

HPS&ST NEWSLETTER



HPS&ST NEWSLETTER

JUNE 2020

The HPS&ST NEWSLETTER is emailed monthly to about 8,400 individuals who directly or indirectly have an interest in the contribution of history and philosophy of science to theoretical, curricular and pedagogical issues in science teaching, and/or interests in the promotion of innovative, engaging and effective teaching of the history and philosophy of science. The NEWSLETTER is sent on to different international and national HPS lists and international and national science teaching lists. In print or electronic form, it has been published for 25+ years.

The NEWSLETTER seeks to serve the diverse international community of HPS&ST scholars and teachers by disseminating information about events and publications that connect to concerns of the HPS&ST community.

Contributions to the NEWSLETTER (publications, conferences, opinion pieces, &c.) are welcome and

should be sent direct to the editor: Michael R. Matthews, UNSW (m.matthews@unsw.edu.au).

The NEWSLETTER, along with RESOURCES, OBITUARIES, OPINION PIECES and more, are available at the website: <http://www.hpsst.com/>

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ISSN: 2652-2837

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Michael Ruse: A Darwinian Reflects on the Coronavirus Pandemic

I am seventy-nine years old and I have Idiopathic Pulmonary Fibrosis (IPF). It is a pretty severe lung disease and, until recently, if you developed it, make sure your will is in order and you might think about pre-arranging your funeral. It was fatal in a couple of years or so. Now, thanks to a very powerful new drug (OFEV), IPF can be controlled. It is not cured, and there are side effects, but generally you can relax and get on with things. Although, obviously, at seventy-nine, getting on with things is more a stroll in the park than running a marathon.



I do not tell you this to complain. The very opposite. I don't have dementia and I don't have Lou Gehrig's Disease. I have a good quality of life. A loving wife, kids in interesting and worthwhile jobs, grandchildren in growing numbers. I am just finishing fifty-five years as a philosophy professor, it has been a great job, and I doubt being retired will make so much difference. My pension is in really good shape. My wife and I will be able to travel. The pandemic stopped this spring's visit to the Metropolitan Opera in New York City, but there will be more chances. And we can go on spoiling the grandchildren in the usual way.

A dilemma. On the one hand, the coronavirus is a

real threat to someone like me. The old-age homes in Florida are death camps. I am not in one, but like the inhabitants, if I get it, it is curtains. On the other hand, I don't want to die, at least not yet. I really don't. So, it all seems straightforward. Our leaders should enact policies to make it less and less probable that people – and this includes me – get the virus and die. And in the absence of a vaccine or any reasonable antidote, that means social isolation. People must not pass it on to others, and that means staying away from others.

A lot of businesses must close – restaurants for a start, but many other places like factories where workers are necessarily in close contact. People will lose their jobs. A lot of people will have no money and must do without. Even to the point – almost at once to the point – of having insufficient food for themselves and their children. The Smithfield processing plant in South Dakota is a prime case in point. It employs over two thousand people. Three hundred employees have tested positive for the virus, so the plant has been shuttered. Think of the knock-on effect. Two thousand plus people out of work. Ten thousand family members without money coming into their home. Pig farmers with nowhere to send and sell their animals. Supermarkets getting less and less produce to sell. And more.

My question is how do you strike a balance, my well-being against the well-being of so many of my fellow citizens? Obviously, no one wants to reopen the processing plant right now. But suppose present distancing measures are effective and, if the plant were reopened, the prospect is that only three people would get the virus, or thirty people. The numbers of sick are down but not vanished entirely. Would it be right to start things up again, even though people like me would be under more threat than if all stayed closed indefinitely?

We philosophers are supposed to be able to answer these questions. After all, morality is our subject matter! I am not sure that things are quite that easy. Moral decisions demand knowing the facts. Is this operation necessary? But suppose we are all agreed that getting things going again will carry risks, but not super-risks. However, clearly the risks are still going to be a lot more for me than for a healthy thirty-year old. When do we say that it is right to worry about the well-being of people generally, even though we know there are going to be costs for a certain group – the old and sick?

Philosophers have ways of answering questions like these. The Kantian will say that you should treat people as ends and so you have a moral obligation to help the old and sick. The utilitarian to the contrary will say that overall happiness is all important, and if a few geriatric philosophers must head for the crematorium, so be it. There is a general feeling that there must be a way out of this dilemma. There must be a unique right answer. Think of the analogous Trolley Problem and the time and paper and energy devoted to solving that one – time and paper and energy that only make sense if you think there is a unique end point, the right answer.

However, as a Darwinian evolutionary ethicist, thinking morality is no more than (no less than) emotions put in place by natural selection to help us get through this world, and thus a moral non-realist, increasingly I wonder if there are solutions to problems like these. Morality works just fine for everyday issues – taking a casserole over for my sick neighbor – but when we have unexpected or extreme cases, morality simply breaks down and doesn't work. Natural selection doesn't usually fine-tune adaptations, and this is a case in point. There is no disinterested right solution – God's will, Platonic Forms, non-natural proper-

ties. We just have to muddle through and hope that we don't make too much of a mess of it.

So, if and when constraints start to be lifted, as a utilitarian I will be all in favor. Until I catch the virus, at which point I will be very Kantian in condemning those who made these decisions. I will be inconsistent. I am not sure I will be so very wrong, because right and wrong are simply out of their depth at times like these. I do know that, as an animal fashioned by natural selection, I will be human, so very human.

Michael Ruse is Professor of Philosophy at Florida State University. His publications include *Can a Darwinian be a Christian? The Relationship between Science and Religion* (Cambridge University Press, 2001), *Atheism: What Everyone Needs to Know* (Oxford University Press, 2015), and *A Meaning to Life* (Oxford University Press, 2019).

Infectious Diseases and the Evolution of Virulence, Elliott Sober

We all are anxious to know when the COVID-19 pandemic will end, but what will happen to the disease's virulence between now and then? Do infectious diseases inevitably decline in virulence? The answer is no. Scientists have observed some infectious diseases whose virulence has held steady, and others whose virulence has increased. These observations are fine as far as they go, but they fail to describe the causal factors that govern how virulence evolves. You need to grasp what those causal factors are if you want to predict what will happen.

I'm going to present a simple mathematical model that describes those causes. The simplifications make the logic clearer, but they also make the

model unrealistic. The lack of realism is harmless, however, since the conclusions I'll draw concerning the evolution of virulence remain in place when the needed complexities are taken into account.



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To think clearly about whether the virulence of a disease will increase or decline as it spreads through a population of hosts, we need to define our terms. I define virulence as the average effect the disease has on the host's lifespan after the host is infected. Individuals infected by a more virulent disease die sooner, on average, than individuals infected by a less virulent disease. This definition is pretty standard in epidemiology, in part because it is useful in calculating R values, but outsiders to the science sometimes think that a disease's virulence is simply the number of people the disease kills. This other definition does not distinguish a disease that kills a total of 500,000 people, who die the day after they're infected, from a disease that kills the same total number of people after they've had the disease for a decade. I mention this other definition so you'll be clear on the definition I'm

discussing. Note also that virulence as I define it doesn't have to do with how many people get infected; the question is what happens to people once they are infected.

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[Conclusion] Next time you hear someone assert that the virulence of infectious diseases always declines, beware! And also beware of the opposite assertion, that infectious diseases always become more virulent. Both these unconditional pronouncements are wrong. Reduction in virulence is a possible evolutionary outcome, but so is increase. The devil is in the details.

The strains of an infectious disease compete with each other, and there are three arenas (D, E, and F) in which that competition takes place. If one strain beats the other in all three arenas, it increases in frequency and the other declines. Alternatively, if one strain beats the other in a given arena, but the reverse is true in another arena, you need more quantitative information about what happens in the three arenas to determine which one wins overall. In either case, winning today does not guarantee winning tomorrow, when the three-fold competition recurs. Infectious diseases don't just spread or disappear. They also evolve. To think about how they evolve, the indispensable first step is to see that infectious diseases are populations that contain variation for many characteristics, virulence included.

Elliot Sober is Professor of Philosophy at University of Wisconsin-Madison; the author of numerous important books in philosophy of biology; and president of the Division of Logic, Methodology and Philosophy of Science and Technology (DLMPST).

Full text of this paper at British Society for the

Philosophy of Science [here](#).

History of Science Society (HSS)

Sarton Medal 2020: James Bennett

Prof. James (Jim) A. Bennett's work as a historian of scientific instruments, curator of world-class collections, museum leader, and teacher has had a remarkable impact in the field of history of science and beyond. Jim was one of the earliest historians of science to foster the "material turn," i.e., to argue that historical scientific instruments and apparatus not only serve as historical sources, but also provide insights not gained from paper documents. The relevance of scientific instruments and material culture is now almost undisputed, and Jim's work was crucial for this shift of attention from ideas and paradigms to everyday practice and artisanal cultures.



His fundamental 1986 article on "[The mechanics' philosophy and mechanical philosophy](#)" (*History of Science* 24, 1-28) made it clear that major changes associated with the Scientific Revolution emerged from the domain of instrument-making

and practical mathematics. This article lifted the veil on the 16th-century practitioners who, by engaging with the practical problems posed by artillery, navigation, and surveying, had recorded and addressed several inconsistencies of Aristotelian physics. This lesson has been so deeply absorbed in the decades following the publication of Jim's seminal article that it is now easy to forget where it originated.

His early book *The Divided Circle: A History of Instruments for Astronomy, Navigation and Surveying* (Phaidon-Christie's, 1987), which surveys European instruments for measuring angles made from the 16th through the 19th centuries, showed the profound importance of the circle and its measure for the history of science, highlighting how instruments provide valuable and unique insights into the worlds of theory and practice.

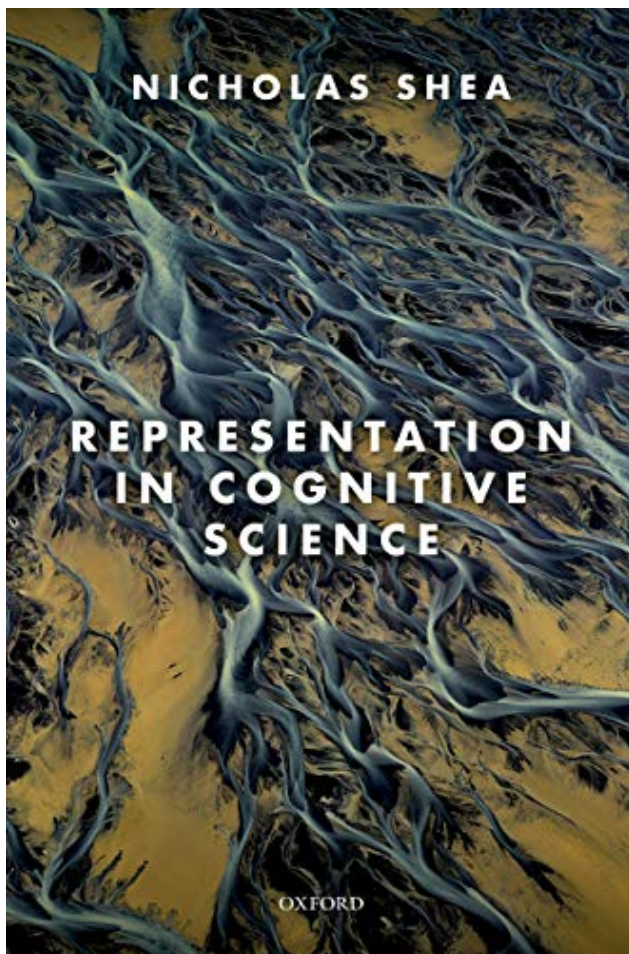
Throughout his career, Jim has always stood out as an active, influential, and generous member of the museum and scholarly communities. He has held many distinguished leadership positions, including those of President of the BSHS, President of the Scientific Instrument Commission of the International Union for the History and Philosophy of Science and Technology, Vice-President of the International Academy of the History of Science, and more recently, President of the Hakluyt Society. He has also acted as an associate editor of leading academic journals and served on the advisory boards of the Nobel Museum and the Science Museum.

For more information see [here](#).

London School of Economics, Lakatos Award 2020, Nicholas Shea

The London School of Economics and Political Science (LSE) is pleased to announce the winner of the 2020 Lakatos Award, which goes to Nicholas Shea for his book *Representation in Cognitive Science* (Oxford University Press, 2018).

Representation in Cognitive Science is praised by selectors as ‘a blockbuster of a book’ and ‘a landmark study’. Its argument is acclaimed to be ‘original in interesting ways, without losing touch with the existing literature’ and the book is reported to be ‘well-written and convincingly argued’.



