Raffaele Pisano, Joseph Agassi, and Daria Drozdova, *Hypotheses and Perspectives in the History and Philosophy of Science: Homage to Alexandre Koyré 1892-1964*, New York: Springer International Publishing, 2017, 482 pp., £109.99, ISBN: 9783319617121

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Alexander Koyré is at the center of the 21 papers included in this work, from which several interconnecting and overlapping key understandings emerge. The introduction suggests four different angles of study:

1) The occasion, starting from Koyrè's intellectual background, for an interdisciplinary reflection on the philosophical history of science

2) An interlacing of the history of scientific, epistemological and philosophical thought

3) The main concept of the scientific revolution and the birth of modern science

4) An analysis of historical epistemology and philosophical categories of investigations

In this review, I would like to reduce them to three, although keeping them close to the ones proposed by the editors with extra emphasis on the phenomenological inheritance in Koyrè. In the first instance, the book can be seen as a historical examination of the "history of science" as a discipline. Koyré takes center stage as the father of the new historiography by leading the philosophical enterprise from the legacy of Sarton and Duhem to the post-Kuhnian tradition. Second, the collection is a study of the scientific breakthrough of modern philosophy through the analysis of major figures such as Galileo, Descartes, Copernicus, Pascal and Kepler. Here, some charges of one-sidedness or obsolescence (specifically regarding the debate on Galileo) are applied to Koyré. Finally, the text offers insight into the Göttingen Circle and the beginnings of the phenomenological movement. As a student of Husserl, Koyrè found himself not only strongly influenced but also personally involved in the dramatic debate triggered by the "transcendental turn." My review will be structured according to these three reading keys.

From the old to the new historiography of science

J. C. Pinto de Oliveira and Amelia J. Oliveira introduced Sarton in a quite original and indirect comparison with Thomas Kuhn to underline the main differences between the old and new historiographies. They recognize the founder of the history of science as a Whig thinker. Sarton saw the *gradual* conquest of objective truth as playing a major role in the overcoming of violence, intolerance, error and superstition. In a most Baconian and positive fashion, rationalism and experimentalism are then underlined in Sarton as the real engines of scientific development. On the other side, the new historiography (and Kuhn here recognizes Koyré's legacy) "viewed these 'prejudices' or 'points of view' and 'principles' or 'conceptual frameworks', not as impediments but as essential to the development of science."[33]

Agassi revises the mentioned experimentalist and gradualist ideas by introducing the main feature of Koyré's thinking, namely the role of trans-scientific concepts for the possibility of the scientific enterprise. Moving away from the Baconian inheritance on one side and the Duhemian idea of continuous development on the other, Koyré introduced qualitative changes and "showed the relevance of both theology and metaphysics to the scientific revolution."[34] For the author of the *Études galiléennes,* it is effectively within space, intended as a "complex network of trans-scientific ideas such as philosophical, metaphysical and also religious ones,"[35] where human thought reveals its unity and interconnection. Following Koyré, once errors, *Idola* and metaphysics are set aside, not much remains to explain scientific dynamics. Drago states this clearly when he considers that this feature, the introduction of the historical (regarding contextual time), cultural and philosophical/metaphysical context, is what enabled Koyré to overcome traditional history more than any subsequent historians.[36]

The contextualization of the debate, the introduction of the conti-

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[33] Raffaele Pisano, Joseph Agassi, and Daria Drozdova, *Hypotheses and Perspectives in the History and Philosophy of Science: Homage to Alexandre Koyré 1892-1964* (New York: Springer International Publishing, 2017), 290.
[34] Ibid., 7.
[35] Ibid., 19.
[36] Ibid., 124.

nuity/discontinuity dichotomy and the role of external ideas as relevant factors for theoretical improvement, are the parts of Koyré's legacy that most influenced Kuhn to develop his dynamic of scientific development. All of his best-known conceptual tools, such as "community," "normal/revolutionary science," "problem solving" and "paradigm shift," can be seen as an attempt to encompass the entire previous debate within the discipline. Schuster suggests that the originality of the author of *The Structure of Scientific Revolutions* was to make visible a model and a dynamic that was hidden within Koyré's textual analysis. However, at the very core of his paper, he shows how Kuhn's sociological and psychological position goes beyond the two historians. Indeed, several authors discuss Koyré's internalist position and its strong rejection of social dynamics as possible explanations for the emergence of the modern revolution. Strongly critical of the Marxist approach and Edgar Zilsel's position, Koyré was more prone to state that "the sociological 'why' explains the 'necessary conditions,' [while] the theoretical or metaphysical 'why' explains the 'sufficient conditions'."[37] The rejection of any social context seems the blind spot of Koyré's history of science; it was something which, on the contrary, Kuhn never overlooked. Raven gives us a better insight into this idea by showing us how the elements of the dichotomies, such as theoretical/experimental or theory/practice, reflect two different socio-cultural spheres, respectively the scholars' and the artisans' conception of knowledge. Neither of the two seemed able to develop modernity without a mutual confluence which, according to Raven, was possible at an institutional level.

