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Research Article

Animal-shaped Helmets of the Tang Dynasty: Cultural Heritage in Chinese Military History

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ABSTRACT

This study examines animal-shaped helmets of the Tang Dynasty as a distinctive component of Chinese military material culture. While international scholarship has discussed animal-decorated helmets in diverse cultural traditions such as Greek boar's-tusk helmets, Celtic swan helmets, Germanic boar-crested helmets, and Renaissance parade helmets, systematic research on Tang examples remains limited. To address this gap, the present study integrates morphological analysis of 24 excavated warrior figurines with textual examination of official histories and archaeological reports to clarify their historical terminology, structural features, and cultural significance. Using NVivo software, key morphological elements including eyes, ears, muzzle, and crest were coded to establish typological relationships among the tiger, lion, and bear prototypes. The analysis identifies three structural types of helmets (open front, cloak-style, and slip-on), each associated with specific symbolic functions and ritual contexts. Textual evidence further confirms "Maotou" as the overarching historical term, with Hushi Fu (Tiger Helmets), Bear-skin Crown (Bear Helmets), and Lion Helmets representing distinct subtypes linked to rank, protective symbolism, and ceremonial authority. By combining artifact morphology with historical semantics, this study clarifies how animal imagery was translated into material forms that embodied power, spiritual protection, and elite identity within the Tang military uniform system. Methodologically, it demonstrates the utility of NVivo-based feature coding for the analysis of ancient armor and provides a reference framework for future digital conservation and visualization of early Chinese military heritage.

Keywords: Tang Dynasty Art; Animal-Shaped Helmets; Military Uniform Culture.

INTRODUCTION

The Tang Dynasty (618–907 CE) represents one of the most prosperous eras in Chinese history, marked by flourishing cultural exchange, institutional sophistication, and highly developed military systems. In recent decades, archaeological discoveries, particularly warrior figurines unearthed in Shaanxi, Shanxi, and Henan, have revealed a unique category of animal-shaped helmets. These helmets, often seen on terracotta warrior figurines, feature sculpted animal heads with pronounced fangs, manes, or expressive facial features, creating a powerful and striking visual effect. Their distinctive morphology sets them apart from other types of Tang military headgear and highlights an important yet understudied aspect of Tang military uniforms.

Despite their visual prominence and cultural value, academic research on Tang animal-shaped helmets remains limited. Existing studies have mostly focused on describing their outward appearance, speculating on possible materials, or examining potential artistic influences. However, these discussions tend to rely heavily on stylistic comparison and fragmented textual references, without integrating archaeological, textual, and institutional evidence. As a result, many essential questions remain unanswered: What were these helmets called in Tang historical records? How were they used? What symbolic meanings did they carry? And how did they fit into the broader military uniform system of the Tang Dynasty?

Furthermore, current museum displays typically refer to these artifacts with general terms such as "animal-shaped helmets" or simply categorize the figurines as "warrior figurines," without clarifying their precise nomenclature or functional context. The absence of systematic typological analysis, historical terminology verification, and institutional interpretation highlights the need for a more comprehensive investigation grounded in material culture studies.

In response to these gaps, this study explores the terminology, morphology, and institutional meaning of Tang animal-shaped helmets through an integrated analysis of textual sources and archaeological materials. Specifically, this research addresses the following questions:

1. What were the historical names and classifications of animal-shaped helmets in Tang texts?
2. How do excavated helmets correspond to these historical terms?
3. What symbolic, ritual, or hierarchical roles did these helmets play within the Tang military uniform system?

To answer these questions, this study analyzes 24 excavated warrior figurines using NVivo-based coding, establishes a typological framework for animal-shaped helmets, and systematically correlates morphological features with historical terminology. The findings clarify "Maotou" as the overarching term for animal-shaped helmets, further categorizing them into Hushi Fu (Tiger Helmets), Bear-skin Crown (Bear Helmets), and Lion Helmets, each associated with distinct visual features and symbolic functions. This research also identifies three structural types of animal-shaped helmets and situates them within the Tang ceremonial and hierarchical system. By integrating morphological analysis with textual evidence, this study offers a more comprehensive understanding of the institutional meanings and cultural connotations embedded within Tang Dynasty military uniforms.

LITERATURE REVIEW

Research on Animal-Shaped Helmets in Chinese Scholarship

Chinese scholars have addressed animal-shaped helmets from various perspectives, yet the overall research remains relatively preliminary. Existing studies mainly focus on three aspects: morphological features, cultural origins, and symbolic meanings. Although these works provide important clues for understanding Tang Dynasty animal-shaped helmets, most remain at the level of appearance description or material speculation, lacking systematic analysis in terms of typology, institutional context, and material-cultural significance.

First, regarding materials and structural construction, some scholars argue that Tang animal-shaped helmets may have been made primarily of animal fur, supplemented by iron or leather linings. For instance, Liu, Y. (2013) speculates that such helmets may have been modified from real animal heads or constructed with iron and leather as internal structures. These hypotheses are based largely on assumptions about craft possibilities and lack direct textual or archaeological evidence.

Second, in terms of cultural origins and artistic style, many studies adopt an iconographic approach. Wei (2011) suggests that the imagery of Tang animal-shaped helmets may have originated from Greek cultural elements transmitted to the Western Regions after Alexander's eastward campaigns, later reinterpreted within Buddhist art traditions. However, such arguments rely mainly on stylistic comparison and do not sufficiently integrate the military institutions or material culture of the Tang period.

Third, regarding symbolic functions, some scholars focus on the helmets' intimidation effect and the meanings associated with animal imagery. Zhang and Li (2019) argue that the depiction of roaring beasts with bared fangs enhanced visual intimidation, symbolizing martial bravery and spiritual strength. Nevertheless, these discussions largely emphasize psychological deterrence and provide limited exploration of how such imagery functioned within Tang ritual systems, hierarchical structures, and political symbolism.

In summary, although Chinese scholarship has addressed the materials, appearance, and symbolic meanings of animal-shaped helmets, existing research generally suffers from limited data sources, insufficient typological analysis, and a lack of institutional contextualization. A deeper material culture–oriented interpretation of their role and meaning within the Tang military system is still lacking.

Research on Animal-Shaped Helmets in International Scholarship

International research on animal-shaped or animal-decorated helmets is extensive, spanning the Greek world, the Italian Renaissance, Germanic and Norse regions, and ancient Gaulish traditions.

First, during the Italian Renaissance, van Eck (2024) examined animal-related ornamentation in sixteenth-

century Italian sculpture, architecture, and armor from an anthropological perspective. He identifies a category of three-dimensional ornaments featuring animal faces that appeared widely in Florentine sculpture, architectural decoration, and armor. These hybrid animal forms, often incorporating "hidden eyes," were not derived from classical mythological creatures but represented a distinctive aesthetic vocabulary. Importantly, these features corresponded closely with contemporary parade and tournament armor, illustrating their ritual and symbolic rather than functional military purpose (Van Eck, 2024). In the same context, Bashford Dean (1923) conducted a systematic study of a fifteenth-century lion-headed helmet housed in the Metropolitan Museum of Art and confirmed that the helmet consisted of an Italian salade combined with a gilded copper lion-head casing. He demonstrated that it was originally constructed for ceremonial display, symbolizing rank, authority, and martial legitimacy.