This is all the more important given that ‘the problem is a really difficult one, that is arguably the key problem in the philosophy of psychology and

cognitive science’ and ‘making a novel contribution in this area, as Shea has done, is no small feat: it requires mastery of a massive and complex philosophical literature, and a deep familiarity with cognitive science, both of which Shea has’.

The book is open access and the PDF can be downloaded for free from Oxford University Press’s website [here](#).

Royal Geographical Society, Online Hidden Histories of Exploration Exhibit

When we think about the history of exploration, we often imagine it as the work of exceptional individuals in extraordinary circumstances. Men and women venturing forth on some incredible journey, surviving against all the odds – or perhaps being swallowed up, as Joseph Conrad once put it, by ‘the mystery their hearts were set on unveiling’.

What we usually see is the individual explorers and their heroic deeds that come to mind. Other less visible aspects of this history, including explorers’ dependence on local support and on intermediaries such as interpreters and guides, are often overlooked. In many different parts of the world, from the Arctic to Asia, and from Africa to the Americas, European explorers relied on local knowledge.

Research on the Collections of the Royal Geographical Society (with IBG), which include over two million maps, photographs, manuscripts, books and artefacts, offers a new perspective. Exploration has always been a fundamentally collective and shared experience. Sometimes hidden,

sometimes visible, the role of locals and intermediaries in the history of exploration and travel deserves to be much better known.

Available [here](#).

University of Leeds, HPS Group Online Course

The History and Philosophy of Science group at University of Leeds has turned the videos of a public lecture series conducted in 2016-7 into a free, informal, online intro-to-HPS course, called "History and Philosophy of Science in 20 Objects."



A description of the course and how to join can be found [here](#).

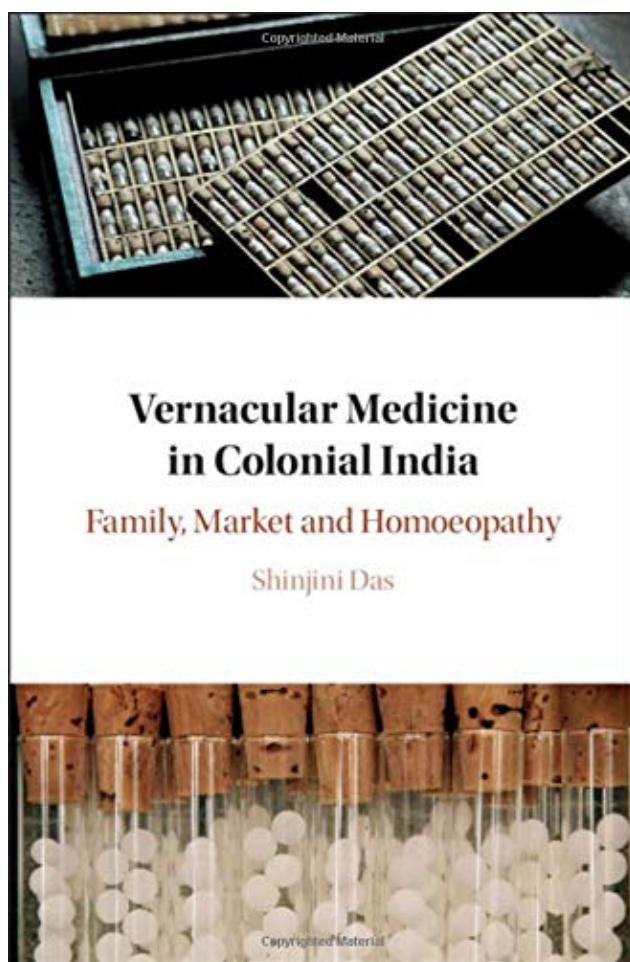
British Society of History of Science, Pickstone Prize 2020, Shinjini Das

The BSHS (British Society for the History of Science) is delighted to announce the winner of the Pickstone prize, awarded once every two years for the best English-language scholarly book in the history of science, technology and medicine. The

2020 prize is awarded to:

Shinjini Das, *Vernacular Medicine in Colonial India: Family, Market and Homoeopathy* (Cambridge: Cambridge University Press, 2019)

The panel commented: 'This outstanding book uncovers the archives that tell the story about how homeopathy was brought to Bengal in the 1930s. It is a highly sophisticated work and its development of the concept of the vernacular potentially transforms old debates about lay and professional discourses of science. It blends questions of nationalism, regionalism, modernity and tradition with great aplomb, and develops the nexus of family and state as a site for science.'



The panel agreed that due to the strength of all the other books on the shortlist, and their diversity of character, it would not award a runner-up prize. Instead, it highlights the excellence of all three re-

maining short-listees:

- Sarah Dry, *Waters of the World: The Story of the Scientists who Unravelling the Mysteries of our Seas, Glaciers, and Atmosphere – and Made the Planet Whole* (London: Scribe, 2019)
- Jacqueline Fekke, *Ptolemy's Philosophy: Mathematics as a Way of Life* (Princeton: Princeton University Press, 2018)
- Erika Milam, *Creatures of Cain: The Hunt for Human Nature in Cold War America* (Princeton: Princeton University Press, 2019)

Center for Inquiry, Richard Dawkins Award 2020, Javed Akhtar



Veteran lyricist and screenwriter Javed Akhtar has become the first Indian to win the Richard Dawkins Award. Presented by the Center for Inquiry (CFI), the award felicitates 'a distinguished individual from the worlds of science, scholarship,

education, or entertainment, who publicly proclaims the values of secularism and rationalism, upholding scientific truth wherever it may lead'.

The award is named after British evolutionary biologist and author Richard Dawkins, known for his landmark book, *The Selfish Gene* (1976) and his advocacy of atheism and scientific thinking.

Previous recipients of the award include American TV host Bill Maher and writer-journalist Christopher Hitchens. Javed Akhtar is known for his views on politics, religion, and public life in India and the world. He has often spoken out against religious fundamentalism and restrictions on freedom of speech.

Dia Mirza wrote, 'Javed Akhtar Saab has won the prestigious Richard Dawkins Award 2020 for critical thinking, holding religious dogma up to scrutiny, advancing human progress and humanist values. He is the only Indian to have won this award! Javed Akhtar, congratulations! You make us proud'.

Symposium on the History, Philosophy & Sociology of School Biology, Dublin City University, 11 - 12 December 2020

Under the aegis of The International Society for the History, Philosophy & Social Studies of Biology (IHSPSSB)

<https://www.ishpssb.org/>

New curricular developments in biology across the educational spectrum are resulting in the re-evaluation of practical biology and the unexpected outcome of reducing practical work in biology.



The Mission of this symposium will be to enhance the HPS of biology by examining the relationship between biology as a discipline and how it is presented in schools.

The vision of the symposium will be to explore traditional historical approaches in practical workshops with historic equipment and re-evaluate them in light of new pedagogies and curricular reform, can school biology be called experimental science any longer? To ask, and answer, what is the purpose of school biology?

Some suggested threads of interest:

- The relationship between biology and school biology
- Historical approaches to teaching biology
- Experimental History of biology
- Methodologies and philosophies of instruction in biology
- The use of natural history collections in biology
- Gender balance and diversity in biology uptake at the second level
- The nature of biology, whether an experimental science?

- The purpose of school biology in society in general
- Mayr's Philosophy of Biology and its application to school biology

Symposiarch :

Dr. Thomas McCloughlin, tom.mccloughlin@dcu.ie,
School of STEM Education

Symposium website available [here](#).

Feng Shui Project: Historical, Philosophical, Scientific, Medical, Cultural and Educational Consideration

The background to the project is decades of research on the contributions of history and philosophy of science (HPS) to theoretical, curricula and pedagogical issues in science teaching.

Much of this research tradition has been published in the Springer journal *Science & Education: Contributions of History, Philosophy and Sociology of Science* that commenced publication in 1992.

An extensive account of the research can be found in the 3-volume, 76-chapter *International Handbook of Research in History, Philosophy and Science Teaching* (Springer 2014) that has contributions by 130 scholars from 30 countries.

An overview of the research can be found in the 440-page monograph *Science Teaching: The Contribution of History and Philosophy of Science* (Routledge 2015). A Chinese translation is published by Foreign Language, Technical and Research Press in Beijing.

One extension of this research can be read in the 340-page, 1,700-references monograph – *Feng Shui: Teaching About Science and Pseudoscience* (Springer 2019). The summary of the book's argument is [available on the web](#). The Feng Shui Project, which began in late 2019, takes this book as 'background information' though contributors are not committed to the book's arguments.

Currently there are 12 papers being written, by 18 authors from eight countries. Their disciplines are science education, anthropology, economics, psychology and philosophy. Provisional [Contents & Abstracts](#) are available. The first draft of papers (5-10,000 words) are due for completion by end of 2020.

Feng shui theory, with its dependence on the millennia-old, Asian core notions of 'life force', chi or *qi*, is intimately connected to the now worldwide practice of Traditional Chinese Medicine (TCM), the spectrum of traditional martial arts and qigong exercises, and increasingly found university medical, nursing, architecture and town-planning programmes. Feng shui is promoted on millions of websites. A Google text search for feng shui returns one-hundred million such sites in half-a-second. The sites support a multi-billion-dollar economy. Amazon has 7,000 feng shui books listed in English alone.

Feng shui is a significant subject with obvious economic, cultural and educational ramifications, yet surprisingly it has generated minimal critical, systematic scholarship; with little attention to the educational responsibilities and opportunities feng shui occasions.

In 2016 the Chinese government legislated its *Benchmarks for Scientific Literacy of Chinese Citizens*. The theory of feng shui is included as a literacy goal. This document at its 9th reference

point stipulates that all students by end of schooling should:

know the traditional Chinese philosophical concepts such as Yin-Yang and Five Elements, and the unity of nature and man, which are the simple materialism and methodology of the whole system in ancient China and have practical significance.

The Feng Shui Project has a good deal of current relevance, not just for China, but also beyond. The educational, cultural and philosophical appraisal of the theory and practice of feng shui is timely. The project connects with long-standing and consequential topics in philosophy of science, philosophy of education and cultural studies:

- Should scientific thinking extend beyond the classroom and laboratory?
- Does being scientifically literate entail having a scientific habit of mind?
- Can a distinction be drawn between science and pseudoscience?
- What role can the appraisal of pseudoscience play in a science programme?
- Can chi, *qi* or 'life force' be known by science or is it 'beyond' science?
- Are theoretical postulates in science to be interpreted realistically or instrumentally?
- If realistically, then how are competing postulates or entities to be evaluated?
- Are scientific truth claims universal or are they to be adjusted to local cultural, religious and political circumstances?

- What should be taught in science programmes when there is a clash between deep-seated, historical cultural commitments and the worldview of science?
- Is methodological and/or ontological naturalism a presupposition of scientific research?
- Is science committed to a particular worldview with specific ontological, epistemological, ethical and political components?
- Is the appraisal of scientific practice and theory worldview neutral?



Some project [material and resources](#) are on the web. The project will come to fruition in late 2021 as a journal special issue and/or book anthology.

For more information on the project please contact project coordinator:

Michael R. Matthews, School of Education, UNSW, Australia

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Opinion Page: A new challenge in the environmental scenario: Will Science Education defeat Post-Truth?

Nathan Willig Lima & Matheus Monteiro Nascimento

Physics Department – Universidade Federal do Rio Grande do Sul - Brazil



In 2016, the Oxford Dictionary chose ‘post-truth’ as the word of the year, ‘denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief’ (*Oxford Dictionary*, 2016). Four years

later, we have already witnessed the boom of fake news all over the world and its undeniable impact in election outcomes as well as in the public opinion in a broader sense.

In Brazil, more specifically, we are currently observing an increasing number of people supporting the most unexpected causes, such as the defence of flat earth conception, the adherence to anti-vaccine movements, the denying of climate change, and more recently there were fake news denying far accepted hygiene methods used to prevent the dissemination of coronavirus (Brazilian Ministry of Health, 2020) and the quarantine recommendations. Furthermore, religious claims have been positioned in equality with scientific studies, and even public policies have adopted practices without scientific support, lacking a more sensible debate that includes and respect the opinions of different sectors in our societies (SBF, 2018).

Besides, in Brazil, it is possible to feel an overall environment of contempt against Science and the scientific community, mainly motivated by statements of influential politicians in social medias such as Facebook, YouTube and Twitter. In this scenario, we also observe the sustaining of an intense polarity among society, which prevents any dialogue and construction of reasonable solutions. The understanding of this social scenario (and how to reverse it) should not be matter of interest only of sociologists but it ought to be considered as part of the problem (and of the solution) that scientific community will have to address to solve the big global issues such as pandemics and climate change.

