

Newsletter of HOPOS, The International Society for the History of Philosophy of Science

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From the Editors

Greetings Hopoi, on the occasion of our first meeting as a formal society! Publication of the current issue coincides with the 2004 HOPOS Congress in San Francisco, described here by the local organizing committee chair, David Stump.

Once again, the Newsletter is far behind our ideal schedule, but not for lack of material. We hope, with the recent addition of Associate Editor Tom Staley, to bring the publication schedule back in line, providing a more regular source of timely news.

In addition to a preview of the 5th HOPOS Congress, you will find here a full set of announcements, notices, and links to helpful resources. We also record the recent loss of several figures in academia and publishing, including Larry Holmes, I. B. Cohen, and Susan Abrams.

In addition, the book reviews here represent the breadth and vitality of our field, ranging from Berggren and Jones' study of Ptolemy's *Geography* (reviewed by Charles Kolb) to James Fetzer's edited collection of assessments of the career of Carl Hempel (reviewed by Alirio Rosales). Other reviews address works pertaining to John Dee, Robert Boyle, Enlightenment encyclopedism, Comtean positivism, quantum physics, and more.

Make sure to visit with us at HOPOS 2004 and share your ideas about the Newsletter.

- Saul Fisher and Tom Staley



HOPOS 2004 Meeting in San Francisco

Welcome to HOPOS 2004, the Fifth Congress of the International Society for the History of Philosophy of Science, in San Francisco, the city by the bay.

The congress is being held at the University of San Francisco, in cooperation with Stanford University and the philosophy department of the University of California, Berkeley, and includes what many have said is the most impressive line-up of speakers yet: plenary addresses by Bernadette Bensaude-Vincent, Daniel Garber, and Alan Richardson, eight symposia and twelve sessions consisting of contributed papers—some seventy-five presentations in all.



The backdrop to this fabulous event is San Francisco, a favorite tourist destination and major

cultural center at the junction of the Eastern and Western worlds. HOPOI have a wealth of lovely possibilities for exploring the city's offerings during time away from the conference.

A number of museums (large and small) cater to interests in science and technology. These include the California Academy of Sciences, housing a planetarium, aquarium, and natural history exhibits (<http://www.calacademy.org>), the Exploratorium hands-on science museum (<http://www.exploratorium.edu>), located in the architectural landmark Palace of Fine Art (<http://www.exploratorium.edu/palace>), the Cable Car Museum (<http://www.cablecar-museum.com>), the Musée Mécanique, a museum of mechanical amusement machines (<http://www.sanfrancisco-musees.com/musee/mechanique.html>), the Golden Gate Railroad Museum (<http://www.ggrm.org>), and the San Francisco Fire Department Museum (<http://www.sffiremuseum.org>).

Among the many fine arts and historical institutions are the San Francisco Museum of Modern Art (<http://www.sfmoma.org>), the M. H. de Young Memorial Museum and Asian Art Museum (<http://www.thinker.org/devyoung>), the Mexican Museum (<http://www.mexicanmuseum.org>),

News of the profession.

Call for Reports.

The Newsletter features occasional, concise reports on conferences of interest to HOPOI. If you are interested in writing such reports, please contact the Associate Editor.

Seminars, Conferences, and Colloquia.

- June 24-27, 2004
Dartmouth College, NH
International Symposium on Scientific Instrument Collections in the University
Co-sponsored by the Scientific Instrument Commission, NSF, and Dartmouth College. For information, go to <http://www.dartmouth.edu/~sicu>.
- June 30-July 1, 2004
London, England
Centenary Conference on the Life, Work and Legacy of John Ambrose Fleming
University College, London. For information, contact Colin Hempstead (colin.hempstead@ntlworld.com).
- July 1-3, 2004
Max Planck Institute for the History of Science, Berlin, Germany
Husserl and the Historical Epistemology of the Sciences
For information, go to <http://aix1.uottawa.ca/~dhyder/husserl.htm> or contact David Hyder (dhyder@uottawa.ca).
- July 3-6, 2004
Barcelona, Spain
First Joint Conference of the Society for Philosophy & Psychology and the European Society for Philosophy & Psychology
For information, go to http://www.ub.es/grc_logos/spp_espp_04.
- July 5-9, 2004
Newcastle, NSW, Australia
2004 Conference of the Australasian Association for the History, Philosophy and Social Studies of Science
In conjunction with the 12th Biennial Conference of the Australian Historical Association. For information, go to <http://www.usyd.edu.au/hps/aahpss/conference-2004>.
- July 5-9, 2004
Urbino, Italy
Second School in Foundations of Physical Theories
For information, go to <http://www.ge.infn.it/~zanghi/urbino>.
- July 8-9, 2004
University of Kent, Canterbury, England
Annual Conference of the British Society for the Philosophy of Science
For information, contact james.ladyman@bristol.ac.uk.
- July 24-30, 2004
Ittingen, Switzerland
1st Ittingen Summer School – The Cunning of Science
Organized by The Collegium Helveticum (Swiss Institute of Technology), the Cohn Institute for the History and Philosophy of Science (Tel Aviv University), and the University of Konstanz Center for Junior Research Fellows, in cooperation with the Lion Foundation. For information, go to <http://www.summerschool-ittingen.ch>.
- August 4-7, 2004
Harbin, China
10th International Conference on the History of Science in China
For information, contact Jiang Zhen-huan (hitskb@hope.hit.edu.cn).
- August 5-7, 2004
Halifax, Nova Scotia, Canada
Fifth Joint International Meeting of the British Society of the History of Science, the Canadian Society for the History and Philosophy of Science Society
For information, go to <http://www.hssonline.org> or contact info@hssonline.org.
- August 15-18, 2004
Durham, England
International Society for the Philosophy of Chemistry, 8th Summer Symposium
For information, go to <http://www.dur.ac.uk/philosophy.department/general/events/ISPC.html>.
- August 15-18, 2004
Morelia, Michoacán, Mexico
9th Mexican Congress of History of Science and Technology
For information, contact pcientifico@smhct.org.
- August 15-21, 2004
University of Konstanz, Germany
3rd International Summer School: Causality, Uncertainty, and Ignorance
For information, go to <http://www.uni-konstanz.de/ppm/summerschool2004>.
- August 25-28, 2004
Paris, France
4S-EASST Joint Meeting
For information, go to <http://www.congres-scientifiques.com/4S-EASST/index.html> or contact 4s-easst@ensmp.fr.
- August 29-September 4, 2004
Bologna, Italy
9th International Summer School in History of Science
For information, go to <http://www.cis.unibo.it>.
- September 1-4, 2004
Helsinki, Finland
International Symposium on 18th Century European Thought and the Nature-Culture Problem in Advanced Techno-Scientific Societies
For information, contact anu.h.katainen@helsinki.fi or pekka.sulkunen@helsinki.fi.
- September 5-12, 2004
Côte d'Azur, France
Seminar in the Philosophy of Science
For information, contact Anouk Barberousse (barberou@heraclite.ens.fr) or go to <http://www.sps.ens.fr>.
- September 15-17, 2004
Budapest, Hungary
'The European Scientist' – Symposium on the era and work of Franz Xaver von Zach (1754-1832)
Precedes the autumn meeting of the Astronomische Gesellschaft (Prague, September 20-25, 2004). For information, contact Bela Balazs (balazs@konkoly.hu).
- September 16-17, 2004
Aix-en-Provence, France
At the Crossroads of the Sciences – Practicing and Understanding Interdisciplinarity
For information, go to <http://www.aix-cs.org> or contact contact@aix-cs.org.
- September 16-18, 2004
Coventry, England
Philosophy: Problems, Aims, Responsibilities
A conference to mark the 10th anniversary of the death of Sir Karl Popper. For information, go to <http://www2.warwick.ac.uk/fac/soc/philosophy/staff/miller/phpar> or contact David Miller (d.w.miller@warwick.ac.uk).
- September 24-25, 2004
Ghent, Belgium
Thought Experiments Rethought
For information, go to <http://logica.ugent.be/TER> or contact ter@logica.ugent.be.
- October 23-24, 2004
Oxford University, England
Seminar in Early Modern Philosophy

(Continued on page 3)

Seminars, Conferences, and Colloquia.

For information, contact
paul.lodge@mansfield.ox.ac.uk.

- November 4-6, 2004
Maastricht, The Netherlands
First Congress of the European Society for the History of Science: Science in Europe - Europe in Science: 1500-2000

For information, go to <http://www.gewina.nl> or contact congress@gewina.nl.

- November 6-7, 2004
Rutgers University,
New Brunswick, NJ
Mid-Atlantic Seminar in Early Modern Philosophy
For information, contact mbolton@rci.rutgers.edu.

- November 18-21, 2004
Austin, Texas
19th Biennial Meeting of the Philosophy of Science Association

For information, go to <http://www.temple.edu/psa2004> or contact psa2004@temple.edu.

- November 27, 2004
Birkbeck College, London, England
Biblical Exegesis and the Emergence of Science in the Early Modern Era
For information, contact k.killeen@english.bbk.ac.uk or peterforshaw@hotmail.com.

