reports." (page 182) While this statement is true, it elides the detail that makes it so much more interesting, and he misses the opportunity to discredit Halley's claim, which has been widely referenced and accepted without question for three centuries.

Even though there are 24 pages of Notes, they are not at a high academic standard. We are told that Jean-Jacques de Mairan (1678–1771) was "... commissioned by the French government to study the problem of auroras." (page 201). No date for this report is given in the text, but in a footnote, he offers a 2021 book in which a quote from the report appears. On pages 198–199 Sokolsky tells us about Father Jerome Ricard (1850–1930), who published a monthly magazine *The Sunspot.* To forecast the weather, Ricard had to take into account 'invisible sunspots', surely the most ludicrous of many crackpot concepts Sokolsky explores. Apparently, The Knights of Columbus "… raised a significant amount of money to build a modern observatory for him [Ricard] on the campus of Santa Clara University." Although the building, in California, was completed, "… the telescope was never finished." We are not told how much money was raised, or in what years all this took place, only that Ricard formulated his bogus sunspot law in 1914. How long after that was the observatory project? Sokolsky offers only a website in a footnote for those who may want to explore further.

The author is also prone to hyperbole. In a study of the solar storm of April 1981, he writes "The entire Canadian power grid went down, and general confusion reigned on Earth." (page 261). This sweeping statement is not bolstered by even one example, and not even a footnote. I personally do not recall the entire planet being gripped by the effects of this particular space weather event.

Through a combination of error and omission, this book does not rise to the level of scholarship demanded by the subject. Nonetheless, it is a compelling guide to the historical study of the Sun, and I do commend the author for including poetry by Tennyson, Updike, James Thomson, and others.

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HAPP Centre: 10th Anniversary Commemorative Volume (published by the Institute of Physics as the *Journal of Physics: Conference Series*, Volume 2877, 2024)

This open access electronic volume (https://iopscience.iop.org/issue/1742-6596/2877/1) contains a large number of refereed papers devoted to the history of physics and astronomy, collected by the St Cross Centre for the History and Philosophy of Physics (HAPP), St Cross College, University of Oxford, UK.

After a preface by Joanna Ashbourn, Director of the HAPP Centre, the volume is organized as follows:

1. PHYSICISTS ACROSS HISTORY
1.1 Medieval Physics in Oxford (5 papers)
1.2 Physics Feuds Throughout History (5 papers)
1.3 Voltaire and the Newtonian Revolution (4 papers)
1.4 The Émigrés in Oxford Physics (5 papers)
1.5 Polymaths Across the Eras (5 papers)
1.6 Physics and the Great War (3 papers)
1.7 On the Role of Brilliant Blunders in Physics (1 paper)
2. SPACE AND ASTRONOMY
2.1 Astronomy Across the Medieval World (5 papers)
2.2 A History of the Moon (4 papers)
2.3 A History of the Sun, Our Closest Star (5 papers)
2.4 Physics and the Dark Side (3 papers)
2.5 Space Travel Across the Decades and Beyond (4 papers)
2.6 Searching for Extraterrestrial Intelligence (4 papers)
2.7 The Martian – Science Fiction and Science Fact (1 paper)
3. PHILOSOPHICAL PERSPECTIVES
3.1 The Nature of Time (5 papers)
3.2 From Space to Spacetime (4 papers)
3.3 The Nature of Light (5 papers)
3.4 Paradigm Shifts Across the Ages (4 papers)

3.5 The Nature of Quantum Reality (5 papers)
3.6 The Philosophy of Cosmology (3 papers)
3.7 Wittgenstein and Physics (3 papers)
3.8 Scientific Thinking Across the Centuries (1 paper)
4. CONCEPTS IN PHYSICS
4.1 Order and Chaos (5 papers)
4.2 A History of the Small (5 papers)
4.3 Physics Controversies Past and Present (5 papers)
4.4 Symmetries in Physics (5 papers)
4.5 The Rise of Big Science in Physics (5 papers)
4.6 Physics of the Science of Living Things (4 papers)
4.7 The Greatest Physics Discoveries of the 20th Century (4 papers)
4.8 Particle Physics Since 1945 (1 paper)
4.9 HAPP Seminars (3 papers)

Most of the authors are English scholars, but a fair number are well-known foreign ones. Of course, it is impossible to give a full account of all these papers. Instead, I will make a somewhat arbitrary choice, concentrating on papers relevant to astronomy.

