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International History, Philosophy and Science Teaching Group

NEWSLETTER

September/October 2012

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ELIZABETH MARY CAVICCHI / Peter Heering and Roland Wittje (eds.) (2011), *Learning by Doing: Experiments and Instruments in the History of Science Teaching* Franz Steiner Verlag

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2. *Science & Education* Journal Report

(a) Rationale and Purpose of the Journal

All involved with *Science & Education* journal are concerned to improve school and university science education by publishing substantial research that utilises historical, philosophical and sociological scholarship.

The journal promotes the engagement of these fields with theoretical, curricular and pedagogical issues in science education. It has a particular interest in bringing these fields of knowledge into teacher-education programmes. The journal welcomes contributions that examine and extend the liberal or humanistic tradition of science teaching. It welcomes serious cross-disciplinary approaches to theoretical, curricular and pedagogical issues. It seeks to promote discussion of the philosophy and purposes of science education, and its contribution to the intellectual and ethical development of individuals and cultures. In this latter endeavour it recognises that many of the major decisions facing science teachers, curriculum writers and administrators have their roots and solutions in fundamental philosophy of education.

(b) Journal on the Web

The journal *Science & Education* is now available on the web at: http://www.springerlink.com then PUBLICATIONS, then S, then 'Science & Education'), or more directly at the journal's home page: www.springer.com/journal/11191. The home page has provision for signing up for 'Table of Contents Alert', which means each time an issue of the journal is published, the Contents are contents are conveyed by email.

The articles can be accessed directly at:
http://springerlink.metapress.com/content/1573-1901

All articles can be downloaded as pdf files for free if the individual's institution subscribes to the relevant Springer journal package; otherwise they can be downloaded for a fee.

Alternatively subscription renewals for printed journals and new subscriptions (USD100 pa, with discount for students, retired faculty and scholars from depressed economies), can be effected at the IHPST web site: www.ihpst.net

The Springer site is now linked to Google, and articles can be searched in Google by typing in author name and first words of title. This goes direct to the Springer site and the pdf file of the article.

Approximately 3,000 institutions around the world have subscribed to the on-line version of the journal, while many institutions have subscriptions to both print and on-line versions.

The web site provides many services to researchers:

The 'On Line First' section allows access to all accepted, forthcoming articles in the journal. As soon as an article is accepted for publication, a typeset pdf version of it is posted on the web and can be accessed by individual journal subscribers or by individuals whose institutions subscribe to a Springer package that includes *'Science & Education'*.
The Contents of each issue of the journal, back to Volume 1 Number 1 in 1992, are available. These can be downloaded by subscribers and individuals whose institutions subscribe to the journal. They are also available, at a cost, to non-subscribers.

(c) Manuscript Submissions

Scholars can submit manuscripts in file form direct to the journal at: www.editorialmanager.com/sced

Thereafter they can check on its progress through the review process. Most submissions are reviewed by three senior scholars, usually involving a spread of educator, historian, philosopher or cognitive scientist. The submission site also has a guide to the journal's format and style conventions.

In 2011 manuscripts were submitted by authors from 41 countries.

(d) Copyediting Assistance Required for Manuscripts from Non-English Authors

The journal publishes many works by scholars whose native language is not English. Copyediting of these papers is very time-consuming and assistance would be greatly appreciated. The papers would all be ones that have passed review and are in reasonable linguistic shape, but they do need refinement. Volunteers would be asked to copyedit no more than one paper per year. Such assistance is one tangible way of promoting good non-English background research to the international community.

If any colleagues are able to assist in this important task, please email the editor.

(e) Article Downloads

The number of article-downloads from the journal's Springer site rise year by year.

Year	2004	2005	2006	2007	2008	2009	2010	2011
Downloads	21,373	22,500	23,584	37,593	48,634	65,152	88,220	108,650

These figures are most gratifying especially for a 'niche' journal in science education. They indicate the amount of worldwide interest in the utilization of historical and philosophical studies in addressing the numerous theoretical, curricular and pedagogical problems in contemporary science and mathematics teaching.

In 2011 the geographical spread of article-downloads was:

Asia-Pacific	32%
Europe	31%
North America	27%
South America	7%
Africa	3%

The high download figures reflect the quality of manuscripts submitted to the journal, and the rigor and competence of the journal's reviewers (normally three per manuscript, often four or five).

One 'lesson' from the download figures is the need to incorporate history and philosophy of science material, if not courses, in science teacher education programmes. The download figures demonstrate a clear interest in HPS-related material by science teachers, educators, and researchers more widely, but unfortunately HPS is rarely included in either undergraduate or graduate teacher education programmes.

(f) Thematic Issues

Since its inception in 1992 the journal has regularly published thematic issues that bring together historical, philosophical and educational scholarship on particular theoretical or pedagogical themes related to History, Philosophy and Science Teaching.

These thematic issues have included:

1994, 'Science and Culture', **3**(1).
1995, 'Hermeneutics and Science Education', **4**(2).
1996, 'Religion and Science Education', **5**(2).
1997, 'Philosophy and Constructivism in Science Education', **6**(1-2).
1997 'The Nature of Science and Science Education', **6**(4).
1999, 'Values in Science and in Science Education', **8**(1).
1999, 'Galileo and Science Education', **8**(2).
1999, 'What is This Thing Called Science?', **8**(4)
1999, 'Children's Theories and Scientific Theories', **8**(5).
2000, 'Thomas Kuhn and Science Education', **9**(1-2).
2000, 'Constructivism and Science Education', **9**(6).
2003, 'History, Philosophy and the Teaching of Quantum Theory', **12**(2-3)
2004, 'Science Education and Positivism: A Re-evaluation', **13**(1-2)
2004, 'Pendulum Motion: Historical, Methodological and Pedagogical Aspects', **13**(1-2,7-8)
2006, 'Textbooks in the Scientific Periphery', **15**(7-8)
2005, 'Science Education in Early Modern Europe', **14**(3-4)
2007, 'Models in Science and in Science Education', **16**(7-8)
2008, 'Teaching and Assessing the Nature of Science', **17**(2-3)
2008, 'Studies in Historical Replication in Psychology', **17**(5)
2008, 'Social and Ethical Issues in Science Education', **17**(8-9)

2008, 'Women, Science Education, and Feminist Theory', **17**(10)
2009, 'Politics and Philosophy of Science', **18**(2)
2009, 'Constructing Scientific Understanding through Contextual Teaching', **18**(5)
2009, 'Science, Worldviews and Education', **18**(6-7)
2010, 'Darwin and Darwinism: Historical, Philosophical, Cultural and Pedagogical Studies', **19**(4-5, 6-8)
2011, 'Science and Pseudoscience in Society and School', **20**(6-7)
2012, 'The History of Experimental Science Teaching', **21**(2)
2012, 'Popular Science between News and Education: A European Perspective', **21**(3)
2012, '"Popularizing and Policing 'Darwinism' 1859-1900", **21**(7)

The Contents of all the above issues can be downloaded from the journal's Springer site: http://www.springer.com/education/science+education/journal/11191

Readers are encouraged to submit proposals for guest-editorship of Thematic or Conference Special Issues. The contents of such issues are all reviewed in the standard manner of the journal. Initial inquiries should be made direct to the journal editor at: m.matthews@unsw.edu.au .

(g) Reviewing

Informed and competent reviewing is a time-consuming and arduous task, but it is crucial to the integrity and quality of published work. Editors, authors, readers, and the scholarly enterprise more generally, benefit from this mostly anonymous and un-rewarded labour of dedicated scholars.

The journal is noteworthy for having so many competent reviewers from the disciplines of Education, Science, Mathematics, Philosophy of Science, History of Science, Sociology and Psychology. Manuscripts are usually reviewed by three scholars, and often by four, five and sometimes more established scholars from these different disciplines.

The following are comments from authors about the reviewing process:

> *I have never been provided with such a comprehensive body of criticism to any paper I have submitted to press. Furthermore I agree with most of the criticism and believe it will help me to improve on the paper. There are some issues I do not agree with, but I will argue this in detail in my response.*

> *We are thankful for the decision of sending the manuscript to eight competent reviewers. Despite the bigger amount of work, we are sure that it has greatly improved the quality of the paper. The decision demonstrates your awareness of the complexity and interdisciplinary character of our proposal. This is confirmed by noticing that the reviews address different issues, which are related to different parts of the article. It also attests your commitment to the quality of the papers published in* Science & Education.
>
> *In any case we would like to express our very many thanks to all the referees for what they have done for us. They surely helped us in a way that is quite uncommon in the scientific community. Even better, we have to state that there are no words to express our gratitude to them. We are proud to have such competent and helpful colleagues.*

> *Thank you for sending the manuscript to four senior scholars for review. ...I have never received comments and criticisms from such wide perspective. This will definitely help to improve on the overall quality of the paper.*

One reviewer has written:

I have reviewed for other journals. I certainly must say that you provide excellent support to the authors. You are providing excellent service to researchers. Reading other reviewers comments is also a great learning experience for me.

The editor of another research journal has written:

Your review process is exemplary.

A list of the 700+ reviewers who have contributed their time and expertise over the past five years to making the journal so successful can be found at:

http://ihpst.net/journal/reviewers/list-of-reviewers/

Apologies to any journal reviewer inadvertently left off this list. Please inform the editor so that the posted list can be corrected.

3. Journal Special Issue: *History and Philosophy of Mathematics in Mathematics Education*

Recent years have seen increasing interest in the role of the history and philosophy of mathematics in the teaching of mathematics at all levels. Although the history and philosophy of mathematics can be thought of as separate domains, they are closely linked to one another, as they are also to more general issues of history, philosophy, and culture.

For this reason, a focused treatment of history and philosophy of *mathematics* can also enlighten science educators as well as mathematics educators, and, indeed, it is important for those involved in science education to understand how mathematics and its history relates to the teaching of science, and conversely how the teaching and learning of mathematics engages with science.

Mathematicians, historians, philosophers and others who are doing research in the history and philosophy of mathematics and their relation to mathematics education are invited to contribute to this special issue of *Science & Education.* Both theoretical and empirical studies are welcome.

Examples of topics include:

The role of history and philosophy of mathematics in teacher training

Theoretical and/or conceptual frameworks for integrating history and/or philosophy into mathematics education.

Classroom experiments or teaching materials that implement history or philosophy of mathematics.

Use of original sources in the classroom and their impact on learning mathematics.

The historical relationship of mathematics to science and technology, and its philosophical and educational implications.

