

BOOK REVIEWS

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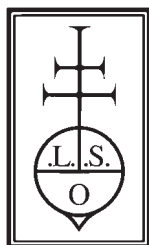
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BOOK REVIEWS

GIANENRICO BERNASCONI, SUSANNE THÜRIGEN (eds.), 2020. *Material Histories of Time: Objects and Practices, 14th-19th Centuries*, Berlin, De Gruyter, 226 pp., 63 ill.

This elegant volume is a bilingual collection of fifteen (including the introduction) essays in English (nine) and French (six). It is based on the homonymous conference held in 2017 at the Musée international d'horlogerie – La Chaux-de-Fonds. In their introductory essay on Urs Graf's 1505-1508 drawing of a *Man with a Pocket Sundial*, the editors state that "the relationship between objects and practices is the focus of the present volume," the aim of which "is to foster a dialogue between two different approaches to the history of horology and of time culture. On the one hand is that of historians, curators and conservators [...]. This approach hinges on an in-depth knowledge of the technical and scientific history of sundials, sandglasses, clocks, watches, etc. On the other hand is the approach of scholars who consider the cultural and social history of the temporal organization of societies" (pp. 10-11). As a result, the book offers a broad and diverse range of short case-studies on time, many of them faithful to this interdisciplinary goal.

This interdisciplinarity makes it difficult to find a specific historiography the book is contributing to: each essay refers to a different field, sometimes drawing upon previous works, some other times presenting new case studies. At first sight the multiplicity of scattered topics covering nearly six hundred years of Western history could be perceived as a weakness, especially if one were expecting a more focussed and consistent collection of essays. Some reader might feel frustrated by the great variety of the topics taken into account, also considering that the first (and longest) essay of the collection appears to be slightly detached from the main focus of the book.

In my opinion, however, this wealth of topics and approaches proves to be a strength of the volume: although this book is not a companion to the history of time and horology, its assortment of subjects and chronologies makes it an interesting reading for both art historian and historian of science and technology in search for inspiring views on time-related topics, as well as for the general public fascinated with horology and the cultural history of time in Early Modern Europe – and in one case North America. I personally liked the fact that some of the essays were endorsing opposed views on the impact of watches in Early

Modern societies. Regrettably, no index of names, no reference lists at the end of the essays, and no general bibliography are included – and this is no minor shortcoming for an academic book. Yet, the sixty-three illustrations succeed in helping to visualize the different materiality of these stories.

Philip Cordez – director of the series *Object Studies in Art History* in which this volume is published – opens the book with an essay (pp. 17-40). Cordez shares in the scholarly interest that, especially after the 2017 exhibition, sprung up around a magnificent French Gothic object: the table fountain housed in the Denver Art Museum.¹ The author interprets this object as a representation of the fountain of youth. Cordez shows how this popular theme thrived in medieval literature and compares the fountain with an illuminated manuscript of the *Roman de Fauvel*, an allegorical musical satyr composed in 1317, shortly before the fountain is believed to have been crafted. Considering the political links of King Philippe V (1316-1322) at the time of his anointment, Cordez connects this table fountain to the patrons of the *Roman de Fauvel*, and of the parc d’Hesdin, with its famous fountains and automata. At first sight, the inclusion of a chapter like this in a collection of essays on time may seem a bit of a stretch; however, the myth of the fountain of youth, which represents the human desire to magically erase the effects of time from the human body, and the Heronian tradition behind such devices, which also embraced automata and clocks, can be considered somehow connected to the main theme of the book.

Günther Oestmann invites us to reconsider astronomic clocks – the most complex products of medieval and renaissance horology – as something far more symbolic than mere pieces of machinery (pp. 41-54). The case study here presented is the famous monumental clock of Strasbourg Cathedral, designed in the sixteenth century by Conrad Dasypodius, built by Isaak and Josia Habrecht, and painted by Tobias Stimmer. Oestmann traces back not just the medieval mechanical tradition of astronomical clocks, but also the social space in which the clock was placed. Oestmann shows how such a complex device was intended to represent the cosmological order of a God-crafted Universe. Oestmann also takes into account the humanist-Vitruvian background in which Dasypodius conceived such a project, to conclude with a testimony by Robert Boyle. Oestmann uses Boyle’s vision of the Strasbourg clock to introduce the seventeenth-century shift in the philosophical perception of God’s presence in nature, and consequently the decline of astronomical clocks.

With Victor Pérez-Álvarez’s essay, we move to a portable astronomical clock (pp. 55-70). This complex time-piece, displaying seven dials, is currently held in the Queens House (National Maritime Museum), Greenwich. Besides describing the many functions of this lavishly decorated late-sixteenth-century clock from Augsburg,

¹ (For a virtual reconstruction of how it functioned, see: <https://www.youtube.com/watch?v=4EnwcX8pPCQ>. For pictures and videos, see also: The Cleveland Museum of Art, 2017 “Table Fountain c. 1320-1340” <https://www.clevelandart.org/art/1924.859>).

burg, the author reconstructs its history and the reception. The clock was created for commercial, and political-religious reasons just after the Catholic Gregorian reform of the calendar and, indeed, it was set to display both the new and the old calendrical style. A printed instructional booklet from 1704 shows how this object was still considered a valuable collectable over a century later. The essay shows how complex the history of the authorship of clocks and scientific instruments can be: Pérez-Álvarez demonstrates that, although signed by a master, the clock was probably coo-crafted by a second person. Thanks to the method of comparing the punches from recognized workshops one can track back the interventions of different individuals on similar objects. I hope the Maritime Museum will make good use of this study and display the clock in a new showcase with all the useful information provided by the Pérez-Álvarez: this would make this beautiful but abstruse object readable to the general public.