Second, similar traditions can also be observed in Celtic cultural contexts. Archaeological evidence from the Tintignac site in France includes a first-century BCE helmet crafted in the form of a swan, with the head, neck, and wings rendered in elaborately sculpted bronze. Although the helmet incorporates certain protective elements, its overall construction and iconography suggest that it was not intended for battlefield use. Instead, it was likely worn by a tribal leader or ritual specialist in ceremonial settings. The symbolic association of the swan with divinity, transformation, and liminality indicates that the helmet primarily conveyed spiritual authority and ritual significance rather than a practical combat function.

Additionally, Mödlinger (2013) reconstructed the developmental trajectory of early European animal-material helmets, particularly the "boar's-tusk helmets" from Dendra and Knossos in Greece. These helmets were constructed from multiple boar tusk segments sewn to a leather base and combined with bronze cheek plates, representing some of the earliest structurally protective helmets in Europe. Her research identifies these helmets as a key transitional form between organic protective materials and fully metal helmets, embodying both technological innovation and the martial identity of Bronze Age warriors.

In Germanic and Anglo-Saxon cultures, helmets adorned with animal imagery held strong symbolic significance. Archaeological evidence indicates that such imagery functioned as a visual expression of martial identity and symbolic protection. The seventh-century Benty Grange helmet from Derbyshire provides a representative example, featuring a three-dimensional boar figure mounted on the crest. Comparative studies of early Anglo-Saxon helmets suggest that animal imagery on helmets was not merely decorative, but conveyed meanings related to warrior identity, spiritual protection, and elite status within early medieval society (Tweddle, 1983).

Lastly, in the Norse "crested helmet" tradition, Swedish Vendel-period helmets often featured animal-head terminals at the ends of the crest, such as the Broe helmet, representing guardianship and power. Although the Yarm Helmet (discovered in the 1950s in North Yorkshire) lacks preserved animal decoration, Caple (2020) demonstrates that its structure aligns with ninth- to eleventh-century Norse crested helmet typologies that commonly incorporated animal terminals. Thus, it is still considered part of the broader animal-symbolic helmet tradition in northern Europe.

Overall, international scholarship consistently shows that animal-shaped helmets were not primarily battlefield equipment but functioned as markers of elite identity, expressions of religious or spiritual beliefs, and carriers of symbolic protective power. These cross-cultural studies provide important comparative perspectives for understanding the institutional role, cultural context, and aesthetic characteristics of animal-shaped helmets in the Tang Dynasty. Although scholarship across different regions has extensively examined helmets featuring animal motifs, this body of research remains highly dispersed within broader studies of arms and armor, visual iconography, and anthropological interpretation. At present, there is no single, unified academic field or monograph dedicated exclusively to "animal-shaped helmets." Instead, the term functions as a synthetic analytical category in this study, allowing the Tang Dynasty examples to be compared within a broader cross-cultural framework and situated in relation to global traditions of animal-decorated helmets.

Research Gap

Although both Chinese and international scholarship have addressed animal-shaped or animal-decorated helmets, several critical gaps remain within the existing literature.

First, there is still no systematic typological framework for Tang Dynasty animal-shaped helmets. Chinese research largely remains at the level of descriptive appearance analysis or speculative discussions about materials, while international studies focus on entirely different cultural traditions, such as Greek "boar's-tusk helmets",Celtic swan helmets, Germanic "boar-crested helmets", and Renaissance lion-headed parade helmets. To date, no study has conducted a structured morphological comparison based on excavated Tang artifacts, nor has any established a stable classification system.

Second, the historical terminology related to Tang animal-shaped helmets has not been systematically examined. Existing studies rarely correlate terms found in historical texts such as the Old Book of Tang and Beitang Shuchao with archaeological objects. Consequently, the relationship between actual helmet artifacts and their authentic Tang-period names, hierarchical distinctions, and symbolic meanings remains unclear.

Third, the institutional functions, symbolic meanings, and cultural roles of animal-shaped helmets within the Tang military uniform system have not been thoroughly analyzed. Previous studies tend to emphasize intimidation effects or artistic style, but seldom explore how animal imagery expressed rank hierarchy, ceremonial functions, imperial authority, moral symbolism, or protective ideology in the Tang context. This contrasts sharply with international scholarship, which consistently emphasizes animal helmets as markers of social status, symbolic protection, spiritual belief, and craftsmanship.

Fourth, the research methods used in existing studies lack transparency and replicability. No current scholarship has applied NVivo coding, multi-node morphological comparison, or feature co-occurrence analysis to Tang animal-shaped helmets, making it difficult to systematically reveal their structural logic, morphological patterns, and design principles.

Finally, Tang animal-shaped helmets have yet to be examined within a broader cross-cultural framework. Although international cases demonstrate that animal helmets often served as spiritual mediators and ceremonial symbols, such comparative perspectives have not been applied to Tang materials. As a result, the cultural position of Tang animal-shaped helmets within global military aesthetics has not been fully articulated.

Research Aim

This study aims to delve into the unique position and multifaceted significance of animal-shaped helmets within the Tang Dynasty military uniform system, filling a critical gap in current scholarly research. Through a systematic analysis of 24 relevant artifacts, as well as archaeological excavation reports, museum collections, and historical documents, this study focuses on the historical origins, artistic features, and cultural value of these helmets. The research objectives include:

1. Identify the possible names of animal-shaped helmets in Tang Dynasty literature and clarify their historical origins and evolution.

2. Classify and interpret their structural and artistic characteristics through morphological comparison and NVivo-based coding analysis, thereby revealing their distinctive design logic and aesthetic principles.

3. Analyze their role and cultural significance within the Tang Dynasty military uniform system.

Through this in-depth study of animal-shaped helmets and military uniform culture during the Tang Dynasty, this study aims to provide theoretical insights into the artistic aesthetics and military uniform culture of the Tang Dynasty, while also offering new scholarly perspectives for broader cultural studies.

METHODOLOGY

This study employs a multilayered qualitative research methodology (Denzin & Lincoln, 2018), integrating three main approaches: morphological analysis, textual examination, and comparative study. It systematically investigates the structural features, design styles, and cultural meanings of animal-shaped helmets from the Tang Dynasty. The research focuses on revealing their institutional functions and symbolic significance within the Tang military uniform system through the combined evidence of artifact morphology and textual semantics. The overall process comprises four stages: morphological feature analysis, NVivo-based coding classification, textual cross-verification, and cultural contextual interpretation, with the aim of reconstructing the historical image and institutional background of Tang animal-shaped helmets from an interdisciplinary perspective.