- December 18-19, 2004
Tunis, Tunisia
8th Maghrebian Colloquium on the History of Arab Mathematics
For information, contact mahdi.abdeljaouad@isefc.rnu.tn.

- December 27-30, 2004
Boston, Massachusetts
History of Early Analytic Philosophy Society (HEAPS)
Sessions for this new scholarly society to be held at the 2004 Eastern Division APA Meeting. For information, contact rcarey@lehman.cuny.edu.

- July 24-30, 2005
Beijing, China
22nd International Congress of History of Science
For information, go to <http://2005bj.ihns.ac.cn> or contact Dun Liu (dliu@ihns.ac.cn).

Memorial notes.

- Frederic Lawrence Holmes (1932-2003)
Larry Holmes was Avalon Professor of the History of Medicine at Yale, Chair of the Section of the History of Medicine (1977-2002), and HSS President from 1981 to 1983. He was a guiding force in his field, winner of numerous awards, and author of several major studies on the history of life sciences. Contributions can be made to the Beaumont Medical Club, for the Frederic Holmes Lectureship Fund; go to <http://info.med.yale.edu/histmed>.

- I. Bernard Cohen (1914-2003)
Bernard Cohen was a founding figure of academic history of science. Professor Emeritus of History of Science at Harvard, where he taught for 55 years, Cohen was best known for his work on Sir Isaac Newton. On Cohen and his career, see <http://www.news.harvard.edu/gazette/daily/0306/20-cohen.html>.

- Susan Abrams (1945-2003)
Susan Abrams was science editor at University of Chicago Press from 1979 until her death. She established a very large and distinguished list of books in history and philosophy of science. In her honor, the Press has created the annual Susan Abrams Prize for the best HPS manuscript submitted to the Press. For an obituary, see <http://suntimes.com/output/obituaries/cst-nws-xabrams03.html>.

- George Henrik von Wright (1916-2003)
Wright was former Professor of Philosophy at Cambridge University and the University of Helsinki, and a major figure in 20th c. philosophy of science and logic. For an obituary, see <http://www.opinion.telegraph.co.uk/news/main.jhtml?xml=/news/2003/06/23/db2301.xml&sSheet=/opinion/2003/06/23/ixopright.html>.

- Annie Kuipers (1938-2003)
Kuipers was Publishing Editor at Reidel and Kluwer, and made a tremendous contribution to STS fields with her efforts in this role.

Archives and Catalogues

- Researchers interested in the work of Wilfrid Sellars can find a comprehensive catalog of work by and about Sellars, and a wealth of other information, at <http://www.ditext.com/sellars/>.

- Those interested in Moritz Schlick can find references to research sources and recent literature at the Schlick Edition Project at Vienna Circle Institute at <http://www.univie.ac.at/ivc/Schlick-Projekt/>.

- The University of Pittsburgh Library System has acquired the personal and professional papers of Richard C. Jeffrey, professor of philosophy emeritus at Princeton, who passed away on November 9, 2002. Jeffrey worked with Carnap, Gödel, and Hempel, and was best known for his work in post-Bayesian decision theory. For information, go to <http://www.library.pitt.edu/libraries/special/asp/archive.html>.

- The University of Pittsburgh Library System has acquired the professional and scholarly papers of Wesley C. Salmon (1925-2001), University Professor Emeritus of Philosophy and Professor of History and Philosophy of Science at the University of Pittsburgh. Salmon's work included research on the problems of space and time, the character of reasoning, probability and confirmation, and the problem of causality and scientific explanation. For information, go to <http://www.library.pitt.edu/libraries/special/asp/archive.html>.

Calls for Papers.

- In commemoration of the centennial of Henry Carrington Bolton's death (2003), issue Number 6 of the Bolton Society newsletter, Boltonia was devoted to Bolton. For information, go to <http://www.chemheritage.org/OthmerLibrary/boltonSociety.htm>.

- Call for Manuscripts. The Cahiers d'Histoire et de Philosophie des Sciences, launched 25 years ago, is a French-language journal specializing in the history of sciences and engineering. For information, contact Vincent Jullien (vincent.jullien@univ-brest.fr).

- Greenwood Publishing Group seeks authors for books in reference series in the history of science, medicine, and technology, including the *Greenwood Guides to Great Ideas in Science*. For information, contact Kevin J. Downing (kdowning@greenwood.com).

Electronic and other Scholarly Resources.

- Oldenburg, the German mailing list for history of science, has moved. To subscribe, send a message with the command <subscribe Oldenburg> to maiser@listserv.ngate.uni-regensburg.de. The standard language is German; messages in English are also welcome. For information, go to <http://www.dgmn.de/oldenburg/>.
- The History of Natural History mailing list has been launched. For information, go to <http://www.jiscmail.ac.uk/lists/hist-nat-hist.html>, or contact listserv@jiscmail.ac.uk.
- The Ceromaya mailing list provides news of events in history of science, technology and medicine in Spanish and Portuguese speaking countries, since 2002. To subscribe, contact ceromaya@servidor.unam.mx.
- The British Society for the History of Science website includes a news and events service archived since April 2004; go to <http://www.bshs.org.uk/news/>.
- The Chemical Heritage Foundation has a new website; go to <http://www.chemheritage.org>.
- The Theuth website has a new address: <http://name.math.univ-rennes1.fr/theuth/>.
- The University of Leeds History and Philosophy of Science Division website is now located at <http://www.hps.leeds.ac.uk>.
- Papers presented in May 2002 at the 3rd Meeting of the Asociación de Filosofía e Historia de la Ciencia del Cono Sur (AFHIC) are available at <http://ghc.ifi.unicamp.br/afhic3/>.
- T E Rihl has created a website on Greek and Roman science and technology; go to <http://www.swan.ac.uk/classics/staff/ter/grst/Home%20Page%20G&RS&T.htm>
- The British Society for the History of Science Wheeler Library Project features searchable journal article listings and listings submitted to the Mersenne list (1993-present); go to <http://www.bshs.org.uk/wheeler/journalsindex/>.
- The British Society for the History of Science List of Theses has been relaunched as a searchable online publication; go to <http://www.bshs.org.uk/theses/>.
- 19th and 20th century German scientific journals are available from the University of Göttingen; go to http://134.76.163.65/agera_docs.
- The Newton Project release of October 2003 features over 200,000 words of text and 1000 images taken from Newton's personal and theological material; go to <http://www.newtonproject.ic.ac.uk/new/new.html>.
- Resources of the Leibniz Archive are available at <http://www.nlb-hannover.de/Leibniz/Leibnizarchiv/>. The Leibniz editorial centers common website is at <http://www.leibniz-edition.de>.
- The online Euler Archive features more than 198 of Euler's original papers (including complete *Commentarii* and papers from early years in St. Petersburg); go to <http://www.eulerarchive.org>.
- Resources are available from the Albert Einstein Archives at the Hebrew University; go to <http://www.alberteinstein.info/>. For a review of the online resources go to <http://hsokult.geschichte.hu-berlin.de/rezensionen/id=11&type=rezwww>.
- The *Electronic Newsletter for the History of Astronomy* (1994-2004) is available at <http://www.astro.uni-bonn.de/~pbrosche/aa/enha/>.
- Volumes 1-2 (2003-2004) of the electronic journal *Logic and Philosophy of Science* are available at <http://www.units.it/~episteme/>.
- The electronic journal *Scientiae Studia* is available at www.fflch.usp.br/df/scientiaestudia. Other Portu-

Jobs, Fellowships, and other Opportunities.

- *Philosophisches Seminar Universität Tübingen History and Philosophy of Science Research Position* HPS PhD for interdisciplinary research project on "The History of the Philosophy of Science from 1860 to 1930: A Comparison of France and Germany". This full-time position involves collaborative research, for a four year project (application for two years, renewable); the deadline for application is July 10, 2004. For information, contact Prof. Dr. M. Heidelberger (michael.heidelberger@uni-tuebingen.de).
- *International Union of the History and Philosophy of Science, Division of History of Science Prize for Young Scholars* The IUHPS/DHS invites submissions for the first Prize for Young Scholars, to be presented in 2005. Applicants must have a doctorate in history of science, awarded in or after July 2001. Deadline: August 31, 2004. For information, contact Prof. Dr. E. Ihsanoglu (President's Office) at irica@superonline.com.
- *Max Planck Institute for the History of Science, Berlin PhD Research Fellow* Two years, with the possibility of renewal, beginning October 1, 2004; the deadline for application is July 15, 2004. For information, contact Prof. Hans-Joerg Rheinberger Max Planck Institute (radeck@mpiwg-berlin.mpg.de).
- *Swiss National Science Foundation 2 PhD positions in philosophy of science and science studies* Research project on quality assessment and expertise in scientific research. The project begins October, 2004. For information, contact weber@ww.uni-hannover.de.
- *British Society for the Philosophy of Science Doctoral Scholarship in Philosophy of Science* For doctoral work in philosophy of science in a UK university. Closing date for applications is August 2004. For information, contact Dr. James Ladyman (james.ladyman@bristol.ac.uk).
- guese language history of science resources can be found at http://www.scielo.br/scielo.php?script=sci_serial&lng=pt&pid=0104-5970&nrm=iso.
- News of the European Science Foundation (ESF) program *From Natural Philosophy to Science* is available at <http://www.phil.kun.nl/center/esf/news.htm>.
- The ESF Network for Philosophical and Foundational Problems of Modern Physics website is at <http://www.philphys.nl>.
- *Elektronische Mitteilungen zur Astronomiegeschichte* Number 71 (May, 2004) is available at <http://www.astrohist.org/aa/ema/>.
- The newsletter of the African Mathematical Union Commission on the History of Mathematics (AMUCHMA) is available at http://www.math.buffalo.edu/mad/AMU/amuchma_online.html.
- Volumes 1-5 of Christopher Clavius' *Opera Mathematica*, have been digitized by the University of Notre Dame; for information, contact ladwig.1@nd.edu.
- Digitized original works in mathematics from the 16th-18th century are available for purchase from the Università di Firenze; the table of contents is available at http://www.math.unifi.it/archimede/archimede_inglese/CD_rom/elenco_CD.html.
- Oxford Scholarship Online features over 700 electronic texts from Oxford University Press, including works in philosophy (by subscription); go to <http://www.oxfordscholarship.com>.

