

STORIA DELLE MACCHINE

Analisi, interpretazioni e sviluppi

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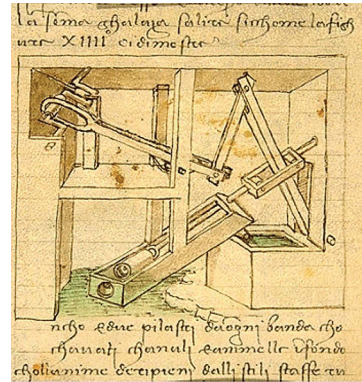
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STORIA DELLE MACCHINE

Analisi, interpretazioni e sviluppi



Non c'è nulla di nuovo
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SEXTUS FRONTINUS

La collana costituisce un forum all'interno del quale presentare e discutere analisi e interpretazioni di progetti e sviluppi storici relativi alle macchine. L'attenzione principale è focalizzata su un'ampia prospettiva disciplinare, utile a coprire tutti gli aspetti conoscitivi e applicativi dello sviluppo delle macchine.

I volumi hanno un taglio principalmente tecnico ma le pubblicazioni ospitate in questa serie indagano anche altri campi di studio, al fine di considerare l'ampia influenza delle macchine nello sviluppo della società umana.

L'ambito geografico di riferimento riguarda le regioni italiane con una notevole apertura sul resto del mondo, per analizzare le influenze e le interazioni con altri Paesi.

Giuseppe Boscarino

The mystery of Archimedes

The tradition of Italic thought of Science

Preface by
Marco Ceccarelli





Aracne editrice

www.aracneeditrice.it
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www.gioacchinoonoratieditore.it
info@gioacchinoonoratieditore.it

via Vittorio Veneto, 20
00020 Canterano (RM)
(06) 4551463

ISBN 978-88-255-0120-9

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I edition: March 2017

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Preface

by MARCO CECCARELLI*

Since always Archimedes has attracted the attention and admiration of scholars and general public for his genius that has served to knowledge increase with practical applications for the benefits of the society. The works of Archimedes, even with last discoveries, give still points of inspiration for modern activity in Science and particularly in Mechanical Engineering when referring to machine design and developments from theoretical speculation. This book by Giuseppe Boscarino is a brilliant synthesis of the several perspectives from which Archimedes and his work can be evaluated both for historical merits and modern inspiration. The multiple views of the book content can help to fully understand not only the specific values of Archimedes in his polyhedral merits, but even to give a clear discussion on how machine designs both as results and means of Science developments, can be considered fundamental for the growth of human society. The approach in this book is well fitted in the scopes of this book series on History of Machines that is aimed to collect contributions to explain the machine developments not only in term of technical aspects but more appropriately as combined with the impacts and influences that machines have determined and motivated.

The readers will surely appreciate the content of the book with its panoramic presentation of a historic, philosophical, epistemological, and technical studies on the values of Archimedes with still modern sources of interest.

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Introduction

The approach to Archimedes is neither born by rhetorical and celebrative intents, nor by purely philological intents, much less by intents of localistic exaltation. Archimedes does not belong only to the history of science and technology, but to something larger, to the history of the philosophy and the culture, in short, to the history of the human thought. Archimedes in his works does not refer to previous authors, except for Euclid and Eudoxus, just as school men, while in his considered most brilliant work, such as the so-called “Method”, refers only to Democritus, the only to whom he recognizes innovative scientific merits, but whose immense and multifaceted production is disappeared. It is said that Plato wanted to burn the works by Democritus, but that he was obstructed by the Pythagoreans, and on whom he spread, unlike all the so-called pre-Socratics in his work, a veil of silence, until to appear that a real conspiracy of the silence. Then the mystery, as it is written, is not about Archimedes anymore, who proves, but that he does not reveal, the secret of his discoveries, but the disappearance of that immense production, from which the thought of Archimedes draws To insist on the “genius” of Archimedes, on his « wonderful geometric and techniques discoveries », on the « splendor and grandeur of Syracuse » of Archimedes, as well as on aspects of philological nature, as the restitution to the press of the famous Palimpsest, though they certainly make Archimedes more and more interesting Archimedes, they do not help to free the figure and the work of Archimedes from the many misunderstandings, misrepresentations and limitations, to which they have been subjected. Archimedes does not belong only to the history of science and technology, but to something larger, to the history of philosophy and culture, in short, to the history of human thought, to its highest forms of the way of building science and understanding it. To use the category of the genius, of belonging to an ethnic group, Hellenism, or of the location, do not help to understand how those ways have been elaborated his-

