Proceedings of an International Conference in Mexico, February 27-28, 2020

Landscape, Monuments, Arts, and Rituals Out of Eurasia

in Bio-Cultural Perspectives

Edited by **Naoko Matsumoto, Saburo Sugiyama** and **Claudia Garcia-Des Lauriers**



OUT OF EURASIA

Grant-in-Aid for Scientific Research on Innovative Areas (2019-2023)

Integrative Human Historical Science of "Out of Eurasia"
Exploring the Mechanisms of the Development of Civilization

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Proceedings of an International Conference in Mexico, February 27–28, 2020

Landscape, Monuments, Arts, and Rituals

Out of Eurasia in Bio-Cultural Perspectives

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Part I

The "Out of Eurasia" Project
Objectives and Strategies of Transdisciplinary Studies

Part I Introduction
The "Out of Eurasia" Project: Objectives and Strategies of Transdisciplinary Studies

Naoko Matsumoto and Saburo Sugiyama

"Integrative Human Historical Science of 'Out of Eurasia': Exploring the Mechanisms of the Development of Civilization" is a five-year research project supported by MEXT Grants-in-Aid for Scientific Research on Innovative Areas that started in 2019. The umbrella project consists of seven smaller research projects involving more than 70 researchers from various fields including archaeology, cultural and physical anthropology, cognitive psychology, genetics, astronomy, etc. The main task of this project is to explore the mechanisms of how the people who left Eurasia and spread to the American continents, Japanese Archipelago, and Pacific Islands have adapted to the new environments and developed socially.

This volume records the first international research meeting of the project that was held at Teotihuacan, one of the largest ancient cities in the New World during the pre-Hispanic period, on February 27–28, 2020. 29 Japanese researchers, six invited researchers from the United States, and 15 researchers and related graduate students in Mexico participated in a two-day semi-closed research meeting with English as the main language for presentation and discussion (Figure Part I.1).

On February 29, we held an open forum at the Great Temple Museum in Tenochtitlan (now Mexico City), the capital of the Aztecs, where we introduced the theoretical foundations and strategies of our research, as well as specific research topics in Mesoamerica (Figure Part I.2). While we were unfortunately not able to have all of the main contributors participate in this forum, it seemed that our research approach, which focused on the internal factors of humans as the actors who created civilization, was stimulating to Mesoamerican researchers, who tend to focus on diverse natural and social environments and local resources (external factors).

Figure Part I.1.
Group photo of participants.



It was a great opportunity for participants from Japan to have lively discussions with project members and local researchers at archaeological sites at Teotihuacan, Monte Albán, and Cholula. It was a stimulating opportunity for active academic exchange and discussion among researchers of different cultures, academic disciplines, and regions. We were very fortunate to have been able to hold such an international meeting before the COVID-19 pandemic became more serious. We certainly realized how important it is for us to physically be at a location, to actually see, touch, and experience the material world with our body. The issue of global pandemics will be discussed in our project, along with the urban development, population increase, and the importance of gathering that have been essential in the formation of civilizations.

We hope that the discussions we started at the first international conference with local Mexican and North American researchers will be utilized to set concrete tasks and narrow down strategic research targets and contribute to the formation of a dynamic theory of civilizations in the future. We had an opportunity to reconsider different perspectives and approaches, as well as to reaffirm issues that were unclear to us. The meeting was important in order to formulate a practical strategy and a concrete research agenda that can be implemented in five years through our project, which holds ambitious research objectives.

Part I of this volume consists of papers intended for sharing the purpose, framework, and perspectives of the diverse participating disciplines of the project with other project members, collaborators, and overseas researchers. In the first chapter, Matsumoto gives an overview of the Out of Eurasia project, an unprecedented cross-regional comparative study, in which Mesoamerica is one of the central fields. Focusing on the close interrelationship between matter and mind through the body, the formation of civilization is examined as a process of uniquely human niche construction.

The subsequent chapters by Sugiyama, Tsurumi, and Mitsumoto are based on specific examples of archaeological sites in Mesoamerica, the Andes, and Japan. Based on specific case studies of monumental construction, the large-scale construction of an artificial environment, they describe how the research will be carried out in the project with shared perspectives and precise 3D measurements. Readers will be able to understand not only the differences in the nature and structure of monuments formed in each region but also the commonalities in their features, which

Figure Part I.2.

Flyer of "Foro de Arqueología Cognitiva: Monumentos, Arte, y Cuerpo Humano, afuera de Eurasia. Monumentos y tumbas como lugar de memoria social".



will be further investigated in the future. The chapter by Sekiguchi and Tanaka, who specialize in astronomy, discusses the development of a simulation system to visually show the relationship between archaeological sites, landscapes, and celestial bodies. The use of accurate astronomical data is important to study the formation of monuments and cities based on astronomical knowledge and the development of space-time cognition.

The chapter by Matsumoto describes a research strategy to elucidate how art, including both technological and aesthetic aspects, has played a role in the formation of civilizations. Focusing on anthropomorphic artifacts, she presents a research plan for the comparative analysis of figurines in Mesoamerica and Japan, referring to the universal characteristics of human cognition. The chapter by Matsugi points out the unique characteristics of the transformation process of complex societies in the Japanese Archipelago. By focusing on war, art, and monuments, he discusses how the unique material environment was created from a cognitive point of view.

Chapters by Ōnishi and Inamura consider how ethnography can contribute to the elucidation of the formative mechanisms of civilization. Based on his research on the relationship between the Ainu, the indigenous people of the Japanese Archipelago, and the Tokugawa Shogunate, Ōnishi discusses one of the most important issues in archaeology and anthropology, state formation, examining how external factors contribute to social complexity and how a relationship with a state level society does not necessarily lead to the formation of a state in the other group. Inamura discusses the importance of camelid breeding in the formation of complex societies and the development of political power in the Andes from multiple perspectives and argues for the effectiveness of collaboration between ethnography and archaeology.

The chapters by Bretas, Yamazaki, and Iriki, Yamazaki and Iriki, and Saito discuss perspectives and models that our project employs to approach the mechanisms of civilization formation from the perspective of neuroscience and cognitive science. Bretas et al. describe the phase transition of the primate brain with reference to the coevolution of language and the brain, in addition to the triadic niche construction model, which is used as a hypothesis to explain the mechanism of human civilization. Yamazaki and Iriki discuss the latest research trends based on primate studies of the gut-brain axis, which suggest that microbiota living in internal organs influence brain function. This research may provide us with a new clue for considering how subsistence and foods may affect the body and mind of people. Saito discusses the prospects for experiments to examine the universality and diversity of human cognition in drawing behavior, based on experimental research on drawing behavior in chimpanzees and children.

Seguchi and Quintyn analyze trends in human skeletal materials from around the world to clarify the early migration to the Americas and population history from the perspective of skeletal biology. The results of this study indicate that some of the common groups in Late Pleistocene Northeast Asia may have been early migrants to the Japanese islands and the Americas.

We still await systematic comparisons of the processes of civilization formation in Mesoamerica, the Andes, Oceania, and the Japanese Archipelago based on concrete archaeological data, experimental studies in collaboration with neuroscience and cognitive psychology, and the construction and validation of models. The chapters in Part I of this volume provide the direction, basic information, and perspectives. Collaboration with researchers of various regions is essential for the success of this project. We hope that these proceedings will contribute to the understanding and sharing of research perspectives across regions and disciplines.

Finally, we would like to express our deepest gratitude to the participants and to the many people and students who generously provided assistance. This gathering was also supported by authorities and experts of the Teotihuacan Archaeology Park, the Templo Mayor Museum, and the Monte Albán-Atzompa Archaeology Park, all of which are under the National Institute of Anthropology and History in Mexico. We are also deeply grateful to Joseph Ryan and Chihiro Shimada for their efforts in editing this book. Many thanks to all.

1
Outline of the Out of Eurasia Project

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The Out of Eurasia project focuses on the human being itself, linking nature and culture, mind and matter, and human action and cognition, and advances a new theoretical model of the development of civilization. We strategically consider the Americas, the Japanese Archipelago, and Oceania—the final destinations of Homo sapiens *who left Eurasia and dispersed by overcoming bottlenecks and extreme conditions—to observe human initiatives toward the natural environment, the emergence of specific cognitions or behaviors, and the construction of relations with cohabitant species through comparative analyses. By focusing on material culture belonging to the period of the development of civilization, we aim to construct an integrative history of humankind that will clarify how the specifically human niche (ecological position) has been formed. A model of the mutual permeation of matter and mind as mediated by the body is situated at the core of transdisciplinary research to develop a clearer model to overcome both biological determinism and cultural relativism.*

El proyecto "Fuera of Eurasia" se enfoca en el ser humano en sí, vinculando naturaleza y cultura, mente y materia, y acción y cognición, y presenta un nuevo modelo teórico del desarrollo de las civilizaciones. En este proyecto hemos considerado estratégicamente las Américas, el archipiélago japonés y Oceanía, destino final del Homo sapiens que abandonó Eurasia y se dispersó superando los denominados cuellos de botella y las condiciones extremas, para estudiar las iniciativas humanas de adaptación el medio natural, el surgimiento de cogniciones o comportamientos específicos y la construcción de relaciones con especies convivientes a través de análisis comparativos. Centrándonos en la cultura material perteneciente al período del desarrollo de la civilización, nuestro objetivo es construir una historia integradora de la humanidad que aclare cómo se ha formado el nicho específicamente humano (posición ecológica). Un modelo de la permeación mutua de la materia y la mente mediada por el cuerpo es escalable en el núcleo de la investigación transdisciplinaria para desarrollar un modelo más claro que supera tanto el determinismo biológico como el relativismo cultural.

At present, there are 7.7 billion humans living on earth and together with their domesticated animals they account for more than 90 percent of the terrestrial vertebrate biomass (Bar-On et al., 2018). Why have humans, with an estimated worldwide population of less than 10 million in 10,000 BCE, reached such an unusual biological "prosperity"?

Over the course of the development of civilization, specific characteristics appeared that greatly separated human behavior from other animal behavior, such as a large-scale and complex social structure, a high level of scientific technology, and a variety of religious beliefs, including massive world religions. "Civilization" is a controversial term which has often been used within a framework that considers modern Western society as the most advanced state. While such an ethnocentric view must be abandoned, the nature of this significant transformation remains an important question. In our project, we use the term "civilization" as a heuristic framework for comparative analysis of the processes that led to the significant transformation of human lives.

While the period and specific nature vary according to region, in the midst of the changes in the natural environment accompanying climatic warming from approximately 10,000 years ago, sedentism, plant and animal domestication, and the production of a diverse material culture (including pottery) began, and as population growth, concentrated settlement, and social complexity and integration proceeded, the construction of large-scale monuments and the development of rituals and religion occurred. The past development of civilization, centering on northern Africa, the Middle East, Europe, South Asia, East Asia, Mesoamerica, and South America, despite changing through subsequent exchange and development, became the sociocultural foundation of later ages. Accordingly, in order to understand how humans reached their present state, it is necessary to clarify how the formation and development of civilization occurred.

Academic Background of the Research

Research focusing on the relationship between human biology and culture is gradually increasing, with research being advanced on how the human body (such as the brain and genetics) and culture have coevolved (Richerson & Boyd, 2004) or through attempts at describing human history from the perspective of "niche construction", which posits that organisms modify their immediate environments in ways that in turn influence the evolution of subsequent generations (Feldman, 1992; Odling-Smee et al., 2003). There has been little advance, however, in our comprehensive understanding of what happened and in what manner over the period of the development of civilization. The reason for this can be traced to insufficient consideration of the role played by material culture produced by humans.

In multiple regions of the world, the shape of the material environment made by humans has greatly transformed both quantitatively and qualitatively over the past 10,000 years. What is common to this process during the "development of civilization" is that the social norms and behavioral patterns that had evolved within the nomadic hunting-and-gathering lifestyle and had until then been the basis of human livelihood underwent a major conversion. Understanding how this vital transformation in human history occurred will clarify the origins of urgent issues in modern society (population explosion, frequent warfare, prejudice, poverty, environmental degradation, the expansion in wealth inequality, etc.) and provide important guidelines when considering ways to remedy these problems.

In order to think about how culture is produced through the interaction of mind and matter, which have until now been conceptually treated as distinct, research perspectives

are needed which place the focus on the human body and behavior, and—(1) while falling neither into biological determinism nor an extreme cultural relativism, take humans, the living organism, and human-produced cultural variability as a single entity, and (2) overcoming the dualistic mind-body and mind-matter frameworks that have formed the basis of modern science—consider the transformation of matter, mind, and body as a single, tightly integrated system. Furthermore, in order to examine how material culture influences humans, it is necessary to undertake an integrative analysis of "art", considering both the technological aspect that extends human physical functions and the artistic aspect that manipulates the heart by evoking symbolism and metaphor and engaging emotion.

In this regard, the Out of Eurasia project focuses on the human being itself, linking nature and culture, mind and matter, and human action and cognition, and advances a new theoretical model of the development of civilization. By focusing on material culture belonging to the period of the development of civilization, we aim to construct an integrative history of humankind that will clarify how the specifically human niche (ecological position) has been formed.

Perspective of the Research Project

Human groups that dispersed all over the world have developed a variety of cultures within the climate and topography of each location. At present, while there is some anxiety over the loss of diversity due to precipitous changes brought about by globalization, human physical and cultural continuity inherited across generations can be seen in each region. Although the interaction of mind and material as mediated by the body may change qualitatively and quantitatively within each situation, the basic mechanism should be common from the past until the present.

What is needed now is the establishment of a new research methodology which, by focusing on that basic mechanism, integrates research results on what happened in the period of the development of civilization and what is happening at present, and achieves outcomes that could not be obtained in either of those areas separately. In research taking currently existing societies and individuals as the subject, it is difficult to isolate innate characteristics from what is formed socially and culturally; therefore, in order to clarify the specific characteristic of human nature that creates civilization, or how diversity is born, or how the human body, society, and culture have changed through those processes, it is essential to integrate multiple approaches: The study of material culture, which requires archaeological research from an empirical basis on how and in what manner change has occurred; the examination of the interaction between the environment and human cognition and behavior as mediated by the body, needing ethnographic investigation and research on neurological and psychological mechanisms; and the investigation of the movement of groups and physical changes, through studies in biological anthropology and genetic research.

Ordinarily it is difficult to test hypotheses within the field of history, as it is constituted by a series of unreproducible events. However, by systematically comparing as a "natural experiment" multiple examples of the processes of the "development of civilization" that unfolded independently under different natural environmental and historical circumstances, it becomes possible to extract relations among factors and common processes, the emergence of differences and their expansion, and so forth.

For the development of civilization on the Eurasian continent, such as in Western Asia, Europe, and China, where there was frequent interregional and intercultural exchange, it is difficult to extract from the complex

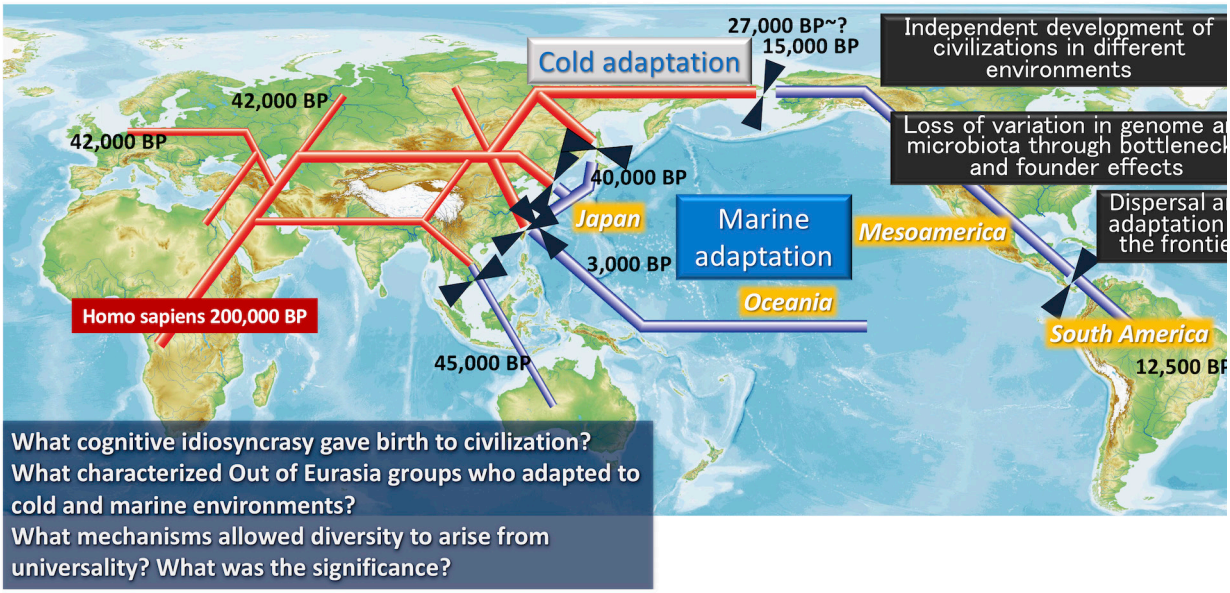
relations of influence the mutual interaction between human cognitive traits and the environment. The current project therefore considers the Americas, the Japanese Archipelago, and Oceania—the final destinations of *Homo sapiens* who left Eurasia and dispersed by overcoming bottlenecks and extreme conditions (Figure 1.1). Through this strategic regional selection in the midst of adapting to an environmental "blank page" (frontier) that no longer existed in Africa or the Eurasian continent, we can observe in purer form human initiatives toward the natural environment, the emergence of specific cognitions or behaviors, and the construction of relations with cohabitant species.

Basic Research Strategy

In order to conduct a comparative analysis of the large-scale construction of the material environment seen in the period of the development of civilization, we will situate at the core of our research strategy a model of the mutual permeation of matter and mind as mediated by the body (Figure 1.2). Rather than taking individual cognition as confined within the brain, this perspective is based on lines of research on such concepts as the "embodied cognition" (Rosch et al., 1991), "extended mind" (Clark & Chalmers, 1998; Clark, 2003, 2008), and "distributed cognition" (Hutchins 1995), which hold that cognition is inextricably related to the material world as mediated by the body. Our model also has its roots in the continuing discussion on materiality (Ingold, 2007; Knappet, 2014) and in the idea of "external symbolic storage" as an indispensable part of human history (Donald, 1992; Mithen, 1998; Renfew & Scarre, 1998). This line of argument has developed into the theory of material engagement, which holds that in archaeology material culture must be analyzed not simply as a product in which mind may be partially reflected, but rather as something which constitutes cognitive processes (Malafouris & Renfrew, 2010; Malafouris, 2013). Through transdisciplinary research, we aim to develop a clearer model to overcome both the established theory of biological determinism which regards man's nature as genetically

Figure 1.1.

Map showing the regions to be studied with our research questions.



determined, and the position of cultural relativism which asserts that human society and culture should be considered independently of biological factors.

Based on this model, as a theoretical framework for considering temporal change, we adopt the theory of niche construction, which holds that organisms change their environments on their own and such changes influence the evolution of succeeding generations (Odling-Smee et al., 2003). Our working hypothesis to proceed with the project is the "triadic niche construction model" (Iriki & Taoka, 2012), which is based on experimental research on monkeys that suggests that the ability to use tools brings about changes in the brain, which in turn results in cognitive change. It holds that with the emergence of new ecological niches further changes occur in cognition and the brain. This theory is to be advanced in our project using an integrative approach centered on archaeology.

Through this integrative approach we aim to achieve an understanding of the dynamic process in which human beings as biological organisms (with genes, a body, and a brain) produced culture, while the artificially constructed environment and social norms formed thereby became the uniquely human niche (environment of adaptation), acclimation to which produced further changes in the human body and cognition.