Books, Publication Series, and Journals.

- William Herschel, The Scientific Papers of Sir William Herschel. Bristol, UK: Thoemmes Press, 2003. For information, go to <http://www.thoemmes.com/science/herschel.htm>.
- Gottfried Wilhelm Leibniz, Mathematischer, naturwissenschaftlicher und technischer Briefwechsel, 1691-1693. Sämtliche Schriften und Briefe - III. Reihe Band 5. Berlin: Akademie-Verlag. For information, go to <http://www.akademie-verlag.de>.
- Gottfried Wilhelm Leibniz, Mathematische Schriften 1672-1676. Differenzen, Folgen, Reihen. Sämtliche Schriften und Briefe - VII. Reihe Band 3. Berlin: Akademie-Verlag; for information, go to <http://www.akademie-verlag.de>.
- Thomas Bonk (ed.), Language, Truth and Knowledge: Contributions to the Philosophy of Rudolf Carnap. Vienna Circle Institute Library 2. Dordrecht: Kluwer, 2003. For information, go to <http://www.wkap.nl/prod/b/1-4020-1206-3>.
- Adrian Brock, Johann Louw and Willem van Hoorn (eds.), Rediscovering the History of Psychology: Essays Inspired by the Work of Kurt Danziger. Dordrecht: Kluwer, 2003. For information, go to <http://www.wkap.nl/prod/b/0-306-47906-0>.
- Erik Banks, Ernst Mach's World Elements: A Study in Natural Philosophy. Western Ontario Studies in Philosophy of Science 68. Dordrecht: Kluwer, 2003. For information, go to <http://www.wkap.nl/prod/b/1-4020-1662-X>.
- Thomas E. Uebel and Robert S. Cohen (eds.), Otto Neurath: Economic Writings, Selections 1904-1945. Vienna Circle Collection 23. Dordrecht: Kluwer, 2004. For information, go to <http://www.wkap.nl/prod/b/1-4020-2273-5>.
- James E. Force and Sarah Hutton (eds.) Newton and Newtonianism: New Studies. Archives Internationales d'Histoire des Idées/ International Archives of the History of Ideas 188. Dordrecht: Kluwer, 2004. For information, go to <http://www.wkap.nl/prod/b/1-4020-1969-6>.
- Michel Serfati (ed.), De La Methode. Presses Universitaires Franc-Comtoises, 2003. For information, go to <http://pufc.univ-fcomte.fr>.
- Laurence Viennot and Claude Debru (ed.s), Enquête sur le concept de causalité. Paris: Presses Universitaires de France, 2003. For information, go to <http://www.puf.com/livres/22419828a.html>.
- Jean-Jacques Szczeciniarz, La Terre immobile: Aristote, Ptolémée, Husserl. Paris: Presses Universitaires de France, 2003. For information, go to <http://www.puf.com/livres/22419450a.html>.
- Juan José Saldaña (ed.), Science and Cultural Diversity, Proceedings of the XXIst International Congress of History of Science, Volume I. Mexico City: Sociedad Mexicana de Historia de la Ciencia y la Tecnología-UNAM, 2003. For information, go to http://www.smhct.org/Noticias/noticia_del_1er_volumen_ingles.htm.
- Annette Chomard-Lexa, Lucien Cuénot: L'intuition naturaliste. Paris: L'Harmattan, 2004. For information, go to <http://www.editions-harmattan.fr>.
- Jean-Claude DuPont and Stéphane Schmitt (eds.), Du feuillet au gène. Une histoire des concepts de l'embryologie moderne (fin XVIIIe / XXe siècle). Paris: Éditions Rue d'Ulm, 2004. For information, go to <http://www.pressens.fr>.
- Frank Pierobon, Kant et les Mathématiques. La conception kantienne des mathématiques. Collection Bibliothèque d'Histoire de la Philosophie. Paris: J. Vrin, 2003. For information, go to <http://www.vrin.com>.
- Jacqueline Boniface, Hilbert et la Notion d'Existence en Mathématiques. Paris: J. Vrin, 2003. For information, go to <http://www.vrin.com>.
- Natacha Fabbri, Cosmologia e Armonia in Kepler e Mersenne: Contrappunto a due voci sul tema dell' «Harmonice mundi». Leo S. Olschki, 2003. For information, go to <http://www.olschki.it>.
- Aestimatio: Critical Reviews in the History of Science is a new publication available from the Institute for Research in Classical Philosophy and Science (Princeton, NJ); for information, go to <http://www.ircps.org/publications/aestimatio/rpublished.htm>.
- Frenia. Revista de Historia de la Psiquiatría 3 (2) is available; for information, go to <http://www.frenia-historiapsiquiatria.com>.
- Revue d'Histoire des Mathématiques 2 (8) is available. For information, go to <http://smf.emath.fr/Publications/RevueHistoireMath/>.
- Perspectives on Science 11 (1), "Contexts of Philosophy of Science" and 11 (4), "Early Modern Philosophy and Biological Thought" (papers from HOPOS 2002) are available; go to <http://mitpress.mit.edu>.
- Scientiae Studia - Estudos de filosofia e história da ciência 3 is available; for information, go to <http://www.discurso.com.br>.
- Social Science Information/ Information sur les Sciences Sociales 42 (4), "Epistemology of Measurement in the Social Sciences" is available; for information, go to <http://www.sagepub.co.uk/journalIssue.aspx?pid=105779&jiid=516140>.
- Social Epistemology 17 (2-3), on Steve Fuller's 2000 book on Thomas Kuhn is available; for information, go to <http://taylorandfrancis.metapress.com>.
- The Bertrand Russell Society Quarterly 120 (Winter 2003) is available; for a complementary copy, contact Rosalind Carey (rcarey@lehman.cuny.edu) or John Ongley (j.ongley@northwestern.edu).
- Noesis 5, "Formes et crises de la rationalité au XXe siècle", tome 2, "Epistémologie", is available; for information go to <http://www.vrin.com>.
- Revue d'Histoire des Sciences 56 (1), "Expérience et raison, la science chez Huygens (1629-1695)", is available; for information go to <http://www.puf.com/revue.php?revue=TX>.
- Cahiers du Centre d'histoire des sciences et des philologies arabes et médiévales 4 is available; for information, go to <http://chspam.vjf.cnrs.fr>.
- Redes 9 (18) (2002) features a Spanish translation of Hans Hahn, Otto Neurath, and Rudolf Carnap (1929), "Wissenschaftliche Weltauffassung: Der Wiener Kriech"; and Redes 10 (19) (2002) features a Spanish translation of Otto Neurath (1935), "Pseudorationalismus der Falsifikation"; for information, contact Pablo Lorenzano (pablol@unq.edu.ar).
- Annals of the New York Academy of Sciences 988, "Chemical Explanation" is available; for information, go to <http://www.nyas.org/annals/detail.asp?strvolume=988>.

Book Reviews

From physics to philosophy.

Jeremy Butterfield and Constantine Pagonis (eds.). xv + 235 pp. Cambridge, UK: Cambridge University Press, 2000. £40 / \$54.95

This collection of essays in philosophy of physics—of quantum theory in particular—represents a set of papers given at a conference in honor of Michael Redhead and held at Cambridge University in June 1997. Redhead is best known for his *Incompleteness, Nonlocality and Realism* (1987) and *From Physics to Metaphysics*, in which he argues for a symbiotic relationship between physics and metaphysics. The present volume includes a bibliography of Redhead's writings.

Most of the essays in this collection aim at a detailed presentation of one or another aspect of quantum theory, with philosophical discussion of its significance. The first several essays are technical and require some knowledge of contemporary physics; here I list only their content. Arthur Fine analyses new proofs of quantum nonlocality, of which Lucien Hardy's is taken as a typical example. Rob Clifton's essay is about the assignment of values to quantities in algebraic quantum theory. Harvey Brown investigates aspects of the Galilean and gauge covariance of non-relativistic quantum mechanics. The next two contributions are concerned with alternative versions of quantum theory introduced by de Broglie in the 1920s under the rubric of "pilot wave theory"—later developed by Bohm. Simon Saunders asks whether these theories can resolve the quantum meas-

urement problem in the relativistic domain. James Cushing and Gary Bowman write on the problem of empirically distinguishing Bohm's non-relativistic version from the orthodox Copenhagen quantum theory.