Gerhard Dohrn-van Rossum, author of the best-selling *History of the Hour* (originally published in German with the title *Die Geschichte der Stunde. Uhren und-moderne Zeitordnung*, Hanser, 1991), has written an essay (pp. 71-88) that tackles the so-called 'Age of Hogarth,' characterized by "the appearance of a growing social class of merchants, shopkeepers, small employers, 'middling men,' apprentices, clerks: a new bourgeois class and an urban culture that supplanted aristocratic culture almost completely" (p. 76), which followed "new trends in social time and scheduling," and that consequently made great use of timepieces. Indeed, during the first half of the eighteenth century, London had become the world capital of clockmaking: according to the author, in this span of time, Britain produced the half of the 200.000 timepieces that were crafted in Europe. Hogarth's works are here taken as witnesses of what the author calls a 'Horological Revolution,' a concept that Gerrit Verhoeven attacks in his chapter of the present book. In a nutshell, the opposition between the two scholars revolved on whether interpreting the increase in production of pocket clocks as a rupture or in continuity with previous social practices involving time-keeping.

Marie-Agnés Dequidt's essay (pp. 89-102) shows that in eighteenth-century Paris clocks happened to be used by a vast array of people – much wider than one would think of. By examining the practices used by Parisian clockmakers and their strategies for navigating an increasingly competitive market, Dequidt explores both technical and aesthetical innovations. Based on different documents that he has uncovered, the author discusses the relationship between objects and practices as found in the archives of the Académie des sciences, clockmakers' treatises and accounting books.

With Gerrit Verhoeven's contribution (pp. 103-117) we go back to the other side of the Channel. The author has studied thousands of statements from London's supreme court of criminal justice, produced between 1774 and 1825. In light of this evidence, he confutes the traditional teleological narrative (also adopted, as previously seen, by Dohrn van-Rossum) that during the eighteenth century, pocket watches revolutionized traditional concepts of time and created a modern perception of a precise individual awareness of it. In fact, the documents analysed

demonstrate that public bells and night watches still played a paramount role in the community's awareness of time.

The next three essays deal with time from the standpoint of the "history of mobility:" Nicolas Verdier looks at the transformation of travelling practices involving the use of mechanical devices to measure distance and time. This essay (pp. 117-128) investigates the encounter between the odometer, an ancient instrument for measuring distances, and the new accurate timepieces. Catherine Herr-Laporte's (pp. 129-144) contribution also travels in the same direction, exploring the evolution of carriage clocks at a time of increasing mobility in Enlightenment culture. Finally, Grégoire Besson (pp. 145-156) explores the experience of time measurement by travellers in the era of Napoleon, highlighting practices and also disparities in the diffusion and reception of timepieces in different parts of Europe.

The next three essays discuss changes in the practices of time-keeping and time-measurement. Fabio Pruneri tackles a very large topic: in his essay (pp. 157-172), he attempts to investigate how, in some settings, time rhythms at school changed from the late Middle Ages to the Industrial Age. Gianenrico Bernasconi shows (pp. 173-186) how from the Enlightenment period indications of time-measurement were included in cookbooks, thus contributing to the formalization of food cultures. In his contribution (pp. 187-200), Marco Storni argues that the technologies to measure time used in Lavoisier's and Séguin's experiments on animal respiration were taken for granted by these actors. In this essay, Storni tries to conceptualize the phrase *Taken-for-Granted Knowledge* and suggests that it be made into an analytical tool. Recalling that during the seventeenth century "the measuring of time and the mechanism of the clock were objects of scientific inquiry" (p. 194), the author refers only to Huygens, and he does not pay due attention to other important contributions on the theme, such as the reflections on time-measurement in experimental practices at the court of Florence, from Galileo to the Accademia del Cimento. See for instance the considerations and uses of the bifilar pendulum and the pendulum-regulated clock as time-measurers in the experiments described in: MAGALOTTI Lorenzo (ed.), 1666. *Saggi di Naturali Esperienze*, Firenze, Cocchini, pp. XVI-XXII, and Vincenzo Viviani's letter on the pendulum-regulated clock in: ALBÈRI Eugenio (ed.), 1855. *Le opere di Galileo Galilei*, XIV, Firenze, Società Editrice Fiorentina, 341-356.

With Alexis McCrossen's essay we leave Europe. This author takes a look (pp. 201-210) at "Broken Watches" and the nineteenth-century American praxis of repair. Making use of David Edwards Hoxie's account book (for the period 1876-1883), McCrossen provides interesting insights on the use and ownership of pocket watches. The book ends with Johannes Graf's fascinating contribution (pp. 211-224) that, in the footsteps of recent studies on Peter Henlein's nineteenth-century fake watch, explores from both a material and historiographic standpoint the wooden clocks traditionally considered early Black Forest timepieces. Thus, Graf exposes the political and commercial agendas behind these forgeries and the consequent impact on the history of horology.