Perspectives and Goals

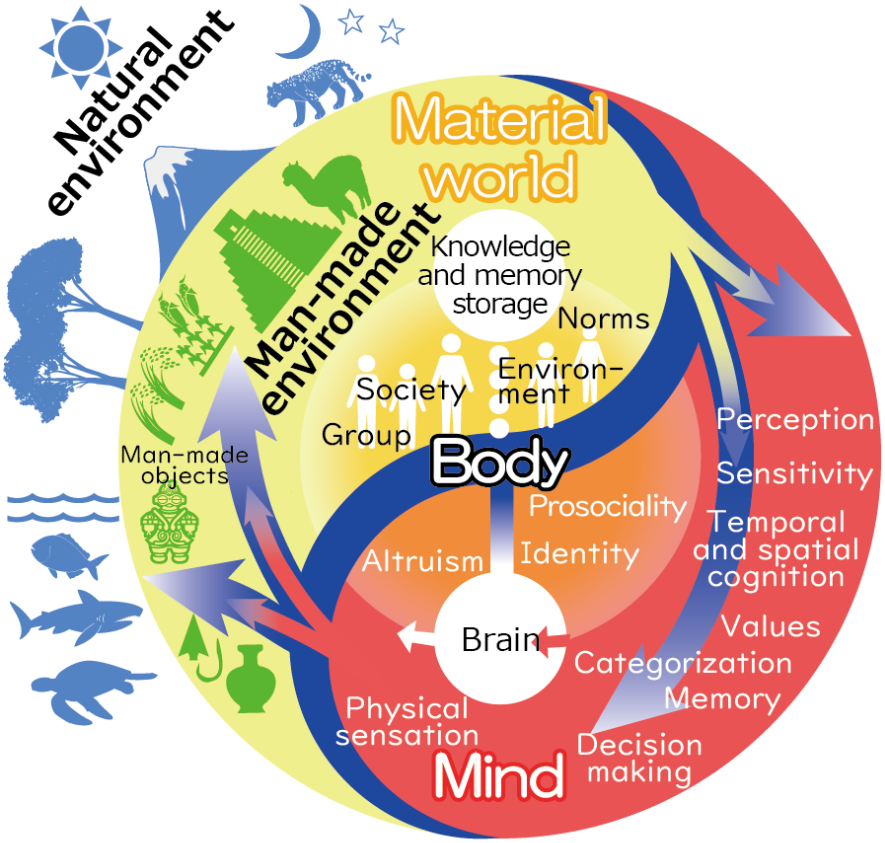
The most salient of human cognitive idiosyncrasies are imaginative powers, the sharing of ideas, and, through environmental construction based on these, the ability to create new "realities". Through comparative analysis of this process as it unfolded independently during the period of the development of civilization, the actual conditions of various locations in the Japanese Archipelago, Mesoamerica, the Andes, and Oceania will be clarified: In particular, the manner in which material culture came to take on the role of information storage external to the brain; and how culture as a system of knowledge surpassing the abilities of individuals as biological creatures came to be formed through cognitive systems and shared information extending beyond any individual body. By shedding light on the actual state of material culture, not merely as an extra-physical means of adaptation or as a reflection of interior phenomena, but as a vital constitutive element of human cognitive activity that shapes the human mind, body, and social relations, a basis can be achieved for advancing further research.

Through archaeological, anthropological, and psychological analyses of the phenomenon by which the environment is humanized and humans are artificialized through art (technology, fine art, etc.), the historical process by which unique social realities (subjective realities that serve as norms for behavior) are formed will be clarified, thus providing new understandings of human beings and culture. Through experimental research utilizing data on social backdrops that can be inferred archaeologically, the relationship between artistic behavior and social change and the relationship of cognitive functions supporting that behavior will be made evident. Knowledge can thus be gained regarding why human artistic behavior, which has often been regarded as "impractical", has progressed.

By matching material change with human physical change, the actual conditions of physical change resulting from artificial niche formation and adaptations to it will become clear. In this project we focus on the human groups that advanced throughout the Japanese archipelago, Mesoamerica, South America, and Oceania in order to elucidate the manner in which the processes of constructing social and cultural environments are interrelated with the following two areas: (1) The relationship between the processes of group and civilization formation and infectious diseases, health conditions, and changes in population; and

Figure 1.2.

Model of the mutual permeation of matter and mind as mediated by the body.



Mediated by the body, the mind and the material world permeate one another. Through the process of mutual creation between humans and the material world, the body also changes.

(2) differences in the ratios of particular types of genetic polymorphism that are connected to cognitive trends. These analyses will make clear in an empirical fashion the level and manner in which interaction with artificial environments, diet, and behavior influence the brain and cognition.

It will also be possible to clarify the manner in which, in the process of social stratification, the aggravation of inter-group disputes and intra-group hierarchical differentiation are related to material culture and physical changes. Additionally, cognitive and environmental factors related to the promotion and suppression of group identity and inter-group violence will become evident.

By drawing from the perspectives of niche construction and material culture research and integrating the results of various fields regarding the relationship between cognitive niche construction and forms of environmental utilization and transformation (including domestication), a theoretical model will be constructed that integrates phenomena observed on a short-term basis with long-term change. By so doing, we hope to present a coherent view of human history linking the past and the present.

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2
Introduction to the "Out of Eurasia" Program: Theoretical Perspectives of Mesoamerican Landscape, Monument, and (Sacrificial) Ritual Studies

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This introduction to the "Out of Eurasia" program sponsored by the Japan Society for the Promotion and Science is to reconsider the theories and strategies to better-understand the bio-cultural evolutionary processes in Mesoamerica. By applying a shared interpretative "niche construction" model, we examine social evolutionary processes of hunter-gatherer communities who migrated into the New World and gradually developed subsistence strategies, new ideological realms, art works, technologies, and finally created complicated stratified societies independently without having direct interactions with Old-World societies. Some of the bio-cultural features newly created in the New World are similar to those observed in the Old-World; we therefore explore the underlying reasons why these similarities emerged and also discuss the implications of the distinctiveness of the New World civilizations.

Homo sapiens arrived in the New World for the first time around 13,000 years BCE or earlier crossing Beringia or through the Bering coasts. Restricted ethnic entities with rather homogeneous DNA haplo-groups, similar physical features, and bacteria repertory set out in the cold environments creating the first bottle-neck in Beringia. These early populations were dispersed throughout the New World for millennia, gradually organizing socio-cultural complexes, and finally achieved their own urban forms without contact with Afro-Eurasian entities. In order to explain the origin of a pristine or autochthonous social formation processes in Mesoamerica, instead of focusing on regional cultural traits reflecting local geography (outside factors), our transdisciplinary studies contrastingly explore agents who created cultures to elucidate the underlying mechanisms fueled by people's unusual intellectual faculties that mediate outside factors and consequently created artificial niches, subsistence strategies, efficient technologies, arts, religious realms, and complicated social organizations.

Here, I focus on city formation, particularly monumental constructions, to explore people's unique features (powerful capacity of imagination, memory, collaboration and altruistic action to build solid social structures). Connecting the social transformation process during 3,000 years (BCE 1500 - CE 1500) in the Mexican central plateau (mainly at Teotihuacan, Cholula, and Monte-Albán) I discuss the monumentality in terms of ① symbolism, ② functions as temple platform and (sacrificial) ritual place, and ③ materializations of rulership, in comparative contexts.

① Most of monuments in Mesoamerica, originally connoted "the sacred mountain," functioning as the spatial axis, a device symbolizing worldviews. The position, the shape, the dimensions, the directionality

with the neighboring topography of the monuments apparently incorporated the symbolism of the heavenly bodies and a complicated calendar system including sacred numbers. We plan to create precise 3D maps with LiDAR at Teotihuacan, Monte Albán, and Cholula to explore the interrelations among the monuments, the natural geography, and the heavenly bodies. Comparative analytical studies will contribute to elucidate ancient cognitive systems and knowledge about astronomy, nature, monumental constructions, and how the cityscape developed through time.

② The monuments in Mesoamerica were foundations for temples and (sacrificial) ritual performance at the same time. The recent investigations at the major pyramids in Teotihuacan indicate that sacrificial rituals were carried out at the bottom, inside, and the summit of the monuments. Other monumental constructions in the Mexican highlands may have similarly functioned and would have left ritual remains still to be explored. The sacrificial rituals persisted more than 3,000 years being related to the formation and transformation process of social complexity in Mesoamerica.

③ Monumental architecture and rituals performed were apparently the social symbols that reflected a hierarchical polity. Interdisciplinary studies of rituals conducted at the monuments incorporating archaeology, iconography, ethnography, evolutionary psychology, and brain sciences will contribute to understanding ancient minds and behaviors, and social actions that constituted sacred rulership. Possible royal graves discovered under the monuments at Teotihuacan demonstrate ancient people's concern with dead bodies, state affairs (sovereignty), and the monuments themselves. The reconstruction of ancient landscape, cityscape, in relation to the heavenly phenomena in Mesoamerican cities, using advanced technologies, will deepen our understanding of the dynamic interactions between humans' cognitive systems and natural/social environments, fundamental factors that triggered unique bio-cultural evolution of the Homo sapiens.

Esta introducción al programa, "Afuera de Eurasia" patrocinada por La Sociedad Japonésa para la Promoción de la Ciencia reconsidera las teorías y estrategias para crear un mejor entendimiento de los procesos de evolución bio-cultural en Mesoamérica. Al aplicar un modelo interpretativo de "construcción de nichos", examinaremos los procesos de evolución social de comunidades de cazadores-recolectores, nuevas ideologías, obras de arte, tecnologías, y que finalmente crearon sociedades complejas estratificadas de forma independiente sin haber tenido interacciones con sociedades del Viejo Mundo. Unos de los aspectos bio-culturales creados en el Nuevo Mundo son similares a los observados en el Viejo Mundo; nosotros, por lo tanto, exploraremos las razones subyacentes por las cuales estas similitudes emergieron y discutiremos las implicaciones y distinciones de las civilizaciones del Nuevo Mundo.

Homo sapiens llego al Nuevo Mundo por primera vez por los 13,000 ANE o antes, cruzando Beringia o por las costas Bering. Entidades étnicas restringidas y con grupos haplo de ADN bastante homogéneos, con similitudes físicas, y un reportorio de bacteria salieron de los ambientes fríos creando el primer

embotellamiento en Beringia. Estas poblaciones tempranas se dispersaron por el Nuevo Mundo por milenios, gradualmente organizando complejos socio-culturales, y finalmente logrando sus propias formas urbanas sin algún contacto con entidades Afro-Euroasiáticas. Para poder explicar el origen de procesos de la formación social prístina o autóctona en Mesoamérica, en vez de enfocarnos en rasgos culturales regionales que reflejan la geografía local (rasgos externos), nuestros estudios transdisciplinarios contrastan en explorar agentes que crearon culturas para elucidar los mecanismos subyacentes alimentados por las facultades intelectuales inusuales de las personas que median factores externos y en consecuencia crearon nichos artificiales, estrategias de subsistencia, tecnologías eficientes, artes, religión, y organización social compleja.

Aquí me enfoco en formación de ciudades, particularmente construcciones monumentales, para explorar los aspectos únicos de las personas (la poderosa capacidad de imaginación, memoria, colaboración y acción altruista para construir estructuras sociales solidas). Conectando los procesos transformación social durante 3000 años (1500 ANE-1500 NE) en la meseta central de México (principalmente en Teotihuacán, Cholula y Monte Albán), tratare la monumentalidad en términos de su ① simbolismo ② funciones como plataforma y lugar de sacrificio y rito y ③ materialización de gobernación en textos comparativos.

① Muchos de los monumentos en Mesoamérica, originalmente connotan "la montaña ", funcionando como eje espacial, y dispositivo que simboliza cosmovisiones. La posición, la forma, dimensiones, orientación en relación con la topografía circunvecina de monumentos aparentemente incorpora el simbolismo de los astros y el sistema complejo calendárico incluyendo numerología . Planeamos crear mapas tridimensionales usando LiDAR en Teotihuacán, Monte Albán, y Cholula para explorar las interrelaciones entre los monumentos, la geografía natural, y los astros. Estudios analíticos comparativos contribuirán a la elucidación de sistemas cognitivos antiguos, conocimiento de la astronomía, la naturaleza, construcciones monumentales, y como el paisaje urbano fue desarrollado durante el tiempo.

② Los monumentos en Mesoaméric funcionaron como templos para actuaciones (de sacrificio y rito al mismo tiempo. Las investigaciones recientes en las pirámides mayores de Teotihuacán indican que ritos de sacrificio se tomaron acabo en la base, adentro, y en la cumbre de los monumentos. Otras construcciones monumentales en el altiplano de México también funcionaron de la misma manera y hubieran dejado rasgos todavía por explorar. Los ritos sacrificiales persistieron mas de 3000 años y se relacionaron a los procesos de formación y transformación de la complejidad social en Mesoamérica.

③ Arquitectura monumental y rituales realizados aparentemente fueron los símbolos sociales que reflejaron la jerarquía política. Estudios interdisciplinarios de los rituales realizados en los monumentos incorporan arqueología, iconografía, etnografía, psicología evolucionaria, y ciencias del cerebro y contribuirán a nuestro conocimiento de las mentes, comportamientos, y acciones sociales que constituyeron la gobernación . Posibles tumbas reales descubiertas bajo los monumentos de Teotihuacán demuestran la preocupación de los antiguos con los cuerpos fallecidos, asuntos de estado (soberanía), y los monumentos

mismos. La reconstrucción del paisaje antiguo, paisaje urbano en relación de los fenómenos celestiales en las ciudades Mesoamericanas, usando tecnología avanzada, profundizaran nuestro conocimiento de las interacciones dinámicas entre sistemas cognitivos humanos y ambientes naturales/sociales, y factores fundamentales que desencadenaron la evolución bio-cultural única del Homo sapiens.

Theories and Strategies for Bio-Cultural Studies in Mesoamerica

Following the theoretical framework and strategies set by the "Out of Eurasia" program (Matsumoto in this volume), I present an introductory discussion about people's unique "niche construction" strategies, particularly ancient landscaping and monumental construction in relation to ritual activities and changing social complexity in Mesoamerica (Figure 2.1). I focus on monumentality as an index of a long-term bio-cultural evolutionary trajectory. Monuments directly reflect shifting relationship between the surrounding natural environment (resources) and the people (brain-mind-body), and are intimately entangled with both symbolic behavior and social stratification at pertinent temporal span (Hodder 2012). Instead of applying historical particularism that focuses on regional geography and cultural diversity, the "Out of Eurasia" program explores the mechanism of agents, which created growing and resilient complex societies from cross-culturally comparative perspectives. Our goal is to take a step further toward constructing bio-cultural evolutionary models searching for an underlying unique nature of Homo sapiens that may be commonly detectable in different ancient entities (Brown 1991). In order to build hypothetical premises, we may better first review roughly the early stages of Homo sapiens to propose what the first Americans would already have had in their minds and bodies before they wandered out of Eurasia.

Intelligent Hunter-Gatherers

Recent paleo-anthropological studies indicate that Homo sapiens migrated out of Africa by 70,000 years ago while becoming powerful and efficient in imaginative capacities, communicative skills facilitated by the advent of language, religious thoughts, artistic/technological productions, and social organizations at different stages of human evolution, all which made people flexible, resilient, and successful enough to inhabit in almost all regions of Afro-Eurasia. Hunter-gatherer communities reached the East Asian coasts, inner highlands of Eurasia, or severe cold front in Siberia. Around its north-eastern edge, a small number of communities traveled out of Eurasia to get into the New Worlds through Beringia or along the coasts by 1,000 BP or earlier (e.g., Potter et al. 2017; the dates are still contested). We still do not have precise archaeological data to demonstrate how they survived and successfully achieved such trans-continental journeys. However, new discoveries in other parts of the Old World suggest that the Homo sapiens were continuously evolving for millennia becoming more skillful and intelligent developing ideological schemes, materializing them in rock-paintings, or finally building shelters or houses. Thus, humans gradually shifted surrounding environmental conditions that may be termed as a beginning of "artificial niche construction" that we discuss later. The excavations at Gobekli Tepe in Turkey (Haklay and Gopher 2020) for example, among other Pleistocene sites, clearly demonstrate

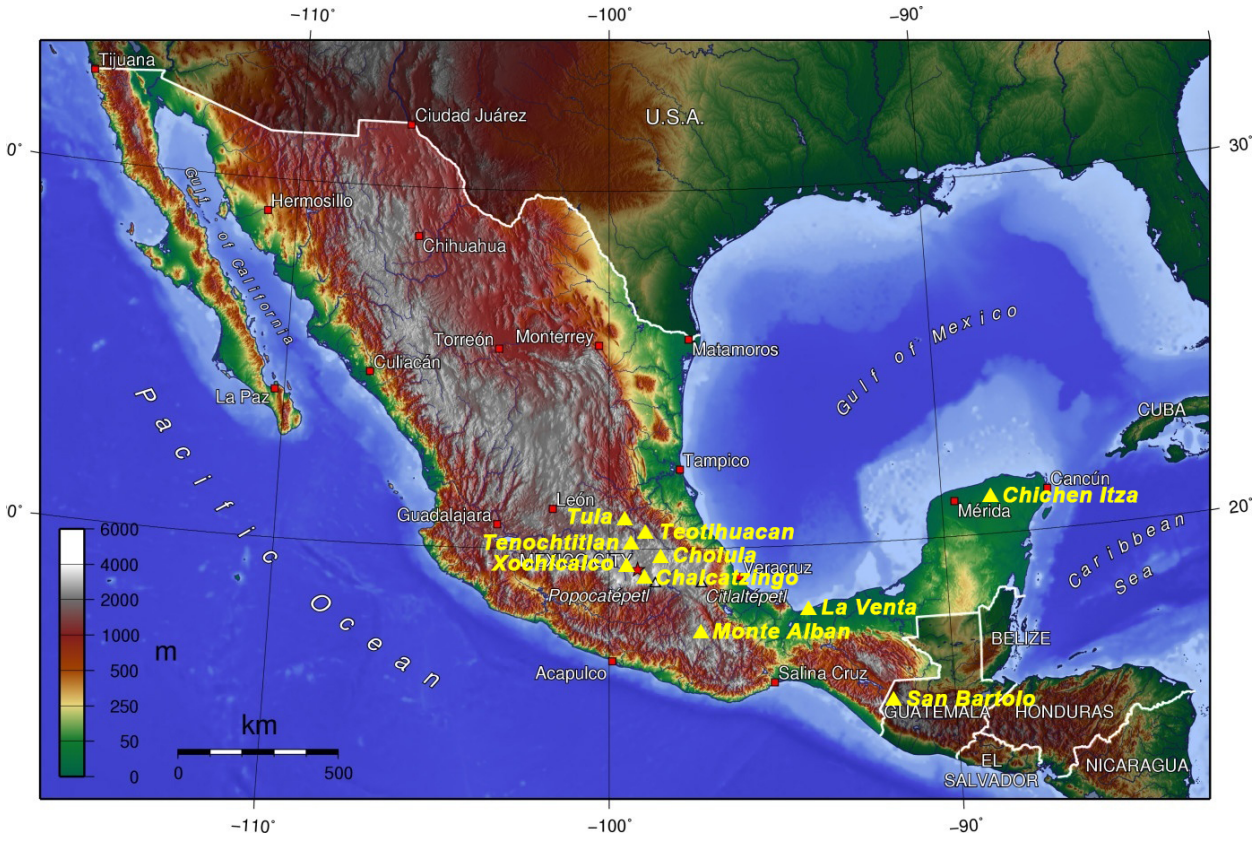
that advanced hunter-gatherers had the capacity to build large symbolic monuments, handling complicated social organization, sharing architectural, sculptural, and probably astronomical knowledge by 12,000 BP before evidence of domestication. That was the time when the initial peopling into the New World had already begun, presumably with same intelligent and imaginative capacities as anatomically modern humans.

Cooperative First Americans

There is increasing evidence for elaborated large-scale collaborative organizations for big-game hunting, systematic food gathering, landscaping, navigating/fishing to exploit new kinds of marine resources, or building shelters or residences with perishable materials in the Americas (e.g., Des Lauriers in this volume; Meltzer 2009). These features can be described as products of people's distinctive cognitive system, or Triadic Niche construction (Iriki and Taoka 2012), in which the mind mediates matter through the body's cognitive system to create new artificial niches, which bio-culturally affected the following generations successively. This is a basic model that we explore and want to develop further in this program, specifically focusing on the critical period of the rising social complexity during the last 10,000 years in the Americas. As a consequence of the advent of agriculture, the rise of cities, industrial technologies during the last five centuries, and long-distance massive demographic

Figure 2.1.

General plan of Mexico and Central America with locations of sites mentioned in the text.



movements including modern aerial transportation system, Homo sapiens rapidly became the most dominant, populous, and dangerous species in the planet. Advanced hunter-gatherer communities, before sedentarism was established in the New World, continuously developed efficient collaborative organizations, hunting technologies, more artificial niche construction strategies by themselves. Among their feats included, the conceptualization and structuralization of the materials, lives, and natural phenomena, the gradually increased degree of control or domestication of plants and animals, and quantification of materials, and core ideological factors like time and space, arts, religious practices, astronomy and myth (Hodder 2010; Mithen 1999; Renfrew 2008; Prufer et al. 2019). These ideological factors began to shape "high culture" materials in Mesoamerican complex societies.

