

The background of the image is a photograph of the interior of Antelope Canyon. The walls are made of smooth, undulating sandstone that has been eroded into flowing, ribbon-like shapes. The lighting is warm and golden, creating a play of light and shadow that highlights the textures and curves of the rock. The overall atmosphere is ethereal and majestic.

HPS&ST NEWSLETTER

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JANUARY 2020

The HPS&ST NEWSLETTER has been published for about 30 years in print or electronic form. It began during the editor's 25-year period (1990-2014) as editor of Springer's *Science & Education: Contributions from History and Philosophy of Science* journal and his term as president of the International History, Philosophy and Science Teaching Group and later as president of the Inter-Divisional Teaching Commission of the DLMPST & the DHST.

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.

The contents page of 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 teacher education; and/or interests in the promotion of innovative, engaging

and effective teaching of the history and philosophy of science.

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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Australian Bushfires: A Personal Report

As editor of the NEWSLETTER, and a life-long resident of Australia, I beg indulgence to make some immediate and personal remarks about our dire bushfire situation.

The Australian bushfires that have burned since late December have already consumed 11 million hectares (110,000 sq. kms, or approximately the combined area of Belgium, The Netherlands and Denmark) of forest, crops and grazing land. An estimated one million stock and native animals have been killed; hundreds of homes and businesses destroyed; at least 30 people, including perhaps 10 firefighters, have died. And they are still burning. The smoke and particles have spread through two-thirds of the earth's atmosphere, turning snow yellow in the New Zealand alps, and ash dropping in parts of Latin America. NASA expects the Australian smoke to do a complete lap through the earth's atmosphere at a height of 18 kms. The ecological, environmental and health damage is almost 'off the scale', as is the national economic cost.

The catastrophe has been widely covered in all international media. MSNBC gives one report that can be recommended because it clearly ties natural and environmental factors to political and economic decisions taken by the Australian government. Please read the report [HERE](#).

The causal connection between change in nature and political/economic decision-making is universal; it is not an Australian phenomenon. Nature and social systems are interrelated. The world is systematic and needs to be studied as such by scientists, economists and sociologists; 'problems' need to be addressed systematically. Subatomic particles are parts of atoms, which are parts of molecules, which are parts of molecular chains,

which can be parts of cells, which are parts of bodies and organisms, which are parts of communities, which are parts of populations, which are parts of societies, that are parts of political/economic systems, and so on. And all of the inter-related causal complexes have their own histories. This is one uncontested conclusion of good science and of HPS studies.

For the purposes of this HPS&ST NEWSLETTER, it is worth drawing attention to two local and personally-related episodes; the 'Big Picture' can be readily filled in from elsewhere.

The first episode concerns Anthony Allen, a 73-year-old long-standing friend from high school days, who is a dairy farmer at Cobargo about 400 kms south of Sydney.

One of the Australian mega-fires burnt through the historic timber town on the south coast of NSW near the Victorian border, and through hundreds of thousands of acres of surrounding bush and farmland.



Cobargo fire images, many of which were seen worldwide can be seen [HERE](#).

Tony Allen saved his house and dairy though everything else on the farm was lost. He has been

appointed the Coordinator for Cobargo Reconstruction.

Sadly, his near neighbours Robert (father, 63) and Patrick (son, 29) Salway died defending their dairy farm and milking herd. Their bodies were found in a large paddock the next morning by Patrick's pregnant-with-second-child wife, Renee who had left the farm for safety the previous day.



The *Sydney Morning Herald* gives an account of the tragedy [HERE](#).

Tony's daughter Julie O'Meara (nee Allen) has initiated a [GoFundMe](#) campaign with the aim of raising money for the direct support of Renee, her son and her-to-be-born child. The site is [HERE](#).

Any support, no matter the size, that NEWSLETTER readers might give Renee will assuredly be welcomed and appreciated.

The [GoFundMe](#) site works well and easily. The donation can be by name or anonymously. The specified amount goes in whole to the site controller, Julie O'Meara who will pass all monies collected onto Renee for her welfare and that of her family. There is an optional provision for making an administrative 'tip' to [GoFundMe](#) organisation of any amount from zero up. There is a set default percentage but that can just be manually altered downwards as one wishes or ignored.

Alternatively, the Australian Red Cross is one of

many national bodies accepting donations for relief of fire-affected communities. You can donate [HERE](#).

The second personal story concerns the Gospers Mountain fire in the Blue Mountains just 100 kms west of Sydney. On December 21 it consumed huge areas of bush, orchards, properties and much of the small mountain town of Bilpin. Images can be seen [HERE](#).

Another 73-year-old, long-standing personal friend and carpenter, Ian Muir, stayed to defend the home that he built, including all its windows, cupboards, tables, and most other furniture. His daughter Ella filmed the dramatic house-saving episode from inside the family home. It is filmed from the front line of the Australian fire fight [HERE](#).

One vital lesson to be learnt from Ian Muir's experience is that being very well prepared is crucial. He had installed extensive sprinkler systems around and over the house, he had petrol, not electric water pumps taking unlimited water from his own dam, fire hoses not garden hoses, double-glazed windows, and five capable friends to assist. Anything less than all of this and the scales are tipped. The vast bulk of the population does not have the time, resources, or expertise to be so prepared.

The constant backstory of the Australian fires is that they are unannounced and unpredictable, they spread with astonishing speed, many trees do not so much burn as they explode from within, and the fires are devastating to the whole ecological environment. And such extreme episodes will be the new normal in Australia as anthropogenic planet warming proceeds along its ever-upwards trajectory. This trajectory is abetted by blind, ill-informed political decisions by both the

Australian major political parties.

For instance, mining has been approved in 2019 of the largest known field of brown ‘dirty’ coal in the world, the Galilee Basin in Queensland (240,000 sq kms or the area of Romania). Coal extracted from the huge open-cut mines will be shipped by the Adani Company to India for burning in its coal-fired power plants [HERE](#). This is a carbon dioxide, greenhouse, global bomb primed and set off by governments and citizens who elect them.

One of the many challenges for science educators is to reflect on the Science Denial debate that is part of the bushfire story. A disturbing number of politicians and opinion makers, especially in the international Rupert Murdoch owned press, including Fox News, simply deny the science of climate change; they deny that there is a trajectory of global warming, or that the trajectory is human-related. They are denying the science. But a worrying number of science educators have for decades maintained that there is no universal science, that all science claims are ‘local’, that scientific consensus does not tell us how nature is, but how science as a social system is organised and how scientific decisions are made or coerced. Such a view of the epistemology of science, of the scientific enterprise, discounts the voice of science in social and political decision making about climate change.

Fourth International Conference on History of Physics, Trinity College, Dublin, 17-19 June 2020.

This conference is the fourth in the series following the first three, which were held at Trinity College, Cambridge UK in 2014, Pöllau, Austria in

2016 and San Sebastian, Spain in 2018. It will be the first to be formally overseen by an International Advisory Committee which is recognised by the Institute of Physics and the European Physical Society.



The aim is to bring together physicists interested in the history of their subject and professional historians of science in the belief that proponents of the two disciplines, with their different perceptions and methodologies, can benefit from interaction and discourse.

Student attendance and participation will be encouraged in the firm belief that a study of the history of the subject can inspire future generations by informing them about the lives and work of great scientists, and also facilitate a better understanding of topics that present conceptual problems today just as they did to their discoverers.