(This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101025015).

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PATRICK J. BONER (ed.), 2021. *Kepler's New Star (1604). Context and Controversy*, Leiden, Brill, 296 pp., 21 ill.

The volume aims to examine the writing Kepler devoted to the appearance in 1604 of a “new star” in the constellation of the Serpentarius. The Nova aroused the interest of astronomers, astrologers, and philosophers throughout Europe. The lively debate over the interpretation of this star, which resonated in different fields of early modern culture and society, also gave rise to apocalyptic predictions and astrological speculations, thus also involving discussions about prodigies and preternatural phenomena.

The volume gather ten chapters, originally presented at an homonymous conference organized by the Department of Philosophy at the University of Barcelona in 2017, documents the vast array of topics relating to Kepler's research on Nova. By intertwining Kepler's philosophical thought and sources together with his analysis of astronomical and optical phenomena, this collection of essays argues for the relevance of *De stella nova* in Kepler's cosmology, as well as in issues that concern his reform of both astrology and celestial physics – in particular, the enduring question of the cosmological *ordo*, the dimension of the universe, the finitude or infinity of the world, and the Christian interpretation of the sky. The discussions around the Nova relied on topics that had been largely debated by medieval commentators of Aristotle and the so-called “perspectivists,” such as celestial light, phenomena of solar light reflection, the corruptibility of the heavens, and the fluidity of the sky/heavens. The rich interplay of issues and sources that surfaced from Kepler's *De stella nova* can also be noted in other contemporary writings, in which the discussion on the new star led to reconsider the ontological status of the Moon. Among them, it is worth mentioning Galileo's public lectures on the Nova and several publications – written even in vernacular – that were issued between 1604 and 1605: specifically, Cecco di Ronchitti (pseudonym of Gerolamo Spinelli) published the *Dialogue on the New Star* (Padua 1605), Raffaello Gualterotti wrote a *Discourse on the appearance of the New Star* (Florence 1605), and Alimberto Mauri argued against Lodovico delle Colombe in his *Considerations on some points of Lodovico delle Colombe's “Discourse on the appeared star”* (Florence 1606).

The topics addressed in the opening chapters of this volume testify to Kepler's lasting concerns for the infinity of the universe and Giordano Bruno's doctrine.

Dario Tessicini's chapter (pp. 17-40) outlines Kepler's adoption of Aristotelian arguments – mainly drawing on *Physics* and *On the Heavens* – to refute the infinite extension of universe – as especially advocated by Bruno and Gilbert – and to reject claims that the Cassiopea Nova of 1572 moved rectilinearly towards the Earth. In his chapter (pp. 41-62) Christopher Graney examines the defense of heliocentrism carried out in Kepler's refutation of Brahe's arguments on the size of the fixed stars. Kepler's analysis of the stars, which are 'great bulks' endowed with remarkable swiftness, turns out to be an argument against the infinite number of worlds. It indeed denied the uniformity between the center and the periphery of the cosmos by maintaining a clear difference between the Sun and the stars, which were not 'other suns' rather celestial bodies as big as Saturn's orbit.

The dimension of celestial bodies and of the cosmos is the core of Javier Luna's chapter (pp. 63-80). The absence of a stellar parallax visible from the Earth urged Kepler to assume that the stars lay further than what was previously thought. In *De stella Nova*, he attempted to analyse for the first time the mathematical proportion and symmetry of the heliocentric cosmos, in agreement with the action of the physical forces of the universe. Again, Kepler's main target was Giordano Bruno, whose model on the ontological homogeneity of the cosmos contended/denied the centrality of the Sun.

Patrick Boner's chapter (pp. 81-106) deals with atmospheric refraction, which was indeed of major importance for astronomers, and it prevented them from reaching a high level of precision in their observations, thereby urging them to the exact value of this refraction. Kepler shared Brahe and Rothman's concerns about the accuracy of observations, contrary to Johannes Krabbe, who did not regard the refraction as an obstacle to gathering precise measurements. The chapter focuses on the quarrel between Kepler and Krabbe, analyses the system of patronage in which they operated (Prague, respectively, and Wolfenbüttel) and contrasts their interpretations of new stars and comets, as well as their definition of extraordinary phenomena acting against the laws of nature and revealing god's messages.

Jonathan Regier (pp. 107-128) dwells on the scintillation of the 1604 Nova and the Anselmus Boëtius de Boodt's studie on mineralogy. Although Kepler and Boodt never explicitly mentioned one another, the paper examines the implicit references in their writings. It discusses *De fundamentis astrologiae centioribus* (*aggiungi date di tutte le opera, anche sotto*), *Strena seu de nive sexangula*, and even the project presented to Duke Friedrich I of Württemberg to create a lavish liquor bowl decorated with precious stones, which would have symbolized the model of the planetary orbs described in the *Mysterium cosmographicum*.

Aviva Rothman's chapter (pp. 129-144), entitled *Kepler's Astrological Play*, re-frames Kepler's view of astrology by reading it in the light of the opposition between culture and Nature. Although Kepler eventually ascribed the twelve signs of the zodiac and astrology to the former category, in *De stella nova* he nevertheless led a battle against Pico della Mirandola's critic of judicial astrology. Rothman also put forward an insightful overview on the dimension of play-*ludus* in Kepler's

works, in his idea of astrology, numerology, as well as in the poetic descriptions of natural phenomena.

