



ΑΚΑΔΗΜΙΑ ΘΕΣΜΩΝ ΚΑΙ ΠΟΛΙΤΙΣΜΩΝ ACADEMY OF INSTITUTIONS AND CULTURES

THE ANTIKYTHERA MECHANISM Editorial

The Antikythera Mechanism has been characterized as the epitome of ancient Greek Science and Technology. It belongs to the apical, among the saved, technological achievements of the Hellenistic era. It embodies Mathematics, Astronomy, the Greek Calendars, as well as a plethora of scientific elements. It is the first analog Computer in the history of humanity, functioning and providing data, not only for the past, but especially for the future. Theoretically, it can continue by its function the provision of data, as long as our Universe exists, and up to the Universe's exhaustion, the σβενύμενον μέτρα, according to Heraclitus, or according to chaos theory, of Anaximander. Therefore, the analog Antikythera Mechanism computer, constructed around 200 BC, still continues to provide its data trustworthy.

This complicated instrument does not appear by accident or by chance in the History of Science. It appears at the moment of the realization of a radical change in the political system in Asia and the Mediterranean. The former Persian government system of absolute despotism, with its Asian imperial and theocratic characteristics, has been collapsed under the blows of Alexander the Great. A novel art of governance and Thought rearranges the Societies, based on the Greek Cosmosystem. Education, Culture, Egalitarianism, the abolishment of racial discriminations, freedom of religion, the right for self-governing and judicial autonomy, the rejection of the loot wars and the pursuit of peace, through the practice of commerce, constitute already the common conscience. The spirit of the Greek Oecumenism, having as its vehicle the Greek language and as its epicenter the city of Alexandria creates a new multicultural society. During their historical evolution, the ideas of Oecumene shape politically the Byzantine state as well, but get injured damaged by their way of perception from the Western European Renaissance, get altered with the advent of Enlightenment, and step back, during the era of the formation of the Nation States.

The Antikythera Mechanism is the emergent result of the vast explosion of the Sciences and of Technology, which takes place during the Hellenistic era. It is the era after Alexander the Great, in which, the citizen of the City-state changes socially, politically and philosophically into becoming the citizen of Oecumene. A characteristic of this era is the continuous pursuit for Knowledge, regarded as an autonomous value, with pragmatological extensions, nevertheless. Networks of researchers, either autonomously or by accompanying trade or military missions, record, experiment, systematize or structure, with scientific treatises, the body of Knowledge, which, in turn, instills into society as a common property. This pursuit of Knowledge becomes an autonomous value; it is the great legacy of Aristotle to humanity. In parallel with the radical development of Science, and due to it, the explosion of Technology also emerges, with its achievements improving the life conditions of the human society. Even technological achievements, such as the use of steam, which stayed on the research phase, without being broadly implemented, because of various reasons, and also because of the destructive sweep caused in the Greek cities by the Roman conquest, were discovered during that era.

There arises the question, about this special element of the Hellenistic era, responsible for triggering the explosion of Science and Technology, an explosion, to which the modern global Civilization owes everything. For reasons of scientific accuracy, we have to stress the fact that the phenomenon actualized during this era roots deeply in the Cycladic and Creto-mycenaean Civilizations, which,



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as Societies, possess the same characteristics, that is the aptitude for exploration, for discovery, as well as for the collection, systematization and codification of knowledge. Through a spiral evolution, these characteristics take their familiar form, during the era succeeding Alexander the Great.

