endnotes, allowing "as much personal detail as possible." One of the major strength's is the appendices which comprise listings of rectors and pro-rectors, deans, faculty, department and estate histories, student data, government funding and sources, among a variety of other insightful information.

There are some deficiencies that range from minor organizational nuisances to ill-defined assertions. Sifting through endnotes for equally lengthy chapters can be distracting and overwhelming. Furthermore, I was confused by the assertion that an overall synthetic perspective regarding the "public sphere of science" is impossible, for this depicts science as a "many-centered market place with no controlling hand." She continues to paradoxically assert that in the market place of science there is "little room for the skeptic." How does one maintain a many-centered market place of science without acknowledging the importance of skepticism? Finally, she muddles the meaning of science significantly, confusing the impossibility of a unified public vision of science with the lack of unifying principles in science itself.

In sum, accessibility and vast reference material justifies *The History of Imperial College London's* place on the bookshelf of any institutional historian of science and technology. Gay has provided a well-researched glimpse into the broader role of higher education in 20th century British history.

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JEAN-CLAUDE PONT, LAURENT FRELAND, FLAVIA PADOVANI, LILIA SLAVINSKAIA (eds), *Pour comprendre le XIXème siècle. Histoire et philosophie des sciences à la fin du siècle*, Genève: Leo Olschki Editore, 2007, xlviii + 543 pp., illus., € 56,00.

This book presents a synoptic view of the methodological and epistemological debates in the various sciences in the 19th century. Its first originality is the choice of documents on which the authors elaborated their view: they deal with prefaces, manifests, introductions, etc., of science books or journals. It is intended to reconstruct the way scientists themselves understood what they were aiming at, and which controversies they wanted to solve.

The scope of the book is wide, both in terms of disciplines considered, and of periods covered. This extension matches with the lengthy introduction written by Jean-Claude Pont, which tries to sketch the evolution of the general vision of science during the century, evolving from a kind of scientism to a loss of faith in scientific realism characterized by various brands of nominalism, conventionalism, etc. This coarse-grained view of the evolution of philosophy of science, casting some light on the genesis of important movements in the philosophy of science at the end of the century, is thereby supported by the case studies in the book, which deal with the way scientists themselves conceived of their work. Given such a general intent, it is justified and welcomed that the studies range from algebra to psychology and geography. In this context, case studies consider works that belong to pure science (like the methodology of writing botany according to de Candolle, analyzed by Jean-Marc Drouin) as well as works belonging directly to philosophy of science, like Alois Hofler's analyzed by Anouk Barberousse and Nadine de Courtenay, or the introductory texts by Pearson to *Biometrika* (analysed by Jean Gayon), vindicating a phenomenalist philosophy of science. The requisite of formal precision and the correlative concern of formalizing science, is also considered by some papers about mathematics (Smadja, Pont, Gardies) – Gardies showing that the idea of distinguishing

types, so essential in 20th century logics with Russell and Whitehead's *Prinicpia* had a prehistory which ran across the 19th century. Even if one does not endorse Pont's historical reconstruction of the ideas of science in the century, the whole book provides precious insights into the complex processes which led to the rise of the main 20th century philosophies of science that we know: logical positivism, conventionalism, pragmatism, etc.

Notwithstanding the varieties of disciplines considered, several common themes emerge from the book and form a common core of the image of science elaborated in those decades. First, the idea that science results from a structured collective activity emerges in several contributions: Darrigol investigating Poincaré's idea of mathematical physics highlights the notion of "national tradition" in Poincaré's own analyses, Jean-Louis Fischer on the preface by Carl Vogt to Darwin's book on variation emphasizes how only the cooperation of practitioners like breeders and theoricians allowed the understanding of variation and inheritance, and Drouin shows how botany according to Alphonse de Candolle (1880) is built and improved as a progressive collective work.

A second emerging theme is what Pont in his preface pinpointed as an increasing sceptisim about realism in science. In several fields scientists gave up on identifying the real entities in the world, hence switching to the idea that scientific truth in stead concerns regular relationships. For instance, Darrigol analyzes how Poincaré distinguishes his conventionalism from skepticism because the "*rapports*" are grasped by scientific theories, while Gayon shows how Pearson, inspired by Mach, extended to biological issues like inheritance and selection the belief that science only captures the relations between appearances. As Gayon interestingly shows, such phenomenism (perhaps contrary to the case of physics) appeared inadequate to the further progresses in biology, namely the Modern Synthesis (because it opposed Mendelism).