Miguel Ángel Granada's chapter (pp. 145-180) focuses on the final chapter of the first part of *De stella nova*, entitled *Astronomical Report on the Star of the third magnitude in the constellation of Cygnus*. It contrasts Kepler's reading of the Nova of 1600 in Cygnus, of the one appeared in Cassiopea (1572) and of the 1604 new star in Serpentarius. Whilst referring to the analysis formulated by Cornelius Gemma and rejected by Tycho, Kepler reckoned that the appearance of this star also called for the definition of a new configuration of the Cygnus, which would have represented the figure of the Crucifixion, a shape also mentioned by Johann Bayer in the *Uranometria* (1603), by Willem Blaeu and also by Justus Bürgi, the clockmaker of Emperor Rudolph II. Although the main goal of the *Astronomical Report* was to prove the novelty of this star, Kepler was also strongly interested in such religious reading, which involved the topic of the Christianization of the heavens and complied with his Trinitarian image of the cosmos.

The three chapters at the end of the book move to consider the legacy and reception of Kepler's studies on the Nova. On the backdrop of Pietro Daniel Omodeo's chapter (pp. 181-203) is Kepler's idea of a harmonic order of the cosmos, which urged him to strongly refute Epicureans, as well as the atomistic-minded accounts of comets that emerged in the sixteenth- and seventeenth century. In this context, Omodeo devotes special attention to the revival of atomism by Giordano Bruno, Nicholas Hill, and Pierre Gassendi. The chapter by Matteo Cosci (pp. 204-258) considers the correspondences of three leading Italian astronomers of the XVI and XVII century: Christoph Clavius, Giovanni Antonio Magini and Guidobaldo del Monte, and the work of one of the first observers of the new star, Andrea Argoli. The concluding chapter by William Blair (pp. 259-266) offers an overview of the legacy of Kepler's study on the new star, building a bridge with recent explanations of the explosion mechanism at the origin of the supernova.

In the course of ten chapters, the volume offers a thoughtful analysis of some very specific topics pertaining to Kepler's survey and, in the meantime, reconsiders the role of *De stella nova* within the broader context of his astronomy, connecting the study on the new stars with the religious, philosophical and metaphysical ideas that inspired his research.

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RIENK VERMIJ, 2020. *Thinking on Earthquakes in Early Modern Europe. Firm Beliefs on Shaky Ground*, London and New York, Routledge, 256 pp.

Rienk Vermij's monograph provides the first comprehensive study about the idea of earthquake before the great seismic event of Lisbon in 1755, which cer-

tainly represented a turning point in the conception of seismology. Beginning with the analysis of people's traumatic experience, in terms of panic and fear, but also of pity and curiosity, the book highlights how a cognitive approach to the seismic phenomenon came to light in early modern Europe. Vermij carries out a detailed investigation of different writings by classical authors and from geographical areas affected by seismic events: Italy, Greece and Anatolia. Needless to say, earthquakes exerted a great influence over these authors and their tales became part of European culture.

The *excursus* on the religious traditions (pp. 21-25), which brought earthquakes into the realm of extraordinary or supernatural phenomena, is particularly interesting. For instance, according to the Christian religion – and first of all the Bible – seismic events were a divine sign and disclosed the existence of a profound connection between deity and natural phenomena.

The book also provides a valuable insight into Greek philosophical culture: the first to attribute a natural meaning to telluric events (pp. 25-33). Indeed, Aristotle's conception of the origin of earthquakes – depending upon a natural cause – became dominant over the centuries and was studied in all of the academies.

Vermij's work is further valuable because it outlines an extensive examination of the available documentation belonging to both oral and written tradition. He analyses pamphlets, correspondence and a variety of documents from the end of the 1500s, and – among many others – about the earthquakes of Ferrara in 1570, Yvorne (Switzerland) in 1584, and then Calabria in 1638.

The book analyses the transition from moral philosophy, which was more interested in political issues than in the study of nature, to the Stoicism of Seneca and Beroaldo, who wrote many texts on natural phenomena and earthquakes. It then delves into medicine's interest in the functioning of nature and in subterranean fires. The two main factors that profoundly influenced the emergence of new seismological ideas were the interest in the origin of springs and, curiously, the discovery of gunpowder, whose explosion De Dondi compared to volcanic eruptions. It is then considered the contribution of many scientists, first of all Georg Agricola, who identified the reason of Earth's endogenous forces in the underground fires.

The detailed analysis of primary sources dating back to the sixteenth century allows the reader to delve into a period of deep crisis due to a number of historical as well as natural events that affected European society at that time, such as religious controversies, the fear of the Ottoman invasion and other occurrences which fuelled expectations on the imminent end of the world. However, it was precisely in Italy that theories about earthquakes were developed without any reference to their prophetic interpretation, in contrast to the beliefs of Martin Luther, who strongly criticised Aristotelian philosophy. Despite predictions of a huge flood, which actually did not occur, the sixteenth century was distinguished by many "natural signs." The passage of Halley's Comet in 1531 marked a significant turning point in the interpretation of certain phenomena as natural wonders; this boosted a harsh discussion within the Catholic Church, opening up the debate

to seismological notions. The religious Reformation – which aimed at creating a God-fearing society – and the resulting Counter-Reformation – which had roughly the same purposes – exerted a strong influence over the interpretation of natural signs as manifestations of God, giving rise to the Science of Signs. But, between the sixth- and the seventeenth centuries, a new science-based academic approach to astronomical phenomena reopened the discussion on natural phenomena and earthquakes, especially in Protestant lands.

