

## # Mario Bunge: Physicist, Philosopher, Champion of Science, and Citizen of the World (1919-2020)

Mario Bunge, the centenarian Argentine/Canadian physicist/philosopher passed away in the loving company of his wife Marta and children Eric and Silvia on 24<sup>th</sup> February 2020 in Montreal.

He was one of the outstanding figures in 20<sup>th</sup> century philosophy of science; few others approached the scope, depth, and detail of his contributions to the discipline. He was a cosmopolitan scholar at ease listening, speaking, reading and writing in English, Spanish, French, and German, and only slightly less at ease in a number of other languages.



When Bunge was aged 65-years, Bernulf Kanitscheider, a German philosopher of science, wrote:

*Few extraordinary personalities have the chance to decisively shape the intellectual geography of a scientific epoch. Mario Augusto Bunge belongs to the small circle of important philosophers of science whose works have already become landmarks in the spiritual landscape of world philosophy. (Droste 2019, p.78)*

Subsequently Bunge published a further 20 books and 200+ articles. That none of his works have become landmarks in Anglo-American philosophy is an enduring puzzle. Many less-substantial works, by less-careful and less-informed scholars have become landmarks. This is more the pity for students who have less opportunity to examine whether the ‘landmarks’ have feet of clay.

The core of his scientific/philosophical work since its beginnings in Argentina in the mid-1940s, was the conviction that philosophy and science should be done in tandem:

*Physics cannot dispense with philosophy, just as the latter does not advance if it ignores physics and the other sciences. In other words, science and sound (i.e., scientific) philosophy overlap partially and consequently they can interact fruitfully. Without philosophy, science loses in depth; and without science philosophy stagnates. (Bunge 2000, p.461)*

Most competent commentators concur with this judgement: Can metaphysics, epistemology, ontology, cosmology, or ethics be sensibly pursued independently of science?

Bunge's uncommon distinction was that he himself did both in tandem; he researched and published in physics whilst formulating an integrated 'scientific' philosophical system. Of the latter he says:

*... scientific philosophy is essentially critical and self-correcting, requiring that its assertions be put to the test. Philosophy ... deserves to be called 'scientific' solely to the extent to which its hypotheses are somehow testable – whether directly (by their logical compatibility with a given set of principles) or indirectly by the verifiable consequences such ideas may have on practical human activity and on scientific research (Bunge 1979, p.xxviii)*

Bunge was a prolific and serious researcher across a staggering range of fields. In 70 books (including many translations and revised editions) and 540 articles, written over an 80-year span, he made substantial contributions to physics, philosophy of physics, metaphysics, methodology and philosophy of science, philosophy of mathematics, philosophy of psychology, philosophy of social science, philosophy of biology, philosophy of technology, moral philosophy, social and political philosophy, medical philosophy, criminology, legal philosophy and education [HERE](#). At age 98 he published on the philosophical, specifically ontological, implications of the discovery of the gravitational waves that were predicted in Einstein's 1916 Theory of General Relativity [HERE](#).

Twenty years ago, Martin Mahner, a German philosopher/biologist who worked with Bunge at the McGill Foundations and Philosophy of Science Unit, published a collection of 30 of Bunge's philosophy papers ranging over nine different fields (Mahner 2001). Conveniently, a number of Bunge's papers are now available on the web [HERE](#).

In terms of breadth, depth and coherence of scholarship Bunge was a standout in 20<sup>th</sup> century scientific and philosophical communities. He was a Renaissance scholar, a Citizen of the World; a convinced universalist who thought that not only were there truths in science, but also truths in ethics and politics which could be identified and defended. And although these truths were formulated within cultures having certain linguistic, mathematical, political and technical components, the truth of the formulations was independent of their parental culture.

