CULTURAL FLOURISHING OF MATHEMATICS IN GREECE: GOLDEN AGE IN SCIENCE

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ABSTRACT

The Library of Alexandria represented the apogee of knowledge and culture in ancient times, becoming a symbol of the confluence of cultures and knowledge.
Set in a Hellenistic context, it was a key center for scholarship, where librarians preserved and transmitted knowledge over time. The era of mathematical splendor in Alexandria, with figures such as Euclid, Archimedes, and Apollonius, left a lasting impact on geometry and trigonometry, laying foundational foundations for scientific disciplines and logical thinking, making these mathematicians true architects of knowledge.

Keywords: Library. Knowledge. Culture. Mathematics. Erudition.

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INTRODUCTION

Ancient Greece, the cradle of Western civilization, stood out for its flourishing in various disciplines, especially in Mathematics. During this golden age, Greek mathematicians developed fundamental concepts in logic, geometry, arithmetic, and number theory, laying the foundation for a rigorous and systematic discipline. This breakthrough was driven by a spirit of inquiry and critical reasoning, which enabled thinkers to understand the world through reason and observation.

The legacy of this period influenced not only science, but also philosophy and physics, laying the foundations for logical and deductive thinking in the Western intellectual tradition.

This paper explores the achievements and contributions of Greek mathematicians and advances in various branches of mathematics during this era, highlighting the importance of their role in preserving and transmitting the knowledge of the era. It is hoped that this research will spark interest in mathematics in ancient Greece.

CONCEPTUAL ELEMENTS

In a corner of the ancient world, the city of Alexandria rose as a beacon of knowledge and culture in the Hellenistic era of ancient Egypt. Next, he delves into the vibrant historical and cultural context surrounding the founding of the Library of Alexandria, an enclave that transcended the borders of time and became the epicenter of ancient scholarship.

THE CITY OF ALEXANDRIA AND ITS IMPORTANCE IN THE ANCIENT WORLD

The city of Alexandria, founded by Alexander the Great in 331 BC, became a cultural and scientific epicentre of great relevance in the ancient world. Located on the coast of the Mediterranean Sea in Egypt, Alexandria was conceived as a cosmopolitan city and a meeting point between different cultures. (Neugebauer, 1957)

Alexander the Great conceived of Alexandria as a beacon of knowledge and a center of cultural exchange. Under his reign, the city began to take shape, with the construction of monuments such as the Lighthouse of Alexandria and the Museum; In addition, an innovative urban plan was established, with straight streets and grandiose architecture.

Alexandria's geographical location, at the intersection of important trade routes, contributed to its economic importance. The city became a thriving trading port and attracted merchants and merchants from all over the ancient world. Flourishing economic activity fueled Alexandria's development and influence in the international arena. (Neugebauer, 1957)

Nonetheless, it was its role as a cultural and scientific center that cemented Alexandria's reputation in the ancient world. The city was home to the famous Library of Alexandria, considered the most important of antiquity. The library, founded in the third century B.C., became an unrivaled repository of knowledge, with a vast collection of literary, scientific, and philosophical works.

The city was also home to illustrious scholars and philosophers, such as Euclid, Eratosthenes, and Hypatia. The Museum of Alexandria, which functioned as a center for research and teaching, attracted brilliant minds from different fields of knowledge. The exchange of ideas and intellectual discussion were encouraged, generating an environment conducive to the flourishing of thought. (Rojas, 2015).

IMPORTANCE OF THE LIBRARY OF ALEXANDRIA: BACKGROUND

The Library of Alexandria, founded in the third century B.C., was an institution of enormous importance in the ancient world. This library became the symbol of learning and scholarship, and its legacy endures to this day.

The antecedents of the Library of Alexandria can be traced back to previous attempts to preserve knowledge in ancient Greece and Egypt. Libraries and centers of learning existed in both Greece and Egypt before the founding of the Library of Alexandria, but neither reached the size and prestige of the latter. (Rojas, 2015).

