

HPS&ST

NEWSLETTER



HPS&ST NEWSLETTER

SEPTEMBER 2020

The HPS&ST NEWSLETTER is emailed monthly to about 8,500 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, etc.) 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/>

HPS&ST NEWSLETTER STAFF

Editor Michael Matthews

Assistant Editor
(Opinion Page
& Formatting) Nathan Oseroff-Spicer

Assistant Editor
(Publications
& Website) Paulo Maurício

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COVID-19 teaching materials

COVID-19 education materials have been developed, with National Science Foundation (NSF) funding, for use in post-secondary science courses and are freely available at:

<https://storybehindthescience.org/covid19.html>

The materials include:

- [SARS-CoV-2 and COVID-19 background information](#)
- [COVID-19 Pandemic and Science-Based Decision-Making](#)
- [COVID-19 Pandemic and Pseudoscience Impact on Decision-Making](#)
- [COVID-19 Case Study: To Mask or Not to Mask](#)

Citizens are largely being asked to judge information about COVID-19 and make crucial decisions regarding how to respond. However, pervasive misinformation and pseudoscience exists regarding COVID-19 that both reflects and promotes public distrust in science and exacerbates the personal and societal decision-making that places all of society at greater risk.

The project research and data driven educative materials will promote both content understanding and foster trust in STEM professionals and the knowledge they produce to improve personal and public decision-making regarding the COVID-19 pandemic and future pandemics.

Contact the project PI, Dr. Benjamin Herman (bcherman@tamu.edu) for further information regarding the materials and if you are interested in participating in the project research.

2020 Gustav Neuenschwander Prize: Kostas Gavroglu

It is with great pleasure to announce that the historian Kostas Gavroglu has been awarded the 2020 Gustav Neuenschwander Prize. In awarding the prize, the ESHS Scientific Council considered Gavroglu's outstanding personal and scientific trajectory and especially his commitment to the discipline as community builder. In particular, the Council acknowledged:



- His contribution to the history of science encompassing the study of science in the Greek-speaking world during the Enlightenment, the study of science in the European Periphery, the history of universities, and the investigation of key transition in physical sciences, including the foundations of quantum chemistry and low temperature physics;
- His role in building a community of historians of science in Greece and in fostering the teaching of history of science at various educational levels;

- His active involvement in fostering international collaborations among historians of science in several countries, especially across Europe (and its peripheries);
- His extensive networking activities in other parts of the world uniting various communities of historians, central and peripheral, consolidated and emerging, young and senior.

Kostas Gavroglu was born in Istanbul in 1947. He received his bachelor degree in theoretical physics from Lancaster University and completed the Part III of the Mathematical Tripos in Cambridge University at the Department of Applied Mathematics and Theoretical Physics. He received his doctorate from the Department of Physics, at Imperial College, University of London, with a thesis on theoretical aspects of elementary particle physics (Non-leptonic decays of hyperons). He held a post-doctoral appointment at the State University of New York in Long Island.

Gavroglu was appointed a Privat dozent in the Departments of Physics, first at the University of Patras and then at the National Technical University of Athens. In 1994, he became professor of history of science in the Department of History and Philosophy of Science at the University of Athens. He retired in 2014 and is presently Emeritus Professor.

Abroad, he was a visiting professor at Imperial College, Harvard University, Boston University, Cambridge University, and Istanbul Technical University. He was research fellow at the Chemical Heritage Foundation, Pennsylvania and the Dibner Institute for the History of Science and Technology at MIT.

Concerning his research career, Kostas Gavroglu was scientific coordinator in many research

projects funded by the European Union, the European Science Foundation, the Greek State and private foundations. He was a founding member of the international network Science and Technology in the European Periphery (STEP), created in 1999. He served as Director of the [Laboratory of the Electronic Processing of Historical Archives](#) and was President of the Executive Board of the [Historical Archive of the University of Athens](#).

He was a member of the Executive Board of the [John S. Latsis Public Benefit Foundation](#) and a founding member and member of the Governing board of the [Research Center for the Humanities](#), based in Athens, Greece.

Gavroglu's research fields are the history of physical chemistry, the history of quantum chemistry, the history of artificial cold as well as issues related with the appropriation of the scientific ideas and practices by the European periphery since the 18th century. He has been a co-editor of series in history and philosophy science by Springer Publishers, by Brill Publishers and editor of the series in history of science by Crete University Publishers and member of the editorial boards of a number of scientific journals in the history of science.

In September 2015, Kostas Gavroglu was elected MP with SYRIZA. He was simultaneously president of the Standing Committee on Education of the Greek Parliament until November 2016, when he became Minister of Science, Education and Religious Affairs. He stepped down as a minister in July 2019 and has resumed his involvement with history of science, and more generally, with higher education.

University of Pittsburgh Fellowships

The Center for Philosophy of Science at the University of Pittsburgh invites applications for Fellowships supporting visits in the Center for a term or an academic year during the academic year 2021 - 2022.

Applications are due by December 15, 2020, and can be submitted electronically here: <https://www.centerphilsci.pitt.edu/fellow-application/>

The Center has invited Heather Douglas to be the Senior Visiting Fellow for the academic year September 2021 – April 2022. We encourage applications for Visiting Fellowships from scholars whose research intersects with Professor Douglas.

For more details see [here](#).

Paul Bunge Prize 2021: History of Scientific Instruments

The German Chemical Society (Gesellschaft Deutscher Chemiker – GDCh) and the German Bunsen Society for Physical Chemistry (Deutsche Bunsen-Gesellschaft für Physikalische Chemie) invite proposals for the Paul Bunge Prize 2021.

The prize is awarded annually by the Hans R. Jenemann-Foundation. It is named after Paul Bunge (1839 – 1888), the most important maker of precision balances in the second half of the nineteenth century.

The Paul Bunge Prize honours outstanding research publications on all aspects of the history of scientific instruments. The prize is endowed with

€7.500. It is awarded for either individual books or papers published within the last five years or for lifetime achievements. Submitted works may be published in English, German or French.

Applications and proposals should include the publications to be considered (in printed or electronic form), a curriculum vitae and a full list of publications. The Advisory Board of the Hans R. Jenemann Foundation will decide on the prize winner.

The award ceremony is expected to take place at the meeting of the GDCh History Division in Karlsruhe on 25/26 March 2021 – circumstances permitting.