Inspired by the recent centenary of two major landmarks in modern physics – nomination of the proton as a fundamental nuclear particle and discovery of the bending of light in a gravitational field – the leading theme of the present conference will be:

‘On the Road to Modern Physics’

Presentations on the history of particle physics, general relativity, cosmology and astrophysics will

be particularly welcome. However, *papers on any topic related to physics history will be considered for inclusion.*



We are very fortunate in having the conference venue at Trinity College Dublin. Many significant figures in the history of physics have been associated with Trinity. Richard Helsham wrote the first undergraduate textbook, published in 1739, on Newton's natural philosophy: for an account of those who followed, Eric Finch's *Three Centuries of Physics at Trinity College Dublin* is to be recommended.

The Commission for the History of Physics of the International Union for the History of Science, Technology and Medicine are offering a limited number of bursaries of up to 400 Euros to help early career scholars to present papers at this conference. Please click [here](#) to find out more information.

Biographical Memoirs of the Royal Society

The Biographical Memoirs of the Royal Society are now free to access from the date of publication. These are an invaluable resource - detailed

biographies of leading scientists written by people who know the science and the person.

There's a blog about the new access [here](#) (along with a video from the Editor-in-Chief, physicist and astronomer Malcolm Longair).

The Biographical Memoirs can be accessed [here](#).

4th International Conference on Science and Literature, University of Girona, Spain, 2-4 July 2020

Following the successful three International Conferences on Science and Literature which took place in Athens, Poellau and Paris, this Conference is the fourth to be organized under the aegis of the Commission on Science and Literature DHST/UHPST. The fourth International Conference will be organized by the Càtedra Dr. Bofill de Ciències I Humanitats (Dr Bofill Chair on Science and the Humanities) integrated at the University of Girona (UdG) with the technical support of the Commission on Science and Literature. The Conference will be organized along thematic sessions. Those proposed by the Organizing Committee are:

- Science in Western Art
- Literature and Medicine
- Science and Religion
- Poetry and Science
- Scientific Genres in Science Fiction
- Mathematics, Physics and Literature
- Women in the History of Science, Philosophy and Literature

Other themes, according to the papers accepted by the Scientific Committee, can be organized.

Proposals for individual papers or panels of three or four papers should be submitted by February 29th, 2020. They must include the title of the paper (or the theme of the panel), name and affiliation of the author(s), an abstract of no more than 350 words and a short CV.

Proposals and inquiries about practical matters may be sent to gvlahakis@yahoo.com and cgamez@unav.es. Juan Ortega will be the chair of the Local Organizing Committee.

Further information is available [here](#).

Fellowships

Summer School: "Philosophy in Biology and Medicine," Carcans, France, 25-29 May 2020. This summer school will bring together 20 young scholars (PhD students and postdocs) from the fields of philosophy of science, the life sciences, and medicine.

Deadline: 21 February 2020. More information is available [here](#).

Fellowships: The Center for Humanities & History of Modern Biology at Cold Spring Harbor Laboratory invites applications for its 2020-21 fellowship program. Sydney Brenner Research Fellowships of up to \$5000 recognize and support historians, writers, and artists who are engaged in ambitious and significant work on the history of the life sciences.

Deadline: 31 January 2020. Research Travel Grants of up to \$1000 (no deadline) defray travel and lodging costs for individuals planning to travel to the CSHL archives for research purposes.

More information is available [here](#).

Fellowships: The Beckman Center at the Science History Institute, Philadelphia, PA, offers fellowships on an annual cycle for scholars doing research on their collections or in the history and social studies of chemistry, chemical engineering, and the life sciences. The Center offers postdoctoral fellowships (2 years), dissertation fellowships (9 months), and short-term fellowships (1-4 months).

Deadline: 3 February 2020. More information is available [here](#).

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

Feng shui is an internationally significant and growing body of theoretical beliefs and associated architectural, health, medicinal, astrological and geomantic practices. It has obvious cultural and educational ramifications, yet very little systematic attention has been paid to the educational responsibilities and opportunities feng shui provides for science teachers or for historians and philosophers of science.

To address these shortfalls, a collection of research papers is being overseen and edited by Michael Matthews. A general invitation for educators, philosophers and historians to contribute to the project can be read [here](#).

A brochure for the editor's recent book on the subject, giving its 14-chapter contents and some appraisals, can be read [here](#).

An overview of the book's argument can be read [here](#).

Philosophical and educational discussion of feng shui has some features in common with more common discussion about astrology, about complementary or holistic medicine, debates on special creation and evolution, and about social-psychological research on why people believe 'unusual', 'minimally-evidenced', or 'science-rejected' contentions.

More generally in feng shui discussion there is overlap with arguments about teaching the Nature of Science (NOS), the place of multi-cultural and indigenous science in school programmes, and with proposals for international STEM education. Is feng shui theory scientific? If feng shui is embedded in a culture should it be taught or at least not criticised? Does STEM education have any responsibility for addressing pseudoscientific belief and is feng shui in the latter category? Ideally, the general philosophical arguments and the localised ones concerning feng shui should inform each other.

A 110-item select bibliography of writings on the subject is available [here](#).

Project papers of 5-10,000 words need to be completed by the end of 2020, with reviews and revisions completed by mid-2011.

Indication of interest and possible participation should be sent to the editor (m.matthews@unsw.edu.au) by the end of this month (January 31). Further details can then be conveyed.

Narrative in Science Project

The Narrative Science Project (ERC funded at the LSE) would like to announce the publication of their first "Anthology of Narrative Science Cases" [here](#). This provides 8 short primary-source texts containing the narratives that scientists have told as part of their working practices, each accompanied by equally short commentaries providing context and explanation. You can see that we are eclectic about scientific contents, and about the media in which narratives are found (not just words, but diagrams). We are now preparing a second anthology, and invite contributions from scholars of the human, natural and social sciences, and of any period. Please do get in touch with Mat Paskins (m.paskins@lse.ac.uk) or Andrew Hopkins (a.e.hopkins@lse.ac.uk) or Mary S. Morgan (m.morgan@lse.ac.uk) if you would like to propose a contribution, or send us the primary text or reference directly. Primary texts should be maximum 1500 words. We hope that you find the 'narratives' in Anthology I interesting, and that it prompts not only your contributions, but also your curiosity about the project: please do surf the site for other resources from the project.

[Mary S. Morgan](#)

LSE, Department of Economic History
Visiting Fellow, University of Pennsylvania

ERC Narrative science project is available [here](#).
Catch Professor Morgan's 2013 Keynes Lecture [here](#).

Opinion: Science + Religion

Tom McLeish, Department of Physics, University of York

Tom McLeish is a professor of natural philosophy in the Department of Physics at the University of York in the UK.

His broadly interdisciplinary research ranges from the theoretical physics of soft and biological matter to the medieval history of science, and the theology, sociology and philosophy of science.



See [here](#) for more information.

To riff on the opening lines of Steven Shapin's [book](#) *The Scientific Revolution* (1996), there is no such thing as a science-religion conflict, and this is an essay about it. It is not, however, another rebuttal of the 'conflict narrative' – there is already an abundance of good, recent writing in that vein from historians, sociologists and philosophers as well as scientists themselves. Readers still under the misapprehension that the history of science can be accurately characterised by a continuous struggle to escape from the shackles of religious oppression into a sunny secular upland of free thought (loudly expressed by a few scientists but no historians) can consult Peter Harrison's masterly [book](#) *The Territories of Science and Reli-*

gion (2015), or dip into Ronald Numbers's delightful edited [volume](#) *Galileo Goes to Jail and Other Myths about Science and Religion* (2009).

