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Introduction

Major contributions from the ancient world helped in the development and achievement of many milestones in today's contemporary world. Technology used in prehistoric times was a profound accomplishment especially due to the wisdom inculcated by ancient scientists and engineers in making work easy and achievable. Their contributions aided in channeling efforts toward attaining realizable goals through mechanization and efficiency. The Roman Empire is credited with their impeccable exploits in architecture, engineering, mathematics and the sciences. As time progresses, ancient technology has been embraced and advanced to accommodate the changing trends in technological advancement. This paper will delve into the contributions of the Roman Empire to the world in the form of science and mathematics.

Mathematics

Contributions from early philosophers of mathematics provided a resource for scientific exploits and engineering. Thales introduced the angles of triangles inscribed in circles. The rules he explained and derived in theorem, which provided new measures in which the ancient communities interrelated the concepts of engineering and science as a whole. His theorem originated from the knowledge of interpreting the height of the pyramids by use of their shadows. Although much of the attributes in his theorem originated from Babylon and Egypt, he conceptualized the idea into a formidable mathematical concept used in today's world in many fronts. His contribution to geometry provided the leeway for many other mathematicians to develop

on the theory and provide other means of interpreting geometric functions and tasks.

Pythagoras an influential figure in ancient mathematics specialized in astronomy. The Pythagorean school of thought was a fountain for many mathematical discoveries and astronomical concepts. In addition to their religious discoveries, Pythagoras is largely credited with the honor of conceptualizing the Pythagoras theorem. In addition to this, he derived that 'the sum of squares among the sides of a triangle is equivalent to the square of the other side' (Selin and D'Ambrosio 62). Although the Babylonians had prior knowledge of the fact, Pythagoras was able to provide the proof behind this assumption hence the accreditation of the theorem to his name.

Aristotle, the greatest scientist in medieval history is considered one the most influential historians who ever lived. His exploits in science and technology provided the background for most of the ancient curriculums of studying science. He tutored Alexander the great. He wrote geometric theorems and derived definitions of the circle as being a locus of points whose distances between two different points are identical. Archimedes made several advances in algebra, number theory and mathematical analysis. Although he ventured in too many exploits, his most famous contribution to the world of mathematics and modern science is his theory of the plane and geometric series. Moreover, his discovery on buoyancy set the standard for construction of warships and massive vessels used for transporting goods and people across rivers and canals. In addition to his principle of buoyancy and use of mirrors to harness sun rays that created the fire, Archimedes, was able to provide solutions pertinent to mathematical

problems and solutions. Hipparchus of Rhodes considered the pioneer of trigonometry is credited with most of the modern exploits in the development of science. He conceptualized a theoretical model in geometry to finalize on numerical predictions of the theory.

The Romans had no mathematicians of importance probably because they only relied on mathematics for practical reasons, as opposed to abstract thought of mathematical principles. Although they had a full set of numerals in their mathematical alphabet, their alphabet proved to be tedious and complicated especially when calculating obscure figures. Based on the Roman alphabet, the Roman numbers are well known today and are the dominant form of numerals for most of the world until the introduction and preference of the Arabic numeral system. Moreover, their system of numbers did not include any zero hence inconsequential for mathematical and arithmetic purposes. The system was hence clumsy, and its eradication was inept. Although, the Roman numerals were adjusted using a subtractive notation to remove ambiguity, the system received criticism from all fronts hence its eradication in mainstream mathematic computations.

Mathematics provided the channel for conducting population census in the country. The basis of counting exhibited in the Roman numeral contributed to the new field of population census. Officials in Rome endeavored to undertake a census in order to determine the population of the inhabitants of the country. In addition to this, the census would provide the leaders an idea of the total population for the purposes of planning and devolving administrative functions (Struik 34). More importantly, the provision of the census report would come in handy especially with the distribution of

amenities, wealth and resources.

In addition to their many discoveries, the Romans ventured into the fabric industry to provide clothing and gear for their soldiers. The Romans produced all kinds of garments from fabric including shoes, socks and undergarments. Their soldiers were fitted with heavy armor made up of metal and leather, carefully tailored and fitted to provide them necessary protection when they went to war. Although they had trouble in adjusting shoes depending on their shapes, the ideology was appreciated and embraced by many as being a step towards better living. Many board games also originated from medieval Rome due to their sense of interaction and bonding.