Applications and nominations may be submitted by September 30, 2020, to

Gesellschaft Deutscher Chemiker
Preise und Auszeichnungen
c/o Jasmin Herr
Varrentrappstraße 40–42
60486 Frankfurt a.M.
Germany

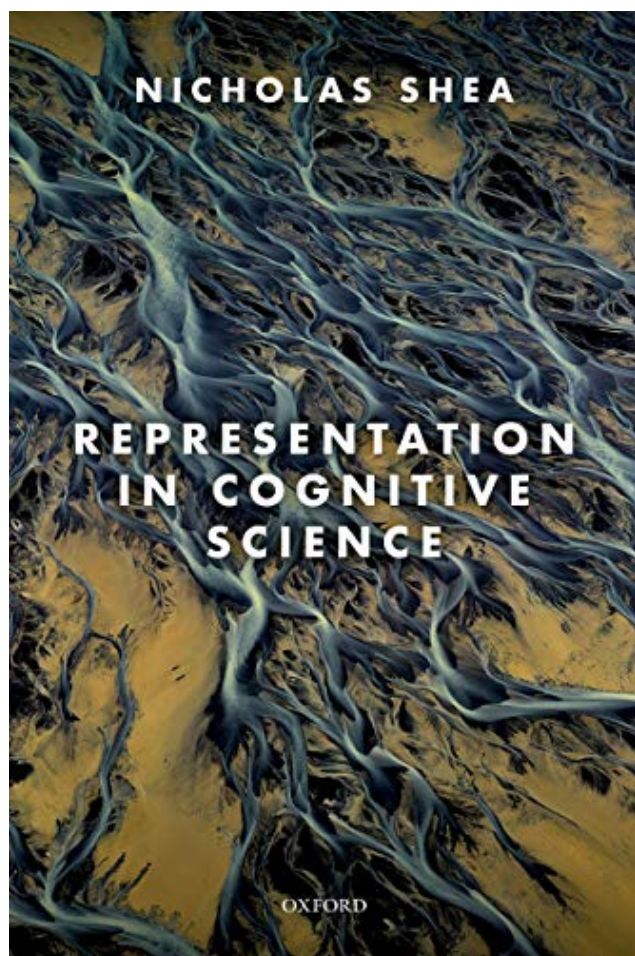
For additional information see [here](#).

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 land-

mark 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](#).

IUHPST Essay Prize in History and Philosophy of Science

The International Union of History and Philosophy of Science and Technology (IUHPST) invites submissions for the 2021 IUHPST Essay Prize in History and Philosophy of Science. This biennial prize competition seeks to encourage fresh methodological thinking on the history and philosophy of science and related areas.

Entries in the form of an essay of 5,000–10,000 words in English are invited, addressing this year's prize question:

What can history and philosophy of science, technology and medicine contribute to our current global challenges?

What constitutes a current global challenge is left to the judgment of the authors, but examples include the coronavirus pandemic, climate change, socioeconomic inequality, racism, the refugee crisis, and science denialism.

All entries should consist of original work that has not previously been published. Entries written originally in another language should be submitted in English translation, along with the name and contact details of the translator. Entries will be judged on the following criteria, in addition to general academic quality: direct engagement with the prize question, effective integration of historical and philosophical perspectives, and potential to provide methodological guidance for other researchers in the field.

The author of the winning entry will be invited to present the work at the 26th International Congress of History of Science and Technology (ICHST) to be held in Prague, Czechia, 25–31 July

2021. Presenting at the Congress will be a condition of the award.

The award will carry a cash prize of \$1,000 and a waiver of the Congress registration fee.

Other strong entries will also be considered for presentation at the Congress. In order to ensure this consideration, entrants should submit the entry also as a standalone paper abstract for the Congress by the deadline for that, following the standard instructions indicated on the Congress website [here](#).

Entries are invited from anyone, without restriction of age, nationality or academic status. Co-authored work will be considered; if the winning entry is a co-authored work the cash prize will be shared out among the authors.

This prize is administered by the Joint Commission of the IUHPST, whose remit is to make links between the work of the two Divisions of the IUHPST: the DHST (Division of History of Science and Technology) and the DLMPST (Division of Logic, Methodology and Philosophy of Science and Technology). For further information about IUHPST, see: <http://iuhps.net>

Entries for the prize competition should be submitted in pdf format by e-mail to the Chair of the Joint Commission, Prof. Hasok Chang, Department of History and Philosophy of Science, University of Cambridge (hc372@cam.ac.uk). Any queries should also be directed to him.

The deadline for submission is 15 January 2021.

2021 DHST Dissertation Prize Competition, Call for Applications

The International Union of the History and Philosophy of Science and Technology, Division of History of Science and Technology (IUHPST/DHST), invites submissions for the sixth DHST Dissertation Prize to be presented in July 2021. Initiated at the 22nd International Congress of History of Science in 2005 held in Beijing, IUHPST/DHST now awards the prize every two years. Up to three awards for recent Ph.D. historians of science and technology will recognise outstanding doctoral dissertations completed and filed between 1 September 2018 and 1 September 2020.

The Prize does not specify distinct categories, but submissions must be on the history of science, technology, or medicine. The Award Committee endeavours to maintain the broadest coverage of subjects, geographical areas, chronology and civilisations (African, North American, South American, Asian, Islamic, Western and Ancient Civilisations, and others not included in this list). Prizes consist of a certificate, waiver of registration fees, assistance with travel and accommodation expenditures to the IUHPST/DHST Congress in Prague in July 2021.

The winner of a prize whose dissertation engages substantially Islamic science and culture (over competitions five (2016-2018) and six (2018-2020)), is also awarded the İhsanoğlu Prize funded by the Istanbul Foundation for Research and Education (ISAR). The Turkish Society of History of Science has graciously funded the İhsanoğlu Prize for the Congress following Prague 2021.

AWARD COMMITTEE: The Award Committee includes DHST Council members and distinguished subject specialists.

COMPETITION CALENDAR: Applications open 10 July 2020 and close 1 October 2020 (22:00, GMT).

Announcement of prize winners for the sixth competition in early 2021.

Award ceremony for winners of competitions 5 and 6: July 2021 in Prague.

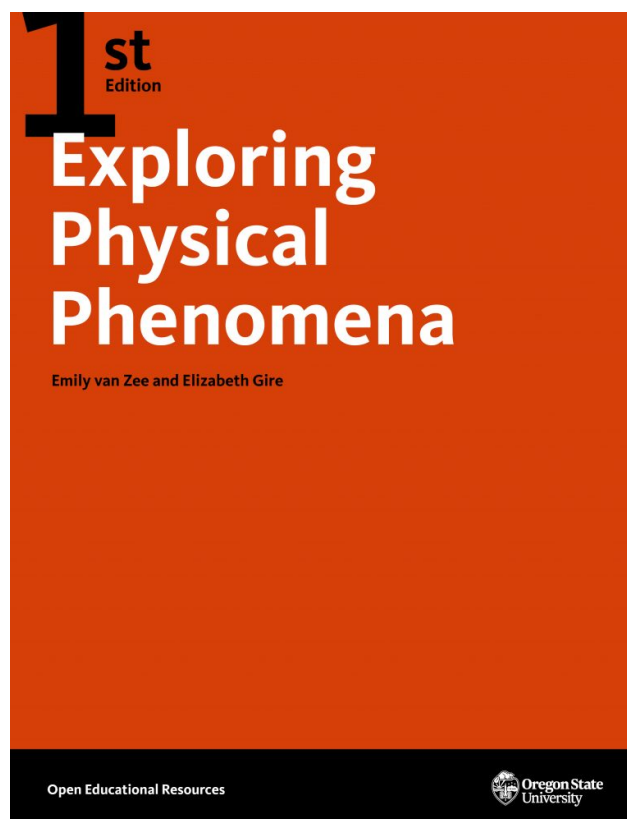
APPLICATION PARAMETERS: Submission in any language is welcome. All dissertations must be accompanied by a detailed summary in English of no more than 20 double-spaced pages. A list of previous winners and their projects may be found on the DHST web page at: <http://dhstweb.org/awards/dhst-dissertation-prize>

APPLICATION PROCEDURE: There are three elements. All three must be submitted in PDF format. Candidates should email one copy of the dissertation and the English language summary to (Mike.Osborne@oregonstate.edu). Applicants should request that their dissertation supervisor write a separate confidential letter (to the same email address) of three pages or less assessing the dissertation and its historiographical significance.