The book moves on to consider the relationship between natural and miraculous events in Catholic lands (pp. 104-111). It mainly focuses on the Jesuit context of the seventeenth century, whose treatises were generally interested in astronomy, but at the same time they could include digressions on seismic phenomena. As it happens, the Jesuits considered not only the classic Aristotelian gas exhalation among triggers, but also the effect of underground fires and winds. On this subject, there was a clear reference to *Agricola*.

The occurrence of numerous seismic events in Europe at the end of the sixteenth century stirred controversies on their origin. In Italy, the debate also took place in the vernacular and was led by writers, such as Gaetano da Thiene, Gabriele Falloppio or Vitale Zuccoli, who even argued about the age of the Earth. They often came to conclusions that did not comply with the biblical theses at all.

The Ferrara earthquake of 1570, which occurred under the powerful House of Este, was not only responsible for severe damage to the city, but also fostered a large exchange of correspondence on the topic. In the epistles, the possible causes of the terrible event were often described; among these, the thesis of divine was again brought to light. Many sonnets and treatises in the vernacular were also written – all examined by Vermij (pp. 115-119).

The Dover earthquake of 1580 gave the opportunity for English and French authors to express opinions on the seismic phenomenon, revealing a strong religious influence. Yet, it is worth mentioning that these debates also provided some significant scientific insights, and put special emphasis on the Aristotelian assumptions behind the traditional explanations.

The German-speaking lands, on their part, became especially engrossed in these debates in the wake of the Vienna earthquake in 1590. In one of his sermons, for example, the Bishop of Vienna stated that the fear, aroused in the faithful by the earthquake, was itself a divine punishment, a sort of death of the soul before that of the body. The reports written after the phenomenon, however, are an extremely important documentary source in order to reconstruct both the intensity and the spread of the event (pp. 123-129).

It is worth noting that, in Protestant Europe, the sermons read during religious ceremonies expressed ideas and conceptions of the theologians of the time. In the Catholic world, by contrast, the circumstance of sharing thoughts about natural phenomena was rather represented by public ceremonies and processions, which were often staged to protect the population from the same phenomena.

Vermij does not neglect the analysis of non-dogmatic philosophers, reporting the opinions of several authors who, in the sixth- and the seventeenth centuries,

suggested hypotheses of a spiritual nature – think for example of the English Robert Fludd, the Dutchman Johan Baptist van Helmont, the French François de La Mothe le Vayer or the German Johannes Moltherus (pp. 142-152). At the same time, he does not forget to focus on those naturalistic beliefs widespread in popular culture.

However, the eighteenth century opened with a profound criticism of the confessional theses. This was the result of a new vision of nature that, within academic and cultural circles, was certainly supported by recent scientific discoveries. Furthermore, the greater circulation and dissemination of information, due to the periodical press, encouraged the beginning of a more complete and widespread study of natural phenomena and so of earthquakes. Thus, the book deals with the work of authors – such as Pietro Francesco Orsini, later Pope Benedict XIII, Giorgio Baglivi, physician in Rome or Francesco Grimaldi, priest, who, following the universal and immutable “laws of Nature” as well as using an empirical approach, attempted to analyse any geological event on the basis of the Earth’s internal structure (pp. 203-218).

The monograph concludes its historical overview before the Lisbon earthquake of 1755, which was indeed a ‘landmark’ in the history of geology, contributing to the birth of scientific seismology and challenging the confessional approaches.

By providing a chronicle of the events, the volume is a worthy contribution to the history of those seismic beliefs and ideas that had developed in the European *milieu* over the centuries. The author points out how ancient and medieval philosophers, after suggesting rational hypotheses about the origin of earthquakes, moved on to supernatural and confessional explanations, turning science to social, political and religious needs. Rienk Vermij’s work not only bears witness to the cultural history of modern European society, but also is a fundamental source for historians of geology and science.

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FABRIZIO BALDASSARRI, 2021. *Il metodo al tavolo anatomico. Descartes e la medicina*, Roma, Aracne editrice, 264 pp.

In this book, Fabrizio Baldassarri aims at bringing out Descartes’ interest in medicine. As shown by a number of recent studies – as, among others, Franco Aurelio Meschini, Delphine Antoine Mahut, Gideon Manning, Vincent Aucante – Descartes (1596-1650) was interested in medicine throughout his life. Baldassarri provides evidence for this claim based on Descartes’ specifically ‘medical’ texts – which he carefully examines by shedding a new light on Descartes’ unpublished

writings (*Excerpta, Primae Cogitationes, Recherche de la verité*) – and also by working out the connections between Descartes' method his the physical and metaphysical principles; hence the title of the book, "The Method to the Slab."