Bunge rejected all popular multi-science options. Sciences were good, bad or bogus; addition of a national, racial, religious or political appellation – Christian, Nazi, Soviet, Maoist, Aboriginal, Islamic, Chinese, Maori, Indigenous - serves an anthropological, cultural or sociological purpose, but the appellation does not confer special tests or exemptions for truth claims. All of these cultural enterprises contain truths and useful procedures, but this does not convert the enterprise into modern science. He vigorously defended the legitimacy and utility of the concept of pseudoscience. It was not just a rhetorical slogan, it was central to his life-long critique of Freudianism and psychoanalysis, and later critiques of parapsychology, rational-choice theory and alternative medicines [HERE](#).

Bunge was born in Buenos Aires on September 21, 1919. His father Augusto Bunge was a medical doctor and for 20 years the sole Socialist member of Argentina's parliament. His mother Mariechen was a German-educated nurse. They wanted their son to be 'a citizen of

the world'; to not be defined and limited by the haphazard geography of his birth. In this they assuredly succeeded.

From an early age he was set a demanding regime of reading literature in six languages: Spanish, English, French, Italian, German and Latin, with Chinese read in translation. His parents' socialist-cosmopolitanism formed Mario's character and outlook; it set him on his life's path. His early multi-lingualism was of inestimable benefit to his education, allowing him to read the classic and the best modern authors of science, philosophy and literature in their own words. It freed him from dependence on commercial, political, religious and ideological judgements about what books would be translated and published in Argentina. To the end he thought that if an author were worth reading, they were worth reading in their own words, not second-hand in translations of doubtful veracity.

From the beginning he was concerned with education. At age 22, whilst a physics and mathematics undergraduate student at *Universidad Nacional de La Plata*, he founded a Workers School (the *Universidad Obrera Argentina*). A fellow teacher was Arturo Frondizi a future President of Argentina. During this time, he wrote his first book, *Temas de Educación Popular* (Bunge 1943), dealing with the principles and practice of workers education. In his *Memoirs* he said of this initiative:

*I replaced the traditional lecture with self-study in groups of four. The teacher was available for consultations. To implement this didactic change, I replaced the classical classroom with small desks and chairs for four persons each. The students read the lecture notes, discussed them among themselves, and asked the teacher for help only when none of the four could resolve a difficulty. (Bunge 2016, p.68)*

Under combined pressure from the Argentina Communist Party, the Catholic Church and the Peronists, the government closed the school in 1943 when 1,000 students were enrolled. Reactionary bodies then, as always, could not tolerate independent centres for adult education and thinking.

Bunge graduated in physics from La Plata in 1942. In 1943 he started to work on problems of nuclear and atomic physics under the guidance of Guido Beck an Austrian refugee who had been an assistant of Heisenberg in Leipzig. Beck was the inventor of the layer model of the atomic nucleus, the first to propose the existence of the positron, and pioneered the study of beta decay. Bunge thought that had Beck been in the northern hemisphere, he would have received the physics Nobel prize. He thanked Beck for 'teaching me not to allow politics to get in the way of my science' (Bunge 1991, p.524). By the mid-1940s he had published on electron spin, neutron-proton scattering, and nuclear forces in the international journals *Nature* and *The Physical Review* and Argentine physics journals.

There followed a decade of graduate studies, research, teaching, political upheavals and being jailed briefly in 1951 for 'illegal' union activity. In this period he published a 20-page paper in *Science & Society* on 'What is Chance?' [HERE](#) that contains the philosophical roots of his much-contested renunciation of the use of Bayesian probability theory in scientific decision making [HERE](#).

Bunge was granted his PhD in physics in 1952 for a dissertation on the kinematics of the relativistic electron. This was published as a book in 1960. He wrote: 'My doctoral diploma did me no good, because it was not accompanied by the Peronist party card without which I

could not even get a job as a dogcatcher' (Bunge 2016, p.89).

At this time, Bunge began what would be decades of writing on a defining problem: namely refuting the orthodox, non-realist, positivist interpretation of quantum physics proposed by the dominant and dominating Copenhagen School. Briefly he thought he could collaborate with David Bohm, another quantum and political dissident, and travelled to Brazil in 1953 to do so. There was no collaboration.