The email header for all three elements should specify in the subject line DHST Dissertation Prize-2021- followed by the last name of the candidate as in this format: DHST Dissertation Prize-2021-Last Name.

Michael A. Osborne
President, IUHPST/DHST
Professor of History of Science Emeritus
Oregon State University

Open Source Physics Text for Elementary and Middle Schools



Exploring Physical Phenomena: What Happens When Light from the Sun Shines on the Earth? by Emily van Zee and Elizabeth Gire

This [open source textbook](#) is intended for use in laboratory-centred physics courses for elementary and middle school teachers. Emphasis is upon questioning, predicting, exploring, observing, discussing, reading, and writing about what one thinks and why. This textbook also is appropriate for use in general science courses that explore some of the physical phenomena underlying global climate change. Organisations such as museums, youth groups, or senior citizen programs may find portions feasible for workshops, special events or on-going exhibits. Explorations mostly use everyday equipment available in homes, schools and offices. Supplementary materials include an equipment list suitable for re-

mote learning contexts.

After exploring light and thermal phenomena in units 1 and 2, participants consider the influence of these phenomena on local weather in unit 3 and on global climate change in unit 4. In unit 5, they observe the sun, moon, and stars and develop explanatory models for day and night, the phases of the moon, and the earth's seasons. Each unit ends by making connections to the Next Generation Science Standards (NGSS Lead States, 2013).

If interested, please contact Emily van Zee, vanzee@oregonstate.edu (note the three e's)

Science & Education Thematic Issue: Epistemology & STEM Education

A special issue of the journal *Science & Education* with the title "Epistemic Underpinnings of Integrated Science, Technology, Engineering, and Mathematics in Education" has been published and is available [here](#).

Southeast Asian Journal of STEM Education

The inaugural issue of the *Southeast Asian Journal of STEM Education* has been published (Vol. 1, No. 1, Sep-Dec 2020). You may access the journal contents [here](#).

The next issue will be January 2021. We are now accepting manuscripts for the January issue until 1 November 2020. Manuscripts are accepted from all parts of the world. Please read the author

guidelines before submitting.

John Stiles, Editor

Peter Slezak, Retirement

After 40+ years of teaching, Peter Slezak, University of New South Wales, has retired. He, and so many others, have been caught up in the sector-wide forced redundancies that have seen nearly 500 staff retired at UNSW alone, and many times that number across all Australian universities.



Peter was appointed in 1981 to the School of History and Philosophy of Science (HPS) after completing his PhD in philosophy at Columbia University whose faculty included Ernest Nagel, Arthur Danto, and Sidney Morgenbesser, all of whom Peter says he is indebted to for his own philosophical education.

The UNSW HPS School became dominated by the social constructivist enthusiasm of the time, and thereafter never appointed a single philosopher of science. Its name was, for some years, changed

to the School of Science and Technology Studies (STS) but with falling numbers, it was eventually disbanded.

Peter moved to the philosophy department. His energies and enthusiasm for teaching and promoting philosophy of science never dimmed.

Peter's career has been spent in the promotion and defence of good philosophy, HPS, cognitive science, science education and numerous liberal causes including, for the past two decades, that of the Palestinian people.

He has been a public intellectual. In 1996 he was Joint Coordinator with East Timor Relief Association of Noam Chomsky's visit and lectures in Australia. During the 1999 Timor Independence crisis he organised the largest political rally held at UNSW since the end of the Vietnam war. In 2002 and again in 2013 he supported atheism in large public debates with US religious philosopher William Craig. In 2007 he was co-founder of the public advocacy group Independent Australian Jewish Voices (IAJV). He has supported the Palestinian cause at many Australian, and overseas, meetings and rallies.

In 1989 he established, with considerable financial support from Apple, Australia's first Centre and Graduate degree program in Cognitive Science. Being directed by a philosopher made it a distinctive Centre. In 1990 he was Founder and Inaugural President, Australasian Society for Cognitive Science. In 2003 he was Chair, joint international conference of ASCS with International Conference on Cognitive Science ICCS. The Keynote speaker was Nobel Laureate Daniel Kahneman.

In 2010, following some years of his annual classroom mock re-trials of Galileo with students and faculty in his Galileo course, he directed and

performed in a public 'Retrial of Galileo' with a celebrity cast of public figures, and with Maurice Finocchiaro one of the world's leading Galileo scholars. This was done in the UNSW auditorium before an audience of one thousand people and filmed by the Australian Broadcasting Commission for a [one-hour national television program](#).

The idea of a dramatic re-enactment of Galileo's trial for educational purposes came from Peter seeing just such a performance at the first international HPS&ST Group conference held at Florida State University in 1989. There, the cast included Michael Ruse, Joseph Pitt, Fabio Bevilacqua, Joan Solomon, Arthur Lucas and David Gruender. Although 100 or more good papers were given, it is the Trial that 30 years later is remembered by attendees.

He has been an important contributor to and supporter of all HPS&ST projects including conferences, teacher workshops, journal articles, handbook chapters, reviewing, and editing. The drift, tenor, trajectory, scholarship, and lucidity of his contributions to HPS&ST are all well seen in the first of his many publications in *Science & Education* journal:

Slezak, P.: 1994a, '[Sociology of Science and Science Education: Part I](#)', *Science & Education* 3(3), 265-294.

Slezak, P.: 1994b, '[Sociology of Science and Science Education. Part II: Laboratory Life Under the Microscope](#)', *Science & Education* 3(4), 329-356.

Peter writes in the first:

This article is the first of two that will examine the claims of contemporary sociology of scientific knowledge (SSK) and the bearing of these claims

upon the rationale and practice of science teaching. It is maintained that if the claims of ssk are true then there are serious, and educationally and culturally deleterious, implications which follow. The two articles will argue that, fortunately, the claims of ssk for the external causation of scientific belief are baseless. And thus science teachers should resist admonitions to accept the findings of the sociology of science.

And in the second:

In the present article the celebrated work *Laboratory Life* of Latour and Woolgar is critically examined. Its radical, iconoclastic view of science is shown to be not merely without foundation but an extravagant deconstructionist nihilism according to which all science is fiction and the world is said to be socially constructed by negotiation. On this view, the success of a theory is not due to its intellectual merits or explanatory plausibility but to the capacity of its proponents to “extract compliance” from others. If warranted, such views pose a revolutionary challenge to the entire Western tradition of science and the goals of science education which must be misguided and unrealizable in principle. Fortunately, there is little reason to take these views seriously, though their widespread popularity is cause for concern among science educators.

A selection of Peter’s publications across many fields can be seen [here](#).

Peter has maintained to the very end a classroom energy and engaged interest in students that is as commendable as it is rare. He has repeatedly said that the classroom and engagement with students will be the greatest downside of his retirement. This lament is not commonly heard, especially by academics who have been teaching for 40 years.

Peter has recently drafted an essay – ‘Relevance of the Humanities?’ in response to the Australian

government’s just-announced policy of charging more for university humanities degrees than professional and technical degrees.

The essay captures a number of perennial themes in Peter’s writing. It concludes:

we need to ensure that the primary task of university education is not to make students job-ready, but to create critical, informed, and humane citizens, and a society in which the ideals of free inquiry are themselves the main measure of relevance.

The essay is available [here](#).