The research materials consist of classical texts such as official histories, encyclopedic compilations, inscriptions, and epitaphs, as well as 24 excavated relic samples obtained from archaeological reports and museum collections. These samples mainly originate from tombs dated to the Early and High Tang periods (approximately 618 – 741 CE), with well-preserved conditions and clearly documented provenance, excavation sites, or datable references. Since this study emphasizes the artistic and material-cultural aspects of the helmets rather than precise chronology, a few undated but well-preserved Tang artifacts with clear visual features were also included to supplement the overall morphological and artistic analysis. To ensure representativeness and reliability, severely damaged, fragmented, or undocumented specimens were excluded from the dataset. Artifact information was primarily drawn from formal archaeological excavation reports, authoritative publications, and museum databases to ensure accuracy and verifiability.

During the morphological analysis phase, this study systematically documented and compared the external

forms, structural components, and artistic expressions of the 24 animal-shaped helmets, focusing particularly on facial features (eyes, nose, mouth, and ears), crown-top structures, neck extensions, and decorative techniques. NVivo software was then used to code and categorize the image samples, establishing a node system centered on "facial features." A total of 19 primary coding nodes were established, covering elements such as nose shape (spiral shape, triangular shape), forehead contour (smooth, wrinkled), ear angle (both sides, directly forward, slightly forward), ear shape (rounded and curled, upright), eye shape (inverted trapezoid, oval, regular trapezoid), mouth outline (masseter muscle structure, oval shape), chin (absent, exists), and teeth (upper canines, lower canines, upper teeth). Each node was further subdivided according to morphological variation to allow systematic comparison of stylistic and structural diversity among the figurines. This process made it possible to identify recurring combinations of features across samples, thereby revealing design consistency and artistic differentiation within the Tang Dynasty animal-shaped helmets (Figure 2).

The coding process followed a three-step procedure: (1) initial node establishment, (2) iterative comparison and adjustment, and (3) final model confirmation. To ensure the scientific validity and reproducibility of the results, the coding and validation were jointly conducted by three researchers. Two researchers independently performed double-blind coding of all samples, while a third researcher acted as an adjudicator and consistency reviewer. Following a pre-developed Coding Manual, the team conducted two rounds of cross-validation and discussion to unify node definitions and boundaries, resolving any discrepancies through collective consensus until the final version was agreed upon. Based on frequency statistics and co-occurrence analysis, the study identified distribution patterns and morphological correlations among various features, thereby summarizing the design logic and typological relationships of Tang animal-shaped helmets (Holton & Walah, 2017).

However, this study acknowledges certain limitations. Although the analysis includes discussion of materials and craftsmanship, it must be noted that terracotta figurines differ significantly from actual military equipment. Therefore, the inferences regarding helmet materials and manufacturing techniques are based on reasonable analogies drawn from similar excavated artifacts and historical records. These interpretations remain hypothetical and should be understood within the constraints of limited physical evidence.

THEORETICAL FRAMEWORK

This study, through the lens of costume art research and within the theoretical framework of material culture studies, explores the artistic morphological characteristics and cultural symbolic meanings of animal-shaped helmets from the Tang Dynasty. According to the theory of material culture, clothing and relics in the material world not only convey artistic and functional information but also embody specific sociocultural meanings (Shen, 2011). The animal-shaped helmets, characterized by realistic or exaggerated animal forms, serve as a typical manifestation of this theory: their deterrent and symbolic functions not only reflect the wearer’s identity and social role but also express ritual reverence for power and natural forces. This theoretical perspective directly supports the study's objectives by providing a conceptual basis for classifying, interpreting, and contextualizing the Tang animal-shaped helmets within their institutional and aesthetic systems.

Building on this theoretical foundation, the study proceeds from tangible evidence. The dataset comprises 24 excavated figurines collected from archaeological reports and museum holdings in China, supplemented by relevant historical texts and catalogues. To ensure representativeness, samples were selected with clear provenance, datable references where available, and sufficient preservation to support morphological comparison.

As an empirical starting point, Table 1 summarizes the basic archaeological information of the 24 samples (provenance, date/period, collection), and Figure 1 presents their corresponding images. Together they provide the practical basis for applying material culture theory in this research: Table 1 anchors interpretation in real-world context (materiality and provenance), while Figure 1 supplies the visual ground for linking the theoretical triad of form, function, and symbolism to concrete design features of the helmets. In combination, they connect abstract concepts to observable evidence and prepare the way for the focused analyses that follow.

With this foundation in place, the next subsections synthesize common traits and distinctive traits , showing how recurring morphological patterns map onto institutional roles and symbolic meanings within the Tang military uniforms system.

Table 1. Basic Information Table of Tang Dynasty Animal-shaped Helmet Relics

Code	Relics Name	Excavation Site	Quantity	Burial Date	Collection Institution
PF1	Tri-colored	Tomb of Wei	1	AD 689	Xi’an Museum

	Warrior Figurine	Siqian			of History
Code	**Relics Name**	**Excavation Site**	**Quantity**	**Burial Date**	**Collection Institution**
PF2	Standing Warrior Figurine	The Tomb of Crown Prince Jiemin	16	AD 710	Xi'an Museum of Archaeology
PF3	Painted Tiger-Headed Helmet Warrior Figurine	The Tomb of Yuchi Jingde	2	AD 658	Zhaoling Museum
PF4	Shield-Holding Warrior Figurine	Unknown	1	Unknown	Palace Museum
PF5	Painted Ceramic Warrior Figurine	Unknown	2	Unknown	Palace Museum
PF6	Warrior Figurine	Pingding County, Shanxi Province	1	Unknown	Yangquan Museum
PF7	Tri-colored Heavenly King Figurine	Luoyang City, Henan Province	1	Unknown	Henan Museum

Summary of Common Characteristics

Figure 1. Artifact Images and Identification Numbers

Based on the data summarized in Table 1 and the artifact images presented in Figure 1, it is evident that these animal-shaped helmets exhibit distinct commonalities in design:

1. Animal Prototypes and Intimidation: The overall helmet design is modeled after the heads of fierce animals, typically depicting open mouths with exposed teeth and prominent fangs to enhance intimidation.

2. Functionality and Uniformity: All helmets are paired with full sets of armor, creating a visually cohesive appearance while conveying strong functionality and symbolic meaning.

3. Diversity of Styles: Some helmets emphasize realism in facial features (PF1, PF2, PF4), such as detailed depictions of fangs and jaw muscles. Others focus on artistic expression (PF3, PF5), with features like rounded,

curled ears and spiral-shaped nose decorations. Despite these stylistic differences, all designs reflect a combination of functionality and aesthetics in Tang Dynasty helmet design (Yang et al., 2024).