Bunge was stunned that Bohm had produced a philosophical muddle mixing three mutually independent categories: realism, causality and classicism (Bunge 2016, p.92). And worst was to follow when Bohm embraced Hegel (in English translation), idealist holism, and went on international lecture tours sponsored by the Hare Krishna sect. The whole experience reinforced his contention that good science and good philosophy are interdependent, and consequently that bad philosophy results in poor science.

The failed Bohm collaboration lay behind his 1961 paper on 'Cosmology and Magic' where he pointed to the philosophical problems of then 'new' steady-state cosmology which for Bunge solved a riddle by creating a mystery' [HERE](#).



Bunge & David Bohm, Buenos Aires, 1954

For many, Bunge's realist interpretation of quantum mechanics was his major contribution to modern physics. In 2003 he surveyed the arguments in his 'Twenty-Five Centuries of Quantum Physics: From Pythagoras to Us, and from Subjectivism to Realism' [HERE](#). In a journal double-issue, ten physicists and philosophers laid out and appraised his 'signature' account of quantum mechanics, with Bunge replying [HERE](#).

Bunge held chairs in physics and philosophy at the University of Buenos Aires and *Universidad Nacional de La Plata*. His appointments and funding rose and fell with changes in Peronist and military governments.

Bunge made his international philosophical debut at age 37 years at the 1956 Inter-American Philosophical Congress in Santiago, Chile. Willard Van Orman Quine, in his *Autobiography*,



mentions attending this congress, and the only thing about the congress that he thought worth recording was:

*The star of the philosophical congress was Mario Bunge, an energetic and articulate young Argentinian of broad background and broad, if headstrong, intellectual concerns. He seemed to feel that the burden of bringing South America up to a northern scientific and intellectual level rested on his shoulders. He intervened eloquently in the discussion of almost every paper. (Quine 1985, p.266)*



Bunge, 1956, Buenos Aires

In support of Quine's surmise about Bunge's disciplinary 'vocation', it can be noted that Bunge was the only Latin American contributor to the first three congresses of the Division of Logic, Methodology and Philosophy of Science (DLMPS) of the International Union for History and Philosophy of Science (IUHPS): Stanford University (1960), Jerusalem (1964), and Amsterdam (1967). Thereafter, many distinguished Latin American philosophers of science contributed to this international community. Bunge was the harbinger.

Bunge's first major book in philosophy was his 1959 *Causality: The Place of the Causal Principle in Modern Science* (Bunge 1959). The book, endorsed by Quine, was an instant success and put Bunge, and Latin American philosophy of science, firmly on the international map. In 400 pages it appraised over 200 significant English, French and German works on determinism and causality. It came out of the philosophical 'left field': it was, at the time, among the few books written by Latin American philosophers of science to receive international recognition.

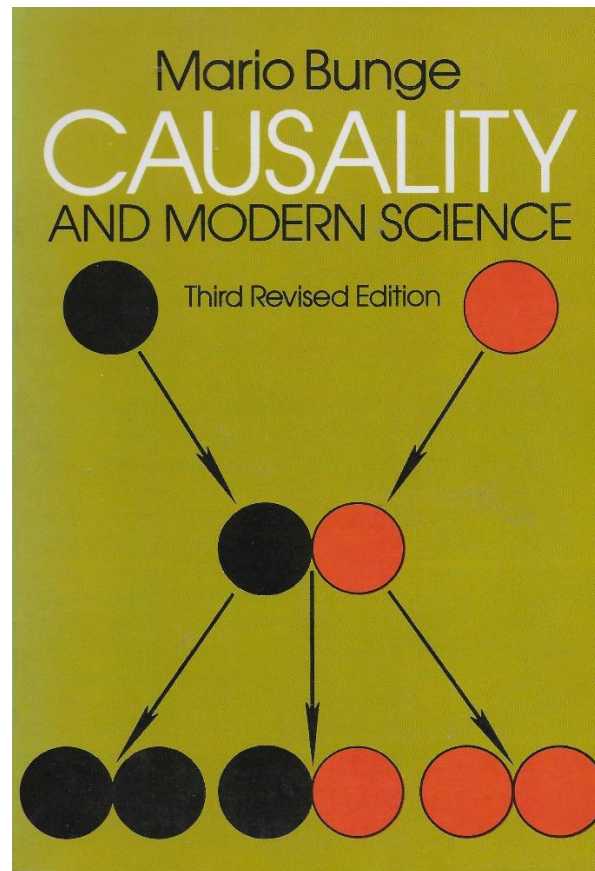
The book concludes:

