



## Research project

### Between nature and artifice.

## The concept of τὸ αὐτόματον in Greek medicine and philosophy

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Τὸ αὐτόματον, understood as something which operates by itself, refers to the apparent spontaneity of physiological phenomena or what seeks to replicate the naturalness of movements. The medicine presents itself as a privileged field for investigating the complexity of this concept because the body human, object of study of the medical art, is depicted as an exemplary mechanical model that could move by itself.

How did τὸ αὐτόματον develop from the meaning of "chance" or "spontaneity of nature" to the better known meaning of "machine"? Today more than ever we talk about "automatons" and their unpredictable ability to push beyond human limits: both in the ancient world and in contemporary society, this concept appears complex and ambiguous, placed between unknowable nature and extreme technique.

### Project description

How did the term τὸ αὐτόματον develop in ancient Greek medicine and philosophy? Sometimes translated "chance", sometimes "spontaneity", the meaning of "automaton" has remained unchanged today – "machine that reproduces movements (and generally also the external appearance) of humans and animals"<sup>1</sup> – and it seems to refer on the one hand to the artificial world of τέχνη, on the other to φύσις, so there's the attempt to imitate the naturalness of animal movement. It refers to the apparent spontaneity of physiological phenomena or to what seeks to replicate their naturalness movements, and therefore specifically indicates something that operates by itself and that is self-determining.

The aim of this research will be to reflect on this concept starting from ancient Greek texts, with specific reference to medicine, which represents a privileged field for the investigation of complexity of this concept, both from an epistemological and etiological point of view, because the physiological or pathological phenomenon looks like spontaneous to a doctor who doesn't know yet its cause and because the human body, the object of the medicine, figures as the perfect model of an autonomous movement. Τὸ αὐτόματον reveals the double face of the relationship between technique and nature: on the one hand it is associated with the extraordinary and prodigious products of technology, on the other hand it indicates the unpredictability of a φύσις which escapes human knowledge and therefore it results something mysterious and fearsome. From this perspective, the hippocratic and galenic experiences assume a key role. First of all, the objective of the project will be to reconstruct the history of

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<sup>1</sup> Cfr. *Treccani*, s. v. "automa".



this concept with particular reference to *Corpus Hippocraticum*: here τὸ αὐτόματον is connected to the unpredictable development of the human body's phenomena, and above all to the *corpus* of Galen's work. Galen collects not only the Hippocratic heritage but also the Platonic and Aristotelian one and he stands out compared to other Greek authors for the highest number of passages in his works about αὐτόματον (over a hundred)<sup>2</sup>: why is this concept so relevant and frequent in medical texts and, in particular, in Galen?

### Current state of the bibliography and possible developments

There are only two specific studies on τὸ αὐτόματον: the first (Cambiano 1994) concerns the Hellenistic period in which the term begins to take on the meaning of "machine" in the field of mechanical studies of Hero of Alexandria, while a synthetic reconstruction of the history of this term is found in Micheli 1998 (in which Homer, Hesiod, *Corpus Hippocraticum* and Aristotle are partially analyzed). However, in the critical panorama, a monographic study on the concept of τὸ αὐτόματον<sup>3</sup> is still missing.

### Objectives and structure of the research

The research project aims to analyze τὸ αὐτόματον from a lexicographic and linguistic point of view, reconstructing diachronically the history of the term, and to reflect on the ethical and epistemological issues that could derive from it. In addition to *Corpus Hippocraticum* and Galen, it could be useful to examine other authors who have a connection with medicine and in which occurrences of the word are attested, like Plato and Aristotle<sup>4</sup>, who had a great influence on the galenic works: the aim is revealing how medicine and philosophy (and different philosophies) are in relationship with each other considering the specific reference of this theme. Other authors will be not excluded, in fact existing essays examine αὐτόματον only in Homer, Hippocrates, Aristotle and Hero of Alexandria. One of the objectives will be to verify the role of this concept in other texts<sup>5</sup> left out of the bibliography and where this theme appears with occurrences that will be worth it to observe and study to complete the research framework<sup>6</sup>, although they could be sporadic.

First, greek texts will be selected through a research on *Diogenes*, on the entire *TLG*, and galenic texts will be read in the critical reference editions. In the exclusive field of medicine, and in particular galenic medicine, a further objective will be analyzing other terms through combined research (τύχη, τέχνη, φύσις) closely related with the concept of τὸ αὐτόματον, allowing us to understand how τὸ αὐτόματον has evolved from the meaning of "chance" or "spontaneity of nature" to the more well-known meaning of "machine". It will be important to establish how it moved from a meaning closely connected to τύχη and completely separated from the human τέχνη to the representation of the extreme product of artifice. The "spontaneity" in τὸ αὐτόματον in fact, already in hippocratic medicine, refers to

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<sup>2</sup> In its various declinations, τὸ αὐτόματον appears in the *Corpus Hippocraticum* 92 times while in the *corpus* of Galen 140 times.