For the objectives of our program, it may be constructive to recognize that the first Americans in the New World experienced two population bottle-necks, once in the Isthmus of Beringia and another in the Isthmus of Panama, that incidentally provide an ideal experimental condition to explore, in comparative contexts, the two irreversible histories that happened in Mesoamerica and the Andes. Restricted ethnic entities with rather homogeneous DNA haplo-groups, similar physical features, and bacteria repertory set in the cold environments at the first bottle-neck in Beringia, were dispersed in the New World for millennia, gradually organizing socio-cultural complexes, and finally achieved their own urban forms without contact with Afro-Eurasian entities. Namely, social formation and transformation processes in the New World may be considered as genuine or pristine not unlike those of the Old World ancient complex societies among which interactions, trade, communications, or tribal hybrids apparently occurred and should be considered as critical for mutual development.

We also consider that the Andean and Mesoamerican societies independently developed their socio-political, ideological, technological, and economic factors by their own creative capacities, although small scale interactions between Andean and Mesoamerican communities seem to have intermittently occurred (Beekman and Colin 2019). Particularly, Mesoamerica can be well defined almost as an isolated territory limited by the Gulf of Mexico, Caribbean ocean, the Pacific Ocean, Isthmus of Panama with buffer zone, and Sonoran dessert and wide northern barren zones near the US-Mexico border; the last extensive vacant areas were where few movements of materials and people seem to have occurred sporadically (Nelson 2008). It can be proposed that the natives formulated their proper worldviews for millennia within geographically well-defined territory of Mesoamerica, and finally materialized them during the Formative period (1800 BCE-250 CE). They gradually upgraded ideological contents qualitatively and quantitatively through the Classic (250-900 CE) and Postclassic (900-1521 CE) periods until the sudden encounters with the Spaniards in the early 16th century. We here try to underline this long independent social formation processes in Mesoamerica to recover data about indigenous cognitive systems in archaeological, ethnohistorical, or ethnographic records and to compare them.

In order to precisely define and evaluate the origin of a pristine or self-developed social formation process in Mesoamerica, archaeologists tend to stress regional cultural traits reflecting characteristic local geographies, like particular mountains, lakes, rivers, volcanic activities, climate variables, land fertilities, rocks, minerals, animals, plants, or other locally available materials/phenomena as advantageous factors which might have led toward the civilization (Nichols and Pool 2012). Here in our trans-disciplinary project, we contrastingly focus on agents, to explore the underlying mechanisms fueled by humans'

unusual intellectual faculties that mediated outside factors and consequently created particular artificial niches, subsistence strategies, architecture, efficient tools, art objects, religious beliefs, or complicated social organizations that we may call high culture complexes (Smith 2019; Yoffee 2015). Mesoamerica seems to be methodologically an attractive cultural unit to re-analyze intricate creation process of cooperative and collective behaviors and stratified social organizations, and to test explanatory models of bio-cultural evolution (Carballo 2016).

Rejecting the Wild vs Domestication Dichotomy

Many theories and practices for bio-cultural evolution were, in fact, hypothetically proposed largely based on data from Old World civilizations. Classic historical perspectives and epistemological foundations of the Westerners' sense of civilizations to evaluate ancient worldview, religion, philosophy, science, art, music, and other characteristics unique to humanity have long been created considering cases of Afro-Eurasian cultures, without taking into account the New World contextual data that had not been available until impacting collusion and social/cultural conquest by Spaniards in the 16th century. While the strong impulse of colonization by the Europeans in the New World caused substantial changes, fusions, or extinctions of indigenous bio-cultural elements, the Western values only gradually assimilated American indigenous traditions and cultural varieties in a minor scale. We may still need to explore countless bio-cultural factors from New World complex societies to evaluate or modify some of explanatory models about humans' historical trajectories constructed in the Old World. For example, the impact of domestication might merit re-evaluation from the perspectives of Homo sapiens' unique cognitive systems since the humans faced for the first time many unknown species in the New World and explored alternative strategies to exploit them creating distinct technological and ideological foundations. First, we may need to evaluate upgrading power of hunter-gatherers' and fishers' communities with long-distance navigation skills and exploring technologies for seafood subsistence, in addition to cognitive potentials to conceive nature and astronomy (Des Lauriers, in this volume).

Domestication is considered a fundamental human intervention on nature based on Old World models. Domestication studies in the Eurasian contexts have evaluated this process as a revolutionary from a hunting and gathering life style into a sedentary one that triggered food storage systems, large-scale collaborative works, social stratification, and consequentially urbanism (Childe 1950). This model seems to still structure our mind to meaningfully conceive social evolution. However, in the Americas indigenous communities sustained long and intricate symbiotic processes with an immense variety of new species of plants and animals, some of which remained wild or semi-wild despite long period of systematic exploitation by controlling, feeding, or teaming, and carefully consumed by people (Figure 2.2). There would not have been simple dichotomy or clear border lines between domesticated and wild plants/animals that demonstrate a big step-up on variety, complexity, and interactivity of the changing relationship between human and plants/animals in worldwide contexts. Apparently, the New World people alternatively created distinct landscapes, food chains, or complicated social organizations to obtain food resources efficiently that would not necessarily follow evolutionary models created on the Old World civilizations (Sugiyama, et al. in press). The issue should be revisited reanalyzing materials and contextual data from trans-disciplinary approaches in the "Out of Eurasia" program, particularly now that extremely selected species of domesticated animals and plants are monopolistically providing primary

Figure 2.2.

Zoo-plant reservation at Ixtapalapa in the Valley of Mexico, where the domestication of the whole symbiotic landscape can be observed (Florentine Codex).



resources for a large portion of entire population in the world causing serious global problems of bio-diversity, environmental degradation, and climate changes, in addition to the central questions of social stratification and inequality (McClung de Tapia and Sugiyama 2012).

2. Evolutionary Perspectives of Mesoamerican Monuments

To re-evaluate how exceptional human abilities (e.g. brain's imaginative power, memories, and creativity to organize social complexity) developed, we take a bio-cultural evolutionary approach to better understand social changes over time. We focus on monuments to discuss what triggered indigenous' minds to modify landscape, and to finally create cityscapes in the New World. Particularly, relatively well explored archaeological sites in Central Mexico and Maya zones provide an unusual opportunity for long-term comparative studies of the 3,000-year urbanization processes, from Olmec ceremonial centers (1500 BCE~) through Maya cities, Monte-Albán (Figure 2.3), Teotihuacan, Cholula, and others, up to densely populated Aztec capital of Tenochtitlan (~1500 CE). While we observe great diversity in environmental condition, landscaping, monument morphology, or city-layout, in addition to ethnic and linguistic variation in this area, we explore many commonly shared socio-cultural, especially ideological factors. In order to evaluate salient human cognitive idiosyncrasies connected to imaginative power, emotions, memories, and socialization, we here concentrate in the commonly observable factors in chronological framework. Three aspects of monumentality can be examined in Mesoamerica; ① cosmic symbolism of monuments, ② functions of monuments as theoretical stages for (sacrificial) rituals, and ③ changing socio-political implications or rulership proclaimed at monuments in Mesoamerica.

As other contributors to the volume discuss varied case studies, I briefly review these three aspects of monumentality during the Late Formative (400 BCE to 250 CE) and the Early Classic (250 CE to 600 CE) periods in the Mexican highlands, particularly at Teotihuacan. This symbolic city rather suddenly emerged by the first century CE and became one of the largest Pre-Columbian urban centers in the Americas in terms of the metropolitan area it covered (about 25 km2), its estimated population (85,000-125,000; Cowgill 2015), and the degree of multi-ethnic interactions with other distant cities (Hirth et al. 2020). The period from the Late Formative to the Early Classic in Mesoamerica particularly seems to have been characterized as a new phase of urban formation, when innovative astronomical knowledge, the long count and 260-day ritual calendar systems, invention of writing system, grand monumental buildings, and new creature deities, among others, emerged spontaneously at different parts in Mesoamerica. I hope that discussions of cosmic symbolism, theatrical functions, and polity, interrelated at the three major monuments in Teotihuacan shed light on

bio-cultural evolutionary perspectives we search with the Out of Eurasia program.

Monuments Symbolizing Sacred Mountain and Cosmology

As López convincingly explains in this volume, Mesoamerican monuments fundamentally represented the "Sacred Mountain", a portal connecting the upperworld and underworld. This fundamental concept can be traced back to 1500 BCE or much earlier and lasted more than 3,000 years in Mesoamerica in spite of changing morphology of monuments. For instance, Complex C at La Venta built around 1000 BCE apparently symbolized a sacred mountain by shape, and provides a good example of an original artificial niche materialized collectively by physical human labor.

Monuments were, however, multi-symbolic and multi-functional. Some Classic and Post-Classic monuments visually represented a cosmogram that meaningfully structured the time and space of the present world, visualizing time-recognition systems and/or calendar cycles connected to astronomical movements (Aveni 1980). We may recall that the Early Post-Classic El Castillo pyramid at Chichen Itza apparently has represented cosmic order materializing 365-day solar calendar by the numbers of steps, platforms, or with the orientation of the building. I here summarize how the major monuments at Teotihuacan encoded complicated and precise time and space cognition system (Sugiyama 2017). Ceremonial centers in later periods could have had similar symbolism and functions as memories of Teotihuacan's monumental symbolism (Garcia-Des Lauriers this volume, Travis et al. in this volume).

I have mentioned that the Teotihuacan city layout conspicuously materialized indigenous concepts of time and space, an innovative version of the Mesoamerican

Figure 2.3.

Central Plaza of Monte Albán, viewed from the North Pla tform toward the south (photo by author).



cosmogram by the time of the city's massive foundationaround 200 CE (Sugiyama 2011). The harmoniously proportioned architectural plan of public buildings and residential structures strongly suggest that the city did not develop through an aggregation of independent buildings, but with a single master plan imposed by leading entities who orchestrated the massive construction program of a meaningful cityscape. Archaeological data accumulated to date support this idea (e.g., Sugiyama et al. 2013; Sugiyama 2017). Analogous instances of centralized cosmic city planning exist around the world, like at the Inca capital of Cuzco or in ancient Chinese cities like Xian or Luoyang (Zuidema 1983; Wheatley 1971). Mesoamerican monuments and important administrative structures or palaces were spatially arranged accordingly to reflect the cosmic order that authorized governing elite to stand at the axis mundi, the center of the universe. I suspect that at Teotihuacan, in order to begin this kind of large-scale construction program, social organization with powerful leadership to organize people must have been already established before 200 CE. However, we still know little about the origin of the Teotihuacan ritual center as barely fragmented data are available concerning the movements of this critical period, the 1st to 2nd century CE.

In contrast, various archaeo-astronomical studies

(e.g. Aveni 1980; Dow 1967; Malmstrom 1978) and a measurement unit study of Teotihuacan architecture (Sugiyama 2010, 2017) indicate that the currently seen city layout was established in accordance with the movement of celestial bodies, local topography, and the calendar systems (Figure 2.4). A three-dimensional systematic recording of the architectural assemblage in AutoCAD demonstrates that Teotihuacan architects applied 83.0 cm as the basic measuring unit (called TMU, Teotihuacan Measurement Unit) to design the city layout. The dimensions of major monuments and distances between them corresponds to multiples of this unit, often reflecting calendric or cosmologically significant values including 9, 13, 18, 20, 52, 73, 178, 260, 360 (365), 486, and 520 (Figure 2.5).

One of the most intriguing characteristics is that the Mesoamerican people integrated astronomical and human cycles harmoniously in this cosmic perspective of time and space. The 260-day ritual calendar, which approximates the human gestation period, is a distinctive calendar conceptually combined with the solar calendar to create a larger cycle of 52 solar years (365 x 52 = 260 x 73) that had long been celebrated in the most Mesoamerican centers for more than 2,000 years. This important Mesoamerican large cycle or "century" may have represented a persons average life expectancy or menopause, like the 60 solar year cycle calculated as human's life cycle integrated in solar calendar systems in ancient East Asian civilizations that seems to represent, rather than merely coincidence, most probably a product of commonly shared human's imaginative capacities.

Thus, the city's proportional spatial distribution with symbolic monuments can be argued to have symbolized a combined cosmic vision of the solar/natural cycle and a ritualized human life cycle, for which leading groups meticulously and precisely calculated complicated movements of celestial phenomena, like the cycles of the Sun, the Moon, the Venus star, the Pleiades, or solstices, equinoxes, and eclipses, and cycles of human body and

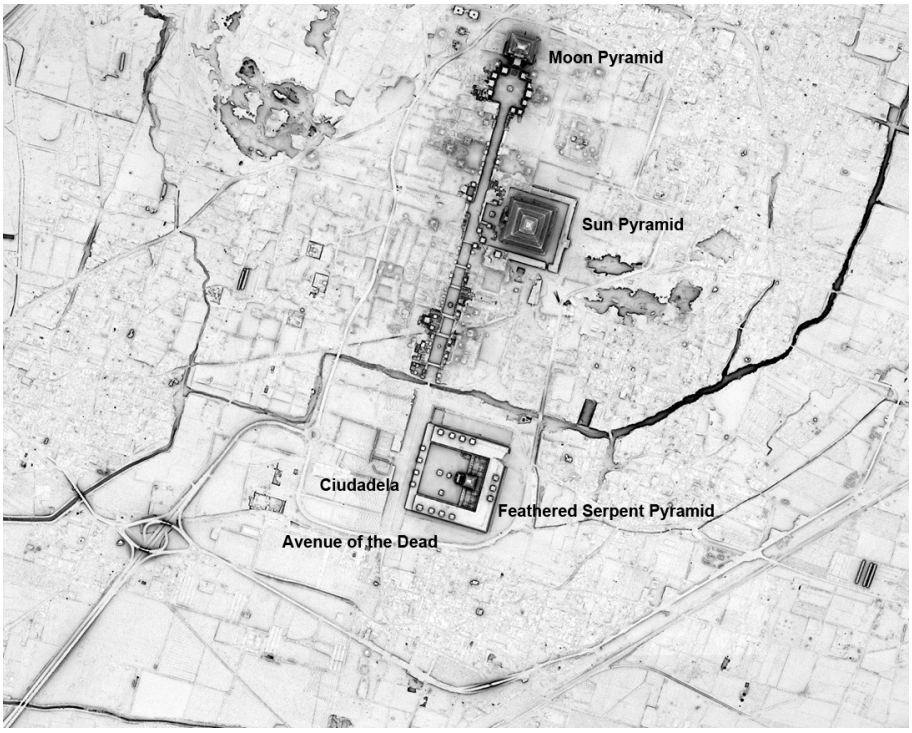
Figure 2.4.

View of the Moon Pyramid from the central axis of the Avenue of the Dead toward the north at Teotihuacan. Notice that the top of the Moon Pyramid exactly coincides with the top of the highest mountain of the Teotihuacan Valley, Cerro Gordo, which is often covered with cloud especially during the rainy season, as if the mountain is seen as a water resource connected to the north.



Figure 2.5.

LiDAR map of the central section of the ancient city of Teotihuacan, Mexico. We believe that systematic analysis of topographic features detected by the map will reveal an indigenous perception of time and space.



integrated produced numerals symbolically into monumental layout. This grand construction program must have absorbed many elites, specialists, workers, and material resources that should have had strong impacts on its hinterland communities, distant states, and surrounding natural environment. We can imagine how this grand enterprise with new foundational ideas was attractive for many Mesoamerican people intellectually and emotionally. Recent discoveries at Teotihuacan also suggest that dignitaries or astronomers from diverse Mesoamerican states including Maya and Zapotec cities seem to have participated in the cosmic urban construction program by the 3rd century CE (Gómez 2017). Consequently, the symbolic monuments became a religious, intellectual, political, and socio-economic attraction during its heyday, and such monumental sites conspicuously remained in the social memories for centuries after the collapse of the city during the 6th century CE.

Many other ancient Mesoamerican centers have not been explored extensively to reconstruct monumental cityscape with precision to run this kind of city-layout analysis searching for encoded numerological symbols. Teotihuacan has been extensively excavated and consolidated since the late 19th century, allowing for this type of analysis. We expect that new studies proposed by the "Out of Eurasia" program with LiDAR mapping, and re-interpretations of previous excavation data may further provide opportunities to explore numerological symbols and indigenous perceptions of the nature and humans; we may consequentially be able to retrieve ancient people's

mind that mediated outer worlds (the environments) and inner worlds (body and mind), and invented systems to quantitatively measure time and space (Morley and Renfrew 2010).

Monuments as Theater for (Sacrificial) Rituals

Major monumental buildings integrated evidence of public ritual performance, physical remains into their foundation, particularly those of human (and animal) sacrifices at Teotihuacan (Figure 2.6). These characteristic rituals lasted more than 3,000 years crossing over different regions, ethnic groups, dynasties, or states in Mesoamerica. We know from abundant archaeological and ethnohistorical records that this peculiar symbolic, emotional, and collective behaviors must have constituted a central politico-religious and moral discipline for the Mesoamerican societies. Monuments, plazas, and surrounding facilities had long been functioning for theatrical performance carried out on special days with specific purposes like celebrating the passage of time, dedication rites to deities or significant individuals, and other commemorative events (Fash and López 2009; Inomata and Tsukamoto 2014; Tsukamoto this volume). Sacrificial rituals often constituted climatic scenes in these events among other integrative components like processions, chanting, dancing, playing music or games, and feasting activities (Inomata and Coben 2006; López and Olivier 2010). Theatrical function of monuments for (sacrificial) rituals can be detected from early Formative centers in Mesoamerica and continued until the time of the conquest by Spaniards who witnessed human sacrifices taking place at the top of the pyramids of Tenochtitlan (Boone 1984). In Teotihuacan, recent and abundant excavation data indicate that monumental constructions like the Sun, the Moon, and the Feathered Serpent Pyramids, as well as complementing large plazas and other functional monumental buildings served as theatrical stages to carry out such bloody sacrificial rituals.

People and sacred animals, such as pumas, jaguars, wolves, eagles, and rattle snakes, among others, were ultimately embedded within, above, and under major structures in Teotihuacan (N. Sugiyama 2014; N. Sugiyama, et al. 2014, Sugiyama and López 2007; Sugiyama 2005). Particularly at the Feathered Serpent Pyramid, we uncovered more than 200 warriors/elites were sacrificed and systematically buried while being constructed the pyramid around 200-250 CE that I once interpreted as dedication burials to the erection of the new monument (see below for further discussion) (Cabrera et al. 1993).

New discoveries at the Moon Pyramid evidenced a fundamental function of the pyramid. Our tunnel excavations along the upper floor of Building 5 confirmed the lack of a masonry temple atop the pyramid, suggesting that the pyramidal monuments fundamentally served as a stage for public ritual display, not as a platform to sustain temple(s) on its summit in Teotihuacan. As illustrated in later period codices about Mexica's sacrificial rituals scenes, archaeological data indicate the Teotihuacanos probably executed sacrifices on the top of the monuments or inside the nucleus while being constructed (Sugiyama and López 2007). Conspicuous bloody rituals atop the hill-top-like summit of the monuments must have had tremendous and lasting emotional impacts in mind and bodies of thousands of public audiences watching from the wide-open plazas. A trans-disciplinary unit study group of sacrificial rituals in the "Out of Eurasia" program will explore the logics of practitioners and biological/cultural mechanisms analytically. A modeling methodology including examination of ancient cooperation or altruism in relation to brain mechanisms, may be explored to explain how and why this kind of rituals persisted widely in space and time among Mesoamerican stratified societies. Sacrificial performances in fact have been recorded in many

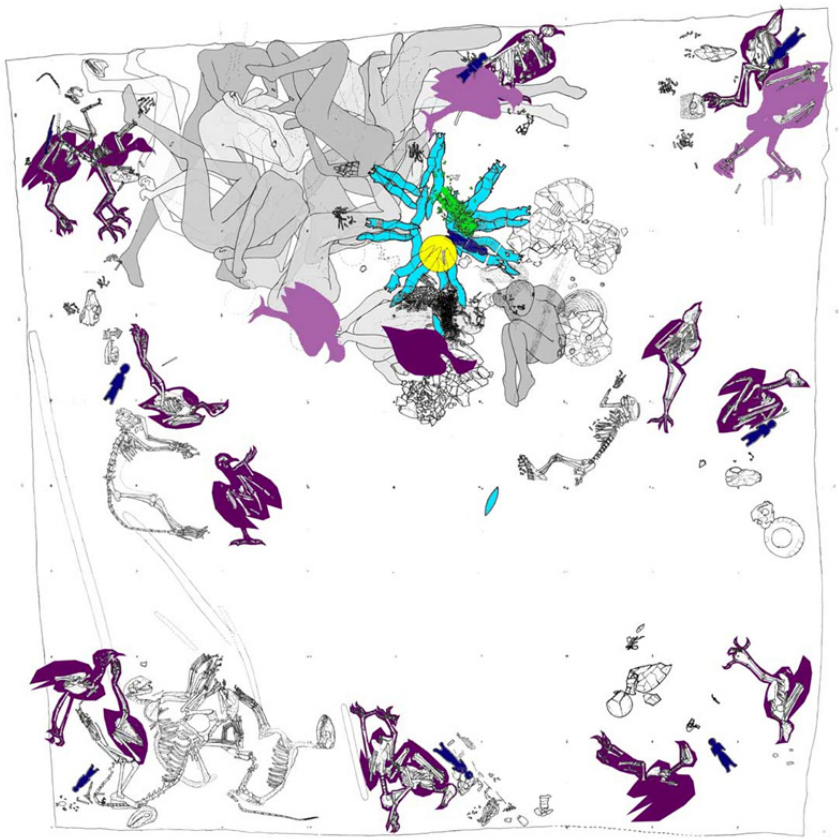
ancient complex societies world-wide. In order to discuss in comparative contexts of this peculiar ritual behaviors we have substantial data about monumental buildings as theatrical stage for ritual performance, a wide assemblage of tools for sacrifice, abundant osteological materials of sacrificial victims (both people and animals), related pictorial and written information (epigraphy and codices), in addition to ethnographic records and new investigations of modern indigenous communities which still perform sacrificial rituals with animals that we will coordinate to carry out in "Out of Eurasia" program.

