

# Landmarks in the History of Science

Great Scientific Discoveries from  
a Global-Historical Perspective

**Basil Evangelidis**  
Leiden University, Netherlands



Vernon Series on History of Science



VERNON PRESS

Copyright © 2017 Vernon Press, an imprint of Vernon Art and Science Inc, on behalf of the author.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of Vernon Art and Science Inc.

[www.vernonpress.com](http://www.vernonpress.com)

*In the Americas:*  
Vernon Press  
1000 N West Street,  
Suite 1200, Wilmington,  
Delaware 19801  
United States

*In the rest of the world:*  
Vernon Press  
C/Sancti Espiritu 17,  
Malaga, 29006  
Spain

Vernon Series on History of Science

Library of Congress Control Number: 2016959066

ISBN: 978-1-62273-200-5

Product and company names mentioned in this work are the trademarks of their respective owners. While every care has been taken in preparing this work, neither the authors nor Vernon Art and Science Inc. may be held responsible for any loss or damage caused or alleged to be caused directly or indirectly by the information contained in it.

Front cover illustration: The “Archimedes” Portrait was painted about 1620 by Domenico Fetti in Mantua. It probably remained in Italy until 1743. Today the picture is located in the art museum Alte Meister in Dresden (Germany).





# Contents

List of illustrations	7
Foreword	11
Chapter 1 An introduction to Ancient Greek Science	15
1.1. Plato and Aristotle upon truth and Ethics	17
1.2. Scientific topics in antiquity: measurement, experiment, and construction	21
1.3. Mathematical Astronomy	25
1.4. Rhetorical and political sites	27
1.5. Alexandrian Renaissance	29
Chapter 2 Earlier than Western Science: knowledge in transcultural historical settings	35
2.1. Reports on Chinese Science	37
2.2. Exchanges and diaspora	39
2.3. The Islamic transfers of the traditional science	40
2.4. The Transition to the Modern Era	43
Chapter 3 The age of the oceanic discoveries	45
3.1. Sea passages	49
3.2. Ships and shipbuilding	51
3.3. Colonialist competition and utilitarianism	54
3.4. Scientific discoveries, telescopes, clocks and longitude	58
3.5. The rise of the Atlantic World	60
Chapter 4 Material science and culture	65
4.1. Mining engineering and mineralogy in Early Modern Europe	67
4.2. Studies of magnetism	70
4.3. Magnetism and electricity	71
Chapter 5 The petroleum pioneers in the age of illumination	77
5.1. Research on petroleum	86

5.2. Oil in Arabia	92
5.3. The international petroleum sector at the end of the twentieth century	96
5.4. Energy science and technology issues	100
Chapter 6 Computer generations	105
6.1. Charles Babbage and the development of computational technology	108
6.2. The emergence of the computer industry	116
6.3. Algorithms and their power	118
6.4. Innovation in the age of Technoscience	120
6.5. Work, technology, and Human-Machine Interaction	122
6.6. The Human-Machine Interaction in future smart societies	126
Chapter 7 Scientific conceptions of the universe	129
7.1. Space and time as relations	151
Chapter 8 Philosophy and History of Science	159
8.1. Continuities, ruptures, and transitions	162
Bibliography	169
Index	201

## List of illustrations

<b>1a</b> The ecliptic	32
<b>3a</b> Lordine tenuto dall' armata della Santa Lega Christiana	52
<b>3b</b> L'île de Hoorn	56
<b>4a</b> Magnetic Pole-Piece	75
<b>7a</b> The orbit of Mars studied by Kepler	138
<b>7b</b> The paths of the sun on the solstices and equinoxes	143





*“My purpose is to set forth a new science dealing  
with a very ancient subject”*

(Galileo, Dialogue Concerning Two Sciences, Third  
Day)



# Foreword

*The scope of this book is a short journey through the last 2400 years of consciously recorded scientific practice. From the aspect of this considerably long period of time (from Ancient Greek, to Chinese and Islamic Science until the Age of the Discoveries and Modern Science and Technology), the greatest advancements in the world-history of science may be found not only in the theoretical field, such as with heliocentrism, atomism, relativity, but, more important, in the methodological transition to the experimental, mathematical, constructivist, instrumental practice of science.*

The advancement of science, from antiquity to the renaissance, was significant in the domain of medicine, especially in the anatomy, the pathology and the hygiene, which may be ascribable mainly to the physicians and anatomists Thaddeus of Florence, Mondino de Liuzzi, Jacopo Berengario da Carpi, Andreas Vesalius, Realdo Colombo, the tradition of the works of Hippocrates and Galen, and that of Muslim scientists such as Muhammad ibn Zakariya al-Razi. The ancient medicine, however, believed that the venous blood is generated in the liver, from where it was distributed and consumed by all organs of the body. Willian Harvey was the one who recognized the importance of the circulation of the blood, in his work *On the Motion of the Heart and Blood*. Harvey was also one of the first embryologists.

From the inner organs of the organisms to the outer regions of earth, renaissance science was ubiquitous. Significant discoveries were taking place in geography and cartography: The Norse voyages to Greenland and North America and the African travels of Masudi, Ibn Haukal, El-Bekri and Ibn Battuta had an inappreciable influence to Western Europe. A relatively larger impact had the journeys of John of Plano Carpini, William of Rubruck, Nicolo, Maffeo and Marco Polo, in the thirteenth century, and the voyages of John of Monte Corvino, Odoric of Pordenone, Andrew of Perugia, Jordan of Severac, and John of Marignolli, in the early fourteenth century. Aside from the eyewitness or hearsay story of Masudi, who “believed the ‘green sea of darkness’ (the Atlantic) to be unnavigable, and the frigid and torrid zones of the earth to be uninhabitable” (Parry, 1963: 5), Jewish cartographers and instrument-makers working in Majorca in the later fourteenth century, especially Abraham Cresques, produced, by about 1375, the famous accurate Catalan

Atlas. He applied, for the first time, medieval hydrographical techniques to the world outside Europe, representing places such as Timbuktu and the rivers Senegal, Niger, and Nile.

The Iberian Peninsula was a meeting point and crossroad of mutual affection between Arab, Jewish and European culture. Alfonso X of Castile summoned into his court intellectuals of three religions, his works were translated into French and his astronomical tables were annotated by Copernicus. Spanish culture was also influenced by the Arabs, in the vocabulary, in architecture, in commerce, irrigation, the design and rig of ships, in the construction of saddlery and harness. The Arabs were found to possess the original manuscripts of Greek scientists, which they translated and commented. When the Christians conquered the library of Toledo, they found numerous writings, while some searching for Ptolemy's *Mathematical Syntaxis* or *Almagest*. The intellectuals knew about that work, where Claudius Ptolemy exposed the geocentric system (based on observations made with naked eye).

The Toledo School in Spain, directed firstly by Archbishop Raymond of Toledo, hosted a significant movement of translators, during the twelfth and the thirteenth centuries. The practice of translation extended also to other libraries in Spain and locally organized translation workshops. The translators were doctors who served in the courts of the rulers and knew Judeo-Arabic and Latin. They were Jewish, Italian, such as Gerard of Cremona, baptised Jews, as John of Seville and Dominicus Gundissalinus, of Latin or other origins, such as Michael Scot and Rudolf of Bruges. There are two families of works translated from Arabic translations: a) Works concerning practical knowledge related to everyday life: The medical works of Hippocrates and Galen, various projects of mathematics that have particular utility as geometric works, reflections on ratios, the fifth book of Euclid, various books of Euclid's *Elements*, astronomical and engineering works, such as for pumping water, manufacturing catapults etc. b) The other family was favoured by medieval scholars, works mainly of Plato and Aristotle. Later, the contact of the Europeans with Greek texts was stopped and some translations are incomplete.

By 1200 in Paris, Bologna, and Oxford the students were hundreds, and learned liberal arts, medicine, theology, law, while from 1377 to 1520 more than 200,000 students passed from German universities. The universities had three courses: a) The faculty of arts involved internally two cycles (corresponding to Bachelor and Mas-

ter). The student studied the trivium (grammar, rhetoric, dialectic) and the quadrivium (arithmetic, astronomy, mathematics, physics). b) The second cycle was standardized, biennial and the teachers were many. The students learned mathematics, natural philosophy, astronomy, music, metaphysics, poetry, and ethics. c) The doctoral cycle offered theology, medicine, and law and it was extremely long. In Paris, there were four schools, a graduate school of liberal arts and three postgraduate (law, medicine, theology) (Rüegg, 1993).

### ***Navigating and trading resources***

The Spanish invasion in North Africa began with the capture of Melilla in 1492. The next year Columbus reported of islands in western Atlantic and insisted that they might be used as stepping-stones to China. Meanwhile the art of printing made possible a diffusion of navigational manuals and spread the news of discoveries, with bestsellers such as Peter Martyr's *De Orbe Novo*, Fracanzano da Montalboddo's *Paesi novamente ritrovati*, Sebastian Münster's *Cosmographia universalis*, Theodor De Bry's *Grands Voyages*.

Seaborne trade was traditionally organized by merchant guilds, craft guilds, regulated companies, as a type of commenda, societias, and compagnia. A fifteenth-century merchant ship might take up to two months to make the passage from Barcelona to Alexandria; perhaps two or three weeks from Messina to Tripoli; ten or twelve days from Genoa to Tunis. In the fifteenth century, the small Atlantic ships of Basque, Galician or Portuguese origin, invaded in the Mediterranean. The economic activity of the region was concentrated in Milan, the center of metallurgical industry, Florence, the main textile and banking center, Genoa and Venice, the centers of Eastern luxury trade to western and northern Europe. The Genoese capital associations *compere* and *maone* had a corporative character. Constantinople and Cairo were immense urban and consuming centers. Florence, Genoa, Venice, Ragusa, Naples, the western Mediterranean as a whole was rarely self-sufficient and depended upon sea-borne trade in grain, salt, food preserved in salt, oil, wine, cheese, raisins, currants, almonds, and oranges.

*Towards the end of the century, however, exports of oil from Andalusia began to be directed to the Canaries, and later to the West Indies, where it commanded very high prices. The Mediterranean wine trade -since viti-*

*culture was spread throughout the region- could not compare with the great fleets which left the Gironde, and later the Guadalquivir, for Atlantic destinations (Parry, 1963: p. 39).*

The far eastern trade was controlled by Chinese, who delivered spices in the important Malayan port of Malacca. From there, together with the cinnamon of Ceylon and the pepper of India, the spices were sold in the *spice ports* of the Malabar Coast and Gujarat. From Malabar, Arabian teak-built ocean-going baghlas followed two alternative routes from the Indian Ocean to the Mediterranean, and two principal ports of transshipment: Aden to the Red Sea and Ormuz through the Persian Gulf.

PAGES MISSING  
FROM THIS FREE SAMPLE

# Bibliography

- Abdalla, M. (2007). Ibn Khaldun on the Fate of Islamic Science after the 11th Century. *Islam and Science*, 5(1): pp. 61-70.
- Aczel, Amir D. (1999). *God's Equation: Einstein, Relativity, and the Expanding Universe*. New York: Four Walls Eight Windows.
- Adams, J. (1996). Principals and Agents, Colonialists and Company Men: The Decay of Colonial Control in the Dutch East Indies. *American Sociological Review*, 61(1): pp. 12-28.
- Agricola, Georgius (1950). *De Re Metallica*. New York: Dover.
- Alexander, H. G. (Ed.), (1956). *The Leibniz-Clarke Correspondence*. Manchester University Press.
- Al-Hassan, Ahmad Y. and Donald R. Hill (1986). *Islamic Technology: An Illustrated History*. Cambridge University Press.
- Allen, R.E. (1959). Anamnesis in Plato's 'Meno' and 'Phaedo'. *The review of metaphysics*, 13 (1): pp. 165-174.
- Allen, Richard B. (2010). Satisfying the 'Want for Labouring People': European Slave Trading in the Indian Ocean, 1500-1850. *Journal of World History* 21(1): pp. 45-73.
- Anapolitanos, D. (1999). *Leibniz: Representation, Continuity and the Spatiotemporality*. Dordrecht: Kluwer Academic Publishers.
- Anderson, Benedict (2006). *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (3<sup>rd</sup> Ed.). London: Verso.
- André-Julien Fabre (2008). Pneumatic Machines in Antiquity (Air as Source of Energy in the *Treatise on Pneumatics* of Heron of Alexandria). *Analecta Historico Medica*, VI (1): pp. 67-70.
- Anyanwu, Chika J. (1998). Virtual World and Virtual Reality. *Journal of Australian Studies* 154.
- Appadurai, Arjun (2005). *Modernity at Large: Cultural Dimensions of Globalization* (7<sup>th</sup> Ed.). Minneapolis, London: University of Minnesota Press.
- ARAMCO withdrawn from talks to buy the country's state-owned refinery shares (1997). *Oil*, 130: p. 3.
- Ariew, R. (Edited, with Introduction). (2000). *G. W. Leibniz and Samuel Clarke: Correspondence*. Indianapolis/Cambridge: Hackett.
- Aristotle (1938). *The Constitution of Athens; Poetics*. Athens: Papyrus.
- (1939). *On the Heavens*. Loeb Classical Library. Harvard University Press.
- (1960). *On Interpretation*. Opera. Berolini apud W. De Gruyter et socios: 16-24.
- (1960). *On Sophistic Refutations*. Opera. Berolini apud W. De Gruyter et socios: pp.164-184.