Likewise, assumptions that theological and scientific methodologies and truth-claims are necessarily in philosophical or rational conflict might be challenged by Alister McGrath's [book](#) *The Territories of Human Reason* (2019) or Andrew Torrance and Thomas McCall's [edited](#) *Knowing Creation* (2018). The late-Victorian origin of the 'alternative history' of unavoidable conflict is fascinating in its own right, but also damaging in that it has multiplied through so much public and educational discourse in the 20th century in both secular and religious communities. That is the topic of a new and fascinating [study](#) by the historian James Ungureanu, *Science, Religion, and the Protestant Tradition* (2019). Finally, the concomitant assumption that scientists must, by logical force, adopt non-theistic worldviews is roundly rebutted by recent and global social science, such as Elaine Eklund's major survey, also published in a new [book](#), *Secularity and Science* (2019).

All well and good – so the history, philosophy and sociology of science and religion are richer and more interesting than the media-tales and high-school stories of opposition we were all brought up on. It seems a good time to ask the 'so what?' questions, however, especially since there has been less work in that direction. If Islamic, Jewish and Christian theologies were demonstrably central in the construction of our current scientific methodologies, for example, then what might such a reassessment imply for fruitful development of the role that science plays in our modern world? In what ways might religious communities support science especially under the shadow of a 'post-truth' political order? What implications and resources might a rethink of science and religion

offer for the anguished science-educational discussion on both sides of the Atlantic, and for the emerging international discussions on ‘science-literacy’?

I want to explore here directions in which we could take those consequential questions. Three perspectives will suggest lines of new resources for thinking: the critical tools offered by the discipline of *theology* itself (even in an entirely secular context), a reappraisal of ancient and pre-modern texts, and a new way of looking at the unanswered questions and predicament of some postmodern *philosophy* and *sociology*. I’ll finish by suggesting how these in turn suggest new configurations of religious communities in regard to science and technology.

The humble conjunction ‘and’ does much more work in framing discussions of ‘theology and science’ than at first apparent. It tacitly assumes that its referents belong to the same category (‘red’ and ‘blue’), implying a limited overlap between them (‘north’ and ‘south’), and it might already bias the discussion into oppositional mode (‘liberal’ and ‘conservative’). Yet both science and theology resist boundaries – each has something to say about everything. Other conjunctions are possible that do much greater justice to the history and philosophy of science, and also to the cultural narratives of theology. A strong candidate is ‘of’, when the appropriate question now becomes: ‘What is a theology of science?’ and its complement, ‘What is a science of theology?’

A ‘theology of...’ delivers a narrative of *teleology*, a story of purpose. A ‘theology of science’ will describe, within the religious narrative of one or more traditions, what the work of science is for. There have been examples of the ‘theology of...’ genre addressing, for example, music – see James

Begbie’s *Theology, Music and Time* (2000) – and art – see Nicholas Wolterstorff’s *Art in Action* (1997). Note that working through a teleology of a cultural art by calling on theological resources does not imply a personal commitment to that theology – it might simply respond to a need for academic thinking about purpose.

For example, Begbie [explores](#) the role that music plays in accommodating human experience to time, while Wolterstorff [discovers](#) a responsibility toward the visual aesthetics of public spaces. In both cases, we find that theology has retained a set of critical tools that address the essential human experience of purpose, value and ethics in regard to a capacity or endeavour.

Intriguingly, it appears that some of the social frustrations that science now experiences result from missing, inadequate or even damaging cultural narratives *of* science. Absence of a narrative that delineates what science is *for* leave it open to hijacking by personal or corporate sectarian interests alone, such as the purely economic framings of much government policy. It also muddies educational waters, resulting in an over-instrumental approach to science formation. I have [elsewhere](#) attempted to tease out a longer argument for what a ‘theology of science’ might look like, but even a summary must begin with examples of the fresh (though ancient) sources that a late-modern theological project of this kind requires.

The cue for a first wellspring of raw material comes from the neo-Kantian Berlin philosopher Susan Neiman. In a remarkable [essay](#), she urges that Western philosophy acknowledge, for a number of reasons, a second foundational source alongside Plato – that of the Biblical *Book of Job*. The ancient Semitic text offers a matchless starting point

for a narratology of the human relationship of the mind, and the experience of human suffering, with the material world. Long recognised as a masterpiece of ancient literature, *Job* has attracted and perplexed scholars in equal measures for centuries, and is still a vibrant field of study. David Clines, a leading and lifelong scholar of the text, [calls](#) *Job* ‘the most intense book theologically and intellectually of the Old Testament’. Inspiring commentators across vistas of centuries and philosophies, from Basil the Great to Emmanuel Levinas, its relevance to a theology of science is immediately apparent from the poetic ‘Lord’s Answer’ to Job’s complaints late in the book:

Where were you when I founded the earth?
Tell me, if you have insight.
Who fixed its dimensions? Surely you know!
...Have you entered the storehouses of the snow?
Or have you seen the arsenals of the hail?

The writer develops material from the core creation narrative in Hebrew wisdom poetry – as found in Psalms, Proverbs and Prophets – that speaks of creation through ‘ordering’, as well as bounding and setting foundations. The questing survey next sweeps over the animal kingdom, then finishes with a celebrated ‘de-centralising’ text that places humans at the periphery of the world, looking on in wonder and terror at the ‘other’ – the great beasts Behemoth and Leviathan.

The text is an ancient recognition of the unpredictable aspects of the world: the whirlwind, the earthquake, the flood, unknown great beasts. In today’s terms, we have in the Lord’s Answer to Job a foundational framing for the primary questions of the fields we now call cosmology, geology, meteorology, astronomy, zoology... We recognise an ancient and questioning view into nature unsurpassed in its astute attention to detail and sensibility

towards the tensions of humanity in confrontation with materiality. The call to a questioning relationship of the mind from this ancient and enigmatic source feeds questions of purpose in the human engagement with nature from a cultural depth that a restriction to contemporary discourse does not touch.

Drawing on historical sources is helpful in another way. The philosophy of every age contains its tacit assumptions, taken as evident so not critically examined. A project on the human purpose for science that draws on theological thinking might, in this light, draw on writing from periods when this was an academically developed topic, such as the scientific renaissances of the 13th and 17th centuries. Both saw considerable scientific progress (such as, respectively, the development of geometric optics to explain the rainbow phenomenon, and the establishment of heliocentricity). Furthermore, both periods, while perfectly distinguishing ‘natural philosophy’ from theology, worked in an intellectual atmosphere that encouraged a fluidity of thought between them.

An instructive and insightful thinker from the first is the polymath Robert Grosseteste. Master to the Oxford Franciscans in the 1220s, and Bishop of Lincoln from 1235 to his death in 1253, Grosseteste wrote in highly mathematical ways about light, colour, sound and the heavens. He drew on the earlier Arab transmission of and commentaries on Aristotle, yet developed many topics well beyond the legacy of the ancient philosopher (he was the first, for example, to identify the phenomenon of refraction to be responsible for rainbows). He also [brought](#) a developed Christian philosophy to bear upon the reawakening of natural philosophy in Europe, whose programmes of astronomy, mechanics and above all optics would lead to early modern science.