The last three essays offer broader perspectives. Gordon Belot and John Earman seek to reaffirm what they see as a 'symbiotic' relationship between physics and metaphysics. After stressing physicists' interest in the philosophy of space and time (through numerous quotes), they discuss possible interpretations, substantial or relational, of general relativity. But it appears that the debate is bound up with difficulties facing the development of a quantum theory of gravity. The authors then offer a survey of different approaches to the problem of time in quantum gravity. They conclude that as long as the way forward in quantum gravity is unclear, physicists will continue to debate metaphysical questions about the nature of space, time, and change. Here physics and metaphysics seem to form a "seamless whole".

Steven French investigates the relationship between mathematics and physics in order to capture the heuristic role of mathematics in theory construction. The issue is not the mathematical representation of physical theories and, in that sense, the inexplicable utility of mathe-

matics in science as the indispensable language in which theories are expressed. Taking for granted that physical theories are represented as mathematical structures, what French tries to describe is the way in which progress in science can be made *via* the embedding of a theory—that is already mathematized—into a new and larger mathematical structure. French uses a model-theoretic framework with a sort of hierarchy of models. This approach sheds light on a review of Wigner and Weyl's work on group theory in quantum physics, and can be linked with so-called "structural realism".

In the last essay, Abner Shimony assesses the conjecture that the fundamental laws of physics are products of evolution. The conjecture is not about the human knowledge of the laws of physics but about these laws themselves, as matters of fact concerning

nature. This view implies a kind of 'evolution' of nature. Shimony gives a survey of four cosmologies which seem to adopt such a position—those of Peirce, Whitehead, Smolin, and Wheeler—and offers a notable skepticism about the prospects of each.

This collection gives accurate and precise perspectives on various technical problems or puzzles of contemporary quantum theory, yet lacks a substantial introduction that might present such technicalities more informally, starting from common knowledge of quantum theory. Such an introduction might have made the book more accessible.

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Encyclopaedic Visions: Scientific Dictionaries and Enlightenment Culture Richard Yeo. 335 pp. Cambridge: Cambridge University Press, 2001. £45 / \$65.

One of my most prized possessions is a set of the ninth and tenth editions of the *Encyclopaedia Britannica* that I purchased many years ago in a second hand bookshop in Beverley. Although these thirty-five weighty volumes fill half a bookcase, they provide wonderful rich snapshots of the state of knowledge in the period 1875-89 (for the ninth edition) and the year 1902 (for the tenth). Moreover, the

quality of the articles is generally superb, many of them having been written by experts in their fields, such as T. H. Huxley and James Clerk Maxwell. As an historian I frequently consult the *Britannica* if I want to bone up on late Victorian views on any scientific subject ranging from acoustics to zoology. These volumes are also very helpful in providing information about

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Review of Yeo

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how the Victorians perceived the social and political history of far-off places. More frivolously, the map of railway lines—most of which have long disappeared—enables me to fantasize about how I might have crossed the length and breadth of Britain by train.

In his prefatory note to the first volume, the editor of the ninth edition identified “the rapid progress of science during the last quarter of a century” as the main reason why a new edition was required. Moreover, science had changed “as much in substance as in form”, requiring not only the entries to be updated but also new patterns of arrangement to be deployed. His assessment of the primary problems facing encyclopedias provides the main focus of Richard Yeo’s fascinating study. While acknowledging earlier attempts to encompass knowledge, Yeo concentrates on the development of encyclopedias from the dictionaries of science of the early eighteenth century through to Macvey Napier’s wonderfully detailed and sophisticated *Supplement to the fourth, fifth, and sixth editions of the Encyclopaedia Britannica* published in 1815-24. It is important to note, in line with above comments of the editor of the *Britannica*, that the growth of scientific knowledge was often the main engine driving the production of encyclopedias.

The organization of knowledge is one of Yeo’s pri-

mary themes. He shows that editors and proprietors were divided over whether subjects should be arranged alphabetically or according to some *a priori* plan. Many early works, such as Chambers’ *Cyclopaedia* (1728) proposed a map of knowledge that encompassed all topics within a pre-arranged taxonomy. Trees of knowledge were also popular.

However aesthetically pleasing these may have been, the pressure on these all-encompassing taxonomies resulted in their abandonment in favor of an alphabetical arrangement. Despite alphabetical arrangements introducing a high degree of arbitrariness, since any entry is unlikely to share much with the content of its immediate neighbors, they were well suited to those readers who wanted to gain a quick introduction to any subject. Yet, such an arrangement had the disadvantage that closely-related topics would be spread thinly across many volumes. Principally under Napier the *Britannica* sought an agreeable compromise, combining shorter alphabetical entries with lengthy dissertations. Ironically, such dissertations were often published as separate books, thus undermining their role within an all-encompassing encyclopedia.

Another issue of importance is the role of the expert.

Many eighteenth-century encyclopedias made extensive use of hack writers who compiled entries by the time-honored and relatively cheap scissors-and-paste

method. The *Britannica* was again innovative in recruiting well-qualified experts and in paying them well. For example, Napier’s correspondence shows his concern to obtain contributors who would write high-quality articles and dissertations. The quality of the product was a major selling point and he could trumpet in advertisements his team of celebrated contributors.

By adopting a thematic approach to his vast subject Yeo is able to cover a wide range of topics. Thus, for example, he assesses the place of encyclopedias in the debates over copyright in which editors were placed in an ambivalent situation, both seeking a degree of protection for authors and wanting to ensure the wide circulation of knowledge to the public. Again—and perhaps not quite so convincingly—Yeo draws the connection between the privately-maintained commonplace books of the eighteenth century and the format of such encyclopedias as Chambers’ *Cyclopaedia*. Although he offers some useful insights into the different constituencies in-

involved in encyclopedia production he might have drawn more heavily on recent work on the ‘history of the book’ and especially the economics of publishing these necessarily weighty multi-volume tomes. How did the production of encyclopedias compare with other aspects of the market for books? How strong was the competition between encyclopedias and periodicals (which had the advantage of bringing innovations quickly to the reader’s attention)? We also know all too little about who purchased these early encyclopedias, who read them, and how they were read.

Yeo has opened up a wonderfully rich subject and explored many of its themes and byways with his usual clarity and insight. Having read this attractively produced book I shall all the more appreciate those volumes of the *Britannica* that crowd my bookshelves.

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Ptolemy’s Geography:

An Annotated Translation of the Theoretical Chapters
J. Lennart Berggren and Alexander Jones. 231 pp.
Princeton, NJ: Princeton University Press, 2001.
\$39.50

Claudius Ptolemaeus, the second century CE astronomer, mathematician, scientist, and geographer, considered the Earth to be the center of the universe. Al-

though little is known of his life—indeed, his life is so obscure that scholars do not agree on his birth and death dates (ca. CE 90-168) or name—Ptolemy is regarded

Review of Berggren and Jones

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particularly for his astronomical calculations (*He mathematike syntaxis*, divided into 13 books, and since the 9th century referred to as *Almagest*). He is also recognized for his studies of geometry (*Analemma* or *De analemmate*) in which he defined horizon, meridian, and prime vertical; a study of optics (*Optica*, five books) in which he deals with the concept of refraction; and a treatise on music (*Harmonica*, three books). However, his reputation as a geographer overshadows even these stellar accomplishments. Ptolemy's *Geographike hyphegesis* (*Guide to Geography*), divided into eight books, is the only work on cartography to have survived from the classical period. The influence of this volume lasted for more than fifteen centuries since it was the most detailed topography of Europe and Asia available to scholars and was the best reference on how to collect data and draft maps.

Ptolemy championed the use of astronomical observation and applied mathematics in determining geographical locations, and he introduced the practice of compiling the coordinates of longitude and latitude for each feature depicted on a world map so that anyone possessing only the text of *Geography* could reproduce a map, in whole or in part, in any scale desired. Book 1 contains basic principles and deals with map projections and the construction of

globes. Six subsequent books include lists of about 8,000 place names with their latitudes and longitudes. The eighth book embraces instructions for preparing maps of the world, essays on mathematical geography, and fundamental principles of cartography.

In spite of the significance of his effort, there has been no authoritative or satisfactory English translation of *Geography*. Two Canadian scholars have undertaken the task of creating an annotated translation of the chapters on theory—Books 1, 2, 7, and 8—and providing a detailed introduction, in which the background and context of Ptolemy's work is documented exquisitely. J. Lennart Berggren (Professor of Mathematics at Simon Fraser University) is also author of *Episodes in the Mathematics of Medieval Islam* (New York: Springer-Verlag, 1986) and, with Bernard Goldstein, editor of a collection of historical papers on astronomy and mathematics, *From Ancient Omens to Statistical Mechanics: Essays on the Exact Sciences Presented to Asger Aaboe* (Copenhagen: University Library, 1987). Alexander Jones (Professor of Classics and of Philosophy of Science at the University of Toronto) is the author of *Book 7 of the Collection: Pappus of Alexandria* (New York: Springer-Verlag, 1986), *An Eleventh-century Manual of Arabo-Byzantine Astronomy* (Amsterdam: J. C. Gieben, 1987), and *Astronomical*

Papyri from Oxyrhynchus (American Philosophical Society, *Memoirs* 233, 1999).