- (1960). *On the Soul*. Athens: Papyrus.
- (1960). *Posterior Analytics*. Opera. Berolini apud W. De Gruyter et socios: pp. 71-100.
- (1960). *Topica*. Opera. Berolini apud W. De Gruyter et socios: pp. 100-164.
- (1980). *Poetics*; 'Longinus,' *On the Sublime*; Demetrius, *On Style*. London: The Loeb Classical Library.
- (1993). *Politics*. Athens: Cactus.
- (1997). *Physics*. Athens: Cactus.
- Ashtekar, A. (2006). Space and Time: From Antiquity to Einstein and Beyond. *Resonance* 11 (9): pp. 4-19.
- Audi, R. (2003). *Epistemology: A Contemporary Introduction to the Theory of Knowledge* (2nd Ed.). New York: Routledge.
- Ayres, Robert U. (1990). Technological Transformations and Long Waves. Part I. *Technological Forecasting and Social Change* 37: pp. 1-37.
- (1997). *Industrial Metabolism: Work in Progress*. Working Paper 97/09/EPS, INSEAD, Fontainebleau, France.
- Babbage, Charles (1864). Of the Analytical Engine. In: *Passages from the Life of a Philosopher*, Ch. VIII. London: Longman, Green, Longman, Roberts, & Green.
- (1889). *Babbage's Calculating Engines Being a Collection of Papers Relating to Them; Their History and Construction*. Edited by Henry P. Babbage. London.
- (2009; first published 1832). *On the Economy of Machinery and Manufactures*. Cambridge: University Press.
- Bacon, Francis (1989). *The Works of Francis Bacon* (ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath) 14 vols. London, 1857-74; facsimile reprint, Stuttgart/Bad Cannstatt.
- Baird, D. (2004). *Thing Knowledge: A Philosophy of Scientific Instruments*. Berkeley, CA: University of California Press.
- Ballard, K. E. (1960). Leibniz's theory of Space and Time. *Journal of the History of Ideas* 21: pp. 49-64.
- Barker, Peter (2001). Kuhn, Incommensurability, and Cognitive Science. *Perspectives on Science* 9(4): pp. 433-462.
- Barrera-Osorio, Antonio (2006). *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution*. Austin: University of Texas Press.
- Beamish, Anne (2008). *Learning from Work: Designing Organizations for Learning and Communication*. Stanford, CA: Stanford Business Books.
- Beazley, C.R. (1895). *Prince Henry the Navigator, the Hero of Portugal and of Modern Discovery, 1394-1460 A.D. With an Account of Geographical Progress throughout the Middle Ages as the Preparation for His Work*. New York: G. P. Putnam's Sons.

- Bell, David (2001). *An Introduction to Cybercultures*. London: Routledge.
- (2006). *Science, Technology and Culture*. Berkshire: Open University Press.
- Ben-David, Joseph (1971). *The Scientist's Role in Society: A Comparative Study*. Prentice Hall.
- Bengtson, Herman (1991). *History of Ancient Greece* (A. Gavrelis, Trans.). Athens: Melissa.
- Benson, H.H. (2003). The Method of Hypothesis in the 'Meno'. *Proceedings of BACAP* 18, 2003, pp. 95-126.
- Berdayes, Vicente, and John W. Murphy (Eds.). (2000). *Computers, Human Interaction, and Organizations: Critical Issues*. Westport, CT: Praeger.
- Berlin, Leslie (2005). *The Man behind the Microchip: Robert Noyce and the Invention of Silicon Valley*. New York: Oxford University Press.
- Bernard, Alain (2003). Ancient Rhetoric and Greek Mathematics: A Response to a Modern Historiographical Dilemma. *Science in Context* 16 (5): pp. 391-412.
- (2003). Comment définir la nature des textes mathématiques de l'antiquité grecque tardive? Proposition de réforme de la notion de «textes deutéronomiques». *Revue d'histoire des mathématiques* 9: pp. 131-173.
- Bernard, Claude (1865; 1957). *An Introduction to the Study of Experimental Medicine* (H.C. Greene, Trans. 1927). New York: Dover.
- Berraha, N., J. Bozemb, J.T. Costello, et al. (2010). Non-linear processes in the interaction of atoms and molecules with intense EUV and X-ray fields from SASE free electron lasers (FELs). *Journal of Modern Optics* 57(12): pp. 1015-1040.
- Berthold, A. (2011). Die Darstellung von Raum auf griechischen Münzen. *eTopoi*, 1: pp. 69-98.
- Bertoloni Meli, Domenico (1993). *Equivalence and Priority, Newton versus Leibniz, including Leibniz's unpublished manuscripts on the Principia*. Oxford: Clarendon Press
- Biagioli, Mario (2003). Stress in the Book of Nature: the Supplemental Logic of Galileo's Realism. *MLN* 118(3): pp. 557-585.
- Bikson, Tora K., and Constantijn W. A. Panis (1999). *Citizens, Computers, and Connectivity: A Review of Trends*. Santa Monica, CA: Rand.
- Bintliff, J. (2012). 'The Immense Respiration of a Social Structure: An Integrated Approach to the Landscape Archaeology of the Mediterranean Lands. *eTopoi*, Special Volume 3: pp. 1-9.
- Bird, Richard J. (2003). *Chaos and Life: Complexity and Order in Evolution and Thought*. New York: Columbia University Press.
- Biringuccio, Vannoccio (1943). *Pirotechnia*. New York: The American Institute of Mining and Metallurgical Engineers.

- Birkhoff, Garrett and John Von Neumann (1936). The Logic of Quantum Mechanics. *Annals of Mathematics*, Second Series, 37(4): pp. 823-843.
- Blackmore, J. (2002). *Manifest Perdition: Shipwreck Narrative and the Disruption of Empire*. Minneapolis: University of Minnesota Press.
- Bloor, David (1991). *Knowledge and Social Imagery* (2<sup>nd</sup> Ed.). Chicago: University of Chicago Press.
- (2011). *The Enigma of the Aerofoil. Rival Theories in Aerodynamics, 1909–1930*. Chicago and London: The University of the Chicago Press.
- Bokulich, Alisa (2008). Paul Dirac and the Einstein-Bohr Debate. *Perspectives on Science* 16(1): pp. 103-113.
- Bolter, Jay David (2000). *Writing Space: Computers, Hypertext, and the Remediation of Print*, 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates.
- Bose, Sugata (2006). *A Hundred Horizons: The Indian Ocean in the Age of Global Empire*. Cambridge, Mass.: Harvard University Press.
- Bowker, Geoffrey C., Susan Leigh Star, William Turner, and Les Gasser (Eds.). (1997). *Social Science, Technical Systems, and Cooperative Work: Beyond the Great Divide*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Boxer, C.R. (1959). *The tragic history of the sea, 1589-1622: Narratives of the shipwrecks of the Portuguese East Indiamen Sao Thome (1589), Santo Alberto (1593), Sao Joao Baptista (1622), and the journeys of the survivors in South East Africa*. Cambridge, England: Hakluyt Society.
- Brazil: Delaying the sale of a 35% stake of Petrompras by the government. State company the Petrompras, as a result of political conflicts (2000). *Oil*, 140: p. 2.
- Briar, Celia (1997). *Working for Women? Gendered Work and Welfare Policies in Twentieth-Century Britain*. London: UCL Press.
- Brinley, Thomas (1993). *The Industrial Revolution and the Atlantic Economy: Selected Essays*. New York: Routledge.
- Broadbent, Jane, Michael Dietrich, and Jennifer Roberts (Eds.). (1997). *The End of the Professions? The Restructuring of Professional Work*. London: Routledge.
- Bromley, Allan G. (1987). The Evolution of Babbage's Calculating Engines. In: *Annals of the History of Computing* 9(2): pp. 113-136.
- Brorson, Stig (2006). The Seeds and the Worms. Ludwig Fleck and the Early History of Germ Theories. *Perspectives in the History of Biology and Medicine* 64(1): pp. 64-76.
- Brown, Clair, Yoshifumi Nakata, Michael Reich, and Lloyd Ulman (1997). *Work and Pay in the United States and Japan*. New York: Oxford University Press.

- Buchanan, Brenda J. (2006). *Gunpowder, explosives and the state: a technological history*. Aldershot: Ashgate.
- Büchel, Bettina S. T. (2001). *Using Communication Technology: Creating Knowledge Organizations*. New York: Palgrave.
- Bullinger, Hans-Jörg, and Jürgen Ziegler (Eds.). (1999). *Human-Computer Interaction: Communication, Cooperation, and Application Design*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Butorac Marc (2001). *From The Other Oil Field: Mendeleev, the West and the Russian Oil Industry*. Doctoral Thesis, McGill University, 2001.
- Cain, Peter J., and Antony G. Hopkins (2001). *British Imperialism, 1688-2000* (2<sup>nd</sup> ed.). Harlow and New York: Macmillan.
- Camino, Mercedes M. (2005). *Producing the Pacific: Maps and narratives of Spanish exploration (1567-1606)*. Amsterdam: Rodopi.
- Campbell, Gwyn (Ed.). (2005). *Abolition and Its Aftermath in Indian Ocean Africa and Asia*. London: Routledge.
- Campbell-Kelly, Martin, and William Aspray (2014). *Computer: A History of the Information Machine* (3<sup>rd</sup> Ed.). Boulder, CO: Westview Press, 2014.
- Carter, Matt (2007). *Minds and Computers: An Introduction to the Philosophy of Artificial Intelligence*. Edinburgh: Edinburgh University Press.
- Chandler, Alfred D., Jr. (1962). *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, MA: M.I.T. Press.
- (1999). *The Visible Hand: The Managerial Revolution in American Business* (15<sup>th</sup> ed.). Cambridge, MA: The Belknap Press of Harvard University Press.
- (2005). *Inventing the Electronic Century: The Epic Story of the Consumer Electronics and Computer Industries*. Cambridge, MA: Harvard University Press.
- Chandler, Alfred D., Jr., and James W. Cortada (Eds.). (2000). *A Nation Transformed by Information: How Information Has Shaped the United States from Colonial Times to the Present*. New York: Oxford University Press.
- Chandler, Alfred D., Peter Hagstrom, and Orjan Sölvell (Eds.). (1999). *The Dynamic Firm: The Role of Technology, Strategy, Organization, and Regions*. Oxford, England: Oxford University Press.
- Chatalian, G. (1991). *Epistemology and Skepticism: An Enquiry into the Nature of Epistemology*. Carbondale, IL: Southern Illinois University Press.
- Christianidis, J. (2007). The way of Diophantus: Some clarifications on Diophantus' method of solution. *Historia Mathematica* 34: pp. 289–305.

- Cifoletti, Giovanna C. (1995). La *Question* de l'Algèbre: Mathématiques et Rhétorique des Hommes de Droit dans la France du 16<sup>e</sup> siècle. *Annales. Histoire, Sciences Sociales* 50(6): pp. 1385-1416.
- Clark, Andy (2003). *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*. New York: Oxford University Press.
- Clulow, Adam (2006). Pirating in the Shogun's Waters: The Dutch East India Company and the *San Antonio* Incident. *Bulletin of Portuguese-Japanese Studies* 13: pp. 65-80.
- Cognitive Science Society (U.S.). (1996). *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society*, July 12-15, 1996, University of California, San Diego. Edited by Garrison W. Cottrell. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cohen, Floris H. (1994). *The Scientific Revolution: A Historiographical Inquiry*. Chicago: The University of Chicago Press.
- Cohen, Paul A. (2003). *China Unbound: Evolving Perspectives on the Chinese Past*. London, New York: Routledge.
- Cole S. A. (1996). 'Which Came First, the Fossil or the Fuel?' *Social Studies of Science* 26: pp. 733-66.
- Cole, S. A. (1998). 'It's a Gas!' *Lingua Franca*, December 1997/January, 1998: pp. 11-13.
- Collier, James Lincoln (2004). *Gunpowder and Weaponry*. New York: Benchmark Books.
- Collins Harry and Trevor Pinch (1994). The world according to Gold: disputes about the origins of oil. In: Harry Collins and Trevor Pinch, *The Golem: What Everyone Should Know About Science* (Cambridge: Cambridge University Press): pp. 72-92.
- Collis, Betty A., Gerald A. Knezek, Kwok-Wing Lai, Keiko T. Miyashita, Willem J. Pelgrum Tjeerd, and Takashi Sakamoto (1996). *Children and Computers in School*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Colombia: Danger to become the country importer of oil from oil-producer that is today (2000). *Oil*, 140: p. 3.
- Comstock, Helen (Ed.). (1958). *The Concise Encyclopedia of American Antiques*. New York: Hawthorn Books.
- Conee, E., and R. Feldman (2004). *Evidentialism: Essays in Epistemology*. Oxford: Clarendon Press.
- Conlin, David L., and Larry E. Murphy (2002). Shipwrecks. In C.E. Orser Jr. (ed.), *Encyclopedia of Historical Archaeology*. London and New York: Routledge: pp. 500-502.
- Conway, Flo, and Jim Siegelman (2005). *Dark Hero of the Information Age: In Search of Norbert Wiener the Father of Cybernetics*. New York: Basic Books.
- Cook, Daniel J., and Henry J. Rosemont (1981). The Pre-Established Harmony between Leibniz and Chinese Thought. *Journal of the History of Ideas* 42(2): pp. 253-267.