The creation of the Library of Alexandria was closely linked to the reign of Ptolemy I Soter, one of the successors of Alexander the Great. Ptolemy I had a deep interest in culture and knowledge, and decided to found a library that could house and preserve all the knowledge existing in the known world.

The library was built in a building annexed to the famous Museum of Alexandria, a research and teaching center that brought together the most prominent scholars of the time. The library began collecting literary, scientific, philosophical, and religious works, both from ancient Greece and from other cultures of the known world. (Neugebauer, 1957)

One of the highlights of the Library of Alexandria was its dedication to acquiring works from different cultures and its effort to translate them into Greek, the predominant language in the region. This allowed the knowledge of different civilizations to be preserved and widely disseminated.

At its peak, the library is estimated to have housed between 400,000 and 700,000 papyrus scrolls, a staggering amount of knowledge for the time. Not only was it a passive

repository of books, but research and the production of new knowledge were also encouraged. (Rojas, 2015).

Sadly, over the centuries, the library of Alexandria suffered various fires and looting, resulting in the loss of a large amount of ancient knowledge. The most famous and devastating fire occurred in the third century AD, but it is not known for sure if it was the final destruction of the library.

Despite its tragic fate, the Library of Alexandria left a lasting legacy in human history. His vision of preserving and disseminating knowledge influenced the creation of future libraries and centers of study around the world, and his loss is considered one of the greatest cultural tragedies of antiquity. (Rojas, 2015).

We can conclude that the Library of Alexandria was a monument to knowledge and scholarship in the ancient world. Its importance lay in its ability to collect and preserve a vast collection of works from different cultures, as well as in its dedication to the translation and production of new knowledge.

THE SAGES OF THE LIBRARY OF ALEXANDRIA

The Library of Alexandria was one of the most famous and largest libraries of the ancient world. It was founded in the third century B.C. in the city of Alexandria, Egypt, during the reign of the Ptolemies. This library became an important center of knowledge and attracted numerous scholars and scholars of the time. (Heath, 1999).

The Sages of the Library of Alexandria were a group of highly educated and respected scholars who worked in the library. Its main objective was to collect, preserve and study all the knowledge and literature available at the time. These sages were experts in various disciplines, such as mathematics, astronomy, philosophy, medicine, poetry, and more. (Heath, 1999).

In addition to their work in the library, the Sages were also engaged in research and the exchange of ideas with other scholars of the time. Many of them contributed to the advancement of knowledge in their respective fields and made important discoveries and developments.

The Library of Alexandria and its Sages played a crucial role in preserving ancient knowledge and passing that knowledge on to future generations. Unfortunately, however, the library was destroyed multiple times throughout history, and much of its contents were irretrievably lost.

Zenodotus of Ephesus and Callimachus of Cyrene

Zenodotus of Ephesus and Callimachus of Cyrene were two prominent Greek poets and scholars who lived during the Hellenistic period. (Rojas, 2015).

Zenodotus of Ephesus was the first director of the Library of Alexandria and played a pivotal role in setting its standards and practices. He was recognized for his experience in the criticism and editing of literary texts. Zenodotus devoted himself to the task of collecting and cataloguing Homer's epic poems, carrying out meticulous research and establishing a system of divisions and notes to facilitate the study and understanding of Homeric works. (Rojas, 2015).

Callimachus of Cyrene was also a prominent poet and scholar who worked in the Library of Alexandria. He is credited with creating a new form of poetry known as an "epigram," which consisted of short, concise poems that expressed intense ideas or emotions. Callimachus was also noted for his skill in literary criticism and the composition of catalogues of literary works, such as his famous work "Pinakes" which listed the titles of numerous books of the time. (Rojas, 2015).

Both Zenodotus and Callimachus made important contributions to the literature and literary criticism of their time. His works laid the foundation for the systematic study of poetry and the preservation of literary texts, and his legacy influenced later generations of poets and scholars.

Eratosthenes and Apollodorus of Athens

Eratosthenes and Apollodorus of Athens were two prominent Greek scholars who lived in ancient Athens and made significant contributions in their respective fields. (Netz, 2003).