Technical and technological improvements will be necessary to deal with contemporary global challenges, but the relation between science and so-

ciety must enter this equation. Thus, we can say that the current scenario is quite different from that in which authors like Paul Feyerabend (1995) opposed the description of science as an institution of the highest authority. We are living a time when society has ceased to have total confidence in science and has gone to an absolute distrust in its methods and results. This change was recognised recently by Bruno Latour (Vrieze, 2017), considered one of the protagonists of the 'science wars'.

Two Questions

This environment being briefly described, our intention now is to propose two questions, aiming to offer preliminary answers for them. Firstly, we would like to discuss 'Where did we go wrong?', and secondly, 'What can the scientific community and science educators do now?'.

To answer the first question, we must acknowledge that there is not only one factor involved in such a wide-ranging situation. So, all we can offer is one possible way of understanding the present scenario. Our claim is that whether the public opinion has been hostile to the scientific community, it means that scientific community failed to show to the general public the role of science in contemporary society. Also, if alternative traditions and ways of knowing are being considered relevant enough to be contrasted with scientific communities in paramount discussions (such as the shape of earth, for instance) and still attracting people's attention, we can also assume that the scientific community has also failed explaining and convincing different people about their perspectives on these contemporary topics.

In both cases, the genesis of the problem relies

in the miscommunication, or the lack of communication, between scientific community and society. We propose a historical explanation for that. The success of scientific endeavours, translated into the industrial revolution, made science one of the pillars of the western society in the 20th century. During the period of the World War II and the Cold War, it was not possible to dismiss science contributions, since the development of nuclear technology could represent victory or defeat. This geopolitical situation created a specific change in the pedagogic practices – which become more pragmatic and instrumentalist (Kaiser, 2005, 2006). In this period, there was no possibility of criticising science, reflecting on its meaning or relevance. Science, during this period, was considered to be essential in education, contributing to encourage new scientists and engineers in a high scale.

In the nineties, the cold war ended, but its scientific pedagogy was still alive; and contemporary scientific education is still much based on memorisation and instrumentalist solution of problems. Scientist and science educators failed to realise that it was necessary to justify the importance of science again. The proposal of making science education and history and philosophy of science closer (Matthews, 1988) and discussing nature of science in science courses is still far from being part of the reality of most of our schools.

In Brazil, it is the scientific courses offered during high school that are the main source of knowledge about science for regular citizens. If during high school, someone does not learn about scientific knowledge, about how science works, about how it is related to social and political subjects one probably will not learn about it in any other place. And, unfortunately, many researches in Science Education have confirmed that this is the case.

Science in Society

Furthermore, the research that is produced in the universities often does not dialogue with the basic expectations of the society that pays for it. Of course, it is important to perform theoretical science and to research about contemporary international problems. However, it is not possible anymore to make science chiefly directed to an international agenda. Today, science needs again to answer society expectations and to make this answer socially visible.

In order to defeat the post-truth scenario, we believe that scientific community (more than ever) ought to be present in the heart of society. Or, in the other way around, it is necessary to take society to the heart of science. Public universities (where most of science is produced in Brazil) must never stop being the spring of the specialised knowledge, but it has also to become the safe zone of dialogue between specialists and non-specialists, even if that means to dialogue with flat-earth defenders.

By taking society into the heart of Universities (or by taking science into society), scientists can not only better communicate science, but also to listen to the different needs and expectation of different social groups, to which, for sure, they can try to manage newer solutions, built in a horizontal relation. However, if scientists keep sustaining the privileged epistemological status of science without listening and learning with other groups, science will not have a chance in the post-truth scenario.

Schools

Again, the ideal context where science can rebuild its place in society is in high school education. It is in the regular science education that the public opinion about science is formed. It is the right place at the right time to discuss how science answers to contemporary problems and how science works – making explicit not only the epistemic factors involved in science but also its political, economic and sociological entanglements (Nascimento, Lima, Cavalcanti, & Ostermann, 2019).

It is also the place for fomenting the spirit of inquiry and skeptical thinking. Nowadays, it is responsibility of science education also to teach how to search for trustable references and how to check their reliability. Scientific Education must become contemporary, must look at the local problems and must address objective solutions created by the political scenario (Lima & Nascimento, 2019).

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Invitation to Submit Opinion Piece

In order to make better educational use of the wide geographical and disciplinary reach of this HPS&ST NEWSLETTER, invitations are extended for readers to contribute opinion or position pieces or suggestions about any aspect of the past, present or future of HPS&ST studies.

Contributions can be sent direct to [Michael Matthews](#) or [Nathan Oseroff-Spicer](#).

Ideally, they might be pieces that are already on the web, in which case a few paragraphs introduction, with link to web site can be sent, or else the pieces will be put on the web with a link given in the NEWSLETTER.

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command of languages, and the broad grasp of the history of ideas and culture, that he brought to bear on philosophical issues, particularly those of epistemology and methodology raised by Marxism and by the sciences, has seldom been equalled by Australian scholars, nor by scholars considerably distant from Australia.



Vale: Wallis Arthur Suchting (1931-1997)

This delayed obituary is occasioned by a project to publish a collection of Suchting's philosophical papers. Though a Marxist philosopher, he did in his final years write a number of important papers in science education.

Wallis Suchting was born in 1931 in the small north Queensland sugar-cane town of Gordonvale. In a severe depressive state, of the kind he had suffered for some many years, he ended his life on 12 January 1997 at his home in the inner Sydney suburb of Ultimo. The scholarship, the

Wal was an only child, brought up in Australia's 'deep north' where his father was a police sergeant. By his own account, his youth and family life was less than happy, to put not too fine a point upon it (an expression he was fond of using).

His intelligence ('titanic' as an academic friend described it) stood out early, and he won a place in the prestigious Brisbane Grammar School for the last two years of his education. He boarded in a house near to a former north Queensland school friend Ted D'Urso who was already in the second year of philosophy studies at Queensland University. Ted introduced Wal to philosophy which, along with Wal's already strong interest in literat-

ure and the arts, filled his final years of school.

His earliest writings – ‘To Shelley: A Sonnet’, ‘Thoughts on the Function of Criticism in Art’ and ‘Demophilus: A Socratic Dialogue’ – were published in *The School Window* (1947-48), an annual publication of the Brisbane Grammar School. While at school, and immersed in the aestheticism movement, he was selected to represent Queensland in a national colloquium of Australia’s young intellectuals.

In 1949 he commenced the study of philosophy, history, and literature at Queensland University. At the end of his first year he spent the summer vacation teaching himself Italian. Then he wrote an essay on Dante’s *The Divine Comedy* that won first prize in the Australian Dante Alighieri Society’s competition. This was the first sign of his life-long commitment to, wherever possible and despite the effort, reading authors in their original tongue. In 1951 he graduated BA from Queensland University with first class honours in philosophy, ranked equal with his soon-to-be wife, Marie Leaver, and moved on a scholarship to Melbourne.

In 1953 he completed his MA at Melbourne University on ‘The Concept of Necessity in Marx and Engels’. In 1954 he commenced his PhD degree on ‘The Criterion of Empirical Verifiability in Science’. His supervisor was Gerd Buchdahl who wrote one major text on *Metaphysics and the Philosophy of Science*, another on *Kant and the Dynamics of Reason*, and who would become the first lecturer in history and philosophy of science at Cambridge. In order to read ancient texts on this subject Wal learnt Latin and Greek; and then German, Russian, French and Spanish to understand the texts and arguments of the European philosophers who debated the subject.

This concern with the mastery of languages was

one reason why the thesis extended four years beyond his scholarship funds, and why during this time he completed a Diploma of Education at Sydney Teachers College and became a high school history teacher. The thesis was awarded in 1961, with one examiner describing it as ‘a terrifying piece of work’. The following year, 1962, he was appointed to the Philosophy Department at the University of Sydney where he stayed till his retirement in 1990 as Reader in Philosophy.

Wal cared about words and what they meant. He regarded language as the greatest enabler of human culture. He took delight in reading well written and elegant prose, poetry, and philosophy. He laboured as a craftsman over his own writing. He was a wordsmith. He strove for elegance, but not at the expense of clarity; and he did not allow the primacy of clarity to obscure nuances of meaning. He had an abiding animus for sloppy, careless and confused writing, and for dishonest euphemisms, jargon and pretence. In his later years he despaired at how the humanities, including philosophy, in Australia were encouraging all the things he loathed.

Wal’s despair with the scholarly world was only heightened by his experience of having to work with a person widely held as the ‘Prince of Hegel translators’ on a translation of Hegel’s *The Encyclopedia of Logic* published in 1991. The situation arose because Wal and the very prominent north American scholar had in 1986 independently submitted a new English translation of the *Logic* to Hackett Publishing Company. The director urged them to pool their work and make a joint translation. Wal said in correspondence: ‘This was the beginning of one of the most miserable periods in my life’. Wal’s interpretations and judgements were repeatedly overruled, and he was driven to ask that a ‘dissenting, minority foreword’

be included in the publication, listing the numerous points of difference between himself and his prestigious co-translator. Wal privately wondered whether the Prince 'could order a meal in a German restaurant'.

Wal derived bitter pleasure when the early reviews in major journals – *Review of Metaphysics*, *Mind*, *Bulletin of the Hegel Society of Great Britain*, etc. – endorsed his minority report and said, as in the last mentioned journal, that 'This reviewer is of the opinion that [the collaborators] would have done better to heed the advice of their colleague, Suchting, as set out in his minority comments on terminology'. The whole experience only confirmed Wal's pessimism about the state of university scholarship, even at the supposed highest levels. It confirmed for him the wisdom of his 1990 request for early retirement from the University of Sydney.

The Hegel episode is also indicative of another feature of Wal's scholarly life: He strove to understand those he disagreed with. He did not believe in cheap shots, or in repeating others' critiques and analyses. He was a life-long Marxist who had no sympathy for Hegel's idealism, writing that his whole system was 'an artificial concoction' and that his *Philosophy of Nature* was 'a lot of rubbish'. Yet he worked for years on mastering the philosophical and cultural contributions of German Idealism, and on providing a faithful English translation of Hegel's *Logic*. He also was an atheist who read the Bible daily in ancient Greek. And for a while he toyed with learning Hebrew to do this better but was exhausted by the prospect. He wilted, shaking his head and verging on being sick, when he read work making cheap and mistaken claims about 'Positivism', 'Modernism', 'Scientism', 'Empiricism', 'Marxism', 'Realism' and other supposed bogeymen, by people who had

never bothered to read, understand or study the views they criticised.

Wal was a meticulous teacher. When teaching courses on Hume, Hegel, Dewey, Marx, Popper and Foucault he picked the central texts and strove to have his students understand them. For instance, in his class on Dewey's 1938 *Logic*, that he regarded as one of the 'masterpieces of 20th century philosophy', there were only two students, this writer being one of them, yet he spent days on the preparation of each class.

Wal thought that in teaching philosophy, texts were akin to rocks for geologists, birds for ornithologists, reactions for chemists or plants for botanists. Good teachers brought students into contact with the actual subject matter of the discipline, and made it 'come alive', as might be said. For philosophers, 'eyes on' teaching was the equivalent of 'hands on' teaching for the sciences; close reading was experiential learning.

Progressive humanities pedagogy passed Wal by. He had too much respect for his students, and for the texts and ideas he was dealing with, to get by with 'throwing some ideas about' or 'facilitating students' responses to the author'. The question of 'What does this mean for you?' came a distant second to 'What does this mean for the author?' in Wal's classes. He saw such ploys as basically bull sessions, and an abnegation of the educative function of the teacher; the author disappears in favour of the reader. He had no problem with being a 'sage on the stage'. Wal thought that the immense problems of education could only be solved by providing students with good books and with teachers who understood them. Other more high-tech and costly proposals he saw as simply adding to the problem. Needless to say, he saw postmodernism as a blight on the academy and a cultural

disease.

Wal was committed, with eyes wide open, to the Enlightenment tradition. He saw it as a praxis tradition with in-built correcting mechanisms. He was seriously engaged by the intellectual and cultural achievements of the Scientific Revolution that gave birth to the tradition. The Enlightenment was the outstanding achievement of the quest for knowledge of the world. He wrote of the 'Galilean-Newtonian Paradigm' and regarded this scientific-philosophical GNP as far more consequential than any economic GNP has ever been. He believed that the history of philosophy was inseparable from the history of science, and that those seriously engaged in the former needed to be seriously engaged with the latter. To complement his training in the humanities he taught himself the rudiments of physics, and of mathematics, by working through every page and example in Feynman's three-volume *Lectures on Physics*.