Philosophical lessons from ethnomathematics, and ways these can contribute to mathematics education.

Deadline for Submissions: December 1st 2012
Submissions to: www.editorialmanager.com/sced Choose MATHEMATICS as mss type.
Notification of intention to submit and subject matter is appreciated as it assists coordination and planning of the issue.
Guest Editors, questions and inquiries should be directed to:

Victor J. Katz **Uffe Thomas Jankvist** **Michael N. Fried** **Stuart Rowlands**

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4. Journal Special Issue: Mendel, Mendelism and Education: 150 Years Since the "*Versuche*"

A noteworthy Mendel anniversary occurs in 2015: It will be 150 years since the presentation of Mendel's famous *Versuche über Plfanzen-Hybriden* paper. Although Mendel himself did not write much, a great deal has been written about him and his impact. His 1865 paper was adopted in 1900 as the foundational document of modern Genetics. For some this was a delayed recognition of Mendel's contribution; for others it gave a rise to a myth about the rise of Genetics and more generally about science as a process.

Contributions are sought that deal with Mendel, the history of mendelism, and the incorporation of mendelian principles in genetics education Examples of topics may include (but are not limited to) the following:

- The impact of Mendel's work
- The reception of Mendelism
- Differing interpretations of Mendel
- The concept of "mendelian" inheritance
- Mendel and classical genetics
- Mendelism and genetics education
- Mendel and nature of science
- Mendelism as "field" science; Mendelism as "lab" science
- Mendelism and the unified field of "Biology"
- Mendel and contemporary genetics
- Mendelism, ideology and politics

The following scholars are contributing invited essays:

- **Garland Allen**, Washington University: *Morgan and Muller on mendelian mutation*
- **Nicholas Gillham**, Duke University: *The battle between the Biometricians and the Mendelians*
- **Charbel El-Hani**, Federal University of Bahia: *How Mendel and his story are portrayed in articles for teachers?*
- **Norman G. Lederman**, Illinois Institute of Technology: *The case of Mendel and Nature of Science*
- **Robert Olby**, University of Pittsburgh: *The place of hybrids--natural and horticultural-- in our understanding of Mendel's achievement*
- **Vítězslav Orel,** The Mendelianum, Brno
- **Staffan Müller-Wille**, University of Exeter: *Mendel's discovery in the broad historical network*
- **Margaret Peacock**, University of Alabama: *Mendel lives: The survival of mendelian genetics in the Stalinist classroom*
- **Hans-Jörg Rheinberger**, Max Planck Institute for the History of Science: *Re-discovering Mendel: the case of Carl Correns*
- **Marsha Richmond**, Wayne State University: *Women as Mendelians and geneticists*
- **Mike Smith**, Mercer University: *Mendel in the modern classroom*
- **Ida Stamhuis,** Free University, Amsterdam: *Hugo de Vries and theories of inheritance around the rediscovery of Mendel*.

Submission Date: **December 31, 2012**

Manuscripts, with Abstract, should be submitted for review directly to:
www.editorialmanager.com/sced/

Notification of intention to submit and subject matter is appreciated as it assists coordination and planning of the issue. Questions and inquiries should be directed to either of the guest editors:

Erik L. Peterson
Department of the History of Science
University of Wisconsin-Madison
USA
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Kostas Kampourakis
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email: kkamp@ath.forthnet.gr ;
kamp@geitonas-school.gr

5. First IHPST Asian Regional Conference, Seoul October 18-20, 2012

The First Asian IHPST regional conference will be held October 18-20 2012 at Seoul National University. Deadline for on-line registration is 20th September 2012

The conference should be most successful with over 100 papers having been contributed from scholars in 18 countries: Korea, Japan, Thailand, USA, Philippines, Malaysia, Canada, Australia, Israel, Iran, Singapore, Taiwan, Germany, Turkey, India, France, China and Hong Kong.

Web site: http://ihpst2012.snu.ac.kr

Registration

Registration category	Conference fee (registration fee + membership fee)
Registration	**$245**
Registration for students/teachers	**$155**
On-site registration	**$275**
On-site registration for students/teachers	**$175**

Programme

Begins Thursday October 18, 10am (registration) 11am (concurrent papers)
Ends Saturday October 20, 2pm. Details of the programme will be soon available on the conference web site above.

Accommodations in Seoul National University

IHPST conference participants are encouraged to stay at Hoam Faculty House, located in Seoul National University.
The number of rooms are limited (about 60) so it is highly recommended to make reservations as early as possible.

Hoam Faculty Housing at SNU
Location: A 15-walk from the conference venue
Tel: 82-2-871-4053 / FAX: 82-2-871-4056
Homepage: Korean http://www.hoam.ac.kr/

English http://www.hoam.ac.kr/english/

Other possible lodging options are given on the conference web site.
http://ihpst2012.snu.ac.kr/accommodation.php

Plenary Speakers

Yung Sik Kim, is Professor of History of Science in the Department of Asian History, Seoul National University. He was the founder of the History and Philosophy of Science programme at SNU and has advised nationally on HPS studies in Korean universities. He initially trained as a chemist, graduating with a PhD from Harvard University. After a period of teaching chemistry at SNU he turned to historical study and earned a second PhD in history of science from Princeton University.

He has served as the president of Korean Society of the History of Science, and as the president of International Society for the History of East Asian Science, Technology, and Medicine. He has authored numerous books and papers.

Hasok Chang is Professor of History and Philosophy of Science at Cambridge University. After completing a science degree in Korea, he received his PhD in philosophy from Stanford University. His research interests are broadly in the history and philosophy of the physical sciences (particularly physical measurements), and general philosophy of science. Currently he is engaged in a historical and philosophical study of heat and temperature, with a focus on the 18th and 19th centuries.

He is co-founder of the Society for Philosophy of Science in Practice; and Associate Editor of the *British Journal for the History of Science*.

Igal Galili is a professor in of Science Education at the Faculty of Mathematics and Natural sciences at the Hebrew University of Jerusalem. He studied physics in the former USSR and later at the Hebrew University of Jerusalem where he got his B.Sc. and M.Sc. in physics and Ph.D. in theoretical physics.

He has published research papers in various educational journals - *American Journal of Physics, International Journal of Science Education, Science Education* and *Science & Education*. And has developed a textbook in optics in broad cultural perspective that displayed the historical development of theories of light and vision from the ancient Greece to the modern physics.

Alice Siu Ling Wong received her B.Sc. degree in Physics with First Class Honours from the University of Hong Kong and received her D.Phil. degree in Physics from the University of Oxford, England in 1994. She then worked as a postdoctoral research fellow in the Clarendon Laboratory and a lecturer at Exeter College at Oxford University. She returned to Hong Kong in 1997 and taught Physics and Mathematics in the Diocesan Girls' School. She obtained the Postgraduate Certificate in Education with Distinction from the University of Hong Kong in 2001. She joined the Faculty of Education at the University of Hong Kong in 2002 and is currently an Assistant Dean and Associate Professor of the Faculty.

Her research interests include nature of science, socio-scientific issues and teacher professional development. She is the National Research Coordinator (Science component) for Hong Kong in the Trends in International Mathematics and Science Study (TIMSS). She has authored and co-authored many international journal papers and book chapters. She is a founding member and currently the Secretary of the East-Asian Association for Science Education.

Norman Lederman is professor of Mathematics and Science Education at the Illinois Institute of Technology. He has B.S. and M.S. degrees in biology and in science education from Bradley University, and a Ph.D. in science education from Syracuse University and an honorary doctorate from Stockholm University.

He is widely known for his research on students' and teachers' conceptions of nature of science and scientific inquiry. He has also published widely in the area of pedagogical content knowledge. He is Co-Editor of the *Handbook of Research on Science Education* (2007) and has published three comprehensive reviews of research on the teaching and learning of nature of science (1992, 2000, 2007).

Takehiko Hashimoto is a professor of the History of Science and Technology at the Graduate School of Arts and Sciences at the University of Tokyo University. His research interests include the history of Science and Technology. After graduating from the University of Tokyo, he took his PhD in history of science at Johns Hopkins University in 1991.

Among his books are *Historical Essays on Japanese Technology* (University of Tokyo Centre for Philosophy, 2009). He has published articles on Optics, Engineering and other subjects in *Historia Scientiarum.*

Inquiries & Further Information: Conference secretary ihpst2012@gmail.com

6. Second IHPST Latin American Regional Conference, Mendoza, 3-6 October 2012

The 2nd Latin-American Conference of the International History, Philosophy, and Science Teaching Group will be held in Mendoza Argentina from Wednesday October 3rd (noon) to Saturday October 6th (noon), 2012.

This conference should be as successful as the first regional meeting in Brazil (2010). There have been 130+ proposals submitted by 160+ authors from eight countries: Argentina, Chile, Brazil, Colombia, Mexico, Turkey, Germany and Australia.

Plenary Speakers:

Mercè Izquierdo-Aymerich graduated B.Sc. and Ph.D. in chemistry at the Universitat Autònoma de Barcelona. She is Chair and Professor of didactics of science at the Universitat Autònoma de Barcelona, Spain. Her research interests are broad: history of chemistry and its application to science education, curriculum design, teacher training, and language in the classroom. She has published many articles in journals, conferences and books. In 2007 she received the Rosa Sensat award of pedagogy for the collective work *Aprendre ciències tot aprenent a escriure ciències*.

She has co-edited the following book: *Pensar, actuar i parlar a la classe de ciències: Per un ensenyament de les ciències racional i raonable* (2004) and *Genere i Ensenyament de les Ciencies: Representacions i Propostes* (2009).

Olival Freire Jr. is a associate professor in the physics insititute of the Federal University of Bahia, Brazil. After graduating with B.Sc. in physics (UFBa, Brazil), he completed a PhD degree in history of science (USP, Brazil). He has been a Senior Fellow at the Dibner Institute for History of Science at MIT and Harvard, and a Visiting Professor at the Université de Paris VII. His research

interests are concentrated on the history of quantum physics, the history of physics in Brazil, and the use of history in science education.

He has published in journals such as *Studies in History and Philosophy of Modern Physics*, *Historical Studies in the Physical and Biological Sciences*, *Foundations of Physics*, *Historia Scientiarum and épistémologiques*, and *Science & Education*.

