
Scienza antica in età moderna. Teoria e immagini edited by Vanna Maraglino

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INTRODUCTION

This book is the first of a new series, *Biblioteca della tradizione classica*, and contains 17 papers, most of them written in Italian and otherwise in German. The book is divided into four sections dedicated to the following topics:

- (1) the military art,
- (2) geography,
- (3) medicine, and
- (4) the natural sciences.

The explicit aim of the book is to investigate the role of images in the processes of the transmission of ancient science during the early modern period. The book represents the proceedings of a conference held in 2011, ‘*La tradizione della scienza antica nell’età moderna attraverso l’immagine*’.

The subjects addressed by the sections of the book are all disciplines and activities which, in Aristotelian terms, doubtlessly belong to what has been defined as *τέχνη*. Discussing the role of images in the history of the reception of such traditions of knowledge thus means discussing the role of images as mediators. Not only do images mediate between the content of a work and the general cultural environment in which the work originated, they also, in the subjects touched upon in the book, mediate between practical and theoretical knowledge. From a diachronic perspective, moreover, images transmit, integrate, and, finally, transform scientific knowledge over time; and they do this continuously from one epoch to another. Such a history of the reception of ancient science during the early modern period with its focus on the role of images, therefore, concerns the history of the processes by which knowledge is transformed. In short, the act of mediation is finally to be defined as an act of transformation.

The same concept of image, in this context, requires a more elaborate taxonomy. Images have entered scientific practice in history as figurative illustrations, diagrams, technical drawings, and as a sort of gloss to the text, either singly or in sequences. All these types of images have specific functions, specific origins, and specific consequences in the processes by which knowledge is transformed and their history.

During the early modern period, images in science developed into an autonomous language. As Paolo Galluzzi has stated [2002], this process started during the 15th century. What pushed the process of development and diffusion of pictorial language in science during the Renaissance so effectively was the need to explore and clarify the technical knowledge or the practical knowledge transmitted from antiquity. Leonardo played a key role in this context. He redefined the function of drawings, especially concerning machines. Not only was he a keen observer of reality, he was also able to ‘transfigure reality through graphic registrations’ [Galluzzi 2002, 53]. Leonardo moved toward an anatomical approach while examining (and not only reproducing) machines by means of drawings. He isolated the mechanical components and introduced the use of perspective in technical drawings as well as the use of *chiaroscuro*. To put it in Galluzzi’s words,

Leonardo liberated drawing from the restrictions that bound it tightly to the figurative arts, transforming it into a powerful tool of investigation and demonstration. [2002, 63]

The emergence of modern technical drawing found its roots in Leonardo’s works and developed further until it became an essential element of the scientific enterprise. As the historian Wolfgang Lefèvre has shown, for instance, the emergence of highly professionalized technical drawing during the early modern period originated in and, at the same time, contributed to the emergence of new forms of the division of labor which mirrored the practical organization of the working procedure together with new hierarchies defined in terms of responsibility concerning the final products. Technical drawing was also connected to new paths and methods of propagation of knowledge, including new didactic institutions such as the Accademia del disegno, founded in 1563. At this point in time, a new type of image was created, one which Lefèvre calls the ‘learned image’ [2004, 71].

During the process described by Lefèvre, the new figure of the engineer-scientist emerged [see Valleriani 2010, 2013]. Engineer-scientists increasingly

combined practical knowledge with theoretical elements. As engineers, they conceived and designed new artifacts by working on and thinking with images. Through the development of a new scientific language, the engineer-scientists also established an autonomous pictorial language [see Engel, Queisner, and Tullio 2012].

Scientific images inform about the social context of scientific practice and also convey meanings that are not explained in texts, thus superseding texts in their epistemic and didactic functions. Images in science integrate different domains of knowledge and transform texts over epochs in continuously different new scientific and cultural frameworks, as Joyce van Leeuwen was able to show in reference to the Pseudo-Aristotelian *Mechanical Problems* [2012].