Some of Wal's early publications (1967, 1969) were on the conceptual structure of Newtonian mechanics, a topic he returned to in 1993 in one of his final reviews (in *Science & Education*) where he took exception to interpretations of a prominent Newton expert. Something of Wal's style is manifest when he says 'the limits of the review forbid following the author into the "waste howling wilderness" wither his footsteps are directed by his original false compass readings'. Of the mistakes in the text, he said that they were:

*Thick as autumnal leaves that strow the brooks
In Vallombrosa, where th'Etrurian shades
High over-arched embower.*

His style strained professional relations. But Wal thought that academics should resist the 'Macdonaldisation' of discourse. Not surprisingly he was

not overly bothered with the academic circuit. In his thirty-year university career, he attended one philosophy conference and came back regretting the time away from his library and music. A consequence was that his reputation was limited. But he never thought that academic fame and, God forbid, popularity, was a substitute for ideas understood and arguments followed through.

He was, of course, interested in the ideas and work of others. To the very end, he subscribed to journals and carried on voluminous private correspondences over points of philosophical interpretation; but the idea of doing anything 'for show', or spending time on a social circuit when he could be reading or listening to classical music or jazz, appalled him.

From the early 1950s, Wal was engaged by the study and exposition of Marx's fundamental philosophical ideas. Needless to say, he read Marx in the original. In 1972 he taught, with Michael Devitt, the very first course in Australia on 'Marxism and Philosophy'. The course was attended by hundreds and had a lasting impact on a generation of Sydney philosophy students. Two books gave public face to this engagement: *Marx: An Introduction* (Harvester, 1983), and *Marx and Philosophy* (Macmillan, 1986). He had hundreds of pages of correspondence with Marx scholars over large and minute matters of interpretation of Marx's text, and the classical traditions of exposition and translation of them.

Perhaps two examples from these pages suffice to give a feel for Wal's Marxist project, and his own tentativeness and inquisitiveness about aspects of it. In 1996, in commenting on two papers on 'Value-Theory in Political Economy' sent to him by an Australian colleague, Wal replied:

However, neither of them [the received papers] so

much as hints at what seems to me to be one of the fundamental problems of M.'s value-theory – perhaps *the* fundamental one – namely, the idea of 'abstract labour'. M. himself emphasised the significance of the idea of the distinction between 'abstract' and 'concrete' labour early in the first volume of *Capital* – he calls it the Springpunkt of his theory (a relatively unusual word, meaning something like: the very source from which all else flows – quite inadequately rendered in the Penguin edition which simply has M. saying that it is 'crucial' to this theory). In two letters to Engels he lists it as one of the original ideas in *Capital*.

I well remember that when I used to teach courses on *Capital* I always had a sneaking feeling that I was being a bit of a phony at the point where I had to introduce the notion of 'abstract labour', because, deep down, I didn't feel confident that I had a real grip on the idea. But M. seemed to have no doubts about what he was talking about, people whom I respected seemed to understand it, it seemed crucial to a theory to which I could see no alternative, so I pressed on, hoping that eventually light would vouchsafe me (cf. Pascal's advice to kneel and pray and belief would come!). But I am still uncertain that I really 'get it'.

In 1995, in commenting on a manuscript on Ideology sent by a Finnish correspondent, Wal wrote:

You say that Marx never used the phrase 'false consciousness', to be found in the well-known letter from Engels to Mehring (14 July 1893, MEW 39:97). That is true. But I think that it is not seriously contestable that what E. indicates, in the text mentioned, he means by this is an idea held by Marx *from first to last* in different forms, tied up with the idea of *Verkehrung*. I have been struggling mightily over the last few months to become clearer in my mind about the latter, which I always found puzzling and which I've found the more puzzling the more I've thought about it.

He then documents three slight variations on *Verkehrung* as found in the *Paris Manuscripts*, the *German Ideology* and *Capital* periods. He regards it as a transition by Marx from an ontological to an epistemological understanding of the term.

After retirement Wal contributed to international science education by writing a series of long and scholarly articles for the journal *Science & Education*. These articles, published yearly from 1992 to 1997, ranged over the cultural significance of science, constructivism, scientific method, the sociology of scientific knowledge, hermeneutics and science, and Newtonian mechanics. They all bear the stamp of his scholarship, command of language and concern with the 'truth of the matter'.

His *Science & Education* papers provide some of the clearest statements of his overall philosophical position. For instance, in a 1992 commentary on an exposition of constructivist theory written by an acknowledged 'world leader' in the field, he wrote:

First, much of the doctrine known as 'constructivism' ...is simply unintelligible. Second, to the extent that it is intelligible ...it is simply confused. Third, there is a complete absence of any argument for whatever positions can be made out. ...In general, far from being what it is claimed to be, namely, the New Age in philosophy of science, an even slightly perceptive ear can detect the familiar voice of a really quite primitive, traditional subjectivistic empiricism with some overtones of diverse provenance like Piaget and Kuhn. (Suchting, 1992, p.247)

Concerning empiricism, in a 1995 paper on 'The Nature of Scientific Thought', he wrote:

Thus the *key* inadequacy of empiricism has really nothing to do with the centrality it accords to sense-experience; in particular, the controversy

over whether the ‘basic language’ of science should be ‘phenomenonalist’ or ‘physicalist’ is irrelevant to the main question, a mere internal family dispute, as it were. The central deficiency of empiricism is one that it shares with a wide variety of other positions, namely, all those that see objects themselves, *however they are conceived*, as having epistemic significance *in themselves*, as inherently determining the ‘form’, as it were, of their own representation, rather than as determining the degree of applicability of representations of a given ‘form’, and hence, conversely, that the nature of what is represented can be more or less *directly* ‘read off’ its representation’. (Suchting 1995, p.13)

For Wal, theory, and theorising conducted in accord with an appropriate methodology, was the key identifier of science. The theory was linked to the world by appropriate practices, notably experimentation. Hence supposedly big issues about, for instance, the theory dependence of observation, became side-shows for Wal. Interesting enough, but of no great epistemological import.

A 1997 paper on ‘The Sociology of Scientific Knowledge’ (ssk) develops at length his negative critique, and positive reconstruction, of this enormously influential epistemological programme. From the time of Mannheim’s original formulation, the sociology of knowledge had a certain Marxian flavour; it appeared as an extension of Marx’s theory of ideology. But Wal believed that ‘the general field of sociology of knowledge, as identified by those who have written under this rubric – Bloor, Latour, Woolgar, Collins is fundamentally (and not just in detail) all wrong’. His positive critique involved the elaboration of Marxist historical materialism in a manner that encompassed and illuminated the production of scientific knowledge. This was succinctly done in a four-page appendix to the paper.

His final academic works were a brace of four articles – ‘on experiment’, ‘on empiricism’, ‘on falsificationism’, and ‘on epistemology’ – published in 1997 in a German Encyclopaedia of Marxism *Historisch Kritischer Wörterbuch des Marxismus*. They are exceptionally rich, 6-15,000-word essays, on Marx-informed key topics in philosophy of science. And a posthumously published 1998 paper: ‘What is Living and What is Dead in the *Communist Manifesto*?’

His encyclopaedia entry on experiment opens with Gramsci’s *Prison Notebooks* observation:

the emergence of the experimental method separates two worlds of history, two eras and begins the process... of development of modern thought, whose crowning achievement is in the philosophy of the praxis...

In elaborating the idea of experiment, Wal writes:

This characterisation may be analysed with the aid of a conceptual apparatus developed by Aristotle (who Marx calls ‘der große Forscher’ and whose ‘Genie’ he celebrates [K I, MEW 23,73,74]), namely, his schema of what in Latin translation became familiar as the four *causae* (see, e.g., *Metaph* V,2) of anything that is produced: (1) the ‘material’ cause: what it is made from; (2) the ‘formal’ cause: its nature; (3) the ‘efficient’ cause: what brings it about; (4) the ‘final’ cause: the end, purpose, goal for the sake of which it was brought about.

This immediately allows, indeed requires, a multi-perspectival, but coherent, account of the practice of experiment. Later he comments that:

To say simply that the role of experiment is, in the first place anyway, to produce appropriately isolated systems for the purpose of testing given theories is to presuppose that the investigator knows

what the 'pure' form of what is to be studied is, and what the 'disturbing' conditions are. However, one of the main tasks of inquiry in which experiment is a principal factor is precisely to *determine* wherein this distinction consists. Once this distinction has been determined, experiment becomes, in this regard anyway, less a means of genuine investigation than one of demonstrating what is already known.

And:

Because of the centrality to Marxist epistemology of the rejection of epistemic 'closures' it is particularly well-placed to make effective criticism of recurrent attempts to characterise an essence of experiment on the basis of how experiment is carried on in a necessarily limited historical-theoretical context, and to decontextualise experimental methods, ignoring the specificity of such methods to particular sorts of subject-matter.

Suchting belonged to a disappearing scholarly world. Few graduate students now spend seven years on a PhD because they believe that relevant languages need to be mastered. For staff, and students, reading sources in their original language is not rewarded. Concentrated scholarship is not rewarded; one publication a year does not get anyone tenure or renewal of a contract. In the end, Suchting was deeply pessimistic. He saw everywhere in the humanities and social sciences that the pursuit of publications irrespective of their quality, and the pursuit of research dollars, was corrupting the search for truth and understanding, and interfering with the time required to prepare good classes. He saw less and less evidence that universities were fostering, or even caring about, a love of learning. Concerning philosophy, he thought that 'bad coinage was driving out the good', with reading lists being increasingly filled with the former.

On retirement from the University of Sydney in 1990 Wal shed about two-thirds of his academic library, the 'inessentials'. The 'essentials' he kept in his home library. The contents are a window into the authors he saw as having personal and scholarly value (see next page).

HEGEL	<i>Werkes</i> (German)	20 vols.
	<i>Lectures in Philos. Religion</i>	3 vols.
	<i>Lectures in Philos. History</i>	3 vols.
	secondary literature	25 vols.
KIRKEGAARD	Works	12 vols.
NIETZSCHE	<i>Collected Works</i>	20 vols.
	Secondary literature	10 vols.
KANT	<i>Werkes</i> (German)	10 vols.
	Secondary literature	10 vols.
FREUD	<i>Collected Works</i>	30 vols.
	secondary literature	25 vols.
GIBBON	<i>Rise and Fall ...</i>	3 vols.
BRAUDEL	<i>History of Europe</i>	3 vols.
ANCIENT PHIL	Penguin Classics	25 vols.
	assorted authors	25 vols.
MONTAIGNE	<i>Works</i>	1 vol.
LENIN	<i>Collected Works</i>	46 vols.
MARX & ENGELS	<i>Werkes</i> (German)	45 vols.
	<i>Collected Works</i> (English)	16 vols.
MARXISM	secondary literature	250 vols.
SOCIALIST THOUGHT	assorted histories, etc	40 vols.
ALTHUSSER	<i>Writings</i> (French)	6 vols.
BAKHTIN	<i>Werkes</i> (German)	15 vols.
CASSIRER	<i>Works</i>	12 vols.
KOŁAKOWSKI	<i>History of Marxism</i>	3 vols.
BACHELARD	<i>Works</i> (French)	25 vols.
COPLESTON	<i>History of Philosophy</i>	15 vols.
SPINOZA	assorted works	15 vols.
FEFREBVRE	works (French)	12 vols.
GRAMSCI	works	5 vols.
TROTSKY	works	40 vols.
LUXEMBURG	works	10 vols.
MATHEMATICS	assorted histories	25 vols.
JAMES	works	5 vols.
FOUCAULT	works	5 vols.
DEWEY	works	8 vols.
PLEKHANOV	<i>Collected Works</i>	3 vols.
WITTGENSTEIN	works	15 vols.
LUKÁCS	works	10 vols.
PHIL OF SCI & EPIST	(assorted)	100 vols.
NEW LEFT REVIEW	complete set, vol. 1 (1957) to 1997	
SOCIALIST REGISTER		20 vols.
MUSICOLOGY		70 vols.
DANTE	works	5 vols.
THOMAS MANN	<i>Werkes</i>	10 vols.
HENRY JAMES	Works	4 vols.
MAX RAPHAEL	<i>Werkes</i> (German)	8 vols.
HISTORY OF ART	assorted authors	70 vols.
PSYCHOLOGY	assorted authors	15 vols.
OTHER PHIL AND HIST WORKS		300 vols. (approx.)