Monuments as Reflection of Rulership and Social Memories

We explore another fundamental aspect of Mesoamerican monuments--social stratification and rulership. The monumental buildings in Mesoamerica often symbolized power relations metaphorically using hierarchical order of deities. For example, the twin temples on the Great Temple (Pyramid) in Tenochtitlan demonstrated the two most important deities; the northern temple dedicated to Tlaloc, rain deity fundamental for agriculture, and the southern temple devoted to Huitzilopochtli, the Mexica's patron deity symbolizing the Sun, eagle, and warfare, the most powerful authority in the

Figure 2.6.

Plan of Burial 6 found tri-dimensionally near the center of Building 4. Twelve individuals with canids, felines, eagles, and rattle-snakes, were found sacrificed and buried with rich offerings.

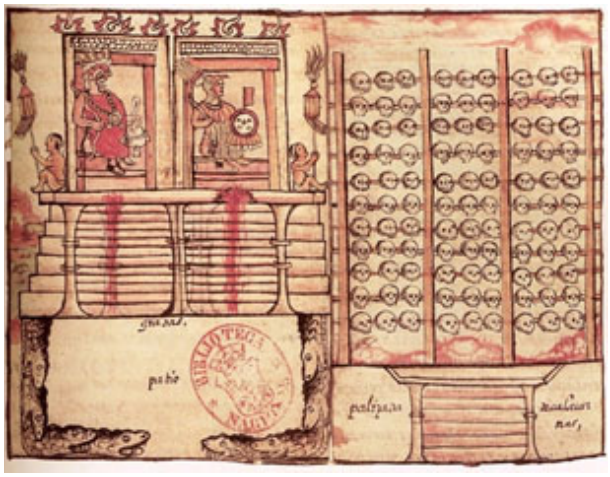


sky (Figure 2.7). This holy dichotomy which divided the sacred mountain into dual temples on the northern and the southern portion of the pyramid evidently corresponded to the movement of the Sun toward the north during the rainy season and toward the south during the dry season (Boone 1987). The Great Temple within its precinct materializing the Mexica's universe operated as theatrical stage to carry out countless sacrificial rituals (in many cases with war captives), thus proclaiming powerful military order and maximum rulership symbolized by the Sun through the dramatization of the universe.

At Teotihuacan we did not know what deity or divine attributes were designated to the Moon and the Sun Pyramids specifically. Recent discoveries and measurement unit study however suggest that the Moon Pyramid located at the northern end of the Avenue of the Dead was dedicated to the water goddess related to fertility, earth, femininity, rainy-season, and probably the Moon (Figure 2.4), and that the Sun Pyramid represented the Sun god with attribute to fire, heat, dry-season, 260 day ritual calendar, and possibly

Figure 2.7.

The Great Temple with twin temple and a platform with rack for decapitated heads (right side) in Tenochtitlan, the Aztec capital, is depicted in the 16th century codex (Duran 1995, II: lam. 5).

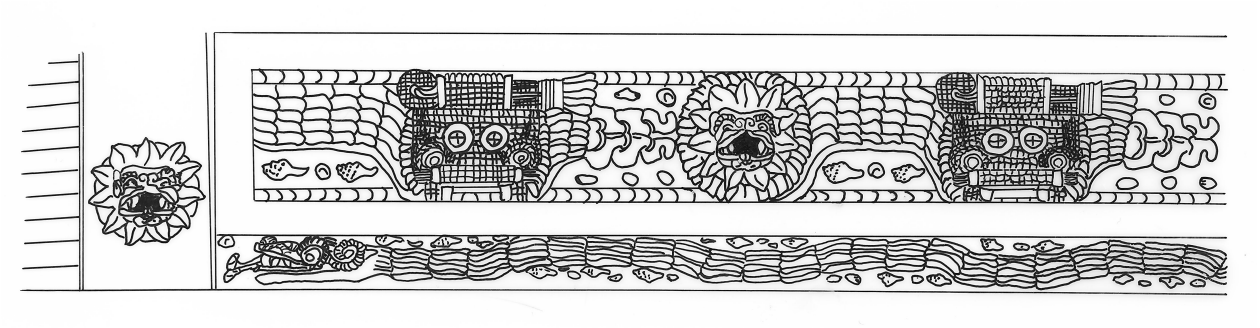


eagle (as a Sun symbol) (Sugiyama 2010, 2017). A large sculpture of the water goddess was found on the western slope of the Moon Pyramid, suggesting that it was perhaps standing on the top of the pyramid. I have mentioned that the pyramid did not have a masonry temple but very probably functioned as a ritual space with a huge image of water goddess emphasizing the importance of the water symbol complex. In contrast, an exceptionally large stone brazier in the form of the Fire God (and Old God) was found at the summit of the Sun Pyramid while many fragments of jaguar sculptures possibly symbolizing the Sun traveling in dark underworld, a fragment of large anthropomorphic figure, and a large skull sculpture resembling the Sun, were found among others in the Sun Plaza in front of the Sun Pyramid. These data suggest that the Sun and the Moon pyramids may have been conceived by the Teotihuacanos as symbols of dualistic worldview; the Sun vs the Moon, fire vs water, heat vs cold, sky vs earth, dry vs rainy seasons, and perhaps maleness vs femaleness. In contrast, the Feathered Serpent Pyramid unmistakably represented the Feathered Serpent deity that symbolizes Venus (Nicholson 2000) (Figure 2.8). This brilliant star was the most important planet in Mesoamerica and is often depicted in Late Classic period as symbol of warfare and rulership (Carlson 1991).

López, López, and Sugiyama (1991) discussed that the sculptural program on the facades of the Feathered Serpent Pyramid symbolized the beginning of new Era inaugurated by supreme deity, the Feathered Serpent. I further believe that the monument was the place where accession ceremonies originally took place proclaiming powerful rulership in Teotihuacan (Sugiyama 2005). The image of Feathered Serpent deity became a symbol of maximal sacred authority for the following centuries in other Mesoamerican ceremonial centers including Xochicalco, Tula, and Chichen Itza. Sacred serpents (not feathered), often depicted with elaborated headdress,

Figure 2.8.

The first platform of the façade of the Feathered Serpent Pyramid at Teotihuacan (drawing by the author).

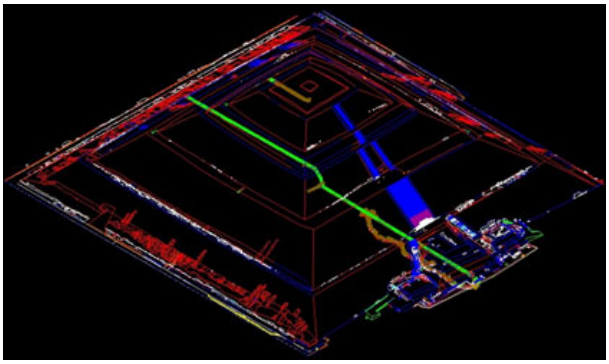


existed since earlier Formative periods like in Chalcatzingo or in Maya mural at San Bartolo (Chinchilla 2017). However, this new creature composed with the elements of serpent, crocodile, jaguar, and bird appeared at Teotihuacan in monumental scale for the first time in Mesoamerica. Curiously, this creature is morphologically and conceptually similar to the Asian Dragon, which also functioned as symbol of authority for millennia over distinct Chinese dynasties. This coincidence of two creatures symbolizing rulership on the both sides of the Pacific Ocean would not have been a result of the contact between two continents, obviously neither completely accidental, but may be worth reconsidering from a bio-cultural evolutionary perspectives as a product derived from similar symbol formation process by creative mind, the theme which may be further analyzed by transdisciplinary studies with psychological modeling.

The city-wide monumental construction program at Teotihuacan apparently demonstrate strong socio-political power relations of ruling groups which metaphorically proclaimed their divine authority in the Citadel. However, a royal grave has not been found or identified to date at Teotihuacan. An accidental discovery in 1971 revealed that a man-made tunnel existed 7 meters below the Sun Pyramid (Heyden 1975) (Figure 2.9). I suspected that this was a strong candidate for royal grave at Teotihuacan (Sugiyama 2010). Unfortunately, original contexts had been disturbed excessively in antiquity, therefore we could not confirm the royal grave. In 2004, Gómez (2017) found another ancient tunnel 15 meters under the Feathered Serpent Pyramid with striking similarities between two tunnels. Material studies from the latter tunnel are currently in the process, and clear evidence of royal grave has not been reported as several re-entering activities disturbed the original contexts (Gazzola and Gómez in this volume; Gómez 2017). However, these tunnels seem to have been most probable place for deposition of rulers' bodies because of direct association with the most significant monuments representing the Sun and divine creature symbolizing rulership, its central locations in the meaningful city layout (Sugiyama 2017), evidence of looting activities, and many associated offertory complexes that would have been dedicated to someone once deposited at the end of the sacred tunnels. In addition, more than 200 sacrificed warriors/elites found in and around the Feathered Serpent Pyramid at the ground level may have been dedicated to a possible ruler originally deposited 17 meters below them. This interpretation of sacrificial retainers and royal grave still needs to be confirmed with material analysis. However, extensive looting activities in the tunnels and the possibility of the cremation of high-status individuals or post-mortem

Figure 2.9.

AutoCAD drawing of the Sun Pyramid, Teotihuacan, with location of straight research tunnels and undulating ancient tunnel discovered under the Sun Pyramid.



activities including reuse of bones of royal members or ancestors by Teotihuacan descendants as social memories may make it difficult to precisely identify the original function of the ancient tunnels as a royal grave (Astor-Aguilera in this volume). As a preliminary conclusion we can confidently propose that the Citadel served as a public ceremonial enclosure as well as the cradle of the maximal political and military forces of the Teotihuacan government, symbolically and physically embedded in the Feathered Serpent Pyramid complex.

Previous brief discussions about the possible meanings, functions, and political implications of the major monuments in Teotihuacan may elucidate power of mind; gradually upgrading intellectual, technological, and informative advents and hierarchically growing social organizations at Teotihuacan, and humans' intolerable interest to explore imaginative spatial dimension (upperworld and underworld), and temporal dimension toward the past and the future. Our projects plan to create precise LiDAR maps of ancient cityscape with monuments and to integrate them in the landscape and astronomy programs that would contribute to conceive humans' evolving cultural/biological factors through time. Systematic trans-disciplinary studies of cosmologies, landscapes, cityscapes, monuments, and rituals would provide more sound interpretations about bio-culturally evolving human's unusual capacities that made us the most dominant and dangerous species in the planet.

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3
Monuments, Art and Social Change in the Formative Andes: Case Study in Tembladera Region, Middle Jequetepeque Valley, Northern Peru

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Throughout the history of the South American continent, the Central Andes is conspicuous in that it displays a variety of domesticated animals and plants and witnessed the emergence of a tradition of constructing monumental architecture since the Late Preceramic Period (ca. 3000–1800 B.C.). The utilization and alteration of the natural environment characterized the Andean Civilization. In the Hamacas Plain, located in the Middle Jequetepeque Valley of northern Peru, there are many civic-ceremonial center sites of monumental scale and large burial towers dated to the Initial Period (ca. 1800–800 B.C.). According to previous investigations and my research, these centers can be divided into eight clusters of architectural complexes and specific time spans can be assigned to each of them: Five centers can be dated to the Hamacas Phase (ca. 1500–1250 B.C.) and three to the Tembladera Phase (ca. 1250–800 B.C.). The gradual change in configuration and distribution of the monumental buildings and tombs from the Hamacas Phase until the Tembladera Phase signifies that social change in the local community strongly influenced decision-making over the alteration of the natural environment and planning of monumental buildings. At the same time, geographical conditions and existing monuments stimulated the establishment of religious thought on ancestors, social difference, and settlement divisions.

Los Andes Centrales es una de las áreas donde se han domesticado varios animales y plantas como recursos comestibles y materiales para artesanía en la Sudamérica. Merece atención la aparición de los centros ceremoniales, cuales son monumentos arquitectónicos con carácter ceremonial, desde el cuarto milenio a.C., lo cual marcó la formación de Civilización Andina en esta zona. Este artículo se enfoca una zona en donde el autor ha investigado tales monumentos prehispánicos y el proyecto "afuera de Eurasia" planifica más estudio para profundizar el tema de formación de ambiente artificial y el rol de los monumentos.

En el valle medio de Jequetepeque, norte del Perú, se ubican gran número de conjuntos arquitectónicos del Periodo Formativo. El sitio arqueológico "Complejo Hamacas" en la Pampa de las Hamacas es una densa concentración de monumentos tempranos correspondientes a la Fase Hamacas (aprox. 1500–1250 a.C.) y a la FaseTembladera (aprox. 1250–800 a.C.). Según los datos de excavaciones estos monumentos están asociados con áreas residenciales y funcionaron como núcleo de asentamiento humano. La ubicación

de un monumento fue definida considerando el acceso al campo agrícola y la estrategia de evitar desastre causado por alta precipitación. La dirección de eje arquitectónica de construcciones y ubicación de tumbas grandes en su contorno indican que los centros ceremoniales fueron diseñados y colocados para visualizar la memoria de los ancestros en el paisaje.

Sin embargo, en la Pampa de Mosquito que se extiende en la margen opuesta de la Pampa de las Hamacas, existe otro sitio denominado "Complejo Mosquito" que consiste en varios monumentos arquitectónicos más antiguos; datan de la primera mitad de segundo milenio a.C. Ellos presentan otro patrón de ambiente artificial. En la Pampa de Mosquito se distribuyen petroglifos de iconografía religiosa que jugaba rol en el paisaje, pero no podemos confirmar entierros visibles como los casos del Complejo Hamacas. Mientras tanto, la presencia de terreno agrícola cerca de monumentos es una característica común entre Complejo Hamacas y Complejo Mosquito, lo cual sugiere que la economía fue un elemento fundamental en el proceso de formación de asentamiento con monumentos. El estudio comparativo de estos dos sitios nos permitirá discutir el mecanismo y función de los monumentos.

Introduction

In the history of South American Continent, the Central Andes (Figure 3.1) is a conspicuous area because there emerged a tradition of constructing monumental architecture with elaborated design, high visibility and durability. They are considered as civic-ceremonial centers, which are monumental architecture with ritual character and built with large labor investment. The first appearance of centers is dated to the Late Preceramic Period (ca. 3000-1800 B.C.). Especially in the Central Coast and North Central Coast of Peru, numerous ceremonial center sites which correspond to the early part of this period are found.

The Central Andes was an important core of domestication process for various plant and animal species. They supported the rise of complex society not only as food (e.g. potato, llama, alpaca, and guinea pig) and labor force for transportations (llama), but also as materials for craft productions (e.g. cotton, gourd, bone and alpaca wool). Fiber products as fishing net, basket, and textile helped subsistence, and especially textile functioned as media for represent ideas graphically. In the Central Andes, the iconography was highly elaborated by weavers before the introduction of pottery. Geometrical patterns and geometrically arranged zoomorphic/anthropomorphic designs originated from textile show strong influence on Andean religious art, for instance, ceramic products, ornaments made of a variety of materials, stone carvings and wall paintings/relieves associated to the monumental buildings of the civic-ceremonial centers.

Therefore, the utilization and alteration of natural environment during the Late Preceramic Period characterized the Andean Civilization, and the subsequent periods, the Initial period (ca. 1800-800 B.C.) and Early Horizon (ca. 800-250 B.C.), the civic-ceremonial centers were constructed in a large extent of Peruvian coast and highland, and some part of tropical forest. In this paper I focus on the centers located in a basin of northern Peru where I researched to clarify the formation process of artificial environment during the Initial Period.

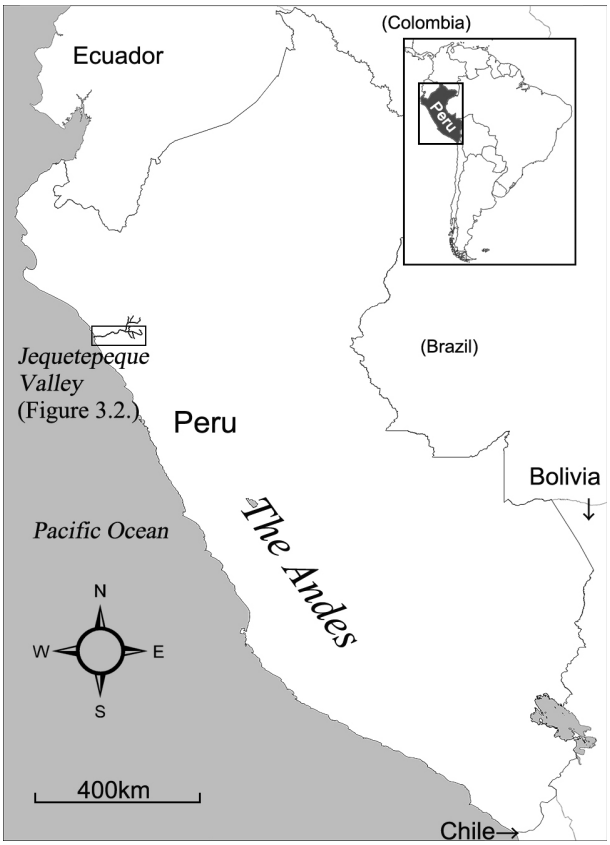
The Middle Jequetepeque Valley

The Middle Jequetepeque Valley, northern coast of Peru, there are many civic-ceremonial center sites dated to the Initial Period (Figure 3.2). They are architectural

complexes which consist in monumental buildings such as platforms and sunken courts. Especially in the Hamacas Plain (Figure 3.3) which extends along the north bank of the river nearby modern village Tembladera many sites were found and investigated (Carcelén 1984; Keatinge 1980; Paredes 1984; Ravines 1981, 1982, 1985a, 1985b; Tam and Aguirre 1984; Tellenbach 1986; Ulbert 1994). Notably, on this plain there are considerable numbers of masonry burial towers of the same time period. Such a densely clustered concentration of early monumental buildings and conspicuous tombs is uncommon in the Central Andes. I launched an archaeological project in collaboration with Peruvian archaeologists to investigate them in 2003, 2004, and 2005. Also, since 2009 we have investigated on the opposite bank of the Hamacas Plain and detected earlier monumental buildings dated to the Late Preceramic Period (ca. 2000-1600 BC) and later ones of the Early Horizon (ca. 800-500 BC). My study area offers an important opportunity to study the emergence of monument and formation of cultural landscape in the Andes because we can research a long chronological sequence during the Formative Period of the civilization (late Preceramic, Period, Initial Period and Early Horizon) in the valley. As to the geographic setting, Hamacas Plain and the opposite bank of the river presents a relatively closed zone surrounded by mountains and the cultural remains are highly visible.

Figure 3.1.

The Central Andes and the Research Area.



Research history in the Hamacas Plain

Today many of the archaeological sites of the Hamacas Plain have been destroyed and/or altered by the Gallito Ciego Reservoir and roads constructed during the 1980s. Two archaeological projects investigated them before and during the construction works. One project produced detailed inventory and maps of archaeological sites and carried out test excavations at some of them (Ravines 1982, 1985a, 1985b). Another project excavated some architectural complexes intensively. Especially the monumental buildings and the surrounding residential area at the North Complex of Plateau 2 of Montegrande are well known for its discussion on social organization (Tellenbach 1986:295) and detailed analysis of pottery (Ulbert 1994). The sites were believed to have destroyed totally, but Japanese Archaeological Mission in 1999 (Sakai et al. 2000), to which the author participated, rediscovered some sites on the shores of the reservoir. I decided to draw up a new project to reconsider the results of two antecedent projects that had been published independently and revaluate them considering advances of studies on the Initial Period.

Figure 3.2.

Civic-ceremonial center sites of the Initial Period in the Middle Jequetepeque Valley, Peru.