In his *Commentary on the Posterior Analytics* (Aristotle's most detailed exposition of his scientific method), Grosseteste places a sophisticated theological philosophy of science within an overarching Christian narrative of Creation, Fall and Redemption. Employing an ancient metaphor for the effect of the Fall on the higher intellectual powers as a 'lulling to sleep', he maintains that the lower faculties, including critically the senses, are less affected by fallen human nature than the higher. So, re-illumination must start there:

Since sense perception, the weakest of all human powers, apprehending only corruptible individual things, survives, imagination stands, memory stands, and finally understanding, which is the noblest of human powers capable of apprehending the incorruptible, universal, first essences, stands!

Human re-engagement with the external world through the senses, recovering a potential knowledge of it, becomes a participation in the theological project of healing. Furthermore, the reason that this is possible is because this relationship with the created world is also the nexus at which human seeking is met by divine illumination.

The old idea that there is something incomplete, damaged or 'out of joint' in the human relationship with materiality (itself drawing on traditions such as *Job*), and that the human ability to engage a question-based and rational investigation of the physical world constitutes a step towards a reversal of it, represents a strand of continuity between medieval and early modern thinking. Francis Bacon's theologically motivated framing of the new 'experimental philosophy' in the 17th century takes (though not explicitly) Grosseteste's framing as its starting point. As framed in his *Novum Organum*, the Biblical and medieval tradition that sense data are more reliable than those from reason or ima-

gination constitutes his foundation for the 'experimental method'.

The rise of experimentation in science as we now know it is itself a counterintuitive turn, in spite the hindsight-fuelled criticism of ancient, renaissance and medieval natural philosophers for their failure to adopt it. Yet the notion that one could learn anything general about the workings of nature by acts as specific and as artificial as those constituting an experiment was not at all evident, even after the foundation of the Royal Society. The 17th-century philosopher Margaret Cavendish was among the clearest of critics in her *Observations upon Experimental Philosophy* (1668):

For as much as a natural man differs from an artificial statue or picture of a man, so much differs a natural effect from an artificial...

Paradoxically perhaps, it was the theologically informed imagination of the medieval and early modern teleology of science that motivated the counterintuitive step that won against Cavendish's critique.

Much of 'postmodern' philosophical thinking and its antecedents through the 20th century appear at best to have no contact with science at all, and at worst to strike at the very root-assumptions on which natural science is built, such as the existence of a real world, and the human ability to speak representationally of it. The occasional explicit skirmishes in the 1990s 'science wars' between philosophers and scientists (such as the 'Sokal-affair' and the subsequent public acrimony between the physicist Alan Sokal and the philosopher Jacques Derrida) have suggested an irreconcilable conflict. A superficial evaluation might conclude that the charges of 'intellectual imposture' and 'uncritical naivety' levied from either side are simply the mil-

lennial manifestation of the earlier ‘two cultures’ [conflict](#) of F R Leavis and C P Snow, between the late-modern divided intellectual world of the sciences and the humanities. Yet in light of the long and theologically informed perspective on the story that we have sketched, the relationship of science to the major postmodern philosophical themes looks rather different.

Søren Kierkegaard and Albert Camus wrote of the ‘absurd’ – a gulf between the human quest for meaning and its absence in the world. Levinas and Jean-Paul Sartre wrote of the ‘nausea’ that arises from a human confrontation with sheer, basic existence. Derrida and Ferdinand de Saussure framed the human predicament of desire to represent the unrepresentable as *différance*. Hannah Arendt introduces *The Human Condition* (1958) with a meditation on the iconic value of human spaceflight, and concludes that the history of modernism has been a turning away from the world that has increased its inhospitality, so that we are suffering from ‘world alienation.’ The first modern articulation of what these thinkers have in common, an irreconcilable aspect of the human condition in respect of the world, comes from Immanuel Kant’s *Critique of Judgment* (1790):

Between the realm of the natural concept, as the sensible, and the realm of the concept of freedom, as the supersensible, there is a great gulf fixed, so that it is not possible to pass from the former to the latter by means of the theoretical employment of reason.

Kant’s recognition that more than reason alone is required for human re-engagement with the world is echoed by George Steiner. *Real Presences* (1989), his short but plangent lament over late-modern literary disengagement with reference and meaning, [looks](#) from predicament to possible solution:

Only art can go some way towards making accessible, towards waking into some measure of communicability, the sheer inhuman otherness of matter...

Steiner’s relational language is full of religious resonance – for *re-ligio* is simply at source the reconnection of the broken. Yet, once we are prepared to [situate](#) science within the same relationship to the humanities as enjoyed by the arts, then it also fits rather snugly into a framing of ‘making accessible the sheer inhuman otherness of matter.’ What else, on reflection, does science do?

Although both theology and philosophy suffer frequent accusations of irrelevance, on this point of brokenness and confusion in the relationship of humans to the world, current public debate on crucial science and technology indicate that both strands of thought are on the mark. Climate change, vaccination, artificial intelligence – these and other topics are marked in the quality of public and political discourse by anything but enlightenment values. The philosopher Jean-Pierre Dupuy, [commenting](#) in 2010 on a Europe-wide [project](#) using narrative analysis of public debates around nanotechnology, shows that they draw instead on both ancient and modern ‘narratives of despair’, creating an undertow to any discussion of ‘troubled technologies’ that, if unrecognised, renders effective public consultation impossible.

The research team labelled the narratives: (1) Be careful what you wish for – the narrative of desire; (2) Pandora’s Box – the narrative of evil and hope; (3) Messing with nature – the narrative of the sacred; (4) Kept in the dark – the narrative of alienation; and (5) The rich get richer and the poor get poorer – the narrative of exploitation. These dark and alienated stories turn up again and again below the surface of public framings of science, yet driving opinion and policy. The continuously

complex case of genetically modified organisms is another example. None of these underlying and framing stories draws on the theological resources within the history of science itself, but all do illustrate the absurd, the alienation and the irreconcilable of postmodern thinking.

Small wonder, perhaps, that Bruno Latour, [writing](#) in 2007 on environmentalism, revisits the narrative of Pandora's Box, showing that the modernist hope of controlling nature through technology is dashed on the rocks of the same increasingly deep and problematic entangling with the world that prevents our withdrawal from it. But Latour then makes a surprising move: he calls for a re-examination of the connection between mastery, technology and *theology* as a route out of the environmental impasse.

What forms would an answer to Latour's call take? One is simply the strong yet gentle repeating of truth to power that a confessional voice for science, and evidence-based thinking, can have when it is resting on deep foundations of a theology that understands science as a gift rather than a threat. One reason that Katharine Hayhoe, the Texan climate scientist, is such a powerful advocate in the United States for taking climate change seriously is that she is able to explicitly work through a theological argument for environmental care with those who resonate with that, but whose ideological commitments are impervious to secular voices.

There are more grassroots-level examples that demonstrate how religious communities can support a healthy lay engagement with science. Local movements can dissolve some of the alienation and fear that characterises science for many people. In 2010, a group of local churches in Leeds in the UK, decided to hold a community

science festival that encouraged people to share their own and their families' stories, together with the objects that went with them (from an ancient telescope to a circuit board from an early colour TV set that was constructed by a resident's grandfather). A diverse movement under the general [title](#) 'Equipping Christian Leadership in an Age of Science' in the UK has discovered a natural empathy for science as a creative gift, rather than a threat to belief, within local churches (see here for examples).