His Books include: *David Bohm e a controvérsia dos quanta* (1999) and *O Universo dos Quanta - Uma Breve Historia da Fisica Moderna* (1997). And has co-edited: *Teoria Quântica: Estudos Históricos e Implicações Culturais* (2010), *Filosofia, Ciência e História - Michel Paty e o Brasil, uma homenagem aos 40 anos de colaboração* (2005) and *Perspectivas em Epistemologias e Histórias das Ciências* (1997). He is editor of *History of Physics Journal,* and *Physics Teaching*.
Pablo Lorenzano graduated in Philosophy from the Universidad Nacional Autónoma de México, and graduated Ph.D. in Philosophy from the Freie Universität of Berlin. He is Chair and Professor of Philosophy at the Universidad Nacional de Quilmes (Argentina) and Researcher at the Consejo Nacional de Investigaciones Científicas y Técnicas-CONICET. He has published a book about the history and philosophy of genetics: *Geschichte und Struktur der klassischen Genetik* (1995) and a virtual textbook of general philosophy of science: *Filosofía de la Ciencia* (2004). He has co-edited the following books: *Desarrollos actuales de la metateoría estructuralista: Problemas y reconstrucciones* (2002), *Filosofía e historia de la ciencia en el Cono Sur* (2002), *Ciências da vida: estudos filosóficos e históricos* (2006), *Filosofía e Historia de la Ciencia en el Cono Sur*, Vol. II (2007), and a virtual encyclopedia volume: *History and Philosophy of Science and Technology, en Encyclopedia of Life Support Systems* (EOLSS) (2007). He has published numerous articles in anthologies and journals.

Presentations:
The official languages of the conference are Spanish, Portuguese and English.

Important Dates:

Registration deadline: 2nd September 2012
On-line publication of the programme: 16th September 2012
Conference Dates: 3rd (noon)-6th (noon) October 2012

Conference Website: http://www.um.edu.ar/IHPSTLA2012/
Contacts and Information: ihpstla2012@um.edu.ar

7. The Second Nordic HP&ST Conference, 24 -26 October 2012, Helsinki, Finland.

The Second Nordic HPST regional conference will be held 24 -26 October 2012, in Department of Physics, University of Helsinki, Finland. Select, reviewed papers from the First Nordic regional meeting, October 28-30, 2009, were published in *Science & Education* Vol.20 Nos.3-4, 2011.

The special theme of the second meeting is *Conceptual Change in Learning Science: Viewpoints from Cognition, History and Philosophy*.

Invited speakers include:

Arto Mutanen (Finland),

Ola Hallden (Sweden)
Dietmar Höttecke (Germany)
Agustin Aduriz-Bravo (Argentina)

Concurrently with Nordic regional meeting the research school of Nordic Science Education (NorsEd) will take place. There will be ample opportunity for common discussion between participants of both meetings.

For more details, contact Ismo Koponen, ismo.koponen@helsinki.fi

8. Fifth International Conference of the European Society for the History of Science, Athens November 1-3, 2012

The 5th International Conference of the European Society for the History of Science will be held in Athens, Greece, from November 1 to 3, 2012.

The theme of the conference is: *Scientific Cosmopolitanism and Local Cultures: Religions, Ideologies and Societies.*

The conference is organized by the History, Philosophy and Didactics of Science and Technology Programme of the National Hellenic Research Foundation.
More details are available at the conference website: http://5eshs.hpdst.gr

9. Seventh Hellenic History, Philosophy and Science Teaching Conference, Athens, November 1-3, 2012

The Seventh biennial Hellenic History, Philosophy and Science Teaching Conference will take place in Athens in parallel to the European Society for the History of Science conference. The Teaching conference will take place in the Byzantine Museum of Athens. Currently there are 40 papers accepted for the programme.

Details can be obtained from the conference organisers:

Constantine D. Skordoulis
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University of Athens
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Kostas4skordoulis@gmail.com

Dimitris Koliopoulos
Dept. of Early-childhood Education
University of Patras
Greece
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10. Society for Philosophy of Science in Practice (SPSP) Fourth Biennial Conference, 26-29 June 2013, University of Toronto, Canada

The Society for Philosophy of Science in Practice (SPSP) aims to create an interdisciplinary community of scholars who approach the philosophy of science with a focus on scientific practice and the practical uses of scientific knowledge. For further details on our objectives, see our mission statement on our website (URL above).

Deadline for submission: 1 December 2012. Under exceptional circumstances, late submissions may be considered by the Program Committee's discretion if there is still space on the program; however, on-time submissions will receive clear priority. If you plan to submit but foresee that you will not be able to meet the deadline, please let us know beforehand.

The SPSP biennial conferences provide a broad forum for scholars committed to making detailed and systematic studies of scientific practices — neither dismissing concerns about truth and rationality, nor ignoring contextual and pragmatic factors. The conferences aim at cutting through traditional disciplinary barriers and developing novel approaches. We welcome contributions from not only philosophers of science, but also philosophers working in epistemology and ethics, as well as the philosophy of engineering, technology, medicine, agriculture, and other practical fields. Additionally, we welcome contributions from historians and sociologists of science, pure and applied scientists, and any others with an interest in philosophical questions regarding scientific practice.

We welcome both individual papers, and also strongly encourage proposals for whole, thematic sessions with coordinated papers, particularly those which include multiple disciplinary perspectives and/or input from scientific practitioners. You may wish to involve other members of SPSP (a listing is available on our website) or post a notice to the SPSP mailing list describing your area of interest and seeking other possible participants for a session proposal

Individual paper proposals: must include a title and an abstract of 500 words, and full contact information for the speaker(s).

Session proposals: must include an overall title for the session, a 250-500 words abstract of the session, and a 500-word abstract for each paper (or an equivalent amount of depth and detail, if the format of the proposed session is a less traditional one), and full contact information for each contributor. Session proposals should be submitted as a group by the organizer of the session.

To receive updates about this conference, please become a member of the SPSP mailing list using the menu to the left. You can also use the menu to explore past events.

Additional notices:

- Submissions (text only) should be sent using the links below. Contact Shahar Avin, sa478@cam.ac.uk in case of technical problems.
- For your convenience: Examples of paper and symposia abstract of SPSP2011, as well as the conference program can be found under this link: http://spsp.webfactional.com/media/docs/SPSP2011Book.pdf
- A web link to the University of Toronto on accommodation and travel etc. will be posted on the SPSP website.
- Under exceptional circumstances, late submissions may be considered by the Program Committee's discretion if there is still space on the program; however, on-time submissions will receive clear priority. If you plan to submit but foresee that you will not be able to meet the deadline, please let us know beforehand.
- Participants should plan to arrive by Wednesday evening, when an informal social gathering will occur, and depart on Sunday following three full days of conference activities. We strongly encourage all participants to plan to stay for the duration of the conference, and no single day registration will be available.
- A pre-conference kick-off SPSP workshop will be held on Wednesday June 26. Location: University of Toronto. Title: Science, Policy, Values. Organizer: Heather Douglas.
- Main Contact: Andrea Woody, awoody@u.washington.edu

Links for submission:

- Submit individual abstract
- Submit session abstract

11. 4th Conference of the European Philosophy of Science Association

Helsinki, Finland, 28-31 August 2013

http://www.helsinki.fi/epsa13/

The Fourth Conference of the European Philosophy of Science Association (EPSA) will be organized and hosted by the Finnish Centre of Excellence in the Philosophy of Social Sciences at the University of Helsinki, Finland, 28-31 August 2013.

EPSA invites contributed papers and proposals for symposia.

The conference has eight sections:

1. General philosophy of science
2. Philosophy of the physical sciences
3. Philosophy of the life sciences
4. Philosophy of the cognitive sciences
5. Philosophy of the social sciences
6. Philosophy of technology and applied research
7. Formal philosophy of science
8. Historical, social and cultural studies in philosophy of science

INVITED SPEAKERS:

Alison Wylie (University of Washington),
Martin Kusch (University of Vienna),
Hannes Leitgeb (University of Munich)

CONTRIBUTED PAPERS: Please submit an abstract of 1000 words prepared for blind review. Abstracts should start with the number and title of the relevant section. The allocated time for delivering contributed papers at the conference will be 30 minutes, including discussion.

SYMPOSIUM PROPOSALS: Please submit a full proposal that includes the number and title of the relevant section, the title of the proposed symposium, a general description of the topic and its significance (up to 1500 words), and titles and abstracts of all papers (up to 300 words for each paper). The symposium proposals should be prepared for blind review, but make sure that you provide separately a list of all participants (including the chair) and their contact information (institutional affiliation and e-mail addresses), and indicate the organizer(s) of the symposium proposal (who may or may not be a proposed speaker). Accepted symposia will be allocated 120 minutes, including discussion. They can have any format but the maximum number of speakers is 5. Symposium proposals that explore connections between different areas or research programs in philosophy of science or between philosophy of science and sciences are encouraged.

All questions about submissions should be directed to the co-chairs of the Program Committee for EPSA 13: Stéphanie Ruphy (stephanie.ruphy@wanadoo.fr) and Gerhard Schurz

(gerhard.schurz@phil-fak.uni-duesseldorf.de). Members of the Program Committee and Local Organizing Committee for EPSA 13 are listed at

Important Dates

15 January 2013: Submission deadline (contributed papers and symposia)
15 April 2013: Notification of acceptance
15 June 2013: Early registration deadline
28-31 August 2013: Conference

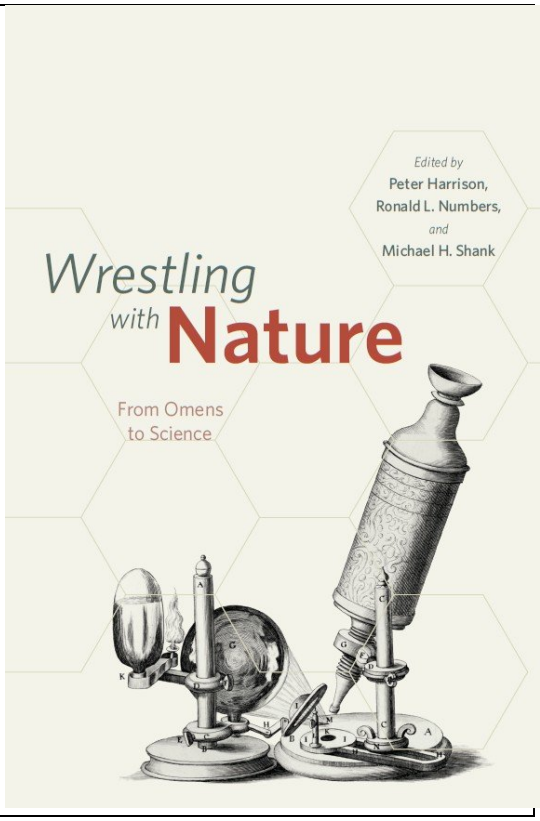
European Philosophy of Science Association (EPSA) www.epsa.ac.at

12. Book Reviews

(i) Peter Harrison, Ronald L. Numbers, and Michael H. Shank, eds. (2011), *Wrestling with Nature: From Omens to Science.* The University of Chicago Press, Chicago, IL. ISBN (paperback): 978-0-226-31783-0, 416 pages, $35.00

Reviewed by: Jean-François Gauvin, Collection of Historical Scientific Instruments, Department of the History of Science, Harvard University, Cambridge, MA, USA, email: gauvin@fas.harvard.edu

What is "science"? How do—should—we define "science"? Has this concept—some would say belief or opinion—held the same meaning(s) over the *longue durée*, from ancient Mesopotamia up to the present day? Though the subtitle of the book might create a little confusion, the methodological approach of this rich collection of essays has no correlation with the conventional teleological narratives of progress still largely favored by practicing scientists and science popularizers. Squarely set in the history of science's intellectual scholarship and sociological framework of the last 30 years, this book examines rather "how students of nature themselves have understood and represented their work" (p.4). The ambition of this stellar collection of authors has not been to carefully investigate the etymology and lexicography of the word "science" in its many forms, derivatives, and languages in order to ascertain the evolution of science itself.