Analysis of Distinctive Characteristics

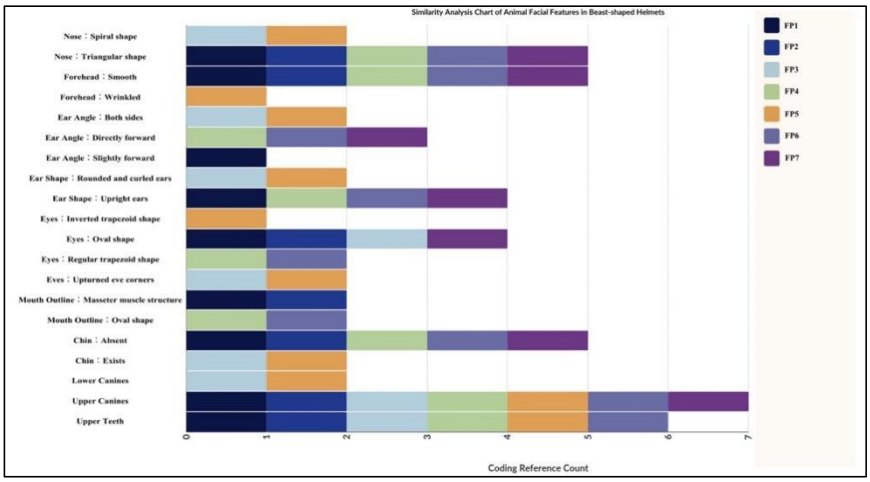

Figure 2. Similarity Analysis Chart of Animal Facial Features in Beast-shaped Helmets

The differences among animal-shaped helmets primarily lie in the detailed representation of facial features and the structural styles of the helmets. To identify these differences and further investigate the animal prototypes, seven representative artifacts were selected for systematic analysis of 20 specific features, including the eyes, nose, ears, mouth, and forehead. The study revealed significant variations in the design and expression of these helmets' facial features and structural styles. These differences serve as key criteria for classification and provide crucial clues for identifying their animal prototypes (Figure 2).

Furthermore, by conducting a proportional analysis of the artistic techniques used in depicting facial features, the study highlights the design tendencies of these helmets. According to the visual data (Figure 3), the design styles of the artifacts can be categorized into two major types: realistic style and embellishment style. The realistic style emphasizes the faithful depiction of animal characteristics, such as clearly detailed fangs, nasal features, and ear shapes. In contrast, the embellishment style focuses more on decorative expression, such as spiral-shaped nose ornaments and ears.

Through statistical analysis of these stylistic proportions, the diverse designs of Tang animal-shaped helmets and their unique value in military and cultural contexts become clearer. This differentiation not only reflects the Tang craftsmen's pursuit of balance between functionality and artistry but also provides a scientific basis for further exploration of the cultural background and usage of the helmets. Specifically:

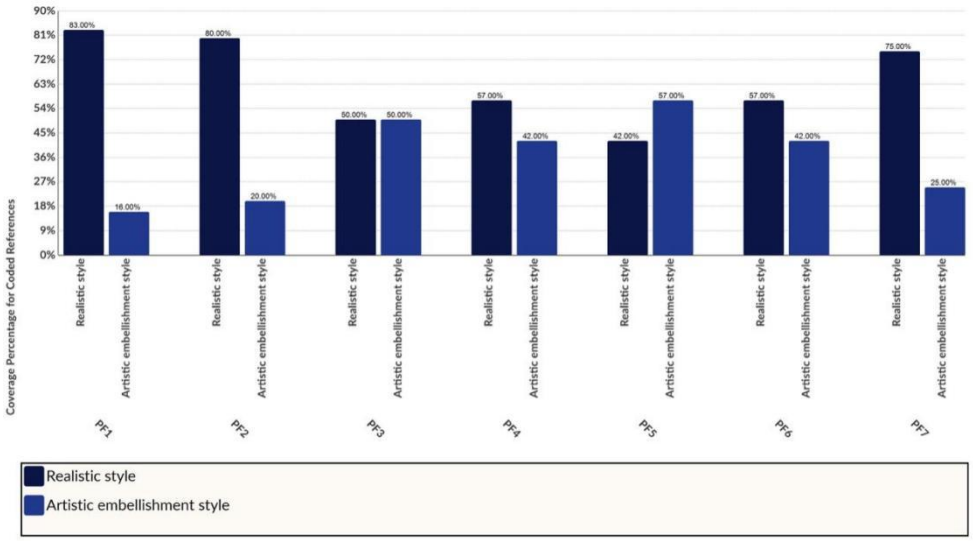

Figure 3. Design Style Tendency Diagram of Animal-shaped Features in Beast-shaped Helmets

Differences in the Ears of PF1 and PF2

Artifacts PF1 and PF2 exhibit significant similarities in overall characteristics, though some differences exist in finer details. Both feature triangular noses, rounded foreheads, and prominently oval eyes, with well-defined jaw muscles and protruding fangs (Figure 2). However, PF2 lacks ear representation, likely due to design simplification, which does not detract from its core attributes. Upon cross-referencing the images, PF1 distinctly showcases tiger-like features, with faint tiger stripe patterns visible near the paw details, reinforcing its identification as a tiger prototype. Although PF2 lacks ears, it exhibits evident feline characteristics, as highlighted in Figure 2, emphasizing the strong similarity and consistency in design and craftsmanship between the two artifacts. The designs predominantly adopt a realistic style, which further supports the consistency and synchronicity of PF1 and PF2 helmets. Thus, both helmets are conclusively identified as representations of a tiger's image (Figure 1).