The book is structured in six chapters, with an introduction on the epistemological value of medicine. Each chapter addresses a different aspect of Descartes' medical reflection, in the order: (I) the importance of the method, the principles, and the epistemological value of medicine (pp. 29-58), (II) cardiocentric physiology and blood circulation (pp. 59-100), (III) the mechanization of the sensitive soul (pp. 101-150), (IV) nutrition (pp. 151-182), (V) generation and embryology (pp. 183-208) and, finally, (VI) therapeutics (pp. 209-235).

According to Baldassarri, Descartes' medicine consists of an anatomy-physiology which is "embedded in philosophy" (p. 12; all translations are mine), inasmuch as grounded on the metaphysical certainty and the mechanical laws of physics. Baldassarri argues that physics and metaphysics find their bond in medicine, that represents the metaphysical theories in the physical field. To establish this claim, Baldassarri highlights the relation of medicine with philosophy through the application of three principles that would allow us to know the nature of the body (p. 15):

1. the metaphysical distinction between mind and body, which was intended by Descartes to free medicine from any animistic or hilemorphic residue;
2. the physical principle of the mechanical laws of motion, which permits to study the living body;
3. the physiological principle of an internal source of heat and movement – styled by Descartes as "le grand Ressort – The great mechanism" (cf. *Description*, AT XI 226).

However, Descartes' medicine is not purely a *rational* medicine, as Baldassarri perfectly knows: it is precisely thank to the three above-mentioned principles that the direct observation of living beings acquires vigor and value. In Baldassarri's works, there are several references to anatomical dissections of corpses (pp. 52-53, 82-89, 194-195 and *passim*) to which Descartes assisted as a spectator, along with those of slaughtered animals, conducted by the philosopher himself, as well as the vivisections employed by Descartes to experience what mechanical physics had established on a purely theoretical level. To put it into other words, medicine for Descartes was no discipline among other, but also an instrument of verification. Medicine, indeed, permits to shed light on quite some aspects of Descartes' philosophy: from physics, up to the metaphysics of the mind-body union.

According to Baldassarri, Cartesian medicine comes thus to constitute itself through the interplay of anatomical-physiological studies and metaphysical meditations, intellectual evidence, and application of the method (p. 35). Baldassarri concludes that, in the course of his life, Descartes resorted more and more to method as a "philosophical medicine" against the deceptions of reason; accordingly, it is up to this method to restore the balance of the mind (p. 15).

The study of the living body is considered by Baldassarri as the "privileged area of verification" (p. 17) of Descartes' philosophy, which allows us to frame

two fundamental theoretical aspects: Descartes' comparison of living bodies with machines and the use of geometry to study biological functions.

Indeed, Descartes argued for the ontological identity between living bodies and machines and, accordingly, made use of them as models for understanding and observing the human body. In this way it is possible to analyze the structures of the body and its functions by adopting an *animated anatomy* aiming to describe the functions of the body, which is itself based on the application of the machine model, thereby parting ways with the Paduan model (p. 17).

The second innovation, which Baldassari deems crucial, is the use of geometry in studying the living body and his functions. Interesting examples are the shapes variously assumed by food particles during digestion, or the circularity that characterizes the motion of blood. According to Baldassarri, the geometrization of nature is especially fundamental for understanding Descartes' embryology (p. 183). As it happens, this is indeed one of the most innovative aspects of Baldassarri's reading. In particular, he describes how Descartes studied plants – a topic to which Baldassari has already devoted quite some attention – as a means for examining animal reproduction by means of analogy. In fact, the formation of plants and animals results for Descartes from the arrangement of matter and the strength of the heat contained in the bodies. On Baldassarri's account, Descartes sets out to understand how particles aggregate among themselves through movements; this type of mechanics applies to both plants and animals, the only difference being that plants particles are characterized by a circular and simple motion, whereas animal particles' motion is complex and spherical (pp. 186-188). As Baldassarri shows, according to Descartes the particles of plants tend to form circles starting from the roots to the branches, whereas animal particles make up a sphere – the fetus – from which the animal being originates.

Baldassarri employs the *comparison* of living body to machine body and the *comparison* of nature to geometry as a "lens" (p. 23) to enquire into the application of the method to natural philosophy (pp. 12-14, 30-36, 116, 234-235).

It is impossible here to do justice to Baldassarri's book, but let me at least mention some of the theories that Baldassarri considers innovative in Descartes medicine: the definition of the body and its functions in a purely mechanical sense (p. 41), with the exclusion of any form of animism; the heart's innate heat seen as a natural phenomenon and the Descartes's proximity to Harvey's discoveries on blood circulation (p. 92); finally, the reduction of sensations to the brain's re-elaboration of physiological stimuli, whether external or internal (p. 232), thereby permitting to safeguard the mind-body compound. This conception of sensation, placed entirely in charge of the brain, is connected to the sense organs through the nerves, whose study, Baldassarri observes, derives from "a sensory physiology based on the principles of physics proper to the complex mechanism of a system of bodily impulses, sensible data, instinctual processing, imaginations, memories and intellectual knowledge" (p. 150). The study of the passions of the soul (pp. 97-98, 138-150, 232) is for Baldassarri instrumental for understanding the mind-body union, as well as the distinction between the two, and their respective functions.

Last but not least, Baldassarri considers Descartes' scattered remarks on death and illness.