Their goal was instead to uncover "what it is that various individuals and groups, in different times and places, have imagined themselves to be doing as they have wrestled with nature" (p.7).

Were these various individuals and groups doing "science"? Roughly chronological, the book opens with four chapters revisiting this question for ancient Mesopotamia (Francesca Rochberg), ancient Greece (Daryn Lehoux), the Arabic Middle Ages (Jon McGinnis), and finally the Latin Middle Ages (Michael Shank). Over this long historical period the study and observation of nature took several forms and was at the center of natural and theological knowledge. We learn, for instance, that Mesopotamian scribal scholarship shared a continuity of thought between

divination and cosmological mythology. And though a wide gap separated the practice of divination—including astronomy—and religion, the safeguarding of celestial omen compendia in late Babylonian temples was the key factor to the preservation of Babylonian astronomy for the next several centuries. In ancient Greece, mathematical certainty and the careful observation of the smallest anatomical detail demonstrated to Ptolemy and Galen respectively, in very distinct ways, the obvious intentional design behind Nature's creation. In the Islamic world, the *falsafa* and *kalām* traditions, albeit sharing the same set of questions regarding the role of God in Nature, took different approaches: the former was a continuation of the Greek Aristotelian commentary tradition, whereas the latter promoted "a way of thought [occasionalism] intimately linked with the Arabic language and the Islamic religion" (p.60). During the long Latin Middle Ages, between the fifth and the fifteenth century, the broad applicability of the term *scientia—scientia stellarum, scientia de motu, scientia dialecticae,* etc.—may have encouraged an emphasis on taxonomic classification. The liberal arts (*trivium*), the mathematical disciplines (*quadrivium*) and the natural world (*physica*) were but a few schemata designed to break apart and better understand the various methodological approaches to the study of nature.

The book's second cluster of essays is particularly coherent and effective. It looks at the legacy of the so-called Scientific Revolution from the viewpoint of natural history (Peter Harrison), mixed mathematics (Peter Dear), and natural philosophy (John Heilbron). These disciplines were not new to the early modern Western world, but they were in large part redefined during this period. From the revival of ancient learning to the call for a complete reform in the seventeenth century, natural history became less "historical" and theological than ever before with Darwin's controversial mechanism for biological change. The vast amount of natural facts accumulated during the early modern period still did not prevent natural history to remain at the bottom of the Baconian pyramid of knowledge. Even today, although natural history museums flourish "it is most often than not as entertainment for the curious" (p.143). Mixed mathematics, overlapping with what was also known as physico-mathematics, combined a high degree of mathematical scholarship with an attempt at uncovering causal explanations. However, though Newton made a strong case with his *Mathematical Principles of Natural Philosophy* of 1687, this "scientific" method—increasingly equated to operationalism—simply could not deliver the true causes of natural phenomena. The latter were the province of natural philosophy. This period saw the rise of scientific societies and academies as well as public shows, where crucial experiments and popular spectacles probed and displayed to a variety of audiences Nature's hidden world. Natural philosophy, which became highly organized, "emphasized control, efficiency, and utility, and rejected traditional categories, customs, and privileges that did not meet their test of rationalization" (p.174). *Nullius in verba*, as endorsed by the Royal Society of London.

A third perspective explores exclusionary principles, or what was and wasn't considered "good science." Four themes, dealing above all with the Anglo-American context in the nineteenth and twentieth centuries, examine science and medicine (Ronald Numbers), science and technology (Ronald Kline), science and religion (Jon Roberts), and science and pseudoscience (Daniel Thurs & Ronald Numbers). In each case, internal epistemic battles and general public speeches and debates helped forged the modern identity of the "sciences." Often at stake was how to reconcile the practical features—art—of a traditional discipline such as medicine to the more "scientific" clinical techniques. It was no different for religion. Though it was very much integrated to the "scientific" discourses of the past, from ancient Mesopotamia to Victorian England, the last few decades have seen high-profile advocates for an absolute independence between religion and the "sciences." Pseudoscience, conversely, has been seen as a threat and been confronted very early on to Karl Popper's "falsifiability" criterion of what is good "science." All these dualistic clashes had a common institutional purpose: "the preservation of scientific boundaries and the protection of scientific orthodoxy" (p.301).

The final part comprises three chapters focusing on the incomparable status held by the "sciences" in our modern times. One looks at the concept of scientific methods (Daniel Thurs) and what it has meant to the determination of legitimate natural knowledge in the nineteenth and

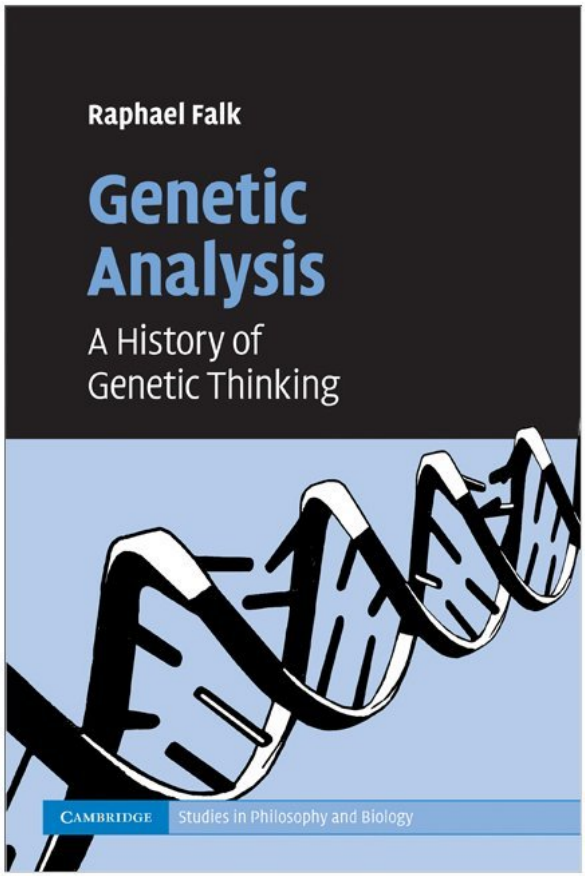
twentieth centuries. Scientific methods became known as the "greatest gift of science" to humanity in the 1930s, only to be challenged after WWII by an increasing relevance of technology—or technoscience—and its less normative "scientific" methods. Another chapter discusses the role of the public in building "science"'s cultural hegemony (Bernard Lightman). Focusing on Victorian England we learn that the professionalization of science went hand in hand with the creation of a popular scientific discourse. The goal was twofold: restricting the number of individuals who possessed the disciplined expertise to validate scientific knowledge while producing at the same time a passive public who would simply receive the end results in a digested way. It is no wonder then that the verb "to popularize" was developed in the English language simultaneously as the word "scientist." Finally, the book's last chapter reminds us that history should not always take precedence over the geography of space in our endeavor to understand the scientific enterprise (David Livingstone). Carefully studying spaces of experimentation, expedition, exhibition, and text Livingstone demonstrates that "*[w]here* ideas and theories are encountered conditions *how* they are received." (p.383) Place does matter.

I used "science" in quotes throughout the review to stress and acknowledge the authors' shared methodological outlook vis-à-vis the historical study of nature. What we define today as "science"—this is a notion often difficult to teach—is certainly no more "scientific" than what past "scientists" understood to be true knowledge of the world. An even stronger general argument could have been formulated if the book had been supplemented with two other lines of analysis. First, one has to recognize that the book essentially deals with an *intellectual* wrestling. Comments about hands-on practices, experiments, and instruments are very discreet and too often concealed within the various narratives. Though Robert Hooke's microscope from his *Micrographia* adorns the cover of the paperback edition, the microscope itself as a scientific instrument is only mentioned once, in passing (p.122). Few relevant references are given to artisans, instrument makers, "hybrid experts," and other such "go-betweeners" who are wrestling—or, paraphrasing Pamela Smith, bodily struggling—with nature in very distinct yet related ways. A recent (and huge) collected work directed by Christian Jacob, *Lieux de savoir 2: Les mains de l'intellect* (Albin Michel, 2011) is essential to balance the overly intellectual narrative found in this book. Related to the latter idea, it would have been extremely useful to historians of science and educators to see how far this idea of "science" can go. Here, I'm thinking about what anthropology has to offer in terms of a global analysis of the topic. Philippe Descola's *Par delà nature et culture* (Paris, 2005) is particularly remarkable since it treats Western concepts of "science"—our knowledge of nature—as simply one mode, not *the* mode, of logical, sensorial, mythical, and cultural cognition. With parallel readings along the lines just mentioned, this book could easily and successfully become the backbone of an undergraduate course on the inclusive notion of "science," past and present.

(ii) Raphael Falk: *Genetic Analysis: A History of Genetic Thinking*. Studies in Philosophy of Biology, edited by Michael Ruse. Cambridge: Cambridge University Press, 2009. ISBN-13: 978-0-521-88418-1, 344 pages, price: $110.00 (hardback).