Ptolemy
c. 87-150

Berggren and Jones's 51-page introduction begins with an assessment of what Ptolemy expected his readers to know, his concept of the world, use of extant sources, his projections and coordinates list, a discussion of the manuscripts of *Geography* and their maps, a consideration of early readers and translators, and modern English-language editions. We are informed that he perceived the earth as a terrestrial sphere surrounded by a gigantic invisible celestial sphere upon which all stars were situated. Readers were to have prior knowledge, for example, about the horizon, parallels and latitude, meridians and longitude, the ecliptic, units of distance, and directions. The authors also document Ptolemy's use of astrological, mathematical, and cartographic principles, and illuminate how these formed the basis of his work and calculations.

Of special note is the dis-

cussion of Ptolemy's sources, especially Marinus of Tyre, from whom he plagiarized much of his early data and ideas about map-making. The first century CE text on overland trade routes, *Parthian Stations* by Isodoros of Charax, and the *Periplus of the Erythrean Sea*, a handbook of maritime travel including the Red Sea and Indian Ocean, are among other documents he apparently used, although Ptolemy himself never claimed that his *Geography* was original in all aspects. Ptolemy's first and second maps, the ringed globe, and regional maps are also assessed. Early readers included Pappus of Alexandria (ca. CE 300), Marcianus of Heraclea, and Jacopo d'Angelo; modern translations by Erasmus (1533) in Greek, Nobbe (1843-1845), and von Mzik's (1938) German translation are also reviewed. The New York Public Library's limited edition of 250 copies of *Claudius Ptolemy: The Geography* (1932), translated by Edward Luther Stevenson, has been reissued in an inexpensive Dover Publications paperback edition (1991), and emended with 27 maps reproduced from the Ebner Manuscript (ca. 1480). Berggren and Jones regard the Stevenson edition as "very unsatisfactory" (p. xi).

The authors then discuss their translation prior to their rendering of Book 1 (37 pp.) concerning cartographic principles; Book 2 (14 pp.), a preface to the

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Review of Berggren and Jones

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detailed guide; Book 7 (10 pp.), a summary of the “inhabited world”; and Book 8 (5 pp.) on dividing the world into regional maps. Accompanying the narrative are seven plates (six in full color) of medieval map representations based upon Ptolemy’s *Geography*. There is also an index of ancient locations and a very significant comparison of the *Geography* maps with eight modern cartographic products. Eight appendices, an 89-item bibliography, 233 explanatory footnotes, and a five-page double column conflated index of, in the main, proper nouns rather than topical entries comple-

ment the explanatory essays and translations. Among the appendices are reviews of the journeys of Septimus Flaccus and Julius Maternus to Ethiopia, Central Asian trade routes (the Syria to China “Silk Roads”), assessments of the extent of the Mediterranean (Ptolemy versus Stabo), and the maritime route to Kattigara (east India to Indonesia).

This fresh, explicit, and insightful translation with corrections of old misconceptions and current emendations will be the acknowledged standard for decades to come. The authors write successfully for a variety of readers—historians of science, ancient world special-

ists, geographers, and cartographers, among others. Additional information on Ptolemy and his cartographic work may be found in O.A.W. Dilke’s “The Culmination of Greek Cartography in Ptolemy” in *The History of Cartography*, Vol. 1, edited by J.B. Harley and David Woodward (Chicago and London: University of Chicago Press, 1987, pp. 177-199). Although Berggren and Jones do not cite this essay, it has a particularly valuable discussion of 14 Greek manuscripts of *Geography*.

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library. Harkness argues that Dee’s *Propaedeumata Aphoristica* (1558) and *Monas Hieroglyphica* (1564) attempted to solve the ancient quest for the primal language sustaining Creation, by teasing out—in the manner of cabala—a reformed universal science from the hidden astrological, alchemical, optical, mathematical, and linguistic signs in Nature. She detects from his reading both a continuing obsession with this problem and a growing dissatisfaction with the limitations of these published answers, drawn from the terrestrial and celestial worlds. Eventually he resorted to angelic spiritual insights from the supercelestial world. Employing the metaphysics and physics of light to elevate his angelically enlightened apocalyptic prophecies above ordinary divination, Dee enthusiastically undertook the role of disseminating the angelic knowledge transmitted by Kelly. This included the restored ‘true’ cabala, designed to reveal the secrets not of Scripture but of Nature. This cabala, the angels promised, would by its creative power eventually enable Dee to resolve Nature’s corruptions. Their revelations would also restore current alchemical knowledge to its original Adamic form, opening the way for the spiritual transformation and final salvation of mankind by its prophet, John Dee.

By carefully situating these ambitions within contemporary cultural practices Harkness demonstrates the analytical strengths of the doctoral research from which this book is drawn. Yet in

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John Dee’s Conversations with Angels: Cabala, Alchemy and the End of Nature.

Deborah E. Harkness. *xiii + 252 pp.* Cambridge, UK: Cambridge University Press, 2000. £50 / \$59.95

John Dee is enjoying a busy afterlife, albeit as a split personality. Deborah Harkness’ study of his angelology gives further impetus to the recent surge of scholarly interest in Dee’s thought as a window into the astounding mental landscape of the Renaissance. It skirts the excesses of the unscholarly ‘New Age’ belief in Dee as an actual magician, which has crammed the ‘do it yourself’ magic shelves of every occult bookshop, and even spawned a tedious novel and a disastrous opera. We are indebted to her for the first careful, structured analysis

of the multitudinous manuscript and printed evidence, much of it written by Dee himself, of his encounters from 1581 to 1586, and again in 1607, with angelic spirits through a series of ‘scryers’. Harkness sees these angelic ‘conversations’ as Dee’s response to contemporary apocalyptic fears about the final ‘decay of Nature’, unique not in their search for divine insights to resolve the crisis of the End, but in their extensive survival. Dee expected angelic revelation of a new cabalistic language key to decrypt the encoded Book of Nature,

thus perfecting human knowledge and miraculously reforming humanity before the imminent *parousia*.

Commendably, Harkness refuses to pursue these dramatic intentions before carefully dismantling the sources to discuss the ‘scryers’, especially Edward Kelly; the places and paraphernalia required; the particular angels involved; and the politicians who occasionally participated. She situates all this not only within general medieval and contemporary magical beliefs, but also within the particular context of Dee’s developing thought, reconstructed from his published writings and the traces of his annotating reading in the books of angel magic extant from his enormous

Review of Harkness

(Continued from page 9) dealing with a protean thinker like Dee, analysis can become over-schematic, imposing upon the evidence a shape and coherence it actually lacks. This explains the three problems with this otherwise well-researched book—its misconception of the place of angel magic in Dee's thought and career, its isolation of the angel conversations from the contemporary political context, and most seriously its confusion of Dee's thought with that of Edward Kelly. Harkness follows the extant manuscripts in dating the conversations from 1581 to 1586 and again in 1607, and this supports her argument that Dee turned to the angels as a last resort, in despair at the limitations of his earlier insights into true knowledge. However, Harkness herself discusses Dee's belief in 'guardian tutelary angels', perhaps dating from the early 1550s (113-4), and analyses his acquisition by 1557 of several key texts on angelology (104-5). More importantly, she overlooks the clear evidence of Dee's practicing angelic magic in 1555, to which these books may be linked, although she allows that he began to contact angels around 1569 (133), to which he alludes in his *Mathematical Preface* of 1570 (96). This long experience may explain why, contrary to Harkness' depiction of an angel magic devoid of invocations and compulsions (123-4), Dee assumed in the first 'scrying' with Kelly that he could ceremonially command angelic attendance, not supplicate them with

prayers, as Kelly for obvious reasons insisted. The argument that Dee pursued angelic magic *in parallel* with his work on the *Propaedeutica* and *Monas*, rather than later turned to it as an alternative, better fits the continuity of interests she detects between the earlier works and the angel conversations. Further, if Dee abandoned his claims to be the 'singular hero' of natural philosophy for his discoveries in the *Monas* (142), why did he republish it in 1591 to re-establish his reputation?



John Dee
1527-1608

Also sacrificed in the pursuit of clarity is an analysis of the contingent political context that saturates the angelic 'revelations'. Dee pursued the angels not just to remedy the decayed world but also to restore his decayed Court career, enquiring about political decisions and the prospects of future advancement. More generally, the apocalypse bore directly on contemporary political anxieties, dimly seen through the individuals and political problems mentioned in Dee's questions and Kelly's an-

swers. At the highest level of instruction, the 'claves' or 'calls' to reform the Book of Nature are also to reform a political system in conflicted disarray. Yet we are given no sense of the connections between terrestrial and supercelestial politics, and how very often the former set the agenda for the latter.