Moreover, Baldassarri also accounts for the difficulties and shortcomings of Descartes' medicine, which he singles out for consideration at the end of each chapter. Accordingly, Baldassarri lists Descartes' difficulty in defining the nature of cardiac heat (pp. 99-100), as well as the connection between nerves, sense organs, brain and mind (p. 150); the reduction of vegetative functions to a mechanical model (p. 169); the anatomical and mathematical study of reproduction (p. 183); and, finally, the therapeutics derived from the mechanical structure of the body, but which, as Baldassarri argues, turns out to be unsatisfactory because of her incompleteness (p. 209).

These limits and innovations of Descartes' medicine, accurately exposed by Baldassarri, on one hand establish the failure of his attempt to find a cure for diseases of the body and mind, and his attempt to prolong life; on the other hand, they show a "methodical way," given precisely by the application of the method to natural philosophy, which makes medicine the real testing ground of the principles of philosophy. By so doing, Descartes' medicine inaugurates a philosophical – and medical – program that it was for posterity to pursue, so as to use medicine as "a rational tool" useful to understand "the nature of the living body" from the point of view of a "modern philosophical system" (cf. p. 235).

Baldassarri's book perfectly succeeds in its intent to accurately explain Descartes' complex contributions to medicine. This reconstruction allows us to retrace the fundamental stages of its development and the place it occupies in Descartes' thought, also thanks to a remarkable apparatus of notes and bibliography. It also provides an accurate and timely analysis of the strengths and weaknesses of these contributions. For these reasons, Baldassarri's book work as a useful guide for those who intend to approach Descartes' medicine and, more in general, with an interest in the link between philosophy and medicine in Cartesian thought. This research would allow to deepen not only the more technical and experimental side of this story (so well described by Baldassarri), but would shed further light on the theoretical and metaphysical aspects of Descartes' medicine, which still remain to be adequately explored and call for further research.

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FABIO MINAZZI, 2021. *Epistemologia storico-evolutiva e neo-realismo logico*, Firenze, Leo S. Olschki Editore, 571 pp.

Now more than ever, in these uncertain and turbulent times, a critical reflection of the theoretical and historical nature on the foundations of scientific

rationality is essential. Fabio Minazzi's recent book, entitled *Epistemologia storico-evolutiva e neo-realismo logico* ("Historical-evolutionary epistemology and logical neo-realism"), provides an extensive critical analysis of many of the main classical themes in the history and philosophy of science, including – to mention just a few – the problem of scientific objectivity, the normative dimension of science, the role of scientific models and methods. The book is divided into three parts: (i) "Historical-evolutionary epistemology and logical neorealism" (pp. 5-234), (ii) "Some moments of scientific and philosophical thought" (pp. 235-368), (iii) "Studies on contemporary thought" (pp. 369-506) and (iv) an appendix entitled "The problem of critical rationalism in the School of Milan" (pp. 507-530).

The present book has the merit of giving us a broad, systematic, and analytical overview of Fabio Minazzi's intellectual research, notably that carried out during the last decade. It is based on contributions that were written between 2009 and 2019 and which show the extent but also the depth of the author's research topics. This book will very likely be remembered as one of Fabio Minazzi's fundamental works.

Minazzi's epistemological and historical research is chiefly inspired by Kant. This is quite clear also in the present book, which places special emphasis on the analysis of the Kantian *a priori* and the possibility of revealing its historical significance. As the author himself also notes, speaking of a historical "*a priori*" seems to be contradictory, since *a priori*, being before any experience, seems to lie outside history. According to Minazzi, the Kantian *a priori* is necessary, universal, and fixed, while "the transcendentalist perspective can easily be opened up to a serious historical sensitivity, capable of helping us to better understand the conceptual dynamics of human thought, by elaborating a *historical* and *relative* notion of the same Kantian *priori*" (p. 246; all translations are mine). This perspective, termed "evolutionary-historical" by Minazzi, is particularly associated with the reflection of the philosophical "School of Milan" and, specifically, with Giulio Preti (1911-1972), whose name, not incidentally, is the one that recurs the most in the book. As it happens, also the reference to "logical neo-realism" in the title is borrowed from Preti. The view of logical neo-realism is not widely known and finds its origins in Preti's studies on medieval logic. Preti – and Minazzi with him – intends it as a third way between Platonic realism and nominalism. The core premise of this perspective is that "the idea presupposed by semantic investiture works as a kind of *ideal objective heuristic model*, but never as a substantial and metaphysical unity [...]. In fact, for the logical neorealists the *significatio* concept must be interpreted as a sort of *open project* that addresses itself to the world of referents which are constructed and delineated on the basis of this same *project of signification*" (p. 63). According to the author, this third way represented by logical neo-realism implies a "plastic, open and critical" relationship with the world of praxis, as opposed to other dogmatic and metaphysical positions. This fascinating idea of an open project is then linked by Preti to that of philosophy as a critical meta-reflection on the sciences, as Minazzi makes especially clear.

