

Ars et Scientia: The Role of Apparatus and Devices in Della Porta's Natural Magic

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Abstract

There are several studies about the relationship between science and technology as well as between science and magi. Such studies once based on different trends in historiography include issues and historical reflections concerning their interrelation in the origins of modern science. In a recent study we showed that Giambattista della Porta's natural magic was a kind of science (*scientia*) closely associated to *technee*, often translated as art (*ars*), but closer in meaning to "skill". However, the magicians (*magi*) were not mere skilled artisans. Renaissance *magi* as Della Porta embraced, bore the idea that nature could not be held easily for it was in constant changing flux. According to *magi*, nature enjoyed the movement of changing and disguising itself and it was precisely by watching and imitating nature metamorphosis that magicians acquired knowledge and practice of their art. However, mere observation and imitation were not enough to make nature reveals its secrets, it was also necessary to manipulate it in all of its aspects to finally deceive it. Della Porta then used specific devices and resources in order to produce *mirabilia*. The aim of this paper is to point out that the wonders produced by magicians were instances which enabled them to reveal secrets of nature. Through the use of certain kinds of apparatus and devices, Della Porta produced different sorts of effects which allowed him to work on and to uncover the secrets of nature.

Introduction

There are several studies about the relationship between science and technology as well as between science and magic. Such studies once based on different trends in historiography include not only issues and historical reflections concerning their interrelation, but also the theoretical and practical knowledge and their relationship in the origins of modern science. Historians of Science have approached different

issues concerning experiments, laboratory, scientific instruments, connections between science and industries, technology and labor, and so on.¹

We discuss in this work the relation between science and art (*techné*) in the origin of modern science by means of the idea of wonders in the sixteenth century natural magic². We here examine Giambattista della Porta's conception of natural magic considering his purpose to use apparatus and devices in such way to reveal hidden secrets of nature³.

Art, Science and Natural Magic

A certain number of sixteenth century documents have shown us that magic influenced a whole generation of natural philosophers. In this regard, just to name some leading natural philosophers dedicated to natural magic, we can track back to Girolamo Cardano (1501-1576), Cornelius Agrippa (1486-1535), John Dee (1527-1608) and Giambattista della Porta. Furthermore, one could say that natural philosophers as Francis Bacon (1561-1626), Isaac Newton (1643-1727), René Descartes (1595-1650), for instance, were somehow interested in the occult sciences⁴.

The search for magic by those natural philosophers resided upon the possibility to manipulate phenomena once it could not be deduced from pre-established

¹ C. D. Conner, *People's History of Science: Miners, Midwives, and "Low Mechanics"* (New York: Nation Books, 2005); J. A. Bennett, "The Mechanics' Philosophy and the Mechanical Philosophy," *History of Science* 24 (1986): 1-28; A. Gabbey, "Between *ars* and *philosophia naturalis*: reflections on the historiography of early modern mechanics", in *Renaissance & Revolution: Humanists, Scholars & Natural Philosophers in Early Modern Europe*, eds. J. V. Field & F. A. J. L. James (Cambridge: Cambridge University Press, 1997), 141-142; S. Kusukawa & I. Maclean, eds., *Transmitting Knowledge: Words, Images, and Instruments in Early Modern Europe* (Oxford/New York: Oxford University Press, 2006). See also: A. M. Alfonso-Goldfarb & M. H. R. Beltran (eds.), *O saber fazer e seus muitos saberes: experimentos, experiências e experimentações* (São Paulo: Ed. Livraria da Física/Educ/FAPESP, 2006) and *O laboratório, a oficina e o ateliê: a arte de fazer o artificial* (São Paulo: Educ/FAPESP, 2002).

² On arts in the Sixteenth and Seventeenth centuries, see: P. H. Smith, "Art, Science, and Visual Culture in Early Modern Europe," *Isis* 97 (2006): 83-100; *Idem*, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago/London: The University of Chicago Press, 2004), 1-55; P. Long, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to Renaissance* (Baltimore: The Johns Hopkins University Press, 2001); P. Rossi, *Philosophy, Technology and the Arts in the Early Modern Era* (New York, London: Harper, 1970).