This preference for schematic clarity over contingent contextuality becomes a more serious problem when Harkness presents the angelic revelations as autonomous utterances. This enables her more convincingly to depict the development of Dee's angel beliefs. However, the proper context for much of the text of the angel conversations is not Dee's thought, but Edward Kelly's. Dee wrote down the revelations that Kelly dictated, and although we can reconstruct something of Dee's thinking from his side of the 'conversations', and from his later annotations on fair copies, reconstructing Kelly's

thought is a much more difficult process. Yet Kelly performed an astonishingly clever confidence trick over a number of years, using his grasp of Dee's thinking and careful reading in his library to manipulate him through a labyrinthine reforming natural philosophy that still fascinates the unwary. Moreover, Kelly's political cunning exceeded Dee's, and explains both the political preoccupations of the angelic conversations and why Kelly rather than Dee prospered at the court of Rudolph II. The angels revealed not the answers to Dee's previously unanswered questions, but what Kelly, and perhaps other more shadowy figures, wanted him to hear. We still await accurate maps of Dee's strange mental landscape.

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*Natural Laws in Scientific Practice.*

Marc Lange. 348 pp. Oxford, UK: Oxford University Press, 2000. £45 / \$70.

The concept of natural law is a prominent topic in the history of science, philosophy, and philosophy of science. According to many scientists and philosophers of science, historical as well as contemporary, natural laws play an important role in scientific reasoning. Many think that the trustworthiness of scientific inferences (e.g., explanations, predictions, inductions) stems from the fact

that these inferences rest on well-confirmed natural laws. According to these thinkers, our expectations about the (modelled) behavior of intended applied systems, experimental instruments, and materials are considered to be reasonable (precisely) to the extent that they are based on a correct understanding of the natural laws that somehow 'govern' these phenomena. Undoubtedly, much

Review of Lange

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scientific activity is devoted to discovering laws. But despite the seemingly crucial importance of natural laws in science, it is difficult to find a general account of what sort of things laws are that can do justice to everything we take to be true of them. Marc Lange offers such an account that brings illumination and clarification into historical as well as contemporary discussions of the issue.

The three perhaps most important and influential ways of understanding laws of nature are the reductionist or skepticist accounts well-known under the labels ‘regularity’, ‘instrumentalist’, and ‘necessitarian’. Roughly, regularity theorists (including Alfred Ayer, R. B. Braithwaite, Rudolf Carnap, Richard Feynman, Carl Hempel, David Hume, Ernest Nagel, Hans Reichenbach, Norman Swartz, and Peter Urbach) maintain that natural laws describe the way things actually behave—that such laws are nothing more than a special kind of descriptive summary of what has happened and what will happen. Instrumentalists (including Nancy Cartwright, Bas van Fraassen, and Ronald Giere) hold that natural laws are neither true nor false; they are simply tools that scientists use to summarize data and to make inferences. According to instrumentalists, neither the necessity nor the universality of natural laws is an objective feature of the world; both are human inventions that we impose on

the world for the purposes of representation and prediction. The main problem with instrumentalism is that, if natural laws are neither true nor false, then it is difficult to make sense of their being tested, confirmed, and refuted. Necessitarians (including David M. Armstrong, John Bigelow, John Carroll, Fred Dretske, Immanuel Kant, W. C. Kneale, Christopher Swoyer, Michael Tooley, and Friedel Weinert) insist that laws are more than just summaries—that they tell us not merely how things actually behave, but, more importantly, how they ‘must’ behave. For the necessitarians, both the universality and the necessity of laws are objective, real features of the world (although necessitarians disagree among themselves about the nature of that necessity).

I take it that natural laws may be characterized by the following criteria (which should be understood as constituting an incomplete and open list):

1. They are synthetic statements, and they are given the logical form of for-all-quantified (if-then-) conditionals, formally $\Lambda x (Ax \rightarrow Bx)$.
2. They can (should) be shown to be acceptable as hypothetically true, or reliable (in the sense of the inductive or abductive inference to the best explanation, which is to be ‘measured’ according to the relevant research purposes). *Prima facie* at least, it might be considered as being open to debate whether this acceptability, or reliability might be associated with strong(er)

realist intuitions (‘true’ descriptions of nature) or with more moderate interpretations like ‘applicability’, ‘usefulness’, or ‘adequacy’ under the conditions of certain approximating considerations etc. (I prefer the latter.)

3. Finally, in contradistinction with accidental generalizations, they may support counterfactual conditionals, and therefore be characterized by some sort(s) of contingent necessity, such as is ‘physical’ or ‘structural’ (as against ‘logical’), and should be defined without appeal to the notion of natural law itself.

Lange’s careful analysis of natural laws in scientific practice captures all of these criteria. In contrast with most prior approaches, Lange’s approach is neither reductionist nor skepticist, but methodologically pluralistic and pragmatic. Thus, he distinctly departs from regularity, instrumentalist, and necessitarian approaches of the received type. While developing his account he also critically discusses diverse approaches presented by such central figures in the recent history of philosophy of science as Armstrong, Dennett, Dretske, Earman, Fodor, Giere, Goodman, Hempel, Lewis, Mackie, Mill, Putnam, and van Fraassen.

By means of conceptually detailed, empirically informed, and complex analyses, Lange tries to pin down the natural laws’ distinctive roles as they show up in concrete scientific practice. And he does a very good job, such as in his analysis of how natural laws function in

connection with key issues of counterfactual conditionals, inductive projection, and scientific explanation. Among other proposals, Lange argues that we should loosen the connections between natural laws, regularities, and counterfactuals; that we should differentiate multiple grades of physical necessity as well as specific natural laws of particular scientific disciplines; that we should tie our beliefs about natural laws to certain aspects of our research purposes and scientific practices; and, above all, that the confirmation of natural laws is a reliabilist and holist matter. Along the way, he offers a number of considerations and arguments that merit further investigation. As Lange himself states at the very end of his rich and fruitful book (274-275): “...it would be nice to understand whether laws make counterfactuals correct or vice versa, or whether some other sort of fact is responsible for both of these. Such an account would presumably also shed some light on dispositions, chances, and causal relations. I have tried only to reveal some of the points at which scientific practice constrains any such account...much of the task of developing a satisfying, comprehensive account of natural law that does justice to scientific practice remains unfinished.”

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Introduzione a Il Positivismo.

Stefano Poggi. Bari: Edizioni Laterza, 1999. 3rd ed. € 9.30

In reading an introductory book on classical positivism, one expects a guide to the usual philosophers, according to the usual reference points: a survey that chooses, among various critical viewpoints, the least common denominator. On the contrary, Stefano Poggi presents here an original perspective on positivism that prompts him to offer a wide-ranging and rich set of material on the subject.

He starts from the notion of positivism described in André Lalande's *Vocabulaire technique et critique de la philosophie* (1926). This view characterizes positivism as a complex of doctrines sharing Comte's content of the term: the illuminating *leitmotiv* of the fruitfulness of the science(s)-philosophy relationship, based on a conviction that the progress of sciences and of knowledge are intrinsically linked. This definition entails these substantial claims: only experimental sciences yield certainty, only a constant linking to experience and refusal of the *a priori* are guarantees against errors, and only relations and laws can be realized by our thought.

On this basis, Poggi divides the book into three parts: 'scientific reason and the history of human spirit', 'new sciences and new *Weltanschauungen*', and 'critical analysis of scientific experience'.

In the first part we find a perspective on sciences and

scientific institutions from 1800 and 1830, followed by a presentation of the main lines of Comte's thought (the three steps of the history of humanity), a description of empiricism in England (Herschel, Whewell and Mill), and finally a description of the situation of Comte's thought (and its diffusion) and of the sciences in the 1840s.



Auguste Comte
1798-1857

In the second part, according to the scheme of describing philosophy and the sciences in parallel fashion, we find initially a description of both Comte's 'religion of humanity' and the situation of the sciences between 1840 and 1840, followed by chapters devoted to Spencer and to the decline of Comtian positivism. Further chapters center on relations between philosophy, psychology, and biology.

In the third part, Poggi presents changes over the last quarter of the 19th century in the sciences, paralleling a revival of positivism—a full chapter is devoted to Mach. He concludes by characteriz-

ing the nature and limits of positivist tradition in the 20th century.

We encounter few Italian names in this text (in its third—unchanged—edition; the first was published in 1987), which may be a surprise for a book written in Italian by an Italian author. Still, this was a specific choice by Poggi. He aimed at presenting 'only' main ideas and crucial nodes of classical positivism. As he states in the introduction, he did not intend to construct a history of the *circulation* of ideas—and generally speaking, the Italian philosophers (except for a few) received

their ideas from abroad. He considers the history of circulation of ideas irrelevant and even fruitless for such a project as this history of *philosophical* concepts (Poggi's emphasis), as it prevents revision of standard views about positivism which are erroneous and have obscured its historical value. Rediscovering this value is Poggi's aim throughout this volume, which is so dense and rich with learned detail.

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The Philosophy of Robert Boyle.