Differences in the Eyes and Forehead of PF3 and PF5

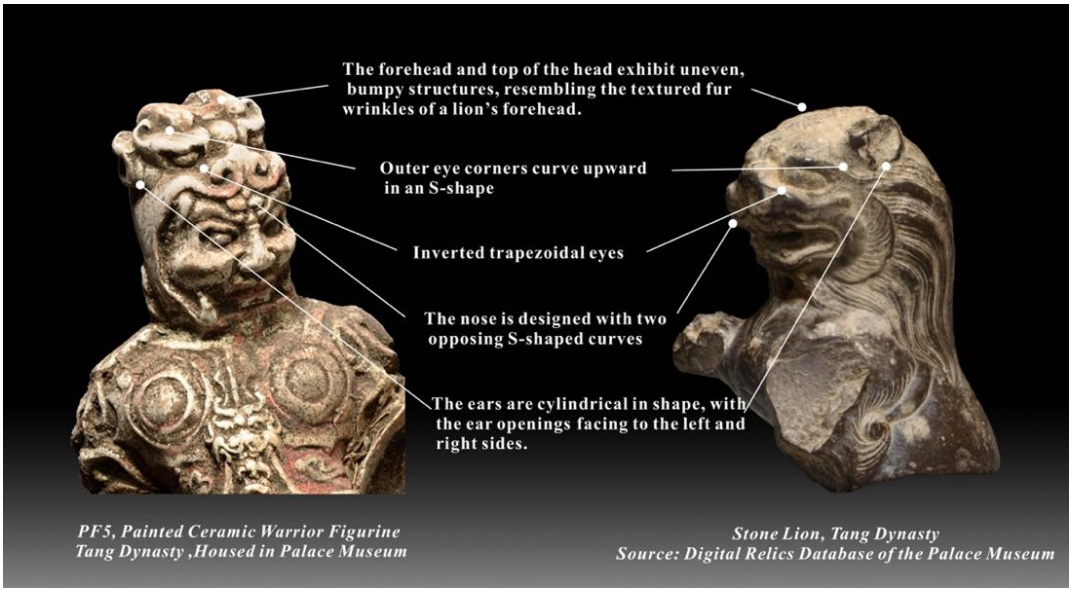

Figure 4. Comparison of PF5 and the Design of Tang Dynasty Stone Lions

Compared to other artifacts, PF3 and PF5 (Figure 1) exhibit stronger decorative characteristics (Figure 3), particularly in the consistent design of the nose, ears, and eye corners. Both feature spiral-shaped noses, curled round ears, and upward-slanting eye corners. The primary differences lie in the eyes and forehead: PF5 has a prominently wrinkled forehead and trapezoidal eyes, while PF3 features softer, oval-shaped eyes (Figure 2). As shown in Figure 4, the overall appearance of PF5 demonstrates distinct lion characteristics, aligning completely with confirmed lion-shaped artifacts from the Tang Dynasty. Therefore, PF5 can be definitively identified as a lion. Due to the significant similarities between PF3 and PF5, aside from the difference in eye shape, it can be concluded that both are artistic representations of lion imagery.

Stylistic Differences Among PF4, PF6, and PF7

PF4, PF6, and PF7 (Figure 1) exhibit a high degree of consistency in the design of their noses, mouths, and ears, with PF4 and PF6 being almost identical (Figure 2). All three feature upright, semi-circular ears and prominently raised oval-shaped noses. Additionally, PF4 and PF6 display the characteristic downward-slanting outer corners of the eyes. The features of PF4 are particularly distinct, clearly identifying it as a representation of a bear. In contrast, PF7 adopts a more minimalist design, with flat circular eyes that reduce the three-dimensional effect. However, analysis reveals that the overall design of PF7 still shares significant similarities with the features of PF4 and PF6. Thus, it can be conclusively determined that the prototypes of these three artifacts are bears).

RESULTS

This section presents the analytical findings derived from the morphological classification and comparative study of Tang Dynasty animal-shaped helmets. Table 2 establishes the analytical framework linking animal prototypes, helmet structures, and stylistic categories, while Figures 5-7 visualize these relationships through correlation mapping, 3D structural reconstruction, and comparative color evidence from mural sources. Together, they translate typological patterns into material and visual evidence that support the theoretical interpretation of form, function, and symbolism within the Tang military uniform system.

Table 2. Matrix of Relationships Among Animal Prototypes, Styles, and Structures

Animal Prototypes	**Cloak-style Helmet**	**Open-front Helmet**	**Slip-on Helmet**
Tiger	PF1	PF2	—
Lion	—	—	PF3, PF5
Bear	—	PF4, PF7	PF6
—	Semi-enclosed Design		Fully enclosed Design

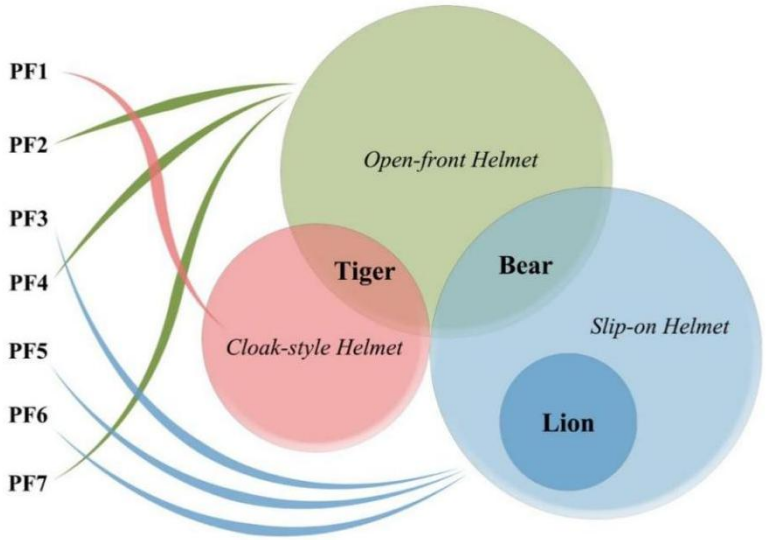

Figure 5. Visualization of the Correlation Between Animal Prototypes and Styles in Beast-Shaped Helmets

Overview of Typological Classification

As shown in Table 2, the classification matrix integrates three analytical dimensions: animal prototype, stylistic form, and structural configuration. Together, these dimensions form the typological framework that underpins the following analyses. The horizontal axis organizes helmet styles into three categories: cloak-style helmets, open-front helmets, and slip-on helmets, while the vertical axis lists the corresponding animal prototypes: tiger, lion, and bear. Each cell of the matrix specifies which excavated samples (PF1 to PF7) fall within each combined category, allowing for a clear comparison of stylistic and structural variation. The matrix reveals a distinct pattern of correspondence between animal type and structural design:

- Tiger helmets (PF1 – PF2) are associated exclusively with semi-enclosed forms, typically featuring a frontal opening that exposes the wearer's face while maintaining neck protection.
- Lion helmets (PF3 – PF5) appear only in the fully enclosed slip-on style, characterized by a continuous surface covering the entire head and emphasizing decorative and ceremonial functions.
- Bear helmets (PF4 – PF7) span both open-front and slip-on structures, suggesting a broader functional adaptation that bridges practical protection and symbolic representation.

These correlations reveal an underlying structural hierarchy among the three animal types. This cross-

distribution indicates that helmet styles were not randomly designed but rather followed a structured visual logic related to the symbolic attributes of each animal.

Figure 5 visually illustrates these typological relationships, with overlapping circular zones representing the intersections between different animal prototypes and helmet styles. The placement of samples (PF1 – PF7) within each zone reflects both morphological similarities and transitional variations among them. The tiger – cloak-style group shows the highest degree of cohesion, indicating a uniform structural form and a strong ceremonial function. The bear group, which overlaps both the open-front and slip-on categories, demonstrates greater diversity and suggests that during the Tang Dynasty, bear helmets were not bound by strict structural regulations, showing a more flexible approach to form and likely a lower hierarchical status compared with tiger and lion helmets. In contrast, the lion group remains distinct and isolated, emphasizing its exclusive ritual and symbolic role within the system.

