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Comparative Study on Urbanization Development of Uruk and Zhengzhou Shang City

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Abstract. As the capital of the Early Shang civilization, Zhengzhou Shang City is crucial for studying Shang civilization and early Chinese urban development. Uruk, founded by the Sumerians, is recognized as the world's first true city. Comparing Zhengzhou Shang City and Uruk in terms of geography, urban planning, and artifacts reveals that differing environments led to distinct agricultural and cultural practices. Zhengzhou Shang City, influenced by kingship, featured high walls and large palace complexes, reflecting royal authority and ritual systems, while Uruk's temple-centered layout highlights religion' s central role. Excavated artifacts from both sites further illustrate differences in materials, production, and usage. Although both cities emerged from river civilizations on alluvial plains, Uruk developed around religious and natural needs with mixed functions, whereas Zhengzhou Shang City was shaped by political power and cultural integration, resulting in a highly planned metropolis. These contrasts reveal divergent paths of religious and royal dominance in early urbanization and highlight the diversity of early city development.

Keywords: Zhengzhou Shang City, Uruk, Urban Development, Great River Civilization

1. Introduction

The emergence of early cities was a key point in the development of human civilization, marking the transition from nomadic, fishing and hunting and simple agricultural socie ties to complex social structures. Urbanization paths vary significantly across ecological and cultural contexts. Mesopotamian and Shang civilizations, both originating in major river basins and represented by Uruk and Zhengzhou Shang city, exemplify distinct Eastern and Western urbanization trajectories. Located in the Two River Basin, Uruk is one of the earliest cities in human history, and its urban planning, architectural technology, and writing system have profoundly impacted later generations. In contrast, as an early Shang Dynasty's early capital, Zhengzhou Shang city demonstrates the rigor and sophistication of urban planning in ancient China, and its palace architecture, bronze casting, and ceremonial sites reflect a highly developed social organization and religious culture.

By comparing the geographic environment, urban planning layout and excavated artifacts of the Uruk and Zhengzhou Shang city, this paper delves into their commonalities and differences in the development of urbanisation. This cross-civilization comparative study not only reveals the theoretical significance of the urbanization development of different civilizations, but also fills the academic gap of cross-civilization comparison of early cities. More importantly, through the

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comparative study, we can see more clearly the diversity of human beings in adapting to the environment and constructing social order in different ecological environments, as well as how unique patterns of urbanization developed in similar environments due to cultural differences. This comparison enriches our understanding of early urbanization and provides valuable historical lessons for modern urban planning and sustainable development.

2. Geographic comparison

2.1. Geographic environment of Zhengzhou Shang city

The geographical environment played a driving role in the formation and development of Zhengzhou Shang city. Zhengzhou Shang city, centrally located in Henan Province within Zhengzhou, lies at the junction of the Huanghuai Plain and western Henan hills. Its core position in the civilization-breeding belt, temperate monsoon climate, and marked seasonal variation provided favorable conditions for early agriculture and human habitation. In terms of the hydrological environment, a diversified water system has been formed around the city: the Yellow River, which is more than 20 kilometers to the north, flows from west to east, and the Xingze and Guji waters provide a large amount of usable water resources for the city. These abundant water resources not only guaranteed the supply of drinking water to the city but also supported the needs of urban life, such as washing, bathing, and gardening. The archaeological discovery of large-scale water storage facilities in the palace area confirms the mature water resource management system. Even though the water conservancy project gradually showed its importance with the expansion of the capital city's size and the population's growth, the archaeological evidence shows that the utilization of the natural water system was still dominant in the Shang city period. Regarding microgeography, Zhengzhou Shang city is surrounded by rolling hills, highlands to the west and south, and low-lying swamps to the east and north [1]. Geographic analysis indicates that Zhengzhou Shang city exemplifies livability, with natural mountain and water barriers providing defense, fertile alluvial soils supporting advanced agriculture, and a temperate climate sustaining diverse flora and fauna. This ecological advantage of flood control, water supply, cultivation and transportation made it an ideal site for constructing early capitals, and laid the material foundation for the flourishing of the Early Shang civilization.

2.2. Geography of Uruk

Uruk was located in the southern part of ancient Mesopotamia, i.e., near the site of Warka in present-day southern Iraq. Uruk is situated on the alluvial plain of the lower Euphrates River. Because the Tigris and Euphrates rivers flow from the highlands of eastern Turkey through Syria and Iraq and into the Persian Gulf, the rivers flooded the area every spring when the snow from the nearby mountain ranges melted and entered the rivers. Although flooding is destructive, it enriches the sandy soil with nutrients, enabling agriculture. Uruk lies on a flat plain composed mainly of sedimentary deposits [2], and the flat terrain and fertile soils are conducive to agricultural development, providing natural fertilizers for crops. However, the flat topography also made the cities vulnerable to flooding, and the Sumerians developed complex hydraulic systems to regulate irrigation and flood control. Uruk’s hot, arid climate, characterized by high summer temperatures and minimal rainfall, necessitated reliance on the Tigris and Euphrates rivers for agricultural irrigation. At the same time, climatic factors such as large diurnal temperature differences promote sugar accumulation in crops. This combination of climate and topography led to the development of

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local agriculture, which resulted in the cultivation of large quantities of grains and fruits, such as dates. As a result of these environmental factors, people gradually settled and lived in the area and formed settlements, thus contributing to the city of Uruk.