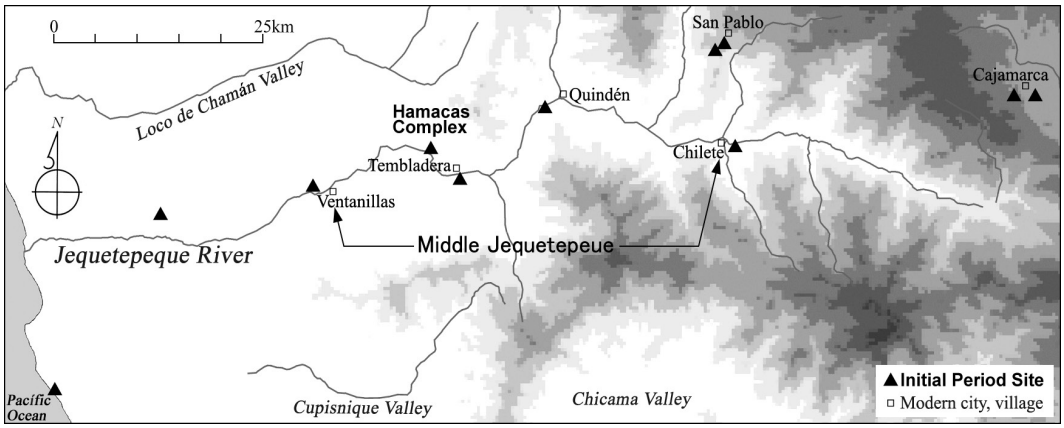
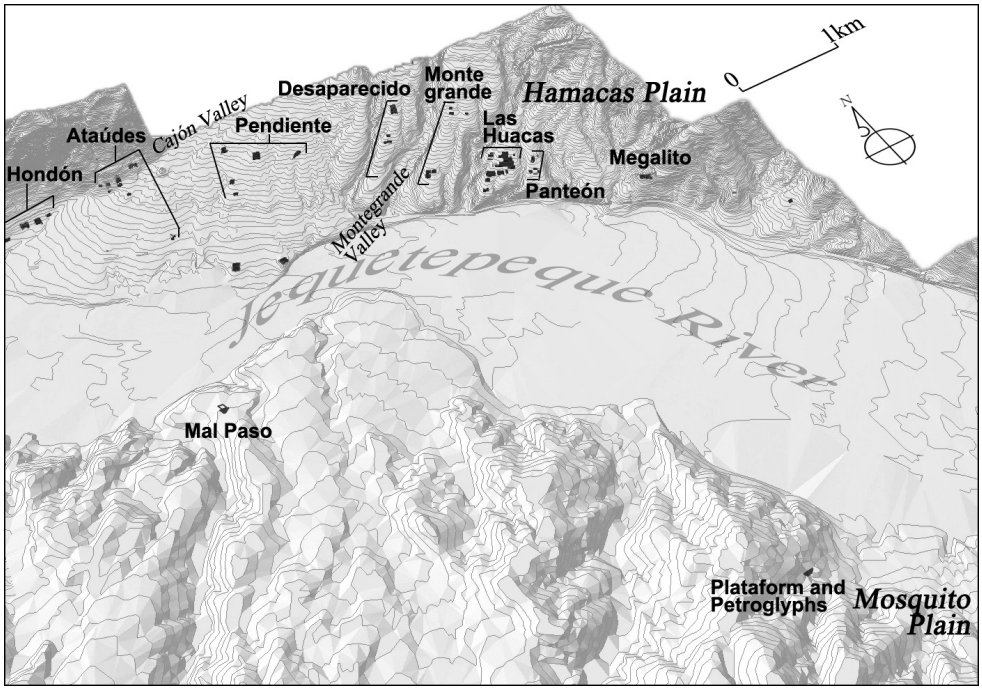


Figure 3.3.

Monumental buildings of the Initial Period in Hamacas Plain and Mosquito Plain.



Chronological study of Hamacas Complex

On starting archeological project of this area in 2003, I posed two research problems; to establish a chronological sequence for such an unusually large number of monumental buildings, and to clarify the functional relationship among them. Five monumental architecture sites were excavated by my project. Among them, Las Huacas site was excavated more intensively because it was the largest in scale and demonstrated the longest sequence of construction phases. Also, I carried out survey inside and around of the Hamacas Plain, including the opposite bank of the river, to detect archaeological remains of the same period.

Based on the results of these researches, I came to realize that the monumental buildings in the Hamacas Plain should be divided into eight clusters of architectural complexes although they had been registered as twenty-three discrete archaeological sites (Ravines 1981). On the opposite bank I found another architectural complex that was chronologically parallel to those of the Hamacas Plain. I have named the assemblage of these nine civic-ceremonial center sites the Hamacas Complex regarding them as remains of a local community that lasted for more than seven centuries during the Initial Period.

Furthermore, I have assigned certain time spans to each architectural complex (Tsurumi 2010:148–154), according to the seriation analysis of pottery associated to each sites, seriation analysis of a wide variety of architectural features (Tsurumi 2010:154–159), and radiocarbon dating. The chronological sequence of the occupation in the Hamacas Complex can be divided into two phases. They are named the Hamacas Phase (early Initial Period, ca. 1500–1250 BC) and the Tembladera Phase (late Initial Period, ca. 1250–800 cal BC), and each of them can be divided in two subphases according to features of architecture and pottery. Based on such a chronological division I reconstructed the history of nine civic-ceremonial centers.

During the Hamacas Phase, five architectural complexes (Hondón, Ataúdes, Pendiente, Desaparecido and Montegrande) were constructed, but all of them did not function simultaneously as civic-ceremonial centers. The earliest center named Hondón was built in the western end of the plain, and the second earliest named Ataúdes was built 700m to the east. Five centers were built sequentially from the west to the east and were abandoned one by one in the same order. I infer that during the Hamacas Phase two centers could have functioned at the same time, assuming a few decades of time lag (Tsurumi 2010, 2014).

In the Tembladera Phase none of the five civic-ceremonial centers built during the former phase continued to function and three architectural complexes (Las Huacas, Panteón, and Megalito) were constructed to the east of them. Las Huacas is the largest site among them because it was renovated more frequently than the others throughout the Tembladera Phase. Furthermore, on the opposite bank of river another center named Mal Paso was constructed in the latter half of the Tembladera Phase.

During the Hamacas Phase, each civic-ceremonial center functioned only for around one century, although those of the Tembladera Phase were maintained for several centuries. In the former phase many centers were built as a result of repeated "location shifts" while the latter phase is characterized by multiple coexisting centers. I infer the background of such a difference of the construction and maintenance activities between two phases as follows.

Frequent location shift of centers of the Hamacas Phase

The process of construction of monumental buildings of Hamacas Complex need to be considered as a result of activities of local inhabitants who had some strategies to convert the natural environment to an artificial one. Utilizing GIS analysis which help us researching ancient topography before the severe destruction caused by

reservoir, I inferred the background of the formation process of Hamacas Phase centers as follows.

The western half of the plain where the earliest centers were situated corresponds to the riverbed of the two tributaries (Montegrande Valley and Cajón Valley) of the Jequetepeque River. Consequently, this zone is richer in water resources than the fluvial terraces of the eastern half of the plain. In the 20th century a modern village called Montegrande once occupied this zone and its inhabitants cultivated the riverbed around their houses. Similarly, I suppose that the three earliest civic-ceremonial centers in this western area (Hondón, Ataúdes, and Pendiente) were arranged next to the cultivated field on the riverbed and were surrounded by residential area of the inhabitants. There are many evidences of agriculture during the Hamacas Phase; pottery sherds from Las Huacas demonstrate manioc starch on its surface of (Tsurumi 2010:163) and monumental platform of Pendiente site was accompanied by a terraced cultivation field (Ravines 1985a:133, 1985b:213). I suppose that the earliest centers were strongly associated with ritual of agriculture and, not only physically but also symbolically, functioned as nuclei of local society.

At the same time, the western half of plain is in peril of flash floods (huaycos) in the times of ENSO (El Niño-Southern Oscillation). In Montegrande and Las Huacas sites of the eastern half of plain, there are evidences of buildings destroyed by this disaster, but GIS analysis indicates that the occupations in the western half must have suffered more severely; especially the earliest two centers, Hondón, and Ataúdes. The difference of topographic condition in the plain caused the location shift of the centers as a result of refuge from natural disaster. But the shift from Desaparecido to Montegrande did not make any sense as protection against flash flood because topographic conditions of them are very similar. Furthermore, some of small platforms of Las Huacas dated to the later part of the Hamacas Phase occupied an even more dangerous location than those of Montegrande.

Through these disastrous events the location shift came to have another meaning. People aimed to create new monumental buildings in relation to ancestor worship. In Montegrande site, after the abandonment of the monumental buildings, some burial towers -probably for deceased local elites- were constructed on them (Paredes 1984; Tellenbach 1986). The other four centers of Hamacas Phase also present burial towers on or beside their platforms (Ravines 1981). During the Hamacas Phase the local inhabitants constructed burial towers near monumental buildings to ritually "close" them. A closed center with burial tower(s) was transformed into a memorial monument to the dead, and a new center offered a view of the anterior one. The earliest two centers (Hondón and Ataúdes) only obtained north-south direction stairway, coincident with the topographic inclination of the plain, while the third (Pendiente) own a platform whose stairway (approximately WNW-ESE) is directed to the former two centers. One who step up to the platform via this stair could see Ataúdes directly ahead. Although Hondón was out of view because it was constructed in a geographical depression, the second earliest center Ataúdes is highly visible and came to be the principal monument to commemorate the ancestors. The fourth (Desaparecido) and the fifth (Montegrande) also equipped the stairway toward the second. As a result, they came to present an almost straight line between the second (Ataúdes) and the fifth (Montegrande)[1]. Therefore, the local history was embodied in the spatial arrangement of the monuments.

Long-term Coexistence of centers of Tembladera Phase

The inhabitants of Tembladera Phase followed this tradition in constructing their own monumental buildings while their strategy was altered as follows. The three

civic-ceremonial centers of the Tembladera Phase (Las Huacas, Panteón, and Megalito) were built to the east of the former five centers and the "straight line" was prolonged consequently. However, these three centers were constructed almost simultaneously, and Las Huacas is the largest complex among them because of more frequent renovation than the others throughout the Tembladera Phase. The coexistence of three centers, their long-term maintenance, and inequality in scale among them, are quite different from the Hamacas Phase centers.

The prominent scale and spatial position of Las Huacas suggest that it had played a special role in the worship for the ancestors of the Hamacas Phase by the people of the Tembladera Phase, and that Panteón and Megalito functioned especially for worshipping the more recently deceased during the Tembladera Phase (Tsurumi 2010:159–161, 2014:214–216). This interpretation is suggested by the absence of tombs inside of the Las Huacas site and the existence of larger burial towers than those of the former phase situated around Panteón and Megalito. From the largest platform of Las Huacas, one can view the closed centers and burial towers of their ancestors of the Hamacas Phase. However, from Panteón and Megalito when one wish to view them, the huge platforms of Las Huacas will inevitably occupy a large area of their field of vision.

Such differences between Hamacas and Tembladera Phases show that the dominant figures of the social organization, namely, elite religious authorities, aimed to reinforce their power by emphasizing continuity derived from worshipped ancestors, possibly on the basis of kinship. By constructing three civic-ceremonial centers, and placing Las Huacas in the principal position among them, they altered the whole of the landscape of the Hamacas Plain. From a broad setting that memorialized their ancestors, they shifted to construct a landscape that represented a more hierarchical social organization. This new approach functioned over several centuries, at least during the the first subphase of Tembladera Phase, possibly because they intended to maintain such a new order.

Not only public buildings, but also the residential area changed. In Montegrande site of the Hamacas Phase, a few comfortable dwellings were found built on the low platforms next to the monumental buildings, and many more simple dwellings constructed directly on the natural plateau surface surrounded them. The former is more resistant to precipitation than the latter. Such a difference is one of the reasons to believe that the local society of the Hamacas Phase was organized hierarchically (Tellenbach 1986). However, dwellings associated to architectural complex of Las Huacas of the Tembladera Phase only correspond to those for the elites. I suppose that the Tembladera residential area was divided geographically by the steep cliff between plain and riverbed; only a few small human groups had lived near the monumental buildings, whereas other community members were distributed among the cultivated land in the bottom of the valley, just like the farming villages of the twentieth century.

Furthermore, the establishment of Mal Paso, the ninth civic-ceremonial center, is an interesting phenomenon in the second subphase of the Tembladera Phase. Mal Paso was intentionally placed in the southern bank to have a direct view of the Hamacas Phase centers on the northern bank and it is reasonable to suppose that the founder of this center shared a special interest to the ancestors with the people of contemporaneous centers (Las Huacas, Panteón and Megalito). However, unlike the hierarchical distribution among three centers on the northern bank, its architectural axis is simply directed toward Ataúdes not considering the presence of Las Huacas. Las Huacas owns two sunken courts with peculiar configuration -the four sides are delimited by two unevenly parallel walls like a bench with a back- and no other centers do not obtain

similar court, excepting the one of Mal Paso. Considering such features, I suppose that Mal Paso insisted on an equal role with Las Huacas in the landscape. These architectural evidences can be considered an "idiosyncratic architectural practice" (Bandy 2004:325) that the founders of Mal Paso derived from the original community controlled by Las Huacas after a fissioning event of occupation.

Concluding Remarks

In this article I attempted to explain the process by which the cultural landscape in the Hamacas Plain developed during the Initial Period. The gradual change of configuration and distribution of monumental buildings since Hamacas Phase until Tembladera Phase signifies that the social change of local community strongly influenced on decision-making on the alteration of natural environment and planning of monumental buildings and, at the same time, the geographical condition and existing monuments stimulated the establishment of religious thought on ancestors, social difference and division of settlement. The extraordinarily dense cluster and wide variety of Initial Period remains in the Hamacas Plain permit me to infer such a process based on archaeological evidences although it is not so simple in other archaeological sites of this period. Therefore, further investigations are needed in this area to complete the local history from the earlier period to the later ones in search of clues to understand the characteristic of artificial environment in the Andes.

Especially, the remains of the previous period are important because in the case of Hamacas Complex we can see the repetition of construction of monumental buildings considering the view of the older ones sequentially. I have mentioned to the Hondón site as the "first" center of the Hamacas Complex, although it does not mean the "first" in this section of the Jequetepeque Valley. Motivated by such an interest, I am carrying forward investigations in Mosquito Plain on the opposite bank. In this plain, Peruvian archaeologists and I have detected, at least, six units of architectural complexes which are considered to have functioned as civic-ceremonial centers. The absence of pottery sherds in their filling suggests that they correspond to preceramic period. According to excavations at these complexes we elucidated that the largest buildings date to 1900-1650 BC, the late Preceramic Period (Tsurumi and Morales 2018). Although from Hamacas Plain one can view a broad part of Mosquito Plain and vice versa, the sequential process of Hamacas Complex cannot be applicated simply to them because the environment and cultural remains are different. In the Mosquito Plain we see no tombs with monumentality like the burial towers of the Hamacas Complex, and clusters of rocks with petroglyphs including very large images with ritual theme, is taking part of the preceramic occupation. Also, earlier exploitations of natural resources than the Hamacas Plain are expected to be detected in the Mosquito Plain. The further researches in Mosquito Plain and landscape analysis will be conducted as a part of the Out of Eurasia project.

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[1]The presence of stairway in Desaparecido site is a hypothesis (Tsurumi 2010: 167) based on an assumption that the Platform 12.16 of this site had possessed such architectural feature although this place had been altered by later constructive activities (Ravines 1981:25-26).

4
LiDAR Mapping of the Tsukuriyama Kofun Group: Research History of Three-Dimensional Surveys

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Located in Okayama City, Tsukuriyama Kofun is the fourth largest mounded tomb in Japan, measuring approximately 350 m in length. In addition to Tsukuriyama Kofun, the Tsukuriyama Kofun Group includes six smaller mounded tombs. These tombs are dated to the Middle Kofun period, or the early 5th century AD. Our project team will conduct three-dimensional surveys of the entire landscape surrounding the Tsukuriyama Kofun Group using UAV LiDAR (Light Detection and Ranging). Previously, Izumi Niiro and the Okayama University Department of Archaeology obtained three-dimensional data of the Tsukuriyama Kofun Group and its surroundings through direct measurement of the ground surface beginning in the 2005 fiscal year. Our project marks the first time UAV LiDAR has been used for a survey of this tomb group.

This paper is divided into three parts. First, I present an overview of the Tsukuriyama Kofun Group, touching upon the layout of the mounded tombs, their chronological positions, and the social structure as seen from the mounded tombs. Second, I introduce the research history of three-dimensional surveys of the tomb group and its environs. Third, I present our outlook for the LiDAR mapping project. I conclude that our LiDAR mapping project will provide detailed data in order to reconstruct the original mound shapes and the surrounding landscape and contribute to the field of LiDAR archaeology in Japan.

Localizada en la ciudad de Okayama, el Tsukuriyama Kofun es la cuarta tumba de montículo más grande de Japón, con una medida de aproximadamente 350 m de largo. Adicionalmente al Tsukuriyama Kofun, el complejo llamado Grupo Tsukuriyama Kofun, contiene seis pequeñas tumbas de montículo. Estas tumbas datan del periodo Kofun medio a principios del siglo V d.C. Nuestro equipo de proyecto realizará estudios tridimensionales de toda el área que rodea al Grupo Tsukuriyama Kofun utilizando UAV LiDAR (Detección de distancia mediante la luz). Anteriormente, Izumi Niiro y el Departamento de Arqueología de la Universidad de Okayama obtuvieron datos tridimensionales del Grupo Tsukuriyama Kofun y sus alrededores mediante la medición directa de la superficie del suelo a partir del año fiscal 2005. Nuestro proyecto es el primero que utiliza UAV LiDAR para el estudio de este complejo de tumbas.

Este artículo está divido en tres partes. En la primera Presento una descripción general del Grupo Tsukuriyama Kofun, haciendo referencia al diseño de las tumbas de montículo, sus posiciones cronológicas

y la estructura social desde el punto de vista de las tumbas de montículo. En la segunda present la historia de la investigación de los estudios tridimensionales del grupo de tumbas y sus alrededores. En la tercera parte present nuestra perspectiva del proyecto de mapeo LiDAR. Concluyo que nuestro proyecto de mapeo LiDAR proporcionará datos detallados para reconstruir las formas originales del montículo y el paisaje circundante, además de contribuir al campo de la arqueología LiDAR en Japón.

Tsukuriyama Kofun[1] (*kofun* is Japanese for "ancient mounded tomb") is the fourth largest mounded tomb in Japan, measuring approximately 350 m in length. Located in Okayama City in Western Japan, the Tsukuriyama Kofun Group is dated to the early 5th century AD and consists of Tsukuriyama Kofun and six smaller mounded tombs (Figures 4.1 and 4.2) Our project team plans to survey the group and surrounding area using UAV LiDAR in 2020. Okayama University previously conducted a digital survey of the Tsukuriyama Kofun Group from fiscal year 2005 to 2009. This pioneering work using 3D data is instructive when preparing our LiDAR mapping project of the mounded tomb group and its environs.

This paper consists of three parts. First, I will introduce the Tsukuriyama Kofun Group, including its location, the layout of its mounded tombs and their chronology, and the relationship between the mounded tombs and settlements. Second, I will provide an overview of research history on three-dimensional mapping of the tomb group. Third, I will present our research plan and outlook concerning the LiDAR mapping project.

1. Overview of the Tsukuriyama Kofun Group

Tsukuriyama Kofun is located at the end of a tongue-shaped plateau extending from the south. Located near the Ashimori River, it was made using the natural land. This area is considered to have been the traditional center of the Okayama Plain during the Yayoi and Kofun periods. The nearby Tatetsuki burial mound, measuring 80 m in length, is the largest mound of the Late Yayoi period, before the emergence of the standardized mounded tombs (*kofun*) of the following Kofun period (Kondō, ed., (*kofun*) of the

Figure 4.1.

Bird's-eye view of Tsukuriyama Kofun (provided by Izumi Niiro; Niiro ed., 2012).