<sup>3</sup> The occurrences on *TLG* are over 3000.

<sup>4</sup> In Plato the term appears 25 times, in Aristotle 103 times.

<sup>5</sup> Plutarch, in which αὐτόματον appears 87 times, but also Cassius Dio, Diogenes Laertius.

<sup>6</sup> Occurrences are found in Democritus and Anaxagoras, but also in Euripides, Aristophanes, Menander, Theophrastus.



a phenomenon or an object that appears to have the cause of the movement in itself.

Starting from Hesiod in which this term indicated the spontaneous birth of the fruits of the earth independently of the activity and human work, from Aristotle and from the Hellenistic period onwards, the word αὐτόματον comes to mean something that is totally the result of τέχνη but at the same time that tries to replicate nature and its products. The earth of Hesiod in the myth of the golden age is defined as αὐτομάτη because it offers fruits spontaneously. With Hippocrates, this concept will no longer be linked to divinity but will indicate the intrinsic and necessary capacity of nature to realize and develop autonomously from humans. According to Aristotle, τὸ αὐτόματον - in addition to indicating the spontaneity of natural phenomena - denotes material devices and self-propelled machines produced by art that replicate natural movements<sup>7</sup>: even Erone of Alexandria, in the Hellenistic age, fully shows this meaning. So a reflection on αὐτόματον, φύσις and τέχνη in medicine, where each of these terms plays a role priority, will allow us to reflect on the technique, its limits and the boundary between its products and the nature.

Therefore a first phase of the research will consist in the direct analysis of the text and the language: a historical reconstruction of the main attestations will be carried out (up to the period Hellenistic)<sup>8</sup>, since the bibliography covers the study of occurrences only partially. Then it will be necessary to explore the role of τὸ αὐτόματον in galenic medicine, which represents a *summa* of hippocratic medicine and previous philosophies, in particular platonic and aristotelian ones.

In fact an other phase of the research will be to focus on τὸ αὐτόματον mainly in Galen<sup>9</sup>, starting from the *Corpus Hippocraticum*, in relation to other significant terms connected to it (τύχη and τέχνη): after an initial phase of lexicographic analysis, we will reflect on the multiple issues that the theme arouses, such as that of the unpredictability of reality, of its spontaneous or random developments (in relation to τύχη) and the possibility of controlling it (in relation to τέχνη); finally how the meaning of "mechanical device" or "machine" may have relevance in medicine and in study of the human body<sup>10</sup>.

A further phase of the research will be to study the several attestations of αὐτόματον even after the Hellenistic period and consult the passages in which the word αὐτόματον is found, for investigating how and with which value it is used, to have a clearer vision of the notion development of the automaton after the 1st century A.D.<sup>11</sup>.

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<sup>7</sup> For example puppets or machines.

<sup>8</sup> For example, the term often appears, in its various declinations, also in Plato and in natural philosophers, such as Democritus, Anaxagoras, Theophrastus but also in the context of the theatre; in fact we find occurrences in Euripides, Aristophanes, Menander. The meanings can therefore be different and it will be worth establishing a comparison.

<sup>9</sup> Some of the galenic works in which the term appears: *De sectis ad eos qui introducuntur*, *De temperamentis*, *De anatomicis administrationibus*, *De ossibus ad tirones*, *De usu partium*, *De motu musculorum*, *De usu pulsum*, *De placitis Hippocratis et Platonis*, *De sanitate tuenda*, *De alimentorum facultatibus*, *De symptomatum causis*, *De plenitudine liber*, *De tumoribus praeter naturam*, *De locis affectis*, *De praesagitione ex pulsibus*, *De methodo medendi*, *De curandi ratione per venae sectionem*, *Quos quibus catharcis medicamentis et quando purgare oporteat*, *De simplicium medicamentorum temperamentis ac facultatibus*, *In Hippocratis de natura hominis librum commentarii*, *De libris propriis liber*.

<sup>10</sup> The combined research can also be used in other medical or philosophical texts, such as in Plato or Aristotle, since there are various passages where αὐτόματον and τύχη/αὐτόματον and τέχνη appear simultaneously.

<sup>11</sup> Plutarch, in which the term αὐτόματον appears 87 times, Cassius Dio, Diogenes Laertius who operate from the 1st century A.D.



### Relevance of the project in the contemporaneity

The reflection on the concept of αὐτόματον and automata, in relation to the possibilities of the human technique, is still of the utmost relevance, and in particular the field of medicine is privileged either for the practical application of automata or for bioethical and political questions that could come from it.