- Cook, Weston F. Jr. (1994). *The Hundred Years War for Morocco: Gunpowder and the Military Revolution in the Early Modern Muslim World*. Boulder, CO: Westview Press.
- Cooper, Joel, and Kimberlee D. Weaver (2003). *Gender and Computers: Understanding the Digital Divide*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Copeland, B. Jack, ed. (2006). *Colossus: The Secrets of Bletchley Park's Codebreaking Computers*. Oxford, England: Oxford University Press.
- Copernicus, Nicolaus (1992). *On the Revolutions* (Translation and Commentary by Edward Rosen). Baltimore, MD & London: The Johns Hopkins University Press.
- Corsi, P. (Ed.). (1983). *Information Sources in the History of Science and Medicine*. London: Butterworth Scientific.
- Cortada, James W. (2004). *The Digital Hand: How Computers Changed the Work of American Manufacturing, Transportation, and Retail Industries*. New York: Oxford University Press.
- (2004). *The Digital Hand: How Computers Changed the Work of American Public Sector Industries*. New York: Oxford University Press.
- (2006). *The Digital Hand: How Computers Changed the Work of American Financial, Telecommunications, Media, and Entertainment Industries*. New York: Oxford University Press.
- Couldry, Nick, and Anna McCarthy (Eds.). (2004). *Mediaspace: Place, Scale, and Culture in a Media Age*. New York: Routledge.
- Crevier, Daniel (1993). *AI: The Tumultuous History of the Search for Artificial Intelligence*. New York: Basic Books.
- Crombie, Alistair C. (1992). *Augustine to Galileo* (2 Vols) (M. Iatridou and D. Kourtovik, Trans). Athens: MIET.
- Curtin, Jeremiah (1996; 1<sup>st</sup> ed. 1908). *The Mongols: A History*. Conshohocken, PA: Combined Books.
- Curtin, Philip D. (1990). *The rise and fall of the plantation complex: Essays in Atlantic History*. Cambridge: Cambridge University Press, 1990.
- Dale, John, and David Kyle (2015). Smart Transitions? Foreign Investment, Disruptive Technology, and Democratic Reform in Myanmar. *Social Research: An International Quarterly* 82(2): pp. 291-326.
- Dallal, Ahmad (1999). Science, Medicine, and Technology: The Making of a Scientific Culture. In *The Oxford History of Islam*, edited by John L. Esposito, 155-214. New York: Oxford University Press.
- Davies, Martin (2012). *The Universal Computer. The Road from Leibniz to Turing* (2<sup>nd</sup> ed.). Boca Raton, London, New York: CRC Press.
- Davison, George S. (1928). Pittsburgh and the Petroleum Industry. In: Chamber of Commerce of Pittsburgh. *Pittsburgh and the Pitts-*

- burgh Spirit: Addresses at the Chamber of Commerce of Pittsburgh, 1927-1928.* Pittsburgh, PA: Robert L. Forsythe Company, pp. 85-104.
- Day, Christopher, Pam Sammons, Gordon Stobart, Alison Kington, and Qing Gu (2007). *Teachers Matter: Connecting Work, Lives and Effectiveness.* Maidenhead, England: Open University Press.
- Day, Lance, and Ian McNeil (Eds.). (1998). *Biographical Dictionary of the History of Technology.* London: Routledge.
- DeLancey, Craig (2002). *Passionate Engines: What Emotions Reveal about Mind and Artificial Intelligence.* New York: Oxford University Press.
- Deming, David (2010). *Science and Technology in World History.* 3 Vols. Jefferson: McFarland and Company.
- Derbyshire, John (2006). *Unknown Quantity: A Real and Imaginary History of Algebra.* Washington D.C.: Joseph Henry Press.
- Derry, T. K., and Trevor I. Williams (1961). *A Short History of Technology from the Earliest Times to A.D. 1900.* New York: Oxford University Press.
- Di Cosmo, Nicola (2002). *Warfare in Inner Asian History: 500-1800.* Boston: Brill.
- Diaper, Dan, and Neville A. Stanton (Eds.). (2004). *The Handbook of Task Analysis for Human-Computer Interaction.* Mahwah, NJ: Lawrence Erlbaum Associates.
- Dijksterhuis, Eduard J. (1989). *Die Mechanisierung des Weltbildes.* Berlin, Heidelberg, New York: Springer.
- (1956). Die Mechanisierung des Weltbildes. *Physikalische Blätter* 11: 481-494.
- Diller, A. (1941). The Parallels on the Ptolemaic Maps. *Isis* 33(1): pp. 4-7.
- Dimitriadis, N. D. (1983). *Anatomy of rhetoric. The "disagreement" between Plato and Isocrates.* Athens: Michalas.
- Dinello, Daniel (2005). *Technophobia!: Science Fiction Visions of Posthuman Technology.* Austin, TX: University of Texas Press.
- Disney, Anthony (2010). Prince Henry of Portugal and the Sea Route to India. *Historically Speaking* 11(3): pp. 35-37.
- Docherty, Peter, Jan Forslin, and A. B. (Rami) Shani (2002). *Creating Sustainable Work Systems: Emerging Perspectives and Practice.* London: Routledge.
- Dodgson, C.L. (2009). *Euclid and His Modern Rivals.* New York: Cambridge University Press.
- Donner, Fred M. (1999). Muhammad and the Caliphate: Political History of the Islamic Empire up to the Mongol Conquest. In: *The Oxford History of Islam*, edited by John L. Esposito. New York: Oxford University Press: pp. 1-62.
- Dovey, Jon, and Helen W. Kennedy (2006). *Game Cultures: Computer Games as New Media.* Maidenhead, England: Open University Press.

- Dubai will precede Turkey in receiving Iranian gas (1997). *Oil*, 130: p. 5.
- Duhem, Pierre (1954). *The Aim and Structure of Physical Theory* (Philip P. Wiener, Trans). Princeton, NJ: Princeton University Press.
- Dumett, Raymond E. (Ed.). (1999). *Gentlemanly Capitalism and British Imperialism: the New Debate on Empire*. London and New York: Routledge.
- Dunn, Ross E. (2012; 1<sup>st</sup> ed. 1986). *The Adventures of Ibn Battuta*. Berkeley: University of California Press.
- Dym, Warren (2005). Scholars and Miners: Dowsing and the Freiberg Mining Academy. *Technology and Culture* 49(4): pp. 833-859.
- Earman, J. (1989). *World Enough and Spacetime: Absolute versus Relational Theories of Space and Time*. Cambridge MA: MIT Press.
- Edelmayer, Friedrich (2010). Die ‚Leyenda negra‘ und die Zirkulation anti-katholisch-antispánischer Vorurteile. In: Europäische Geschichte Online (EGO), hrsg. vom Institut für Europäische Geschichte (IEG), Mainz 03.12.2010.
- Edwards, John (2005). *The Geeks of War: The Secretive Labs and Brilliant Minds behind Tomorrow's Warfare Technologies*. New York: AMACOM.
- Egypt: Oil Production is Declining, as the Gas Production Rises, together with the Demand for Gas (1999). *Oil*, 139: p. 6.
- Einstein, Albert (1916). Die Grundlage der allgemeinen Relativitätstheorie. *Annalen der Physik* 354(7): pp. 769-822.
- Elden, S. and J.W. Crampton (2007). *Space, Knowledge and Power: Foucault and Geography*. Hampshire: Ashgate.
- El-hawary, Mohamed E. (2014). The Smart Grid—State-of-the-art and Future Trends. *Electric Power Components and Systems* 42(3-4): pp. 239-250.
- Eliade, Mircea (1978). *The Forge and the Crucible*. Chicago, London: University of Chicago Press.
- Ercker, Lazarus (1951). *Treatise on Ores and Assaying*. Chicago: University of Chicago Press.
- Esteban Piñeiro, Mariano (2002-2003). Las Academias Técnicas en la España del Siglo XVI. *Quaderns d'Història de l'Enginyeria*, Volum V: pp. 10-19.
- Euclidis Elementa* (1883–1884), edidit et Latine interpretatus est I.L. Heiberg, Lipsiae, in aedibus B.G. Teubneri.
- Fara, Patricia (1996). *Sympathetic Transactions: Magnetic Practices, Beliefs, and Symbolism in Eighteenth Century England*. Princeton, NJ: Princeton University Press.
- Fabre, André-Julien (2008). Pneumatic Machines in Antiquity (Air as Source of Energy in the Treatise on Pneumatics of Heron of Alexandria). *Analecta Historico Medica* VI (1): pp. 67-70.
- Faulkner, W. (1994). Conceptualizing Knowledge Used in Innovation: A Second Look at the Science-Technology Distinction and



- Industrial Innovation. *Science, Technology, and Human Values*, 19(4): pp. 425-458.
- Feingold, Mordechai, and Navarro Brotons, Víctor (Eds.). (2006). *Universities and Science in the Early Modern Period*. Dordrecht: Springer.
- Fernández-Armesto, Felipe (2004). Maritime History and World History. In Daniel Finamore (ed.), *Maritime History as World History*. Gainesville: University Press of Florida: pp. 7-34.
- Fernández-Armesto, Felipe (2009). *1492: The Year Our World Began*. New York, NY: Harper Collins.
- Feyerabend, Paul (1993). *Against Method* (3<sup>rd</sup> Ed.). London: Verso.
- Feynman, Richard P. (1988). *QED: The Strange Theory of Light and Matter*. Princeton, NJ: Princeton University Press.
- Fink, Leon (Ed.). (2011). *Workers across the Americas: The Transnational Turn in Labor History*. New York: Oxford University Press.
- Finocchiaro, Maurice A. (1980). *Galileo and the Art of Reasoning: Rhetorical Foundations of Logic and Scientific Method* (Boston Studies in the Philosophy of Science, Vol. 61). Dordrecht and Boston: D. Reidel Publishing Co.
- (2005). *Retrying Galileo, 1633-1992*. Berkeley, CA: University of California Press.
- (2010). *Defending Copernicus and Galileo: Critical Reasoning in the Two Affairs* (Boston Studies in the Philosophy of Science, Vol. 280). New York: Springer.
- Fisch, M. and S. Schaffer (1991). *William Whewell, a Composite Portrait*. New York: Oxford University Press.
- Fischer, I. (1975). Another Look at Eratosthenes' and Posidonius' Determinations of the Earth's Circumference. *Quarterly Journal of the Royal Astronomical Society*, 16: pp. 152-167.
- Flach, John, Peter Hancock, Jeff Caird, and Kim Vicente (Eds.). (1995). *Global Perspectives on the Ecology of Human-Machine Systems*. Vol. 1. Hillsdale, NJ: L. Erlbaum Associates.
- Fleck, Ludwig (1979). *The Genesis and Development of a Scientific Fact*. Chicago: The University of Chicago Press.
- Flynn, Dennis O. and Giraldez, Arturo (1995). Born with a 'Silver Spoon': The Origin of World Trade in 1571. *Journal of World History* 6(2): pp. 201-221.
- Foerster, Heinz Von (2014). *The Beginning of Heaven and Earth Has No Name: Seven Days with Second-Order Cybernetics* (Edited by Albert Müller and Karl H. Müller. Translated by Elinor Rooks and Michael Kasenbacher). New York: Fordham University Press.
- Fontes da Costa, Palmira, and Henrique Leitão (2009). Portuguese Imperial Science, 1450-1800: A Historiographical Review. In Daniela Bleichmar et al. (eds.), *Science in the Spanish and Portuguese Empires, 1500-1800*. Stanford, CA: Stanford University Press: pp. 35-53.