Peter R. Anstey. xv + 231 pp., apps., bibl., index. London/New York: Routledge, 2000. £65 / \$114.95

Robert Boyle has recently been popular among historians of science, but his place in the history of philosophy has received less attention. Historians such as Michael Hunter, Steven Shapin, and Lawrence Principe have vastly increased our knowledge of Boyle's institutional context, his social interactions, and his chemical and alchemical practice, though general consensus has held that his philosophical and theological writings are too eclectic and diverse to constitute a comprehensive system of natural philosophy. Peter Anstey's recent book *The Philosophy of Robert Boyle*, however, offers a new perspective on Boyle, which challenges this consensus and claims to be the first "entirely given over" to a consideration of his philoso-

phy. By approaching Boyle as a philosopher, Anstey carves out new space in an increasingly crowded constellation of recent Boyle studies, and his synthesis of the scientific and philosophical themes in Boyle's work should be relevant to HOPOI interested in the early modern period.

Anstey presents himself with an immediate hurdle by claiming to present Boyle's philosophy systematically: Boyle is well-known to have been suspicious of system-builders (he criticized Descartes on these grounds) and he was famously neutral about a number of central metaphysical and ontological questions (such as the existence of void and the nature of atoms). Indeed, this 'diffidence' towards broad

Review of *Anstey*

(Continued from page 12) philosophical problems has been much commented on in recent scholarship.¹ To Anstey's credit, he acknowledges Boyle's own reluctance to make broad metaphysical and ontological claims, and he presents Boyle's eclecticism as a positive feature of his 'systematic' philosophy: "Boyle's contribution as a natural philosopher is characterised both by system and by diversity; by an all-encompassing hypothesis in theory and by a high degree of specialisation over a range of subjects in practice." In this way, Anstey argues, despite "a trend away from systematisation," Boyle's writings nonetheless reveal "yet another 'intellectual system of the universe'" (6).

Anstey's goal of a systematic presentation of Boyle's philosophy meets with mixed success, but the book generates a number of insights that will be welcomed by anyone familiar with Boyle or with the mechanical philosophy. Anstey's close readings of key passages are often illuminating, and his extensive knowledge of Boyle's oeuvre is impressively demonstrated throughout the book. More casual readers, however, or those with interests more squarely in history than philosophy, may be somewhat disappointed. Despite its general-sounding title, this book is not a comprehensive overview of Boyle's thought; rather, it is a selective examination of a set of important and interrelated topics—qualities, sensation, perception, natural law—that allow

Anstey to position Boyle in relation to immediate and near-contemporaries like Gassendi, Descartes, and Locke. This emphasis will be of great interest to specialists in the history of early modern philosophy, but may discourage those interested in learning more about Boyle's scientific epistemology (which the author explicitly avoids). This selective treatment of topics also often prevents deeper examination of historical context due to the relatively short length of the monograph. The author is quite honest about these potential shortcomings, and indeed makes an explicit defense of what some might consider an anachronistic historical strategy: in cases where Boyle is unclear or contradictory, Anstey acknowledges his willingness to draw out Boyle's "latent ideas," which "enables us to understand in a deeper way the concerns of the thinker involved" (7). While in practice Anstey demonstrates considerable historical sensitivity, this advertisement may nonetheless make some historians uneasy.

In the first of the book's two major sections, Anstey attempts to center Boyle's philosophy on a 're-casting' of the Aristotelian scheme of qualities, arguing that "it was Boyle, above all others, who effected [the] transition from scholasticism to the new philosophy" (28). This conclusion is based on a close examination of many important texts, but much of the material covered will be familiar to those current with recent Boyle scholarship.

Anstey draws frequent, useful comparisons between Boyle and Gassendi in this section, but in a number of cases he chooses to situate Boyle's positions in relation to classical philosophy rather than raising potentially more relevant (and contemporary) influences. To take one example, Anstey notes that Boyle's notion of "primary concretions" (corpuscles that germinate 'form' in organic and chemical bodies) has its origins "in the Anaxagorean notion of seeds" (48). This may be partially true, but it ignores a significant tradition in sixteenth-century Paracelsian medical and scientific theory that may have had a more direct influence on Boyle.² In such cases Anstey appears to be deliberately simplifying historical context in order to situate Boyle within a recognizable framework of philosophical debate; unfortunately, this strategy sacrifices a more contextually nuanced appreciation of Boyle's own time.

Anstey should be credited, however, for his careful analysis of Boyle's philosophy of perception, and of the relationship between the mechanics of sensation and the ontological status of matter in Boyle's philosophy. Scholars have examined similar views in the works of many of Boyle's contemporaries (including those of Descartes, Hobbes, and Locke), and Anstey does an admirable job of inserting Boyle's philosophy into this tradition. Anstey's consideration of basic ontological categories in Boyle's philosophy leads him into the second section of the book, which attempts to present the disparate strands of Boyle's

thought as a coherent mechanical system. Here Anstey focuses on Boyle's account of the relationship between natural law and the principles of mechanics, which involves an examination of Boyle's scientific and theological beliefs. Anstey's central argument is that Boyle proposes "a unique account of the relation of God to the created order," which "involves a peculiar conception of laws of nature... that is particularly sensitive to the theological problems that beset the mechanical philosophy" (115).

A central influence on Boyle's understanding of natural law was his voluntarism—an implicit theme in his theological writings—which stresses God's "important and ongoing role in upholding the laws of motion" (154). This, Anstey shows, has important implications for Boyle's account of mechanical causality. Unlike many of his contemporaries, Boyle avoids both occasionalism and deism: inanimate matter cannot properly be said to 'obey' laws, but neither is it devoid of causal efficacy, having limited power to transmit, preserve, and change motion through collision. God is ultimately responsible for "determin[ing] the path or tracks that mobile corpuscles are to follow" (165), and divine active intervention to some extent determines how matter interacts. For Boyle, such direction from God produces 'laws' of nature, but Anstey notes that in this formulation 'laws' are not equivalent to the causal 'natures' of matter itself (that is, the properties of collision). Nor do laws produce

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the causal properties of matter. Law and cause are instead independent in Boyle's mechanical system, which Anstey characterizes as neither dynamic per Newton nor materialist per Hobbes, but rather a "theologico-physical" mechanism unique in that period.

Overall, Anstey's treatment of the prominent theological concerns in Boyle's mechanics is persuasive and insightful, and his emphasis on Boyle's conception of natural law helps situate Boyle among other voluntarist and "physico-theological" natural philosophers. Anstey broadly concludes that historians and philosophers have had difficulty discerning a systematic mechanical theory in Boyle's writings because of misplaced modern expectations about the nature of mechanical philosophy, rather than because Boyle's own work lacked coherence. The close relationship between theology and mechanical ontology in Boyle's philosophy was a persistent and essential feature of many other mechanical systems in

Boyle's day, and attempts to separate one from the other have produced a distorted picture of what the 'mechanical philosophy' actually meant to many philosophers. Such a notion, if not entirely original, is worth repeating, and Anstey's often original application of that notion to Boyle is worth the time of scholars of early modern philosophy of science.

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Notes

1. See in particular Rose-Marie Sargent, *The Diffident Naturalist: Robert Boyle and the Philosophy of Experiment* (Chicago: University of Chicago Press, 1995).
2. See Jole Shackelford, "Seeds with a Mechanical Purpose: Severinus' *Semina* and Seventeenth-Century Matter Theory," in *Reading the Book of Nature: The Other Side of the Scientific Revolution*, ed. Allen G. Debus and Michael T. Walton (Kirksville, MO: 16th Century Journal Publishers, Inc., 1998).

epilogue follow, and a Hempel bibliography is included at the end of the volume.

The history of any field is normally understood through general interpretative categories that may reflect divisions of labor in the field, and there is always a danger that those categories are considered to represent clear-cut boundaries. Yet in the coming of age of a field, boundaries blur and a more dynamic understanding of the field's history falls in place. Such a dynamic understanding of the history of 20th century philosophy of science is reflected in the contributions to this volume. In the opening interview and in Michael Friedman's chapter ("Hempel and the Vienna Circle"), one can see that a Carnapian concern for logical reconstruction and a more naturalistic approach—including historical, sociological, and other pragmatic factors—coexisted during Hempel's academic life. Referring to his 1935 paper, "On the Logical Positivists' Theory of Truth", Hempel recalls that Schlick offered a very critical response "...because I wrote there something about the ultimate acceptability of scientific statements depending on the consensus of the scientific community, ideas which are around now again very much with Kuhn and others and which Neurath very explicitly propounded at the time" (10). The logical positivist view of science was never in a naturalistic vacuum, as these last remarks illustrate. The early tension "between a Carnapian conception and a

Neurathian conception of philosophy of science" (60), as Friedman puts it, remained dormant up until the late 1980s, when Hempel experienced a 'reawakening' (61) of his Neurathian concerns. These concerns are the subject of essays by Philip Kitcher ("Reasonable People") and Robert Nozick ("The Objectivity and the Rationality of Science").

In all the chapters, different *Hempelian* problems are explored with a view towards identifying open challenges and taking a fresh look at how the problems themselves developed. The tension announced by Friedman surfaces, in one way or another, in almost every chapter. Jaakko Hintikka examines Hempel's logicist philosophy of mathematics and vindicates it as the thesis that mathematical theorems are deduced from logical principles, distinguishing it from the thesis—not equally vindicated—of the "uninformative character of logical and mathematical truths" (72). Hintikka stresses the complexities of the notion of logical deduction: "...it is arguably true that all the theorems of the *relevant* part of mathematics are logical consequences of the appropriate definitions." (72; emphasis added) He then shows that, when it comes to logical deduction within mathematics, logical consequence becomes a much richer and complex notion—that such a "...consequence relation cannot be exhausted by any set of rules of step-by-step deduction".