Reviewed by: Staffan Müller-Wille, University of Exeter, Department of History, email: S.E.W.Mueller-Wille@exeter.ac.uk

Anyone with an interest in the history and philosophy of genetics is likely to have come across Raphael Falk – or Rafi as he is known to his many friends and colleagues. His incisive and thought-provoking comments, always put forward with energetic and inexhaustible enthusiasm, have enlivened discussions at workshops and conferences dedicated to this field for the past 30 years. His numerous papers have drawn attention to the historical and philosophical significance of phenomena like dominance and linkage which are not easily reconciled with reductionist and determinist accounts of the gene and keep this concept "in tension" – as Falk put it in a seminal contribution to the volume *The Concept of the Gene in Development and Evolution*, which Falk co-edited in 2000 with Peter Beurton and Hans-Jörg Rheinberger for the same series as the book under review.



His training in classical and population genetics with Gert Bonnier in Stockholm (1952-1955), and as a postdoc with H. J. Muller and Curt Stern (1959 to 1960), as well as his own distinguished career as geneticist at the Hebrew University in Jerusalem, not only explain the sophistication with which Falk treats the complex contents of genetic science, but also the urgency with which he poses philosophical questions and the determination with which he proposes answers to those questions. More than anyone else in the field – with the notable exception of François Jacob – he can lay claim to be an attentive and critical witness of the "century of the gene."

Genetic Analysis is Falk's *opus magnum*. It is not simply a collection of previously published papers, but a chronologically and thematically structured account of the history of twentieth century genetics. In twenty chapters, Falk deals with the prehistory of genetics (including Mendel; ch. 1-2), early formulations of gene concepts by de Vries, Bateson and Johannsen (ch. 3-4), the methodological significance of linkage (ch. 5-7) and mutation analysis (ch. 8-10), the molecularization of recombination (ch. 11-13), the elucidation of transcription and translation processes (ch. 14-16), and the fate of Crick's "central dogma" of molecular genetics (c. 17-20). The chapters are often remarkably clear, despite the increasing complexity of experiments covered, and indicate at many points how much remains to be done in the history of genetics. "Proper" historians will perhaps miss explicit discussions of social, economic and political contexts. Yet, the book is a treasure trove of hints towards unexplored territory in the history of genetics, mostly in the form of references to primary sources that Falk treats with an intimate familiarity that he must have retained from his post-doc days. The popularity of chemical mutagens in mutation research among geneticists like Friedrich Oehlkers (Germany), J. A. Rapoport (USSR) and Charlotte Auerbach (UK) had certainly as much to do with the hope to get at the chemical nature of the genetic material itself, as it had to do with the contingencies of industrialization and World War II (p. 135). And it was news to me, at least, that genetic markers were used to study cell-fate in the late twenties already by Sturtevant (p. 235), and that this developed into an important tool of cancer research (p. 242). A rich and detailed index allows the reader to tap the rich arsenal of primary sources that Falk cites at such junctures.

But this would not be a book by Raphael Falk, if it did not also make a grand claim. Both the story Falk tells, and the conceptual analyses he supplies, build on a distinction between methodological and conceptual reductionism (p. 4) that is familiar from his previous papers. It is perhaps best explained with reference to Falks's brilliant discussion of the difference between Gregor Mendel's theory, and what one of his so-called "re-discoverers", Hugo de Vries, made out of it. Mendel, Falk claims without reservations, established genetic analysis while being firmly rooted in what he calls the "hybridist research tradition" in biology. This tradition assumed underlying genetic factors in order to explain observed phenomena, but otherwise eschewed assumptions about the material nature as well as physiological and developmental role of these factors. De Vries, in contrast, belonged to the "morphogenist" research tradition and was after the material and causal elements that determine the properties of organisms, hence imputing physiological and developmental roles to these elements (p. 209). Mendel, in short, was a methodological reductionist, and de Vries a conceptual reductionist (p. 254). One of the consequences, as Falk shows in some detail, was that "dominance as a phenomenon of development [was] central to the morphogenist theory of de Vries", whereas Mendel, unlike de Vries, would never have considered dominance "as a law of inheritance" (p. 41).

While the case of Mendel and de Vries illustrates the great analytic value that Falk's distinction of methodological and conceptual reductionism can posses in individual cases, I have my doubts regarding its more general, historiographical as well as philosophical value. Historiographically, it does certainly not provide a dichotomy that runs through history like a red thread. To align eighteenth-century naturalists like Linnaeus and Buffon with this distinction is rather artificial as questions of heredity and development were not really held apart yet. Linnaeus did certainly not endeavour to provide a natural system in his *Systema naturae* of 1735 (p. 18), and he definitely shared Buffon's interest in species transformation (p. 22). And twenty-first century attempts to define the gene functionally, like those undertaken by Gerstein et al., certainly do not refer to the gene anymore as a "something" (p. 265).

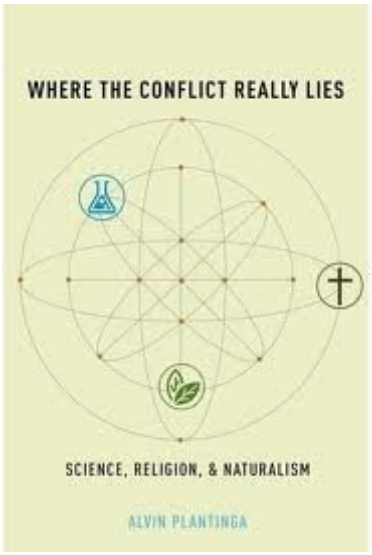
And philosophically, the methodological and conceptual reductionism distinction just ties together too many separate issues. This comes to the fore most clearly in the long concatenations of adjectives that Falk uses in places to characterize the two traditions he is trying to hold apart, as on p. 50, where a "top-down phenomenological descriptive analysis of the variability of a race" is opposed to a "bottom-up particulate reductive analytical interpretation of individual (or pure line) character differences in hybridization experiments." Whether a bottom-up perspective on organisms implies a commitment to particulate inheritance or reductionism, or whether a top-down perspective implies a phenomenological outlook, are open questions. Likewise, it seems odd to associate the hybridist tradition with deductive strategies, and the morphogenist tradition with inductive strategies of reasoning (pp. 22 and 209). It seems to me, that a hybridist can perfectly well endorse a top-down perspective on organisms, proceed inductively, and espouse anti-reductionist positions., In fact, Wilhelm Johannsen seems to be a case in point (pp. 60-64).

An introductory chapter that clearly laid out what is meant by such terms as 'methodological', 'conceptual', 'bottom-up', 'top-down', 'deduction', 'reduction', 'induction', 'particulate', 'phenomenological', and how these terms interrelate, would have helped a lot to make the book more accessible. As it stands, Falk's presentation of the century of the gene will remain quite challenging to any reader but the specialist. Yet it is worthwhile to take up this challenge, for the volume brings home what I consider to be an extremely important message. Falk's presentation draws attention to hybridization as one of the central methods of twentieth-century biology (p. 4), a method that not only brings unity to such diverse traditions as classical and molecular genetics (248), but also is a *specifically biological* method, as demonstrated by the fact that it was the Hershey-Chase experiment, and hence "a biological, 'hybridization' experiment, rather than a biochemical experiment that finally convinced biologists of the fundamental role played by DNA as the genetic material" (p. 193). In hybridization, it is organisms (and not physical agents or chemical substances) that interfere with each other and display the effects of such interferences. Genetic

analysis, that is, can never entirely eliminate the organisms, even if it aims at identifying what it is that organisms are made of. It is this "dialectic" (p. 156), that keeps genetic analysis alive to this day, as Falk's lively and intellectually stimulating account of the "history of genetic thinking" demonstrates.

(iii) Alvin Plantinga (2011), *Where the Conflict Really Lies. Science, Religion and Naturalism* Oxford University Press, USA. 376 pages; ISBN-10: 0199812098; USD27.95

Reviewed by: Maarten Boudry, Ghent University, Department of Philosophy and Moral Sciences, Ghent, 9000, Belgium
Email: maartenboudry@gmail.com



In *Where the Conflict Really Lies*, Alvin Plantinga sets out to demonstrate that, appearances to the contrary, there is no real conflict between science and (theistic) religion. While there are areas of superficial or apparent incompatibility, underneath we find a deep concord. By contrast, the relationship between science and naturalism is exactly the other way around: an appearance of harmony on the surface, but a fundamental discord underneath. There has been a veritable cottage industry of books purporting to demonstrate that, for various reasons, science and religion are really in harmony. To a skeptical observer, the very frequency with which these books are published suggests that the appearance of conflict is a hard one to dispel. The book flap heralds Plantinga's effort as "a long-awaited major statement" on a controversial question. Indeed, the University of Notre Dame professor stands in high repute among academic philosophers. If there is any hope of averting the conflict between science and religion, it may well rest on someone with Plantinga's credentials.

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In Part I, Plantinga tackles the "Apparent Conflict" between science and Christian belief (evolutionary theory and the problem of divine intervention). Part II deals with the areas of "Superficial Conflict" (evolutionary psychology and biblical scholarship). In the second half of the book (Parts III & IV), Plantinga digs below the surface and explains where the deep conflict and deep concord really lie.

Unguided or misguided?

In Part I, Plantinga argues that theism is not in conflict with evolutionary science, only with *unguided* evolution, which is a metaphysical add-on, not a part of evolutionary theory proper. But what about the thesis that the source of mutations is random, an assumption that is part and parcel of evolutionary theory? "Random" in this context does not mean pure chance, but rather without foresight, or not necessarily concordant with the organism's adaptive needs. According to Plantinga, random mutation is compatible with God orchestrating the whole process. It is just God's way of creating novelty. But there is no wedge to drive between "random" and "unguided". If God is steering evolution in the right direction, making sure that suitable mutations arise, the mutations cannot be "random" in the technical sense, for then they would occur for the benefit of the organism (or whichever plan is on God's mind). This becomes clear when Plantinga, strangely enough, endorses creationist Michael Behe's argument from "irreducible complexity" (IC, see further), a pseudoscientific concept that has been completely rejected by the biological community. Behe's argument is that the evolution of IC systems requires the simultaneous occurrence of different beneficial mutations, which is exceedingly unlikely. Therefore, some intelligent designer must have monitored the development of IC systems, if not by miraculous creation, then at least by causing the requisite mutations for natural selection to work on. But then, obviously, the mutations arise to meet the organism's adaptive needs, and are no longer "random". That is exactly the point of Behe's argument. Besides, why doesn't God skip the cruel selection part and create a whole population of well-adapted organisms without further ado? (See below for Plantinga's answer to the problem of evil.)