Finally, it is worth mentioning that Ferrari offers an interesting parallel between Koyré and Cassirer. He underlines how they independently embraced and discussed remarkably close ideas such as "scientific revolution" and the active role of philosophy in its origins and development, although starting from different traditions (phenomenological in the former and neo-Kantian in the latter). The author regrets that Cassirer's position never received appropriate recognition from the historians of science. His being part of a fading neo-Kantian tradition is proposed as one possible reason for the eclipse of his insights.

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[37] Ibid., 55.

Koyré's methodology and the role of trans-scientific Ideas in modern Science

Koyré's methodology was based on a deep analysis, which we might call hermeneutical, of original sources and it strived to understand the network of ideas that led to the emergence of the modern scientific enterprise. His work illustrates a huge range of philosophical, metaphysical and religious concepts directly linked with scientific development. The authors in this collection name them "trans-scientific ideas." The papers agree on the main features introduced by Koyré when referring to his idea of scientific revolution. Drozdova unfolds them in four different overlapping concepts: the mathematization of nature; the geometrization of space; the transition from the world of more or less to the universe of precision; and moving from the closed world to the open universe. Koyré highlighted these as the key new attitudes which, external to purely experimental research and discoveries, opened up the possibility of modern scientific development.

Galileo was the key figure of Koyre's study. His quoting of the well-known statement that the book of nature is written in "the language of mathematics" is considered one of the main proofs of an underlying Platonism within the work of the author of the *Discorsi*. In this sense, Koyré's approach shows an outstanding similarity with Husserl's *Krisis,* which I will refer to later in the review. The main idea is that the overlaying of a metaphysical construction on the physical cosmos allows Galileo to trigger the new conception of science intended as an everlasting mastery of nature. Koyré held such a belief to the detriment of the experimentalist approach. By analyzing the biographical and theoretical facts behind Galileo's leaning tower of Pisa Experiment, Crapanzano states that Koyré's disproving of the experiment "is indeed functional to the affirming of [his] perspective on the genesis of scientific theories."[38] A similar concept is underlined by Gaukroger when he affirms that Koyré, by drawing attention to the metaphysical dimension of scientific question, effectively translated the latter into the former.[39] A critique of the one-sidedness of Koyré's work is thus visibly present over the col-

[38] Ibid., 82.
[39] Ibid., 179.

lection. However, De Caro argues that such a criticism cannot only be applied to Koyré but must also be discussed in relation to Galileo and the several later interpretations in Platonist, Aristotelian and Archimedean terms. He is more prone to treat as obsolete the "debate on the prevailing philosophical underpinnings of the Scientific Revolution."[40] Finally, it is Jorland who defends Koyré's position when he affirms that "he could not mean that Galileo was a self-conscious follower of Plato, but rather that, willy-nilly, what he achieved was the accomplishment of Platonism."[41]

Descartes is Koyré's second source on the path to the already mentioned mathematization/geometrization of nature, which was one of the main features of the Scientific Revolution of the seventeenth century. Just as in the case study of Galileo's interpretation above, Gaukroger affirms that Koyré's reduction to the metaphysical was a major cause for overlooking the real reason behind Descartes' refusal of the void. As Gaukroger says, "Koyré assumes that what motivates Descartes' rejection of the idea [...] are *a priori* epistemological and metaphysical arguments about the void deriving from Aristotle and the Stoics."[42] Consequently, "he misses [...] one of the most significant conceptual parting of ways in the seventeenth-century physical theory: the rift between hydrostatic/statical models for dynamic and kinematic ones."[43] Hartz and Lewtas devote a chapter to Descartes' trans-scientific idea of theological voluntarism, namely the idea that God will determine both normative and contradictory aspects of reality which are independent of God's own thought, and ask whether it represents a coherent argument within his philosophy. They agree with Koyré that "voluntarism undermines the major arguments (including the cogito) in the *Meditations* by making them logically or normatively circular."[44] On the other hand, they part from the historian when he affirms that Descartes abandoned the idea toward the end of his life, in order to protect his philosophical system. A position that, according to the authors, he never rejected.