*The causal principle reflects or reconstructs only a few aspects of determination. Reality is much too rich to be compressible once and for all into a framework of categories elaborated during an early stage of rational knowledge, which consequently cannot account for the whole variety of types of determination, the*

number of which is being increased by scientific research and by philosophical reflection upon it. (Bunge 1979, p.352)

The work was translated and published in German, Hungarian, Italian, Japanese, Polish, Russian and Spanish editions. When the Russian edition arrived in Buenos Aires, the police wanted explanations from him.

The book was not published in French. Bunge remarks: 'At that time, Paris had long ceased to be the City of Light, and its faculties of philosophy had become the homes of the most obscurantist and reactionary of all schools: Nietzsche, phenomenology, existentialism, Lévi-Strauss's structuralism, Lacan's psychoanalysis, Althusser's version of Marxism, hermeneutics, and general semiotics.' (Bunge 2016, p.127).



Bunge *Causality* 1979 (original 1959)

Twenty years later, a third, revised edition was published as a Dover paperback, *Causality and Modern Science* (Bunge 1979). William Wallace, the Catholic priest, Thomist philosopher, and writer on causation, wrote of this edition: 'I regard it as a truly seminal work in this field'.

That the arguments of this ground-breaking, detailed anti-Aristotelian, contra Humean-empiricist, and scientifically-informed book are ignored in major contemporary surveys and handbooks on the philosophy of causation is another matter for sociologists of philosophy to investigate. What is the relevant contribution of internal factors (coherence and philosophical worth) and external factors (politics, reputation, geography, etc.) to disciplinary recognition?

In 1962 the Argentine generals ousted President Frondizi and instituted tighter and tighter control over universities, prompting Bunge and his mathematician wife Marta to seek to leave Argentina and pursue their research careers elsewhere. Despite having four major philosophy books published (*Causality*, Harvard University Press, 1959; *Metascientific Queries*, Charles C. Thomas, 1959; *Intuition and Science*, Prentice-Hall, 1962; *The Myth of Simplicity*, Prentice Hall, 1963) and 67 articles in physics and philosophy journals, and the support of Quine - his applications for philosophy chairs in England went nowhere. He was told by one esteemed university: "we prefer to hire our own even when unpublished" (Bunge 2016, p.155). Needless to say, this left a lasting and negative impression on Bunge. He had

suffered a decade or more of such venal and corrupt ‘academic’ decision making in Argentina; such decisions violated his very idea of a university.

But the USA came to the rescue. In 1963 he was offered and took a temporary position in philosophy at University of Texas, Austin. It was a great contrast to everything hitherto in his working life: *‘I found myself immediately surrounded by philosophers, biologists, anthropologists, and historians who were active in research and who looked to me to debate philosophical problems’* (Bunge 2016, p. 158).

The same lively and congenial experiences followed with short-term appointments at University of Delaware, University of Pennsylvania and Temple University before his appointment as professor of philosophy at McGill University in Montreal in 1966 where he remained to the end.