It is worth relating, and not irrelevant to Wal's bleak assessment of the downward spiral of Australian universities, that after his death, this library was offered gratis to the new Western Sydney University. They declined the offer. If universities, even brand-new ones with no established library, cannot house such collections, who will? Such libraries end up buried as landfill.

In one of his *Science & Education* papers 'Notes on the Cultural Significance of the Sciences' (1994) – he concludes with a statement of, one might say, his own view of the human condition:

Soft you; a word or two before you go. At the end of the paper, looking over what I have written, I sense here and there what might be interpreted as, and perhaps is, a tone of optimism, even triumphalism, about the prospects for the deepening and widening of the cultural effects of science, including, in the first rank, a naturalistically conceived ethics. But it would be a betrayal of the realistic spirit of naturalism itself to let this stand, at least without the gravest qualifications.

Recent research has found that homo sapiens shares 98.4% of its genes with pygmy chimpanzees, and this physical continuity is reflected in a propensity for xenophobic killing of other human groups and destruction of the environment. The powers made possible by the remaining 1.6% of genes, have, amongst other things, heightened the former to genocides and the latter to the point where the continued existence of the species, at least in a form worthy of its history at its best, is in serious question. Homo sapiens may be said to be unique in its delight in torture and addiction to toxic substances. It is also, of course, unique in its culture, and here, in the first place, in the possession of the marvel of language. ...

The latter has made possible, amongst other things, the creation of new sorts of toxins such as racisms and nationalisms (but cf. earlier species- and ter-

ritorial 'imperatives') and others that are unique, in the first place, religions and those metaphysical beliefs with an essentially similar character, narcotics that induce fantasies which both console present suffering and help guarantee its continuance.

Given the terrible burden that specifically human life inflicts on the instincts (as Freud explains in many places, especially *Civilisation and its Discontents*), and, on top of this, the pervasive miseries inflicted on the mass of people by historically endemic class-exploitation, together with the failures of all attempts so far to construct any form of social organisation that might countervail, wholly or partly, the effects of the first of these sources of distress, or do away with the second, it may seem, and possibly is, largely frivolous to think that human beings, in any great numbers anyway, will, in any realistically foreseeable future, renounce illusions that make life tolerable in favour of a purely naturalistic view of the world that can offer, at best, only limited prospects of unconditional happiness.

Wal's death was a sad loss for this family, his many friends and the sectors of scholarship in which he laboured. He left a model for serious Marxist and more general philosophical research that challenged many who had the good fortune to know him and will likewise challenge and set standards for many who did not know him.

Select Publications

1966, 'Hume and Necessary Truth', *Dialogue* 5, 47-60.

1967a, 'Deductive Explanation and Prediction Revisited', *Philosophy of Science* 34, 41-52.

1967b, 'Berkeley's Criticism of Newton on Space and Motion', *Isis* 58, 186-197.

1967c, (with G.C. Nerlich), 'Popper on Law

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- 1967d, 'Kant's Second Analogy of Experience', *Kant-Studien* 58, 355-369. [Reprinted in Lewis White Beck (ed.), *Kant Studies Today*. Open Court Publishing Company, 1969; and in Tom L. Beauchamp (ed.), *Philosophical Problems of Causation*, Dickenson Publishing Company, Encino and Belmont, 1974.]
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- 1975, 'Marx on the Dialectics of Production and Consumption in the Introduction to the Grundrisse', *Social Praxis* 3, 291-314.
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- 1983a, *Marx. An Introduction*, Wheatsheaf, Brighton, Sussex (pp. xxii + 242)
- 1983b, 'Knowledge and Practice: Towards a Marxist Critique of Traditional Epistemology' *Science & Society* 47, 2-36.
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- 1986, *Marx and Philosophy. Three Studies*, Macmillan, London, (pp.xiii + 133) [Revised reprint of 1982a, 1983b and 1985b]
- 1990, 'Hegel and the Humean Problem of Induction', *Studies in History and Philosophy of Science* 21, 493-510.
- 1991a, 'On Some Unsettled Questions Touching the Character of Marxism, Especially as Philosophy', *Graduate Faculty Philosophy Journal, New School for Social Research*, 14(1), 139-207.
- 1991b, translation (with T.W. Geraets and H.S. Harris) G.W.F. Hegel *The Encyclopaedia Logic* (with the *Zusätze*), Hackett Publishing Company, Indianapolis. (With Minority Comments on Terminology xxxii-xlvii.)
- 1981a, 'Capitalism and Communism in the

- 1992a, 'Constructivism Deconstructed', *Science & Education* 1(3), 223-254.
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- 1993a, 'Reconstructing Marxism', *Science & Society* 57, 133-159.
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- 1994b, 'Reconstructing Marxism: Some Comments on Comments', *Science & Society* 58, 325-331.
- 1995a, 'The Nature of Scientific Thought', *Science & Education* 4(1), 1-22.
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pp.157-165.

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Recent HPS&ST Research Articles

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Historiography of Physics Transversal. International Journal for the Historiography of Science (Number 8, 2020) Guest Editors' Ivã Gurgel (USP), Thiago Hartz (UFRJ)

Aini, R.Q., Rachmatullah, A., & Harliadi, M.D. et al. (2020). Indonesian Pre-service Biology Teachers' and Biology Education Professors' Views on Evolution. *Science & Education*, 1-29. doi:[10.1007/s11191-020-00127-5](https://doi.org/10.1007/s11191-020-00127-5) online first

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Recent HPS&ST Related Books

Bennett, Michael (2020). *War Against Smallpox: Edward Jenner and the Global Spread of Vaccination*. Cambridge, UK: Cambridge University Press. ISBN: 978-1-139-01956-9

“Michael Bennett provides the first history of the global spread of vaccination during the Napoleonic Wars, offering a new assessment of the cowpox discovery and Edward Jenner’s achievement in making cowpox inoculation a viable and universally available practice. He explores the networks that took the vaccine around the world, and the reception and establishment of vaccination among peoples in all corners of the globe. His focus is on the human story of the horrors of smallpox, the hopes invested in vaccination by medical men and parents, the children put arm-to-arm across the world, and the early challenges, successes and disappointments. He presents vaccination as a quiet revolution, genuinely emancipatory, but also the sharp end of growing state power. By the end of the war in 1815, millions of children had been vaccinated. The early success of the war against smallpox paved the way to further advances towards eradication.” (From the Publisher)

More information available [here](#).

Bowler, Peter J., & Morus, Iwan Rhys (2020). *Making Modern Science* (2nd Edition). Chicago, IL: The University of Chicago Press. ISBN: 978-0-226-36593-0

“An impressively comprehensive, clear, and accessible survey of the history of science since the Scientific Revolution that tells students not only what they should know, but also how and how not to think about the history of science.” – *Annals of Science*

“An accessible, well-written book, with many nuanced and fascinating stories of individual sciences and the communities of science...An ambitious and successful introduction to the history of science.” – *International Studies in the Philosophy of Science*

“In this new edition of the top-selling coursebook, seasoned historians Peter J. Bowler and Iwan Rhys Morus expand on their authoritative survey of how the development of science has shaped our world. Exploring both the history of science and its influence on modern thought, the authors chronicle the major developments in scientific thinking, from the revolutionary ideas of the seventeenth century to contemporary issues in genetics, physics, and more.

“Thoroughly revised and expanded, the second edition draws on the latest research and scholarship. It also contains two entirely new chapters: one that explores the impact of computing on the development of science, and another that shows how the West used science and technology as tools for geopolitical expansion. Designed for entry-level college courses and as a single-volume introduction for the general reader, *Making Modern Science* presents the history of science not as a series of names and dates, but as an interconnected and complex web of relationships joining science and society.” (from the Publisher)

More information available [here](#).

Brockmann, Sophie (2020). *The Science of Useful Nature in Central America: Landscapes, Networks and Practical Enlightenment, 1784–1838*. Cambridge, UK: Cambridge University Press.

ISBN: 978-1-108-36761-5

“In this ambitious new study, Sophie Brockmann argues that interactions with landscape and environment were central to the construction of Central American identities in the Age of Enlightenment. She argues that new intellectual connections and novel ways of understanding landscapes had a transformative impact on political culture, as patriotic reformers sought to improve the region’s fortunes by applying scientific and ‘useful’ knowledge gathered from local and global networks to the land. These reformers established networks that extended into the countryside and far beyond Central America’s borders. Tracing these networks and following the bureaucrats, priests, labourers, merchants and scholars within them, Brockmann shows how they made a lasting impact by defining a new place for the natural world in narratives of nation and progress.” (From the Publishers)

More information available [here](#).

Cordes, Eugene H. (2020). *Hallelujah Moments: Tales of Drug Discovery* (2nd Edition). Oxford, UK: Oxford University Press. ISBN: 9780190080457

“The discovery of novel drugs that fill unmet medical needs is important for the health and well-being of people everywhere. However, the general public knows too little about the pathways through which basic research discoveries are translated into products that protect or restore human health. In the second edition of *Hallelujah Moments*, Eugene

H. Cordes reveals the processes and pitfalls on the route from the laboratory bench to the bedside. These are adventure stories in which wit and grit created several of the most important drugs in human medicine.

“This new edition adds four new tales of drug discovery: for therapy of cancer, hepatitis C, HIV/AIDS, and for weight control. The stories emphasise the integration of basic research in academe and applied research in the pharmaceutical industry and introduce the key scientists. In each case, success resulted from imagination, risk-taking, problem solving, and perseverance.

“Cordes shares his firsthand knowledge of the drug-discovery world, having spent a long and distinguished career in both academic and industrial settings. The eleven drug discovery tales take the reader from concept to clinic for some of the most important drugs in human health including the statins, ACE inhibitors, antibiotics, avermectins, Januvia, and Taxol. These stories offer exciting insights into the fascinating world of drug discovery.” (From the Publisher)

More information available [here](#).

de Chadarevian, Soraya (2020). *Heredity under the Microscope: Chromosomes and the Study of the Human Genome*. Chicago, IL: Chicago University Press. ISBN: 978-0-226-68508-3

“By focusing on chromosomes, *Heredity under the Microscope* offers a new history of postwar human genetics. Today chromosomes are understood as macromolecular assemblies and are analysed with a variety of molecular techniques. Yet for much of the twentieth century, researchers studied chromosomes by looking through a microscope. Unlike any other technique, chromosome analysis offered a direct glimpse of the complete human genome, opening up seemingly endless possibilities.

ies for observation and intervention. Critics, however, countered that visual evidence was not enough and pointed to the need to understand the molecular mechanisms.

“Telling this history in full for the first time, Soraya de Chadarevian argues that the often bewildering variety of observations made under the microscope were central to the study of human genetics. Making space for microscope-based practices alongside molecular approaches, de Chadarevian analyses the close connections between genetics and an array of scientific, medical, ethical, legal, and policy concerns in the atomic age. By exploring the visual evidence provided by chromosome research in the context of postwar biology and medicine, *Heredity under the Microscope* sheds new light on the cultural history of the human genome.” (From the Publisher)

More information available [here](#).

Fleming, James (2020). *First Woman: Joanne Simpson and the Tropical Atmosphere*. Oxford, UK: Oxford University Press.

ISBN: 978-0-198-86273-4

“This is an empathetic and sometimes moving look at the life of a woman, who, in spite of enormous personal challenges, became a great scientist and mentor, and a trail blazer for future female scientists. Like Joanne herself, her life story offers some valuable lessons for navigating a scientific career while caring for oneself and helping colleagues along the way.” – Margaret A. LeMone, Senior Scientist Emerita, National Center for Atmospheric Research

“As the first American woman to receive a Ph.D. in meteorology, Joanne Simpson had to navigate turbulence in her personal life as well as in the storms she studied to become one of the most accomplished and revered atmospheric scientists of

the twentieth century. In *First Woman*, James Fleming has masterfully woven together a rich tapestry of Simpson’s life and career that tells not only her story but also that of the emerging field of tropical meteorology she helped pioneer.” – Sean Potter, author of *Too Near for Dreams: The Story of Cleveland Abbe, America’s First Weather Forecaster*

“*First Woman* is an important book. Joanne Simpson’s biography is not only the story of a woman that had to force her way through a male dominated field as well as fight her own demons, but also the story of the mentor to a generation of scientists. Fleming does her the justice that she deserves by weaving together this nuanced story of the most prominent tropical meteorologist of her generation.” – Lourdes B. Avilés, Ph.D., Professor of Meteorology, Plymouth State University

“Clouds are the spark plugs in the heat engine of the tropical atmosphere, and heat from the tropics drives the planet’s general circulation. Atmospheric scientists didn’t know this in the 1950s, but Joanne Simpson, the first American woman to earn a Ph.D. in meteorology, did. Most histories of meteorology focus on polar and temperate regions and the accomplishments of male scientists. They marginalise or erase completely the contributions of female researchers. Joanne’s work on the tropical atmosphere did not fit this pattern.