This visualization, derived from NVivo-based morphological coding, transforms descriptive typology into measurable relationships. It elucidates how distinct animal prototypes were translated into specific structural and symbolic design principles within the Tang Dynasty military uniform system.

Tiger Helmets

From the matrix table (Table 2), tiger helmets are categorized into two styles: front-open helmets and cloak-style helmets. Both styles feature a semi-enclosed structure, characterized by hanging elements at the bottom of the helmet, primarily designed to protect the neck. Based on the current relics unearthed in China, most tiger-shaped helmets adopt this semi-enclosed structure, with a three-dimensional realistic tiger head on top and an extended protective design for the back of the neck, while the front and face remain open.

As shown in Figure 5, the most unique artifact among them is PF1 (Figure 1), the only cloak-style helmet in this collection. Although this style is extremely rare among terracotta figurines, similar designs appear in Tang Dynasty murals from Dunhuang.

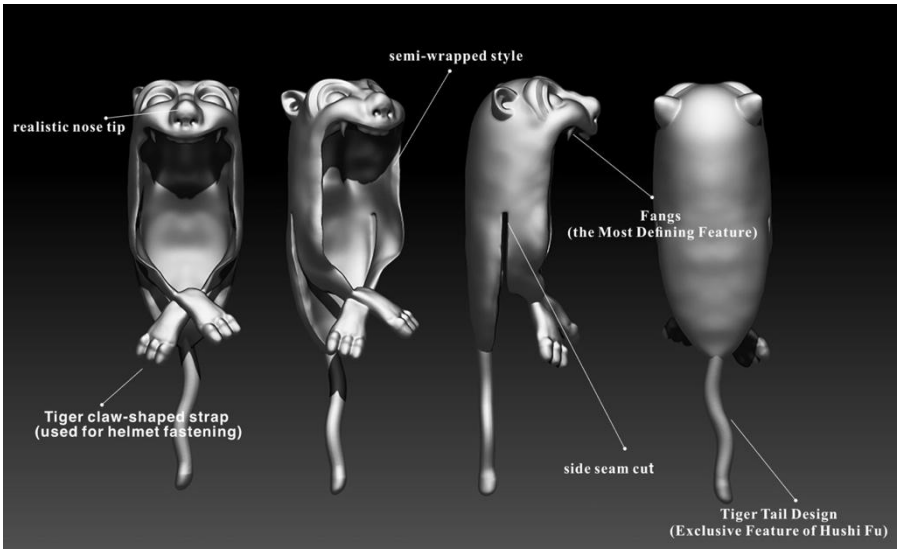

Figure 6. Multi-Angle Diagram of the Structural Design of Tiger Helmets (The prototype is the Tri-colored Warrior Figurine housed in the Shaanxi History Museum.)

1. Top Design: The top is sculpted into a three-dimensional tiger head, vividly realistic and exuding a strong sense of intimidation.

2. Strap Details: The front includes scarf-like straps, not separately stitched but cut and separated from the sides of the helmet. The strap ends are intricately designed to resemble tiger claws, showcasing fine craftsmanship and lifelike detail.

3. Back Cloak: The back extends into a cloak-like drape that reaches at least below the scapula. The end of the cloak features a hanging tiger tail, enhancing the helmet' s realism and adding depth and dimensionality to the design.

Figure 7. Styles and Colors of Tiger Helmets in Dunhuang Murals

The tiger helmets come in two color variations: orange and white. Orange helmets often feature tiger stripe patterns, while white helmets are simpler in appearance (Figure 7). Although the original color of Artifact PF1 is no longer discernible, the remaining tiger stripe patterns suggest it was originally orange. Meanwhile, the white pigment remaining on PF2's helmet confirms it as white, presenting a more minimalist style (Wang, X., 2004). This also indicates that the color scheme of these helmets aimed to closely mimic the appearance of real tigers.

Regarding materials, according to annotations in Zhouli Zhushu, "Siqiu" and Dongguan Hanji, "Kaogong ji", tiger skins were widely used in ancient times for military uniforms or ceremonial decorations (Ji et al., 1999a, 1999b). Therefore, it is hypothesized that these tiger-shaped helmets were primarily made from real tiger skins. However, as suggested by some previous scholars, these helmets might have been produced by directly cutting actual tiger heads, a method that, based on the author's assessment of available evidence and production practicality, appears unrealistic for large-scale manufacture. Moreover, tiger-shaped helmets represented by PF1 and PF2 (Figure 1) were not isolated cases. For example, 16 terracotta figurines associated with PF2, all unearthed from the tomb of Prince Jiemin, formed part of a ceremonial guard, indicating that such helmets were commonly used in Tang Dynasty ceremonial teams. The widespread application suggests a standardized manufacturing process rather than directly cutting tiger heads. The Kaogong ji explicitly records the crafting techniques for leather armor, which involved a process of "molding with a model and applying leather" (Wen, 2021). The specific steps were first, creating a three-dimensional model; second, shaping leather over the model; and finally, attaching or sewing tiger skin onto the surface according to its patterns. This technique preserved the strength of leather armor while reducing weight, making the helmets more practical for soldiers to wear. Artifacts such as the leather armor from the tomb of Marquis Yi of Zeng provide further evidence to support this hypothesis (Bai, R., 2000).

Lion Helmets

As shown in Figure 5, lion helmets exhibit unique design characteristics among animal-shaped helmets. These helmets adopt a slip-on style with a shorter length, covering only the head without extending to the neck or back. Unlike tiger and bear helmets, lion helmets feature a complete animal head design, including the jaw, which closely conforms to the wearer's facial contours. This makes the lion helmet the only style among animal-shaped helmets that represents a full animal head.

A comparative analysis of facial features reveals significant artistic embellishments in lion helmets, with surface details showing extensive artistic exaggeration (Gao, 2013). The artifacts convey strong decorative and ceremonial qualities, particularly in the finely sculpted and aesthetically pleasing facial details. Although the original colors of the artifacts have mostly faded, traces of red are faintly visible on the nose, mouth, and forehead, which differ significantly from the natural coloration of a lion's fur. This suggests that lion helmets likely did not use lion fur but instead employed other materials for decorative purposes.

According to historical records, lions were not native to China and were first introduced when the King of Parthia gifted them to China in 101 CE (Fan & Li, 1999). This suggests that lions remained rare animals during the Tang Dynasty, making it highly unlikely that lion pelts were used to craft helmets. The production techniques for

lion helmets were similar to those for tiger helmets but employed the pelts of other animals as substitutes. The appearance of red elements reflects the artistic choices made by Tang craftsmen in their color schemes, emphasizing the ceremonial function of the helmets. This distinctive design indicates that lion helmets occupied a distinct formal and ceremonial category within the broader typology of animal-shaped helmets.