At a national level, the past five years have seen a remarkable project engaging senior church leaders in the UK with current scientific issues and their researchers. In a country with an established Church, it is essential that its voices in the national political process are scientifically informed and connected. Workshop participants, including scientists with no religious background or practice, have found the combination of science, theology and community leadership to be uniquely powerful in resourcing discussions of ethical ways forward, in issues from fracking to artificial intelligence.

A relational narrative for science that speaks to the need to reconcile the human with the material, and that draws on ancient wisdom, contributes to the construction of new pathways to a healthier public discourse, and an interdisciplinary educational project that is faithful to the story of human engagement with the apparently chaotic, inhuman materiality of nature, yet one whose future must be negotiated alongside our own. Without new thinking on 'science and religion', we risk forfeiting an essential source for wisdom today.

This essay originally appeared in [Aeon Magazine](#) who are thanked for giving permission for its reproduction here.

Themes in this essay are developed in McLeish *Faith and Wisdom in Science* (2014), *Let There Be Science* (2016) and *The Poetry and Music of Science*.

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.

They will be archived in the OPINION folder at the HPS&ST web site: <http://www.hpsst.com/>.

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Michael Corballis, Elizabeth Rata and Robert Nola, University of Auckland, [The Defence of Science and the Status of Māori Knowledge](#), (November 2019)

Maurice Finocchiaro, Philosophy, University of Nevada, Las Vegas, [Galileo's Legacy: Avoiding the Myths and Muddles](#) (October 2019)

Michael R. Matthews, Education, University of New South Wales, [Feng Shui: Philosophical Appraisal and Educational Opportunity](#) (September 2019)

Daniel J. Kennefick, Physics Department, University of Arkansas, [The Problem of Scientific Bias: The 1919 Astronomical Confirmation of Einstein's Theory](#), (August 2019)

Nicholas Maxwell, Philosophy, University College, London, [The Metaphysics of Science and Aim-Oriented Empiricism](#) (May 2019)

Ron Good, Louisiana State University, [The Two Darwins: Erasmus and Charles on Evolution](#), (June 2019)

Lucie Laplane, Paolo Mantovani, Ralph Adolphs, Hasok Chang, Alberto Mantovani, Margaret McFall-Ngai, Carlo Rovelli, Elliott Sober, and Thomas Pradeu: [Why Science Needs Philosophy](#) (April 2019)

Thomas J.J. McCloughlin, School of STEM Education, Innovation & Global Studies, Dublin City University, Ireland, [Beware the Greeks: Sources for the History of Gravity in Science Teaching](#) (March 2019)

Bettina Bussmann, University of Salzburg, Austria & Mario Kötter, University of Muenster, Germany [Between Scientism and Relativism: Epistemic Competence as an Important Aim in Science and Philosophy Education](#) (February 2019)

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- nell University, [How History can Enable Better Teaching of Statistics in Introductory Biology Courses](#) (December 2018)
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- Gerald Holton, Physics Department, Harvard University, [Tracing Tom Kuhn's Evolution: A Personal Perspective](#) (April/May 2018)
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- Susan Haack, Philosophy and Law Departments, University of Miami, [The Future of Philosophy, the Seduction of Scientism](#) (November 2017).
- Nicholas Maxwell, University College London, [What's Wrong with HPS and What Needs be Done to Put it Right?](#) (June 2017).
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- Gregory Radick, Leeds University, [How Mendel's legacy holds back the teaching of science](#) (June 2016).
- Matthew Stanley, New York University, [Why Should Physicists Study History?](#)

PhD Theses in HPS&ST Domain

The HPS&ST NEWSLETTER is the ideal medium for publicising and making known submitted and awarded doctoral theses in the HPS&ST domain.

The following details should be submitted to the editor at m.matthews@unsw.edu.au:

- Candidate's name and email
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- Abstract of 100-300 words
- Web link when theses are required to be submitted for open search on web.

Recent HPS&ST Research Articles

Alcantara, M.C., Braga, M., & van den Heuvel, C. (2020). Historical Networks in Science Education: A Case Study of an Experiment with Network Analysis by High School Students. *Science & Education*. doi:[10.1007/s11191-019-00096-4](https://doi.org/10.1007/s11191-019-00096-4) online first

Dellantonio, S., & Pastore, L. (2020). Ignorance, misconceptions and critical thinking. *Synthese*. doi:[10.1007/s11229-019-02529-7](https://doi.org/10.1007/s11229-019-02529-7) online first

Enderle, P., Cohen, S., & Scott, J. (2020). Communicating about science and engineering practices and the nature of science: An exploration of American Sign Language resources. *Journal of Research in Science Teaching*. doi:[10.1002/tea.21619](https://doi.org/10.1002/tea.21619) online first

Iordanou, K., & Kuhn, D. (2019). Contemplating the opposition: Does a personal touch matter? *Discourse Processes*. doi:[10.1080/0163853X.2019.1701918](https://doi.org/10.1080/0163853X.2019.1701918) online first

Karam, R. (2020). Why are complex numbers needed in quantum mechanics? Some answers for the introductory level. *American Journal of Physics*, 88(1), 39. doi:[10.1119/10.0000258](https://doi.org/10.1119/10.0000258)

Kuhn, D. (2019). Critical thinking as discourse. *Human Development*, 62, 146–164. doi:[10.1159/000500171](https://doi.org/10.1159/000500171)

Kuhn, D. (2019). Why is reconciling divergent views a challenge? *Current Directions in Psychological Science*. doi:[10.1177/0963721419885996](https://doi.org/10.1177/0963721419885996) online first

Kuhn, D., Cummings, A., & Youmans, M. (2019). Is reasoning a fruitful path to changing minds? *Discourse Processes*. doi:[10.1080/0163853X.2019.1646566](https://doi.org/10.1080/0163853X.2019.1646566) online first

Kuhn, D., Floyd, D., Yaksick, P., Halpern, M., & Ricks, W. (2018). How does discourse among like-minded individuals affect their thinking about a complex issue? *Thinking and Reasoning*, 25(3), 365–382. doi:[10.1080/13546783.2018.1532460](https://doi.org/10.1080/13546783.2018.1532460)

Lazenby, K., et al. (2019) Mapping undergraduate chemistry students' epistemic ideas about models and modeling. *Journal of Research in Science Teaching*. doi:[10.1002/tea.21614](https://doi.org/10.1002/tea.21614) online first

Milanovic, V.D., Trivic, D.D. (2020) Arguments of 14-Year-Olds in the Context of History of the

Development of Organic Chemistry. *Science & Education*, 1-32.

doi:[10.1007/s11191-019-00092-8](https://doi.org/10.1007/s11191-019-00092-8) online first

Mumba, F., Pottmeyer, L.O. & Chabalengula, V.M. (2019) Analysis of Articles in The American Biology Teacher for Essential Features of Inquiry Representation. *Research in Science Education*. doi:[10.1007/s11165-019-09906-9](https://doi.org/10.1007/s11165-019-09906-9) online first

Remmen, K. B. & Frøyland, M. (2020) Students' use of observation in geology: towards 'scientific observation' in rock classification. *International Journal of Science Education*, 1-21. doi:[10.1080/09500693.2019.1704914](https://doi.org/10.1080/09500693.2019.1704914) online first

Sharma, R.A. & Honan, E. (2020) Fijian Pre-Service Teachers' Ideas about Science and Scientists. *Journal of Science Teacher Education*. doi:[10.1080/1046560X.2019.1706904](https://doi.org/10.1080/1046560X.2019.1706904) online first

Zidny, R., Sjöström, J. & Eilks, I. (2020) A Multi-Perspective Reflection on How Indigenous Knowledge and Related Ideas Can Improve Science Education for Sustainability. *Science & Education*, 1-41. doi:[10.1007/s11191-019-00100-x](https://doi.org/10.1007/s11191-019-00100-x) online first

Wiblom, J., André, M. & Rundgren, C. (2020) Navigating Alarming Media Messages About Nutrition and Health: How Students Engage in Critical Examination of Science in News Media. *Science & Education*. doi:[10.1007/s11191-019-00099-1](https://doi.org/10.1007/s11191-019-00099-1) online first

Recent HPS&ST Related Books

Bilgrami, Akeel (Ed.) (2020). *Nature and Value*. New York, NY: Columbia University Press. ISBN:

9780231550901

“Today, as we confront an unprecedented environmental crisis of our own making, it is more urgent than ever to consider the notion of nature and our place within it. This book brings together essays that individually and as a whole present a detailed and rigorous multidisciplinary exploration of the concept of nature and its wider ethical and political implications.