“Joanne had a lifelong passion for clouds and severe storms. She flew into and above them, photographed them, modelled them, attempted to modify them, and studied them from all angles. She held two university professorships, married three times, had two lovers (one secret), mentored a generation of meteorologists, and blazed a trail for other women to follow.

“This book is about Joanne’s personal and professional life, her career prospects as a woman in science, and her relationship to the tropical atmosphere. These multifaceted and interacting textual streams constitute a braided narrative and form a complex dynamic system that displays surprising

emergent properties. Is Joanne Simpson best remembered as a pioneer woman scientist or the best tropical scientist of her generation? She was both, with the emphasis on best scientist.” (From the Publisher)

More information available [here](#).

Holm, Sune, & Serban, Maria (2020). *Philosophical Perspectives on the Engineering Approach in Biology: Living Machines?* Abingdon, UK: Routledge. ISBN: 978-0-815-38078-8

“*Philosophical Perspectives on the Engineering Approach in Biology* provides a philosophical examination of what has been called the most powerful metaphor in biology: The machine metaphor. The chapters collected in this volume discuss the idea that living systems can be understood through the lens of engineering methods and machine metaphors from both historical, theoretical, and practical perspectives.

“In their contributions the authors examine questions about scientific explanation and methodology, the interrelationship between science and engineering, and the impact that the use of engineering metaphors in science may have for bioethics and science communication, such as the worry that its wide application reinforces public misconceptions of the nature of new biotechnology and biological life. The book also contains an introduction that describes the rise of the machine analogy and the many ways in which it plays a central role in fundamental debates about e.g. design, adaptation, and reductionism in the philosophy of biology.

“The book will be useful as a core reading for professionals as well as graduate and undergraduate students in courses of philosophy of science and for life scientists taking courses in philosophy of science and bioethics.” (From the Publisher)

More information available [here](#).

Jackson, Roland (2020). *The Ascent of John Tyndall: Victorian Scientist, Mountaineer, and Public Intellectual*. Oxford, UK: Oxford University Press. ISBN: 978-0-198-78894-2 (New in Paperback)

“The book is well written, at times witty, at other times entirely engrossing. But its major strength is the close, first-hand knowledge of all of Tyndall’s writings. Jackson knows Tyndall’s primary sources better than anyone and that is why this biography is so satisfying. Jackson is close to his subject, fully grasps the science, has followed Tyndall’s paths across the Alps, and has managed to write about it in a smooth, engaging style.” – Michael Reidy, *Metascience*

“Jackson’s book is as comprehensive as it is overdue ... Jackson at once recounts the important events of Tyndall’s life and uses Tyndall himself to build a richly textured picture of the social and scientific world in which he lived. The book favours a rigorous attention to detail ... Jackson’s impressive facility with the scientific and political contexts of Tyndall’s late-nineteenth-century world enables him to weave together a series of themes that define both the man and the period, providing a useful and comprehensive launching pad for a wide variety of forays in to the social and scientific worlds of Victorian England.” – Joshue Howe, *Annals of Science*

“Rising from a humble background in rural southern Ireland, John Tyndall became one of the foremost physicists, communicators of science, and polemicists in mid-Victorian Britain. In science, he is known for his important work in meteorology, climate science, magnetism, acoustics, and bacteriology. His discoveries include the physical basis of the warming of the Earth’s atmosphere (the basis of the greenhouse effect), and establishing why the sky is blue. But he was also a leading communicator of science, drawing great crowds to his lectures at the

Royal Institution, while also playing an active role in the Royal Society.

“Tyndall moved in the highest social and intellectual circles. A friend of Tennyson and Carlyle, as well as Michael Faraday and Thomas Huxley, Tyndall was one of the most visible advocates of a scientific world view as tensions grew between developing scientific knowledge and theology. He was an active and often controversial commentator, through letters, essays, speeches, and debates, on the scientific, political, and social issues of the day, with strongly stated views on Ireland, religion, race, and the role of women. Widely read in America, his lecture tour there in 1872-73 was a great success.

“Roland Jackson paints a picture of an individual at the heart of Victorian science and society. He also describes Tyndall’s importance as a pioneering mountaineer in what has become known as the Golden Age of Alpinism. Among other feats, Tyndall was the first to traverse the Matterhorn. He presents Tyndall as a complex personality, full of contrasts, with his intense sense of duty, his deep love of poetry, his generosity to friends and his combativeness, his persistent ill-health alongside great physical stamina driving him to his mountaineering feats. Drawing on Tyndall’s letters and journals for this first major biography of Tyndall since 1945, Jackson explores the legacy of a man who aroused strong opinions, strong loyalties, and strong enmities throughout his life.” (From the Publishers)

More information available [here](#).

James, Matthew J. (2020). *Collecting Evolution: The Galapagos Expedition that Vindicated Darwin*. Oxford, UK: Oxford University Press.
ISBN: 978-0-197-50837-4 (New in Paperback)

“In 1905, eight men from the California Academy of Sciences set sail from San Francisco for a scientific

collection expedition in the Galapagos Islands, and by the time they were finished in 1906, they had completed one of the most important expeditions in the history of both evolutionary and conservation science. These scientists collected over 78,000 specimens during their time on the islands, validating the work of Charles Darwin and laying the groundwork for foundational evolution texts like Darwin’s *Finches*. Despite its significance, almost nothing has been written on this voyage, lost amongst discussion of Darwin’s trip on the *Beagle* and the writing of David Lack.

“In *Collecting Evolution*, author Matthew James finally tells the story of the 1905 Galapagos expedition. James follows these eight young men aboard the Academy to the Galapagos and back, and reveals the reasons behind the groundbreaking success they had. A current Fellow of the California Academy of Sciences, James uses his access to unpublished writings and photographs to provide unprecedented insight into the expedition. We learn the voyagers’ personal stories, and how, for all the scientific progress that was made, just as much intense personal drama unfolded on the trip. This book shares a watershed moment in scientific history, crossed with a maritime adventure. There are four tangential suicides and controversies over credit and fame. *Collecting Evolution* also explores the personal lives and scientific context that preceded this voyage, including what brought Darwin to the Galapagos on the *Beagle* voyage seventy years earlier. James discusses how these men thought of themselves as “collectors” before they thought of themselves as scientists, and the implications this had on their approach and their results.

“In the end, the voyage of the Academy proved to be crucial in the development of evolutionary science as we know it. It is the longest expedition in Galapagos history, and played a critical role in cementing Darwin’s legacy. *Collecting Evolution* brings this extraordinary story of eight scientists and their journey to life.” (From the Publisher)

More information available [here](#).

Kampourakis, Kostas, & Uller, Tobias (Eds.) (2020). *Philosophy of Science for Biologists*. Cambridge, UK: Cambridge University Press.

ISBN: 978-1-108-64898-1

“As a philosopher and a biologist I have been waiting for a long time for a book like this to come out. My students will learn a lot from it.” – Massimo Pigliucci, K.D. Irani Professor of Philosophy, City College of New York

“*Philosophy of Science for Biologists* is a much-awaited book written for biologists, mainly for curious and open-minded biology students. Presenting a broad spectrum of perspectives and many fascinating examples from all areas of biology, the fifteen essays in this book offer a broad and exciting vista of biological ideas, their scope, their ambitions and their potential prejudices. The essays illustrate how a multiplicity of perspectives and methodologies can be combined to answer difficult questions, encouraging cooperation, healthy skepticism and necessary optimism. It should be the basis of an obligatory course for all biology students.” – Eva Jablonka, Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University

“Historically, few biologists have recognised the valuable contributions that philosophy could make to their field. Finally, that is starting to change. In this landmark collection of essays from leading thinkers, Kampourakis and Uller provide the clearest summary yet of the philosophy that biologists really need to know if they want to be outstanding scientists who see the bigger picture.” – Kevin N. Laland, Professor of Behavioural and Evolutionary Biology, University of St Andrews

“Biologists do not simply uncover knowledge about the natural world, they build it, using concepts and classification schemes to frame their observations and experimental tests, and sifting the results so as

to explain certain aspects of that enormously complex world. In this unusual volume, Uller and Kampourakis – a leading evolutionary biologist, and an accomplished critic of science and science education – call on biologists to carefully examine not just what they think, but how they think, by directly engaging with the philosophical issues that are imbedded in their scientific practice. The book will be of unique value to working biologists who seek to clarify their scientific aims and sharpen their concepts, research approaches, and analytical tools.” – Sonia E. Sultan, Biology Department, Wesleyan University, Connecticut

More information available [here](#).

Kampourakis, Kostas (2020). *Understanding Evolution* (2nd Edition). Cambridge, UK: Cambridge University Press. ISBN: 978-1-108-77856-5

“Why do the debates about evolution persist, despite the plentiful evidence for it? Breaking down the notion that public resistance to evolution is strictly due to its perceived conflict with religion, this concise book shows that evolution is in fact a counterintuitive idea that is difficult to understand. Kostas Kampourakis, an experienced science educator, takes an insightful, interdisciplinary approach, providing an introduction to evolutionary theory written with clarity and thoughtful reasoning. Topics discussed include evolution in the public sphere, evolution and religion, the conceptual obstacles to understanding evolution, the development of Darwin’s theory, the most important evolutionary concepts, as well as evolution and the nature of science. *Understanding Evolution* presents evolutionary theory with a lucidity and vision that readers will quickly appreciate, and is intended for anyone wanting an accessible and concise guide to evolution.”

More information available [here](#).

Keogh, Luke (2020). *The Wardian Case: How a Simple Box Moved Plants and Changed the World*.

Chicago, IL: Chicago University Press.

ISBN: 978-0-226-71375-5

“Roses, jasmine, fuchsia, chrysanthemums, and rhododendrons bloom in gardens across the world, and yet many of the most common varieties have roots in Asia. How is this global flowering possible? In 1829, surgeon and amateur naturalist Nathaniel Bagshaw Ward placed soil, dried leaves, and the pupa of a sphinx moth into a sealed glass bottle, intending to observe the moth hatch. But when a fern and meadow grass sprouted from the soil, he accidentally discovered that plants enclosed in glass containers could survive for long periods without watering. After four years of experimentation in his London home, Ward created traveling glazed cases that would be able to transport plants around the world. Following a test run from London to Sydney, Ward was proven correct: the Wardian case was born, and the botanical makeup of the world’s flora was forever changed.

“In our technologically advanced and globalised contemporary world, it is easy to forget that not long ago it was extremely difficult to transfer plants from place to place, as they often died from mishandling, cold weather, and ocean salt spray. In this first book on the Wardian case, Luke Keogh leads us across centuries and seas to show that Ward’s invention spurred a revolution in the movement of plants—and that many of the repercussions of that revolution are still with us, from new industries to invasive plant species. From the early days of rubber, banana, tea, and cinchona cultivation—the last used in the production of the malaria drug quinine—to the collecting of beautiful and exotic flora like orchids in the first great greenhouses of the United States Botanic Garden in Washington, D.C., and England’s Royal Botanic Gardens, Kew, the Wardian case transformed the world’s plant com-

munities, fuelled the commercial nursery trade and late nineteenth-century imperialism, and forever altered the global environment.” (From the Publisher)

More information available [here](#).

Leng Gareth, & Leng, Rhodri Ivor (2020). *The Matter of Facts: Skepticism, Persuasion, and Evidence in Science*. Cambridge, MA: The MIT Press.

ISBN: 978-0-262-04388-5

“Modern science is built on experimental evidence, yet scientists are often very selective in deciding what evidence to use and tend to disagree about how to interpret it. In *The Matter of Facts*, Gareth and Rhodri Leng explore how scientists produce and use evidence. They do so to contextualise an array of problems confronting modern science that have raised concerns about its reliability: the widespread use of inappropriate statistical tests, a shortage of replication studies, and a bias in both publishing and citing ‘positive’ results. Before these problems can be addressed meaningfully, the authors argue, we must understand what makes science work and what leads it astray.

“The myth of science is that scientists constantly challenge their own thinking. But in reality, all scientists are in the business of persuading other scientists of the importance of their own ideas, and they do so by combining reason with rhetoric. Often, they look for evidence that will support their ideas, not for evidence that might contradict them; often, they present evidence in a way that makes it appear to be supportive; and often, they ignore inconvenient evidence.