Bunge at McGill, 1967

Physicists have acknowledged the impact of Bunge’s work. In 1989 the *American Journal of Physics* asked its multi-thousand readers to vote for their favourite papers from the journal, from its founding in 1933 to 1989. In the resulting 1991 list of most memorable papers, alongside classics from Nobel Prize winners and luminaries such as Bridgman, Compton, Dyson, Fermi, Kuhn, Schwinger, Wheeler, and Wigner, was Bunge’s 1956 ‘Survey of the Interpretations of Quantum Mechanics’. In 1993, the journal repeated the exercise, asking readers for the most influential papers in the journal’s first 60 years. In this list, Bunge’s 1966 paper — ‘Mach’s Critique of Newtonian Mechanics’ — took its place alongside his 1956 article. This recognition of a philosopher/physicist by the world’s largest body of physics teachers and researchers is noteworthy.

Also noteworthy is that Bunge is one of only two philosophers listed in the American Association for the Advancement of Science (AAAS) Hall of Fame. The other is Bunge’s boyhood hero, Bertrand Russell.

Susan Haack lamented of contemporary philosophy that: *‘Our discipline becomes every day more specialized, more fragmented into cliques, niches, cartels, and fiefdoms, and more*

*determinedly forgetful of its own history*' (2016). Through his long-life Bunge stood against every narrowing and narrow-minded tendency that Haack lamented.

Bunge was a systematist for whom the natural and social worlds were causally interconnected and so knowledge of those worlds needed to be interconnected; there could be no isolated or orphan disciplines; no academic silos. His philosophical system is laid out in detail in his monumental eight-volume *Treatise on Basic Philosophy* (1974-1989). In a 2012 journal special issue, a group of economists, sociologists, mathematicians, philosophers and cognitive scientists evaluated his systematicity as applied to their own disciplines [HERE](#).

Bunge believed that the lessons learnt from the hard-won successes of natural science should be applied to social science; that the inquiry template forged by the best of natural science can and should be applied to the social and psychological worlds. This is the 18<sup>th</sup> century Enlightenment position. He was an unashamed defender of scientism though a critic of all ill-informed, shallow, reductionist pseudo-scientisms [HERE](#).

Bunge's intellectual position can be more deeply appreciated when viewed alongside that of Abner Shimony (1928-2015) one of the few other stand-out philosopher/scientists who shared Bunge's concern for intellectual coherence and systematisation, and also Bunge's Enlightenment convictions and optimistic fallibilism about science, knowledge and improvement of the world [HERE](#).

Bunge had a life-long commitment not just to research, but also to the social and cultural responsibility of academics; he was never seduced by the 'Ivory Tower' option, comfortable though it would have been at many stages of his life. He was a Public Intellectual, and dramatically so in the Spanish world.

It was natural that he address the question of science and religion and did so in a long, detailed, closely argued essay co-authored with the German philosopher Martin Mahner [HERE](#). The essay was responded to by six theologians, philosophers and educators, with Bunge and Mahner responding [HERE](#). The whole exchange manifests the importance of clarity, relevant knowledge, and personal respect for the advancement of understanding.

The unifying thread of Bunge's life and research is the constant and vigorous advancement of the Enlightenment project that brings science and philosophy together for the advancement of human welfare. He expended the same energy on criticism of cultural and academic movements that deny or devalue the core principles of the project: naturalism; the search for objective, trans-personal, non-subjective truth; the universality of science; the value of rationality; and respect for individuals (Bunge 1996). This thread is explicit in his many contributions to the Boston Studies in Philosophy of Science series initiated by Marx Wartofsky and Bob Cohen in 1961.