Section 1.2 contains several papers of interest:

1.2.2 *Deconstructing the Copernicus and Galilean Controversy with the Catholic Church*, by Anna Marie Roos, offers nothing really new for historians of astronomy, but is well done and is a good read for beginners.

1.2.3 *Newton's Disputes with Hooke and Leibnitz: Institutional, Scientific and Personal Aspects*, by Robert Iliffe, recalls some aspects of Newton's formation and works, especially on light, and controversies. An interesting paper with good iconography.

1.2.5 *The Big Bang Versus the Steady State: Gamow, Hoyle and Ryle, Rivals in Cosmology*, by Simon Mitton. Although many aspects of this controversy are well-known, at least to me (I personally followed it in 'real time' when I started my career as a radio astronomer), I enjoyed very much reading this excellent paper, which is warmly recommended.

Section 1.3 contains four papers about the introduction of Newton's ideas in France, thanks to Émilie du Châtelet, who translated the *Principia*, and her lover Voltaire, the great writer, whom she much influenced.

1.3.1 *The Cartesian Background: England and France*, by Catherine Wilson, recalls that debate between the theories of Descartes and Newton was still present, at least in France, during the first half of the eighteenth century.

1.3.2 *Voltaire FRS: His Career as Scientist*, by Nicholas Cronk, is a very interesting paper. It recalls that Voltaire's *Éléments de la Philosophie de Newton* of 1738, written during his 2-year stay in London and certainly inspired by Émilie du Châtelet, were warmly received in England (and elsewhere) and led to his election as a Fellow of the Royal Society, although they were disputed in France where Cartesianism was still vivid. Voltaire also attempted to perform some experiments and even proposed (in vain) to become the Perpetual Secretary of the French Academy of Sciences.

1.3.3 *Émilie du Châtelet's Newton*, by Sarah Hutton recalls that, in spite of being a woman, Émilie du Châtelet was well considered by the foremost contemporary scientists. Her translation into French of Newton's *Principia*, published posthumously in 1756, was according to Voltaire "… more intelligible than the original …" but its influence on French scientists is unknown. Presumably "… those knowledgeable enough to be able to understand it could probably have read it in Latin."

Item 1.7 *On the Role of Brilliant Blunders in Physics*, by Mario Livio, makes a pleasant reading although these blunders are well known to historians of science.

Section 2.1 contains 5 papers on Medieval Astronomy. Not being a specialist of this topic, I will only cite those papers:

2.1.1 *'The Service of Astronomy': European Star-gazing and its Implications in the Middle Ages*, by Giles Gasper.

2.1.2 *Chinese Astronomy in a World Context*, by Christopher Cullen.

2.1.3 *From Ancient to Modern: Astronomy in Medieval Islam*, by Josep Casulleras.

2.1.4 *Maya and Aztec Astronomy: Sky-watching in Prehispanic Mesoamerica*, by Ivan Šprajc.

2.1.5 *Ptolemaic Astronomy and Its Dissemination in the Islamic World, Europe, and Asia*, by Benno van Dalen.

Now, we come in Sections 2.2 to 2.6 to more specific topics.

2.2.1 *The Bright Side of the Moon: The Historical Journey of our Tidally Locked Satellite*, by Stephen Pumfrey, relates the various opinions from Antiquity to Galileo about the nature of the Moon. This paper is beautifully illustrated. The most interesting part is devot-

ed to the discovery of libration by William Gilbert (and not by Galileo!), who correctly explained it by the non-circularity of the Moon's orbit.

2.2.2 *Associating the Moon and the Tide*, by Philip Woodworth, discusses the history of this concept. It recalls that while Kepler associated correctly the tides with the Moon, this was not the case with Galileo who developed a curious alternative theory. The full theory of the tides is the work of Maclaurin and (essentially) of Daniel Bernoulli and Laplace.

2.2.3 *The Apollo Program and its Legacy*, by Ian Crawford, reviews this program and argues that science would benefit from a human return to the Moon. I leave to him the responsibility of this assertion, that I do not share. Curiously, the author does not mention the present Chinese efforts to go to the Moon.

2.2.4 *From SMART1 and Recent Probes Towards Artemis and a Human/Robotic Moon Village,* by Bernard Foing, is in the same vein, and mentions the European efforts, but also not the Chinese program.