“In a series of essays focusing on controversies, disputes, and discoveries, the authors vividly portray science as a human activity, driven by passion as well as by reason. By analysing the fluidity of scientific concepts and the dynamic and unpredictable

development of scientific fields, the authors paint a picture of modern science and the pressures it faces.” (From the publisher)

More information available [here](#).

Longair, Malcom S. (2020). *Theoretical Concepts in Physics: An Alternative View of Theoretical Reasoning in Physics* (3th Edition). Cambridge, UK: Cambridge University Press.

ISBN: 978-0-511-84017-3

“In this original and integrated approach to theoretical reasoning in physics, Malcolm Longair illuminates the subject from the perspective of real physics as practised by research scientists. Concentrating on the basic insights, attitudes and techniques that are the tools of the modern physicist, this approach conveys the intellectual excitement and beauty of the subject. Through a series of seven case studies, an undergraduate course in classical physics and the discovery of quanta are reviewed from the point of the view of how the great discoveries and changes of perspective came about. This approach illuminates the intellectual struggles needed to attain understanding of some of the most difficult concepts in physics. Longair’s highly acclaimed text has been fully revised and includes new studies on the physics of fluids, Maxwell’s great paper on equations for the electromagnetic field and problems of contemporary cosmology and the very early universe.” (From the publisher)

More information available [here](#).

Mayhew, Robert J., & Withers, Charles W. J. (Eds.) (2020). *Geographies of Knowledge: Science, Scale, and Spatiality in the Nineteenth Century*. Baltimore, MD: Johns Hopkins University Press. ISBN: 978-1-421-43854-2

“Over the past twenty years, scholars have increasingly questioned not just historical presumptions about the putative rise of modern science during the long nineteenth century but also the geographical contexts for and variability of science during the era. In *Geographies of Knowledge*, an internationally distinguished array of historians and geographers examine the spatialisation of science in the period, tracing the ways in which scale and space are crucial to understanding the production, dissemination, and reception of scientific knowledge in the nineteenth century.

“Engaging with and extending the influential work of David Livingstone and others on science’s spatial dimensions, the book touches on themes of empire, gender, religion, Darwinism, and much more. In exploring the practice of science across four continents, these essays illuminate the importance of geographical perspectives to the study of science and knowledge, and how these ideas made and contested locally could travel the globe.

“Dealing with everything from the local spaces of the Surrey countryside to the global negotiations that proposed a single prime meridian, from imperial knowledge creation and exploration in Burma, India, and Africa to studies of metropolitan scientific-cum-theological tussles in Belfast and in Confederate America, *Geographies of Knowledge* outlines an interdisciplinary agenda for the study of science as geographically situated sets of practices in the era of its modern disciplinary construction. More than that, it outlines new possibilities for all those interested in knowledge’s spatial characteristics in other periods.” (From the Publishers)

More information available [here](#).

Musgrave, Toby (2020). *The Multifarious Mr. Banks*. New Haven, CT: Yale University Press. ISBN: 978-0-300-22383-5 [Hardcover]

“As official botanist on James Cook’s first circum-

navigation, the longest-serving president of the Royal Society, advisor to King George III, the "father of Australia," and the man who established Kew as the world's leading botanical garden, Sir Joseph Banks was integral to the English Enlightenment. Yet he has not received the recognition that his multifarious achievements deserve.

"In this engaging account, Toby Musgrave reveals the true extent of Banks's contributions to science and Britain. From an early age Banks pursued his passion for natural history through study and extensive travel, most famously on the HMS Endeavour. He went on to become a pivotal figure in the advancement of British scientific, economic, and colonial interests. With his enquiring, enterprising mind and extensive network of correspondents, Banks's reputation and influence were global. Drawing widely on Banks's writings, Musgrave sheds light on Banks's profound impact on British science and empire in an age of rapid advancement." (From the Publisher)

More information available [here](#).

Nicolaides, Demetris (2020). *In Search of a Theory of Everything: The Philosophy Behind Physics*. Oxford, UK: Oxford University Press.

ISBN: 978-0-190-09835-3

"In times like these—when the deep unity of science and philosophy is under attack from various quarters, in particular from the anti-Enlightenment forces so powerfully present in contemporary society—we need books like the one of Demetris Nicolaides. This is a crystal-clear demonstration that the unity is indeed real and important and that the Enlightenment project is alive and well." – Milan M. Cirkovic, Astronomical Observatory of Belgrade

"At a time when science faces sharp challenges to its authority and philosophy faces fierce attacks on its relevance, Demetris Nicolaides makes a powerful,

historically grounded case for their interdependence. In *Search of a Theory of Everything* shows how millennia-old philosophical questions sit at the very heart of what makes modern science—and the purchase it offers on the world—compelling." – Joseph D. Martin, Durham University

"*In Search of a Theory of Everything* takes readers on an adventurous journey through space and time on a quest for a unified "theory of everything" by means of a rare and agile interplay between the natural philosophies of influential ancient Greek thinkers and the laws of modern physics. By narrating a history and a philosophy of science, theoretical physicist Demetris Nicolaides logically connects great feats of critical mind and unbridled human imagination in their ambitious quest for the theory that will ultimately explain all the phenomena of nature via a single immutable overarching law.

"This comparative study of the universe tells the story of physics through philosophy, of the current via the forgotten, in a balanced way. Nicolaides begins each chapter with a relatively easier analysis of nature—one conceived by a major natural philosopher of antiquity—easing readers gradually into the more complex views of modern physics, by intertwining finely the two, the ancient with the new. Those philosophers' rigorous scientific inquiry of the universe includes ideas that resonate with aspects of modern science, puzzles about nature that still baffle, and clever philosophical arguments that are used today to reassess competing principles of modern physics and speculate about open physics problems.

"*In Search of a Theory of Everything* is a new kind of sight, a philosophical insight of modern physics that has long been left unexamined." (From the Publisher)

More information available [here](#).

Noordhof, Pau (2020). *A Variety of Causes*. Ox-

ford, UK: Oxford University Press.

ISBN: 978-0-199-25146-9

“This is the first book length defence of a counterfactual theory of causation. The analysis defended is new. It expresses the idea that, independent of its competitors, a cause raises the chance of an effect over its mean background chance by a complete causal chain. The analysis depends upon a novel development of David Lewis’s Theory of Counterfactuals. One consequence of the analysis is that causation is not transitive. Causation is also non-symmetric. The counterfactual basis of causal non-symmetry is the result of a number of different, and sometimes interacting, nonsymmetries. The analysis allows for the development of a novel theory of events whose nature is independent of their role in causation and the identification of one other important causal relationship: property causation. Although compatible with Hume’s denial of necessary connections between distinct existences, a key feature of the theory is that it benefits from being independent of the Humean framework. There are two ways in which something may be metaphysically fundamental: vertically and horizontally. Many metaphysicians emphasise vertical fundamentality and focus on truth making. The book rejects this emphasis and the truth making approach in particular. Horizontally fundamental metaphysical entities are those that are necessary components in different possible universes. Causation has a claim to be horizontally fundamental: the cement of any universe. Laws are patterns of causation realised in different metaphysical frameworks such as those articulated by Lewis, Armstrong and the powers ontologists. The book recognises varieties of causation both in, for example, counting cases of double prevention and causation by genuine processes as types of causation, and allowing that the analysis identifies causes across these different metaphysical frameworks.”

More information available [here](#).

Principe, Lawrence M. (2020). *The Transmutations of Chemistry: Wilhelm Homberg and the Académie Royale Des Sciences*. Chicago, IL: Chicago University Press.

ISBN: 978-0-226-70078-6

“This book reevaluates the changes to chemistry that took place from 1660 to 1730 through a close study of the chemist Wilhelm Homberg (1653–1715) and the changing fortunes of his discipline at the Académie Royale des Sciences, France’s official scientific body. By charting Homberg’s remarkable life from Java to France’s royal court, and his endeavour to create a comprehensive theory of chemistry (including alchemical transmutation), Lawrence M. Principe reveals the period’s significance and reassesses its place in the broader sweep of the history of science.

“Principe, the leading authority on the subject, recounts how Homberg’s radical vision promoted chemistry as the most powerful and reliable means of understanding the natural world. Homberg’s work at the Académie and in collaboration with the future regent, Philippe II d’Orléans, as revealed by a wealth of newly uncovered documents, provides surprising new insights into the broader changes chemistry underwent during, and immediately after, Homberg. A human, disciplinary, and institutional biography, *The Transmutations of Chemistry* significantly revises what was previously known about the contours of chemistry and scientific institutions in the early eighteenth century.” (From the Publishers)

More information available [here](#).

Prothero, Donald R. (2020). *The Story of the Earth in 25 Rocks: Tales of Important Geological Puzzles and the People Who Solved Them*. New York, NY:

Columbia University Press.

ISBN: 978-0-231-18261-4

“Every rock is a tangible trace of the earth’s past. The Story of the Earth in 25 Rocks tells the fascinating stories behind the discoveries that shook the foundations of geology. In twenty-five chapters—each about a particular rock, outcrop, or geologic phenomenon—Donald R. Prothero recounts the scientific detective work that shaped our understanding of geology, from the unearthing of exemplary specimens to tectonic shifts in how we view the inner workings of our planet.

“Prothero follows in the footsteps of the scientists who asked—and answered—geology’s biggest questions: How do we know how old the earth is? What happened to the supercontinent Pangea? How did ocean rocks end up at the top of Mount Everest? What can we learn about our planet from meteorites and moon rocks? He answers these questions through expertly chosen case studies, such as Pliny the Younger’s firsthand account of the eruption of Vesuvius; the granite outcrops that led a Scottish scientist to theorise that the landscapes he witnessed were far older than Noah’s Flood; the salt and gypsum deposits under the Mediterranean Sea that indicate that it was once a desert; and how trying to date the age of meteorites revealed the dangers of lead poisoning. Each of these breakthroughs filled in a piece of the greater puzzle that is the earth, with scientific discoveries dovetailing with each other to offer an increasingly coherent image of the geologic past. Summarising a wealth of information in an entertaining, approachable style, *The Story of the Earth in 25 Rocks* is essential reading for the armchair geologist, the rock-hound, and all who are curious about the earth beneath their feet.”
(From the Publisher)

More information available [here](#).

Reck, Erich H., & Schiemer, Georg (Eds.) (2020)

The Prehistory of Mathematical Structuralism. Oxford, UK: Oxford University Press.

ISBN: 978-0-190-64122-1 [Open access]

“This is an open access title available under the terms of a CC BY-NC-ND 4.0 licence. It is free to read at Oxford Scholarship Online and offered as a free PDF download from OUP and selected open access locations.

“Recently, debates about mathematical structuralism have picked up steam again within the philosophy of mathematics, probing ontological and epistemological issues in novel ways. These debates build on discussions of structuralism which began in the 1960s in the work of philosophers such as Paul Benacerraf and Hilary Putnam; going further than these previous thinkers, however, these new debates also recognise that the motivation for structuralist views should be tied to methodological developments within mathematics. In fact, practically all relevant ideas and methods have roots in the structuralist transformation that modern mathematics underwent in the 19th and early 20th centuries.

“This edited volume of new essays by top scholars in the philosophy of mathematics explores this previously overlooked ‘pre-history’ of mathematical structuralism. The contributors explore this historical background along two distinct but interconnected dimensions. First, they reconsider the methodological contributions of major figures in the history of mathematics, such as Dedekind, Hilbert, and Bourbaki, who are responsible for the introduction of new number systems, algebras, and geometries that transformed the landscape of mathematics. Second, they reexamine a range of philosophical reflections by mathematically inclined philosophers, like Russell, Cassirer, and Quine, whose work led to profound conclusions about logical, epistemological, and metaphysical aspects of structuralism.

“Overall, the essays in this volume show not only that the pre-history of mathematical structuralism

is much richer than commonly appreciated, but also that it is crucial to take into account this broader intellectual history for enriching current debates in the philosophy of mathematics. The insights included in this volume will interest scholars and students in the philosophy of mathematics, the philosophy of science, and the history of philosophy.” (From the Publishers)

More information available [here](#).