Marx Wartofsky, Joseph Agassi & Mario Bunge, Boston University, 1969

Bunge at age 95 wrote a 500-page autobiography [HERE](#). By drawing upon his prodigious memory for decades-old readings, events and conversations, it laid out in fascinating detail his personal, family, cultural and scholarly life. As he says in the Preface: *‘When I started writing this book, I could not stop: contrary to my expectations, my memories poured out effortlessly – perhaps a sign that I had enjoyed living even in hard times’*. The *Memoir* is enormously educative and a delight to read. It has 1,200 entries in its Name Index. He manages to say something insightful about the life and work of nearly every person there mentioned. It is a ‘Who’s Who’ of modern South American, Anglo-American, and European physics and philosophy. Additionally, the *Memoirs* contain a touching and informative appendix - ‘My Life with Mario’ – written by his mathematician wife Marta Bunge.

Pleasingly, a pre-publication pdf version of the *Memoirs* is available gratis [HERE](#). Hopefully readers of the file might recommend the Springer book [HERE](#) for purchase by their institution to ensure its availability for future generations of researchers and students. The *Memoirs’* final ‘Summary’ chapter [HERE](#) is a brief 5-page account of what Mario saw as his main contributions to physics, philosophy of physics and philosophy of science. It emphasises the systematism that unifies his ontology, epistemology, ethics and politics. The book with ample quotations is reviewed [HERE](#).

As to be expected, in personal dealings Bunge was polite, attentive and concerned with the well-being of those about him. Office staff in the School of Education at UNSW where he

spent a semester's leave in 2001, said he was the most polite, considerate and courteous visitor that the School had ever had. His academic dealings were different.

In matters of academic debate Bunge believed that arguments should be stated as clearly and exactly as possible; and stated whenever warranted. Lights should not be kept under bushels, and spades should be called spades. He had no regard for 'soft-focus' writing or argument. Instead of saying 'It could be thought that there is a weakness in your argument', he prefers the more direct 'Your argument is weak'; instead of warm, pleasant and collegial agreement about claims that cannot be tested, he sought clear, specific hypotheses that can be tested against evidence. His exchanges with Bohm, Heisenberg, Piaget, Popper, Kuhn, Quine, Gould, Lakatos, von Weiszäcker and so many others – exemplify that conviction. Many lesser but popular figures – Heidegger, Husserl, Garfinkel, Latour, Huntington, Bloor, Feyerabend – after appraising their work, he dismissed as 'charlatans' (Bunge 1996). Bunge here violated certain understandings of academic 'good manners'. Between the rise of postmodernist conceptual incoherence, and rightful concern about giving offence to individuals, the practice of direct and clear academic argument struggles.

In 1978 there was a celebrated occasion involving Bunge which is still remembered by many who were present, and that made the front page of a German city newspaper. It was the International Congress of Philosophy held in Düsseldorf Germany, and Sir John Eccles – the famous Australian neurophysiologist who collaborated with Karl Popper in articulating a dualist but interactionist theory of mind, and who had been awarded the Nobel Prize - was invited to give the opening plenary address. Instead of the customary deference that might be expected to be given to a newly-minted Nobel laureate, Bunge, who was in the audience, stood up and accused Eccles (and Popper) of philosophical incoherence and of retarding the scientific study of mind. Many philosophers, including those who agreed with Bunge's views, thought that it was not the occasion for the arguments to be aired. Bunge thought differently; he has a different style. Doubtless over the decades, his argumentative 'style' impacted his reputation in the profession.

A 30-page account of Bunge's life, achievements and central philosophical positions can be read [HERE](#). His scientific, philosophical, social and educational positions are elaborated and appraised in a recent 41-chapter *Festschrift* [HERE](#).