torically, what conceptual difficulties have been faced and overcome, what hard philosophical and epistemological as well as political and cultural battle one has had to fight, even in terms of personal sacrifices, to support them, to let them grow and spread.

If then it is narrated by Plutarch that Plato not sharing the mix of geometry and mechanics of Eudoxus and Archytas, so that was sentenced by him up to conduct the studies concerning it to the extinction, then we must ask: why from the antiquity the myth of an Archimedes of Platonic or even Aristotelian matrix has imposed?

If this reading of Archimedes with all the misunderstandings, misrepresentations and, as I said, the limitations that it entailed, and on Archimedes and on the entire history of ancient thought of the central and eastern Mediterranean, from the VI–V century BC until the so-called age Hellenistic, IV–V sec. AD, led me to restudy and rethink all this period, out of the official canons of the philosophical and scientific historiography, on the other side another dissatisfaction back me to that time to rethink all that period and all the broadest period of the scientific and philosophical thought from its Mediterranean origins up to the spread of the twentieth century two fundamental physical theories such as the relativity and the quantum mechanics (q.m.).

My primitive interests of philosophy of science had brought me to meet two talented scientists, such as Salvatore Notarrigo, former professor of superior physics at the University of Catania, and Angelo Pagano, a researcher in nuclear physics, both interested in the problems of the foundations of physics. Notarrigo was particularly interested in the problems of foundations of q. m.

Studies and long discussions lead us to be dissatisfied with the philosophical and epistemological structure of the two prevailing theories of physics.

Thanks to the Journal *Mondotre — La Scuola italiana* that we set up, we give life to a series of articles and critical writings about the foundations of the two physical theories.

The fundamental question, around which our researches, studies and writings are revolving, is the following: why Platonism and Aristotelianism seem to dominate in terms of the foundation and the interpretation of the two physical theories, but also of mathematics from the late nineteenth century and then throughout the twentieth century, whereas the modern scientific revolutions of Galileo and

Newton have built themselves as opposed to Plato and Aristotele? See Appendix, *Quantum Mechanics: the real and the possible*.

It is this question that forces us to restudy, possibly through a direct reading of the works, and to rethink now in its totality, beyond artificial historiographical distinctions, of old Aristotelian matrix, of separation of the philosophy from the particular sciences, the history of thought.

Not convincing us neither the theory of genes nor the ethnic theory, nor the geographical and localistic one, we find in Diogenes Laertius (II–III century AD) a happy historiographical indication, of essentially epistemological matrix, i. e. of “Italic school and Ionian school”, around which we organize our work of researches and rethinking.

In the indication of Italic school with all the personalities, of different geographical area, but all gravitating in the area of central east Mediterranean, which have interpreted it, enriched and widespread, even through a hard political and cultural clash, we find those ways of building and understanding the knowledge, then the science–philosophy, of which we said: keep in the becoming of the knowledge the unity of it, and then gradually build a sophisticated critical rationalism, that could maintain it and make it advance, beyond the metaphysical dualistic Platonic rationalism and the flat Aristotelian empiricism, tinged by mere classificatory rationalism, both related to the conception of the tradition, understood in the sense of social and cultural conservation and of aversion to new.