Bear Helmets

As shown in Table 2, bear-shaped helmets display significant diversity in structural styles. Unlike tiger helmets, which are exclusively cloak-style, bear helmets include both front-open, semi-enclosed helmets and fully enclosed slip-on helmets. The styles range from long to short designs, with animal representations varying from fully realistic and three-dimensional (PF4, PF6) to simplified and flat (PF7).

This diversity reflects multiple influencing factors. On one hand, the personal style of craftsmen played a significant role in the detailed design of the helmets. On the other hand, the nearly 300-year span of the Tang Dynasty allowed for continuous advancements in productivity and craftsmanship, leading to stylistic evolution. For instance, PF3's design (Figure 1), which features a warrior standing atop a reclining beast, is a distinctive characteristic of the early Tang period, likely influenced by early craftsmanship traditions (Bao, 2020).

Bears were not rare in ancient China, and their fur and related products were widely used in daily life. For example, bear bile was an important component of traditional Chinese medicine (Y. Li, et al., 2024). Consequently, it is hypothesized that the production of bear helmets likely followed a process similar to that of tiger helmets, using real bear fur as the primary material. The use of genuine fur not only aligned with the Tang Dynasty tradition of adorning weapons and garments with animal hides but also enhanced the helmets' functionality and symbolism. The diversity in styles and designs of bear helmets indicates their widespread application and evolving role within the Tang Dynasty military uniform system.

DISCUSSION

This section builds upon the previous analysis to interpret the results through the lens of material culture theory, focusing on three dimensions: historical naming, functional roles, and cultural meanings. It aims to uncover the institutional and symbolic significance of animal-shaped helmets within the Tang Dynasty military uniform system and to explain how their material form reflected the broader ideological and ceremonial order of Tang society.

Historical Naming and Semantic Origins

Based on the previous research on the morphology of animal-shaped helmets, the author conducted a search in Tang Dynasty historical records using Chinese keywords related to animal headgear, such as "Tiger Crown," "Bear Crown," and "Lion Crown". A critical reference was found in the Old Book of Tang, Original text:

"In 629 CE, a tribal leader named Yuan Shen visited the Tang capital wearing a black Bear-skin Crown, which resembled the contemporary Tang Maotou" (Liu, X., 2000).

This record provided an important clue, prompting the author to further investigate the term "Maotou" in Tang Dynasty encyclopedic works. The search led to a detailed description of "Maotou" in the clothing section of Beitang Shuchao (Yu, 2021). These historical references form the linguistic foundation for identifying the nomenclature and symbolic hierarchy of Tang helmets.

The Beitang Shuchao Contains the Following Key Information:

Classification of Maotou: Maotou as a type of headgear, includes two main categories: "Hushi Fu" and "Bear-skin Crown." The term Maotou is the title of Chapter 7 in the text, and Hushi Fu and Bear-skin Crown are listed as two distinct styles of headgear, each serving different functions and symbolizing different meanings.

Symbolism and Design Origin of Hushi Fu: The Maotou worn by warriors is called Hushi Fu, meaning "Clothing of the Tiger General" or "Attire of the Brave." Hushi Fu embodies the symbolism of warriors' ferocity and duty to defend imperial power, drawing inspiration from the battlefield image of fierce warriors with disheveled hair, bloodshot eyes, and an aggressive, unyielding spirit, representing bravery and protection of the emperor.

Usage and Symbolism of the Bear-skin Crown: The Bear-skin Crown was widely used in the emperor's ceremonial guard. Historical records indicate that warriors wore the Bear-skin Crown while holding banners. This type of headgear, also referred to as Maotou, was designed to mimic a bear, symbolizing strength and authority.

These textual references confirm that Maotou was not a generic term but a hierarchical classification encompassing multiple symbolic subtypes: Tiger (valor), Bear (strength), and Lion (majesty). This classification

reflects the Tang practice of materializing social order through visual design, aligning with material culture theory's emphasis on the social meaning of objects.

Semantic and Cultural Interpretation

The term "Maotou" is composed of two Chinese characters: "mao", which in Classical Chinese specifically refers to the long hair on the necks of wild animals, particularly tigers and lions (S. Xu, et al., 2015); and "tou", meaning "head." This combination precisely highlights the core characteristics of animal-shaped helmets, including material selection, structural design, and the incorporation of animal imagery. Semantically, "Maotou" represents the long fur and head of a wild beast, which are skillfully fashioned into ceremonial or functional headgear. The original intent of this design was to endow the wearer with an aura of majesty and intimidation, evoking the ferocity and strength of a roaring warrior in battle. The helmets, featuring roaring animals with exposed fangs, vividly embody this concept; they serve not only as practical military equipment but also as visual emblems of deterrence and symbolic power.

The character "fu" in "Hushi Fu" signifies "clothing" rather than "helmet," indicating that the tiger-themed Maotou extended beyond the head to include shoulder and neck coverings. This semantic detail corresponds closely to the PF1 artifact, whose cape-like structure integrates the protective and ornamental functions of armor and headgear.

In Chinese culture, the tiger symbolizes kingship and imperial might. This association derives not only from the tiger's physical power but also from the distinctive stripes on its forehead, which resemble the Chinese character "王" (king). Accordingly, the wearer of the Hushi Fu visually embodied the emperor's martial authority, representing imperial power and military strength within the Tang symbolic order.

The name "Bear-skin Crown" explicitly expresses both material and structural characteristics: "bear skin" denotes the use of bear fur as the primary material, while "crown" indicates its form as a helmet or headdress. This naming pattern conforms to the Tang practice of defining military equipment by appearance and material composition. For example, "fine scale armor" is named because its armor surface resembles fish scales, where "scale" clearly refers to fish scales, highlighting the surface design of the armor; similarly, "leather armor" is named because its main material is rhinoceros skin (Li, L. et al., 2014).

Through the analysis of historical texts, it can be confirmed that "Maotou" was the authentic period term for animal-shaped helmets during the Tang Dynasty. Its defining feature was the integration of animal imagery and pelts to construct headgear representing ferocity and imperial authority. Among them, tiger-shaped helmets were referred to as "Hushi Fu," while bear-shaped helmets were called "Bear-skin Crown." Although historical records do not explicitly mention the specific name for lion-shaped helmets, by analogy and cultural context, they may be reasonably categorized as "Lion Maotou." In other words, animal-inspired helmets that emulate fierce beasts could be collectively referred to as "Maotou," a term encapsulating both structural typology and symbolic meaning.

From a theoretical perspective, this linguistic system illustrates how Tang military attire encoded social hierarchy and ideological symbolism within its material terminology: it embodies the material culture theory's principle that objects function as social texts carrying embedded cultural meanings.