³ Giambattista della Porta (1535-1615). On Della Porta's life, see: Pompeo Sarnelli, "Vita di Gio. Battista della Porta napolitano scritta da Pompeo Sarnelli", in G. della Porta, *De ea naturalis physiognomoniae parte quae ad manuum líneas spectat libri duo; in appendice Chirofisionomia a cura di Oreste Trabucco* (Napoli: Edizioni Scientifiche Italiane, 2003), 79-82; see also: P. Piccari, *La sapienza dei maghi: Giovan Battista Della Porta e la filosofia occulta* (Firenze: Propilei, Atanór, 1999), 4-10; F. Colangelo, *Racconto storico di Gio: Battista della Porta Filosofo Napolitano com un'analisi delle sue opere stampate* (Napoli: Fratelli chianese, 1813), 2-19; and L. G. Clubb, *Giambattista Della Porta Dramatist* (Princeton; New Jersey: The Princeton University Press, 1965), 3-56.

⁴ P. Rossi, *Francis Bacon: From Magic to Science* (Chicago, London: The University of Chicago Press, 1968); W. Shea, *The Magic of Numbers and Motion: The Scientific Career of R. Descartes* (New York: Science History Publ., 1991); C. Webster, *De Paracelso a Newton: La magia en la creación de la ciencia moderna* (México: Fondo de Cultura Económica, 1993).

principles such as they were in the Natural Philosophy in Aristotelian trend which did not address to singular and rare phenomena⁵.

In a recent study, we showed that a magician should query on the possibility of producing *mirabilia*, the marvelous effects produced by nature, in order to reproduce them and create even bigger prodigies⁶. One should take into account that although those wondrous effects were rare and extraordinary, they were not miraculous. According to Della Porta, they were miraculous only in the etymological sense. For, in other words, they seem to be miraculous because people did not know what caused them. As he states:

“(...) Wherefore, as many of you as come to behold Magick, must be perswaded that the works of Magick are nothing else but the works of Nature, whose dutiful hand-maid Magick is. For if she find any want in the affinity of Nature, that it is not strong enough, she doth supply such defects at convenient seasons, by the help of vapours, and by observing due measures and proportions; as in Husbandry, it is Nature that brings forth corn and herbs, but it is Art that prepares and makes way for them (...)”⁷.

According to Della Porta, Natural Magic is the practical part of Natural Philosophy. By natural philosophy he meant science (*scientia*) in Aristotelian way to which he gave a different approach. As reported by him: “(...) Magick (...) is a practical part of Natural Philosophy, therefore it behoveth a Magician, and one that aspires to the dignity of that profession, to be an exact and a very perfect philosopher (...)”⁸.

⁵ On magic, see: P. Rossi, *Il tempo dei maghi: Rinascimento e modernità*. (Milano: Raffaello Cortina Editore, 2006); W. Eamon, *Science and the Secrets of Nature. Books of Secrets in Medieval and Early Modern Culture* (Princeton/New Jersey, Princeton University Press, 1996); P. Zambeli, *L'ambigua natura della magia: filosofi, streghe, riti nel Rinascimento* (Milano, Il Saggiatore, 1991); W. Shumaker, *Natural Magic and modern science: four treatises 1590-1657* (Binghamton/New York: Center for Medieval and Early Renaissance Studies, 1989); B. Vickers, org. *Occult and Scientific Mentalities in the Renaissance* (Cambridge/London/New York: Cambridge University Press, 1986). On Della Porta's natural magic see: L. Muraro, *Giambattista Della Porta, mago e scienziato* (Milano: Feltrinelli, 1978); N. Badaloni, “I Fratelli Della Porta e la cultura magica e astrologica a Napoli nel '500”. *Studi storici*, 4 (set. 1960): 677-715; and L. Balbiani, *La Magia Naturalis di Giovan Battista Della Porta. Lingua, cultura e scienza in Europa all'inizio dell'età moderna* (Bern, Berlin, New York, Oxford: Peter Lang, 2001).

⁶ F. Saito, *O telescópio na magia natural de Giambattista della Porta* (São Paulo: Educ, Ed. Livraria da Física, FAPESP, 2011).