The thesis that mutations are random (i.e., unguided), rather than being a metaphysical afterthought, has been amply demonstrated and is accepted as the null hypothesis by evolutionary biologists. Experiment after experiment has shown that there is no evidence of nonrandom mutations arising because an organism "needs" them. Further, if some intelligent agent is triggering mutations after all, it seems that he/she/it is causing precisely the kind and rate of mutations that one would expect if the process *were* entirely undirected. Plantinga's effort to stave off the conflict between theism and evolution is a failure. Either he is buying into creationist fantasies that have been put to rest long ago, or he is hammering on the excessively weak claim that it is logically and metaphysically *possible* that, all evidence to the contrary, evolution unfolds under supernatural guidance.[1] But if the bar for rational belief is lowered to mere logical possibility, and the demand for positive evidence dropped, then no holds are barred. Evolution (or gravity, plate tectonics, lightning, for that matter) could as well be directed by space aliens, Zeus or the flying spaghetti monster. (I was going to include the devil in the list, but then it turns out that, on page 59, Plantinga has no qualms at all about treating the horned one as a serious explanation. There goes my reductio.)

The rest of this chapter on evolution is spectacularly ill-informed. Plantinga seems to imagine that he is the first to think about the "temporal constraint" (23) imposed on evolution: is the time span available to evolution by natural selection sufficiently large to account for complex adaptations and the diversity of life? In Darwin's time, estimates of the earth's age were much lower than today, and some (notably, Lord Kelvin) perceived this as a serious problem for the theory of evolution. Nowadays, we know that the earth (and life on it) is much older than Lord Kelvin imagined. The succession of organisms in the fossil record indicates that there has been plenty of time for complex adaptations to evolve. If we are to believe Plantinga, however, no evolutionary biologist has ever carried out the relevant "calculations" for the evolvability of complex adaptations, and the whole bunch of them are merely relying on "feelings and guesses" (22).[2] This is patently untrue. Nilsson & Perger (1994) have calculated that the time needed to evolve an eye from a light-sensitive patch, ironically Plantinga's own example, is in the range of a few hundred thousand years, a blink in the

[1] Remarkably, this entirely gratuitous suggestion has received the support of no less a philosopher than Elliott Sober (2010, in press).

[2] Note that, later in the book, this does not prevent him from rashly buying into Michael Behe's slapdash calculations about unevolvability.

eye of deep time. Maybe Plantinga should read *Evolution's Witness: How Eyes Evolved* (Schwab, 2011), in which the ophthalmologist Ivan Schwab documents the evolution of eyes in meticulous detail and with lavish illustrations. Like ID advocates before him, Plantinga happily ignores the substantial body of literature reconstructing the evolution of complex adaptations, as well as computer simulations demonstrating the evolvability of such systems (Lenski, Ofria, Pennock, & Adami, 2003).

In a remarkable bout of irony, Plantinga trots out Bertrand Russell's teapot against evolutionary biologists, arguing that "mere possibility claims are not impressive" (25). Famously, Russell asked us to imagine a celestial teapot orbiting the sun, so tiny and far away that it is invisible even to our best telescopes. Although we cannot disprove the existence of such a teapot, that does not make its existence a bit more plausible. According to Russell, the burden of proof rests on those who put forward unfalsifiable hypotheses, be it teapots or deities. Plantinga doesn't quote Russell in full, but it is worth doing so:

> Many orthodox people speak as though it were the business of sceptics to disprove received dogmas rather than of dogmatists to prove them. This is, of course, a mistake. If I were to suggest that between the Earth and Mars there is a china teapot revolving about the sun in an elliptical orbit, nobody would be able to disprove my assertion provided I were careful to add that the teapot is too small to be revealed even by our most powerful telescopes. But if I were to go on to say that, since my assertion cannot be disproved, it is intolerable presumption on the part of human reason to doubt it, I should rightly be thought to be talking nonsense. If, however, the existence of such a teapot were affirmed in ancient books, taught as the sacred truth every Sunday, and instilled into the minds of children at school, hesitation to believe in its existence would become a mark of eccentricity and entitle the doubter to the attentions of the psychiatrist in an enlightened age or of the Inquisitor in an earlier time.[3]

If only Plantinga would keep the celestial teapot in mind while writing about his invisible mutation tinkerer.

In any case, if mere possibility were all that biologists were looking for, they could as well have stuck with Epicurean atomism. According to this ancient hypothesis, which was the main competitor to divine creation in explaining adaptive complexity before Darwin (Hume, 2007 [1779]), the random swirl of matter in the universe will eventually produce orderly patterns and complex adaptations, given sufficient time. If biologists are satisfied with "mere possibility", as Plantinga claims, why do they bother with evolution?

Divine intervention

In the rest of part I (chapters 3 & 4), Plantinga takes issue with the hands-off conception of God that is currently in vogue among theologians. Miracles are perfectly possible, Plantinga claims, because there is nothing that prevents God from suspending the natural order and intervening in the world. But even if we grant that supernatural intervention is *logically* possible, the conflict between science and religion strikes back with a vengeance: there is no empirical evidence for the supernatural that stands up to critical scrutiny, and plenty of failed attempts to find such evidence (Boudry, Blancke, & Braeckman, 2010; Dawkins, 2006; Fishman, 2009). But that mighty elephant in the room gets no attention from Plantinga, who instead belabors the logical possibility of miracles with a 60-page digression into the different interpretations of quantum physics and lots of fancy formalizations (and even then, he ignores the recent work by philosopher Evan Fales [2010] on the logical and conceptual problems plaguing divine intervention. At this point we're no longer talking about a conflict between science and religion, but one between theology and more theology.

[3] The article was commissioned – though not published – by *Illustrated Magazine* in 1952. See http://www.cfpf.org.uk/articles/religion/br/br_god.html

This happens several times in the book: instead of dealing with the real areas of conflict between science and religion, Plantinga wastes his time in a rearguard fight with other theologians.

In Part II (chapters 5 & 6), Plantinga tells us that the discovery that humans are prone to detect agents where none are present, due to the evolutionary trade-offs in their cognitive equipment, does not in any way diminish the plausibility of belief in invisible supernatural agents. Again, his argument never moves beyond the level of logical possibility. By the same token, the discovery of the ideomotor effect – subtle and uncontrolled muscle movements below the level of consciousness – does not affect the belief that a Ouija board is really commanded by ghosts.

The problem of evil

The spectacle of an avowed theist wrestling with the problem of evil is invariably fascinating and often disquieting. Richard Swinburne, another eminent analytic philosopher and defender of theism, once suggested that God allowed the Holocaust to happen as a wonderful opportunity for the Jews to be courageous and noble.[4] What does Plantinga have in store? First, he argues that Tennyson already knew that nature was "red in tooth and claw", so we didn't have to wait for Darwin to tell us that. Even if Darwin added nothing to the problem of evil, however, this reply does nothing to diminish the force of the original problem. It would be like an attorney arguing that the evidence against his client is already so incriminating that one more witness won't make a difference. In any case, Plantinga misses the point. As Philip Kitcher (2007) has noted, death and suffering are the fuel for the engine of natural selection, the creative force of evolution. Because of overpopulation and finite resources, natural selection ruthlessly weeds out unfit individuals and winnows beneficial mutations. The evolutionary road towards *Homo sapiens* is paved with death, hunger and suffering. Would any loving creator use such a cruel and wasteful process? In response to Kitcher's argument that the ultimate goal of evolution – a species receptive to God's revelations – "rings hollow" in the face of the millions years of suffering and death preceding it, Plantinga calls on Genesis to argue that "[t]here is nothing in Christian thought to suggest that God created animals in order that human beings might come to be" (57). That is hardly surprising, since there is nothing in the Bible to suggest *any* form of common descent whatsoever. If anything, in fact, his solution exacerbates the problem, rendering the suffering of non-human animals even more pointless. If animals have evolved for their own sake and not for the biped ape that was given "dominion" (Genesis 1:28) over them, why did they deserve to suffer and die for millions of years, in an endless struggle with each other? Recall that it was God himself who, according to Plantinga, brought about the requisite mutations for the bacterial flagellum of the malaria parasite, or the fangs and venom of the rattlesnake.

The second reply is as preposterous as it is callous: the inordinate amount of death and suffering is a good thing because it allows us better to appreciate the monumental significance of Christ's crucifixion:

> any world that contains atonement will contain sin and evil and consequent suffering and pain. Furthermore, if the remedy [i.e. Christian atonement] is to be proportionate to the sickness, such a world will contain a great deal of sin and a great deal of suffering and pain (59)

But why stop there? Shouldn't theists like Plantinga be praying for another Holocaust once in a while then, as a way of glorifying the divine remedy for evil? Will any amount of suffering satisfy the creator's grandiose and narcissistic scheme of redemption? Does this also mean that it is morally wrong to prevent or relieve the suffering of others, because it would interfere with God's wonderful plan of salvation? Note that this is a book in which the author simultaneously claims to

[4] The anecdote is related in Dawkins (2006).

know why God created millions of beetle species (107), but not why he permitted the Holocaust to happen.

Defeaters

In the short section on Biblical scholarship, Plantinga informs us that what God tells us in the Bible is "certainly true and to be accepted" (153), but that it may be "hard indeed to see what he *is* teaching." In other words, the Bible is always right, regardless of the evidence. At this point, the reader is no longer surprised to learn that Plantinga does not see evolutionary psychology or Biblical scholarship as "defeaters" for Christian belief. From the seemingly innocuous claim that Christians conduct inquiry with a different set of beliefs, and deftly using the ambiguous term "knowledge base" as a semantic fulcrum, Plantinga adduces the claim that Christians possess a "source of knowledge" (177) not available to non-religious believers. Before you know it, non-Christian physics is "truncated" (176) owing to its leaving out of Christ.

This is such an easy trump card for theism that even Plantinga does not seem altogether convinced: after all, why would he bother to insist that "unguidedness" is not a proper part of evolutionary science, if all it takes to resolve the science/theism conflict is to enrich our "knowledge base" with the proposition "God created the living world"? In an attempt to assure the reader that not *anything* goes on this account, Plantinga gives an example where satellite photographs act as a defeater for the Biblical belief that the earth is the stationary center of the universe. But Plantinga never succeeds in pointing out a relevant epistemic distinction between, for example, classical young-earth creationism and his own brand. He is simply reckoning that readers will find flat earthism sufficiently absurd as to believe that his philosophical approach is guarded against it and similar follies. All this illustrates is the subjective point that Plantinga's tolerance of absurdity differs from that of the next person.

