatical year at the Philosophy Department at Florida State University (FSU) in 1987, did Matthews and his colleagues found the International History, Philosophy, and Science Teaching (IHPST) Group. Among other reasons, Matthews chose FSU because of its Philosophy Department's faculty member David Gruender (1928-2007), who had written on Galileo. In April 1987, Matthews was at the Washington AAAS conference's celebration of the tri-centenary of the publication of Newton's *Principia* (1687). Jaakko Hintikka (1929-2015), the editor of Springer's *Synthese* journal, suggested to Matthews to organize a special issue on the topic of 'History, Philosophy and Science Teaching'. Matthews gathered so many good essay contributions for this special issue of *Synthese* that he had to forward the surplus academic contributions to other journals' special issues.[7]

David Gruender also encouraged Matthews to organize the first HPS&ST conference, held in Tallahassee in November 1989. The conference marked the beginning of the IHPST Group in 1989 and its biennial conferences[8]. Regional meetings have also been held in South

[5] Beginning in 1963, the proceedings of many colloquia at the Boston University's Center for Philosophy and History of Science were published in the series *Boston Studies in the Philosophy of Science.* Under the editorship of Robert Cohen alone, the *Boston Studies in the Philosophy of Science* produced more than 200 volumes in the areas of philosophy of the natural and social sciences, logic, mathematics, and the history and social relations of science.

[6] This colloquium "How Can the History and Philosophy of Science Contribute to Contemporary U.S. Science Education?" took place at the Boston University Center for Philosophy and History of Science on December 7, 2012. Gerald Holton was present among others. Holton was a transitional figure between the Institute for the Unity of Science and the founding of the Center. See this talk in https://www.bu.edu/hps-scied/conference-2012/outcomes/presentations/hps-st-looking-back-and-going-forward/.

[7] *Interchange* (Vol. 20, No. 2, 1989) (https://link.springer.com/journal/10780/volumes-and-issues/20-2), *Interchange* (Vol. 24, Nos. 1-2, 1993) (https://link.springer.com/journal/10780/volumes-and-issues/24-1), *Studies in Philosophy and Education* (Vol. 10, No. 1, 1990) (https://link.springer.com/journal/11217/volumes-and-issues/10-1), *Science Education* (Vol. 75, No 1, 1991) (https://onlinelibrary.wiley.com/toc/1098237x/1991/75/1), *Journal of Research in Science Teaching* (Vol. 29, No, 1992) (https://onlinelibrary.wiley.com/toc/10982736/1992/29/4), and *Synthese* (Vol. 80, No. 1, 1989) (https://link.springer.com/journal/11229/volumes-and-issues/80-1).

[8] The biennial IHPST conferences have been successfully held ever since in Kingston, Canada (1992), Minneapolis, USA (1995), Calgary, Canada (1997), Pavia, Italy (1999), Minneapolis, USA (1995), Calgary, Canada (1997), Pavia, Italy (1999), Denver, USA (2001), Winnipeg, Canada (2003), Leeds, England (2005), Calgary, Canada (2007), Notre Dame, USA (2009), Thessaloniki, Greece (2011), Pittsburg, USA

America, Asia, and Europe.[9] Matthews also began editing an IHPST newsletter. In 1989, during the process of organizing the first IHPST conference in Tallahassee, Matthews met Israel Scheffler (1923-2014) at Harvard University, who offered Matthews a contract to write for Scheffler's Routledge Philosophy of Education Research Library's series. The result was his seminal 1994 book, *Science Teaching: The Role of History and Philosophy of Science* (Matthews 1994). Scheffler was another important figure for Matthews' philosophy of education: "For nearly fifty years my own teaching and thinking had been informed first by Richard Peter's analytic philosophy of education; and second by Israel Scheffler's connection of philosophy of education to philosophy of the discipline being taught" (Matthews 2021, 268).

In 1990, Matthews met the Kluwer Education Editor, Peter de Liefde, at the American Philosophy of Education Society (PES), who suggested turning the IHPST newsletter into a Kluwer journal. The journal, *Science and Education: Contributions from History, Philosophy and Sociology of Science and Mathematics*, first appeared in 1992, with four numbers per year, Matthews was Editor-in-Chief until 2019.