- Foucault, Michel (1984). Of Other Spaces, Heterotopias. *Architecture, Mouvement, Continuité*, 5: pp. 46-49.
- Frank, Philipp (1957). *Philosophy of Science: The Link between Science and Philosophy*. Englewood Cliffs, NJ: Prentice-Hall.
- Franks, Kenny A., and Paul F. Lambert (1985). *Early California Oil: A Photographic History, 1865-1940*. College Station, TX: Texas University Press.
- French, Robert M. (2012). Dusting Off the Turing Test. *Science* 336(164): pp. 164-165.
- Friedman, M. (1983). *Foundations of Space-Time Theories, Relativistic Physics and Philosophy of Science*. Princeton, NJ.
- Fuchsluger, Andreas (2013). *Seefahrt zwischen der Iberischen Halbinsel und der Neuen Welt in der frühen Neuzeit (1500-1700) als Träger der Protoglobalisierung*, Diplomarbeit, University of Vienna, Historisch-Kulturwissenschaftliche Fakultät.
- Fuller, S., and Collier, J. H. (2004). *Philosophy, Rhetoric, and the End of Knowledge: A New Beginning for Science and Technology Studies* (2<sup>nd</sup> Ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Furlong, Andy (1992). *Growing Up in a Classless Society? School to Work Transitions*. Edinburgh: Edinburgh University Press.
- Gale, G. (1970). The Physical Theory of Leibniz. *Studia Leibnitiana* 2(2): pp. 114-27.
- Galilei, Galileo (1953). *Dialogue on the Great World Systems*. (Trans. and ed. G. de Santillana). Chicago: University of Chicago Press.
- (1957). *Discoveries and Opinions of Galileo* (Translated by Stillman Drake). New York: Doubleday.
- (1968). *Opere di Galileo Galilei* (Edizione Nazionale edited by Antonio Favaro. Vol. V). Firenze: Giunti Barbera.
- Galison, Peter (1994). The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision. *Critical Enquiry*, 21: pp. 229-266.
- Gallagher, John, and Ronald Robinson (1953). The Imperialism of Free Trade. *Economic History Review*, New Series 6(1): pp. 1-15.
- Gardner, Howard (1993). *Frames of Mind: The Theory of Multiple Intelligences* (2nd Ed.). New York: BasicBooks.
- Gary, James H., Glenn E. Handwerk, and Mark J. Kaiser (2007). *Petroleum Refining: Technology and Economics* (5<sup>th</sup> Ed.). Boca Raton, FL: CRC Press.
- Gaspar, J.A. (2013). From the Portolan Chart to the Latitude Chart. The silent cartographic revolution. *Comité Français de Cartographie*, 216: pp. 67-77.
- Gaukroger, Stephen (2002). *Descartes' System of Natural Philosophy*. Cambridge, England: Cambridge University Press.
- Gaynor, Jennifer L. (2013). Ages of Sail, Ocean Basins, and Southeast Asia. *Journal of World History* 24(2): pp. 309-333.
- Geraci, Robert M. (2010). *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual Reality*. New York: Oxford University Press.

- Gerali, Francesco (2011). Scientific Maturation and Production Modernization; Notes on the Italian Oil Industry in the XIX<sup>TH</sup> Century. *Oil-Industry History* 12(1): 89-108.
- Gerber, Rod, and Colin Lankshear (2000). *Training for a Smart Workforce*. London: Routledge.
- Germany: Decreasing demand for Gas Oil (1997). *Oil*, 130: p. 4.
- Gesner, Abraham (1861). *A Practical Treatise on Coal, Petroleum, and other Distilled Oils*. New York: Baillière Brothers.
- Gilbert, William (1893). *On the Loadstone and Magnetic Bodies, and on the Great Magnet the Earth*. Translated by P. Fleury Mottelay. London: Bernard Quaritch.
- Gille, Bertrand (1947). *Les origines de la grande metallurgie en France*. Paris: Éditions Domat Montchrestien.
- Gillispie, Charles C. (1990). *The Edge of Objectivity: An Essay in the History of Scientific Ideas* (10<sup>th</sup> Ed.). Princeton, NJ: Princeton University Press.
- Ginev, Dimitri (2016). Hermeneutic Perspectives on Science in Fleck's Work and Hermeneutic Critic of Constructivist Epistemology. *Perspectives on Science* 14(2): pp. 228-253.
- Gingerich, Owen (2002). Kepler Then and Now. *Perspectives on Science* 10(2): pp. 228-240.
- (2004). *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus*. New York: Walker & Company.
- Gladney, Dru C. (1999). Central Asia and China: Transnationalization, Islamization and Ethnicization. In *The Oxford History of Islam*, edited by John L. Esposito, 433-474. New York: Oxford University Press.
- Glover, John George, and William Bouck Cornell (Eds.). (1941). *The Development of American Industries, Their Economic Significance*. New York: Prentice-Hall, 1941.
- Goenner, Hubert F.M. (2004). On the History of Unified Field Theories. *Living Reviews in Relativity* 7(2): pp. 1-153.
- Gold, Thomas (1992). The deep, hot biosphere. *Proceedings of the National Academy of the Sciences* 89: pp. 6045-6049.
- (1999). *The deep hot biosphere: The Myth of Fossil Fuels*. New York: Springer.
- Goldstein, B.R. and Bowen, A.C. (1983). A New View of Early Greek Astronomy. *Isis*, 74 (3): pp. 330-340.
- Goldstein, Catherine, Norbert Schappacher, and Joachim Schwermer (2007). *The Shaping of Arithmetic after C.F. Gauss's Disquisitiones Arithmeticae*. Berlin, Heidelberg: Springer.
- Goldstine, Herman H. (1993). *The Computer from Pascal to von Neumann* (5<sup>th</sup> Ed.). Princeton, NJ: Princeton University Press.
- Goodman, David (2009). Science, Medicine, and Technology in Colonial Spanish America: New Interpretations, New Approaches. In: Daniela Bleichmar et al. (ed.), *Science in the Spanish and Por-*

- tuguese Empires, 1500-1800*. Stanford, CA: Stanford University Press: pp. 9-34.
- Goodrich, L. Carrington, and Fêng Chia-Shêng (1946). The Early Development of Firearms in China. *Isis* 36(2): pp. 114-123.
- Goodwin, Richard M. (1990). *Chaotic Economic Dynamics*. Oxford, England: Clarendon.
- Gough, Barry M. (1992). *The Northwest Coast: British Navigation, Trade, and Discoveries to 1812*. Vancouver, BC: University of British Columbia Press.
- Gräßner, C.A. (2011). Wissensräume, Raumwissen und Wissensordnungen. Historisch-kulturwissenschaftliche Forschungen zum Korrelat Raum — Wissen, *eTopoi*, 1: pp. 105–113.
- Gray, Asa (1880). Biographical Memorial, in behalf of the Board of Regents. In: Smithsonian Institution (Ed. *A Memorial of Joseph Henry*). Washington D.C.: Government Printing Office: pp. 53-73.
- Green, Bert F. (1963). *Digital Computers in Research: An Introduction for Behavioral and Social Scientists*. New York: McGraw-Hill.
- Greer, Margaret R., Walter D. Mignolo, and Maureen Quilligan (Eds.). (2007). *Rereading the Black Legend: The Discourses of Religious and Racial Difference in the Renaissance Empires*. Chicago: The University of Chicago Press.
- Grossman, Wendy M. (2001). *From Anarchy to Power: The Net Comes of Age*. New York: New York University Press.
- Guastello, Stephen J. (1995). *Chaos, Catastrophe, and Human Affairs: Applications of Nonlinear Dynamics to Work, Organizations, and Social Evolution*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Gulbekian, E. (1987). The Origin and Value of the Stadion Unit used by Eratosthenes in the Third Century BC. *Archive for History and Exact Sciences*, 37 (4): pp. 359-363.
- Gunkel, David J. (2001). *Hacking Cyberspace*. Boulder, CO: Westview Press.
- Gupta, A. and J. Ferguson (1992). Beyond 'Culture': Space, Identity, and the Politics of Difference. *Cultural Anthropology*, 7(1): pp. 6-23.
- Hacking, Ian (1995). *The Emergence of Probability. A Philosophical Study of Early Ideas about Probability, Induction and Statistical Inference* (6<sup>th</sup> Ed.). Cambridge, New York, Melbourne: Cambridge University Press.
- Hadzsits, G. D. (1963). *Lucretius and his Influence*. New York: Cooper Square Publishers.
- Haggett, N. (Ed.). (1999). *Space from Zeno to Einstein: classic readings with a contemporary commentary by Nick Haggett*. Cambridge, MA: MIT Press.
- Hahn, Martin, and Scott C. Stoness (Eds.). (1999). *Proceedings of the Twenty First Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Lawrence Erlbaum Associates.

- Hailperin, Theodore (1976). *Boole's Logic and Probability. A Critical Exposition from the Standpoint of Contemporary Algebra, Logic and Probability Theory*. Amsterdam, New York, Oxford: North-Holland Publishing Company.
- Hall, E.H. (1997). On a new Action of the Magnet on Electric Currents. In *Science in the Making: Scientific Development as Chronicled by Historic Papers in the Philosophical Magazine, with Commentaries and Illustrations*, vol. 2, edited by E.A. Davis. London: Taylor and Francis: pp. 141-146.
- Halley, Gabriel (2013). *When Robots Kill: Artificial Intelligence under the Criminal Law*. Boston: Northeastern University Press.
- Harman, Peter M. (1994). *Energy, Force and Matter: The Conceptual Development of Nineteenth-Century Physics* (Translated by Tasos Tsiantoulas). Heraklion: Crete University Press.
- Harrison, Andrew, Paul Wheeler, and Carolyn Whitehead (Eds.). (2003). *The Distributed Workplace: Sustainable Work Environments*. New York: Routledge.
- Hartz, G. A. and J. A. Cover (1988). Space and Time in the Leibnizian metaphysics. *Nous* 22(4): pp. 493-519.
- Haugeland, John (1989). *Artificial Intelligence, the Very Idea*. Athens: Katoptro.
- Hawke, Jason G. (2008). Number and Numeracy in Early Greek Literature. *Syllecta Classica* 19: pp. 1-76.
- Hawking, S.W. (1988). *A Brief History of Time. From the Bing Bang to Black Holes*. London: Bantam.
- (2003). *On the Shoulders of Giants. The Great Works of Physics and Astronomy*. London: Penguin
- Hawking, S.W. and Ellis, G.F.R. (1973). *The Large Scale Structure of Space-Time*. Cambridge: University Press.
- Hawley, John F., and Katherine A. Holcomb (1998). *Foundations of Modern Cosmology*. New York: Oxford University Press.
- Headrick, Daniel R. (2009). *Technology: A World History*. New York: Oxford University Press.
- Heath, Thomas (1921). *A History of Greek Mathematics*. Oxford: Clarendon Press, 1921.
- Heilbron, John L. (1990). Introductory Essay. In: Frängsmyr, Tore, John L. Heilbron and Robin E. Rider (Eds). *The Quantifying Spirit in the 18th Century*. Berkeley: University of California Press.
- Heller, Henry (1996). *Labour, Science and Technology in France, 1500-1620*. New York: Cambridge University Press.
- Hempel, C. G. (2001). *The Philosophy of Carl G. Hempel: Studies in Science, Explanation, and Rationality* (J. H. Fetzer, Ed.). New York: Oxford University Press.
- Hennig, Richard (1936-39; 1944-1956). *Terrae incognitae: eine Zusammenstellung und kritische Bewertung der wichtigsten vorcolumbischen Entdeckungsreisen an Hand der darüber vorliegenden Originalberichte*. 4 Bde. Leiden: Brill.