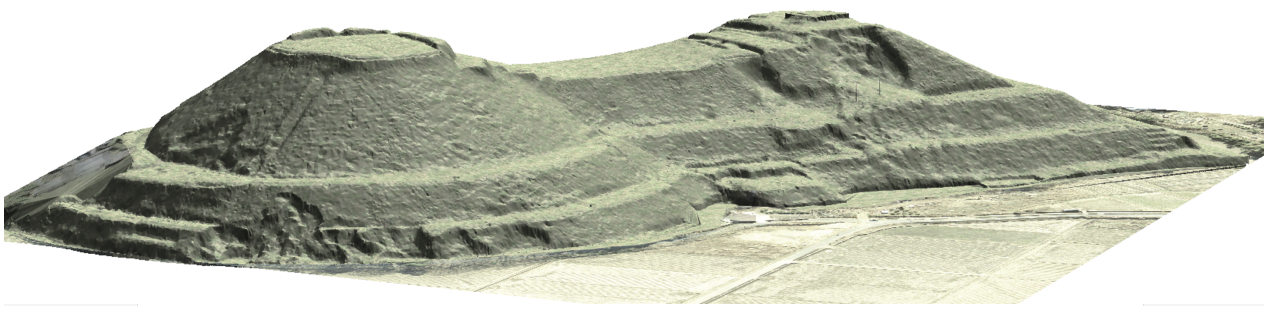
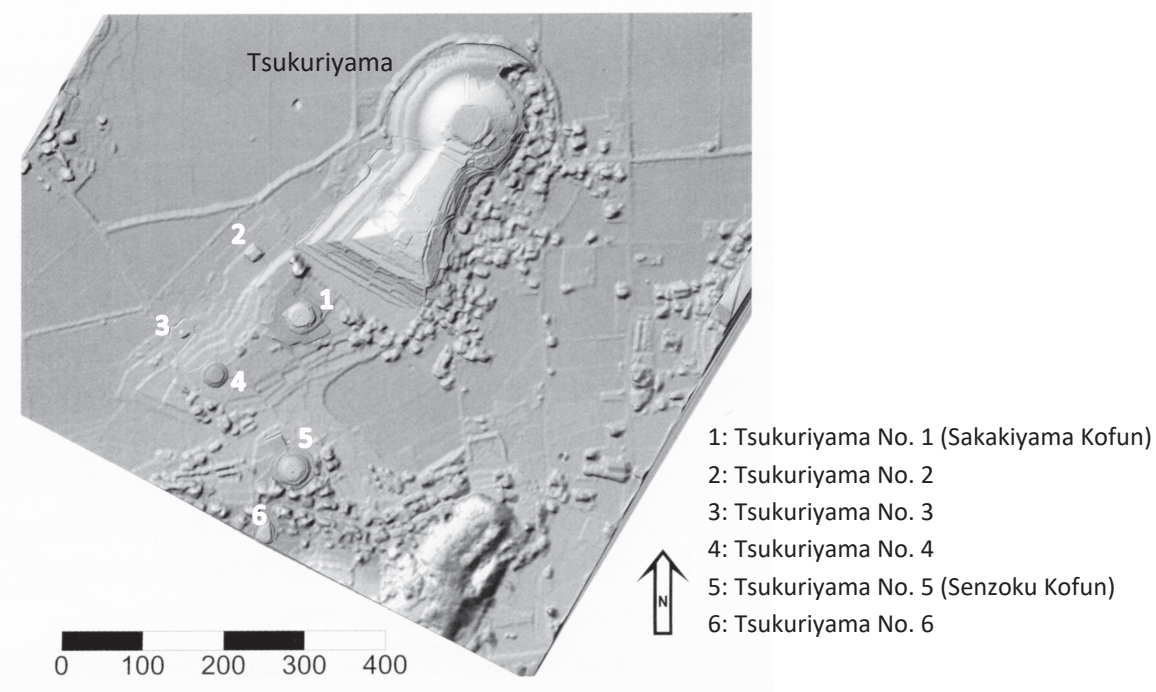


Figure 4.2.

Map of the area surrounding the Tsukuriyama Kofun Group (Teramura, 2012).



following Kofun period (Kondō, ed., 1992), and the nearby Tsudera site is one of the main settlements and rice paddy field sites on the Okayama Plain (Kameyama, 1996).

The location of the 5th-century Tsukuriyama Kofun Group suggests that its construction may have been related to the economy in the area. The San'yōdō, an ancient highway built around the late 7th century AD as a national project, ran between mounded tombs No. 5 and 6 at the southern end of the tomb group. The three major mounded tombs in Okayama Prefecture, namely Tsukuriyama (Zōzan), Tsukuriyama (Sakuzan), and Ryōgūzan, which all belong to the 5th century AD, are all also distributed along this ancient thoroughfare. It can therefore be assumed that this ancient highway played an important role as a traditional traffic route as far back as the 5th century.

As mentioned above, the Tsukuriyama Kofun Group is dated to the first half of the Middle Kofun period, or the early 5th century AD. The latest chronology suggests that it belongs to Phase 6, with some differences in construction period between each tomb within this phase (Yasukawa, 2020). According to the chronology of cylindrical haniwa, Tsukuriyama Kofun and two mounded tombs at the southern end of the group (Nos. 4 and 5) were built first, followed by the two mounded tombs in the northern part (Nos. 1 and 2). The detailed chronological positions of mounded tombs No. 3 and 6 are not clear.

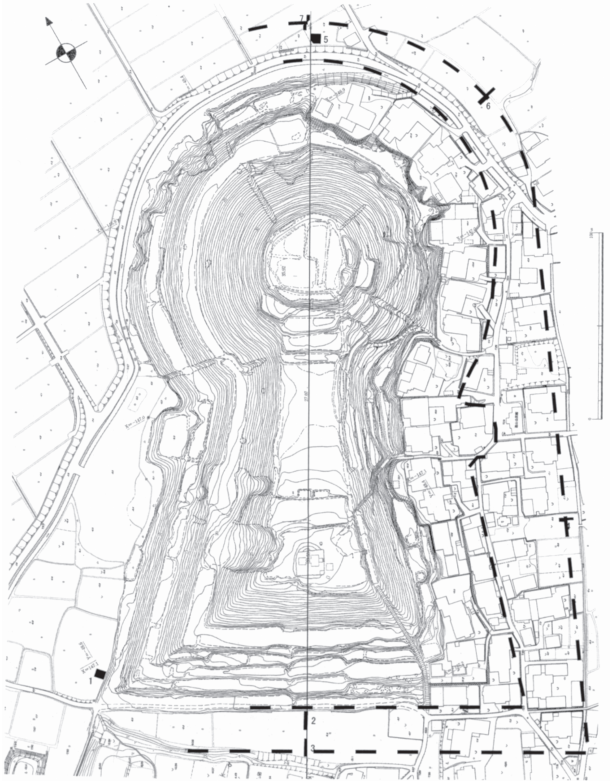
The layout of the *kofun* group is characteristic of the Middle Kofun period, with a main mounded tomb surrounded by several subsidiary tombs located on an open plain. During the preceding Early Kofun period, on the other hand, mounded tombs were generally built atop hills, tucked away within nature. Symbolic meaning associated

with mounded-tomb building may have changed between the Early and Middle Kofun period.

While the burial facility of Tsukuriyama Kofun has not been excavated by archaeologists, the mound was excavated by the Archaeology Department of Okayama University and the Okayama City Board of Education. Excavations carried out by the Okayama University team revealed a surrounding moat (Figure 4.3; Niiro ed., 2012), the existence of which previous scholars had suggested based on the current topography, in particular the rounded shape of the surrounding paddy field.

Figure 4.3.

Reconstruction of the surrounding moat of Tsukuriyama Kofun (Niiro ed., 2012).



Some artifacts found from the Tsukuriyama Kofun Group originated from distant areas. For example, the stone coffin said to be from Tsukuriyama Kofun was made from the tuff of Mt. Aso in Kumamoto Prefecture, Kyūshū (Takagi & Watanabe, 1990). By sea, the distance traveled measures over 600 km. Additionally, the stone chamber of Tsukuriyama No. 5 (also known as Senzoku Kofun) also displays ties to Kumamoto Prefecture and the horse-shaped belt buckle said to be from Tsukuriyama No. 1 (Sakakiyama Kofun) was imported from the Korean Peninsula (Nishikawa, 1986). In this manner, I consider mounded tomb construction to have been a system in which the external was transformed into the internal through the interaction of nature, artifacts, and humans.

As there are no historical documents or findings of directly neighboring settlements, it is not clear who created the Tsukuriyama Kofun Group. A major settlement during the Middle Kofun period may have been located around the Takatsuka site, located approximately 1.4 km north. 38 dwellings have been found dating to the first half of the Middle Kofun period (Hirota, 2000). On the other hand, the area around the Tsudera site, located around 1.0 km to the northeast, was adversely affected by the flooding of the Ashimori River in the latter half of the Early Kofun period, before the construction of Tsukuriyama. At the Tsudera site, while 83 dwellings were uncovered belonging to the Early Kofun period, only one dwelling was found dating to the end of this phase, signaling a drastic decrease (Kameyama 1996). Additionally, only 19 dwellings were found from the entire Middle Kofun period, relegating the Tsudera site from its status as a central settlement to a normal village.

The archaeological data leads us to the following questions: Where did the individual buried in Tsukuriyama Kofun come from? Where did he live? Did he live locally? According to recent research on kinship during the Kofun period, male elite of the political center (the modern Nara

and Osaka Prefectures) were sometimes buried in distant, peripheral regions tied to their matrilineal side (Seike, 2018). The individual buried in Tsukuriyama Kofun, the fourth largest mounded tomb in Japan, may therefore not have lived in what is currently Okayama Prefecture, but rather may have been active in the political center. In such a case, familial ties to the ancient Okayama region would have made possible the construction of these mounded tombs on the Okayama Plain.

2. Research History of Three-Dimensional Surveys of the Tomb Group and its Environs

Professor Izumi Niiro and the Okayama University Department of Archaeology conducted digital surveys of the Tsukuriyama Kofun Group from fiscal year 2005 to 2009 (Niiro ed., 2008, 2012). They used a total station to calculate the XYZ coordinates of the mound surfaces at 50-cm intervals, taking care to accurately reflect subtle changes in topography, such as between the slopes and terraces. It took approximately 120 days for one team consisting of three to four people to calculate 120,000 points at Tsukuriyama Kofun (Niiro ed., 2008, p. 8). The team succeeded in producing a contour map and bird's eye view of Tsukuriyama Kofun. Additionally, using the same method, his team completed measurements on almost all surrounding smaller tombs (Table 4.1).

Hirofumi Teramura produced a digital elevation map for the Tsukuriyama Kofun Group and its environs based on aerial photographs and combined this with XYZ coordinates recorded for each mounded tomb (Teramura 2012).

While we can now utilize 3D laser measurements or photogrammetry to measure sites more easily and quickly, their team's research, based on systematically collected digital points with XYZ coordinates, was nevertheless pioneering. Their thorough recording of ground data ensured actual measurement of the mound surface. On the other hand, this method requires a considerable amount of time and the whole landscape surrounding the Tsukuriyama Kofun Group cannot be easily recorded.

Table 4.1.

Digital measurements of the Tsukuriyama Kofun Group (from fiscal 2005 to fiscal 2009).

Mounded tomb	Mound shape	Length (m)	Method	Measured points
Tsukuriyama Kofun	Keyhole	350	Total station	120,000
Tsukuriyama No. 1 (Sakakiyama Kofun)	Round?	35	Total station	12,025
Tsukuriyama No. 2	Square	40	Total station	2,649
Tsukuriyama No. 3	Round	30	Total station	2,248
Tsukuriyama No. 4	Scallop shell?	35	Total station	7,484
Tsukuriyama No. 5 (Senzoku Kofun)	Scallop shell	81	Total station	13,264
Tsukuriyama No. 6	Round	30	Total station	3,501

3. Outlook for LiDAR Mapping

LiDAR enables us to accurately map the mounded tomb group and surrounding terrain. Three academic questions inform our LiDAR mapping project. The first question is how we can reconstruct the original shape of the mounded tombs. For instance, the topographic data around Tsukuriyama Kofun will be highly instructive in reexamining the extent of the surrounding moat. We will be able to examine the shape of the moat based not only on its planar shape, but also its altitude. The shape of the surrounding moat is important when comparing Tsukuriyama Kofun with the royal tombs located in the Kinki region.

The second question is why this location was chosen for the construction of the mounded tomb group. I view the construction of the Tsukuriyama Kofun Group as being connected to redevelopment activity following the flooding of the Ashimori River. The construction project of the mounded tomb group may have been closely related to the leveling of the tongue-shaped plateau attending the construction of the ancient thoroughfare. The construction process of Tsukuriyama Kofun and the two smaller mounds close to the road, which were built earliest in the tomb group, may have been intimately related to this development project.

The third question is how we can contribute to the field of LiDAR archaeology. Our project team will carry out LiDAR mapping of Tsukuriyama Kofun and its surroundings and analyze the data at our laboratory. In Japanese archaeology, while the entirety or parts of this process have normally been contracted out to surveying companies, we consider it important to conduct the whole process in order to achieve a greater understanding and further develop LiDar applications in archaeology.

We conducted a test flight at Tsukuriyama Kofun in the latter half of March 2020. In the near future, our team will conduct a full-scale mapping covering a 1 km square area over the mounded tomb group.

Note

1. There are two giant keyhole-shaped mounded tombs in Okayama Prefecture whose Chinese characters can be read as “Tsukuriyama”. In order to differentiate these two tombs, an additional reading of their characters is employed: Consequently, the Tsukuriyama Kofun of this paper is often called “Zōzan” Kofun and the other example “Sakuzan” Kofun.

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5
Visualization of Archaeological Structure Data with Astronomical Objects

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We aim to build a light, flexible, and interactive system designed to visualize extensive three-dimensional (3D) archeological structure data combined with the positional data of astronomical objects. Visualizing astronomical objects in the sky and their positions with respect to archeological structures will provide insights into the spatial concepts employed by the builders of such structures. It will also allow us to compare the conceptual developments of civilizations. Visualization allows us to understand how people of ancient civilizations saw the astronomical objects and to explore their conceptual developments of space and the world. We will first examine the tools and technology available today, and then consider what improvements and/or modifications are needed for our purposes.

Nuestra meta es construir un sistema ligero, flexible e interactivo diseñado para visualizar datos extensos de estructuras arqueológicas tridimensionales (3D) combinados con los datos de posición de objetos astronómicos. La visualización de objetos astronómicos en el cielo y sus posiciones con respecto a las estructuras arqueológicas proporcionará información sobre los conceptos espaciales empleados por los constructores de las estructuras. También nos permitirá comparar los desarrollos conceptuales de las civilizaciones. La visualización nos permite comprender cómo la gente de civilizaciones antiguas veía los objetos astronómicos y explorar sus desarrollos conceptuales del espacio y el mundo. Primero examinaremos las herramientas y la tecnología disponibles en la actualidad y luego consideraremos qué mejoras y / o modificaciones son necesarias para nuestros propósitos.

All ancient societies throughout the world have watched the sky. Celestial events and processes were perceived by our ancestors to develop concepts of times and seasons. In antiquity the sky was a part of everyday life and it must have played an important role in developing beliefs about nature and human existence. There are many archaeological studies concerned with possible correlations between the orientations of archaeological structures and astronomical objects and events, such as sunrise/sunset, moonrise/moonset, positions of planets and stars, spatial patterns of stars, and even light and shadow cast by the Sun during the solstices and other particular times. Ample evidence of the orientation of archaeological structures with astronomical objects has been presented in earlier studies (for example, [Belmonte, 2015)], [González-García, 2015], and [Ruggles, 2015b] for the solar, lunar, and stellar alignments, respectively). By analyzing the alignment and orientation of prehistoric monuments, we can interpret the spatial perception of the people, and thereby the society, who built them.

How do we recreate the sky and landscape alignment at a specific time and visualize it? This requires accurate reconstruction of the archaeological structures, the surrounding landscape, and the positions of the celestial objects at that time. Visualization would help us to palpably understand how the people of early civilizations comprehended their environments and how they might have developed their concepts of the "World". There are several commercial software packages which can be used for visualization and analysis of archaeological structures using landscape geographic information system (GIS) data. However, they also need to display the accurate position and motion of celestial objects. On the other hand, there are desktop planetarium programs that can simulate an astronomically correct view of the sky. Most of these allow users to be at any place on Earth at any given time, though they usually use simplified astronomical calculations not suitable for testing the alignments of the distant past (Ruggles, 2015a).

Our aim is to build an accurate and interactive system designed to visualize extensive three-dimensional (3D) archaeological structures with the surrounding landscape and sky. With the help of computer graphics technology, virtual reality (VR) would allow us to walk through the reconstructed archaeological structures and to consider their alignments with the surrounding landscape and the positions of the celestial objects. Since we do not intend to reproduce a software program and/or subroutine already available to us, we began by examining three popular stellar projection software, *StellaNavigator, Mitaka*, and *Stellarium*, to determine their capabilities and accuracy in recreating scenes of the archaeological past. This allows us to ascertain what features need to be added, modified, or improved to best suit our purposes.

Sky Simulation Programs

Sky simulation programs able to simulate the accurate placement and motion of celestial objects in the sky have long been popular among astronomy enthusiasts. Many of these programs are focused on simulation of the sky in relatively recent times and are therefore not suitably useful for simulations of the skies during the archaeological past. Additionally, often it is not easy to obtain information about the algorithms used in such programs, making it difficult to assess their applicability for our purposes. In this study, we chose three popular sky simulation programs for which we have information on the astronomical data used. These are *StellaNavigator*, *Mitaka*, and *Stellarium*, which are readily available in Japan. We compared these programs to determine their applicability and limitations for archaeological use and to assess what further developments and modifications may be needed to make them more

suitable for archaeological studies.

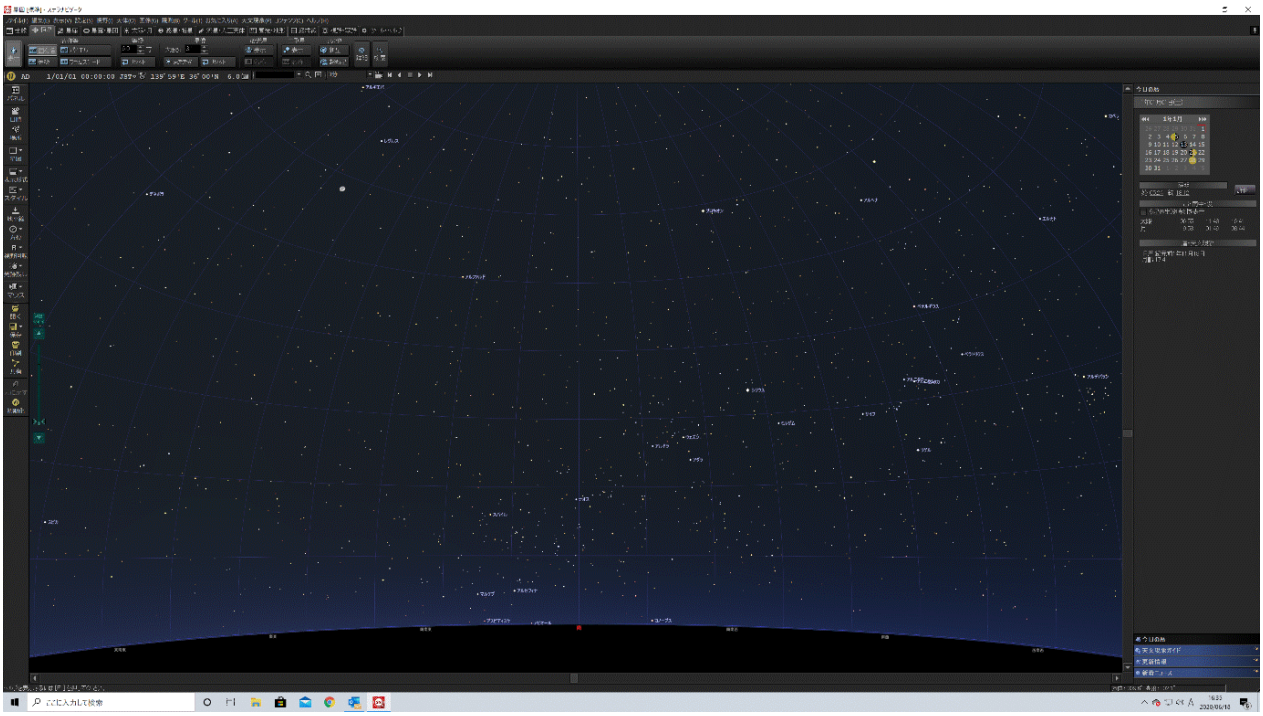
StellaNavigator

StellaNavigator (Figure 5.1) is a popular commercial software sold in Japan since 1992. The current version (Ver. 11) of this fully featured astronomy simulation software allows users to enjoy multimedia planetarium shows, fly through space, and control a telescope. A joystick or gamepad can also be used to control the system. With the use of the PC's GPS receiver, the system can obtain the correct time and current position of the user (i.e., the position of the system in use). It can also simulate the sky for any chosen viewpoint on Earth. For the simulation of celestial objects, *StellaNavigator* claims to be able to calculate star position to 0.1-arcsecond and the Moon and planets to 1.0-arcsecond accuracy in the range of 3000 BC to AD 3000.