Opinion Page: Franklin and the kite: What can we learn from this episode? *Breno Arsioli Moura*

Center of Natural Sciences and Humanities
Federal University of ABC
Santo André – SP
Brazil

<http://www.brenoam.com>

In January of 2020, to commemorate the “International Kite Day” (14th January), the Royal Society published in its official account on Instagram a post with an engraving from the 1860s showing Benjamin Franklin (1706-1790) flying a kite amidst a storm with the following paragraph:

Benjamin Franklin’s most famous contribution to science is the Philadelphia kite experiment. In the 1750s, the nature of electricity was not yet clearly understood & harnessing its power was a scientific ambition rather than reality. His experiment showed the connection between electricity and lightning. [#InternationalKiteDay](#)



I have been working with Franklin's studies on electricity for some years. Recently, I have published the book, *A Filosofia Natural de Benjamin Franklin: traduções de cartas e ensaios sobre a eletricidade e a luz* [Benjamin Franklin's Natural Philosophy: translations of letters and essays on electricity and light] (EdUFABC, São Bernardo do Campo, 2019), with – as the title indicates – translations to Portuguese of some of his writings on electricity and light, along with commentary. The research took around five years and I cannot say enough how much I have learned about electricity and optics in the eighteenth century – the latter, my main field of study – and about Franklin himself. He is without a doubt an interesting and relevant figure of history of science. Therefore, when I read the publication of the Royal Society on Instagram, a mixture of happiness and sadness reached me. Happiness because it is always good to see a name such as Franklin being remembered, studied and discussed. Sadness, on the other hand, because his kite experiment continues to emerge as his greatest, if not only, contribution to the history of science.

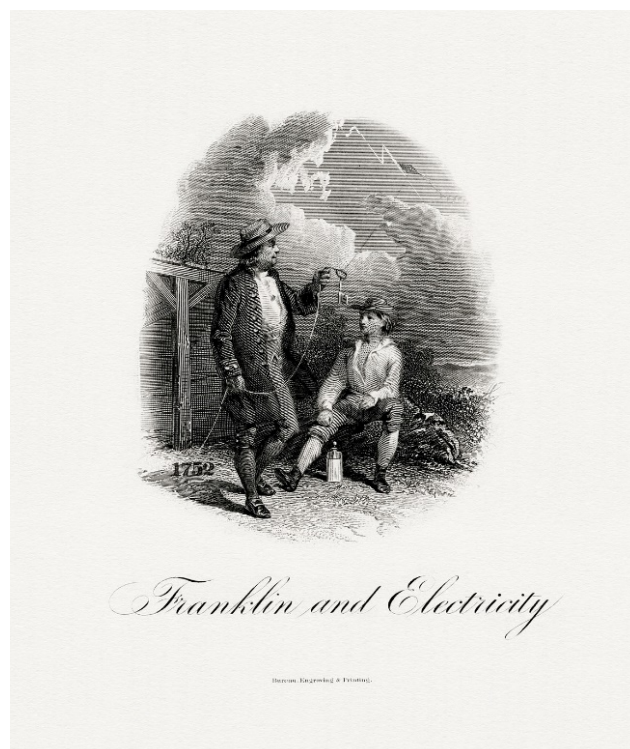


Figure 1 – Engraving showing Franklin performing his kite experiment in Royal Society's post on Instagram.

The historiography on Franklin shows a multiplicity of contributions that goes far beyond the kite experiment. It is true that Franklin never played a central role in the modern historiography of science, in a way such as Galileo Galilei (1564-1642), Isaac Newton (1642-1727) or Albert Einstein (1879-1955). There is not a "Franklin industry" in historiography as we have for Newton, for instance. This may be a controversial opinion, but I could not identify a long-term historiography on his life and works, even though he is the subject of many books and papers. Notwithstanding, the studies of Franklin portray a more complex figure, not only the ingenious man that one happy day decided to fly a kite during a severe storm.

Firstly, Franklin did not publish a treatise on electricity, as many may think, nor did he publish a report on the kite experiment – I will discuss this matter later. We know Franklin's ideas on elec-

tricity mainly due to the efforts of Peter Collinson (1694-1768), a British botanist who kept in contact with eminent natural philosophers in the colony in the first half of the eighteenth century. From 1747 to 1751, Franklin and Collinson exchanged letters on electrical matters, following a gift of an “electrical tube” from the latter to the former in order to test some electrical phenomena. In the 1750s, studies on electricity were trending, which led many natural philosophers to investigate its main properties. Stephen Gray (1666-1736) had shown that electricity could be transmitted, Charles Du Fay (1698-1739) had proposed two kinds of electricity – vitreous and resinous – and Jean-Antoine Nollet (1700-1770) wrote on the affluent and effluent flows of electrical fluid, as well as many other contributions from other authors. Therefore, when Franklin began to study electricity, there was not a dark path.

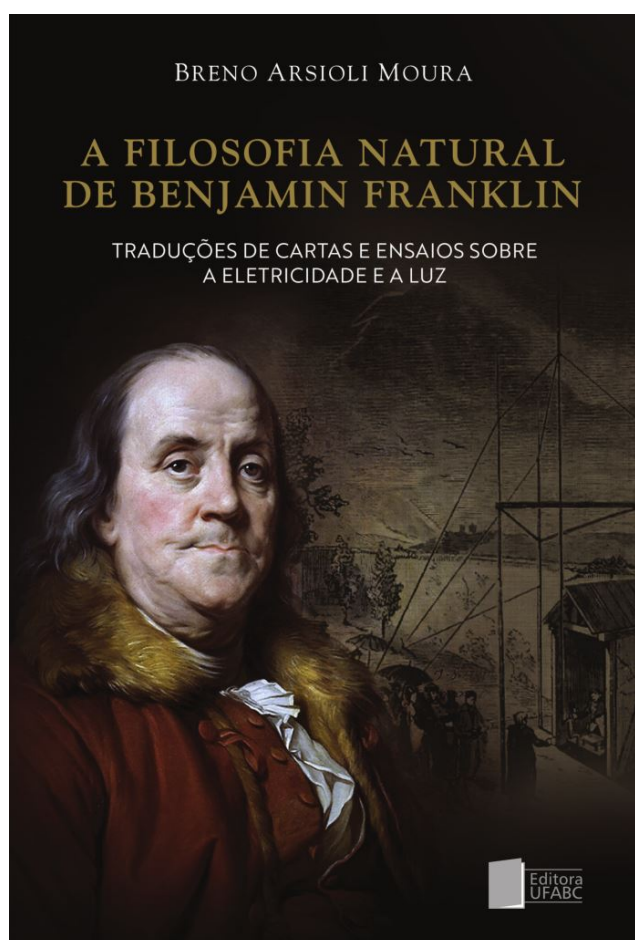


Figure 2 – Cover of my book on Franklin, recently published in Brazil.

Franklin’s first letter on electricity was written on March 28 of 1747. It contains only one paragraph, where Franklin acknowledged Collinson for sending him “an electric tube” to perform experiments on electricity. Almost four months later, Franklin sent another letter, with a more detailed description of his endeavours. In this second letter, we can find two of the main concepts of the Franklinian theories for electricity: the power of points and the idea of positive and negative electricity. He observed that the electrical fire was “drawn off” a charged phial when a sharp object approached. Conversely, if a sharp needle was fixed to the end of a gun-barrel, the latter could not be electrified, since the point of the needle would “throw off” all the electric fluid transmitted to it.