⁷ G. della Porta, *Magiae naturalis libri XX in quibus scientiarum naturalium divitiae et deliciae demonstrantur* (Napoli: Horatium Salvanum, 158), I, 2; henceforth be denoted by *Magia naturalis*. For 1658 English version, see: *Natural Magick by John Baptista Porta a neapolitane in twenty books* (London: Printed for Thomas Young and Samuel Speed, 1658), I, 2; henceforth indicate by *Natural Magick*.

⁸ *Ibid.*, I, 3.

Della Porta pictured natural magic as perfect knowledge meaning complete science (*consummata scientia*) which implied a survey of whole course of nature⁹. As he states:

“We are persuaded that the knowledge of secret things depends upon the contemplation and view of the face of the whole world, namely, of the motion, state and fashion thereof, as also of the springing up, the growing and the decaying of things; for a diligent searcher of Nature Workes, as he seeth how Nature doth generate and corrupt things, so doth he also learn to do (...).”¹⁰

One could say that the difference between natural philosophy in Aristotelian trend and natural magic is that the latter deals with singular and not particular phenomena. Differently from natural philosophy, the focus of natural magic is on those phenomena which do not occur in the ordinary course of nature in Aristotelian fashion¹¹.

Della Porta refers to those phenomena which could be observed or provoked in quite a particular way. Indeed his *Magia naturalis* covers a broad spectrum of issues which include topics related to the art of distillation, perfumes, fireworks, cookery, fishing and hunting etc. The purpose of all these subjects was to survey whole natural and artificial things in order to reproduce them. Therefore we can say that each phenomenon described in *Magia naturalis* was singular and it only could be known by an empirical bias of investigation. That is why all reports in his *Magia naturalis* are reduced to the formula: “how to make, how to do etc”. In this sense, historians of science could see natural magic as a kind of art (*techne*) in the Aristotelian sense because it implies the sort of knowledge which depends on the ability of those who will manipulate phenomena. That is why the conception of natural magic is usually closely associated in meaning to “skill”.

Although natural magic approaches in meaning to art (*techne*), it somehow does not address a skilled artisan because a magician should consider theoretical background as well as practical knowledge. According to Della Porta, knowledge without practice is meaningless and practice without knowledge is useless¹². A magician should have a broad knowledge acquired not only by means of account of the tradition, but also by his own hands by observing and manipulating nature. Hence besides being well learned in philosophy, astrology, medicine, mathematics and so

⁹ Saito, *O telescópio na magia natural*, 25-40.

¹⁰ Della Porta, *Magia naturalis*, I, 10; *Natural Magick*, I, 10.

¹¹ On natural and unnatural phenomena, see: L. Daston, “The Nature of Nature in Early Modern Europe,” *Configurations* 6 (1998):146-72; e L. Daston & K. Park, *Wonders and the Order of Nature 1150-1750* (New York: Zone Books, 2001), 126-128.

¹² Della Porta, *Magia naturalis*, I, 3; *Natural Magick*, I, 3.

on, he “must be a skillful workman, both by natural gift, and also by the practice of his own hands”¹³.

It was expected from the magician to have a broad knowledge of natural philosophy in order to articulate such theoretical part with that of practical counterpart. Therefore, a magician was not a mere artisan for he should take into consideration not only the material but also how to manipulate nature using the necessary tools. In other words, since a magician had to deal with singular and rare phenomena, he had to consider all materials and know how to prepare and organize them. Consequently, a magician was more than a skilled artisan. As Della Porta states, he is an *artifex* (skillful workman) or talented man.

The nature metamorphosis and the role of apparatuses in natural magic

One could say that natural magic disrupts the deductive process of *scientia* in Aristotelian fashion and multiplies the numbers of phenomena which have been explained, implying then, a reorganization of knowledge in order to include all sorts of natural and artificial phenomena.

Della Porta was interested in those phenomena because he wanted to reproduce them in order to hold the process by which they could be improved. He believed that by imitating nature he could grasp the most hidden secrets of nature. One should take into consideration that Della Porta bore the idea that nature could not be held easily for it is in constant changing flux. This meant that nature did not reveal its secrets easily.¹⁴ According to Della Porta, nature enjoyed the movement of changing and disguising. So it was precisely by watching and imitating nature metamorphosis that the magician acquired knowledge and practice of his art. While imitating nature process, a magician could hold its secrets in order to produce even bigger wonders.