The use of images in science goes back to antiquity. Famous is the case of Archimedes who introduced the practice of representing physical bodies by means of abstract diagrams. Construction lines in the diagrams helped to achieve the possibility of applying quantifications, thus mediating between reality and mathematics. The ‘rational artists’ of the early modern period are linked to the entire tradition going back to antiquity [see Roche 1993].

As mentioned, the 17 papers are organized in four sections: ‘Military Art’, ‘Geography’, ‘Medicine’, and ‘Natural Sciences’. Each section contains only the papers: there is no introductory text to help the reader approach the papers or even to offer a short overview of the subject matter.

1. The military art

This section includes four papers of very heterogenous character and style. Only two of the four papers, the second and fourth, deal directly with the role of images in the framework of the process by which ancient knowledge was received. With the exception of the fourth paper, moreover, the works presented here do not pay any attention to the real practice followed in the context of the art of war contemporary to the historical sources—whether ancient or early modern—that are taken into account. The resulting approach is, therefore, genuinely philological.

The first paper is by Corrado Petrocelli, ‘*Racconti di guerra. Figure della narrazione delle «Storie» di Tucidide*’ [5–33]. He discusses the emergence of literary genres in antiquity related to events of war and thus also examines war manuals as historical reports and reconstructions of wars. In particular,

he shows the fundamental role played by Thucydides' *History of the Peloponnesian War* in shaping such genres. The paper refers to the narrative figures created by Thucydides and, therefore, touches on the main subject of the book only at a metaphorical level.

The second paper, Immacolata Eramo's 'Disegni di guerra. La tradizione dei diagrammi tattici greci nell'«Arte della guerra» di Niccolò Machiavelli' [35–62], is the result of an in-depth philological study of the images used by Niccolò Machiavelli in his *Arte della guerra*. In particular, the author shows the strong influence of tracts on the military strategy of Vegetius, *Epitoma rei militaris* and, especially, of Aelianus Tacticus, *On Tactical Arrays of the Greeks* on Machiavelli's work.

The third, Klaus Fabian's 'Des Hoplitzen Schutz und Trutz oder Philologie auf Lanzen spitzen' [63–138], is a very long essay that brings an imbalance to the whole section. This paper of some 75 pages in length shows little internal structure or subdivision of the argument. Furthermore, the goal of the argument is never expressed with the clarity that such a lengthy text definitely requires. In a style marked by strong polemical verve, it seems that the author intends to hurl abuse at the image of ancient cultures and society as created by modern and contemporary cinematography.

The fourth and last paper, Gastone Breccia's 'La geometria di Marte. Polibio e Cesare nelle incisioni di Andrea Palladio: il volto rinascimentale della battaglia' [139–156], shows the results of analyses undertaken in reference to the images published by Andrea Palladio in his *Commentari* of Julius Caesar (1574) and the images produced for Palladio's planned edition of *The Histories* of Polybius, which he never published because of his death in 1580. The author clearly shows the originality of Palladio's work, pointing out that his images have a strong explanatory character that is achieved by means of a scenic geometrization. Contextualized in the process of the geometrization of the art of war during the early modern period, the paper is able to demonstrate effectively the fundamental role of images in the process of professionalization which the art of war underwent in this period.

2. Geography

This section contains four outstanding papers which build a complete narrative. Because of the relation between geography and cartography, it might appear obvious nowadays to assume that geography is one of the best ex-

amples or one of the most appropriate disciplines to investigate the role of images in the history of the reception of ancient knowledge. All four papers reveal precisely why this assumption is not obvious. Firstly, all four of them are able to show that, after the ancient age of mathematical cartography had come to an end, the medieval traditions followed completely different paths so that the history of geography does not show linear developments. Secondly, all papers also reveal that alternative ways of conceiving the work of geographers were given in antiquity and that such ways were not always provided in a close relation to cartography. This implies that the re-emergence of mathematical geography and cartography during the early modern period requires peculiar investigations concerning the reception of specific works from antiquity. This narrative and also a historiographic overview of the discipline of 'history of geography' are both offered in this section.

