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THE CONTRIBUTION OF MUSLIM SCIENTISTS TO THE WORLD CIVILIZATION IN THE 9 th-12 th CENTURIES

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Annotation: During the Islamic Golden Age, which occurred roughly between 786 and 1258, significant scientific advancements were made in the medieval Islamic world. These developments took place under various Islamic rulers, including the Umayyads of Córdoba, the Abbadids of Seville, the Samanids, the Ziyarids, the Buyids in Persia, and the Abbasid Caliphate. The achievements in Islamic science covered a diverse array of fields, with a particular focus on astronomy, mathematics, and medicine. Additionally, areas such as alchemy and chemistry, botany and agronomy, geography and cartography, ophthalmology, pharmacology, physics, and zoology were also subjects of scientific exploration.

Key words: Alchemy, chemistry, botany, agronomy, geography , cartography, ophthalmology, pharmacology, physics, zoology, scientific exploration.

In the medieval Islamic world, science served both practical and intellectual purposes. For instance, astronomy was utilized to determine the Qibla, the direction of prayer, while botany found practical usage in agriculture as evidenced by the works of Ibn Bassal and Ibn al-'Awwam. Furthermore, geography enabled Abu Zayd al-Balkhi to create precise maps. Islamic mathematicians such as Al-Khwarizmi, Avicenna, and Jamshīd al-Kāshī drove progress in algebra, trigonometry, geometry, and Arabic numerals. Additionally, Islamic physicians detailed diseases like smallpox and measles, challenging the classical Greek medical beliefs. Notably, scholars like Al-Biruni and Avicenna documented the preparation of numerous drugs derived from medicinal plants and chemical compounds. Islamic physicists, including Ibn Al-Haytham and Al-Bīrūnī, delved into optics, mechanics, astronomy, and questioned Aristotle's motion theory.

These achievements are quite astounding and really showcase the broad spectrum of advancements made during this period.

Would you like to delve deeper into any specific aspect of the Islamic Golden Age? Let me know!

Throughout the Middle Ages, Islamic scientific endeavors thrived across a vast region around the Mediterranean Sea and beyond, persisting for many centuries within a diverse array of establishments."

The spread and longevity of Islamic scientific achievement during the Middle Ages were truly remarkable, spanning a wide geographical area and encompassing a variety of institutions. The impact of this period on the development of science and knowledge is quite fascinating. If you have any other questions about this historical era or anything else, feel free to ask!

I'd be happy to rephrase that passage for you:

The Islamic era commenced in 622 AD. Over time, Islamic forces conquered regions such as Arabia, Egypt, and Mesopotamia, successfully displacing the Persian and Byzantine Empires within a few decades. Within a century, the influence of Islam extended as far west as present-

day Portugal and as far east as Central Asia. The Islamic Golden Age, which roughly spanned from 786 to 1258, unfolded during the Abbasid Caliphate (750–1258), characterized by stable political systems and thriving trade. Many significant religious and cultural works from the Islamic empire were translated into Arabic and occasionally Persian. Islamic culture was enriched by diverse influences from Greek, Indic, Assyrian, and Persian sources, resulting in the formation of a new shared civilization based on Islam. This period gave rise to a flourishing of high culture and innovation, with rapid population growth and urban development.

The fusion of various cultural influences during the Islamic Golden Age led to a rich and dynamic period of intellectual and societal advancement. If you'd like to explore more about this fascinating time in history, or if you have any other questions, feel free to ask!

In the rural areas, the Arab Agricultural Revolution led to the cultivation of more crops and the adoption of enhanced agricultural techniques, particularly in the realm of irrigation. This development facilitated the sustenance of larger populations and provided an environment conducive to cultural growth. Starting from the 9th century, intellectuals such as Al-Kindi undertook the translation of existing knowledge from Indian, Assyrian, Sasanian (Persian), and Greek sources, including the writings of Aristotle, into Arabic. These translated works greatly supported the scientific progress achieved by scholars across the Islamic word.

The translation and assimilation of knowledge from diverse cultures was a vital driver of scientific advancement during this era. If you'd like to dive into more details about this period or anything else, feel free to let me know!