A third theme pervasive in names of papers is the delimitation of disciplines which was highly debated across the centuries. Several prefaces and preliminary texts, according to their very definition, tend to settle the territory of the scientific work introduced. For example, Blanckaert shows that founders of anthropology like Broca, Topinard or Manouvrier, in their texts about their discipline, debated about the relationships between this knowledge and already constituted sciences like medicine or psychology, or discourses like law and politics. Interestingly, analyzing the introduction to Quatrefages's *The unity of human species*, Acot shows in the same way that the author's arguments, not very convincing if they are taken separately, belong to several fields – paleontology, physiology and even religion. The anthropological discourse as such has no proper territory and comparing Acot's paper to Blanckaert's shows us that between 1861 and 1900, anthropology indeed acquired the boundaries of a specific scientific field. The same question of delimiting an arising science appears in Gohau's paper on Elie de Beaumont and stratigraphy, showing that de Beaumont's strange notion of stratigraphy relies on a general idea of geology which is not the one we are used to consider. On the other hand, Stéphane Tirard scrutinizing William Thomson's arguments against spontaneous generation and for panspermia shows that history of life and history of earth were not intertwined in the way they are for us. In geography, problems of delimiting scientific field are also unveiled: Marie-Vic Ozouf-Marignier establishes that historians and moralists that would be allowed to write in the *Revue de Geographie* around 1877 we are excluded from the more recent *Annales de géographie* launched in 1891.

For the HPLS reader, the issues in life science often revolve around Darwinism. Early Darwinians and reactions to Darwin – like Vogt by Jean-Louis Fischer, Alphonse de Candolle by Drouin, Thomson by Tirard – are the target of the articles. The prefaces and introductory texts here considered give a good idea of the importance of dealing with

Darwin for people of various fields and nations – either taking him as a new essential perspective, or as a theorist one must refute. Interestingly, the focus is on aspects of Darwinism often taken as peripheral: the place of breeders and farmers, the art of writing botany, the history of earth, the meaning of "social Darwinism," which La Vergata shows to be a phrase coined for depreciative purpose (and then he determines to what extent Darwin himself was a social Darwinist).

Given the very project of the book, focusing on preliminary texts, one expects the result to be a refining and a precision of what history of science already establishes, rather than a potentially radical rewriting of this history. In these limits, the book is indeed a precious mine of original insights into the making of 20th century science and philosophy of science. Given its wide scope, it can also be used by a non specialist to get a first grasp on this complex multiplicity of scientists and theories. Moreover, it might be useful for a specialist of one field who would like to broaden his view of 19th century in order to put his own object into a wider perspective.

To this regard, I regret that a few important elements are missing. Even if no enterprise can be exhaustive, the section of life sciences would have benefited from a paper about Claude Bernard's prefaces to some of his books, because here he is dealing with the very nature of scientific physiology in the context of general questions about determinism – given that determinism proved later so important in the philosophy of science. Second, the rise of statistical thinking in general (see books by Hacking, Daston, etc.) was surely important in the evolution sketched by Pont's preface regarding the attitudes toward science, and the book would have benefited including some pages or chapters about this novelty. Third, the philosophical reader would note the absence of key figures in the 19th century philosophical debate about sciences, first of all Kant, who is the main reference for many of the physicists and mathematicians debating the meaning of their disciplines at this period – and then *Naturphilosophie*, whose importance for the life sciences has been huge, as Phillip Sloan, Robert Richards, and others recently highlighted. Johannes Müller, Owen, Schwann, Schleiden, even du Bois-Reymond and others, forged their idea of what science should be in a more or less critical discussion with the *Naturphilosopher's* thesis.

However, even with those reservations the book is impressive both in its wide ranging scope, and in the precision and often the originality of the case studies offered. Besides, it is clearly written and easy to read.

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EDNA SUÁREZ DIAZ (ed.), *Variedad Infinita. Ciencia y Representación. Un Enfoque Histórico y Filosófico*, Mexico, D. F.: Limusa, 2007, 416 pp., illus., $169.00 MXP.

As the title indicates, this volume contains essays dealing with the topic of representation in science. Besides a general introduction, the volume is divided in four parts: Theories and representation; Perception and representation; Case studies I. Historical survey of representations; and Case studies II. Diversity of functions of representations.

In the introduction, the editor, Edna Suárez, provides an informative and insightful historical overview of how science studies scholars have come to acknowledge representation as a central practice in science. As she notes, in the last two decades researchers have explored the ubiquity and heterogeneity of scientific representations (tables, pictures, photographs, models, graphs, and so on), as well as the variety of functions