Beyond physics, philosophy, psychology, biology and his other scholarly pursuits, Bunge had wide, if selective, cultural appreciations. In his *Memoirs* he writes of literature, that:

*I am a fan of great literature, from the towering triad made up by Don Quijote, War and Peace, and La comédie humaine, to Chinua Achewe, Jorge Amado, Margaret Atwood, Saul Bellow, Giovanni Boccaccio, Anthony Burgess, Dino Buzzatti, Italo Calvino, Peter Carey, Alejo Carpentier, Rosario Castellanos, J. M. Coetzee, Miguel Delibes, Alfred Döblin, Fiodor Dostoyevski, George Eliot, John Galsworthy, Anatole France, Carlos Fuentes, Eduardo Galeano, Robert Graves, William Henry Hudson, Ismail Kadaré, Franz Kafka, J. M. G. Le Clézio, Primo Levi, Sinclair Lewis, Naguib Mahfuz, Hilary Mantel, Rohinton Mistry, Haruki Murakami, V. S. Naipaul, R. K. Narayan, Michael Ondaatje, Orhan Pamuk, Benito Pérez Galdós, Eça de Queirós, Mordechai Richler, Romain Rolland, Philip Roth, Salman Rushdie, José Saramago, Leonardo Sciascia, Vikram Seth, Wole Soyinka, Bruno Traven, Anthony Trollope, Mario Vargas Llosa, Kurt Vonnegut, Edith Wharton, Marguerite Yourcenar; and several others – such as Jane Austen, Umberto Eco, Henry Fielding, Thomas Hardy,*

*Manuel Mujica Láinez, Machado de Assis, Vladimir Nabokov, Michael Ondaatje, Horacio Quiroga, M. J. Vassanji, Voltaire, and so on. (Bunge 2016, p.403)*

And of poetry, that:

*I am no longer enthusiastic about poetry, except for Homer's Odyssey, Lucretius, Omar Khayyam, the Spanish romancers, John Donne, Goethe, Heine, Shelley, Walt Whitman, Roberto Ledesma, and Antonio Machado. My knowledge of Italian history is insufficient to understand Dante, and my English too poor to fully appreciate Shakespeare: I only understand his popular plays. I dislike the latter Joyce's hermeticism, and T.S. Eliot for trying hard to be quotable as well as a pro-fascist English gentleman. (Bunge 2016, p.403)*

Of playwrights, that:

*My favorite playwrights are Aristophanes, Athol Fugard, Carlo Goldoni, Henrik Ibsen, Lope de Vega, Christopher Marlowe, Arthur Miller, Molière, Eugene O'Neill, J.B. Priestley, George Bernard Shaw, Jean-Paul Sartre, Tom Stoppard, Oscar Wilde, and Tennessee Williams. But the darkness and pomposity of the ancient-Greek, French, and Spanish tragedies don't move me, and hence I fail to understand Marx's admiration for Calderón de la Barca. (Bunge 2016, p.403)*

He concludes:

*my artistic tastes are middle-brow. I have never been carried away by cleverness, style, or technical virtuosity alone. And I never read art critics or book reviewers, except for A.A. Alvarez, the most supportive of all. (Bunge 2016, p.403)*

Bunge's passing is a loss for his family and the scholarly world. Hopefully some in the succeeding generations of philosophers, physicists and educators will be inspired to emulate his example of a wide-ranging, in-depth, cosmopolitan approach to the advancement of knowledge and the formation of a more just and equitable society. These Enlightenment ideals are also those of liberal education.

Obituaries in the Spanish press can be read [HERE](#), [HERE](#) and [HERE](#); in French [HERE](#); and a memorial appraisal from the University of Oulu of Bunge as a philosopher of social science is [HERE](#).





Mario had countless dear friends and colleagues throughout the world. Hundreds are named and their views elaborated upon in his *Memoirs*. It was my own privilege and pleasure to have known Mario for the past 25 years. As with nearly all who met and engaged with him, the experience was intellectually and personally enriching, but also challenging. One hesitates to use the term 'genius', but if the word has any currency or reference, then Mario Bunge was assuredly one; or, to use a 'fudge' qualifier that he would disdain, at least close to being one.

The source of the unlikely interaction of an Australian science educator with a renowned physicist/philosopher can be found in the 1968 completion of a compulsory course on philosophy of education in a University of Sydney teacher-education degree. Perhaps there are some general lessons about the value of philosophy in science-teacher training that can be learnt from this experience [HERE](#).

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