Historical Origins and Functional Roles

The origins of animal-shaped helmets can be traced back to a legend recorded in Records of the Grand Historian (Shiji) about the State of Qin during the Spring and Autumn Period, providing a key cultural context. According to the legend, during the reign of Duke Wen of Qin, a catalpa tree in the kingdom could not be felled. It was only after following the instructions of a ghostly spirit or supernatural being to wrap the tree in red silk that it could be successfully cut down. After the tree was felled, a green ox emerged from within. Attempts to ride or tame the ox repeatedly failed until a warrior with disheveled hair tried, startling the ox into leaping into the Feng River, where it vanished forever (Sima et al., 1959). This narrative symbolizes the ritual transformation of ferocity into divine protection and is widely regarded as the earliest prototype of the Maotou system. The "disheveled warrior" figure in this story can be seen as the archetype of later Maotou soldiers, whose fierce appearance and ritualized bravery continued into Tang military visual culture.

Figure 8. Word Cloud on the Topic of Maotou

To further analyze the cultural and functional significance of Tang animal-shaped helmets, this study extracted all available references to Maotou from Chinese historical texts and conducted a word-frequency analysis (Figure 8). The results reveal that the Maotou operated across three primary dimensions of Tang military culture, namely military, ceremonial, and cultural aspects, each reflecting distinct yet interconnected roles.

Military Function and Hierarchical Identity

Keywords such as "soldier," "knight," "guard," and "pioneer" appear prominently in the word cloud, highlighting the critical role of Maotou in the Tang military system. Warriors wearing Maotou were typically positioned at the vanguard or within elite palace units such as the Huben Guard and Wuwei Guard, signifying bravery, loyalty, and rank. Their ferocious and imposing helmet designs enhanced morale and intimidated enemies. Historical texts such as the Book of Han and Taiping Yulan describe similar precedents, noting that Maotou soldiers acted as vanguard guards and imperial protectors during royal processions (Ban & Yan, 1964; Li, F. et al., 1994). Within the Tang context, this practice evolved into a formalized system, where Maotou helmets served as both functional armor and symbols of hierarchical identity.

Ceremonial Function and Symbolic Authority

High-frequency terms such as "emperor" and "honor guard" highlight the special status of Maotou in imperial ceremonies. Beyond its practical function, the Maotou became a visual emblem of imperial authority and legitimacy. The Tang Huiyao records that during Emperor Gaozong's Fengshan ceremony in 666 CE, the imperial honor guard wore Maotou and white armor while standing in formation, clearly demonstrating the importance of Maotou in royal ceremonies (Wang, W., 2006a). This combination of white armor and beast-shaped helmets symbolically expressed cosmic order and political hierarchy, reinforcing the emperor's divine authority. Earlier ritual texts such as Erya Yi also mention the "Bear-skin Crown," associating it with auspicious virtues: bears symbolized loyalty and perseverance, while leopards represented vigilance (Luo, 1922). The deliberate inclusion of such animal motifs in ceremonial contexts demonstrates how Tang rituals translated natural imagery into moral and cosmological symbolism.

Cultural Representation and Iconographic Continuity

The high frequency of the term "animal" in the word cloud highlights the important connection between animal imagery and Maotou. In ancient Chinese culture, animal motifs were deeply rooted in clothing traditions and closely intertwined with political and military attire. From a broader iconographic perspective, these motifs functioned as symbolic expressions of hierarchy, virtue, and cosmic order rather than mere decoration.

For instance, in the Tang Dynasty, the emperor's ceremonial robe (Mianfu) was often adorned with animal patterns such as the red-bellied pheasant, symbolizing exceptional talent and intellect (Bai, X., 2018). During the reign of Empress Wu Zetian (694 CE), animal imagery was further institutionalized in official dress codes, where embroidered animal patterns signified rank and administrative responsibility. This system of visual symbolism linked moral attributes with social roles, reflecting how animal imagery mediated the relationship between power and virtue. Among the Tang Dynasty's Sixteen Guards (military units protecting the imperial capital), the Martial Guard (Wuwei Wei) and the Gate Guard (Jianmen Wei) were assigned tiger and lion motifs, respectively (Wang, W., 2006b). This differentiation illustrates how animal characteristics were metaphorically aligned with military functions: tigers embodied courage and protection, while lions symbolized vigilance and authority. For example, soldiers of the Wuwei Guard wearing tiger-shaped Maotou were primarily responsible for safeguarding the emperor's person, while those with lion-shaped Maotou guarded palace gates and ceremonial entrances. These

designations demonstrate that the selection of animal prototypes in Tang helmets was not arbitrary but part of a codified visual language that integrated aesthetic form with ideological function. The cultural legacy of animal-shaped helmets extended far beyond the Tang military context. Similar symbolic expressions persisted in later artistic and folkloric traditions. For example, the tiger-head hats worn by children to ward off evil spirits reflect the continuation of Tang visual symbolism in vernacular culture, transforming a martial emblem of protection into a domestic guardian motif. This continuity from elite military regalia to popular attire illustrates the deep-rooted role of animal iconography in shaping Chinese visual identity across time.

In summary, the Maotou and its animal prototypes embodied an enduring iconographic system, bridging military hierarchy, ceremonial order, and cultural symbolism, and revealing the Tang Dynasty's sophisticated integration of art, ideology, and material culture.

CONCLUSION

Through an integrated analysis of archaeological materials, historical texts, and NVivo-based coding, this study provides a systematic framework for understanding animal-shaped helmets in the Tang Dynasty. The findings clarify their terminology, morphological structure, and institutional roles, while also situating Tang practices within broader global traditions of animal-decorated helmets.

First, the study proposes a typological system for Tang animal-shaped helmets based on 24 excavated figurines. Three stable structural types are identified, corresponding to the standardized forms of Hushi Fu (Tiger Helmets), Bear-skin Crown (Bear Helmets), and Lion Helmets. This helps address the lack of a replicable and evidence-based classification in previous research.

Second, the research clarifies the historical terminology in Tang sources by confirming Maotou as the overarching term for animal-shaped helmets and linking each subtype to specific morphological characteristics and symbolic functions. This helps clarify previous ambiguities between textual nomenclature and excavated artifacts.

Third, when placed within the military uniform system of the Tang Dynasty, animal-shaped helmets demonstrate clear ceremonial and symbolic functions rather than practical combat use. Their fierce animal imagery expressed rank and aristocratic authority, conveyed symbolic protection drawing on the power of the depicted animals, embodied spiritual meanings associated with ritual presence and moral virtue, and reflected sophisticated craftsmanship as a marker of elite identity. These four dimensions correspond closely to international scholarship on animal-shaped helmets, showing that Tang examples shared similar cultural logics while developing a uniquely Chinese institutional expression.

Methodologically, this study demonstrates the value of NVivo-based morphological coding for analyzing complex sculptural features. This transparent and replicable approach enhances the analytical rigor of research on ancient armor and provides a model for future digital studies of material culture.

Future research may expand the typological corpus by incorporating newly excavated figurines, apply 3D reconstruction to explore structural feasibility, or compare Tang helmets with those from other Eurasian regions to deepen cross-cultural understanding. Such work will continue to illuminate the cultural significance of animal-shaped helmets within global military visual culture.

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