You can read in one of my essays in this regard about the dynamics “evolution of the scientific theories and tradition” as Aristotele writes in the following passage, which I quote:

It is well to persuade oneself of the truth of the ancient and truly traditional theories, that there is some immortal and divine thing which possesses movement, but movement such as has no limit and is rather itself the limit of all other movement. A limit is a thing which contains; and this motion, being perfect, contains those imperfect motions which have a limit and a goal, having itself no beginning, or end, but unceasing, through the infinity of time, and of other movements, to some the cause of their beginning, to others offering the goal. The ancients gave to the gods the heaven or upper place, as being alone immortal; and our present argument testimonies that it is indestructible and ungenerated. Further it is unaffected by any

mortal discomfort, and, in addition, effortless; for it needs no constraining necessity to keep it to its path, and prevent it from moving with some other movement more natural to itself.

Aristotele finally concludes « Only on this hypothesis we are able to advance a theory consistent with popular divinations of the divine nature » (Aristotele 1971).

For Aristotele science must move in a circle; as tradition, the common sense, with its “words”, and religion with its beliefs, attest, is found by the scientific and philosophical reason and vice versa. Scientific research shows how the common language says, without knowing, and religion believes, without reasoning. Indeed it cannot profess theories that conflict with these.

The study of ancient thought brings us to the belief that then in the area we have identified it was conducted not only a serious battle of the way to build the knowledge, to understand it and spread it, but this has also led to heavy personal sacrifices on the part of its interpreters.

Of Protagoras of Abdera, an Italic, the works are burned in the agora of the democratic Athens; Anaxagoras of Clazomenae is forced to flee from Athens because, accused of impiety, is likely to be sentenced to death; Ictas and Ecphantus of Syracuse, Pythagoreans, fifth century BC, dare to assert that the earth revolves around itself, but of these two the works disappear, as the works of all the pre-Socratics disappear, that we believe not occurred to bad luck or by chance.

Already the great Bacon, at the beginning of the modern scientific revolution, wondered:

Could it be that the time, like a river, has transported down to us the most superficial and swollen things, and made the deepest and strongest ones sink? Why those ancient researchers of truth Heraclitus, Democritus, Pythagoras, Anaxagoras, Empedocles, and others, are known through the writings of others and not for their own? What do you have to think of the silence and the mysteries of antiquity?

The eldest of the Greek philosophers did not open schools, so far as we know, but they more silently and severely and simply — that is, with less affectation and parade — betook themselves to the inquisition of truth. Therefore in our judgment they behaved better, only that their works were in the course of time obscured by the slighter ones, that correspond to the understanding and the affection of the vulgar, who like them and the time,

like a river, brings down the things which are the heaviest and severest, while it brings us the lightest and swollen.

He then pointed to Plato and Aristotele the architects of the destruction of ancient philosophy and science, while dramatically he claimed for the oldest Greeks « a greater investigation and greater integrity of judge that can remedy the injustice of fate ».

Plato has disfigured the natural research with theology, no less than it did Aristotele with dialectic, and, to tell the truth, Plato can be traced back to the figure of the poet just as appropriately Aristotele to that of the sophist. (Bacone 1965)

It was then to give another image of the history of thought of the indicated area. Hence my book *Tradizioni di pensiero. La tradizione filosofica italica della scienza e della realtà* was born. In it my studies of the history of thought, as I prefer to call that geographic period, without fictitious distinctions, and of reflections on the twentieth century physical theories and on aspects of the late nineteenth and twentieth century of the logic and mathematics, rethought with my historical and philosophical epistemological concept of *Tradizioni di pensiero*, came to converge.

If my studies of epistemology, of Popper, Lakatos and others leave me again dissatisfied, because little careful about that time in which the epistemic Italic form is build, and deficient from the point of view of a rigorous historiographical grip of the structure and of the dynamics of the scientific enterprise, the concepts of paradigm, and, especially, of tradition of Kuhn, provoke some interests in me.

Finding the concept of tradition in Kuhn, vague and ambiguous, but interesting from a philosophical–epistemological perspective and from the historical point of view, I am committed gradually over the course of my thoughts and my writings, to elucidate its complex mediation on the plan of the concepts (in particular see my book *Le forme e i mutamenti della scienza*, Aracne, Roma, 2016.) and its fertility in comparison with the historiographical research.