The idea of positive or negative electricity was discussed by an interesting experiment involving two persons standing in separated wax supports and another one standing on the floor. If one of the persons standing on the wax rubbed a glass tube with the other person standing on the wax approaching his knuckle to the tube (without touching the tube or the person), Franklin assumed that the person rubbing the tube lost his/her electricity to the tube, which transferred this electricity to the second person. Therefore, in this configuration, the person who rubbed the tube was electrified “negatively” and the one who collected the electricity from the tube was electrified “positively”. Although we do not accept Franklin’s ideas nowadays, it is remarkable how his concept still persists, even with the adoption of new conceptions after the nineteenth century.

Other letters from Franklin also revealed more interesting ideas. In an undated letter to John

Mitchell (1711-1768), he discussed how thunderstorms were formed. I will give a very short description of Franklin's explanations, but the reader should be advised to consult the original material, in order to see his curious arguments on the nature of matter. According to him, the oceans were constituted essentially by two things: water – a non-electric substance – and salt – an electric substance. The friction in the surface of the ocean made the water electrified. In vaporising, it carried this excess of electricity and very electrified clouds were formed. When these clouds approached mountains or less electrified clouds, the electric fire was transmitted through lightning and then came the rain. This would explain the formation of great rivers, such as the Amazon, near great mountains, such as the Andes. Again, his ideas are outdated, but it is impressive how Franklin managed to combine his conceptions to explain such phenomena.

The most important of his papers and letters was the "Opinions and conjectures concerning the properties and effects of the electrical matter", sent to Collinson on July 29, 1749. In this essay, Franklin resumed his previous concepts – mainly the power of points and the positive and negative electrification – and presented some new and improved ideas. One of them was the model of electrical atmospheres. He believed that, when a body was electrified positively, i.e. a body which contained more electricity than its natural capacity, this excess surrounded it like an atmosphere, with the same shape of the body. Although this was not a new model if we consider Franklin's contemporaries, he seemed to be the first to apply it to electrical phenomena. His other major contribution was the description of the sentry-box experiment. Here we reach a crucial moment in this opinion piece, which deserves a very detailed discussion.

The sentry-box experiment is sometimes associated with the lightning-rod, but they are not the same. Nonetheless, both were cited in the "Opinions and conjectures" – the latter, however, not with this name. Commenting on the power of points to "draw off" electricity, Franklin suggested that "upright rods of iron" should be placed on the top of buildings to prevent the damages caused by the striking of lightning. In this case, the rod was grounded, in order to make electric matter flow from the clouds to the ground. The sentry-box experiment had another purpose.



Figure 3 – The sentry-box experiment, as in Franklin's book.

Franklin's idea was to examine if the electricity of the clouds was the same as those produced in

Leiden jars. There was no intention to verify the electricity of lightning, as we may suppose initially. In this experiment, a sentry-box should be built on the top of a tower, with an iron rod of 20 or 30 feet very sharp at the end rising from it. The other end would be connected with a wax support, where a person should stand over. Therefore, the rod was not grounded. According to Franklin, when a cloud approached the rod, the latter would “draw off” the electricity of the former and, if the person approached his/her knuckle, a sparkle could be obtained. Franklin seemed to presume that, in this situation, lightning would not be produced and the person would be safe (the experiment is not safe, by the way).

Two things must be said regarding the lightning rod and the sentry-box experiment. Firstly, Franklin was not the first experimental philosopher to propose an association with the lightning and the electricity produced with Leiden jars or other electrical apparatus. Nollet, for example, had already discussed some similarities between them in 1748. Even Franklin suggested this connection in the letter to Mitchel concerning the formation of thunderstorms and other prior writings. Secondly, Franklin did not perform this experiment when he sent the essay to Collinson. It was, however, reproduced successfully in France, in 1752, one year after Collinson decided to publish Franklin’s letters in the form of a book, the *Experiments and observations on electricity, made at Philadelphia*, soon translated into French by the incentive of George-Louis Leclerc (1707-1788), the Comte of Buffon.

The successful reproduction of the sentry-box experiment in France has a close, but not very often alluded to, connection with the kite episode. The French experiment was performed in May 1752. As expected, the news took some time to

reach Franklin’s ears. In October of the same year, Franklin sent a letter to Collinson – later published in the *Philosophical Transactions* – reporting an experiment similar to the sentry-box, “though made in a different and more easy [sic] manner”. This was the kite experiment. However, against all possible commonsense ideas, Franklin did not report how he made the experiments, what were the weather conditions, what he obtained, etc. Instead, he simply gave instructions on how to build the kite, including a special detail: “a very sharp pointed wire” at the top of the upright stick. This detail is often neglected in the many engravings picturing Franklin’s kite experiment. It seems that, for Franklin, the kite experiment was nothing more than a variation of the sentry-box. This is corroborated in his *Autobiography*, where he mentions that the latter was a “capital” experiment, while the kite was only a “similar” way to verify the electricity in thunderstorms.

If the kite experiment was not important to Franklin, how did it become a defining event in the historiography on him? The answer probably relies on Joseph Priestley (1733-1804), a British polymath whose best-known contribution to the history of science was the discovery of oxygen. In 1767, Priestley published his widely famous *The History and Present State Discoveries on Electricity*, a very “Franklinian” book. On commenting on Franklin’s contributions to this area of study, Priestley reported the execution of the kite experiment with many details, for example, the presence of one of Franklin’s sons. This report – never confirmed elsewhere – was probably the vector to the famous anecdote on the kite. It is not a coincidence that many of the engravings portraying the kite experiment show Franklin with a young man.

A less known aspect of Franklin’s works was his opinions on the nature of light. In a letter to

Cadwallader Colden on April 23, 1752, he expressed his dissatisfaction with the projectile theory. Franklin claimed that, if light was composed of small particles, then the Sun would vanish sometime in the future. This was a very common argument against the projectile theory in the eighteenth-century. Almost two decades later, Samuel Horsley (1733-1806) responded to Franklin's objections. In two papers published in the *Philosophical Transactions*, he described a series of (feeble) calculations showing that the loss of mass was irrelevant, considering the huge amount of matter of the Sun. Franklin never responded to Horsley. In his letter to Colden, he knew in which scenario he was – a Newtonian one – and he was relieved he was not in times of “philosophical heresy”, as Galileo.

Franklin showed some interest in a vibration theory of light. At the end of his life, he wrote again on the subject, in an essay published posthumously by the American Philosophical Society in 1793, but, as before, he did not advance any new ideas. I could mention other areas in which Franklin actively worked, but I feel that the previous discussion is sufficient to evidence that he was involved in many subjects and did not simply fly a kite in the middle of a thunderstorm and discover the electrical nature of lightning.

What can we learn from this discussion? One possible first answer is: in science, there is no “crucial experiment” without a background. Crucial experiments do not emerge unexpectedly and, in most cases, they are not as crucial as we thought they were. Besides Franklin and the kite, I could mention Newton and the apple, Archimedes and the crown, Oersted and the compass, among many others. There is an extensive literature on these historical episodes showing they were not single events without a previous history. Therefore, sci-

ence does not usually offer magical and instantaneous solutions to problems and doubts. The scientific enterprise develops gradually and is connected with other elements that are not always scientific. In the case of the kite experiment, it was a variation of a more famous experiment – the sentry-box – but its veracity cannot be demonstrated due to the lack of historical evidence.