For precession correction, *StellaNavigator* uses Newcomb's century-old values of the precession constants (Newcomb, 1895). Astronomers have suspected that there are significant errors in these values and the International Astronomical Union (IAU) adopted new precession quantities at epoch J2000.0 (JED 2451545.0) (Lieske et al., 1977). For proper motion corrections, it uses the latest Hipparcos space astrometry mission data (Damljanovic & Taris, 2019). However, there is no polar motion nor nutation correction. On the other hand, it makes rather precise Delta time (ΔT is the time difference between Universal Time and Terrestrial Time) corrections from the year 1972 to the present time using the United States Naval Observatory

Figure 5.1.

Screenshot of StellaNavigator.



Note. *StellaNavigator* screen view of the sky at the latitude +36 degrees and the longitude 136 degrees at 0 hour on January 1, AD 1. Copyright © 2019 *StellaNavigator* 11, AstroArts Inc.

(USNO) Delta T determinations, and for earlier than 1972 and for future days, it uses NASA's Five Millennium Catalog of Solar Eclipses (Espenak & Meeus, 2006). The position of the Moon and the planets was calculated with perturbations for the period between 3000 BC and AD 3000 (Kudryavtsev, 2007). The estimated error of the position coordinates compared with astronomical calendar DE406 of NASA/JPL (Standish, 1998) is less than one arcsecond.

For landscape simulations, *StellaNavigator* can generate and display a topographic image around the observation point automatically. Topographical data includes 50 m grid domestic elevation data and 1:25,000 scale topographic maps with 50 m altitude grid mesh from the Geospatial Information Authority of Japan (GSI), in addition to global 1 km digital raster data derived from a variety of sources. While this is more or less sufficient to create horizon panoramas, it may not be good enough for the testing of detailed astronomical alignments of archaeological architecture. Additionally, it does not have the option to display reconstructed 3D features.

Mitaka

Mitaka (Figure 5.2) is a free downloadable software that allows users to visualize the universe based on real astronomical data and theoretical studies, and can interactively display various celestial bodies and the hierarchical structure of the universe. It was developed by Tsunehiko Kato of the National Astronomical Observatory of Japan (NAOJ)'s Four-Dimensional Digital Universe (4D2U) Project. The latest version (1.6.0b; currently in Japanese only) was released on May 1, 2020 (Kato, 2020). Mitaka navigates across space from Earth to the edges of the known universe. It is optimized for 3D visualizations on multiple screens, but it can also be used on a single Windows PC. There is a virtual reality (VR) version which is compatible with a head-mounted display. The VR version works as a plug-in for the regular versions (currently works with Japanese version 1.5.1 and English version 1.4.1a). Users can navigate in *Mitaka*'s VR space with a game controller, such as the DualShock for Sony PlayStation, with the JC-PS201USV USB adapter by ELECOM or the SMART JOY PAD 3 PlusN by SKnet.

Mitaka employs the IAU 2000/2006 precession-nutation procedures (Capitaine & Wallace, 2007) to correct Earth's precession and nutation for the period between AD 1800 and AD 2200. Outside of this period, it uses the precession expressions by (Vondrák et al., 2011), which are valid for long time intervals with an accuracy comparable to IAU 2006 around the central epoch J2000.0, a few arcseconds throughout the historical period, and a few tenths of a degree at the ends of the ± 200,000 year time span. The Earth's axial tilt is taken from (Capitaine et al., 2000). The ΔT is corrected using (Stephenson et al., 2016) for 720 BC to AD 2015, with years outside this range corrected using polynomial expressions for delta T (ΔT) from (NASA, 2004). The positions of the Earth in the range of 13,000 BC to AD 17,000 and the Moon in the range of 3000 BC to AD 3000 are adapted from (Kudryavtsev, 2016) and (Kudryavtsev, 2007), respectively. For the planets, ephemerides of planets between AD 1900 and AD 2100 by (Chapront & Francou, 1996) are used.

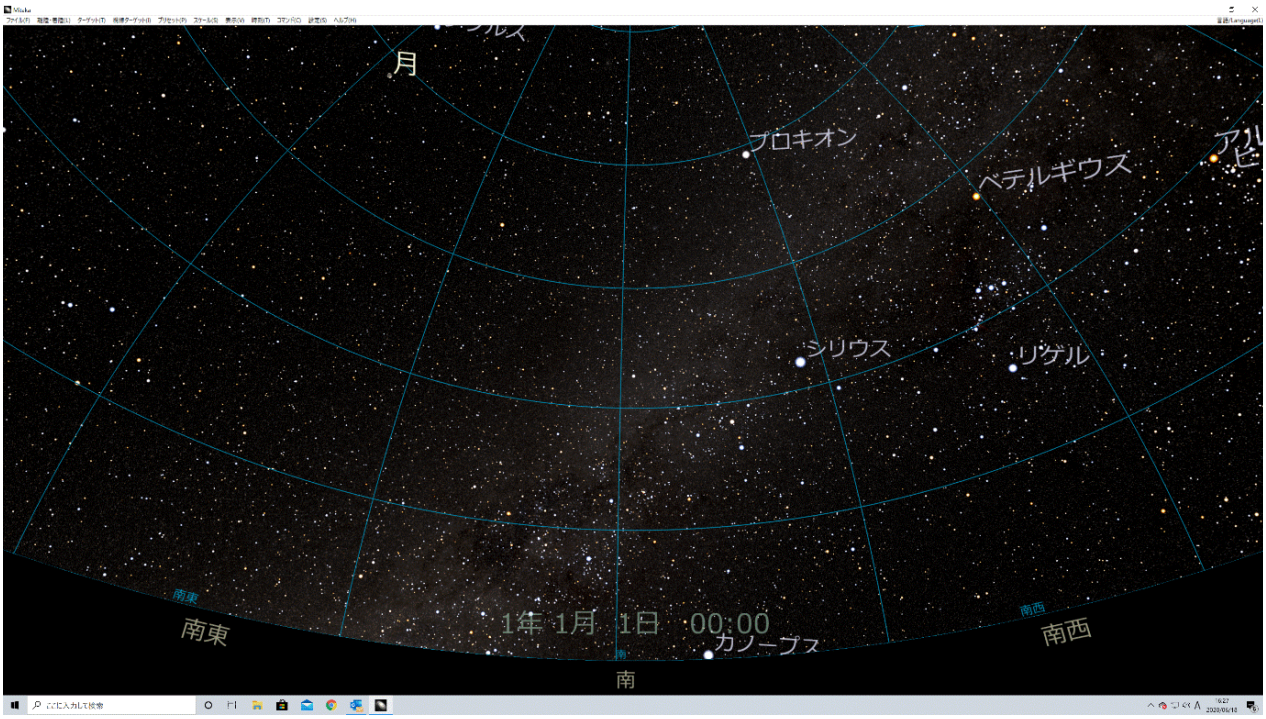
For the Earth's landscape information, GTOPO30 from the U.S. Geological Survey (USGS; U.S. Geological Survey, 1997) is used. Because *Mitaka* focuses on maneuvering in outer space, not much attention was given to the virtual reconstruction of landscape or features on Earth.

Stellarium

Stellarium (Figure 5.3) is a popular open-source desktop planetarium software package originally developed by Fabien Chéreau and others in 2000. *Stellarium* has been

Figure 5.2.

Screenshot of Mitaka.



Note. Mitaka screen view of the sky at the latitude +36 degrees and the longitude 136 degrees at 0 hour on January 1, 1 AD.

Copyright © 2020 *Mitaka* Version 1.6.0b. NAOJ

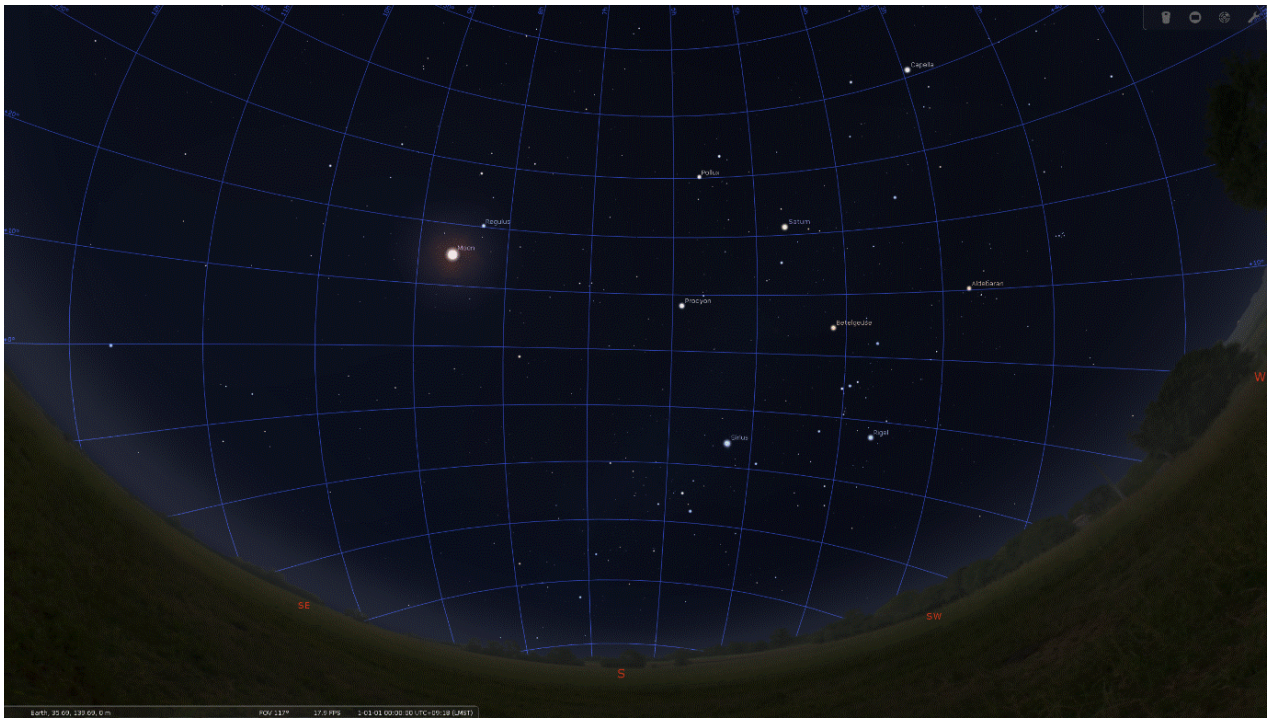
further developed and used extensively for archaeological applications by Georg Zotti (Zotti, 2016a; Zotti & Wolf, 2018). With various plugins, *Stellarium* can project celestial objects, visualize reconstructed 3D architecture, and recreate the past landscape anywhere and at any given time. It can simulate shadows cast by the Sun and Moon on the reconstructed archaeological features.

The latest version, *Stellarium* 0.20.1 (Zotti, 2020), uses precession corrections by (Vondrák et al., 2011) and IAU2000B nutation (McCarthy & Luzum, 2003), though nutation is only computed for ± 500 years around J2000.0. Positions of the planets are calculated using analytic model VSOP87 (Bretagnon & Francou, 1988) and its use is recommended for 4000 BC to AD 8000. However, as an option, for the range between 13,000 BC and AD 17,000, JPL DE431 (Folkner et al., 2014) can be used for much more accurate planet positions. The ΔT is corrected using, by default, (Espenak & Meeus, 2006). Additionally, *Stellarium* offers several ΔT models which the user can choose from.

The Scenery 3d plugin was released with *Stellarium* 0.13.3 in 2015 (Zotti, 2016b). The current Version 0.20.1 (Zotti, 2020) allows architectural 3D models to be embedded into the landscape. It allows users to walk through reconstructed structures and confirm the astronomical alignment of the structures. This plugin also simulates the shadows of the scene's structures cast by the Sun, Moon, and even Venus. Furthermore, it has a plugin called ArchaeoLines which displays any combination of declination (δ) arcs, such as the declinations of equinoxes,

Figure 5.3.

Screenshot of Stellarium.



Note. Stellarium screen view of the sky at the latitude +36 degrees and the longitude 136 degrees at 0 hour on January 1, 1 AD.

Copyright © 2020- *Stellarium* 0.20.1.

declinations of the cross-quarter days, declination of the Zenith passage, current declination of the Sun, current declination of the Moon, etc.

Discussion

The tools of archaeology continue to change and evolve as new questions arise, bringing with those changes many technological challenges. In response to those challenges, the toolkit of archaeology is also changing. Whether or not archaeological structures were built in connection with astronomical orientation patterns can be tested visually, using accurate virtual recreations of the archaeological site with astronomically correct simulated positions of the celestial objects. With the help of computer graphics technology, such 3D visualization can be achieved.

There are two possible ways forward in developing a system for the testing of possible correlations between the orientation patterns of archaeological structures and celestial objects. One is to add an accurate background astronomical simulation to the landscape visualization programs; the other is to add landscape and archeological structures to astronomical simulation programs. In this study we took the latter approach, because there are many astronomical simulation packages that allow calculations of the accurate position and movement of celestial objects and the ability to project them on monitors and screens. We compared three popular astronomy simulation software.

Each of the three programs examined was developed for slightly different applications. *StellaNavigator* is for an individual user on a desktop PC and mobile terminal. *Mitaka* is mainly for a dome theater focused on visual rendering performances and has versions for 3D and

virtual reality (VR). *Stellarium* was originally developed for the desktop PC and now has a mobile and Web version. All three programs apply various corrections achieving accurate views of the sky in past centuries. Though it depends on the degree of accuracy required, for at least a rough approximation, these are adequate to test the astronomical circumstances surrounding the archaeological structures.

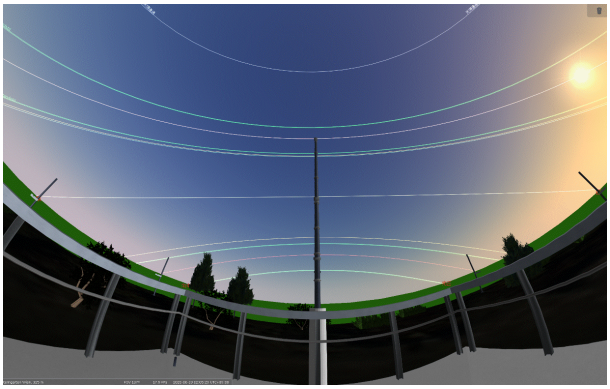
To combine the landscape and the sky view, *StellaNavigator* allows users to project a skyline, which was created using the topographical data, or a 360-degree panoramic picture taken from a fixed viewpoint. *Mitaka* uses the global 1-km digital raster data (USGS) to draw the horizon. Only *Stellarium* is equipped with a sophisticated 3D landscape plugin, called Scenery3d (Zotti, 2015, 2016b, 2019; Zotti et al., 2019), which allows us to incorporate 3D structure and landscape models into the sky view (Figure 5.4).

Over the last decade, Zotti and his collaborators have developed and improved *Stellarium* for use in archaeological studies (Zotti et al., 2019). They successfully applied *Stellarium* to archaeoastronomical simulations of Middle Neolithic Circular Ditch Systems (Zotti, 2016a; Zotti & Neubauer, 2012), the MayaArch3D project (Zotti, 2016b), and Hadrian's Villa (Frischer et al., 2016). Because *Stellarium* is an open-source software, it allows modifying and/or adding new plugins without any license agreement. Additionally, while *StellaNavigator* and *Mitaka* are good for astronomical displays, they require more development to display architectural 3D models. We therefore chose *Stellarium* for further investigation in developing our customized system.

The Scenery3d plugin for *Stellarium* enables users to load 3D models of architecture with the surrounding landscape into an astronomical background simulation. It also allows users to walk through the simulated architectural 3D models and investigate the potential astronomical orientation of the structures. Scenery3d uses Wavefront Technologies' OBJ file format, which stores geometric objects and 3D data. For the 3D archaeological structure data, the actual measurement data can be used (for example, in the CAD format). For the GIS-based landscape modeling, we could use GTOPO 30 or NASA's Shuttle Radar Topography Mission (SRTM) data for a coarse landscape. If available, LiDAR data would provide a finer and better landscape model.

Figure 5.4.

Screenshot of a sample Stellarium simulation.



Note. Stellarium simulation showing *Sterngarten* (Star Garden) of Vienna with ArchaeoLines plugin, which shows declinations of equinoxes, declinations of the cross-quarter days, declination of the Zenith passage, declination of the Nadir passage, declination (δ) of the currently selected object, etc. Copyright © 2020 *Stellarium* 0.20.1.

Conclusions

We examined three popular astronomy simulation software, *StellaNavigator, Stellarium*, and *Mitaka*, for their suitability in investigating the possible alignment of archaeological structures and celestial objects and events. While all three software can accurately model the sky from centuries past, *Stellarium* offers a better option

for modeling 3D architecture within the surrounding landscape. Furthermore, as *Stellarium* is an open-source software, it can be freely modified to suit our specific needs. While *Stellarium* is currently offered for PC, mobile phones, and the Web, no VR versions are available. The next stage of our project is to construct an OBJ file for a sample archaeological site in Japan and develop a VR version which can be used on-site. Visualizing 3D models with the simulated sky has the great potential to allow researchers to address questions about the possible alignment of archaeological structures and celestial objects.

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6
Toward a Comparative Analysis of the Facial and Bodily Representation of Anthropomorphic Artifacts

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How art and technology connect mind, body, and society is one of the key issues of the Out of Eurasia project. In order to investigate how people make things and things make people, it is necessary to undertake an integrative analysis of "art" as the technological aspect which extends human physical functions, along with the artistic aspect which manipulates people's minds by evoking symbolic meanings and engaging emotion. This project aims to elucidate the nature of the generation and transformation of "art" in the processes of the development of civilizations. Through comparative analysis of actual cases from the Japanese Archipelago, Mesoamerica, the Andes, and Oceania, we hope to examine how the two aspects of art are integrated through the body and how they are related to the transformation of society and culture. A comparative analysis of anthropomorphic artefacts is one of the core research projects, as they are a rich source of information about technology, identity, gender, and social structure. Mesoamerica and the Japanese Archipelago are two of the areas where the production of prehistoric anthropomorphic figurines was prominent. I briefly discuss similarities and differences between the Pre-Classic/Formative Mesoamerican figurines and the Jōmon figurines as a starting point for further comparative research.

Uno de los temas clave del proyecto "Fuera de Eurasia" es cómo el arte y la tecnología conectan la mente, el cuerpo y la sociedad. En la investigación de cómo las personas hacen cosas y las cosas hacen a las personas, es necesario emprender un análisis integrador del "arte" como el aspecto tecnológico que extiende las funciones físicas humanas, junto con el aspecto artístico que manipula la mente de las personas al evocar significados simbólicos y comprometer emoción. Este proyecto tiene como objetivo esclarecer la naturaleza de la generación y transformación del "arte" en el proceso del desarrollo de las civilizaciones. Mediante el análisis comparativo de casos reales del archipiélago japonés, Mesoamérica, los Andes y Oceanía, esperamos examinar cómo los dos aspectos del arte se integran a través del cuerpo y cómo se relacionan con la transformación de la sociedad y la cultura. Un análisis comparativo de los objetos antropomórficos es uno de los proyectos centrales de investigación, ya que son una rica fuente de información sobre tecnología, identidad, género y estructura social. Mesoamérica y el archipiélago japonés son dos de las áreas donde la producción de figurillas antropomorfas prehistóricas fue prominente. Discuto brevemente las similitudes y diferencias entre las figurillas mesoamericanas preclásicas / formativas y las figurillas de Jōmon como punto de partida para futuras investigaciones comparativas.

How art and technology connect mind, body, and society is one of the key issues of the "Out of Eurasia" project. The development of a sophisticated artistic style was among the ten archaeological criteria of civilization proposed by Vere Gordon Childe (1950). It sounds intuitively right when you think about a number of complex, state-level societies, such as the Old Kingdom of Egypt, the Shang Dynasty of China, or the Classic-period Maya. However, criteria concerning art are not common among more recent lists of the criteria of civilization, which refer instead to highly developed handicraft specialization (Adams, 1966; Kradin, 2006; Renfrew, 1972). While handicraft specialization certainly covers an important part of art/technology, the emotional, cognitive, and meaningful power of artifacts often fails to garner sufficient attention. The inseparable relationship between artifacts and humans has been actively debated in archaeology with theoretical concepts such as phenomenology, materiality, and entanglement (e.g., Hodder, 2012, Ingold, 2007, Thomas, 2006). In order to investigate how people make things and things make people, it is necessary to conduct an integrative analysis of "art" as the technological aspect that extends human physical functions, in addition to the artistic aspect that manipulates people's mind by evoking symbolic meanings and engaging emotion. Hereafter in this article, the word art is used to mean both aspects.