We talk about "automata" and "artificial intelligence" and their infinitely expandable potential but also of their evident limits, not always definable, of their apparent autonomy by humans: the texts of ancient Greek medicine and philosophy can represent a resource for pondering on our contemporaneity and for understanding how this concept, from meaning of spontaneous and apparently random development of nature, totally independent of artificial intervention, has come to indicate the extreme product of technology. In light of multiple recent studies in various fields of knowledge on such an urgent and current topic, a monographic study on τὸ αὐτόματον and in particular in medicine, where the term already appears in Greek texts frequently, can offer critical insights into contemporary society, which it increasingly explores the unpredictability of an artificial world as prodigious as it is dysfunctional.

### Bibliography

- BERRYMAN 2003 - S. BERRYMAN, *Ancient Automata and Mechanical Explanation*, «Phronesis», XLVIII/4, 2003, pp. 344–369.
- BRUMBAUGH 1966 - R. S. BRUMBAUGH, *Ancient Greek gadgets and machines*, Crowell 1966.
- CAMBIANO 1994 - G. CAMBIANO, Τὸ αὐτόματον, «Studi storici, Rivista trimestrale dell'istituto Gramsci», XXXV (1994), pp. 613-633.
- CORDESCHI-SOMENZI 2022 - *La filosofia degli automi. Origini dell'intelligenza artificiale*, ed. by R. CORDESCHI, V. SOMENZI, «Mimesis», Sesto San Giovanni 2022.
- DEVECKA 2013 - M. DEVECKA, *DID THE GREEKS BELIEVE IN THEIR ROBOTS?*, «The Cambridge Classical Journal», LIX, 2013, pp. 52–69.
- DI PASQUALE 2004 - G. DI PASQUALE, *Tecnologia e meccanica: trasmissione dei saperi tecnici dall'età ellenistica al mondo romano*, Olschki, Firenze 2004.
- DI PIAZZA 2010 - S. DI PIAZZA, Τέχνη e τύχη in Aristotele. Una strana relazione, «Studi filosofici», XXXIII, 2010, pp. 15-33.
- FICHTNER 1996 - *Corpus Galenicum. Verzeichnis der galenischen und pseudogalenischen Schriften, zusammengestellt von G. FICHTNER*, Tübingen 1996.
- FOSSA-TAMBURRINI-SCHIAFFONATI 2021 - *Automi e persone. Introduzione all'etica dell'intelligenza artificiale e della robotica*, ed. by F. FOSSA, V. SCHIAFFONATI, G. TAMBURRINI, Carocci, Roma 2021.
- GAROFALO-VEGETTI 1978 - *Opere scelte di Galeno*, ed. by I. GAROFALO e M. VEGETTI, Torino, UTET 1978.
- GRMEK 1993 - M. D. GRMEK, *Storia del pensiero medico occidentale. Vol. 1: Antichità e medioevo*, Laterza, Bari 1993.
- ISNARDI PARENTE 1966 - M. ISNARDI PARENTE, *Techne. Momenti del pensiero greco da Platone a Epicuro*, La nuova Italia, Firenze 1966.
- JORI 1996 - A. JORI, *Medicina e medici nell'antica Grecia. Saggio sul Perì téchnes ippocratico*, Il Mulino, Bologna 1996.
- KUHN 1969 - T. KUHN, *La struttura delle rivoluzioni scientifiche*, tr. A. CARUGO Einaudi, Torino 1969 (*The Structure of Scientific Revolutions*, Chicago 1962).
- LANG 2005 - P. LANG, *RE-INVENTIONS: ESSAYS ON HELLENISTIC & EARLY ROMAN SCIENCE*, Academic Printing & Pub, Kelowna 2005.
- MAYOR 2018 - A. MAYOR, *Gods and Robots: Myths, Machines, and Ancient Dreams of Technology*, Princeton University



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Press, Princeton 2018.

MICHELI 1998 - G. MICHELI, *Il concetto di automa nella cultura greca dalle origini al secolo IV a.C.*, «Rivista di storia della filosofia», LIII/3, 1998, pp. 421-462.

NAGEL 1968 - E. NAGEL, *La struttura della scienza. Problemi di logica della spiegazione scientifica*, tr. C. SBORGI - A. MONTI, Feltrinelli, Milano 1968 (*The Structure of Science: Problems in the Logic of Scientific Explanation*, London 1961).

PUGLIARA 2003, M. PUGLIARA, *Il mirabile e l'artificio. Creature animate semoventi nel mito e nella tecnica degli antichi*, L'Erma di Bretschneider, Roma 2003.

RODOTÀ 1997 - S. RODOTÀ, *Questioni di bioetica*, Laterza, Roma 1997.

RUSSO 1996 - L. RUSSO, *La rivoluzione dimenticata. Il pensiero scientifico greco e la scienza moderna*, Feltrinelli, Milano 1996.

SINI 2009 - C. SINI, *L'uomo, la macchina, l'automa: lavoro e conoscenza tra futuro prossimo e passato remoto*, Bollati Boringhieri, Torino 2009.