In 1995, as described in Chapter 9, Matthews reviewed an article for *Science and Education* by Argentine/Canadian philosopher Mario Bunge (1919-2020). It was the beginning of a lifetime friendship and intellectual exchange. In 2002, Mario's mathematician wife Marta Bunge went to Sydney's Macquarie University on sabbatical leave and Mario contacted Matthews to see if he could be an Honorary Visitor to the School of Education, and so he did. Just as he had found in Shimony before him, Matthews found in Mario Bunge a sober voice of reason championing the Enlightenment tradition in science education against its detractors (Matthews 2019c). As Matthews comments in Chapter 9: "The unifying thread of Bunge's scholarship is the vigorous advancement of the Enlightenment Project, and criticism of cultural and academic movements that deny or devalue the core planks of the project" (Matthews 2021, 251).

In Chapter 7, Matthew expresses more fully and in greater detail, the Pendulum Studies (1995-2005) mentioned, an integrated, cross-disciplinary, HPS-informed liberal approach to science teaching. As outputs of these landmark studies, Matthews published *Time for Science Education: How Teaching the History and Philosophy of Pendulum Motion can Contribute to Science Literacy* (Matthews 2000), and coordinated a large International Pendulum Project grounded on a number of special issues of *Science and Education*,[10] two conferences held at UNSW in 2002 and 2005, and an anthology co-edited with Colin Gauld (Matthews; Gauld; Stinnes 2005).

In Chapter 8, Matthews describes the research mentioned above, a project developed between 2008 and 2010 on the mutual interaction of science with cultural worldviews (and how that is expressed in science classrooms). He first oversaw the publication of a thematic double issue on the topic in *Science and Education* in 2009,[11] later published as a book by Springer (Matthews 2009a). At around the same time, as Matthews organized the first Asian Regional Conference of the IHPST in 2012, he developed particular interests in Feng Shui as a

(2013), Rio de Janeiro, Brazil (2015), Ankara, Turkey (2017), Thessaloniki, Greece (2019), and Calgary, Canada (2021).

[9] The 1st Latin American Regional Conference of the International History, Philosophy, and Science Teaching Group (IHPST-LA), which I mentioned having participated, took place in Maresias, Brazil, in 2010. The 2nd IHPST-LA Conference took place in Mendoza, Argentina, in 2012. The 3rd IHPST-LA Conference took place in Santiago, Chile, in 2014. The 4th IHPST-LA Conference took place in Santo André, Brazil, in 2018.

[10] *Science Education* (Vol. 13, Nos 4-5, 2004) (https://link.springer.com/journal/11191/volumes-and-issues/13-4) and *Science Education* (Vol. 13, Nos 7-8, 2004) (https://link.springer.com/journal/11191/volumes-and-issues/13-7).

[11] *Science Education* (Vol. 18, Nos 6-7, 2009) (https://link.springer.com/journal/11191/volumes-and-issues/18-6).

worldview, a research interest that extended from 2012 to 2020, resulting in his 2019 publication on the topic (Matthews 2019b).

Another historical figure who caught Matthews' attention, on the occasion of the 5th biennial conference of the IHPST Group in Leeds, was the English chemist Joseph Priestley (1733-1804), as the author describes in Chapter 8. As Matthews rightly pointed out, "Priestley is an underutilized figure in science education" and "Priestley's contribution to the modern understanding of photosynthesis is seldom mentioned in school curricula" (Matthews 2021, 221). Accordingly, Matthews elaborated an integrated, cross-disciplinary, HPS-informed liberal approach to teaching Joseph Priestley and photosynthesis (akin to the one previously-elaborated upon in his Pendulum Studies) (Matthews 2009b). Chapter 10 concludes Matthews' book with some reflections on HPS&ST in science teaching education.

In conclusion, I was delighted to learn more about the history of HPS&ST research through the life and times of Matthews. I could connect many dots in my own conception and storyline of this fascinating history and I would highly recommend this book to anyone interested in or involved in HPS&ST research.

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