“A distinguished list of scholars take up a broad range of questions regarding the relations between the human subject and its natural environment: when and how the concept of nature gave way to the concept of natural resources; the genealogy of the concept of nature through political economy, theology, and modern science; the idea of the Anthropocene; the prospects for green growth; and the deep alienation of human beings in the modern period from both nature and each other. By engaging with a wide range of scholarship, they ultimately converge on a common outlook that is both capacious and original. The essays together present a revaluation of the natural world that seeks to reshape political and ethical ideals and practice with a view to addressing some of the fundamental concerns of our time.” (From the Publisher)

More information available [here](#).

Cagle, Hugh (2019) *Assembling the Tropics: Science and Medicine in Portugal's Empire, 1450–1700*. Cambridge, UK: Cambridge University Press. ISBN: 9781316647424 [Winner, 2019 Leo Gershoy Award, American Historical Association]

“From popular fiction to modern biomedicine, the tropics are defined by two essential features: prodigious nature and debilitating illness. That was not always so. In this engaging and imaginative study,

Hugh Cagle shows how such a vision was created. Along the way, he challenges conventional accounts of the Scientific Revolution. The history of 'the tropics' is the story of science in Europe's first global empire. Beginning in the late fifteenth century, Portugal established colonies from sub-Saharan Africa to Southeast Asia and South America, enabling the earliest comparisons of nature and disease across the tropical world. *Assembling the Tropics* shows how the proliferation of colonial approaches to medicine and natural history led to the assemblage of 'the tropics' as a single, coherent, and internally consistent global region. This is a story about how places acquire medical meaning, about how nature and disease become objects of scientific inquiry, and about what is at stake when that happens." (From the Publisher)

More information available [here](#).

Crețu, Ana-Maria, & Massimi, Michela (Eds.) (2020) *Knowledge from a Human Point of View*. Cham: Springer [Open Access] ISBN: 978-3-030-27040-7

"This open access book – as the title suggests – explores some of the historical roots and epistemological ramifications of perspectivism. Perspectivism has recently emerged in philosophy of science as an interesting new position in the debate between scientific realism and anti-realism. But there is a lot more to perspectivism than discussions in philosophy of science so far have suggested. Perspectivism is a much broader view that emphasizes how our knowledge (in particular our scientific knowledge of nature) is situated; it is always from a human vantage point (as opposed to some Nagelian "view from nowhere"). This edited collection brings together a diverse team of established and early career scholars across a variety of fields (from the history of philosophy to epistemology and philosophy of science). The resulting nine essays trace

some of the seminal ideas of perspectivism back to Kant, Nietzsche, the American Pragmatists, and Putnam, while the second part of the book tackles issues concerning the relation between perspectivism, relativism, and standpoint theories, and the implications of perspectivism for epistemological debates about veritism, epistemic normativity and the foundations of human knowledge." (From the Publisher)

More information available [here](#).

Gaukroger, Stephen (2020). *Civilization and the Culture of Science: Science and the Shaping of Modernity, 1795-1935*. Oxford, UK: Oxford University Press. ISBN: 9780198849070

"How did science come to have such a central place in Western culture? How did cognitive values—and subsequently moral, political, and social ones—come to be modelled around scientific values? In *Civilization and the Culture of Science*, Stephen Gaukroger explores how these values were shaped and how they began, in turn, to shape those of society. The core nineteenth- and twentieth-century development is that in which science comes to take centre stage in determining ideas of civilization, displacing Christianity in this role. Christianity had provided a unifying thread in the study of the world, however, and science had to match this, which it did through the project of the unity of the sciences. The standing of science came to rest or fall on this question, which the book sets out to show in detail is essentially ideological, not something that arose from developments within the sciences, which remained pluralistic and modular.

A crucial ingredient in this process was a fundamental rethinking of the relations between science and ethics, economics, philosophy, and engineering. In his engaging description of this transition to a scientific modernity, Gaukroger examines five

of the issues which underpinned this shift in detail: changes in the understanding of civilization; the push to unify the sciences; the rise of the idea of the limits of scientific understanding; the concepts of ‘applied’ and ‘popular’ science; and the way in which the public was shaped in a scientific image.” (From the Publisher)

More information available [here](#).

Haber, Jonathan (2020) *Critical Thinking*. Cambridge, MA: The MIT Press. ISBN: 9780262538282

“Critical thinking is regularly cited as an essential twenty-first century skill, the key to success in school and work. Given our propensity to believe fake news, draw incorrect conclusions, and make decisions based on emotion rather than reason, it might even be said that critical thinking is vital to the survival of a democratic society. But what, exactly, is critical thinking? In this volume in the MIT Press Essential Knowledge series, Jonathan Haber explains how the concept of critical thinking emerged, how it has been defined, and how critical thinking skills can be taught and assessed.

“Haber describes the term’s origins in such disciplines as philosophy, psychology, and science. He examines the components of critical thinking, including structured thinking, language skills, background knowledge, and information literacy, along with such necessary intellectual traits as intellectual humility, empathy, and open-mindedness. He discusses how research has defined critical thinking, how elements of critical thinking have been taught for centuries, and how educators can teach critical thinking skills now.

“Haber argues that the most important critical thinking issue today is that not enough people are doing enough of it. Fortunately, critical thinking can be taught, practiced, and evaluated. This book offers a guide for teachers, students, and aspiring

critical thinkers everywhere, including advice for educational leaders and policy makers on how to make the teaching and learning of critical thinking an educational priority and practical reality.” (From the Publisher)

More information available [here](#).

Hahn, Barbara (2020) *Technology in the Industrial Revolution*. Cambridge, UK: Cambridge University Press. ISBN: 9781316637463

“Barbara Hahn boldly reframes the story of the profound economic, social, and cultural changes that transformed northern England between the 1760s and the 1840s. By emphasizing networks and systems rather than men and machines she forces us to see the world of the Industrial Revolution anew. We are all in Hahn’s debt for this splendid new study.” – Peter A. Coclanis, University of North Carolina, Chapel Hill

“In this exciting introduction to the Industrial Revolution, Barbara Hahn lucidly and elegantly shows that multiple contexts – local, regional and global – shaped the development of technology in Britain. A perfect text for undergraduates.” – Prasannan Parthasarathi, Boston College

“A much-needed, long-awaited, and deeply engaging contribution to our difficult conversations about the ‘Industrial Revolution.’ Barbara Hahn provides a masterful account of peoples, machines, productions, consumptions, cultures, and the state, weaving together very local, very global, traditional, revisionist, and contested stories. We are lucky to have this book available now.” – Heidi Voskuhl, University of Pennsylvania

More information available [here](#).