However this was not enough because nature only could reveal its secrecy by a sort of negotiation with the magician. In other words, a magician should court nature and put it in a constrained situation by using his abilities and knowledge.¹⁵ However, it was not enough only observe and imitate nature.

¹³ Ibid.

¹⁴ The idea that nature did not reveal its secrets easily was not new. See: P. Hadot, *Le voile d'Isis. Essai sur l'histoire de l'idée de nature* (Paris: Gallimard, 2004). See also: G. Belloni, “Conoscenza mágica e ricerca scientifica in Giovan Battista Della Porta”, in G. della Porta, *Criptologia* (Roma, Centro Internazionale di Studi Umanistici, 1982), 45-101, 57.

¹⁵ On nature playfulness, see: P. Findlen, “Jokes of Nature and Jokes of Knowledge: The Playfulness of Scientific Discourse in Early Modern Europe”, *Renaissance Quarterly*, XLIII (2, 1990), 292-331; e *Idem*, “Between Carnival and Lent: The Scientific Revolution at the Margins of Culture”, *Configurations*, 6 (1998), 243-67.

This meant that a diligent observation and inspection of the behavior of whole things in nature was fundamental to a magician. The survey of whole nature did not imply only an account of whole course of nature in the literal sense. A magician should watch and report the sympathies and antipathies of several things found in nature, as he states:

“By reason of the hidden and secret properties of things, there is in all kinds of creatures a certain compassion, as I may call it, which the Greeks call Sympathy and Antipathy, but we term it more familiarly, their consent (*consensum*) and their disagreement (*dissensum*) (...) There is deadly hatred, and open enmity betwixt Coleworts and the Vine; for whereas the Vine windes it self with her tendrels about everything else, she shuns Coleworts only: if once she comes neer them, she turns her self another way, as if she were told that her enemy were at hand (...) By the example of which experiment, *Androcdes* found out a remedy agains wine, namely, that Coleworts are good against drunkennesse (...)”¹⁶

As we can see in this passage Della Porta suggests that by observing consent and disagreement among things in nature, a magician could achieve many things for the use of men. Furthermore, he believed that the consent and disagreement of things indeed revealed more than hate and love between things. According to Della Porta, sympathy and antipathy were the key to the most hidden secrecies and a magician should persecute nature in order to make it reveals them.

One could say that Della Porta refers to a nature which was its own agent of transformation in his *Magia naturalis*. He established a parallel between the nature process of transformation and the magician’s skill who sought to imitate it and even improve it in such way to shape it and recreate it in the “laboratory”. In this sense the order of subjects in his *Magia naturalis* is suggestive in this respect. With the exception of book one, where Della Porta considers the principles which should guide and inspire the magician’s theoretical and practical activities, the following books deal with practical issues. Each part, corresponding to the three realms of nature (mineral, vegetal and animal) is followed by subjects where deals with processes which should help men to obtain larger and tastier fruits, more malleable metals and so on¹⁷. In other words, Della Porta sought to pursue nature to learn from its procedures which could enable him not only to imitate it, but also to seize it and even to operate it without exceeding its limits.

But, in order to achieve this, Della Porta presents a little set of devices in his *Magia naturalis*. Most of them were endowed by tradition, others developed by his

¹⁶ Della Porta, *Magia naturalis*, I, 7; *Natural Magick*, I, 7

¹⁷ *Ibid.*, II-IX.

contemporaries and others designed by himself. These devices and apparatuses were minded suitably with the purpose to produce certain effects.

In our recent study we showed that those devices in Della Porta's natural magic were not only designed on an empirical basis to promote the understanding of nature, but also to make those powers (*vis*) which were developed within nature visible. Della Porta believed that once the process was known a magician could set apart those powers. Then such powers could be used artificially in the "laboratory" in order to uncover other occult aspects of nature or to use them for most practical purposes¹⁸.

Magical devices revealed subtle aspects of nature. A compass, for example, is an instrument which displays the direction of the terrestrial magnetic field. It has to be considered though that such instrument shows us that this very magnetic field exists. This means that some aspects of nature could not be grasped only by observation. Indeed devices were required to make nature reveal its secrets. These should be used by a magician in order to promote a general welfare as well as producing bigger wonders.