The trio of science, history, and philosophy – and more precisely, the place of the history of science – is also at the centre of most chapters of the book. A number of key moments in the intellectual debate in Italy on these issues are investigated. According to a letter (dated 13 March 1950 and reported in the text on p. 318) written by the father of Italian philosophy of science, Ludovico Geymonat (1908-1991), to Roberto Almagià (1884-1962), President of the Italian Group for the History of Science, we read: “I believe that the study of the history of science is becoming more and more fundamental every day, for both the development of scientific and philosophical research and, ultimately, for a productive collaboration of the philosophical spirit with the scientific one.” According to Geymonat, scientific theories certainly need an analysis of the structure that does not allow itself to be disrupted by considerations extraneous to the structure being studied, but the methodological examination of theories also inevitably needs historical and pragmatic considerations. Given this two-way perspective on scientific theories, from the point of view of *verticality* there is the question of the relationship between theory and common sense, while from the point of view of *horizontality* there is the problem of the connections between different theories at a specific historical moment and associated with a specific set of techno-scientific knowledge. Furthermore, the meaning of common sense and, more so, of the world of life is one of the fundamental aspects of the well-known epistemological vision of scientific thought according to Einstein, which is discussed in chapter VI of Minazzi’s book and whose explanatory graph is elegantly placed on the book’s cover.

In addition to these themes that I have mentioned above and that constitute the main focus of Fabio Minazzi’s reflections, of particular interest are those chapters in which the author deals with issues and authors on which he had dwelt less in his previous books, such as, for example, the Frege-Hilbert dispute, the question of objectivity within Peirce’s pragmatist philosophy, Alan Turing and the general concept of a formal system, etc., to name only a few.

The book concludes with an appendix entitled “The Problem of Critical Rationalism in the School of Milan,” in which the main figures of this school of thought are analysed from a unitary perspective, as well as the initiatives, often carried out by Minazzi himself, to preserve its ideas and documents.

In reading today this very interesting and challenging book by Fabio Minazzi, we can think about the underlying and enduring significance of the great questions that emerge at the intersection of philosophy, history, and science, and to which we should increasingly refer in these times of *science denialism*. Recognition of the canons of objectivity of the different sciences and the corresponding “regional ontologies” is in fact one of the best heuristic tools we have to boost their cultural impact and combat the social rejection – often widespread – of scientific data and methods.

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HEADINGS

The text can be subdivided into sections. The headings should be in small capital letters (e.g.: INTRODUCTION). Leave one empty line before and after each section of the paper. The titles of subsections should be written in *italics*.

FOOTNOTES

Please use footnotes, not endnotes. Footnotes should brief and limit themselves to providing references and to stating what is necessary to document an argument. They should be written in Times New Roman (9,5 pt.), numbered consecutively throughout the paper with no special first line space. Please place footnote numbers at the end of sentences after punctuation marks.

ITALICS AND QUOTATION MARKS

Isolated words or phrases in a foreign language, or those that one wishes to emphasize, can be put in italics. For metaphorical expressions and neologisms, single quotation marks ('...') should be used: e.g.: 'V-day'.

PUNCTUATION

Please include punctuations marks within quotations marks, e.g.: „ ,” ?”

QUOTATIONS

Short quotations by other authors should be placed between double quotation marks (“.....”). Long quotations running to several lines should not be enclosed within quotations marks, but should be put in smaller type (Times New Roman 11 pt.) and separated from the preceding and subsequent lines of typescript by a double space with no special first line space. Omissions or insertions should be placed between brackets: [...].

TRANSLATIONS

The author’s own translations of foreign language passages running to more than a few words should be accompanied by a footnote providing the original text.

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Bibliographic information should be given only in footnotes (not in brackets within the text). Footnotes are to be numbered consecutively with superscript numerals placed after the punctuation (and/or double quotation marks).

The references in the footnotes should only contain the author’s last name (in small capital letters), the date of publication and, when necessary, the page numbers. For example:

¹ NEWTON, 1687.

² HALL, 1962, p. 20.

³ Ibid. [in the case of consecutive citing of the same reference with the same page within footnotes].

⁴ Ivi [in the case of consecutive citing of the same reference with a different page within footnotes].

BIBLIOGRAPHICAL LIST OF REFERENCES

The article ends with a Bibliographical list of references, which should be given in the following form:

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References to archive sources should be reported in footnotes throughout the text, providing detailed information about the document. In the final section “Archive sources” references should be formatted as follows: city, institute, collection, e.g.:

Saint-Germain-la-Blanche-Herbe, Institut Mémoires de l’Édition Contemporaine (IMEC), Fondo Devereux.

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Book

HALL Alfred Rupert, 1980. *Philosophers at War: The Quarrel between Newton and Leibniz*, Cambridge, Cambridge University Press.

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MULTIMEDIA CONTENTS

RADIODIFFUSION TÉLÉVISION FRANÇAISE, 1961. "Etienne Wolff: la culture d'organe, 1^{ère} partie," November 30, <http://www.ina.fr/video/CAF97059028>.

FIGURES

All figures and tables should be cited consecutively in the text. Figures should be submitted as separate source files in .eps, .tif, or .jpg format, in a size suitable for the typesetting area of the journal. The resolution of these files should be at least 300 dpi for an image of 17 × 24 cm (width × height). Please number the files, and indicate in the manuscript where they are to appear (Fig. 1 here). The text in a figure must be legible, and should not be smaller than corps 7. The size of this lettering for any text in a figure should be the same for all figures in the manuscript. Illustrations should be submitted electronically and should be clearly marked. When necessary, crops, horizontal or vertical orientation, enlargement of details, etc. should be indicated.

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