Richards, Evelleen (2020). *Ideology and Evolution in Nineteenth Century Britain: Embryos, Monsters, and Racial and Gendered Others in the Making of Evolutionary Theory and Culture*. Abingdon, UK: Routledge. ISBN: 978-1-138-60771-2

“Written over several decades and collected together for the first time, these richly detailed contextual studies by a leading historian of science examine the diverse ways in which cultural values and political and professional considerations impinged upon the construction, acceptance and applications of nineteenth century evolutionary theory. They include a number of interrelated analyses of the highly politicised roles of embryos and monsters in pre- and post-Darwinian evolutionary theorising, including Darwin’s; several studies of the intersection of Darwinian science and its practitioners with issues of gender, race and sexuality, featuring a pioneering contextual analysis of Darwin’s theory of sexual selection; and explorations of responses to Darwinian science by notable Victorian women intellectuals, including the crusading anti-feminist and ardent Darwinian, Eliza Lynn Linton, the feminist and leading anti-vivisectionist Frances Power Cobbe, and Annie Besant, the bible-bashing, birth-control advocate who confronted Darwin’s opposition to contraception at the notorious Knowlton Trial.” (From the Publisher)

More information available [here](#).

Schmidt, Ulf, Frewer, Andreas, & Sprumont, Dominique (Eds.) (2020). *Ethical Research: The Declaration of Helsinki, and the Past, Present, and Future of Human Experimentation*. Oxford, UK: Oxford University Press.
ISBN: 978-0-190-22417-2

“At the heart of research with human beings is the moral notion that the experimental subject is altruistic, and is primarily concerned for the welfare of others. Beneath the surface, however, lies a very different ethical picture. Individuals participating in potentially life-saving research sometimes take on considerable risks to their own well-being. Efforts to safeguard human participants in clinical trials have intensified ever since the first version of the World Medical Association’s *Declaration of Helsinki* (1964) and are now codified in many national and international laws and regulations. However, a comprehensive understanding of how this cornerstone document originated, changed, and functions today does not yet exist in the sphere of human research.

“*Ethical Research* brings together the work of leading experts from the fields of bioethics, health and medical law, the medical humanities, biomedicine, the medical sciences, philosophy, and history. Together, they focus on the centrality of the Declaration of Helsinki to the protection of human subjects involved in experimentation in an increasingly complex industry and in the government-funded global research environment. The volume’s historical and contemporary perspectives on human research address a series of fundamental questions: Is our current human protection regime adequately equipped to deal with new ethical challenges resulting from advances in high-tech biomedical science? How important has the Declaration been in non-Western regions, for example in Eastern Europe, Africa, China, and South America? Why has the bureaucratisation of regulation led to calls

to pay greater attention to professional responsibility? Ethical Research offers insight into the way in which philosophy, politics, economics, law, science, culture, and society have shaped, and continue to shape, the ideas and practices of human research.”

More information available [here](#).

Schwartz, James S.J. (2020). *The Value of Science in Space Exploration*. Oxford, UK: Oxford University Press. ISBN: 978-0-190-06906-3

“Space exploration, especially the recent push for the commercialisation and militarisation of space, is attracting increased attention not only from the wider public and the private sector but also from scholars in a wide range of disciplines. At this moment of uncertainty about the future direction of national spaceflight programs, *The Value of Science in Space Exploration* defends the idea, often overlooked, that the scientific understanding of the Solar System is both intrinsically and instrumentally valuable. Drawing on research from the physical sciences, social sciences, and the humanities, James S.J. Schwartz argues further that there is truly a compelling obligation to improve upon our scientific understanding—including our understanding of space environments—and that there exists a corresponding duty to engage in the scientific exploration of the Solar System.

“After outlining the underpinning epistemological debates, Schwartz tackles how this obligation affects the way we should approach some of the major questions of contemporary space science and policy: Is there a need for environmental preservation in space? Should humans try to establish settlements on the Moon, Mars, or elsewhere in the Solar System, and if so, how? In answering these questions, Schwartz parleys with recent work in science policy and social philosophy of science to characterise the instrumental value of scientific research, identifying space research as a particularly

effective generator of new knowledge. Additionally, whereas planetary protection policies are currently employed to prevent biological contamination only of sites of interest in the search for extraterrestrial life, Schwartz contends that all sites of interest to space science ought to be protected. Meanwhile, both space resource exploitation, such as lunar or asteroid mining, and human space settlement would result in extensive disruption or destruction of pristine space environments. The overall ethical value of these environments in the production of new knowledge and understanding is greater than their value as commercial or real commodities, and thus confirms that the exploitation and settlement of space should be avoided until the scientific community develops an adequate understanding of these environments. At a time when it is particularly pertinent to consider the ways in which space exploration might help solve some of the world’s ethical and resource-driven concerns, *The Value of Science in Space Exploration* is a thought-provoking and much-needed examination into the world of space.” (From the Publishers)

More information available [here](#).

Sepkoski, David (2020). *Catastrophic Thinking: Extinction and the Value of Diversity from Darwin to the Anthropocene*. Chicago, IL: Chicago University Press. ISBN: 978-0-226-35461-3

“We live in an age in which we are repeatedly reminded—by scientists, by the media, by popular culture—of the looming threat of mass extinction. We’re told that human activity is currently producing a sixth mass extinction, perhaps of even greater magnitude than the five previous geological catastrophes that drastically altered life on Earth. Indeed, there is a very real concern that the human species may itself be poised to go the way of the dinosaurs, victims of the most recent mass extinction some 65 million years ago.

“How we interpret the causes and consequences of extinction and their ensuing moral imperatives is deeply embedded in the cultural values of any given historical moment. And, as David Sepkoski reveals, the history of scientific ideas about extinction over the past two hundred years—as both a past and a current process—is implicated in major changes in the way Western society has approached biological and cultural diversity. It seems self-evident to most of us that diverse ecosystems and societies are intrinsically valuable, but the current fascination with diversity is a relatively recent phenomenon. In fact, the way we value diversity depends crucially on our sense that it is precarious—that it is something actively threatened, and that its loss could have profound consequences. In *Catastrophic Thinking*, Sepkoski uncovers how and why we learned to value diversity as a precious resource at the same time as we learned to think catastrophically about extinction.” (From the Publisher)

More information available [here](#).

Whysner, John (2020). *The Alchemy of Disease: How Chemicals and Toxins Cause Cancer and Other Illnesses*. New York, NY: Columbia University Press. ISBN: 978-0-231-19166-1

“Since the dawn of the industrial age, we have unleashed a bewildering number of potentially harmful chemicals. But out of this vast array, how do we identify the actual threats? What does it take to prove that a certain chemical causes cancer? How do we translate academic knowledge of the toxic effects of particular substances into understanding real-world health consequences? The science that answers these questions is toxicology.

“In *The Alchemy of Disease*, John Whysner offers an accessible and compelling history of toxicology and its key findings. He details the experiments and discoveries that revealed the causal connections

between chemical exposures and diseases. Balancing clear accounts of groundbreaking science with human drama and public-policy relevance, Whysner describes key moments in the development of toxicology and their thorny social and political implications. The book features discussions of toxicological problems past and present, including DDT, cigarettes and other carcinogens, lead poisoning, fossil fuels, chemical warfare, pharmaceuticals—including opioids—and the efficacy of animal testing. Offering valuable insight into the science and politics of crucial public-health concerns, *The Alchemy of Disease* shows that toxicology’s task—pinpointing the chemical cause of an illness—is as compelling as any detective story.” (From the Publisher)

More information available [here](#).

Wolfe, Audra J. (2020). *Freedom’s Laboratory: The Cold War Struggle for the Soul of Science*. Baltimore, MD: Johns Hopkins University Press. ISBN: 978-1-421-43908-2

“Scientists like to proclaim that science knows no borders. Scientific researchers follow the evidence where it leads, their conclusions free of prejudice or ideology. But is that really the case? In *Freedom’s Laboratory*, Audra J. Wolfe shows how these ideas were tested to their limits in the high-stakes propaganda battles of the Cold War.

“Wolfe examines the role that scientists, in concert with administrators and policymakers, played in American cultural diplomacy after World War II. During this period, the engines of US propaganda promoted a vision of science that highlighted empiricism, objectivity, a commitment to pure research, and internationalism. ‘Working (both overtly and covertly, wittingly and unwittingly) with governmental and private organisations, scientists attempted to decide what, exactly,

they meant when they referred to scientific freedom' or the 'us ideology.' More frequently, however, they defined American science merely as the opposite of Communist science.

"Uncovering many startling episodes of the close relationship between the US government and private scientific groups, *Freedom's Laboratory* is the first work to explore science's link to us propaganda and psychological warfare campaigns during the Cold War. Closing in the present day with a discussion of the 2017 March for Science and the prospects for science and science diplomacy in the Trump era, the book demonstrates the continued hold of Cold War thinking on ideas about science and politics in the United States." (From the Publishers)

More information available [here](#).

Authors of HPS&ST-related papers and books are invited to bring them to attention of [Paulo Maurício](#) or [Nathan Oseroff-Spicer](#) for inclusion in these sections.

Coming HPS&ST Related Conferences

July 21-23, 2020, 24th Conference of the International Society for the Philosophy of Chemistry. Buenos Aires, Argentina.

More information available [here](#).

July 27-31, 2020, Summer School on "Open science": ambivalences and tensions – New borderlands between science, technology and society (Donostia-San Sebastian, Spain).

Details available [here](#) or

Lilia Bolz (lilia.bolz@humtec.rwth-aachen.de).

August 10-14, 2020, Bayesian Epistemology: Perspectives and Challenges. MCMP, LMU Munich.

Details available [here](#).

August 18-21, 2020, EASST + 4S Joint Conference, Prague

Details available [here](#).

August 31 – September 3, 2020, European Society for History of Science Biennial Conference, Bologna

Details available [here](#).

September 9-11, 2020. The 8th Congress of the Society for the Philosophy of Science. University of Mons, Belgium.

Details available [here](#).

September 14-19, 2020, 39th annual symposium of the Scientific Instrument Commission, London

Details available [here](#).

October 8-9, 2020 Conference on Science & Technology Education, Porto, Portugal

Details available [here](#).

October 8-11, 2020, History of Science Society Annual Conference, New Orleans

Details available [here](#).

November 19-22, 2020, Twenty-Seventh Biennial Meeting of the PSA. Baltimore, Maryland

Details available [here](#).

December 11-12, 2020, 'History, Philosophy and Sociology of School Biology', on-line and in-person ISHPSSB symposium, Dublin City University

Details available [here](#).

July 4-8, 2021, IHPST 16th International Conference, University of Calgary, Canada

Details from Glenn Dolphin:

glenn.dolphin@ucalgary.ca.

July 11-16, 2021, Biennial meeting of the Interna-

tional Society for the History, Philosophy, and Social Studies of Biology, Milwaukee, WI
Details available [here](#).

July 19-23, 2021 'Objects of Understanding: Historical Perspectives on Material Artefacts in Science Education' will take place at the Europa-Universität Flensburg (Germany)
Details: Roland Wittje, roland.wittje@gmail.com and [here](#).

July 25-31, 2021, 26th International Congress of History of Science and Technology (DHST), Prague
Information: <https://www.ichst2021.org/>

September 20-22, 2021, 'Developing Mario Bunge's Scientific-Philosophical Programme', Huaguang Academy of Information Science, Wuhan, China
Details from Zongrong LI 2320129239@qq.com.

July 24-29, 2023, 17th DLMPST Congress, University of Buenos Aires
Information: Pablo Lorenzano, pablo@unq.edu.ar.

HPS&ST Related Organisations and Websites

IUHPST – International Union of History, Philosophy, Science, and Technology

DLMPST – Division of Logic, Mathematics, Philosophy, Science, and Technology

DHST – Division of History, Science, and Technology

IHPST – International History, Philosophy, and Science Teaching Group

NARST – National Association for Research in Sci-

ence Teaching

ESERA – European Science Education Research Association

ASERA – Australasian Science Education Research Association

ICASE – International Council of Associations for Science Education

UNESCO – Education

HSS – History of Science Society

ESHS – European Society for the History of Science

AHA – American History Association

ISHEASTME – International Society for the History of East Asian History of Science Technology and Medicine

BSHS – British Society for History of Science

EPSA – European Philosophy of Science Association

AAHPSSS – The Australasian Association for the History, Philosophy, and Social Studies of Science

HOPOS – International Society for the History of Philosophy of Science

PSA – Philosophy of Science Association

BSPS – The British Society for the Philosophy of Science

SPSP – The Society for Philosophy of Science in Practice

ISHPSB – The International Society for the History, Philosophy, and Social Studies of Biology

PES – The Philosophy of Education Society (USA)

The above list is updated and kept on the HPS&ST website [HERE](#).

HPS&ST-related organisations wishing their web page to be added to the list should contact assistant editor Paulo Maurício (paulo.asterix@gmail.com)

The NEWSLETTER is typeset in XeLaTeX.

The font is Minion Pro.

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