One could say that those devices follow a certain process of nature. A distiller and chemistry apparatus (*Chymisticis organis*) are good examples of this¹⁹. To Della Porta, a distillation is a process learned by the magician from nature itself. It was by observing process of rarefaction and condensation in nature that the magician improved the art of distillation. Nevertheless, distillation is not only a procedure to reveal those processes, but also an art which allows a magician to extract the virtues of plants and herbs. This meant that a device has twofold roles in natural magic: on one hand, it follows nature and reproduces phenomena, on the other hand, it could be used as a tool to manipulate nature in order to make it reveal new phenomena.

In this sense one could say that an apparatus used by a magician was not invented by the human mind because it had its source in nature itself which, in other words, were lessons given by nature.

These devices and apparatus, such as different lenses and mirrors (and their sundry arrangements), sophisticated distillers with many sorts of vases, diverse kinds of furnaces and water clocks, were used by Della Porta to deceive nature. By using these devices, he could take nature out of its ordinary course in such a fashion to constraint and lure it.

It should be taken into account that Della Porta embraced the view that nature and art had the same ontological status. He emphasized that art was immanent in nature and settled an analogy between art and nature without opposing them. This is so because he understood that the operations found in nature were mysteries gradually

¹⁸ Saito, *O telescópio na magia natural*, 54-71.

¹⁹ Della Porta, *Magia naturalis*, X, "proemio"; *Natural Magick*, X, "The proeme".

introduced to the magician. When he manipulated nature and intervened in its ordinary course, he was not attempting to control the hostile nature to secure his power over it, but was instead looking for means which could enable him to “operate from within”²⁰.

Della Porta remarked that “nature produced things and provided them with faculties” and art could “ennoble them and provide them with many qualities”. In this sense, the art of distillation²¹ taught a magician how to extract “dewy vapors, spirits, lumpy, sticky or viscous humors and that very essence which is hidden in the depths and intimate parts of things”²². But to achieve this, i.e. to extract “waters”, oils, tinctures, elixirs, etc., a magician should consider for each kind of extraction a specific set of apparatuses. In this regard Della Porta ingeniously imagined and built different kinds of arrangements for each required situation.

In the same way, when Della Porta deals with optical apparatuses²³, he seeks to investigate on properties of light and heat by means of sundry sorts of lenses and mirrors. For each required situation, Della Porta used different combinations of lenses and mirrors not only to pursue the nature of light, vision and heat, but also to manipulate them in order to produce even bigger wonders and quicken some natural processes. An interesting case is the combination of a distiller with a caved spherical or a parabolic mirror. The purpose of this, was to quicken the process of distillation, or even to supply more heat to the distiller²⁴. This arrangement illustrates two things. The first is that a magician could manipulate matter, light and heat by using different sorts of apparatuses. This was possible because those apparatuses incorporate nature in itself in the sense that they reproduce a natural process. The second is that the wise magician should know how to use this knowledge and design new devices to uncover the properties and qualities of all things in nature.

Final remarks and conclusion

Della Porta designed devices and apparatuses considering the effects they could produce. It was his purpose to multiply and to create bigger and wondrous effects. However, it should be taken into account that these devices were more than simple tools used to examine nature, they were part of nature and enabled a magician to penetrate it from within. The magician designed apparatuses to serve two purposes,

²⁰ *Ibid.*, I, 2.

²¹ On distillation, see: Della Porta, *Magia naturalis*, X, and also: *De distillatione libri IX* (Roma: Ex Typographia Ver. Camerae Apostolica, 1608).

²² Della Porta, *Magia naturalis*, I, 3; *Natural Magick*, I, 3.

²³ On optics, see: Della Porta, *Magia naturalis*, XVII, and also: *De refractione optices parte libri novem* (Napoli: Io. Iacobum Carlinum & Antonio Pacem, 1593).

²⁴ Della Porta, *De distillatione*, I, 16.

to illustrate a process which was intrinsic in nature and, to be useful tools by which he could go into nature and grasp its most occult secrecies.