Vanishing point

In much of what passes as sophisticated theology these days, the term 'God' does no explanatory work at all, but functions as an intellectual vanishing point, a bundle of all explanatory loose ends. God is simply equated with the uncaused cause, the ground of all being, as that-which-does-not-require-further-explanation. Plantinga plays his own variation on that theme, claiming that theism "provides a natural [sic] explanation" of the existence of scientific laws and natural regularities. But it does nothing of the kind. God can only guarantee regularity if one accepts that God is a dependable fellow to start with. What reasons do we have, short of definitional non-starters, to assume that God will not act capriciously, that he will continue to sustain the natural order? This is especially true of Plantinga's God, who can interfere at will in his creation and violate the natural order. Plantinga is impressed that the kinds of mathematics that are useful for understanding reality are extremely challenging, though just manageable by humans (284). Is God trying to find out how far he can push the human intellect? Are we like those lab rats trying to find their way out of a maze, with God monitoring the cosmic experiment?

There is a self-selection effect that Plantinga ignores. If some part of the world would require mathematics that are too complicated for us to manage, we would never be able to judge our own ignorance, because by definition we would never have those mathematics. Maybe today's physics has already run up against human cognitive limits. The mathematics of string theory and M-brane theories are so arcane that they challenge the minds of even our most gifted scientists. The physical interpretation of these theories is even more difficult to get our heads around. It seems that the farther we move from the environment for which our brains evolved, the more quixotic and baffling the world appears to us. This is exactly what one would expect from a brain that is the product of evolution by natural selection (see below).

The vacuity of theistic 'explanation' becomes all too clear when Plantinga claims that *both* the complexity and relative simplicity of the world count in God's favor. Naturalism gives us no reason to "expect the world to conform to our preference for simplicity" (298). Plantinga seems unaware of the probabilistic justifications for preferring simple explanations (Forster & Sober, 1994; Hitchcock & Sober, 2004; Jefferys & Berger, 1992). He wonders why we don't live in a world where our most complex and cumbersome theories would be most successful, but the question is misguided. There is a probabilistic 'penalty' for complexity, which means that, all other things being equal, complex hypotheses are less likely than simple ones that fit the data equally well. The more complex a theory, the more ways in which it can go awry. The preference for simplicity is thus conducive to truth, regardless of the complexity of the world we are living in.

This book abounds in non sequiturs, most of which can't be listed here. In his *Dialogues concerning natural religion* (2007 [1779]), David Hume offers several alternative design hypotheses to theism, for example that the world was created by a group of gods, or an evil demon, or that it is the unfinished product of a young and inexperienced deity. Plantinga's response to Hume is a blunt argument *ad populum*: there are more theists around, so theists can call the shots (263). On page 22, we learn that theists have more "freedom" in explaining complex adaptation and can "follow the evidence wherever it leads": maybe there is a Darwinian explanation, maybe God intervened. That would be like saying that a believer in Bigfoot has more "freedom" than the skeptic in explaining strange footprints in the woods. In the chapter about design, Plantinga shields the design inference from rational assessment by noting that it is arrived at in an "immediate or basic way" (248). Indeed, only just as people ascribe intentions to irregularly moving dots on a screen in an "immediate, basic way", and can't help getting angry at their non-cooperative computers. What is this supposed to demonstrate? As Darwin taught us, just because something appears to us as designed or intentional does not mean that it is.

Is naturalism self-defeating?

In the final chapter, Plantinga mounts his infamous warhorse against naturalism. The prose goes in crescendo: those who claim that evolution is unguided as far as science goes are guilty of conflating science and metaphysics and deserve nothing but "disdain" (309). In this light, one cannot help wondering why scientists ever abandoned the view that lightning reflects the wrath of a deity and strikes only the wicked. Are those who say that lightning strikes with moral indifference, as far as the laws of physics are concerned, deserving of scorn and contempt?

Plantinga's core argument is that evolution by natural selection cares about survival and reproduction only, not about truth. The naturalist, who believes his own cognitive faculties to be the product of evolution, has no reason to put trust in his own beliefs, including his belief in evolution itself. Naturalism is thus self-defeating. According to Plantinga, theism is the only way out of this vicious circularity. Our cognitive faculties are trustworthy because our creator ensured that they are. In the final chapter of their published dialogue, Daniel Dennett made short shrift of Plantinga's argument against naturalism (Dennett & Plantinga, 2010), as has Evan Fales, with more patience (Fales, 1996).

In the current exposition, Plantinga makes a long and irrelevant detour into several strands of naturalism (reductive and non-reductive materialism), and couches his arguments in a technical framework that doesn't serve any discernible purpose. Much is made of the trivial observation that, for an organism, survival does not always require belief. Of course it does not: bacteria and other lower organisms thrive well without it. From there, Plantinga slides to the claim that such activities as finding mates and fleeing predators "do not require *true* belief" (329, my italics). The crux is in the italics. There is a huge difference between claiming that an organism doesn't need belief for

survival (and *a fortiori* not true belief), and claiming that, if it relies on belief to survive, it needs to be true belief. Compare: "If I want to go to the city, I don't need a car. After all, I can take my bike. So I don't need gasoline to go to the city. So in order to drive my car to the city, I don't need gasoline." If and to the extent that an organism relies on belief as an adaptive strategy, it better be (approximately) true belief (in ecologically relevant situations). Plantinga pretends that natural selection is blind to belief content, but of course it isn't. Selection weeds out neural structures that give rise to false beliefs (not always, but often enough). As soon as belief directs action, natural selection will kick in to weed out beliefs (usually false ones) that are not conducive to an organism's survival and reproduction. Also, we have evolved brain mechanisms that enable us to learn about the environment in which we live and to modify our beliefs so as to bring them into greater accord with reality. The content of a belief is connected to its neurophysiological (NP) properties in an appropriate manner. A belief with a different content will have different NP properties (i.e. a different physical realization in the brain), and will thus result in different kinds of actions. Bizarrely, Plantinga thinks that the NP properties of a concrete belief stand to its content as a ball shattering a window stands to its being a birthday present (337). The content is thus completely irrelevant. Does a ball break a window "by virtue of being a birthday present", asks Plantinga rhetorically? Of course not: some balls are not birthday presents, and some birthday presents are not balls but rather, say, stuffed animals, which usually don't shatter windows. The property of being a birthday present is not causally connected to its breaking force and is thus irrelevant. What on earth is Plantinga trying to prove here?

There is a fascinating and ongoing philosophical discussion about the reliability of our cognitive faculties, their flaws and limitations, their blind spots and inherent biases, all from an evolutionary perspective (De Cruz, Boudry, De Smedt, & Blancke, 2011; Griffiths & Wilkins, in press; Papineau, 2000). But this problem should be tackled in a careful fashion and on a case-by-case basis, not, as Plantinga does, by compressing all the complications and details in one single proposition R ("our cognitive faculties are reliable"), and confusing such a rigid all-or-nothing approach with logical rigor. Sometimes this extremely reductive strand of formalism results in unintended humor. For example, at the very end of the book, Plantinga asks us to consider the "faculty (or subfaculty) that produces metaphysical beliefs", and to call it M (where is it located in the brain?). If N is Naturalism and E is evolution,

> What is P(MR/N&E), where MR is the proposition that metaphysical beliefs are reliably produced and are mostly true? (349)

This is the philosophical equivalent of doing brain surgery with an axe.

The extensive use of logical trickery is one of the most irritating aspects of this book. At some point in chapter 3, Plantinga pretends to prove that determinism is "necessarily false", but the formalization of determinism he starts out with is obviously wrong. The trick is pulled off with two nested conditionals in the first premise[5]: at that point, the rabbit is already smuggled in the hat, and what follows is just formalistic window dressing. Formalization can be a means to provide clarity and rigor to an argument, and thus to enhance a philosophical debate. Alas, it can also be misused

[5] This is his formalization on page 81: "N (if (1) then F)", where N means 'Necessarily', and F is the actual future. But proposition (1) itself contains a conditional: "

(1) (If U is causally closed , then P) and PAST

where P is the "conjunction of the consequents of all the laws [of nature]" and PAST is a specific state of the universe. But this formalization is bizarre. The bracketed part of (1) holds as soon as the universe is *not* causally closed (because 'if A then B' is equivalent to 'not-A or B'). Because of these nested conditionals, Plantinga's formalization of determinism states that (1) necessarily entails the actual future F. But of course, if supernatural powers are in the game (non-closure), the future state of the universe can no longer be derived from the past and the laws of nature (because god can mess things up). Plantinga's determinism is a straw man. In any case, the formalization of P is awkward (what are the "consequents of the laws"?).

as a rhetorical ploy to disguise non-sequiturs under a tapestry of symbols. This is analytic philosophy at its worst.

The upshot of the argument in this book, according to Plantinga, is that theism is "vastly more hospitable to science than naturalism" and that this belief in an invisible creator "deserves to be called 'the scientific worldview'" (no worries about "metaphysical add-ons" this time). This is sheer rhetorical bluster. Naturalism emerges unscathed from Plantinga's attack, and he has done nothing that comes even close of averting the conflict between science and religion. This book will not impress anyone except those who were already convinced that science and religion can live in peaceful harmony, and even in those accommodationist quarters, it seems to have put some people off (Ruse, 2012). If this is the best that sophisticated defenders of theism can come up with, God is in very dire straits indeed.

