encore peu courante qu'on retrouve néanmoins avec les travaux de Nicholas J. Wade, Gérard Simon, Dominique Raynaud [8], et Gül A. Russell. Les travaux non encore publiés de cette dernière nous laissent espérer de nouvelles découvertes esquissées dans ses conférences sur les conceptions cognitives de la perception visuelle d'Ibn al-Haytham [9], dans la perspective générale du livre de Michel Imbert voyant dans l'Optique d'Ibn al-Haytham une véritable révolution cognitive, précédemment à la physiologie cérébrale cartésienne qui elle-même s'appuie en grande partie sur une analyse de la perception visuelle.

Jean-Gaël BARBARA

Vincent JULLIEN, *Ce que peuvent les sciences : Une enquête* (Paris : Éditions Matériologiques, 2020), 16 × 24 cm, 318 p., bibliogr., index nominum, coll. « Sciences & philosophie ».

As they said in the Library of Alexandria in Euclid's time, *mega biblion mega kakon*, a big book is a bad thing, a big evil. Vincent Jullien's inquiry on the nature of the sciences is a compendious, insightful, thoughtful, well written little book. Divided in three parts, it is organized as a commentary on, and defense of, historical epistemology as crucial to the practice of history and philosophy of science. The first part focuses on the very notion of historical epistemology as a metatheoretical tool for the historian and philosopher of science. The second part focuses on physico-mathematics, a term and a discipline that played a major role from classical antiquity up through the 18th century, and beyond, as it is connected to forms of mathematization in many fields, including biology. Jullien makes on it a case-study of sorts for historical epistemology. The third part turns to the fundamental issues related to the progress of knowledge. The book pays a lot of attention to the sciences not traditionally placed under the umbrella of mathematics, with fascinating discussions that have been recently developed about the notion of genes, neo-Lamarckism, and so on. It also includes a perceptive discussion of the new methodological perspectives opened by Big Data algorithms and tools.

Historical epistemology is a tricky notion that has been understood in different ways by different people. First emerging in connection with the genetic epistemology introduced by Piaget's school, historical epistemology points to an understanding of the growth of knowledge that is built in time, by stages. Speaking of science, historical epistemology is set in opposition to the philosophy of scientific knowledge usually described as logical positivism or empiricism. In the latter school the essence of scientific knowledge is assumed to rest in the logical structure that binds together experimental data, formalized concepts, mathematics,

8 - Gérard Simon, L'Optique d'Ibn al-Haytham et la tradition ptoléméenne, *Arabic sciences and philosophy*, vol. 2 (1992), 203-235 ; Gérard Simon, The Gaze in Ibn al-Haytham, *The medieval history journal*, vol. 9 (2006), 89-98 ; Dominique Raynaud, Ibn al-Haytham sur la vision binoculaire : Un précurseur de l'optique physiologique, *Arabic sciences and philosophy*, vol. 13 (2003), 79-99.

9 - Voir J.-G. Barbara, La théorie de la vision d'Ibn al-Haytham (X^e^-XI^e^ siècle) dans l'histoire des neurosciences, *Lettre des neurosciences*, vol. 60 (2021), 4-9, https://www.neurosciences.asso.fr/qui-sommes-nous/la-lettre.

system building, and experimental tests. History plays no role here, or at best a merely anecdotal one to describe the "context of discovery." In contradistinction, historical epistemology sets scientific knowledge squarely in historical time. It takes historical growth to be of the essence of science.

Some radical versions of the historical approach turn scientific experimental knowledge largely into a description of nature that is historically and socially contingent. Not Vincent Jullien's version. He takes a carefully balanced course between the history of scientific concepts and theories on the one hand, and their proper logical structure on the other, which is radically non-historical according to him. In classical approaches to philosophy of science, knowing nature is a duo affair between nature and humans thinking about and experimenting with nature. Sociological approaches to the philosophy of science no longer take nature to be an independent actor. In them the duo has collapsed into just one (solipsistic ?) actor, namely social humans and their endeavors to "construct" nature out of social agendas and agreements. In Jullien's account the story becomes a trio – nature, humans, and "the sciences" – which can obviously not be identified with nature, but are also endowed with their own life, consistency, and logic. This is most dramatically suggested by the anthropomorphic language attributed to the sciences : "Ce que *peuvent les sciences*" (title page), "les théories scientifiques *ont permis* l'obtention [de] quantité de connaissances sur la manière dont la nature *se présente* à nous" (p. 195), "les connaissances que les sciences *nous ont permis d'acquérir*," "théories qui… *ont fait naître* [connaissances]" (p. 196) (emphasis always added).