The first paper, Francesco Pontera's 'Geografia antica nella cartografia medievale: l'Asia in un codice di San Gerolamo' [159–179], analyzes the influence of Greek mathematical and empirical cartography as well as the influence of the Roman cartography of a practical character on the cartographic tradition of the Middle Ages. The merit of this study is to throw light on the broader cultural process that led to the separation of proper geographic knowledge from its graphical representation, as is typically found in medieval cartography. In particular, the author is able to show that such separation was due to the intrinsic limits of Greek mathematical cartography—for instance, the scant number of astronomical data available to 'fill' the mathematical grid conceived by Ptolemy—and due to a tendency in that direction which emerged as early as late antiquity and which can be recognized in works such as Pliny the Elder's *Naturalis historia* and Pomponius Mela's *De situ orbis libri III*.

The second paper, Nicola Biffi's '«È simile a ...». L'uso delle immagini nella «Geografia» di Strabone' [181–214], is an interesting reading of Strabo's *Geography* which aims to identify the heuristics used to shape the territory figuratively. As the author convincingly argues in the conclusion, Strabo's *Geography* might represent a peculiar genre in the context of the discipline which however did not transform into a fortunate tradition of knowledge. The peculiarity of such a genre consists in the fact that Strabo's *Geography* is not provided with any maps or charts, though the intention of the work is to furnish a universal description of the known territories. As an alternative to a geography accompanied by cartography, Strabo implements the idea of

associating the territories described with either regular, geometric figures or with images of well-known objects from everyday life; for instance, he associates the shape of the coast starting from the Caspian Sea and the blade of a butcher's knife. This erudite paper not only offers a rare but also very relevant overview of such an important yet nevertheless often neglected work on antiquity, it also gives the opportunity to reflect critically upon the much discussed subject of the existence or non-existence of maps from antiquity from a new perspective. In particular, the use of geometric or known images certainly was an efficient method to systematize knowledge taxonomically and, at the same time, to make sure that such knowledge could be spread easily over cultures and handed down over time.

The third paper, Vladimiro Valerio's 'La «Geografia» di Tolomeo e la nascita della moderna rappresentazione dello spazio' [215–232] focuses on Ptolemy's *Geography*, a work that re-emerged in Florence at the end of the 14th century and featured 27 maps, whose ancient provenance was not doubted at the time. This work exerted enormous influence during the era of humanism because Ptolemy's *Geography* was the first example of metric geography after the tradition of medieval geography and cartography, which, in its three forms (*mappae mundi*, Portolans, and maps of geographically limited territories, mostly for military purposes) did not show any metrical character. The paper describes in detail the process that led to the development of metric geography during the early modern period as intimately connected to the activities of astronomers. It is convincingly argued that this was a process similar to the one that occurred during antiquity and which led, in the interval from Hipparchus to Ptolemy, from the work of mapping the stars to that of mapping the Earth.

On the basis of the analysis of such specific sources as Johan Stabius' *Planisphere* of 1515, the author is, moreover, able to show that the emergence and establishment of metric geography during the early modern period can only be historically explained by means of the simultaneous development of the technique of perspective—this is a natural development implicitly suggested by Ptolemy's third kind of projection in the seventh book of his *Geography*. The author concludes the argument by pointing to the fact that the emergence of the new early modern cartography is based not only on the revitalization of ancient geography but also on the technique of perspective that was being developed, eventually also under the influence of Ptolemy's

works. Particularly interesting is the author's point regarding the long-lasting debate on whether ancient culture knew the technique of perspective: although it is true that the reconstruction of Ptolemy's techniques (which he described carefully) does not lead to the linear perspective as based on projective geometry, it is nevertheless also true that its technique allows the creation of a stable two-way relation between the plane image and the space that it represents, while the internal metric relations also correspond to those of the real space that is represented. The paper concludes by briefly touching upon the role that optics played in connecting figurative arts and geography during the early modern period, as was suggested by the Ptolemy as well.