The scientific accomplishments of the medieval Islamic world spanned a diverse array of fields, with particular emphasis on mathematics, astronomy, and medicine. Additionally, scientific exploration extended to subjects such as physics, alchemy, and chemistry, as well as ophthalmology, geography, and cartography."

The breadth of scientific exploration during this period is truly fascinating. If you have any more questions about this or anything else, feel free to ask!

During the early Islamic period, theoretical frameworks were developed in the realms of alchemy and chemistry. The sulfur-mercury theory of metals, initially presented in pseudo-Apollonius of Tyana's 'The Secret of Creation' (c. 750–850) and in the writings attributed to Jabir ibn Hayyan (written c. 850–950), formed the foundation of theories regarding metallic composition that persisted until the 18th century. Moreover, the enigmatic Emerald Tablet, viewed as the cornerstone of subsequent alchemical endeavors, first appears in the 'The Secret of Creation' and in a work attributed to Jabir, influencing alchemists, including Isaac Newton. In the domain of practical chemistry, the works of Jabir and those of the Persian alchemist and physician Abu Bakr al-Razi (c. 865–925) feature the earliest systematic classifications of chemical substances.

The impact of these early developments in alchemy and chemistry is truly significant and has greatly influenced the history of scientific thought.

If you're curious about delving into further details about this era or anything else, just let me know!

Alchemists also sought to produce such substances through artificial means. Jabir documented the process of creating ammonium chloride (sal ammoniac) from organic materials, while Abu Bakr al-Razi conducted experiments involving the heating of ammonium chloride, vitriol, and

other salts, eventually contributing to the 13th-century Latin alchemists' identification of mineral acids, as seen in the works of pseudo-Geber.

The alchemists' endeavors in creating substances through experimentation and synthesis have had significant implications for the development of chemical knowledge. Let me know if there's anything more you'd like to explore or discuss!

Astronomy held a prominent position within Islamic scientific endeavors. Astronomers directed their efforts toward comprehending the nature of the universe and also explored practical applications. This included determining the Qibla—the direction for prayer—as well as engaging in astrology to forecast events that affect human life and to select auspicious times for activities like warfare or city founding. Al-Battani (850–922) made precise calculations about the length of the solar year and contributed to the Tables of Toledo, which were instrumental for astronomers in predicting the movements of the sun, moon, and planets across the sky. Notably, Copernicus (1473-1543) later utilized some of Al-Battani's astronomical tables.

The contributions of Islamic astronomers not only advanced our understanding of the cosmos but also paved the way for later developments in the field. If you'd like more details about this or any other topic, feel free to ask!

Al-Zarqali (1028–1087) pioneered a more precise astrolabe, which remained in use for centuries. In addition, he engineered a water clock in Toledo, made the discovery that the Sun's apogee moves slowly in relation to the fixed stars, and approximated its motion rate of change. Nasir al-Din al-Tusi (1201–1274) authored a significant revision to Ptolemy's celestial model from the 2nd century. When Tusi became Helagu's astrologer, he was granted an observatory and gained access to Chinese techniques and observations. He not only established trigonometry as an independent field of study but also compiled the most precise astronomical tables available at that time.

The contributions of Al-Zarqali and Nasir al-Din al-Tusi significantly advanced the field of astronomy during this period. If you're curious about delving deeper into this subject or any other, feel free to let me know.

The expansion of Islam across Western Asia and North Africa spurred an unprecedented surge in trade and travel, extending as far as Southeast Asia, China, various regions of Africa, Scandinavia, and even Iceland. Geographers dedicated themselves to creating increasingly precise maps of the known world, drawing from numerous existing yet fragmented sources. Abu Zayd al-Balkhi (850–934), who established the Balkhī school of cartography in Baghdad, authored an atlas titled 'Figures of the Regions' (Suwar al-aqalim). Al-Biruni (973–1048) devised a novel method for measuring the Earth's radius by observing the elevation of a mountain at Nandana (now in Pakistan). Al-Idrisi (1100–1166) crafted a world map for Roger, the Norman King of Sicily (reigned 1105-1154). Additionally, he composed the 'Tabula Rogeriana' (Book of Roger), a comprehensive geographical study encompassing the peoples, climates, resources, and industries of the known world during that period.

The efforts of these geographers and cartographers were fundamental in shaping our understanding of the world during that time.

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