- Hentschel, Klaus (2003). Der Vergleich als Brücke zwischen Wissenschaftsgeschichte und Wissenschaftstheorie. *Journal for General Philosophy of Science* 34: pp. 251–275.
- Heppenheimer, T. A. (2001). *A Brief History of Flight: From Balloons to Mach 3 and Beyond*. New York: Wiley.
- Hicks, Marie (2010). Repurposing Turing's 'Human Brake'. *IEEE Annals of the History of Computing* 32(4): pp. 108, 106.
- Hill, Donald R. (1998). *Studies in Medieval Islamic Technology: From Philo to al-Jazari, from Alexandria to Diyar Bakr*. Aldershot, Hants.
- Hodges, Andrew (2004). *Alan Turing. The Enigma*. Athens: Travlos.
- (2012). Beyond Turing's Machines. *Science* 336(163): pp. 163-164.
- Hodgson, Marshall G.S. (1974). *The Venture of Islam. Conscience and History in a World Civilization*. Vol. 3: *The Gunpowder Empires and Modern Times*. Chicago: The University of Chicago Press.
- Hodgson, Peter (2005). Galileo the Theologian. *Logos: A Journal of Catholic Thought and Culture* 8(1): pp. 28-51.
- Hooykaas, Reijer (1972). *Religion and the Rise of Modern Science*. Edinburgh: Scottish Academic Press.
- (1983). *The Portuguese Discoveries and the Rise of Modern Science*. In: Reijer Hooykaas, *Selected Studies in History of Science*. Coimbra Universidade.
- (1999). *Fact, Faith and Fiction in the Development of Science: The Gifford Lectures Given in the University of St Andrews 1976*. Springer.
- Horvitz, Leslie Alan (2002). *Eureka! Stories of Scientific Discovery*. New York: Wiley.
- Hoschka, Peter (Ed.) (1996). *Computers as Assistants: A New Generation of Support Systems*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Howard, Nicole (2008). Marketing Longitude: Clocks, Kings, Courtiers, and Christian Huygens. *Book History* 11: pp. 59-88.
- Huizinga, Johan (1949). *Homo Ludens. A Study of the Play-Element in Culture*. London, Boston and Henley: Routledge and Kegan Paul.
- Hutchin, E. (1993). Learning to navigate. In *Understanding Practice. Perspectives on Activity and Context*. (Edited by S. Chaiklin and J. Lave). London: Cambridge University Press.
- Iran: Increase of the preferences for the oil pipeline crossing Kazakhstan through the territory of the country (1999). *Oil*, 139: pp. 6-7.
- Iran: Production problems decrease exports of light crude oil (1997). *Oil*, 130: pp. 2-3.
- Jacko, Julie A., and Andrew Sears (Eds.). (2003). *The Human-Computer Interaction Handbook: Fundamentals, Evolving Tech-*

- nologies, and Emerging Applications*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Jagacinski, Richard J., and John M. Flach (2003). *Control Theory for Humans: Quantitative Approaches to Modeling Performance*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Jammer, M. (1993). *Concepts of Space. The History of Theories of Space in Physics*. New York: Dover.
- Jiang, Xiaoyuan (2015). Astronomy. In: *A History of Chinese Science and Technology* (Ed. Yongxiang Lu; Trans. Chuijun Qian, Qingping Hu, Xiaodi Li, Yao Wang and Liang Zhao), Vol. I. Berlin, Heidelberg: Springer: pp. 41-120.
- Japan: The nuclear accident may mean more expanded natural gas for the country (1999). *Oil*, 139: pp. 7-8.
- Johnson, Christine R. (2006). Renaissance German Cosmographers and the Naming of America. *Past and Present* 191: pp. 3-43.
- Johnston, John (2002). A Future for Autonomous Agents: Machinic Merkwelten and Artificial Evolution. *Configurations* 10(3): pp. 473-516.
- Jolley, N. (Ed.). (1995). *The Cambridge Companion to Leibniz*. Cambridge University Press.
- Jones, David Martin (2001). *The Image of China in Western Social and Political Thought*. New York: Palgrave.
- Kaiser, Paul J. (1996). *Culture, Transnationalism, and Civil Society: Aga Khan Social Service Initiatives in Tanzania*. Westport, CT: Praeger.
- Katz, Victor J. and Karen Hunger Parshall (2014). *Taming the Unknown: History of Algebra from Antiquity to the Early Twentieth Century*. Princeton, NJ: Princeton University Press.
- Kellenbenz (Ed.). (1974). *Schwerpunkte der Eisengewinnung und Eisenverarbeitung in Europa: 1500-1650*. Cologne.
- Kennedy, G. (2004). *History of Classical Rhetoric*. Athens: Papadimas.
- Kennefick, Daniel (2009). Testing relativity from the 1919 eclipse - a question of bias. *Physics Today* 62(3): pp. 37-42.
- Kenney, Amanda (2013). Encoding Authority: Negotiating the Uses of Khipu in Colonial Peru. *Traversea* 3: pp. 4-19.
- Kesrouani, Pamela. How do you Build a Smart City, *Wamda* (17 August 2015).  
<http://www.wamda.com/memakersge/2015/08/how-do-you-build-a-smart-city>
- Khan, Iqtidar Alam (1996). The Coming of Gunpowder to the Islamic World and India: Spotlight on the Role of the Mongols. *Journal of Asian History* 30: pp. 27-45.
- Kimmel, Jean, and Emily P. Hoffman (Eds.) (2002). *The Economics of Work and Family*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

- Kindleberger, Charles P. (1984). *A Financial History of Western Europe*. London: George Allen and Unwin.
- Kipiniak, Walerian (1961). *Dynamic Optimization and Control: A Variational Approach*. Cambridge: M.I.T. Press.
- Kirlik, Alex (Ed.). (2006). *Adaptive Perspectives on Human-Technology Interaction: Methods and Models for Cognitive Engineering and Human-Computer Interaction*. New York: Oxford University Press.
- Klee, R. (1997). *Introduction to the Philosophy of Science: Cutting Nature at Its Seams*. New York: Oxford University Press.
- Klein, K.J. and J.S. Sorra (1996). The Challenge of Innovation Implementation. *The Academy of Management Review*, 21 (4): pp. 1055-1080.
- Kline, Ronald (2000). *Consumers in the Country, Technology and Social Change in Rural America*. Baltimore and London: the John Hopkins University Press.
- Knorr, Wilbur R. (1986). *The Ancient Tradition of Geometric Problems*. New York: Dover.
- (1993). Arithmetike stoicheiosis: On Diophantus and Hero of Alexandria. *Historia Mathematica* 20: pp. 180-192.
- Koyré, A. (1939). *Études galiléennes*. 3 Vols. Paris: Hermann.
- (1957). *From the Closed World to the Infinite Universe*. Baltimore: Johns Hopkins University Press.
- (1968). *Newtonian Studies*. University of Chicago Press.
- Kraut, Robert, Malcolm Brynin, and Sara Kiesler (Eds.). (2006). Computers, Phones, and the Internet: Domesticating Information Technology. In: *Computers, Phones, and the Internet: Domesticating Information Technology* (Edited by Robert Kraut, Malcolm Brynin, and Sara Kiesler), Iii-Iv. New York: Oxford University Press.
- Kropf, Marianna (2005). *Rituelle Traditionen der Planetengottheiten (Navagraha) im Kathmandutal Strukturen – Praktiken – Weltbilder*. Inaugural Dissertation, Universität Heidelberg.
- Kuhn, Thomas S. (1977). *The Essential Tension: Selected Studies in Scientific Tradition and Change*. Chicago and London: The University of Chicago Press.
- (1981). *Die kopernikanische Revolution* (übersetzt von Helmut Kühnelt). Wiesbaden: Springer.
- (1996). *The Structure of Scientific Revolutions* (3<sup>rd</sup> Ed.). Chicago and London: The University of Chicago Press.
- Kulp, C. B. (1992). *The End of Epistemology: Dewey and His Current Allies on the Spectator Theory of Knowledge*. Westport, CT: Greenwood Press.
- Ladyman, J. (2002). *Understanding Philosophy of Science*. London: Routledge.
- Lajoie, Susanne P. (Ed.), (2000). *Computers as Cognitive Tools: No More Walls: Theory Change, Paradigm Shifts, and Their Influence*



- on the Use of Computers for Instructional Purposes* (2<sup>nd</sup> ed. Vol. 2). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lakatos, Imre (1968). Criticism and Methodology of Scientific Research Programmes. *Proceedings of the Aristotelian Society* (London: Blackwell Publishing), 69: 149-186.
- Latour, Bruno (1998). From the World of Science to the World of Research? *Science* 280(5361).
- (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Laudan, Larry (1990). The History of Science and the Philosophy of Science. In R.C. Olby, G.N. Cantor, J.R.R. Christie, M.J.S. Hodge. *Companion to the History of Modern Science*. London: Routledge.
- Launius, Roger D., and Howard E. McCurdy (2008). *Robots in Space: Technology, Evolution, and Interplanetary Travel*. Baltimore: Johns Hopkins University Press.
- Lazos, C.D. (1995). *Archimedes. The Ingenious Engineer*. Athens: Aiolos.
- Le Roy, G. (Ed.). (1966). *Leibniz, Discours de Metaphysique et Correspondence avec Arnould*. Paris: Librairie Philosophique J. Vrin.
- Leclerc I. (1973). *Leibniz and the Analysis of Matter and Motion*. In: Leclerc I. (Ed.), *The Philosophy of Leibniz and the Modern World*. Nashville: Vanderbilt University Press: 114-32.
- Leibniz, G. W. (1966). *Hauptschriften zur Grundlegung der Philosophie*. Hamburg: Felix Meiner Verlag.
- (1969). *Die philosophischen Schriften* (Bund 7). Hildesheim: Georg Olms.
- Lennox, J. G. (2011). Aristotle on Norms of Inquiry. *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, 1(1): pp. 23-46.
- Lerski, George J. (1996). *Historical Dictionary of Poland, 966-1945*. Westport, CT: Greenwood Press.
- Lesky, A. (1998). *History of Ancient Greek Literature*. Thessaloniki: Kyriakidis Brothers.
- Light, Jennifer S. (1999). When Computers were Women. *Technology and Culture*, 40: pp. 455-483.
- Lin, Tzung-De (2015). Theater as a Site for Technology Demonstration and Knowledge Production: Theatrical Robots in Japan and Taiwan, *East Asian Science, Technology and Society: an International Journal* 9(2): pp. 187-211.
- Lindberg, David C. (2007). *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450* (2<sup>nd</sup> Ed.). Chicago: The University of Chicago Press.
- Light, Wang (1947). On the Invention and use of Gunpowder and Firearms in China. *Isis* 37 (3/4): pp. 160-178.
- Lipartito, Kenneth (2003). Picturephone and the Information Age. In: *Technology and Culture* 44: pp. 50-81.

- Liu, Dun (2015). Vertical and Horizontal Beginnings. In: *A History of Chinese Science and Technology* (ed. Yongxiang Lu, trans. Chuijun Qian, Qingping Hu, Xiaodi Li, Yao Wang and Liang Zhao), Vol. I. Berlin, Heidelberg: Springer: pp. 1-40.
- Liu, Haiming (2005). *The Transnational History of a Chinese Family: Immigrant Letters, Family Business, and Reverse Migration*. New Brunswick, NJ: Rutgers University Press.
- Livingston, David (2013). *Putting Science in its Place: Geographies of Scientific Knowledge*. Chicago: University of Chicago Press.
- Livingstone, David N., D. G. Hart, and Mark A. Noll (Eds.). (1999). *Evangelicals and Science in Historical Perspective*. New York: Oxford University Press, 1999.
- Long, Pamela O. (2003). Of Mining, Smelting, and Printing: Agricola's *De re Metallica*. *Technology and Culture* 44(1): pp. 97-101.
- Lu, Yongxiang (ed.) (2015). *A History of Chinese Science and Technology* (4 Vols.). Translated by Chuijun Qian, Qingping Hu, Xiaodi Li, Yao Wang and Liang Zhao. Berlin, Heidelberg: Springer.
- Lucas, Adam R. (2005). Industrial Milling in the Ancient and Medieval Worlds. A Survey of the Evidence for an Industrial Revolution in Medieval Europe. *Technology and Culture* 46(1): pp. 1-30.
- Lucier, Paul (2008). *Scientists and Swindlers: Consulting on Coal and Oil in America, 1820–1890*. Baltimore, MA: The John Hopkins University Press.
- McCormick, John (2012). *Nine Algorithms That Changed the Future: The Ingenious Ideas That Drive Today's Computers*. Princeton, NJ: Princeton University Press.
- Mach, Ernst (1883; 7<sup>th</sup> ed., 1912). *Die Mechanik in ihrer Entwicklung historisch-kritisch dargestellt*. Leipzig.
- Machado, Pedro (2005). *Gujarati Indian Merchant Networks in Mozambique, 1777–c. 1830*. PhD diss., University of London.
- Mackenzie, Donald, and Judy Wajcman (Eds.). *The Social Shaping of Technology* (2<sup>nd</sup> edition). Buckingham: Open University Press.
- Maerivoet, Sven (2001). *Leidt het Standaardmodel in de elementaire deeltjesfysica tot een quantum veldentheorie van Alles?* Universitaire Instelling Antwerpen.
- Maimonides, Moses (n.d.). *The Guide for the Perplexed. Grand Rapids, MI: Christian Classics Ethereal Library. Chapter IX. On the Number of the Heavenly Spheres*. Grand Rapids, MI: Christian Classics Ethereal Library, [www.ccel.org](http://www.ccel.org)
- Mair, Victor H. (2001). *The Columbia History of Chinese Literature*. New York: Columbia University Press.
- Mansell, Robin, and Uta When (1998). *Knowledge Societies: Information Technology for Sustainable Development*. Oxford: Oxford University Press.
- Marboe, Alexander (2009). Zur Einführung: Schiffsbau und Nautik im vorneuzeitlichen Europa. In: Alexander Marboe and Andreas