2.3.1 *Discovering our Sun: From the Most Important God to a Mere Dwarf Star*, by Francisco Diego, is similar to paper 2.2.1 about the Moon, but organized around pictures of the Sun through the ages. It was a pleasure to look at.

2.3.2 *The Sun from Copernicus to Newton: From Heliocentrism to the Solar System*, by David Wootton, escapes lack of originality through description of the relatively poorly known ideas by Leonard Digges. This long paper makes a good introduction for the non-specialist, but the author mistakes Aristotle for Tycho (Figure 9) in the frontispiece of Hevelius' *Cometographia* (1668).

2.3.3 *The Problem of Solar Energy Generation: From Eddington to Bethe*, by Helge Kragh, is a good review of the developments from 1840 to 1940. However, it does not mention the contemporary work of von Weizsacker, whose model applied to the Sun while Bethe's model was for more massive stars.

2.3.4 *The Sun From Space: Discoveries from Space Missions Over the Past Fifty Years*, by Andrezej Fludra, is a long paper that gives an excellent review of the results of 15 space missions, the last one being Solar Orbiter.

2.3.5 *Unsolved Questions and Future Prospects For Understanding the Sun*, by Philippa Browning. They are: What is the origin of the Sun's magnetic field and activity cycle? How do solar flares work, and can the weather in space be predicted). Why is the solar corona so hot?

2.4.1 *Celestial Shadows: From Terror and Myth to Science and Beauty*, by Francisco Diego, is similar to papers 2.2.1 and 2.3.1, and devoted to eclipses of the Sun, with beautiful illustrations.

2.4.2 *The Quest for Dark Matter*, by Gianfranco Bertone, exposes the present state of this research: absence of evidence in all experiments carried out in the past four decades. The author concludes that the field is completely open to future researches. But curiously, he does not mention alternative theories with modified gravity like that of Mordehai Milgrom (MOND) and more recently of André Maeder, the latter also accounting for the accelerated expansion of the Universe usually attributed to dark energy.

2.4.3 *A Universe Dominated by Dark Energy?* by Timothy J. Sumner, is of the same vein. It contains a good, simple introduction to cosmology, and mentions MOND for dark matter, but not Maeder.

2.5.1 *Space Travel Across the Decades and Beyond: A Brief History of NASA's Space Programme*, by James L. Green, is an excellent and useful summary.

2.5.2 *Space Travel Across the Decades and Beyond*, by Günther Hasiger, and

2.5.3 *Soviet/Russian Planetary Exploration: Historical Highlights*, by Mikhail Marov, and

2.5.4 *Space Exploration in China*, by Yidong Gu and Jin Ba, are all similar to 2.5.1 for the European, Russian and Chinese space agencies, respectively. Unfortunately, there is no paper about the Japanese one, in spite of its beautiful results.

2.6.1 *Searching for Extraterrestrial Intelligence*, by Martin J. Rees, is a nice, critical summary of the problem, well worth reading and thinking about.

2.6.2 *Searching for Extraterrestrial Intelligence Across a Century,* by Jill Tarter and Simon Steel, describes briefly the history of SETI, and what to look at.

2.6.3 *Searching for Extraterrestrial Intelligence Across a Century,* by Andrew Siemion, also from the SETI Institute, is similar but is centered on searches in the radio domain.

2.6.4 *SETI at FAST in China*, by Tong-Jie Zhang, Bo-Lun Huang, Jian-Kang Li, Zhen-Zhao Tao, Xiao-Hang Luan, Zhi-Song Zhang and Yu-Chen Wang, is devoted to the in-

coming searches with the large FAST radio telescope (similar to the late Arecibo one but larger, with its 500-m diameter), which started in 2019. The program, which consists of looking at individual exoplanets near 1 GHz with a multibeam system, is described.

I will stop here, and congratulate the HAPP Centre and IOP for making available for free to a large (I hope) community a variety of good and interesting papers.

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Epicureanism and Scientific Debates: Antiquity and Late Reception. Volume 1. Language, Medicine, Meteorology, edited by Francesca Masi, Pierre-Marie Morel and Francesco Verde (Leuven, Leuven University Press, 2023). Pp. vi + 341. ISBN 978-94-6270-373-5 (hardback), 160 × 240 mm, Euro 90.