Secondly, we must not idealise historical scientific figures. By placing Franklin as a sole and brave scientist trying to prove his theory in a risky situation, we are creating a mythical picture of science which is far from reality. If we want to understand Franklin's contribution, we should turn our attention to who he was, what he had experienced before and in which context he was living, to mention just three elements. Franklin was not a scientist or a physicist, in our current standards. He was a natural philosopher, in a broad sense, just as his correspondents and colleagues in the eighteenth century. Franklin was born in one of the colonies of Great Britain. The United States of America did not exist, neither did its scientific power. To the eyes of the British community, Franklin was an outsider, which explains why his first letters to Collinson were not published by the Royal Society. Franklin's experience with typography and the publication of his journals and pamphlets put him in contact with several authors and their books and papers, including natural philosophers. In the eighteenth century, electricity became one of the most studied topics, so many savants were involved with the subject; Franklin was not the only one. Many of his ideas were later developed, altered or rejected, even by himself.

Thirdly, this episode also teaches us about the collective character of science. Although we may be familiar with Franklin's name, he had many colleagues whom he collaborated with, such

as Philip Syng (1703-1789), Thomas Hopkinson (1709-1751) and Ebenezer Kinnersley (1711-1778). The latter was particularly known for having advanced the experiments with the kite. In addition, Collinson was essential to making Franklin's works known among the British, otherwise none of his letters would have reached the Royal Society. Buffon also played an important role, since, without his incentive, the translation of his book to French would have taken longer and perhaps the reproduction of the sentry-box experiment may have never occurred in France.

These three suggestions are just a few among many other possibilities that may arise from the history of Franklin's natural philosophy. Getting to know such a fascinating person and such a fascinating time for the history of science can bring many contributions to a better introduction of historical content in science teaching. In these troubled times, we certainly need to improve our comprehension of the many factors involved in the scientific enterprise. Although anecdotes such as this one may at first be amusing, they do not always bring the message we desire for science. The better we understand the history of science, the better we will be prepared for the future that lies ahead.

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/>.

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
- Institution
- Supervisor
- Thesis title
- Abstract of 100-300 words
- Web link when theses are required to be submitted for open search on web.

Recent HPS&ST Research Articles

Science & Education ([Volume 29, Issue 4](#), August 2020) Topic: Nature of STEM (14 articles in this issue)

Centaurus ([Volume 62, Issue 3](#)) Special Issue: The creative power of experimentation: Bacon and Della Porta Issue Edited by: Doina-Cristina Rusu and Dana Jalobeanu

- Akbayrak, M., & Kaya, E. (2020) Fifth-grade students' understanding of social-institutional aspects of science. *International Journal of Science Education*, 1-29. doi:[10.1080/09500693.2020.1790054](https://doi.org/10.1080/09500693.2020.1790054) online first
- Alisir, Z.N., Irez, S. (2020) The Effect of Replicating Historical Scientific Apparatus on High School Students' Attitudes Towards Science and Their Understanding of Nature of Science. *Science & Education*. doi:[10.1007/s11191-020-00148-0](https://doi.org/10.1007/s11191-020-00148-0) online first
- Bruckermann, T., Fiedler, D., & Harms, U. (2020) Identifying precursory concepts in evolution during early childhood – a systematic literature review. *Studies in Science Education*, 1-44. doi:[10.1080/03057267.2020.1792678](https://doi.org/10.1080/03057267.2020.1792678) online first
- Dent, R. (2020). Subject 01: Exemplary Indigenous masculinity in Cold War genetics. *The British Journal for the History of Science*, 1-22. doi:[10.1017/S000708742000031X](https://doi.org/10.1017/S000708742000031X) online first
- Erduran, S., Kaya, E., Cilekrenkli, A. et al. (2020) Perceptions of Nature of Science Emerging in Group Discussions: a Comparative Account of Pre-service Teachers from Turkey and England. *International Journal of Science and Mathematics Education*, 1-22. doi:[10.1007/s10763-020-10110-9](https://doi.org/10.1007/s10763-020-10110-9) online first
- Fuertes-Prieto, M.Á., Andrés-Sánchez, S., Corrochano-Fernández, D. et al. (2020) Pre-service Teachers' False Beliefs in Superstitions and Pseudosciences in Relation to Science and Technology. *Science & Education*, doi:[10.1007/s11191-020-00140-8](https://doi.org/10.1007/s11191-020-00140-8) online first
- Hansson, S.O. (2020) Social constructionism and climate science denial. *Euro J. Phil Sci*, 10(37), 1-27. doi:[10.1007/s13194-020-00305-w](https://doi.org/10.1007/s13194-020-00305-w) online first
- Hesketh, I. (2020) The making of John Tyndall's Darwinian Revolution. *Annals of Science*. doi:[10.1080/00033790.2020.1808243](https://doi.org/10.1080/00033790.2020.1808243) online first
- Jiménez-Liso, M.R., López-Banet, L. & Dillon, J. (2020) Changing How We Teach Acid-Base Chemistry. *Science & Education*, 1-25. doi:[10.1007/s11191-020-00142-6](https://doi.org/10.1007/s11191-020-00142-6) online first
- Lampert, Y. (2020) Teaching the Nature of Science from a Philosophical Perspective. *Science & Education*, 1-23. doi:[10.1007/s11191-020-00149-z](https://doi.org/10.1007/s11191-020-00149-z) online first
- Landa, I., Westbroek, H., Janssen, F. et al. (2020) Scientific Perspectivism in Secondary-School Chemistry Education. *Science & Education*, 1-28. doi:[10.1007/s11191-020-00145-3](https://doi.org/10.1007/s11191-020-00145-3) online first
- Lessl, T.M. (2020) Demarcation as a classroom response to creationism: a critical examination of the National Academy of Sciences' Science, Evolution, and Creationism (2008). *Cultural Studies of Science Education*, 1-13. doi:[10.1007/s11422-020-09977-5](https://doi.org/10.1007/s11422-020-09977-5) online first
- Palomo, M. (2020) New insight into the origins of the calculus war. *Annals of Science*. doi:[10.1080/00033790.2020.1794038](https://doi.org/10.1080/00033790.2020.1794038) online first
- Shaw, J. (2020) The Problem of the Empirical Basis in the Popperian Tradition: Popper, Bartley, and Feyerabend. *HOPOS: The Journal of the International Society for the History of Philosophy of Science*. doi:[10.1086/710183](https://doi.org/10.1086/710183) [just accepted]

Taşkin, Özgür: 2020, 'Teaching Evolution in Muslim Countries: Is Constructivism a Solution or a Threat?', *Journal of Education for Life* 34(2), 561-578. <http://journals.iku.edu.tr/yed/index.php/yed/article/view/202/139>

Zummo, L., Donovan, B., & Busch, K.C. (2020) Complex influences of mechanistic knowledge, worldview, and quantitative reasoning on climate change discourse: Evidence for ideologically motivated reasoning among youth. *Journal of Research in Science Teaching*. doi:10.1002/tea.21648 online first

Recent HPS&ST Related Books

Alexander, Denis R. (2020). *Are We Slaves to our Genes?* Cambridge: Cambridge University Press. ISBN: 978-1-108-56652-0

'Denis Alexander has a rare skill. A first-rate scientist, working on fascinating problems of both intellectual and moral importance, he is able to speak to the general public in ways that are clear, without the slightest hint of condescension. At the cutting-edge of the science of genetics, Alexander takes us through the implications for nearly everything, from putting on weight to church attendance! Read and learn from his book. Wonder at this incredible world in which we live and which we are now starting to understand.' – Prof. Michael Ruse, Lucyle T. Werkmeister Professor of Philosophy, Florida State University