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(iv) James A. Shapiro (2011), *Evolution. A View from the 21st century* FT Press Science, ISBN 978-0-13-278093-3, 272 pages, price: $34.99

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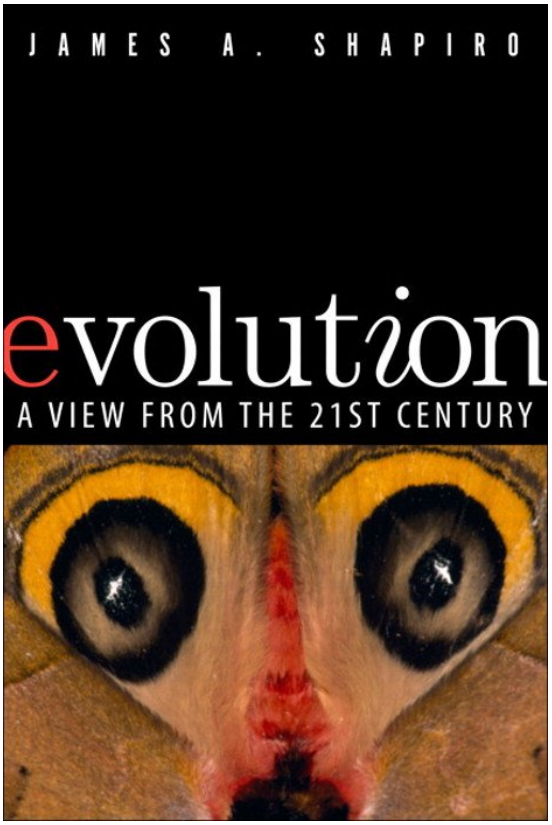

The great evolutionary biologist, field naturalist and philosopher of science Ernst Mayr (1904–2005) once wrote that "arm-chair taxonomists", i.e. laboratory scientists who have never studied populations of animals and plants in the wild, are not qualified to discuss the question as to what species are, how we can define them, and via which mechanisms they evolved. Although Charles Darwin (1809–1882) spend a large part of his professional life as an "arm-chair-writer", he had ample experience as a naturalist and geologist, notably during his 5-year-long trip on board of the HMS Beagle. Based on this extensive "hands-on-experience" with living and fossil animals as well as plants, Darwin postulated that variable populations of organisms (species) descended with modification from ancestral types under the constraints of natural selection.

Hundreds of subsequent field (and laboratory) studies have confirmed Darwin's basic tenet: populations, the units of evolution, adapt, via heritable variation-selection, to novel environmental conditions in the course of numerous subsequent generations, and hence change over long time periods, or become extinct.

This general concept of random genetic modifications, followed by directional natural selection, is still valid today. However, many revisions, and additions were necessary to integrate this classical Darwinian view of evolution by natural selection into our current framework of the biological sciences, which are to a large extent based on sophisticated molecular techniques.

In his book *Evolution. A view from the 21st century*, James A. Shapiro, a laboratory microbiologist with an impressive career and a long list of publications in the field of molecular microbiology, challenges this consensus view held by the majority of evolutionary biologists. With reference to Darwin's *Origin of Species*, he writes that "Conventional evolutionary theory made the

simplifying assumption that inherited novelty was the result of chance or accident …". The "neo-Darwinist followers took the same kind of black-box approach in the pre-DNA era by declaring all genetic change to be accidental and random with respect to biological function or need" (p. 1). Based on the premise that "The capacity of living organisms to alter their own heredity is undeniable", and, therefore, "Our current ideas about evolution have to incorporate this basic fact of life" (p. 2), the author proposes a "set of basic evolutionary principles" from a "21st century perspective". This list contains the following statements:

> "1. Living cells and organisms are cognitive (sentient) entities that act and interact purposefully to ensure survival, growth and proliferation. They possess […] decision-making capabilities.
> 2. Cells are built to evolve; they have the ability to alter their hereditary characteristics rapidly though well-described natural genetic engineering […]
> 3. Evolutionary novelty arises from the production of new cells and multi-cellular structures as a result of cellular self-modification functions and cell fusions […]
> 4. The role of selection is to eliminate evolutionary novelties that prove to be non-functional and interfere with adaptive needs. Selection operates as a purifying but not creative force" (pp. 143-144).

It should be noted that these arguments are similar to those of Jablonka and Lamb (2005), who likewise argue against one basic principle of evolutionary biology (i.e., the expanded synthesis): mutation, and thus hereditary variation, is not "random". The authors argued that, in accordance with the principles proposed by Jean Lamarck (1744–1829), "the inheritance of genomic changes (is) induced by environmental factors" (Jablonka and Lamb 2005, p. 7).

Let us now take a close look at Shapiro's four basic assumptions. The first statement (1.), i.e., the view that organisms are sensitive and act "purposefully to ensure survival" does, for instance, not apply to green algae and land plants (embryophytes). As every field-naturalist knows, certain plants can, when enough nutrients are available, over-produce progeny to such an extent that very dense populations develop that finally die and become extinct. The cosmopolitan *Elodea canadensis* is a famous example for such "collective suicides" by purposeless vegetative reproduction in the plant kingdom.

Shapiro's assumption no. 2, that organisms intelligently modify their genomes in response to challenges from the environment, corresponding to the idea of "natural genetic engineering", may in part apply to certain bacteria. As noted by the author, an enhancement in the rate of mutations as a result of stressful environmental conditions has been documented in some prokaryotic microbes. However, these concepts can not simply be extrapolated to the other four (eukaryotic) Kingdoms of Life (Protoctista, Fungi, Animalia, Planta). In eukaryotes, stress does not induce "adaptive mutations". For instance, heat-induced mutations do not produce phenotypic changes related to heat tolerance (Merlin 2010). In eukaryotic macro-organisms, genetic recombination and heritable germ-line mutations are unpredictable chance events (see Lynch 2010 and references cited therein). These "random processes" provide the "raw material" for directional natural selection, which is caused by changing environmental conditions and co-existing or symbiotic (often pathogenic) micro- and macro-organisms (Kutschera 2008, 2009; Merlin 2010).

Shapiro's hypothesis no. 3, stating that cellular self-modifications can create evolutionary novelties, is, to the best of my knowledge, not supported by empirical evidence when applied to members of the four eukaryotic kingdoms.

His statement no. 4, that natural selection only eliminates less adapted varieties, and therefore can not "create" novel phenotypes, is a popular misconception. The author confuses stabilizing (conserving) and directional (adaptive) natural selection, a distinction that was made for the first time by August Weismann (1834–1914), the founding father of the Neo-Darwinian theory that was popular during the years 1890 to 1910. Independent of Weismann, the Russian biologist Ivan Schmalhausen (1884–1963) introduced this concept. According to the "Weismann-Schmalhausen-principle", strong directional selection can, under gradually changing environmental

conditions, lead, over many subsequent generations, to the evolutionary development of modified phenotypes (Kutschera 2009).

Finally, it should be noted that, according to Shapiro, the "concept of cell-guided natural genetic engineering" is compatible with 19th-century teleological ("Lamarckian") thinking. The author states that "cells are now reasonably seen to operate teleologically: their goals are survival, growth, and reproduction" (p. 137). These and other statements indicate that Shapiro had the out-dated Scala naturae ("Great Chain of Being") in mind when he extrapolated novel findings on adaptive mutations in certain bacteria to animals and plants (Kutschera 2011). It is not clear to me whether or not Shapiro's teleological and hence supra-naturalistic ideas are related to the religious dogma of Intelligent Design or another branch of modern creationism.

In summary, I conclude that the book of molecular biologist James Shapiro contains many interesting details on bacterial genetics and related subjects. However, an "evolutionary paradigm shift" that "replaces the 'invisible hands' of geological time and natural selection with cognitive networks and cellular functions for self-modification" (p. 146) cannot be deduced from the laboratory studies described by the author. The experiments Shapiro refers to were carried out with clones of bacteria that were grown on agar plates. These prokaryotic microbes, which were cultivated under artificial conditions, have clearly yielded many novel insights into the process of adaptive evolution. However, complex eukaryotic macro-organisms, such as animals and plants, can not simply be regarded as clones of more or less identical cells. Populations of these multi-cellular living beings should be studied in the lab and under natural conditions, i.e., in the field, in order to understand their plastic development (ontogeny) as well as their phylogeny.

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13. Coming Conferences

October 3-6, 2012, Second Latin America IHPST Regional Conference, Mendoza, Argentina
Details from Agustín Adúriz-Bravo (adurizbravo@yahoo.com.ar)
October 5-6, 2012, Philosophy of Scientific Experimentation, Third Conference,
University of Colorado, Boulder
Details at: http://phys.colorado.edu/psx
October 18-20, 2012, First Asian IHPST Regional Conference, Seoul National University, Korea
Details from Jinwoong Song (ihpst2012@gmail.com)
October 24-26, 2012, Second Nordic HPS&ST Conference, University of Helsinki, Finland
Details from Ismo Koponen (ismo.koponen@helsinki.fi)
November 1-3, 2012, 5th International Conference of the European Society for the History of Science, Athens
Details at: http://5eshs.hpdst.gr
December 1st, 2012, Kuhn's *The Structure of Scientific Revolutions*: 50 Years On, The College of New Jersey, Ewing, New Jersey.
Details at: http://www.tcnj.edu/~lemorvan/KuhnConference.htm
January 7-11, 2013, epiSTEME 5: Fifth International Conference on Science, Technology and Mathematics Education Research, Mumbai, India
Details at: http://episteme5.hbcse.tifr.res.in
March 14-18, Philosophy of Education Society (PES), Annual Conference, Portland, USA
Details at: http://philosophyofeducation.org
April 6-9, 2013, NARST Annual Conference, Rio Grande, Puerto Rico
Details at**:** www.narst.org
April 27-May 1, 2013, AERA Annual Conference, San Francisco
Details at: http://www.aera.net/
June 19-23, 2013, 12th IHPST Conference, Pittsburgh University
Details at: http://www.education.pitt.edu/ihpst2013/, and from Michael Ford: mjford@pitt.edu
June 26-29 2013, Society for Philosophy of Science in Practice (SPSP) Fourth Biennial Conference, University of Toronto, Canada
Details from: Andrea Woody, awoody@u.washington.edu
August 28-31, 2013, 4th Conference of the European Philosophy of Science Association,
Details at: http://www.helsinki.fi/epsa13/

14. IHPST Council (2011-13)

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The email list is used sparingly, usually once a month, to send group information such as contained in this Newsletter. It is a closed list, not an open discussion list.

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Alternatively, if you have friends, colleagues or students who would like to subscribe to the list, tell them to send a message to: majordomo@explode.unsw.edu.au . In the body of the message, not the subject line, simply write: 'subscribe ihpst-group'.

16. Newsletter Items

This IHPST Electronic *Newsletter* goes direct to about 5,000 email addresses on the IHPST list, and it is also posted to various science education, philosophy of education, and HPS lists. Items for inclusion in the *Newsletter* are appreciated. These can be items for the 'Opinion', 'Recent Research', 'Recent Books', 'Books' or 'Conferences' sections.

Please email newsletter material as an attachment (or journal subscriptions or publication orders) to: m.matthews@unsw.edu.au