Ivanova, Milena, & French, Steven (Eds.) (2020). *The Aesthetics of Science: Beauty, Imagination and*

Understanding. Abingdon, UK: Routledge. ISBN: 9780367141141

“This volume builds on two recent developments in philosophy on the relationship between art and science: the notion of representation and the role of values in theory choice and the development of scientific theories. Its aim is to address questions regarding scientific creativity and imagination, the status of scientific performances—such as thought experiments and visual aids—and the role of aesthetic considerations in the context of discovery and justification of scientific theories.

“Several contributions focus on the concept of beauty as employed by practising scientists, the aesthetic factors at play in science and their role in decision making. Other essays address the question of scientific creativity and how aesthetic judgment resolves the problem of theory choice by employing aesthetic criteria and incorporating insights from both objectivism and subjectivism. The volume also features original perspectives on the role of the sublime in science and sheds light on the empirical work studying the experience of the sublime in science and its relation to the experience of understanding.

“*The Aesthetics of Science* tackles these topics from a variety of novel and thought-provoking angles. It will be of interest to researchers and advanced students in philosophy of science and aesthetics, as well as other subdisciplines such as epistemology and philosophy of mathematics.” (From the Publishers)

More information available [here](#).

Khalifa, Kareem (2019). *Understanding, Explanation, and Scientific Knowledge*. Cambridge, UK: Cambridge University Press. ISBN: 9781316646915

“From antiquity to the end of the twentieth century, philosophical discussions of understanding

remained undeveloped, guided by a ‘received view’ that takes understanding to be nothing more than knowledge of an explanation. More recently, however, this received view has been criticized, and bold new philosophical proposals about understanding have emerged in its place.

In this book, Kareem Khalifa argues that the received view should be revised but not abandoned. In doing so, he clarifies and answers the most central questions in this burgeoning field of philosophical research: what kinds of cognitive abilities are involved in understanding? What is the relationship between the understanding that explanations provide and the understanding that experts have of broader subject matters? Can there be understanding without explanation? How can one understand something on the basis of falsehoods? Is understanding a species of knowledge? What is the value of understanding?” (From the Publisher)

More information available [here](#).

Levy, Arnon, & Godfrey-Smith, Peter (Eds.) (2020). *The Scientific Imagination*. Oxford, UK: Oxford University Press. ISBN: 9780190212308

“The imagination, our capacity to entertain thoughts and ideas ”in the mind’s eye,” is indispensable in science as elsewhere in human life. Indeed, common scientific practices such as modeling and idealization rely on the imagination to construct simplified, stylized scenarios essential for scientific understanding. Yet the philosophy of science has traditionally shied away from according an important role to the imagination, wary of psychologizing fundamental scientific concepts like explanation and justification. In recent years, however, advances in thinking about creativity and fiction, and their relation to theorizing and understanding, have prompted a move away from older philosophical perspectives and toward a greater acknowledgment of the place of the imagination in scientific

practice. Meanwhile, psychologists have engaged in significant experimental work on the role of the imagination in causal thinking and probabilistic reasoning.

“*The Scientific Imagination* delves into this burgeoning area of debate at the intersection of the philosophy and practice of science, bringing together the work of leading researchers in philosophy and psychology. Philosophers discuss such topics as modeling, idealization, metaphor and explanation, examining their role within science as well as how they affect questions in metaphysics, epistemology and philosophy of language. Psychologists discuss how our imaginative capacities develop and how they work, their relationships with processes of reasoning, and how they compare to related capacities, such as categorization and counterfactual thinking. Together, these contributions combine to provide a comprehensive and exciting picture of the scientific imagination.” (From the Publisher)

More information available [here](#).

Numbers, Ronald L., & Kampourakis, Kostas (Eds.) (2020). *Newton’s Apple and Other Myths about Science*. Cambridge, MA: Harvard University Press. ISBN: 9780674241565

“A falling apple inspired Isaac Newton’s insight into the law of gravity—or so the story goes. Is it true? Perhaps not. But the more intriguing question is why such stories endure as explanations of how science happens. *Newton’s Apple and Other Myths about Science* brushes away popular misconceptions to provide a clearer picture of great scientific breakthroughs from ancient times to the present.

“Among the myths refuted in this volume is the idea that no science was done in the Dark Ages, that alchemy and astrology were purely superstitious pursuits, that fear of public reaction alone led Darwin to delay publishing his theory of evolution, and that

Gregor Mendel was far ahead of his time as a pioneer of genetics. Several twentieth-century myths about particle physics, Einstein’s theory of relativity, and more are discredited here as well. In addition, a number of broad generalizations about science go under the microscope of history: the notion that religion impeded science, that scientists typically adhere to a codified “scientific method,” and that a bright line can be drawn between legitimate science and pseudoscience.

“Edited by Ronald Numbers and Kostas Kampourakis, *Newton’s Apple and Other Myths about Science* debunks the widespread belief that science advances when individual geniuses experience “Eureka!” moments and suddenly comprehend what those around them could never imagine. Science has always been a cooperative enterprise of dedicated, fallible human beings, for whom context, collaboration, and sheer good luck are the essential elements of discovery.” (From the Publisher)

More information available [here](#).

Peebles, P.J.E. (2020). *Cosmology’s Century: An Inside History of Our Modern Understanding of the Universe*. Princeton, NJ: Princeton University Press. ISBN: 9780691196022

“Modern cosmology began a century ago with Albert Einstein’s general theory of relativity and his notion of a homogenous, philosophically satisfying cosmos. *Cosmology’s Century* is the story of how generations of scientists built on these thoughts and many new measurements to arrive at a well-tested physical theory of the structure and evolution of our expanding universe.

In this landmark book, one of the world’s most esteemed theoretical cosmologists offers an unparalleled personal perspective on how the field developed. P.J.E. Peebles was at the forefront of many of the greatest discoveries of the past century, mak-

ing fundamental contributions to our understanding of the presence of helium and microwave radiation from the hot big bang, the measures of the distribution and motion of ordinary matter, and the new kind of dark matter that allows us to make sense of these results. Taking readers from the field's beginnings, Peebles describes how scientists working in independent directions found themselves converging on a theory of cosmic evolution interesting enough to warrant the rigorous testing it passes so well. He explores the major advances—some inspired by remarkable insights or perhaps just lucky guesses—as well as the wrong turns taken and the roads not explored. He shares recollections from major players in this story and provides a rare, inside look at how natural science is really done.

“A monumental work, *Cosmology's Century* also emphasizes where the present theory is incomplete, suggesting exciting directions for continuing research.” (From the Publisher)

More information available [here](#).

Singham, Mano (2020). *The Great Paradox of Science: Why Its Conclusions Can Be Relied Upon Even Though They Cannot Be Proven*. Oxford, UK: Oxford University Press. ISBN: 9780190055059

“Science has revolutionized our lives and continues to show inexorable progress today. It may seem obvious that this must be because its theories are steadily getting better and approaching the truth about the world. After all, what could science be progressing toward, if not the truth? But scholarship in the history, philosophy, and sociology of science offers little support for such a sanguine view.