The last paper, Claudio Schiano's 'La forma del mondo secondo gli antichi: un esercizio iconografico nel XVII e XIX secolo' [233–265], is an interesting excursus on the history of the history of geography. The author finds the origins of this discipline in the 15th century as a consequence of the travels and explorations that led to a continuously changing and expanding of the rediscovered ancient geography and cartography. The argument extends to the 19th century. It focuses on the historical interpretations furnished for the works of Strabo, Ptolemy, Pomponius Mela, and Eratosthenes, where the last became an object of study for the first time during the 18th century. The historians of geography taken into consideration are, among others, Cellarius and Pascal-François-Joseph Grossellin. Notably, the author shows how history of geography emerged and was established on the basis of the attention given to cartography, as if the attempts to reconstruct the maps of ancient works (even when those maps did not exist before, as in the case of Strabo's work) was the method for historically investigating ancient geographic knowledge. Unfortunately, the integrative potential of the last paper in reference to the entire section is not exploited sufficiently.

3. Medicine

Of the five papers that are presented in this section, only the last two deal with the main topic of the book.

The first paper by Domenico Ribatti, 'Simmetria e asimmetria del corpo umano' [269–276], is a very short text consisting of a series of statements aiming to clarify the concept of symmetry and how it transformed from antiquity—proportion and harmony being observable in nature—into the modern definition related to the abstract idea of invariance in the context

of a group of transformations, which emerged for the first time in the 19th century in crystallography.

The second and third papers both investigate the figure of the physician in antiquity, though not the related images. In Olimpia Imperio's 'Immagini del medico nella tradizione comica antica e moderna' [277–292], the aim is to discuss the social role of physicians in classic societies. The study is accomplished by investigating and analyzing works in the ancient tradition of comedy. Emphasis is put on the fact that physicians were the target of polemic as they were considered to be part of the sophistic school, in the negative meaning of the term. The paper concludes with an outlook on modern comedy up to the works of Molière.

In Luigi Piacente's 'Medici, libri e biblioteche nella Roma capitale' [293–310], the aim is likewise to define the figure of the physician in antiquity, especially during the Roman Imperial Era. By starting with an *exposé* of the history of Galen's famous library, the argument focuses on the organization of libraries in imperial Rome and furnishes a key argument to understanding what might have been the physicians' role in the libraries, a curious presence nevertheless demonstrated by historical sources. The author concludes that the continuous presence of physicians in the libraries was most probably due to the practice of copying, which implied the preparation of relevant quantities of ink. The in-depth analysis shows that cases of poisoning through metallic oxides certainly occurred frequently enough to justify such organization of the library personnel.

Concerning the role of images, the fourth and fifth papers of the section respectively deal with the early modern editions of Galen's work and with a medical text from late antiquity.

After a short overview concerning the origins of the use of images in medical texts during the early modern period and, thus, the works of Andreas Vesalius and Bartolomeo Eustachius, Stefania Fortuna's 'Le illustrazioni dei testi medici: le edizioni latine di Galeno del XVI–XVII sec.' [311–338] focuses on the images provided with the Latin editions of Galen's work from the 15th to the 17th centuries. Twenty-five editions of the complete works of Galen were published in Latin between 1490 and 1625. The first to be provided with images appeared in 1545. On the basis of a philological study, the author executes a detailed review of the editions' images, taking into consideration how they are related to each other and also to the authors of the

images themselves. In particular, the paper shows the enormous success of Giovanni Bernardo Feliciano's images, which were used in 11 entire editions of Galen's work between 1550 and 1679.

The last paper of the section, Raffaele Passarella's 'Aspetti di medicina ginecologica nel tardoantico: Muscione e il parto' [339–356] deals with the *Gynaecia* of Muscione, an author of the sixth century AD, and notably with the images depicting birth and the eventual difficulties that could arise during birth. According to the author, the images accompanying the text, which was supposedly well known during the Middle Ages and the early modern period, had a didactic purpose. In this way, the author is able to explain both the taxonomic character of the images and their almost diagrammatic simplicity that was maintained over the centuries.