'Genetics is generally considered the most significant field in contemporary science for addressing, not only the most important questions in medical science bearing on the treatment of disease, but also our attempts, more widely, to understand human behaviour. It is no surprise, therefore, that it should also pose profound questions for how we understand human identity and agency. This superb book is, quite simply, the most scientifically informed

and deep-thinking discussion of the key questions posed by genetics on the market. It is also lucid and accessible. Not only is this an invaluable resource for students and academics, it is essential reading for all those who have found themselves wondering, 'Did my genes make me do it?', 'How far is my personality, the challenges I face and my orientation to others determined by my genes?' and 'What does all this mean for who I am?' It is unusual for a book on science to be quite such an absorbing and informative read and I could not recommend it more highly!' – Prof. Alan Torrance, Emeritus Professor of Systematic Theology, St. Andrews University

'This book is lucid and erudite, humorous and illuminating, sensitive to history and brilliantly up-to-date. It is also timely – on hand at the right moment to include seriously impressive results from genome-wide association studies (GWAS) that stress how myriad genes each make tiny contributions to forming us as persons. Searches for single gene-behaviour links have been abandoned. Genes, environments and minds interact inseparably to influence the course of our lives. Dr Alexander really helps us to understand more about ourselves, to celebrate our genetics and to wonder at the sheer richness of being a multi-faceted human.' – Graeme Finlay, The University of Auckland

'We hear constantly about genes and their importance in making us who we are, in body and mind. But between our genes and ourselves stretch chains of cause and effect whose intertwining, with each other and our many environments, can be extraordinarily complex. In this wonderful book, Denis Alexander explains lucidly and engagingly how this complexity comes about and why, once we understand it, we see why claims for the determinative power of genes should be handled with extreme caution.' – Prof. Gregory Radick, Professor of History and Philosophy of Science, University of Leeds

Banchetti-Robino, Marina Paola (2020) *The Chemical Philosophy of Robert Boyle: Mechan-*

icism, Chymical Atoms, and Emergence. Oxford, UK: Oxford University Press. [Harback]
ISBN: 978-0-197-50250-1

‘Robert Boyle (1627-1691) believed that a reductionist conception of the mechanical philosophy threatened the heuristic power and autonomy of chemistry as an experimental science. While some historical and philosophical scholars have examined his nuanced position, understanding the chemical philosophy he developed through his own experimental work is incredibly difficult even for experts in the field.

In *The Chemical Philosophy of Robert Boyle*, Marina Paola Banchetti-Robino energetically explains Boyle’s ideas in a whole new light and proposes that Boyle regarded chemical qualities as non-reducible dispositional and relational properties that emerge from, and supervene upon, the mechanistic structure of chymical atoms. Banchetti-Robino demonstrates that these ideas are implicit in Boyle’s writing, making his philosophical contributions crucial to the fields of both philosophy and chemistry.

‘The arguments presented are further strengthened by a detailed mereological analysis of Boylean chymical atoms as chemically elementary entities, which establishes the theory of wholes and parts that is most consistent with an emergentist conception of chemical properties. More generally, this book examines the way in which Boyle sought to accommodate his complex chemical philosophy within the framework of the 17th century mechanistic theory of matter. Banchetti-Robino conceptualises Boyle’s experimental work as a scientific research programme, in the Lakatosian sense, to better explain the positive and negative heuristic function of the mechanistic theory of matter within his chemical philosophy.

‘*The Chemical Philosophy of Robert Boyle* actively engages with the contemporary and lively debates over the nature of Boyle’s ideas about structural chemistry, fundamental mechanistic particles and

properties, the explanatory power of subordinate causes, the complex relation between fundamental particles, natural kinds, and unified chemical wholes. The book is a rich historical account that begins with the dominant paradigms of 16th and 17th Century chemical philosophy and takes readers all the way through to the 21st Century.’
(From the Publisher)

More information available [here](#).

Berman, Jonathan M. (2020). *Anti-vaxxers: How to Challenge a Misinformed Movement*. Cambridge, MA: The MIT Press. [Paperback]
ISBN: 978-0-262-53932-6

‘Vaccines are a documented success story, one of the most successful public health interventions in history. Yet there is a vocal anti-vaccination movement, featuring celebrity activists (including actress Jenny McCarthy and British rapper M.I.A., who attracted attention for tweeting during the pandemic “If I have to choose the vaccine or chip I’m gonna choose death”) and the propagation of anti-vax claims through books, documentaries, and social media. In *Anti-vaxxers*, Jonathan Berman explores the phenomenon of the anti-vaccination movement, recounting its history from its nineteenth-century antecedents to today’s activism, examining its claims, and suggesting a strategy for countering them.

‘After providing background information on vaccines and how they work, Berman describes resistance to Britain’s Vaccination Act of 1853, showing that the arguments anticipate those made by today’s anti-vaxxers. He discusses the development of new vaccines in the twentieth century, including those protecting against polio and MMR (measles, mumps, rubella), and the debunked paper that linked the MMR vaccine to autism; the CDC conspiracy theory promoted in the documentary *Vaxxed*; recommendations for an alternative

vaccination schedule; Kennedy's misinformed campaign against thimerosal; and the much-abused religious exemption to vaccination.

'Anti-vaxxers have changed their minds, but rarely because someone has given them a list of facts. Berman argues that anti-vaccination activism is tied closely to how people see themselves as parents and community members. Effective pro-vaccination efforts should emphasise these cultural aspects rather than battling social media posts.' (From the Publisher)

More information available [here](#).

Blair, Ann, & von Greyerz, Kaspar (Eds.) (2020) *Physico-theology: Religion and Science in Europe, 1650–1750*. Baltimore, MD: Johns Hopkins University. ISBN: 978-1-421-43846-7

Beginning around 1650, the emergence of a number of new scientific concepts, methods, and instruments challenged existing syntheses of science and religion. Physico-theology, which embraced the values of personal, empirical observation, was an international movement of the early Enlightenment that focused on the new science to make arguments about divine creation and providence. By reconciling the new science with Christianity across many denominations, physico-theology played a crucial role in diffusing new scientific ideas, assumptions, and interest in the study of nature to a broad public. In this book, sixteen leading scholars contribute a rich array of essays on the terms and scope of the movement, its scientific and religious arguments, and its aesthetic sensibilities.'

More information available [here](#).

Coelho, R. Lopes, Faria, Cláudia, Valente, Bianor, & Maurício, Paulo (Eds.) (2020) *History and*

Philosophy of Science and Science Teaching Proceedings. Lisbon 2019. Shaker Verlag.

ISBN: 978-3-844-07443-7

'The volume now presented, with texts in English and Portuguese, has a double purpose: to frame the use of History and Philosophy of Science in science teaching; and to provide Portuguese teachers with materials from which to enrich their science classes. To this end, contributions have been gathered from authors who have researched the use of History and Philosophy of Science in the promotion of better education in an international context.

'Since its first meeting in 1989, the International History Philosophy and Science Teaching Group (IHPST) has organised biannual conferences. In recent years, it has also promoted regional conferences. In these conferences, teachers, students and scholars of education, history, philosophy and sociology of science contribute to broaden the field of research and strengthen the contribution of the Group in practical and theoretical issues. It is in this tradition that this volume appears. Most of the authors have been actively involved in the IHPST Group.