2.3. Common insights of geography on early urban development

The influence of geographic environment on city development presents a cross-regional perspective on the evolution of city development of early human civilization. Although Zhengzhou Shang city and Uruk are separated by thousands of miles, they share the survival mode of early humans living by water. Residents of Zhengzhou Shang city utilized natural hills as flood barriers and hydraulic facilities to convert river water into sustainable urban resources on the Yellow and Huaihe alluvial plains. In Uruk, inhabitants controlled Euphrates floods with hydraulic engineering, transforming the region' s soil into fertile land.

Both ancient cities skillfully utilized topography and developed integrated ecological adaptation strategies, combining natural water systems with engineered interventions. This close interaction between geo-environmental factors and human activity highlights early civilizations' shared approaches to resource use, disaster defense, and spatial planning, offering a natural environment perspective on ancient urban evolution.

3. Comparison of urban planning and layout

3.1. Urban planning layout of Zhengzhou Shang city

Regarding the overall layout, Zhengzhou Shang city is divided into multiple city wall structures: the outer, inner, and palace walls. The inner city is nearly rectangular, with an area of about 350,000 square meters, accounting for about 1/6 of the area of the inner city [3], and consists of rammed-earth ramparts and trenches together, with a circumference of about 7 kilometers. The northeastern part of the inner city is concentrated with several large rammed-earth bases, which were the areas where the royal family and nobles lived during the Shang Dynasty and were equipped with a more complete water supply and drainage facilities. Numerous sacrificial remains in the southwestern inner city indicate a designated sacrificial area. The outer city wall, following the terrain, partially encircled the inner city, featuring towers and burnt brick-reinforced gates. Inside, commoner residences, craftsmen's workshops, noble tombs, and central bronze vaults were present.

3.2. The layout of Uruk's urban planning

The urban planning layout of Uruk shows a circular layout pattern. Uruk has a temple as its core, and the core area has two separate building areas, namely Eanna and Kullaba. One of the Eanna temples was dedicated to Inanna, the goddess of Venus, and the Eanna temple area covered an area of about 200,000 square meters, with a mud-brick enclosure wall of about 10 meters in residual height. Several temples and palaces from the Late Uruk period and squares and courtyards have been found in the temple area. The temples are all in a uniform three-part pattern, with a rectangular or "T"-shaped temple in the center, which was the place of worship, and several side rooms arranged symmetrically on both sides [4]. Of the two zones, the most coherent - or easiest to understand - is the Anu zone, where excavators found the temple, the White Temple [5]. The two districts, about 300-400 meters apart, formed a cluster of temples and palaces that were the spiritual and political center of the city, assuming the functions of religious ceremonies, administration, and resource distribution in the town. In Uruk, the temples were not only the center of faith for the local people,

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but also played an equally important role as the economic hub of the Mesopotamian region. The main canal, which ran through Uruk from north to south, not only made the streets accessible but also provided irrigation water for the gardens [6]. Noble residences and administrative institutions are adjacent to the temple district. Craft workshops, distributed along the canals to take advantage of water transportation, pottery, metalworking, and tumblr production areas, were mainly concentrated around the temple and used large-scale production. Markets existed in the temple squares, and the temple guaranteed the exchange of goods. Uruk was connected to the Persian Gulf through the Euphrates River, and the locals exported grains and textiles and imported stone (e.g., limestone) and metals for production and use [7]. The north and southwest gates of Uruk were nearly 15 meters wide and can be interpreted as a floodgate where the central canal of the inner city entered and exited through the city walls [8]. Outside the city walls is an area of agricultural cultivation, extending outward to date palm groves and irrigated farmland, covering an area of about 2.59 square kilometers.

3.3. Comparative summary of urban planning layout

Zhengzhou Shang city and Uruk represent the typical urban planning patterns of early China and Mesopotamian civilizations. Zhengzhou Shang city adopts a multiple city wall structure, presenting an overall square shape. At the same time, Uruk is characterized by a circular layout, reflecting the differences in overall city planning between the two civilizations. The rectangular core area (about 350,000 square meters), the northeastern part of which is the royal residence with an advanced water supply and drainage system, the southwestern part concentrates on ritual remains. The outer city semi-surrounds the inner city according to the terrain, distributing commoners' residences, handicrafts workshops, high-grade aristocratic tombs and bronze cellars. The city gates are reinforced with burnt-brick towers to strengthen the defense on either side of the city gate. Uruk features a circular, radial layout centered on the Ena (200,000 m² mud-brick enclosure) and Kulaba temple districts, separated by 300–400 meters and forming the religious-administrative core. A central canal, equipped with a 15-meter-wide floodgate at the city gate, provides transportation, irrigation, and flood control. Craft industries are located along the canals, with large-scale production, while noble residences adjoin the temple districts. Outside the city walls, 2.59 km² of irrigated farmland and coconut palms extend outward. The city has 2.59 square kilometers of irrigated farmland, date palm groves, and import and export trade via the Euphrates River. Both cities realized complex social management through hydraulic engineering and functional zoning. Still, while Zhengzhou Shang city highlights the hierarchical and political-military control of the city, Uruk reflects the high degree of integration of the temple economy with religion, production, and trade.