4. The natural sciences

The section on natural sciences appears to be the most heterogeneous. Of the four papers, only the last, Franco Minonzio's 'Diffrazioni pliniane prima di Belon (1553): descrizione e classificazione di pesci in Paolo Giovio, Francesco Massari e Simone Porzio' [401–442], deals directly with images according to the general scope of the work. The paper indeed focuses on the relation between images and texts in the early modern editions of Pliny's *Natural History* and with particular reference to chapter nine which concerns aquatic animals. One of the papers, Pierfrancesco Dellino's 'Immaginare la scienza' [289–400], is surprising in that it does not seem to be the result of historical research. Although this comparatively short paper begins with the analysis of Pliny the Younger's letters concerning the eruption of the Vesuvius in the year AD 79, it is in fact more a manifesto in favor of a historical approach in the actual practice of science.

The remaining two papers both focus on textual sources, one on a poem written in the first century AD and the other on a work on geology from the 18th century. The latter, Lucio Cristante's 'Acque, fuochi, pietre, fossili tra letteratura antica e geologia' [359–374] investigates the possible relations between a modern scientific discipline, for instance geology, and ancient science. It analyzes mainly the work of Anton Lazzaro Moro, one of the founders of the discipline in the 18th century. The author shows that, in its origins, geology made profound use of ancient sources from the field of literature and also from the field of science. The former paper, Stefania

Santella, 's 'L'«Aetna (App. Verg.): scienza ed etica' [375–388], analyzes a short anonymous didactic poem from the first century AD 'Aetna' whose content refers to what is today known as vulcanology. The text is fundamentally influenced by Lucretius' work and, according to the author of the present paper, conveys all the aspects of scientific knowledge concerning ancient vulcanology. At the same time, the poem also represents a moral call for scientific investigations and therefore unifies scientific practice and ethics.

CONCLUSION

In spite of the somewhat narrow focus suggested by the book's title, not all of the papers investigate the role of images in the transmission history of ancient scientific works during the early modern period. Clearly, some of them explore histories of transmission between epochs, which do not always belong to the ancient or the early modern epochs. This certainly is a positive aspect, as reception history as a historiographical category can unquestionably be understood on the basis of multiple relations between epochs. More problematic, however, is the idea that images play a significant role only in the context of transmission, as the editor seems to indicate in the introduction to this work. As mentioned, and as many of the papers also demonstrate, the role of images is much too profound and relevant to be reduced to a simple transmission of knowledge from one epoch to the other. The section on geography and some of the papers of the other sections clearly show the integrative and productive role of images in their construction and in their use for scientific practice in any epoch and in reference to the connections between epochs. Although some of the papers are of outstanding quality, like for instance those dedicated to geography, it can only be concluded that the editor has missed the chance to deepen the fundamental historiographical question concerning the role of images in the history of scientific practice.

BIBLIOGRAPHY

Engel, F.; Queisner, M.; and Tullio V. 2012. edd. *Das bildnerische Denken: Charles S. Peirce*. Berlin.

- Galluzzi, P. 2002. 'Art and Artifice in the Depiction of Renaissance Machines'. Pp. 28–46 in W. Lefèvre, J. Renn, and U. Schoepflin edd. *The Power of Images in Early Modern Science*. Basel.
- Lefèvre, W. 2004. ed. *Picturing Machines. 1400–1700*. Cambridge, MA/London.
- Roche, J. J. 1993. 'The Semantics of Graphics in Mathematical Natural Philosophy'. Pp. 197–234 in R. G. Mazzolini ed. *Non-Verbal Communication in Science Prior to 1900*. Florence.
- Valleriani, M. 2010. *Galileo Engineer*. Boston Studies in the Philosophy of Science. Dordrecht.
- 2013. *Metallurgy, Ballistics and Epistemic Instruments: The Nova scientia of Nicolò Tartaglia. A New Edition*. Berlin.
- van Leeuwen, J. 2012. *The Tradition of the Aristotelian 'Mechanics': Text and Diagrams*. PhD dissertation, Humboldt Universität zu Berlin.