- Obenaus (Hrsg.), *Seefahrt und die frühe europäische Expansion*. Wien: Mandelbaum: pp. 11-35.
- Markovits, Claude (2000). *The Global World of Indian Merchants, 1750-1947: Traders of Sind from Bukhara to Panama*. Cambridge: Cambridge University Press.
- Marques, Alfredo P. (1995). The discovery of the Azores and its first repercussions in cartography. *ARQUIPÉLAGO, História*, 2ª série, vol. 1, nº 2: 7-15. <http://hdl.handle.net/10400.3/485>
- Marrou, H. I. (1961). *History of education in antiquity* (Th. Foteinopoulos, Trans.). Athens.
- Martin, G. (1966). *Leibniz, Logique et Métaphysique* (traduit par M. Regnier). Paris: Beauchesne.
- Marx, Karl (2011; first published 1867). *Capital. A Critique of Political Economy*. Vol I. (Translated by Samuel Moore and Edward Aveling). Mineola, New York: Dover.
- Mason, Stephen F. (1962). *A History of the Sciences*. New York: Collier Books.
- Mather, David (2006). Early Calculating Engines and Historical Computer Simulations. *Leonardo*, 39(3): pp. 237-243.
- Matthews, Gerald, Moshe Zeidner, and Richard D. Roberts (Eds.). (2007). *The Science of Emotional Intelligence: Knowns and Unknowns*. New York: Oxford University Press.
- Mann, Alfred M. (2009). Some Petroleum Pioneers of Pittsburgh. *Oil Industry History* 10(1): pp. 49-68.
- Mayr, Otto (1971). Adam Smith and the Concept of the Feedback System. *Technology and Culture* 12 (1): pp. 1-22.
- (1970). The Origins of Feedback Control. *Scientific American* 223(4), October: pp. 110–118.
- McClellan, James E. III, and Dorn, Harold (2006). *Science and Technology in World History. An Introduction* (2<sup>nd</sup> Ed.). Baltimore: John Hopkins University Press.
- McGinnis, J. (Ed.). (2004). *Interpreting Avicenna: Science and Philosophy in Medieval Islam: Proceedings of the Second Conference of the Avicenna Study Group* (Islamic Philosophy, Theology, and Science). Boston: Brill.
- McLaughlin, Glenn E. (1937). The Economic Significance of Oil and Gas. In: The Subcommittee on Technology to the National Resources Committee. *Technological Trends and National Policy: Including the Social Implications of New Inventions. June 1937*. Washington, DC: U.S. Government Printing Office: 123-127.
- McMullin, Ernan (1998). Galileo on science and Scripture. In: Peter K. Machamer. *The Cambridge Companion to Galileo*. Cambridge: New York: Cambridge University Press: pp. 271-347.
- McNeill, William H. (1982). *The Pursuit of Power. Technology, Armed Force, and Society since A.D. 1000*. Chicago: The University of Chicago Press.

- McRae, R. (1979). Time and the Monad. *Nature and System* 1(2): pp. 103-09.
- Meyer, Bertrand (2009). *Touch of Class: Learning to Program Well with Objects and Contracts*. Dordrecht, Heidelberg: Springer.
- Michael, Mike (2006). *Technoscience and Everyday Life: The Complex Simplicities of the Mundane*. Maidenhead, England: Open University Press.
- Miller, Gordon L. (1990). Charles Babbage and the design of Intelligence Computers and Society in 19th-Century England. *Bulletin of Science and Technology Society* 10: pp. 68-75.
- Missiaen, Tine, Ine Demerre, and Valentine Verrijken (2012). Integrated assessment of the buried wreck site of the Dutch East Indiaman 't Vliegende Hart. *Relicta* 9: pp. 191-208.
- MIT, SENSEable City Laboratory, *Trash Track* (2009). <http://senseable.mit.edu/trashtrack/>
- Montague, Gilbert Holland (1903). *The Rise and Progress of the Standard Oil Company*. New York: Harper and Brothers.
- Morrow, Glenn R. (1992). *Proclus: A Commentary on the First Book of Euclid's Elements*. Princeton, NJ: Princeton University Press.
- Morse, Suzanne W. (2004). *Smart Communities: How Citizens and Local Leaders Can Use Strategic Thinking to Build a Brighter Future*. San Francisco: Jossey-Bass.
- Morus, Iwan Rhys (Ed.). (2002). *Bodies/Machines*. New York: Berg.
- Moser, P. K. (Ed.). (2002). *The Oxford Handbook of Epistemology*. New York: Oxford University Press.
- Moss, Jean Dietz (1983). Galileo's Letter to Christina: Some Rhetorical Considerations. *Renaissance Quarterly* 36(4): pp. 547-576.
- Mumford, Lewis (1966). Technics and the Nature of Man. *Technology and Culture* 7(3): pp. 303-317.
- Mungello, David E. (1989). *Curious Land: Jesuit Accommodation and the Origins of Sinology*. Honolulu: University of Hawaii Press.
- Nason, J. W. (1946). Leibniz's Attack on the Cartesian Doctrine. *Journal of the History of Ideas* 7: pp. 447-83
- National Academy of Science (1913). *A History of the First Half-Century of the National Academy of Sciences, 1863-1913*. Edited by Frederick W. True. Washington, DC: N.p.
- Navarro Brotóns, Víctor (1992). Astronomía y Cosmología en la España del Siglo XVI. Seminario «Orotava» de Historia de la Ciencia - Año XI-XII. Actes de les II trobades d'història de la ciència i de la tècnica: (Peníscola, 5-8 desembre 1992) / coord. por Víctor Navarro Brotóns, 1994: pp. 39-52.
- (2000). Astronomía y cosmografía entre 1561 y 1625. Aspectos de la actividad de los matemáticos y cosmógrafos españoles y portugueses. Cronos: Cuadernos valencianos de historia de la medicina y de la ciencia, ISSN 1139-711X, Vol. 3, Nº. 2, Pp. 349-380.

- Needham, Joseph (1986). *Science and Civilisation in China*, vol. 5, *Chemistry and Chemical Technology*, Part 7: *Military Technology; The Gunpowder Epic* (with the collaboration of Ho Peng Yoke, Lu Gwei-Djen and Wang Ling). Cambridge, England: Cambridge University Press.
- (1954-98). *Science and Civilisation in China*. 7 vols. in 15 parts. Cambridge: Cambridge University Press.
- Nef, John U. (1932). *The Rise of the British Coal Industry*. London: Routledge and Kegan Paul.
- Netz, Reviel (1998). Deuteronomic Texts: Late Antiquity and the History of Mathematics. *Revue d'histoire des mathématiques* 4: pp. 261-288.
- Neugebauer, Otto (1975). *A History of Ancient Mathematical Astronomy*. Heidelberg: Springer.
- Neurath, Otto (1973). On the Foundations of the History of Optics. In: *Empiricism and Sociology*, Trans. Paul Foulkes and Marie Neurath. Dordrecht: D. Reidel, pp. 101-12. ["Prinzipielles zur Geschichte der Optik." *Archiv für die Geschichte der Naturwissenschaften und der Technik* 5 (1915): pp. 371-89.]
- (1983). Classification of Systems of Hypotheses. In *Philosophical Papers, 1913-1946*. Trans. Robert s. Cohen. Dordrecht: D. Reidel. [Zur Klassifikation von Hypothesensystemen (mit besonderer Berücksichtigung der Optik). *Jahrbuch der Philosophischen Gesellschaft an der Universität zu Wien* (1915): pp. 38-63]
- Newton, Isaac (1688; 1729). *The Mathematical Principles of Natural Philosophy*. *Newton's Principles of Natural Philosophy*. London: Dawson's of Pall Mall.
- Nigeria: Delays in implementing petrochemical and energy programs because of the monetary and economic crisis (1997). *Oil*, 130: p. 5.
- Norman, Donald (1999). *The Invisible Computer*. Cambridge, Mass.: MIT Press.
- Norman, Donald A., and Stephen W. Draper (Eds.). (1986). *User Centered System Design: New Perspectives on Human-Computer Interaction*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Northrop F. S. G. (1946). Leibniz's Theory of Space. *Journal of the History of Ideas* 7: pp. 422-46.
- Nowell, C.E. (1954). *The Great Discoveries and the First Colonial Empires*. Ithaca and London: Cornell University Press.
- Nye, David E. (2006). *Technology Matters, Questions to live with*. Cambridge, Massachusetts: The MIT Press.
- O'Leary, Jaime (1997). Basque Whaling in Red Bay, Labrador. *Exploration and Settlement*.  
<http://www.heritage.nf.ca/exploration/basque.html>
- O'Neill, O. (1996). *Towards Justice and Virtue*. Cambridge University Press.

- Ohlman, Herbert (1990). Information: Timekeeping, Computing, Telecommunications and Audiovisual Technologies. In: Ian McNeil, *An Encyclopaedia of the History of Technology* (London, New York: Routledge): p. 703.
- Olby, R. C., G. N. Cantor, J. R. Christie, and M. J. Hodge (Eds.). (1990). *Companion to the History of Modern Science*. London: Routledge.
- Olien, Diana Davids, and Roger M. Olien (2002). *Oil in Texas: The Gusher Age, 1895–1945*. Austin: University of Texas Press.
- Olien, Roger M., and Diana Davids Olien (2000). *Oil and Ideology: The Cultural Creation of the American Petroleum Industry*. Chapel Hill and London: The University of North Carolina Press.
- Oliver, John W. (1956). *History of American Technology*. New York: Ronald Press.
- Orser, Charles E. Jr. (2002). Padre Island shipwrecks, Texas, USA. n: Charles E. Jr. Orser (Ed.), *Encyclopedia of Historical Archaeology*. London and New York: Routledge: p. 412.
- Ouma, Stefan (2012). „Markets in the Making“: Zur Ethnographie alltäglicher Marktstrukturen in organisationalen Settings. *Geographica Helvetica* 67: pp. 203-211.
- Padrón, Ricardo (2004). *The Spacious Word: Cartography, Literature, and Empire in Early Modern Spain*. Chicago: The University of Chicago Press.
- Papadimitriou, Christos, Sanjoy Dasgupta, und Umesh Vazirani (2010). *Algorithms*. New York: McGraw Hill.
- Papert, Seymour (1993). *Mindstorms: Children, Computers, and Powerful Ideas* (2nd Ed.). New York: Basic Books.
- Parasuraman, Raja, and Mustapha Mouloua (Eds.) (1996). *Automation and Human Performance: Theory and Applications*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Parry, John H. (1961). *The establishment of the European Hegemony, 1415-1715: Trade and exploration in the Age of the Renaissance*. New York and Evanston: Harper and Row.
- (1963). *The Age of Reconnaissance*. Cleveland, OH: World Pub. Co.
- (1981). *The Discovery of the Sea*. Berkeley, Los Angeles, New York: University of California Press.
- Partington, J. R. (1960). *A History of Greek Fire and Gunpowder*. Cambridge.
- Paterson, Michael (2011). *Voices of the Code Breakers: Personal Accounts of the Secret Heroes of World War II*. Cincinnati, OH: David and Charles.
- Payr, Sabine, and Robert Trappl (Eds.). (2004). *Agent Culture: Human-Agent Interaction in a Multicultural World*. Mahwah, NJ: Lawrence Erlbaum.
- Pearson, K. (1957). *The Grammar of Science*. New York: Meridian Books.