'As has been recognised, science education benefits if teachers and students get to know better the past of science and how science works. This concerns what the authors of the past have said and done – which usually differs from what our textbooks tell us; it concerns the methods of science; the limitations of scientific theories; the impacts of science and technology and the recognition of emerging ethical issues. From all this, the editors hope that the present volume can benefit the teaching and learning of science in Portugal.' (From the Publisher)

More information available [here](#).

de Courtenay, Nadine, Darrigol, Olivier, & Schlaudt, Oliver (2020) *The Reform of the Interna-*

tional System of Units (SI): Philosophical, Historical and Sociological Issues. Abington, UK: Routledge. ISBN: 978-0-367-66260-8

‘Systems of units still fail to attract the philosophical attention they deserve, but this could change with the current reform of the International System of Units (SI). Most of the SI base units will henceforth be based on certain laws of nature and a choice of fundamental constants whose values will be frozen. The theoretical, experimental and institutional work required to implement the reform highlights the entanglement of scientific, technological and social features in scientific enterprise, while it also invites a philosophical inquiry that promises to overcome the tensions that have long obstructed science studies’ (From the Publisher)

More information available [here](#).

Deer, Brian (2020) *The Doctor Who Fooled the World: Science, Deception, and the War on Vaccines*. Baltimore, MD: Johns Hopkins University. ISBN: 978-1-421-43800-9

‘From San Francisco to Shanghai, from Vancouver to Venice, controversy over vaccines is erupting around the globe. Fear is spreading. Banished diseases have returned. And a militant “anti-vax” movement has surfaced to campaign against children’s shots. But why?’

‘In *The Doctor Who Fooled the World*, award-winning investigative reporter Brian Deer exposes the truth behind the crisis. Writing with the page-turning tension of a detective story, he unmask the players and unearths the facts. Where it began. Who was responsible. How they pulled it off. Who paid.

‘At the heart of this dark narrative is the rise of the so-called “father of the anti-vaccine movement”: a British-born doctor, Andrew Wakefield. Banned

from medicine, thanks to Deer’s discoveries, he fled to the United States to pursue his ambitions, and now claims to be winning a “war”.

‘In an epic investigation spread across fifteen years, Deer battles medical secrecy and insider cover-ups, smear campaigns and gagging lawsuits, to uncover rigged research and moneymaking schemes, the heartbreaking plight of families struggling with disability, and the scientific scandal of our time.’ (From the Editor)

More information available [here](#).

El-Hani, C. N., Nunes-Neto, N. F. & Rocha, P. L. B. (2020) Using a participatory problem-based methodology to teach about NOS. In: McComas, W. F. (Ed.). *The Nature of Science in Science Instruction: Rationales and Strategies* (pp. 451-483). Cham: Springer.

Lindee, M. Susan (2020) *Rational Fog: Science and Technology in Modern War*. Cambridge, MA: Harvard University Press. ISBN: 978-0-674-91918-1

‘There is a voluminous literature on science, technology, and warfare, but most of it focuses on a particular science, a particular technology, or a particular war. In this ambitious, synthetic work, M. Susan Lindee explores the relationship between technical knowledge and violence across a wide historical expanse. A highly original and fascinating book.’ – Naomi Oreskes, author of *Why Trust Science?*

‘This book brilliantly illuminates how the “fog of war” creeps beyond the battlefield, engulfing the collaborative and analytical systems of scientists and engineers in the production of weapon systems for the modern age.’ – Robert Jacobs, Hiroshima Peace Institute

‘This fascinating book compels us to reckon with how science has been developed and directed by the

military – and how scientific knowledge and technology underlie the ghastly deadliness of modern warfare, from gunshot wounds to the atomic bomb. M. Susan Lindee presents the coupling of science to the defence state as integral and systemic, not a matter of a few bad actors or the corruption of research. Vital reading.’ – Angela N. H. Creager, author of *Life Atomic: A History of Radioisotopes in Science and Medicine*

More information available [here](#).

Melville, Wayne & Kerr, Donald (Eds.) (2020) *Virtues as Integral to Science Education: Understanding the Intellectual, Moral, and Civic Value of Science and Scientific Inquiry*. Abington, UK: Routledge.

ISBN: 978-0-367-42139-7

‘By investigating the re-emergence of intellectual, moral, and civic virtues in the practice and teaching of science, this text challenges the increasing professionalisation of science; questions the view of scientific knowledge as objective; and highlights the relationship between democracy and science.

‘Written by a range of experts in science, the history of science, education and philosophy, the text establishes the historical relationship between natural philosophy and the Aristotelian virtues before moving to the challenges that the relationship faces, with the emergence, and increasing hegemony, brought about by the professionalisation of science. Exploring how virtues relate to citizenship, technology, and politics, the chapters in this work illustrate the ways in which virtues are integral to understanding the values and limitations of science, and its role in informing democratic engagement. The text also demonstrates how the guiding virtues of scientific inquiry can be communicated in the classroom to the benefit of both individuals and wider societies.

‘Scholars in the fields of Philosophy of Science, Eth-

ics and Philosophy of Education, as well as Science Education, will find this book to be highly useful.’ (From the Publishers)

More information available [here](#).

Mondschein, Ken (2020) *On Time: A History of Western Timekeeping*. Baltimore, MD: Johns Hopkins University Press. ISBN: 978-1-421-43827-6

‘Western culture has been obsessed with regulating society by the precise, accurate measurement of time since the Middle Ages. In *On Time*, Ken Mondschein explores the paired development of concepts and technologies of timekeeping with human thought. Without clocks, he argues, the modern world as we know it would not exist. From the astronomical timekeeping of the ancient world to the tower clocks of the Middle Ages to the seagoing chronometer, the quartz watch, and the atomic clock, greater precision and accuracy have had profound effects on human society—which, in turn, has driven the quest for further precision and accuracy. This quest toward automation—which gave rise to the Gregorian calendar, the factory clock, and even the near-disastrous Y2K bug—has led to profound social repercussions and driven the creation of the modern scientific mindset.

‘Surveying the evolution of the clock from prehistory to the twenty-first century, Mondschein explains how both the technology and the philosophy behind Western timekeeping regimes came to take over the entire world. *On Time* is a story of thinkers, philosophers, and scientists, and of the thousand decisions that continue to shape our daily lives.’ (From the Publisher)

More information available [here](#).

Scerri, E. R., Ghibaudi, E. (2020) *What is a Chemical Element?* Oxford, UK: Oxford University

Press.

ISBN: 978-0-190-93378-4

‘The concept of a chemical element is foundational within the field of chemistry, but there is wide disagreement over its definition. Even the International Union for Pure and Applied Chemistry (IUPAC) claims two distinct definitions: a species of atoms versus one which identifies chemical elements with the simple substances bearing their names. The double definition of elements proposed by the International Union for Pure and Applied Chemistry contrasts an abstract meaning and an operational one. Nevertheless, the philosophical aspects of this notion are not fully captured by the IUPAC definitions, despite the fact that they were crucial for the construction of the Periodic Table. Although rich scientific literature on the element and the periodic table exists as well as a recent growth in the philosophy of chemistry, scholars are still searching for a definitive answer to this important question: What is an element?’

‘Eric Scerri and Elena Ghibaudi have teamed up to assemble a group of scholars to provide readers an overview of the current state of the debate on chemical elements from epistemological, historical, and educational perspectives. *What Is A Chemical Element?* fills a gap for the benefit of the whole chemistry community-experimental researchers, philosophers, chemistry educators, and anyone looking to learn more about the elements of the periodic table.’ (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

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 International 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 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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