Koyré gave a lot of importance to astronomical studies and their

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[40] Ibid., 85-86.
[41] Ibid., 220-221.
[42] Ibid.. 183.
[43] Ibid., 187.
[44] Ibid., 189.

authors. A particular interest was the study of Kepler. The collection refers especially to two trans-scientific concepts that, following Koyré, affected the astronomer's work both positively and negatively: the harmony of the spheres and the belief in a finite universe. Lombardi reveals how in his 1961 book *La révolution astronomique,* Koyré asks himself if it is plausible that Kepler arrived at his "Third Law" only by "trial and error."[45] Not being convinced by a purely accidental discovery, he turns to the astronomer's classical background and spots a key role played by the scientist's contemporaneous musical interests. Koyré was a pioneer in giving "importance to the discipline of music as a key to understanding some crucial passages in the Scientific Revolution of the seventeenth century."[46] Pisano and Bussotti offer insight into how a second metaphysical belief stopped Kepler from believing in an infinite universe, the main feature of Koyré's explanation regarding the possibility of the scientific revolution. The historian asserted that Kepler's universe is linked to several Aristotelian concepts which effectively prevent it from moving beyond the concept of finitude. However, the authors assert that Koyré gave too much importance to Kepler's classical background and that such trans-scientific ideas still stand within the corpus of the interpretations of the astronomical revolution.

Descotes finally brings to readers Koyré's few references to Pascal's thought. The papers devoted to the French philosopher recall a critique of experimentalism that was already mentioned in relation to Galileo's leaning tower experiment. Koyré argues that Pascal's Rouen experiments, dedicated to the discovery of the vacuum, are far from clear: something seems concealed from us. In his opinion, it was performed and described only to "prepare the reader to admit the physical theories."[47] Koyré's argument regarding Pascal can be criticized, nevertheless, he is credited with having first perceived the active role of rhetoric and persuasion within the philosophical enterprise.

[45] Ibid., 234.
[46] Ibid., 225.
[47] Ibid., 120.

Phenomenological background in Koyré's life and thought

The collection often refers to the weight of his phenomenological formation in Koyré's lifework, and Parker gives us the best insight into the matter by reviewing the primary sources and debate. Where biography is concerned, the authors tend to focus or simply mention the relationship with Husserl and Koyré's departure for Paris after the founder of phenomenology decided not to accept his thesis on paradoxes. Starting from a more philosophical perspective, the author argues that Koyré's work (despite his not being conscious of the weight of any phenomenological background) "can (and perhaps ought to) be read as an extension of Husserl's project, specifically the historical–teleological way into phenomenology that Husserl sketched in his *Crisis* writings from the 1930s."[48] Further theoretical analysis of Koyré's thought might be necessary to verify such a thesis. Sticking with the collection, we can sketch two possible points regarding Koyre's similarities with Husserl's last work, the *Krisis*:

1. Stoffel, in his analysis of the anthropological consequences of the Copernican Revolution, recognizes as part of Koyré's legacy the critical insight regarding the divorce between the "world of science" and the "world of life." A position that directly recalls Husserl's *Krisis* and the forgotten "lifeworld." My view is that the concept of the "lifeworld," as a pre-given and pre-reflective everyday world, fits that complex network of trans-scientific ideas already mentioned and which might relate Koyré to a more hermeneutical phenomenology.

2. The second similarity relates to the concept of the "mathematization of Nature," which lies at the very core of Koyré's Galilean studies and is also a quite familiar concept of Husserl's *Krisis.* The ideas overlap so strikingly that it makes it very difficult not to accept a kind of mutual influence.

Further parentheses must be opened regarding Koyré's period in Paris. He is sometimes mentioned as an indirect contributor to phenomenology, which at the time strongly merged with Heidegger's thought. Yampolskaya mentions, however, that "Koyré's affiliation to the [French] phenomenological movement is debatable, his thought owes much to Husserl's phe-

[48] Ibid., 246.

nomenological method."[49] According to her, links are made to phenomenological thinkers such as Levinas and Henry.

A final discussion concerns the debate whether a Hegelian interpretation of Koyré is necessary. The collection gives us four different references to this topic. While Braverman suggests that the Hegelian dialectic stands behind Koyré's analysis of mistakes,[50] Agassi is more prone to accept the idea of a Platonic dialectic, directly criticizing Stump's assertion that the label of "Hegelian" is more appropriate when speaking of Koyré's work.[51] A different analysis must be opened regarding the possible involvement of Koyré (either directly or indirectly) in contributing to the Hegelian influence on the development of French phenomenology. Far from giving an extensive analysis, the collection offers two opposite interpretations by Parker and Yampolskaya. While the former asserts that the compenetration of the two philosophies seems more the doing of Kojève, who in 1933 took over Koyré's course,[52] the latter rejects the idea by affirming that "it was indeed Alexandre Koyré who was responsible not only for the anthropological but also for the neo-Hegelian twist in early French phenomenology."[53]

Supplying a final word on the debate included in the collection is not part of the plan of this review, which is only interested in highlighting some emerging concepts for possible further development. Following the editors' suggestions, I have tried to develop three reading angles (which are far from being exhaustive) to help anyone interested in the work to gain a homogeneous view that is far from the nature of a collection.

[49] Ibid., 453.
[50] Ibid., 25.
[51] Ibid., 15.
[52] Ibid., 265.
[53] Ibid., 455.