Scientific advances and lessons from the Chinese led to the pioneering of ancient medicine in the Roman Empire. Plants, roots and flowers, were incorporated using a sequence of techniques to develop alms and concussions capable of relieving pain, alleviating nausea and extinguishing injuries and certain ailments. Although medicine men and gods were largely relied on for healing and good tidings, the trends in developing medicine became highly appreciated and well endowed within the Roman Empire.

Engineering in Rome

Many as being the most brilliant and conceptual in ancient empires considered the prowess Rome's architecture and engineering designs. Despite their rudimentary knowledge in mathematics, they constructed sturdy and attractive structures that demonstrated their dexterity in the field. The concept of the dome as used in roofing of large structures and

temples captured the attention of many because engineers had tried to deal with the menace of putting up heavy stone roofs to no avail. The conceptualization of the dome, solved problems such as overcrowding of construction sites, with beams and columns to help in supporting the roofing structure. Even though the pyramids were constructed way before the beams, they only provided aesthetic quality on the outside, but the inside was marred by darkness and confined spaces. As opposed to the Parthenon, the roman domes were spacious, open and created an improved perspective on the importance of interior design and beauty. The dome provides a larger area and aeration for the building.

Building of weapons and arms of war was an area of Greek specialization. However, the Romans contributed to the specialization and the perfection of the weaponry in order to provide ease of use and mobility of the weapons. Most of the weapons produced in the ancient world were bulky and complicated in their ease of use. Romans invented weapons called onagers, which threw rocks for long distances. The weapon was more powerful than a catapult due to its capability to throw large boulders of rock for long distances, and they were more accurate and could bring down large walls (Clagett 45).

The use of concrete originated from the Romans. Today, its use is a basic part of any construction project since it is easily manipulated and forms a rigid concrete mixture when dry capable of supporting large buildings and maintaining the structural integrity of the architecture. Concrete is widely renowned due to its use in constructing the Pantheon, the largest known unreinforced structure built purely from concrete more than one thousand

years ago. Moreover, concrete is affordable, fireproof and could be used for underwater construction capable of resisting tremors from an earthquake. Scientific exploits in the Roman Empire included construction of road networks throughout the empire. Of importance to note is that some of the roads built then are still in existence even today with minimal wear and tear. The Romans built sturdy, precise and rigid roads meant to last. Moreover, the Romans built sewers concurrently with their road networks. The sewer system in the Roman Empire spread all over the city collecting human waste and draining it into the Tiber. However, the most interesting bit about the sewer was its complexity in design and engineering mystery that enabled it to contain all the waste in the empire.

People talk of heated floors and seats as a feat that was achieved in recent times but to the surprise of many, the Romans were miles ahead in this form of technological advancement. In fact, maintaining or controlling the temperature of a room is a difficult engineering feat to achieve. However, by using hypocausts this was made possible. Hollow columns of clay evenly spaced were placed beneath the floor of the house. Hot air and steam emanating from another room would pass through the hypocausts and provide heat in the rooms. Hypocausts solved the problem of smoke and fire, which would destroy the aesthetic feel of the building's paintings and roofing.

The Romans perfected the arch- by turning it to a semicircle, which had a perfectly smooth edge. The advantage of the arch is that it is possible to repeat it rather than have gaps in between large arcs. Moreover, the aesthetic attributes of the arches captured the attention of many and was

employed extensively in royal houses, churches and monuments. Another advantage of the arch was its minimal requirement in materials for construction. The Romans also built pontoon bridges utilized for raids and ambushes in times of war. The idea behind the construction of pontoon bridges was a technical one especially considering that they were built across rivers. Engineers placed wooden planks at varying angles underneath the rivers against the current of the wind to provide a firm foundation for the structure. Thereafter beams were arched together, and a wooden bridge placed on top, which acted as the bridge.

Conclusion

Although most of the pioneers in mathematics and science originated from the Greeks, the Romans are credited with the practical application of most of the theories and discoveries made. Moreover, there exists no famous Roman mathematician or Astrologer, but their practical ability and knowledge in mathematics and sciences contributed to the growth of the Roman Empire wholly, whether in engineering or building and construction. The Romans are depicted as hard-working individuals who when provided prior knowledge and facts, are capable of deriving concepts and forming concrete workable solutions to their problems. Their exploits largely act as a testimony to the growth of the Roman Empire to the expense of accommodating Greeks, Babylonians and Mesopotamians.

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