- Perkins, Franklin (2004). *Leibniz and China. A Commerce of Light*. Cambridge: Cambridge University Press.
- Peters, Tom (1997). *Circle of Innovation: You Can't Shrink Your Way to Greatness*. London: Hodder and Stoughton.
- Pielou, E.C. (2001). *The Energy of Nature*. Chicago: University of Chicago Press, 2001.
- Pinsky, Michael (2003). *Future Present: Ethics And/As Science Fiction*. Madison, NJ: Fairleigh Dickinson University Press.
- Pirages, Dennis C. (Ed.). (1996). *Building Sustainable Societies: A Blueprint for a Post-Industrial World*. Armonk, NY: M. E. Sharpe.
- Plato (1939). *Gorgias*. Athens: Zacharopoulos.
- (1956). *Euthedemus*. Athens: Zacharopoulos.
- (1993). *Phaedrus*. Athens: Cactus.
- (1993). *Sophist*. Athens: Cactus.
- (2004). *Symposium*. Thessaloniki: Zitros.
- (n.d.). *Laches - Menon - Parmenides*. Athens: Zacharopoulos.
- Poincaré, Henri (1952). *Science and Hypothesis*. Trans. William John Greenstreet. New York: Dover. [*La science et l'hypothèse*. Paris: Flammarion, 1902.]
- (1958). *The Value of Science*. Trans. G. B. Halsted. New York: Dover.
- Popper, Karl (2010). *The Logic of Scientific Discovery*. New York: Routledge.
- Portuondo, María M. (2009a). Cosmography at the Casa, Consejo, and Corte during the Century of Discovery. In: Daniela Bleichmar et al. (ed.), *Science in the Spanish and Portuguese Empires, 1500-1800*. Stanford, CA: Stanford University Press: pp. 57-77.
- (2009b). *Secret science: Spanish cosmography and the new world*. Chicago: The University of Chicago Press, 2009.
- Potter, V. G. (1996). *Peirce's Philosophical Perspectives* (V. M. Colapietro, Ed.). New York: Fordham University Press.
- Powell, Barry B. (2012). *Writing: Theory and History of the Technology of Civilization*. Chichester, West Sussex, UK: Wiley-Blackwell.
- Prestage, Edgar (1933). *The Portuguese Pioneers*. London: A. and C. Black.
- Psillos, S. (2007). *Philosophy of Science A-Z*. Edinburgh: Edinburgh University Press.
- Ptak, Roderich (2007). *Die Maritime Seidenstraße: Küstenräume, Seefahrt und Handel in vorkolonialer Zeit*. München: C.H. Beck.
- Pyenson, L., and Verbruggen, C. (2011). Elements of the Modernist Creed in Henri Pirenne and George Sarton. *History of Science*, 49(165): p. 377.
- Quataert, D. (1977). Limited Revolution: The Impact of the Anatolian Railway on Turkish Transportation and the Provisioning of

- Istanbul, 1890-1908. *The Business History Review*, 51(2): pp. 139-160.
- Rabinowitz, M. (2007). Deterrents to a Theory of Quantum Gravity. *International Journal of Theoretical Physics* 46 (5): pp. 1403-1415.
- Raina, Dhruv (2003). Betwixt Jesuit and Enlightenment Historiography: Jean-Sylvain Bailly's History of Indian Astronomy. *Revue d'histoire des mathématiques* 9, pp. 253-306.
- Ramsey, Arthur Stanley (2009). *Electricity and Magnetism: An Introduction to the Mathematical Theory*. Cambridge: Cambridge University Press.
- Reich, S. (2011). Edwin Hubble in translation trouble. *Nature* (Online).
- Rescher, N. (1967). *The Philosophy of Leibniz*. Englewood Cliffs, NJ: Prentice-Hall.
- Restivo, Sal (2005). *Science, Technology, and Society: An Encyclopedia*. New York: Oxford University Press.
- Rheinberger, H. (2005). Gaston Bachelard and the Notion of 'Phenomenotechnique'. *Perspectives on Science* 13(3): pp. 313-328.
- (2010). *On Historicizing Epistemology: An Essay* (D. Fernbach, Trans.). Stanford, CA: Stanford University Press.
- Robinson, Ronald, Gallagher, John, and Alice Denny (1961). *Africa and the Victorians: The Climax of Imperialism in the Dark Continent*. New York: St. Martin's Press.
- Rochberg, Francesca (1999). Empiricism in Babylonian Omen Texts and the Classification of Mesopotamian Divination as Science. *The Journal of the American Oriental Society* 119(4): pp. 559-569.
- Rocher, Ludo (1986). The Puranas. In: *A History of Indian Literature*, edited by Jan Gonda, Vol. II, Fasc. 3. Wiesbaden: Otto Harrassowitz.
- Rose, Steven (2005). *The Future of the Brain: The Promise and Perils of Tomorrow's Neuroscience*. New York: Oxford University Press.
- Rosenberg, A. (2000). *Philosophy of Science: A Contemporary Introduction*. London: Routledge.
- Rosenblatt, Frank (1962). *Principles of Neurodynamics; Perceptrons and the Theory of Brain Mechanisms*. Washington: Spartan Books.
- Rosenfeld, B.A. (1988). *A History of Non-Euclidean Geometry. Evolution of the Concept of a Geometric Space*. Berlin: Springer.
- Roth, Cecil (1977). *Doña Gracia of the House of Nasi*. Philadelphia: Jewish Publication Society.
- Rothenberg, Marc (Ed.) (2001). *The History of Science in the United States: An Encyclopedia*. New York: Garland.
- Rüegg, Walter (Ed.), (1993). *Geschichte der Universität in Europa*, 3 Vols. München: C.H. Beck.
- Russell, Stuart J., and Norvig, Peter (Eds.). (2010). *Artificial Intelligence: A Modern Approach* (3<sup>rd</sup> ed). Upper Saddle River, NJ: Prentice Hall.



- Saïd, S., Trede, M., de Boulluec, A. (2001). *History of Greek Literature*. Athens: Papazisis.
- Samuelson, Robert J. (2006). The Next Capitalism; American Business Is in the Midst of Its Greatest Transformation since the Industrialization and Massive Growth at the Turn of the 20th Century. *Newsweek*, October 30: p. 45.
- Sarton, G. (1952). *A Guide to the History of Science: A First Guide for the Study of the History of Science, with Introductory Essays on Science and Tradition*. Waltham, MA: Chronica Botanica.
- (1957). *The Study of the History of Mathematics, and the Study of the History of Science*. New York: Dover Publications.
- (1959). *Ancient Science and Modern Civilization. Euclid and His Time. Ptolemy and His Time. The End of Greek Science and Culture*. New York: Harper.
- (1960). *The Life of Science: Essays in the History of Civilization*. Bloomington: Indiana University Press.
- Saudi Arabia: Government makes clear that it now needs foreign investment for research, development and production (1999). *Oil*, 139: p. 5.
- Saunier, Pierre-Yves (2009). Transnational. In: Akira Iriye et Pierre-Yves Saunier, *The Palgrave Dictionary of Transnational History*, Palgrave Macmillan: pp. 1047-1055. <halshs-00368360>
- Scamehorn, Lee (2002). *High Altitude Energy: A History of Fossil Fuels in Colorado*. Boulder, CO: University Press of Colorado.
- Scarani, Valerio (2006). *Quantum Physics: A First Encounter: Interference, Entanglement, and Reality*. Translated by Rachel Thew. New York: Oxford University Press.
- Schafer, Edward H. (1963). *The Golden Peaches of Samarkand: A Study of Tang Exotics*. Berkeley and Los Angeles: University of California Press.
- Schaffer, Simon (1994). Babbage's Intelligence: Calculating Engines and the Factory System. *Critical Enquiry* 21: pp. 203-227.
- Schehr, Robert C. (1997). *Dynamic Utopia: Establishing Intentional Communities as a New Social Movement*. Westport, CT: Bergin and Garvey.
- Schmidgen, H. (2015). *Bruno Latour in Pieces: An Intellectual Biography* (G. Culance, Trans.). New York: Fordham University Press.
- Schmidt W. (transl.) (1899-1914). *Heronis Alexandrini opera quae supersunt omnia*. Vol. 1: *Die Druckwerke Herons von Alexandria*. Leipzig: Teubner.
- Schott, Heinz (2002). Paracelsus and Van Helmont on Imagination: Magnetism and Medicine before Mesmer. In: *Paracelsian Moments: Science, Medicine and Astrology in Early Modern Europe* (Edited by Gerhild Scholz Williams and Charles D. Gunnoe Jr.). Kirksville, MO: Truman State University Press, 2002: pp. 135-147.
- Schroeder, Ralph (1996). *Possible Worlds: The Social Dynamic of Virtual Reality Technology*. Boulder, CO: Westview Press.

- Shuren, Bo (1989). *Astrometrie und astrometrische Instrumente*. In: *Wissenschaft und Technik im alten China* (Edited and translated by Käthe Zhao and Hsi-lin Zhao). Berlin: Birkhäuser: pp. 20-36.
- Schuld, Maria, Sinayskiy, Ilya, and Francesco Petruccione (2015). An introduction to quantum machine learning. *Contemporary Physics* 56(2): pp. 172-185.
- Scrimshaw, Peter (Ed.). (1993). *Language, Classrooms and Computers*. London: Routledge.
- Segal, Howard P. (1994). *Future Imperfect: The Mixed Blessings of Technology in America*. Amherst, MA: University of Massachusetts Press.
- Serres, M. (1968). *Le Systeme de Leibniz et ses Modeles Mathématiques, Tome Premier, Etoiles*. Paris: Presses Universitaires de France.
- Sezgin, Fuat (2003). *Wissenschaft und Technik im Islam*. Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität.
- Sexton, Donal J., Jr. (comp.). (1996). *Signals Intelligence in World War II: A Research Guide*. Westport, CT: Greenwood Press.
- Shanker, S. G. (Ed.). (1996). *Philosophy of Science, Logic, and Mathematics in the Twentieth Century*. New York: Routledge.
- Sherby, Oleg. D. and Jeffrey Walsworth (2001). Ancient Blacksmiths, the Iron Age, Damascus Steels, and Modern Metallurgy. *Journal of Materials Processing Technology* 117: pp. 347-353.
- Silverberg, R. (1997). *The longest voyage: Circumnavigators in the Age of Discovery*. Athens, OH: Ohio University Press.
- Simmons, Matthew R. (2005). *Twilight in the Desert. The Coming Saudi Oil Shock and the World Economy*. Hoboken, NJ: Wiley.
- Singh, G. (2009). *Applied Chemistry*. New Delhi: Discovery Publishing House.
- Skelton, Raleigh A. (1958). *Explorers' maps: Chapters in the cartographic record of geographical discovery*. New York: Frederick A. Praeger.
- Sklar L. (1974). *Space, Time and Spacetime*. Berkeley: University of California Press.
- Smith, Cyril S. (1943). Introduction. In: Vanoccio Biringuccio, *Pirotechnia*. New York: The American Institute of Mining and Metallurgical Engineers.
- Smith, Elisabeth B. and Michael Wolfe (ed.). (1997). *Technology and Resource Use in Medieval Europe*. Aldershot: Ashgate.
- Smithsonian Institution (1880). *A Memorial of Joseph Henry*. Washington, DC: Government Printing Office.
- Smuts, Aaron (2009). What is Interactivity? *The Journal of Aesthetic Education*, 43(4).
- Sobel, Dava (1995). *Longitude: The True Story of a Lone Genius who Solved the Greatest Scientific Problem of his Time*. London: Penguin.

- Spandagos, Evangelos (2000). *Theodosius' Sphaerics*. Athens: Aithra.
- Stanney, Kay M. (Ed.). (2002). *Handbook of Virtual Environments: Design, Implementation, and Applications*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Steels, Luc, and Rodney Brooks (1995). *The Artificial Life Route to Artificial Intelligence: Building Embodied, Situated Agents*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Sterling, Keir B., Richard P. Harmond, George A. Cevasco, and Lorne F. Hammond, (Eds.). (1997). *Biographical Dictionary of American and Canadian Naturalists and Environmentalists*. Westport, CT: Greenwood Press.
- Sternberg, Robert J., and Talia Ben-Zeev (Eds.) (1996). *The Nature of Mathematical Thinking*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Stinson, Douglas R. (2006). *Cryptography: Theory and Practice*. Boca Raton, FL: Chapman and Hall/CRC.
- Tabbi, Joseph, and Rone Shavers (Eds.). (2007). *Paper Empire: William Gaddis and the World System*. Tuscaloosa, AL: University of Alabama Press.
- Takeyh, Ray (2000). *The Origins of the Eisenhower Doctrine: The US, Britain and Nasser's Egypt, 1953–57*. London: Palgrave Macmillan.
- Taylor, Andrew (2004). *The World of Gerard Mercator: The Mapmaker who Revolutionised Geography*. London: William Collins.
- Taylor, Frederick Winslow (1917). *The Principles of Scientific Management*. New York: Harper and Brothers.
- Teaf, Howard M. Jr., and Peter G. Franck (1955). *Hands across Frontiers: Case Studies in Technical Cooperation*. Ithaca, NY: Cornell University Press.
- Teays, Wanda (2012). *Seeing the Light: Exploring Ethics through Movies*. Malden, MA: Wiley-Blackwell.
- Tebel, René (2012). *Das Schiff im Kartenbild des Mittelalters und der Frühen Neuzeit. Kartographische Zeugnisse aus sieben Jahrhunderten als maritimhistorische Bildquellen*. Bremerhaven: Deutsches Schifffahrts Museum, Oceanum Verlag.
- Thang, Leng Leng, and Wei-Hsin Yu (Eds.). (2004). *Old Challenges, New Strategies: Women, Work, and Family in Contemporary Asia*. Boston: Brill.
- Thompson, J. W., F. Schevill, G. Sarton, and G. Rowley (1929). *The Civilization of the Renaissance*. Chicago: University of Chicago Press.
- Thucydides (1970). *Historiae*. Oxford Classical Texts. Athens: Kardamitsa.
- Topper, David R. (2015). *Einstein for Anyone: A Quick Read*. Delaware: Vernon Press.
- Trinkle, Dennis A. (Ed.). (1998). *Writing, Teaching, and Researching History in the Electronic Age: Historians and Computers*. Armonk, NY: M. E. Sharpe.