In "Probable Inference ver-

(Continued on page 15)

Science, Explanation, and Rationality: *Aspects of the Philosophy of Carl G. Hempel* James Fetzer (ed.). 342 pp. Oxford, UK: Oxford University Press, 2000. £43 / \$65

This is an important volume for the history of philosophy of science in the 20th century, given Carl Hempel's involvement in many of the main problems guiding the evolution of the field. The volume opens with the edi-

tor's instructive and provocative introduction, followed by an intellectual autobiography as *Prologue*, based on a series of interviews Richard Nollan made during Hempel's time in Pittsburgh. Six parts and an

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sus Probable Conclusions”, Henry Kyburg argues that a distinction made by Hempel between uncertain inference and inference about uncertainty is still insufficiently appreciated. This distinction leads to “...two visions of scientific inference, the acceptance view and the probabilistic view.” (88) To assess how these visions fare in our current understanding of scientific inference is for Kyburg a critical issue that needs to be faced.



Carl Gustav Hempel
1905-1997

Risto Hilpinen (“Hempel and the Problem of Induction”) argues that for Hempel there was “no single problem of induction, but a host of interrelated questions about the characterization and the justification of various inductive procedures” (105), and offers an account of the structure of such procedures and their contexts of justification. The problems addressed by Kyburg and Hilpinen are related to Fetzer’s concerns in “The Paradoxes of Hempelian Explanation”, which brings Hempel’s paradoxes of confirmation to bear on problems of the covering-law model. Fetzer shows that Hempel’s

conception of explanation turns on assumptions paralleling those of the paradoxes of confirmation: degrees of nomic expectability are fundamental to both the theories of explanation and induction, and to scientific reasoning in general.

Ilkka Niiniluoto (“Hempel’s Theory of Statistical Explanation”) continues the theme of the covering-law model, reviewing its development and the rich philosophical background behind the concept of statistical explanation. In “The Symmetry Thesis”, Peter Achinstein proposes that Hempel’s view of this thesis is correct when limited to the claim that, as a condition for answering ‘Why did event X occur?’, any rationally acceptable answer must show that X was to be expected. Frederick Suppe discusses Hempel’s conception of theory structure (“Hempel and the Problem of Provisos”) and suggests that the provisos problem hinges on his allegiance to the received view of theories.

The two last sections address the explanation of behavior and rationality. Paul Humphreys offers a thorough study of the notion of scientific understanding (“Analytic versus Synthetic Understanding”), closing a journey in which inference, explanation, and rationality have been linked in a single science with a human face (to paraphrase Putnam). The end though, is only a beginning. Wesley Salmon’s paper “The Spirit of Logical Positivism: Carl

Hempel’s Role in Twentieth-Century Philosophy of Science” (which appeared originally in *Philosophy of Science* 66 (1999), 333-50) is reprinted here, inviting further thoughts on this seminal figure in the phi-

losophy of science of the last century.

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Bibliographie d’Alexandre Koyré

Jean-François Stoffel. xxiv + 195 pp. Florence: Leo S. Olschki, 2000. € 24.

Alexandre Koyré (1892-1964), best known to historians and philosophers of science for his fundamental studies on the Scientific Revolution (*Etudes galiléennes*, 1937; *From the closed world to the infinite universe*, 1957) was an extremely prolific author. In this first complete bibliography of his writings, Jean-François Stoffel has compiled 372 titles of publications that came out until Koyré’s death in 1964 (including book reviews and translations of Koyré’s books), 151 reprints and translations published from 1965 to 1998, and 207 books and articles about Koyré’s life and work, including 18 obituaries. The book is enhanced by an index of names and titles of journals where Koyré published.

Koyré’s work focused on three main topics: the study of religious thought (mainly the German mystics, such as Jacob Boehme), philosophy (with a special interest in Plato and Hegel), and history of science. As the most important loci of his academic career were Göttingen, Paris, and

Princeton, Koyré published in German, French, and English. His books were translated into 10 other languages, including his native Russian—which Koyré himself never used for scientific writings. The bibliography sheds new light on a rather unknown aspect of Koyré’s achievements: his extensive efforts in the twenties and thirties to bring German publications in theology, philosophy, and history of science to the knowledge of the French speaking public by publishing a large number of reviews of German books in French scholarly journals like *Revue philosophique de la France et de l’étranger*, *Revue de l’histoire des religions*, and *Revue d’histoire de la philosophie*.

All historians and philosophers of science will welcome this valuable guide to the richness of thought of an extraordinary scholar in this field.

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HOPOS 2004 Meeting in San Francisco

and the Museum of Craft and Folk Art (<http://www.mocfa.org>). A special exhibition Art Deco, 1910-1939 is currently running at the Legion of Honor, a three-quarter-scale adaptation of the 18th-century Palais de la Légion d'Honneur in Paris, built to commemorate Californian soldiers who died in World War I. Overlooking the Pacific Ocean, Golden Gate Bridge and all of San Francisco, the Legion is noted for its breathtaking setting and its excellent collections (<http://www.famsf.org/legion>).

Berkeley has the best selection of bookstores, anchored by Moe's Books (<http://www.moesbooks.com>), once rated the best used bookstore in the world by scholars in a global email discussion. With Shakespeare & Co. across the street (http://www.shopinberkeley.com/s/shakespeare_books) and the Cartesian Bookstore (<http://www.shopinberkeley.com/c/cartesian>) around the corner to add to the used book shopping and Cody's (new books) down the block on Telegraph Avenue (<http://www.codysbooks.com>) one trip can

result in extra baggage charges on the way home. Another excellent and interesting store for new books in Berkeley is University Press Books which carries, as the name implies, only University Press Books (<http://universitypressbooks.com>). Black Oak (<http://www.blackoakbooks.com>), with stores in North Berkeley and in San Francisco also carries mostly scholarly books. An excellent new and used bookstore in San Francisco with academic content is Green Apple Books on Clement Street (<http://www.greenapplebooks.com>). Since this store is in the middle of an excellent restaurant row, it is easy to stop by while sampling the wonderful San Francisco cuisine. For the real flavor and history of the city, go to City Lights Bookstore in North Beach, a literary landmark of the Beat Poets, independent publishing, and anti-authoritarian politics (<http://www.citylights.com>). In nearby Marin County (Novato), you can visit (by appointment only) Jeremy Norman & Co, Books, specialists in antiquarian books in history of science and related fields (800-544-

9359, <http://www.historyofscience.com>). (For a comprehensive listing of bookstores in the area, see <http://www.geocities.com/Athens/4824/na-bay.htm>).

Other possibilities include hiking trails and well as spectacular views in the Golden Gate National Recreation Area (<http://www.nps.gov/goga>), sporting events (HOPOS 2004 occurs during baseball season: <http://giants.mlb.com>), and walking tours (<http://www.sfvisitor.org/visitoinfo/html/walkpdfs.html>).

A helpful review of new and upcoming events in San Francisco, as well as guides to restaurants and nightlife, can be found by visiting the website of the San Francisco Gate newspaper (<http://www.sfgate.com>). Other restaurant guides are available at <http://www.sanfrancisco.com/dining> and <http://sanfrancisco.citysearch.com/section/restaurants>. A list of restaurants close to the conference site will be provided at the conference in the program. When making plans, remember that the HOPOS Congress is being held at the University of San Francisco, located in the

heart of downtown (http://www.usfca.edu/online/gen_info/map_sf.html).

Travel throughout the Bay area is facilitated by the BART subway and train network (<http://www.bart.gov>), making it easy to get to nearby communities such as Berkeley (<http://www.berkeleycvb.com>). Only an hour away, the Napa Valley produces some of the finest wines in the US (<http://www.napavalley.com>).

We hope you get the chance to explore the city and the surrounding natural environment. Further information about restaurants, museums, bookstores, hiking trails, etc. will be posted on the conference website.

David Stump
University of San Francisco
Chair, HOPOS 2004
Local Organizing Committee



About HOPOS

HOPOS, The International Society for the History of Philosophy of Science, gathers scholars who share an interest in promoting research on the history of the philosophy of science and related topics in the history of the natural and social sciences, logic, philosophy, and mathematics. We interpret this statement of shared interest broadly, to include all historical periods and diverse methodologies. We aim to promote historical work in a variety of ways, including sponsorship of meetings and conference sessions, publication of books and special issues of journals, dissemination of information about libraries, archives and collections, and preparation of bibliographies and research guides.

The HOPOS electronic mailing list is a genial virtual medium for the exchange of news, ideas, and queries regarding the history of the philosophy of science. For information on HOPOS and the HOPOS listserv, go to <http://scistud.umkc.edu/hopos>. Archives of the listserv are available at <http://listserv.nd.edu/archives/hopos-1.html>.

Submissions to and inquiries about the Newsletter of HOPOS may be sent to the Associate Editor, Thomas Staley, at: tstaley@vt.edu.

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