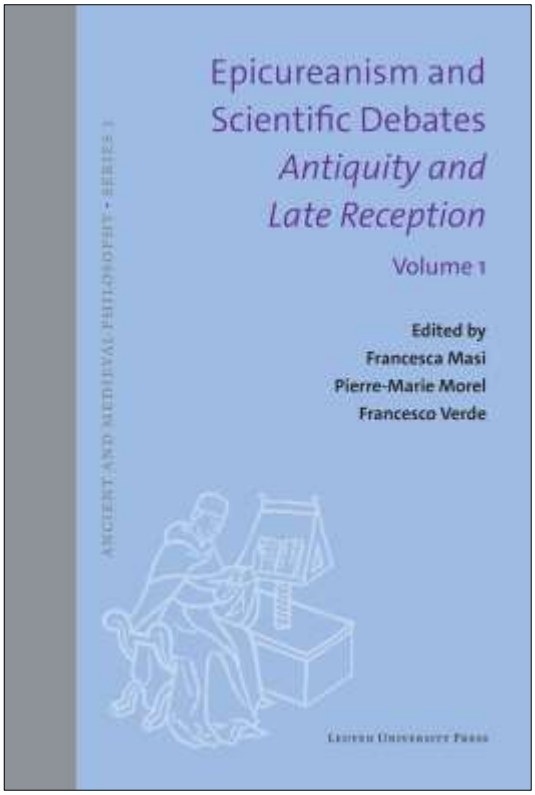
Epicureanism and Scientific Debates: European Tradition and its Ancient Reception. Volume 2. Epistemology and Ethics, edited by Francesca Masi, Pierre-Marie Morel and Francesco Verde (Leuven, Leuven University Press, 2024). Pp. viii + 270. ISBN 978-94-6270-437-4 (hardback), 160 × 240 mm, Euro 90.

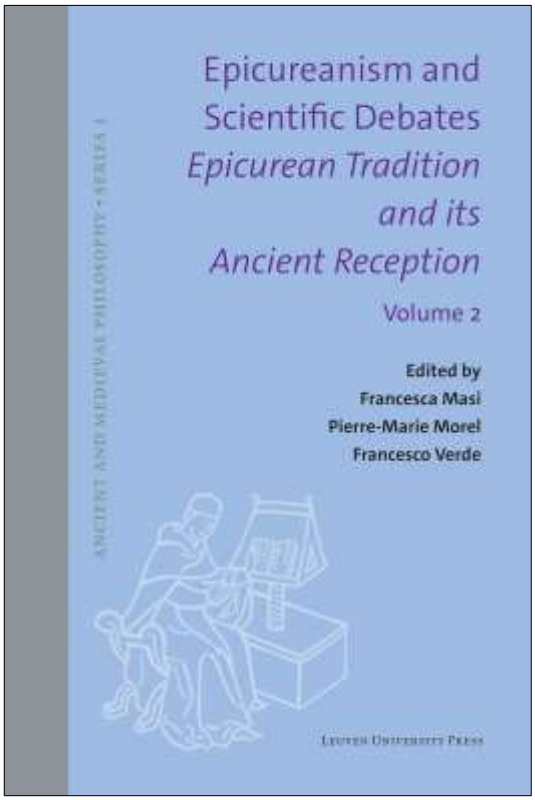
Epicurus is perhaps best-known at second hand, as the philosopher who was most influential on Lucretius, author of *De rerum natura* (*The Nature of Things*). Both of these great thinkers from ancient Greece believed that nature was comprised of atoms and the void, topics at the heart of modern physics. These two volumes, written at the highest scholarly level, explore both the ancient and late reception of Epicureanism. The first volume has more of direct interest to historians of astronomy, but both deliver major insights that will set a new standard in the study of this ancient philosophy.

The three editors of these books have brought the combined intellect of 22 additional scholars to bear on the great issues explored here. Francesa Masi, is Associate Professor in the History of Ancient Philosophy at University Ca' Foscari in Venice; Pierre-Marie Morel is Professor of Ancient Philosophy at the University of Paris 1, Panthéon-Sorbonne; and Francesco Verde is Associate Professor in the History of Ancient Philosophy at Sapienza University in Rome.

The stakes here are high:

The very foundations of modern science, which is rooted in Epicurean philosophy, disproves historiographical attempts to reduce Epicureanism





to ethics … it's theoretical core and the only possible paths to achieve it lie in the knowledge and study of nature. (Volume 2, page 8)