Eratosthenes was a polymath who excelled in areas such as mathematics, astronomy, geography, and poetry. It is mainly known for its fairly accurate calculation of the circumference of the Earth. Using the difference in the length of the shadows cast by two obelisks in two different places in Egypt at the same time of day, Eratosthenes was able to calculate the earth's circumference with remarkable accuracy for his time. (Rojas, 2015).

In addition to his contributions in geography and astronomy, Eratosthenes was also a renowned poet and philosopher. He was the third director of the Library of Alexandria and worked hard to expand its collection of books and promote research and study at the institution.

Apollodorus of Athens, on the other hand, was a renowned librarian and writer. He is best known for his work "Library", a compilation of Greek myths and legends that remains an invaluable source for the study of Greek mythology.

Apollodorus set about collecting and classifying these stories, providing details and genealogies of the mythological characters, and establishing a chronological framework for the myths. (Netz, 2003).

The work of Eratosthenes and Apollodorus in their respective fields contributed significantly to the knowledge and understanding of the ancient world. His works and discoveries have influenced subsequent generations of scholars and continue to be important sources for research in various disciplines.

Didymus

Didymus, also known as Didymus Callimachus, was a famous grammarian and librarian of the Library of Alexandria during the Hellenistic period. He was born in the first century B.C. and is considered one of the most outstanding scholars of his time.

Didymus specialized in grammar and philology, and is credited with authoring numerous works and commentaries on various literary and linguistic subjects. He was a prolific scholar and renowned teacher, and is said to have had thousands of disciples who came to him for education and knowledge. (Netz, 2003).

In addition to his work as a grammarian, Didymus also played an important role in the preservation and cataloguing of the Library of Alexandria. He was in charge of expanding the collection of books and contributed to the organization and classification of existing texts. His in-depth knowledge and passion for study made him an influential figure in the field of scholarship and literature of the time.

Didymus left a lasting legacy in the field of grammar and philology. His works and commentaries became pivotal references for later generations of scholars, and his influence extended far beyond his time at the Library of Alexandria. (Netz, 2003).

The foundation of the Library of Alexandria stands as an unbreakable milestone in the history of humanity, a point of convergence of cultures and knowledge that left an indelible mark on posterity. Through this chapter, we have traveled back in time to the heart of the ancient world, to glimpse the grandeur of Alexandria and its Library.

Its foundations laid the foundation for intellectual exploration and the transmission of knowledge that transcended generations, and its legacy endures as a beacon guiding our unquenchable thirst for wisdom.

DESCRIPTION

This research seeks to examine in depth the legacy of the golden age of mathematics in Greece, highlighting its significant contributions not only to the mathematical sciences, but also its influence on Philosophy, Physics, and other scientific disciplines.

Through a detailed analysis of the achievements and breakthroughs made by prominent Greek mathematicians, it seeks to provide a comprehensive understanding of how these developments laid the foundation for the logical and deductive thinking that has endured in the Western intellectual tradition.

In addition, it aims to promote interest in the study of mathematics in the context of ancient Greece, recognizing its essential role in the preservation and transmission of the knowledge that defined that era. This research will contribute to clarifying the history of mathematics and its evolution to the present.

FINAL THOUGHTS

The birth of the Library of Alexandria represents the spirit of an era where knowledge and culture were deeply intertwined. This city became a beacon of intellect in the ancient world, being a melting pot of ideas in Egypt's Hellenistic period. The library symbolized the confluence of knowledge and, thanks to the dedicated librarians, an immense wealth of knowledge was preserved over time.

The golden age of mathematics in Alexandria left a legacy that still influences our lives. outstanding mathematicians such as Euclid, Archimedes, and Apollonius excelled in Geometry and Trigonometry, transforming our understanding of the world and laying the groundwork for future scientific disciplines.

These thinkers not only solved complex mathematical puzzles, but also promoted a logical approach that continues to enrich and guide contemporary thought.
Thus, the legacy of Alexandria stands as a reminder of the importance of preserving and sharing human knowledge, emphasizing the perenniality of knowledge across generations.

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