Now, trios are notoriously more complex and difficult to handle than duos, not to mention units, and yet they have their uses. His three-cornered approach allows Jullien to epistemologically demarcate his actors. Nature is the seat of an objective reality, in whose existence Jullien believes (I should add that I missed some enlightenment about the grounds on which his faith on the existence of objective reality rests). Human actors, set in historical time and social context, build scientific theories out of the technical and intellectual tools at their disposal. Scientific theories succeed one another in explaining nature. Why is it so ? What makes scientific knowledge progress ? In fact, is there any progress at all ?

These cluster of questions, which reappear once and again throughout the book, leads to a highly interesting discussion. By reviewing the classics (Kuhn, Nagel, Popper, Duhem, Bachelard, and so on), Jullien provides a cogent account of the limitations of classical ways of explaining scientific progress, which leads him to two related but distinct insights. Science is not an activity that takes humanity ever closer (asymptotically closer, Jullien artfully puts it) to the objective truth embodied in nature. (I agree here with Jullien's main arguments and conclusion, although it seems to me there is a tacit, not properly addressed tension between this thesis and Jullien's faith in the existence of some objective reality.) Why, then, new theories supersede older ones ? What makes theories obsolete, if they cannot be said to get ever nearer to the truth ? Interestingly Jullien makes hardly any reference to pragmatic considerations, to the applications, utilities, or practical benefits science did and does provide. It is not here that he finds an explanation for what makes a theory successful. His key concept is *puissance* (power, potency).

It is the greater *puissance* of a theory that makes it supersede older ones. No full discussion of the concept is provided, yet the idea seems strongly related to the capacity of opening new perspectives and posing new fruitful questions (more about this presently). Unfortunately, the reader is left with a powerful but tantalizing intuition, rather than with a clear idea of what specifically makes some theories preferable to others.

Regardless, Jullien relates this concept to another happy formula, "the increase of ignorance." Science grows and demonstrates its power by increasing our ignorance, is the Socratic (and somewhat oxymoronic) aphorism in which Jullien encapsulates his understanding of science. Avowedly "ignorance" is a provocative word in this context, and yet it seems to me the right word. It effectively works against the illusion that science might take humanity nearer to some form of final or definitive truth. Moreover, it usefully points to what is still missed or needed rather than to what is for the time being acquired or known.

Quite apart from the many agreements and some disagreements with Jullien's views as set forth here, this is one of the most stimulating books about the nature of both science and the history of science that I have recently read.

Antoni MALET

Franklin LAMBERT et Frits BERENDS, *Vous avez dit sabbat de sorcières ? La singulière histoire des premiers conseils Solvay* (Les Ulis : EDP Sciences, 2019), préface Thibault Damour, 16 × 24 cm, XVI-322 p., 60 ill. n. et bl., bibliogr., index nominum, table, coll. « Sciences & histoire ».

Le premier conseil de physique Solvay de 1911 est bien connu par la photo qui en a été faite montrant les principaux acteurs de la révolution des quanta réunis pour débattre des récentes découvertes expérimentales et théoriques. Mais peu d'études abordent de façon aussi détaillée les motivations des promoteurs de cette entreprise comme F. Lambert et F. Berends le font dans les 9 chapitres de leur ouvrage. Ces auteurs travaillent depuis très longtemps le sujet. En 2011, avec M. Eckert, ils organisaient un colloque à Bruxelles dans le cadre du centenaire des Conseils Solvay, dont les actes ont été publiés dans l'*European physical journal special topics* en 2015 [1].

L'étude de la correspondance échangée entre les acteurs principaux fait apparaître les motivations des uns et des autres, souvent différentes mais complémentaires. Qui sont ces acteurs ? Tout d'abord, Ernest Solvay, industriel de génie qui en 1863 déposait un brevet sur la production industrielle du carbonate de sodium

1 - F. Lambert, F. Berends, et M. Eckert (éd.), « The early Solvay councils and the advent of the quantum era », *EPJST*, vol. 224, 10 (septembre 2015), https://link.springer.com/journal/11734/volumes-and-issues/224-10. Voir aussi F. Lambert et F. Berends, Une « première mondiale » en physique : Le Conseil Solvay de 1911 (Bruxelles : Archives et Bibliothèques de l'Université libre de Bruxelles, 2011).