What can the Philosophy of Biology learn from the History of Biology?

19-20 March 2016, Utrecht (Sweelinckzaal, Drift 21), The Netherlands

Questions about the interrelation between the history of science and the philosophy of science have received renewed attention in recent years. This workshop focuses on the life sciences and asks how we might employ historical findings and approaches in order to shed light on questions in the philosophy of biology. The workshop aims to take stock of previous work in this domain, to highlight current lines of research, and to identify challenges and opportunities for the future.
This is the first Utrecht Workshop in Philosophy of the Life Sciences. It is hosted by the *Descartes Centre for the History and Philosophy of the Sciences and the Humanities*.

19 March

9.30-10.30	**Sabina Leonelli** (Exeter)	*The Epistemology of Data-Intensive Science: Integrating History, Philosophy and Social Studies of Data Practices*
10.30-11.30	**Bert Theunissen** (Utrecht)	*The role of genetics theory in animal breeding*
11.30-12.00	Coffee	
12.00-13.00	**William Bechtel** (San Diego)	*What can the history of biology teach philosophy about representing biological knowledge?*
13.00-14.00	Lunch	
14.00-15.00	**Ingo Brigandt** (Alberta)	*Research on developmental constraints in the 1980s, and its relevance to current work on evolvability*
15.00-16.00	**Raphael Scholl** (Cambridge)	*TBC*
16.00-17.00	Plenary Discussion	
17.00	Closing	

20 March

9.30-10.30	**Joeri Witteveen** (Utrecht)	*Rethinking 'population thinking'*
10.30-11.30	**Kärin Nickelsen** (Munich)	*TBC*
11.30-12.00	Coffee	
12.00-13.00	**Sahotra Sarkar** (Austin)	*Reductionism in the Philosophy of Biology: What a Little History Does to the Debates*
13.00-14.00	Lunch	
14.00-15.00	Plenary Discussion	
15.00	Closing	

The event is free and open to all. If you intend to participate, please register with Ulrich Stegmann
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Abstracts

What can the history of biology teach philosophy about representing biological knowledge?
William Bechtel
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Philosophers have generally assumed that scientific knowledge is represented linguistically. But biologists rely far more extensively on visual representations—especially graphs and diagrams. What is of particular interest is the inventiveness biologists have exhibited in developing new visual representation formats. My contention is that we can productively turn to the history of biology to understand how developing new representational formats figures in scientific discovery. This starts with the very characterization of biological phenomena—they are often discovered and delineated through the creation of appropriate graphs. Likewise, identifying what factors stand in explanatory relations to phenomena is often revealed and understood by developing and deploying graphing techniques. Finally, proposed mechanisms have often been conceptualized using diagrams. History of biology provides a rich reservoir for enriching our understanding of ways biological knowledge is represented and the work that goes into developing new representational formats.

Research on developmental constraints in the 1980s, and its relevance to current work on evolvability
Ingo Brigandt
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University of Alberta

The concept of developmental constraint was at the heart of developmental approaches to evolution of the 1980s. It is well-known that this idea was used to criticize neo-Darwinian evolutionary theory, in particular adaptationism. Yet mere criticism does not yield an alternative framework that would actually offer evolutionary explanations, as provided by contemporary evo-devo research on evolvability and evolutionary novelty. However, my account of how the concept of developmental constraint was employed in the 1980s shows that it was part of a positive explanatory agenda on the possibility and facilitation of macroevolutionary transformation, which has implications for current work on evolvability.

The Epistemology of Data-Intensive Science: Integrating History, Philosophy and Social Studies of Data Practices
Sabina Leonelli
Department of Sociology, Philosophy and Anthropology
University of Exeter

This paper reports on ongoing efforts to study the movement of scientific data from their production site to many other sites of use within or beyond the same discipline, from both an empirical and a philosophical standpoint. Empirically, the study is grounded on the reconstruction of specific data journeys within four research areas: plant biology, model organism biology, biomedicine and oceanography. Philosophically, the study aims to analyse the conditions under which data travel across research situations, and what implications this has for the epistemology of science.

Reductionism in the Philosophy of Biology: What a Little History Does to the Debates

Sahotra Sarkar
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Reductionism, especially in the context of the molecularization of biology, was vigorously debated by philosophers of biology in the 1970s and 1980s (e.g., Hull 1972; Schaffner 1974; Wimsatt 1976; Kitcher 1984). This debate drew on analyses of reduction which go back to Nagel's (1949) pioneering treatment but which had taken a metaphysical turn in the 1960s (Causey 1967). By the 1980s there was a consensus that reductionism was not rtelevant to molecular biology. This paper argues that this consensus was achieved by ignoring the history of molecular biology in favor or armchair analytic philosophy of science (e.g., Kitcher 1984).
Once that history is given due attention, four theses emerge: (1) Any view that denies reductionism entirely with respect to molecular biology is blatantly at odds with the self-perceptions of early molecular biologists. (2) Reductionism was widely debated within biology in the 1920s and 1930s in the period leading to the establishment of molecular biology as an autonomous discipline. (3) Research programs within the new molecular biology (e.g., Pauling) treated issues connected to reductionism in explicit detail. (4) These discussions required attention to scientific subtleties that were ignored in the philosophical discussions of the 1970s and1980s. (5) The extent to which reductionism is correct was and remains problematic within molecular biology.
Rethinking 'population thinking'

The role of genetics theory in animal breeding

Bert Theunissen
Faculty of Science and Faculty of Humanities
Utrecht University

It has long been assumed that Mendelian genetics brought about a revolution in plant breeding. In recent decades, historians have shown that the crucial importance of genetic theory for plant breeding can be questioned. In our research on the history of animal breeding we have found the role of genetics to have been marginal. Practical breeding methods have not fundamentally changed after 1900 and have remained consistent with nineteenth-century theories about heredity. Nevertheless, quantitative geneticists have played a central role in animal breeding. I shall argue that it was not so much their insights into hereditary theory that explains this role, but rather their powerful capacity to rationalize breeding methods. Genetics theory legitimated their approach, but did not guide it.

Rethinking 'population thinking'

Joeri Witteveen
Faculty of Humanities
Utrecht University

If Ernst Mayr (1904-2005) is to be believed, 'population thinking' marks an important breakthrough in metaphysics. Mayr characterized population thinking as an approach to biological phenomena that recognizes them for their biological ontology, as opposed to their physical, chemical, or, more generally 'typological' constitution. There are good reasons to be skeptical about Mayr's population/typology distinction. A close look at it's genesis shows that it is a conflation—a mixture of cross-cutting methodological, conceptual and theoretical distinctions that Mayr 'compacted' into what thereby became a virtually meaningless construct (Witteveen, 2015; in press). However, this

same origination history can also lead the way in recovering a meaningful set of distinct and cross-cutting typology/population distinctions that inform ongoing debates in the philosophy of biology.