“Those opposed to specific conclusions of the scientific community—nonbelievers in vaccinations, climate change, and evolution, for example—have been able to use a superficial understanding of the nature of science to sow doubt about the scientific

consensus in those areas, leaving the general public confused as to whom to trust, with damaging effects for the health of individuals and the planet.

“*The Great Paradox of Science* argues that to better counter such anti-science efforts requires us to understand the nature of scientific knowledge at a much deeper level and dispel many myths and misconceptions. It is the use of scientific logic, the characteristics of which are elaborated on in the book, that enables the scientific community to arrive at reliable consensus judgments in which the public can retain a high degree of confidence. This scientific logic is applicable not just in science but can be used in all areas of life. Scientists, policymakers, and members of the general public will not only better understand why science works: They will also acquire the tools they need to make sound, rational decisions in all areas of their lives.” (From the Publisher)

More information available [here](#).

Teicher, Amir (2020) *Social Mendelism: Genetics and the Politics of Race in Germany, 1900–1948*. Cambridge, UK: Cambridge University Press. ISBN: 9781108499491

“Who was the scientific progenitor of eugenic thought? Amir Teicher challenges the preoccupation with Darwin's eugenic legacy by uncovering the extent to which Gregor Mendel's theory of heredity became crucial in the formation – and radicalization – of eugenic ideas. Through a compelling analysis of the entrenchment of genetic thinking in the social and political policies in Germany between 1900 and 1948, Teicher exposes how Mendelian heredity became saturated with cultural meaning, fed racial anxieties, reshaped the ideal of the purification of the German national body and ultimately defined eugenic programs.

Drawing on scientific manuscripts and memoirs, bureaucratic correspondence, court records, school

notebooks and Hitler's table talk as well as popular plays and films, *Social Mendelism* presents a new paradigm for understanding links between genetics and racism, and between biological and social thought" (From the Publisher)

More information available [here](#).

Timberlake, Todd K., & Wallace, Paul (2019) *Finding Our Place in the Solar System*. Cambridge, UK: Cambridge University Press. ISBN: 9781107182295

"*Finding our Place in the Solar System* gives a detailed account of how the Earth was displaced from its traditional position at the center of the universe to be recognized as one of several planets orbiting the Sun under the influence of a universal gravitational force. The transition from the ancient geocentric worldview to a modern understanding of planetary motion, often called the Copernican Revolution, is one of the great intellectual achievements of humankind. This book provides a deep yet accessible explanation of the scientific disputes over our place in the solar system and the work of the great scientists who helped settle them. Readers will come away knowing not just that the Earth orbits the Sun, but why we believe that it does so. The Copernican Revolution also provides an excellent case study of what science is and how it works" (From the Publisher)

More information available [here](#).

Todd Timberlake's website with materials to accompany this book in his course on the history of astronomy for non-science majors is available [here](#).

Whitaker, Andrew (2020). *John Stewart Bell and Twentieth Century Physics: Vision and Integ-*

rity. Oxford, UK: Oxford University Press. ISBN: 9780198861263

"This book gives a readable non-mathematical account of the upbringing, education and academic achievement of John Stewart Bell, the celebrated physicist from Belfast, who was born in 1928.

"Bell has become famous for what he described as his 'hobby', analysing the fundamental aspects of quantum theory, where he clarified a long-standing debate between the two most important figures of twentieth century physics, Albert Einstein and Niels Bohr, and showed that, contrary to belief over the previous thirty years, quantum theory could be supplemented with extra 'hidden variables'. His crucial 'Bell's Theorem' or 'Bell's Inequalities' demonstrated a contradiction between quantum theory and local causality. This relation has been tested with increasing rigour over the next years, and quantum theory has triumphed. His ideas were also important in the development of quantum information theory, which covers quantum computation, quantum cryptography and quantum teleportation.

The book covers his earlier work at Harwell, where he worked on the design of accelerators, making extremely important contributions to the physics of strong focussing. He later moved to CERN in Geneva where he carried out highly significant work in the fields of elementary particles and quantum field theory. It also covers some details of Bell's personal life, including his marriage while he was at Harwell to Mary Ross, who also worked in the physics of accelerators, and also describes his career decade by decade, and sums up his importance to twentieth-century physics." (From the publisher)

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

March 15-18, 2020, NARST Annual Conference, Portland OR, USA

More information available [here](#).

March 30 – April 1, 2020, Rudolf-Carnap-Lectures & Graduate Workshop 2020. Ruhr-University Bochum. Germany.

More information available [here](#).

April 3-4, 2020, Mid-South Philosophy of Science (MSPS) 2020 Meeting. Virginia Tech Blacksburg, VA, USA.

Inquiries to Justin Donhauser at jdonhau@bgsu.edu with “MSPS 2020” in the subject line.

April 16-17, 2020, Alternative Approaches to Scientific Realism, Munich Center for Mathematical Philosophy

Details available [here](#).

And Joe Dewhurst (J.Dewhurst@lmu.de)

April 17-18, 2020, Joint Atlantic Seminar for the History of East Asian Science, Technology, and Medicine. John Hopkins University, Baltimore, MD, USA.

Details at: <https://jaseastm.org/>

May 11-14, 2020, Sixth International Conference on the Nature and Ontology of Spacetime. Albena, Bulgaria.

More information available [here](#).

June 8-12, 2020, Philosophy of Biology at the Mountains (POBAM), Workshop, University of Utah.

Details available [here](#).

June 16-17, 2020, International Workshop on Disciplinary Identity: Insights from the History and Philosophy of Chemistry. Hebrew University of Jerusalem, Israel.

Details available [here](#).

June 17-19, 2020, Fourth International History of Physics Conference, Trinity College Dublin

Details available [here](#).

June 29 – July 3, 2020, Objects of Understanding: Historical Perspectives on Material Artefacts and Practices in Science Education. Europa-Universität, Flensburg, Germany.

Inquiries at OoU-conference@uni-flensburg.de

June 29 – July 1, 2020, Measurement at the Crossroads 2020 – Measuring and Modeling. Milan, Italy.

More information available [here](#).

June 30 – July 2, 2020, 7th annual conference of the International Association for Philosophy of Time. Barcelona, Spain.

Inquiries at iapt7barcelona@gmail.com

July 1-3, 2020, STEMM and Belief in Diverse Contexts: Publics, Praxis, Policy and Pluralism, Stellenbosch, South Africa

Details available [here](#).

July 2-4, 2020, 4th International Conference on Science and Literature, University of Girona, Spain.

Details at: <http://icscienceandliterature.com/>

July 7-10, 2020, Society for Philosophy of Science in Practice (SPSP) Eighth Biennial Conference, Michigan State University, USA

Details available [here](#).

July 8-11, 2020, British Society for History of Science Annual Conference, Aberystwyth University, Wales.

Information at: <http://bshsaberystwyth2020.info/>

July 9-11, 2020, 6th International STEM in Education Conference, Vancouver, Canada.

Details at: www.stem2020.ubc.ca

July 15-17, 2020, 8th Integrated History and Philosophy of Science Conference (&HPS8). Virginia Tech, Blacksburg VA.

Information: Lydia Patton (critique@vt.edu) or Jutta Schickore (jschicko@indiana.edu)

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

More information available [here](#).

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

Details at: <https://psa2020.philsci.org/>

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

Details available [here](#).

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

Details available [here](#).

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

Details from Glenn Dolphin:

glenn.dolphin@ucalgary.ca.

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 Lorenzani, 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 Science 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)

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