4. Comparison of excavated artifacts in cities

4.1. Characteristics of excavated artifacts in Zhengzhou Shang city

Bronze is one of the essential symbols of Shang civilization, and its casting technology and artistic value reflect the highly developed social productivity and complex social organization of the Shang Dynasty. Archaeological excavations at Zhengzhou Shang city revealed multiple bronze workshops and cellar pits outside the city, as well as numerous finely crafted Shang Dynasty bronzes within the site, including significant ceremonial vessels like tripods noted for their solemn forms and exquisite workmanship.

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The complex casting process made these bronzes, and their surfaces were decorated with various and exquisite motifs, such as taotie and cloud and thunder motifs. These motifs not only demonstrated the high artistic level of the Shang craftsmen, but also reflected the mysterious and majestic theocratic religious color of the Shang Dynasty, which reflected the society's worship of the gods and ancestors, as well as the close integration of kingship and theocracy at that time.

The casting process of bronzes required the collaboration of highly organized craftsmen, from the mining of ore, smelting of copper to the shaping and decorating of bronzes, each step of the process required the close cooperation of many craftsmen. The discovery of the bronze workshops shows that the bronze casting industry of the Shang Dynasty had already reached a relatively high degree of specialization, and also reflects the absolute control of the king's power over resources. These workshops not only provided many bronze ritual objects and weapons for the royal family and nobles of the Shang Dynasty, but also reflected the Shang society's highly centralized economic model and strict hierarchical system. Through the study of Zhengzhou Shang city's bronze-making workshops and bronze artifacts, we can gain a deeper understanding of the social structure, religious beliefs, and the relationship between kingship and the economy during the Shang Dynasty, and these discoveries provide extremely important physical evidence for the study of the development of ancient Chinese civilization.

4.2. Characteristics of the excavated artifacts in Uruk

The materials of artifacts unearthed in Uruk are mainly clay-based, a phenomenon closely related to the natural environment of the Two Rivers Valley. Stone is scarce in the region, but clay is abundant, so clay became one of the most important materials in the Uruk culture. Archaeologists have found many artifacts made of clay at Uruk sites, including round seals, clay tablets and pottery. These artifacts played an important role in daily life and reflected the economic, cultural and religious life of Uruk society.

Among them, pottery balls used for storage records are a unique invention of the Uruk culture. These balls were carved with reliefs of animals such as cows and goats, and the designs were embossed on clay through the rolling technique. This technique not only made the objects' security features, but also was used for bookkeeping, reflecting the wisdom of the Uruk people in management and social organization. Clay sealing was an important innovation in record-keeping and management in the Uruk culture, laying the foundation for the later development of writing and writing systems.

4.3. Comparison of major excavated artifacts

The major artifacts excavated from the two cities reveal the following points.

(1)Differences in materials and technology. Zhengzhou Shang City is distinguished by its extensive use of bronze artifacts, reflecting the centralized authority and theocratic governance of the Shang dynasty. In contrast, Uruk primarily utilized clay as its foundational material, pioneering innovations such as cylinder seals, cuneiform script, and advanced kiln-firing techniques—developments uniquely tailored to the region’s environmental context.

(2)Differences in Function. The core of Zhengzhou bronzes served to symbolize and rule the divine and royal power, and the bronzes were used to show the king's power and serve the Shang dynasty in rituals to consolidate the king's power further; the clay artifacts in Uruk were used primarily for economic record keeping, warehouse management and administrative communication, and were physical evidence of early urban economy and administration.

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(3) Reflection of social structure. Both reflect the complex social context of the time. The bronzeware unearthed from Zhengzhou Shang city exemplifies the kings' exclusive dominion and centralized regulation over both bronze resources and metallurgical production. In contrast, the clay artifacts from Uruk illustrate the emergence of information recording systems, property administration, and bureaucratic mechanisms developed in response to increasing societal complexity.

5. Discussion

In the early stages of the formation of human civilization, several splendid world civilizations emerged in the world's great river basins. The Mesopotamian civilization represented by Uruk and the Chinese civilization in the Yellow River - Yangtze River basin represented by Zhengzhou Shang city are the world famous centers of early urban civilization. A comparative analysis of the two cities reveals distinct contrasts between their respective civilizations, highlighting variations in urban development and planning strategies shaped by geographic factors, as well as divergences in the cultural attributes of excavated artifacts attributable to differences in institutional frameworks and material resources. The two ancient cities bear witness to the different evolutionary paths of Eastern and Western civilizations: Zhengzhou Shang city shaped the paradigm of civilization through political centralization. At the same time, Uruk gave birth to urban civilization through religious integration. At a time of global urbanization, this comparison of civilizations is not only of academic value, but also provides a historical reference for understanding the collective destiny of mankind.

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