- Tropp, Edward A., Victor Ya. Frenkel and Artur D. Chernin (1993). *Alexander Friedman: the man who made the universe expand* (Translated by Alexander Dron and Michael Burov). Cambridge: Cambridge University Press.
- Tsimpourakis, Dimitris (2004). *The Geometry in Ancient Greece*. Athens: Atrapos.
- Tweney, C.F. and L.E.C. Hughes (1958). *Chamber's Technical Dictionary*. New York: Macmillan.
- Tyndall, John (1961). *Faraday as a Discoverer*. New York: D. Appleton.
- U.S. Congress Office of Technology Assessment (1984). *Computerized Manufacturing Automation: Employment, Education, and the Workplace*. Washington, DC: U.S. G.P.O.
- Unguru, Sabetai (1975). On the need to rewrite the history of Greek mathematics. *Archives for the History of Exact Sciences* 15: pp. 67–114.
- Uzor, O.O. (2004). Small and Medium Scale Enterprises Cluster Development in South-Eastern Region of Nigeria. *Berichte aus dem Weltwirtschaftlichen Colloquium der Universität Bremen*, Nr. 86. Institut für Weltwirtschaft und Internationales Management. Universität Bremen.
- Valenstein, Elliot S. (2005). *The War of the Soups and the Sparks: The Discovery of Neurotransmitters and the Dispute over How Nerves Communicate*. New York: Columbia University Press.
- Van den Boogaerde, Pierre (2010). *Shipwrecks of Madagascar*. Durham: Strategic Book Group.
- Van der Waerden, B.L. (2003). *Science Awakening I. Egyptian, Babylonian and Greek Mathematics* (2<sup>nd</sup> Ed.). Irakleio: Crete University Press.
- Van Heijenoort, Jean (1967). *From Frege to Gödel: A Source Book in Mathematical Logic, 1879-1931*. Cambridge, MA: Harvard University Press.
- Vassiliou M.S. (2009). *Historical Dictionary of the Petroleum Industry*. Lanham MA: Scarecrow Press.
- Véron, Jacques (2008). Alfred J. Lotka and the Mathematics of Population. *Electronic Journal for History of Probability and Statistics* 4(1), <http://www.jehps.net/juin2008.html>
- Vestine, E.H., Lucile Laporte, Isabelle Lange, and W.E. Scott (1947). *The Geomagnetic Field: Its Description and Analysis*. Washington, DC: Carnegie Institution of Washington.
- Virtanen, R. (1960). *Claude Bernard and His Place in the History of Ideas*. Lincoln, NE: University of Nebraska Press.
- Vitrac, Bernard (2008). *Faut-il réhabiliter Héron d'Alexandrie?* France.
- Vitruvius (1914). *The Ten Books on Architecture*. London: Oxford University Press.

- Vlastos, Gregory (2005). *Plato's Universe*. Las Vegas, NV: Parmenides.
- Vogl, Benedikt (2014). *Die Amerikapolitik Karls V.* Diplomarbeit, University of Vienna, Historisch-Kulturwissenschaftliche Fakultät.
- Volti, Rudi (2014). *Society and Technological Change* (7<sup>th</sup> Ed.). New York: Worth Publishers.
- Von Humboldt, Alexander (1858). *Cosmos: A Sketch of Physical Description of the Universe*, vol. 1. Translated by E.C. Otté. New York: Harper and Brothers.
- Von Reitzenstein, Alexander (1959). Die Ordnung der Nürnberger Plattner. *Waffen- und Kostümkunde*, New Series, I: 54-85. München.
- Voth, Hans-Joachim (2000). *Time and Work in England 1750-1830*. New York: Oxford University Press.
- Wagman, Morton (Ed.). (1991). *Cognitive Science and Concepts of Mind: Toward a General Theory of Human and Artificial Intelligence*. New York: Praeger Publishers.
- Wallerstein, Immanuel (1974). *The Modern World System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.
- Weiss, R. (2001). *Virtue in the Cave. Moral Inquiry on Plato's Meno*. Oxford University Press.
- West, Delno C., and August Kling (trans.) (1991). *The Libro de las Profecias of Christopher Columbus*. Gainesville, FL: University of Florida Press.
- Westfall, Richard S. (2004). *The Construction of Modern Science. Mechanisms and Mechanics* (4<sup>th</sup> Ed.), (Trans. Krino Zisi). Irakleio: Crete University Press
- Weston, R. F. and Ruth, M. (1997). A dynamic, hierarchical approach to understanding and managing natural economic systems. *Ecological Economics* 21: pp. 1 - 17.
- Wheeler, John Archibald (1998). *Geons, Black Holes, and Quantum Foam: A Life in Physics*. New York: W. W. Norton.
- Whittaker, John C. (2004). *American Flintknappers: Stone Age Art in the Age of Computers*. Austin, TX: University of Texas Press.
- Wieland, H. R. (2013). *Computergeschichte(n) – nicht nur für Geeks. Von Antikythera zur Cloud*. Bonn: Galileo Press.
- Wilcken, U. (1976). *Ancient Greek History*. Athens: Papazisis.
- Wilhelm, Richard (1979). *Lectures on the 'I Ching': Constancy and Change*. Princeton NJ: Princeton University Press.
- Williams, Alan (2003). *The Knight and the Blast Furnace: A History of the Metallurgy of Armour in the Middle Ages and the Early Modern Period*. Leiden, Boston: Brill.
- Williams, Garnett P. (1997). *Chaos Theory Tamed*. London: Taylor and Francis.

- Williams, Gerhild Scholz, and Charles D. Gunnoe Jr. (Eds.). (2002). *Paracelsian Moments: Science, Medicine and Astrology in Early Modern Europe*. Kirksville, MO: Truman State University Press.
- Williamson, Harold F., and Arnold R. Daum (1959). *The American Petroleum Industry: The Age of Illumination, 1859-1899*. Evanston, IL: Northwestern University Press.
- Wilson, N. L. (1973). Individual Identity, Space, and Time, in the Leibniz Clarke Correspondence. In: Leclerc I. (Ed.). *The Philosophy of Leibniz and the Modern World*, Vanderbilt University Press, Nashville: pp. 189-206.
- Winterbourne, A. T. (1982). On the Metaphysics of Leibnizian Space and Time. *Studies in the History and Philosophy of Science* 13(3): pp. 201-14.
- Yi, Dongshin (2010). *A Genealogy of Cyborgothic: Aesthetics and Ethics in the Age of Posthumanism*. Farnham, Surrey, England: Ashgate.
- Yongming, Zhou (2006). *Historicizing Online Politics: Telegraphy, the Internet, and Political Participation in China*. Stanford, CA: Stanford University Press.
- Youngman, Paul A. (2010). The Dada Cyborg: Visions of the New Human in Weimar Berlin. *German Quarterly*.
- Yourgrau, Palle (2005). *A World without Time: The Forgotten Legacy of Gödel and Einstein*. Cambridge MA: Basic Books.
- Zahar, Elie (2001). *Poincaré's Philosophy: From Conventionalism to Phenomenology*. Chicago: Open Court.



# Index

## A

Agricola, 67, 68, 169, 187  
Albertus Magnus, 66  
al-Khwarizmi, 40, 41, 42  
Archimedes, 15, 16, 21, 23,  
24, 41, 116, 118, 134, 135,  
143, 186  
Aristarchus, 16, 134, 140, 143  
Aristotle, 12, 16, 17, 19, 20,  
24, 30, 41, 129, 130, 135,  
137, 143, 146, 147, 164,  
169, 186

## B

Babbage, Charles, 106, 108,  
109, 110, 111, 112, 113,  
114, 115, 116, 117, 125,  
170, 172, 189, 194  
Bacon, Francis, 38, 136, 148,  
170  
Bacon, Roger, 49, 66  
Biringuccio, Vanoccio, 66, 67,  
171, 195  
Boole, 106, 182  
Buridan, 130, 131

## C

China, 13, 25, 36, 37, 38, 39,  
40, 43, 46, 50, 57, 60, 99,  
102, 174, 180, 181, 184,  
186, 190, 192, 195, 199  
Columbus, 13, 45, 47, 50, 52,  
57, 60, 65, 198  
Conics, 15, 138

Construction, 12, 16, 21, 26,  
30, 31, 38, 43, 44, 48, 52,  
63, 66, 87, 96, 98, 101, 103,  
106, 109, 110, 111, 112,  
116, 117, 120, 145, 163,  
164, 166  
Copernicus, 12, 131, 137, 139,  
140, 141, 142, 144, 151,  
164, 175, 178, 180

## D

Democritus, 15, 23, 135  
Descartes, 105, 131, 132, 133,  
150, 151, 165, 179  
Diophantus, 15, 16, 33, 173,  
185

## E

Einstein, Albert, 154, 155,  
156, 159, 167, 169, 170,  
172, 177, 181, 196, 199  
Euclid, 12, 15, 17, 23, 41, 135,  
139, 140, 149, 176, 189, 194  
Eudoxus, 15, 24, 134

## F

Faraday, Michael, 71, 72, 73,  
86, 197  
Feyerabend, Paul, 162, 178  
Franklin, Benjamin, 71, 77,  
192

## G

Galen, 11, 12, 15, 28, 41, 137



Galileo, 9, 58, 105, 129, 133,  
 135, 139, 140, 141, 142,  
 143, 144, 145, 146, 147,  
 148, 149, 151, 159, 163,  
 164, 167, 171, 175, 178,  
 179, 183, 188, 189, 198  
 Geometry, 15, 16, 23, 25, 26,  
 29, 105, 119, 145, 149, 154,  
 162  
 Gesner, Abraham, 79, 81, 82,  
 83, 84, 85, 180  
 Gilbert, William, 35, 70, 71,  
 180, 189  
 Greek, 11, 12, 15, 25, 27, 29,  
 30, 31, 33, 39, 41, 66, 137,  
 171, 180, 182, 186, 191,  
 194, 197, 198  
 Gunpowder, 42, 173, 174,  
 175, 183, 184, 186, 190, 191

## H

Heron, 15, 21, 23, 24, 42, 135,  
 137, 169, 177  
 Hertz, Heinrich Rudolf, 73,  
 74  
 Hippocrates, 11, 12, 15, 23,  
 24, 41, 137

## K

Kier, Samuel, 81, 86  
 Kuhn, Thomas, 161, 170, 185

## L

Leibniz, G.W., 105, 131, 132,  
 134, 146, 151, 152, 153,  
 157, 169, 170, 171, 174,  
 175, 179, 184, 186, 188,  
 189, 190, 192, 193, 195, 199  
 Leucippus, 131

## M

Mark the Greek, 66  
 Mathematics, 108, 171, 172,  
 182, 190, 194, 195, 197  
 Maxwell, James Clerk, 72, 73,  
 74, 154, 167  
 Menaechmus, 16, 24  
 Menelaus, 26, 138, 139

## N

Newton, Isaac, 105, 116, 118,  
 129, 132, 133, 135, 150,  
 151, 152, 154, 162, 165,  
 171, 190  
 Numbers, 15, 33, 105, 111,  
 112, 113, 114, 115, 119,  
 120, 149, 167

## O

Oresme, 130

## P

Pappus, 15, 16, 23, 24  
 Petroleum, 81, 87, 89, 93, 94,  
 95, 99, 175, 179, 180, 188,  
 191, 197, 199  
 Philosophy, 17, 134, 151, 159,  
 160, 165, 166, 170, 173,  
 178, 179, 182, 183, 185,  
 186, 188, 190, 192, 193,  
 195, 199  
 Physics, 170, 179, 182, 184,  
 193, 194, 195, 198  
 Plato, 12, 17, 18, 19, 24, 134,  
 135, 143, 149, 169, 176,  
 192, 198

Ptolemy, Claudius, 12, 15, 22,  
25, 26, 32, 41, 42, 129, 138,  
149, 194

## Q

Quantum Mechanics, 118,  
157, 162, 172

## R

Relativity, 11, 25, 151, 153,  
155, 162, 184

## S

Sea passage, 49, 50  
Space, 21, 22, 23, 27, 29, 33,  
60, 72, 89, 106, 129, 130,  
131, 132, 146, 151, 152,  
153, 154, 155, 156  
Space-time, 151, 154  
Strabo, 25, 29, 30, 31, 33

## T

Time, 11, 15, 16, 25, 30, 32,  
39, 44, 60, 88, 89, 90, 99,  
111, 112, 118, 128, 140,  
147, 149, 151, 152, 153,  
155, 156, 157, 167, 170,  
177, 182, 189, 195, 198, 199  
Turing, 117, 175, 179, 183

## V

Vespucci, Amerigo, 49, 50  
Vitruvius, 23, 27, 197

## W

Waldseemüller, Martin, 47,  
50, 55