A decisive element for the befall of the aforementioned explosion, is the political system itself. For the first time in History, the State appears and finances research, as well as the development and the broadening of Knowledge, through the vast Libraries, freely accessible to everybody. In parallel, the state, continuing the Greek view about governance, does not exercise looting policies in the periphery, for enriching the capital. On the contrary, the tax revenue from the provinces is being used for the development of the areas of its collection. A brilliant example is Ptolemaic Egypt. The result is the creation of many and various scientific observatories in the periphery, such as astronomical, climatic, etc. Within the prevailing atmosphere of the Greek Oecumene, where the communication and economic system is called to cover the needs of large distances, and at the same time of large populations, with anthropocentric background, the Antikythera Mechanism is constructed, therefore it embodies elements of Science, of Technology, but also of the political and economic system of the era of its construction. Furthermore, this complex instrument reflects the, according to the Greek view, questions about the cosmological elements, time, chaos, and the Universe. These elements rule the Hymns, the Mysteries, Mythology, Tragedy, and these are exactly the structural questions guiding Philosophy, and the Forms of life, in general, in the context of the freedom of Gods and Man (social subconscious), and also in the questioning and the rejection of the former, by the Aristotelian and meta-Aristotelian rational science (scientific and technological conscious). All these, have as a point of reference the Antikythera Mechanism, which, in parallel, forms the view of the Greeks about the divine. They called Jupiter as the “universal mind” and the “universal law”. They considered that there exists one, as expressed in the modern terminology, software, which measures, controls, resets from their deviations, and stabilizes, the microcosm and the macrocosm.

There arises the question, whether the analogue Antikythera Mechanism, is a Greek issue. The answer is categorically negative. The Hellenistic is broader than the Greek, since, by embodying the former, speaks in terms of Oecumenism, in terms of the Cosmopolis. But, the core is the totality of the Greek thought. Many factors contributed, in order for the Greek people to pioneer in this particular era of History, either these mentioned by Herodotus, about their common origin, Religion, language, and the formation of their social concept, or these referring to their idiosyncrasy, according to modern researchers, which is equally crucial for their achievements, that is their tendency towards adventure, traveling, immigration, their love for the sea, their exceptionally rich language, and their passion for life and its delights.

All these philosophical, political, social, scientific and technological elements are embodied in the analog Antikythera Mechanism computer. In the scientific literature, worldwide, there exist exceptional studies, serving as tools for the understanding of the path for the societies and for Science, from the Cycladic and Creto-mycenaean eras up to the era of the Hellenistic world. Because of lack of space even a short enumeration is impossible. Therefore, we shall confine ourselves by citing only the work of Professor George Contogeorgis, “The Greek Cosmosystem”, in which the conditions, under which the Greek City-states are led to the composition of the Greek Oecumene - the Cosmopolis, are studied and demonstrated, that is the conditions responsible for the construction of the Antikythera Mechanism.



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Since the astronomical cognitive wealth of the pre-Homeric Cycladic and Creto-mycenaean world remains still uninvestigated, in order for us to know how it contributed to Hellenistic Astronomy, the knowledge embodied in the Antikythera Mechanism is not a surprise. It was known from the Babylonian observations, and its geometrical processing by Greek astronomers and mathematicians. The “first anomaly of the lunar motion according to Hipparchus”, “the mean solar time”, the “parapegmata”, the smoothly varying calendar described by Geminus of Rhodes, with its “intercalary months” and “excluded days”, all of these are simulated in the Antikythera Mechanism, in an admirable way. On the other hand, what surprises us is the way of the simulation and realization of this knowledge, with technological methods still unknown, with the use of hard metals and cutting instruments, and the production of gears and complicated shafts, of exceptional accuracy and style.

What was the use of the Mechanism, and what is the reason of its construction? Its discovery in a shipwreck reinforces the possibility of nautical usage, and for the calculation of the ship’s geographic location. But, except of two uncorrelated words in the extended text accompanying the Mechanism (ΗΛΙΟΥ ΑΚΤΙΣ), nothing else gives evidence for its use as a navigation instrument. The broad spectrum of astronomical knowledge it contains, the lack of targeted knowledge, and the accuracy of its construction, inspire us to conclude that it possibly served as an educational tool for the study of the then known Universe.

Whatever its use, the Antikythera Mechanism opens a unique window into the study of the sophisticated astronomical knowledge of the ancient Greeks. It is the indisputable evidence for their exceptional mathematical, geometrical and technological abilities. Even in the contemporary era of advanced technology, we stand in awe of this technological miracle and we ask ourselves what kind of assets possessed the civilization which invented it.

The Corpus Operae I is composed by articles in which Greek researchers have made major contributions and have been predominantly peer -reviewed and published in esteemed journals. The Corpus Operae II, shall be published in due course, composed by articles of scientists from the international scientific area.

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