A distinction between art and technology has often been assumed in the analysis of material culture: Technology is for making useful tools, while art is for making beautiful or meaningful things. However, the English word "art" is derived from the Latin *ars*, which corresponds to the Greek *techne*, meaning skill or technology. This is not surprising as we surely feel beauty in even functional artifacts if they are produced with excellent skill, such as finely made bifacial spear points. Sophisticated skill is one of the factors which moves our mind, and you can recognize it not only by observing the process of production but also by looking at the products. Additionally, skill is acquired through practice which engages both body and mind.

The creation of visual symbolic images has often been considered as a typical example of art, being different from the production of functional tools. Nevertheless, it involves both physical and cognitive processes that have evolved as biological adaptation, as the visual symbolism seems to have derived from our ancestral capacity to attribute meanings to visual images, such as animal foot prints (Mithen, 1996b). In addition, creation of art usually involves the utilization of one or more materials, taken from the natural world, such as stone, clay, and metal. Thus, the production and appreciation of art are widely embedded in our body, mind, and the world around us.

This project aims to elucidate the nature of the generation and transformation of "art" in the processes of the development of civilizations. Through comparative analysis of actual cases from the Japanese Archipelago, Mesoamerica, the Andes and Oceania, we hope to examine how the two aspects of art are integrated through the body and how they are related to the transformation of society and culture.

Significance of Anthropomorphic Artifacts

A comparative analysis of anthropomorphic artifacts is one of our core research projects, as they are a rich source of information about technology, identity, gender, and social structure. "The human body has provided a model for conceptualizing and categorizing the organization of natural, social, and cosmic spaces" (Rice, 2019, p.5) .

Anthropomorphic things are generally appealing to us because they are at the nexus of two kinds of cognitive domains: Social and technical (Figure 6.1). Although there are significant disagreements on the definition and understanding of cognitive domains or modules, it is safe

to say that a number of innate domain-specific systems that have evolved in the course of human evolution are at the basis of our cognition and behavior (Hirschfeld Gelman, 1994; Mithen, 1996a). Social cognition is an essential domain which significantly evolved in the genus *Homo*. Social cognition consists of a number of skills including, but not limited to, recognition of social relationships and communication signals, such as facial expressions, and understanding other's intentions. Our brain has neural systems for such skills which are activated when we see people, and the same system may be engaged when we see anthropomorphic artifacts. At the same time, if you recognize that the figurine is an artifact, it also activates the domain for technological cognition: You recognize that the object was made by some other person, you can appreciate how well or poorly it was made, and you may be able to read the intention of the person who made it. If you were experienced in making figurines, you would be able to judge technical details from the observation of the item and may also sympathize with the bodily movements of the maker.

Thus, anthropomorphic artifacts have a unique potential as a research subject with multi-layered, complex meanings. And we may be able to further consider that production of certain kinds of figurines actually affected social cognition within the society.

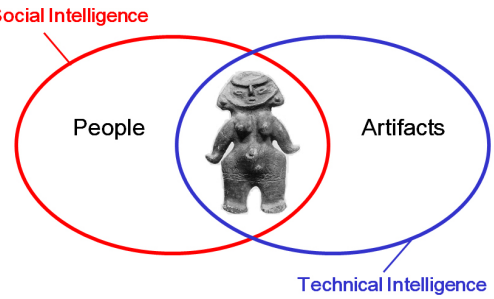
Comparative Analysis of Clay Figurines

Production of clay figurines is widely seen in early agricultural societies across the world, and traditionally dominant research perspectives have focused on their universal feature of femaleness (e.g., Gimbutas, 1991). That figurines tend to be found as fragments from domestic contexts has also attracted researchers' attention (Chapman 2000; Lesure, 2011). Comparative analysis of figurines focusing on their universal features has been criticized for its failure to properly interpret their representational and contextual diversity. We therefore need comparative research that focuses on that diversity, and how these figurines were integrated into the transformation of the world.

An important aspect of the anthropomorphic figurines is that their representation is not a carbon copy of reality. The creation of anthropomorphic figurines is one of the unique features of *Homo sapiens*. The earliest undisputed representation of human form is the Venus of Hohle Fels, which could date back to 40,000 years ago (Conard, 2009). The Lion Man figure of the Hohlenstein-Stadel is contemporary to, or even earlier than, the Hohle Fels figurine. It should be noted that neither of these earliest examples is a realistic representation of human form; the breasts, stomach and vulva are exaggerated, while the head and feet are minimized on the Hohle Fels figurine, and the Hohlenstein-Stadel example has a lion's head on a human body. It is fascinating that these early examples clearly deviate from actual human form. Human representations reflect the cognitive traits and schema of the person who makes them (see the chapter by Saito in this volume). Thus the features of anthropomorphic figurines can provide us with clues for understanding how humans recognize other humans.We therefore need a theoretical standard to interpret particular features of the figurines in order to go beyond arbitrary, ad hoc interpretation.

Figure 6.1.

Anthropomorphic artifact at the nexus of two cognitive domains.



Among many possible factors that cause the deviation from reality is the peak shift effect (Ramachandran & Hirstein, 1999). The concept of peak shift comes from a well-known principle in animal discrimination learning. If a rat is taught to discriminate a square from a rectangle and is rewarded for responding to the rectangle, it will soon learn to respond more frequently to the rectangle, and the rat's response soon becomes greater to rectangles that are longer than the original stimulus.

Selective accentuation of the female form—attributes that allow one to discriminate it from a male figure—can be more evocative and appealing than realistic representation, as "supernormal stimuli" "excite form areas in the brain more strongly than natural stimuli" (p. 39). Referring to the bronze figure of the Goddess Parvati as a caricature of the female form, Ramachandran and Hirstein argue that the artist has chosen to amplify the "very essence" of being feminine by moving the image even further along toward the feminine end of the female/male spectrum. They even suggests that this may be applied to the Palaeolithic Venus "fertility" figures.

In reality, the super-feminine type is not the majority among Jōmon figurines. Therefore the peak shift effect in terms of sexual features does not seem to provide a useful model for the comparative analysis of figurines. From an anthropological perspective, we need to be mindful that the concept of women/men or feminine/masculine varies across cultures. However, if we take the peak shift effect in wider sense, we notice other kinds of "selective accentuation" on figurines, such as extremely large eyes. We may be able to build a database of when and how such selective accentuation occurred in each region/period, and then analyze their correlation to socio-cultural factors.

Facial cognition is another candidate to inform our theoretical standard for comparing these very different datasets. Depiction of the face is important and a specific part of our brain is devoted to facial cognition; additionally, cognitive processing can be automatically activated when we see anything that looks like a face. It is not always easy to differentiate universal cognitive processes from culturally specific processes, but facial cognition is one of those processes that has been proven to be quite universal through numerous scientific studies conducted in the more than one hundred years since its first proposal by Charles Darwin (Darwin, 1872). Darwin's idea of universality in facial expression has been supported by many cases and examinations (Eibl-Eibesfeldt, 1970; Ekman, 1973).

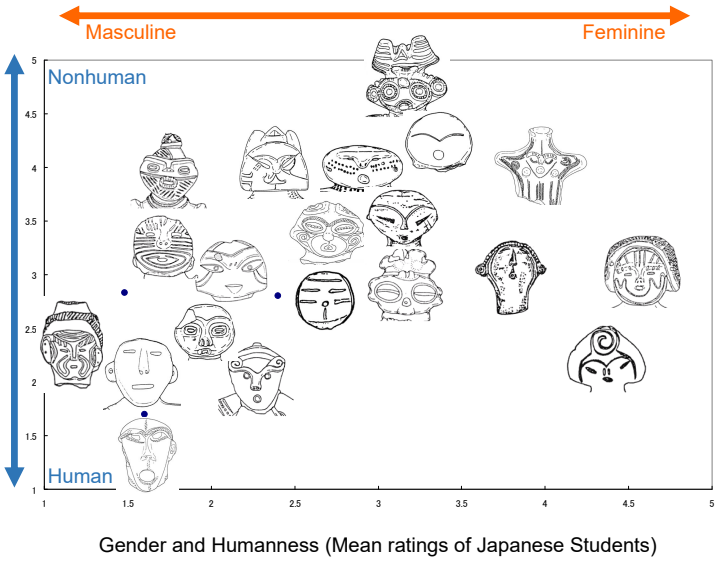
While the universality of facial cognition has been studied on actual human faces, little research has been done on the faces of anthropomorphic objects. Our experimental research showed that we see the faces of figurines as we see the faces of real people (Matsumoto & Kawabata, 2010). In our experiment, 30 drawings of the faces of Jōmon figurines were shown for 30 seconds each on a computer screen, and subjects were asked to rate six basic emotions (anger, surprise, fear, happiness, disgust and sadness) and five general impressions (including feminine/masculine and human/nonhuman) for each face. 32 Japanese students and 17 non-Japanese students took part in the experiment.

It is interesting that, although many figurines are recognized as representing women based on their bodily features, in terms of facial impression, most of them tend to be regarded as masculine except for a few cases. It also shows that the faces that don't look human cannot be gendered consistently. The results of masculine-feminine and human-nonhuman impressions were similar between Japanese students and non-Japanese students, indicating that gender identification and the rating of humanness can be more robust and cross-cultural universals compared with subtle emotion readings (Figure 6.2).

The results show that there are certain common perceptions of figurine faces, however unrealistic they are,

Figure 6.2.

The result of masculine-feminine and human-nonhuman impressions of the Jōmon figurine faces.



Note. Two samples on the far left and far right are taken from anthropomorphic burial jars of the Yayoi period, representing male and female respectively. Not all samples are shown on the graph due to space limitations. See Matsumoto and Kawabata (2010) for details.

based on our innate facial cognition system. Thus, although we cannot directly infer how Jōmon people perceived the figurine faces, we may be able to suggestthat some figurines activate the emotion reading process more than others. Such differences are likely to be related to the function and meaning of the figurines.

At the same time, the results make us more conscious and specific about the differences in perception between people of various cultural backgrounds. This is also an important aspect of this study in regard to understanding the nature of archaeological description and discussion in a globalized archaeology.

While culture-dependent variability is an essential aspect of human cognition, certain universality does exist. The cognition of facial features and reading emotions are known to be a relatively robust innate system which has a long evolutionary basis. Comparing the facial and bodily features of clay figurines will clarify if there is any universal nature in the context and background of their production. We can then investigate how differences in their representation are related to the construction of a particular niche or mind-matter interactive sphere in each region.

Comparing the Figurines from Mesoamerica and the Japanese Archipelago

Mesoamerica and the Japanese Archipelago are two of the areas where the production of prehistoric anthropomorphic figurines was prominent. There has been a long, rich history of research concerning the figurines of each area. Typological classification was dominant in the early stages in both areas, but various theoretical approaches have activated new research avenues for Mesoamerican figurines in recent years (e.g., Halperin et al., 2009; Joyce, 2003; Lesure 2011; Marcus, 2019; Rice, 2019). Their arguments on symbolism, agency, identity, practice, and gender provide us with a sound foundation

for our comparative analysis. Although they are widely different data sets in terms of chronology, social context, economic back ground, production techniques, and representation, a systematic comparison should provide us with many new insights about the meaning behind their similarities and differences.

Roughly speaking, figurines of both areas fit into the universal scheme that figurines appeared in village societies preceding the rise of cities and civilizations (Rice, 2019, p.6). In terms of dates, anthropomorphic clay figurines appeared much earlier in Japan. One of the earliest examples is from the Aidani-kumahara site in Shiga Prefecture and belongs to the latter half of the Incipient Jōmon period (Figure 6.3). The figurine was found from one of the large pit houses. AMS dating of carbon samples taken from the surface of pottery sherds found from the pit house indicates that the figurine dates to around 11,000 cal BC (Matsumuro & Shigeta, 2014). The number of Incipient Jōmon figurines is small with only one or two pieces from a single site. It should be noted that the figurines are found from settlement sites with pit house structures when the dominant life style of the period was foraging (Matsumoto, 2011). Figurines were made through the Jōmon period, but declined when wet rice cultivation spread in the following Yayoi period (800 BC–AD 250). In Mesoamerica, on the other hand, clay anthropomorphic figurines appear around 2500 BC and flourished in the Pre-Classic/Formative period (1500 BC–AD 250).

Figure 6.3.

Figurine from the Aidanikumahara site, Shiga Prefecture. Incipient Jōmon-Period (c. 11,000 cal BC).
Shiga Prefectural Archaeological Center. Photograph by Satoru Nakazono.



Although it is beyond my ability to grasp the details of all the Mesoamerican figurines, I conducted a tentative examination of similarities and differences between the Pre-Classic/Formative Mesoamerican figurines and the Jōmon figurines as a starting point for further comparative research.

Like many other examples of figurines throughout the world, the earliest examples from these two regions are small, solid figurines and many of them have female features such as breasts. Figurines from the Incipient Jōmon to the Early Jōmon Period (5000–3300 cal. BC) lack representation of heads, faces, arms, and legs. Representation of these features appear from the Middle Jōmon Period (3300–2400 cal. BC). The oldest Mesoamerican figurine (2300 ±110) from Zohapilco also lacks a head and arms, while another figurine found from an upper layer of the same site has eyes, a nose, and arms (Marcus, 2019). The torso-centric tendency seems to be common, although further examination of the materials is required. An interesting difference in the emergence process is that figurines appeared prior to pottery in Mesoamerica, while pottery precedes figurines by about 4000 years in Japan.

Larger, hollow figurines appear in later phases, while the production of solid figurines can be seen over an extended period in both areas, and stylistic variation in the representation of the face, body, hair, ornaments, and clothes increases in relation to increasing population size and developing social complexity. It is also common that a majority of the figurines are found scattered as fragments from domestic contexts, with some exceptional

cases buried whole. An interesting difference is the unique development of mold-made figurines and effigy musical instruments in Mesoamerica. In Japan, on the other hand, mold-made figurines appeared only in modern times, and anthropomorphic musical instruments are rare. Some hollow figurines with a stone or clay ball inside have been found and are considered to be bells, but they make only a soft sound. Difference in the representation of facial and bodily features is also intriguing. For example, representation of pupils is rare in Japan but popular in Mesoamerica. Eyes with pupils and eyes without them leave very different impressions on the viewer. In addition, Mesoamerican figurine faces look more realistic than those of the Jōmon figurines in general (Figure 6.4).

Figure 6.4.

An example of a highly stylized Jōmon figurine from the Hirohata shell midden, Ibaraki Prefecture. Latter phase of the Late Jōmon Period (c. 1300 cal BC). H.14.2cm. Okayama University Archaeologycal Museum. Photograph by author.



Prospects

Through archaeological, anthropological, and psychological analyses of the phenomenon by which the environment is humanized, and humans are artificialized through art, I hope to clarify the historical process by which unique social realities are formed. In addition to the anthropomorphic artifacts discussed here, pottery making, metal working, lacquer production, tattooing, and development of patterns and designs are to be investigated by our research group. In order to examine how culture is produced through the interaction of mind and matter, we need a perspective that places the focus on the human body and behavior. Avoiding both biological determinism and extreme cultural relativism, we strive to overcome the dualistic mind-body and mind-matter frameworks that have formed the basis of modern science. Through close transdisciplinary collaborations and the utilization of various technologies such as 3D modeling and XRF analysis, we will explore "art" as an extension of both body and mind in order to clarify how material culture exerts its force on us.

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7
Warfare, Art, and Monuments in the Process of Social Complexity Within the Prehistoric Japanese Archipelago

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This paper reconstructs the process of increasing social complexity in the prehistoric Japanese Archipelago through cognitive analysis of the archaeological evidence for warfare, art, and monuments. Evocative and biotic designs on pottery and communal monuments, such as circles and enclosures, gradually gave way to regular patterns on metal objects and individual monuments, such as burial mounds. This change is interpreted as revealing a significant shift in the material expression of the prevailing worldview and in the manner in which artificial environments were constructed: From communal approaches by egalitarian foragers with little conflict to individual approaches by agricultural communities characterized by social stratification and political integration accompanied by verbal and material representations of warfare. This change is considered to have encouraged the development of complex societies that were mediated by the body and internal cognition, rather than by external relationships between groups.

Este artículo reconstruye el proceso de crecimiento de la complejidad social en el prehistórico archipiélago japonés, mediante el análisis cognitivo de la evidencia arqueológica de la guerra, arte y monumentos. Diseños bióticos y evocativos en la cerámica y monumentos comunales, como círculos y recintos, fueron dando paso gradualmente a patrones regulares en objetos metálicos y monumentos individuales, como túmulos funerarios. Este cambio se interpreta como la revelación de un cambio significativo en la expresión material de la cosmovisión predominante y en la forma en que se construyeron los entornos artificiales: Desde la perspectiva comunal de recolectores igualitarios con poco conflicto hasta la perspectiva individual de comunidades agrícolas caracterizadas por la estratificación social y la integración política, acompañadas de representaciones verbales y materiales de la guerra. Se considera que este cambio impulsó el desarrollo de sociedades complejas, que fueron mediadas por el cuerpo y la cognición interna, más que por relaciones externas entre grupos.

Warfare, art, and monuments are the most remarkable elements of material expression of prehistoric societies increasing in scale and complexity toward archaic states and empires, which are characterized by an institutional structure. This paper aims to reveal the emergence and transformation process of these three elements and the relationship between them. By doing so, the author reconstructs the process of social complexity in the prehistoric Japanese Archipelago.

First, the author presents the chronological framework of prehistoric and protohistoric Japan from the Paleolithic to the Nara period, during which the first institutional state based on legal codes came into existence. Second, the temporal variation in the cognitive quality of artistic expression is shown by comparing Jōmon pottery from hunting and gathering groups and Yayoi pottery from farming societies with social stratification. Third, the morphological classification of prehistoric monuments, including earthworks, fortifications, and burial mounds, is presented in order to reveal the process by which the material expression of the worldview held by each society changed. Fourth, the evolution of warfare is traced by showing the temporal variability of archaeological evidence, such as weapons, skeletal injury, fortified settlements, and buried arms and armor, in order to elucidate the physical and cognitive function of warfare within the process of increasing social complexity. Finally, the author integrates these analyses to elucidate the process of social complexity in Japan from the standpoint of materialization as a creation of the environment, within and against which the social organization increases its scale and complexity.

Chronological Framework

The beginning of the Jōmon period, marked by the appearance of pottery in the Japanese Archipelago, can be dated to around 16,500 BP, during the transition from the Last Glacial Era to the Holocene. Under warming temperatures, productive ecosystems grew and enabled the sedentary foraging groups to increase their scale and complexity, allowing us to categorize them as tribal societies. These tribes economically depended on gathering, fishing, and hunting over the nearly 12,000 years of the Jōmon period.

After 4500 BP, the Jōmon tribes and their rich culture, including magnificent pottery, declined, especially in the northeastern part of the archipelago, which experienced environmental degradation owing to global cooling. In contrast, the southwestern tribes accepted horticulture with dry-field farming from the continent and maintained their population. Around 2950 BP, according to C14 dating, immigrants from the Korean Peninsula introduced more intensive agriculture with wet rice cultivation to the Jōmon tribes of northern Kyūshū. This marks the beginning of the Yayoi period, which witnessed the emergence of the first society based on agriculture in Japan (Fujio, 2015).

Immigrants from the Korean Peninsula are also considered to have introduced warfare practices, including the use of weapons and fortified settlements, which is believed to mark the beginning of warfare in Japan, as discussed later in detail (Fujio, 2015). By 2350 BP (4th century BC), according to C14 dating, the simultaneous importation of bronze and iron tools from the Korean Peninsula triggered the processes of social stratification and the emergence of local chiefdoms. Groups are considered to have been in competition for land and territory in the earlier stage and later for the supply of metal goods and resources (Hashiguchi, 1987; Tsude, 2011). In the middle of the 2nd century AD, select regions, in particular the San'in and Setouchi regions (mainly the modern Shimane, Tottori, and Okayama Prefectures), began to construct large burial mounds for their chiefs. These burial mounds are regarded as the precursors of the *kofun* (standardized mounded

tombs), albeit displaying much stronger regionality.

According to C14 dating and inscriptions of Chinese era names on bronze mirrors, standardized mounded tombs (*kofun*), represented by keyhole-shaped examples (*zenpō-kōen-fun*), emerged in the central Kinki region (mainly the modern Nara, Osaka, and Kyoto Prefectures) in the middle of the 3rd century AD. It can be inferred that this region established its hegemony over areas where local elites participated in the formation of the standardized mounded tombs and built their own examples on a smaller scale (Tsude, 2011).

This hierarchical formulation of mounded-tomb construction is regarded as the manifestation of a status system under the early state, reigned over by the paramount ruler (*daiō*) from the central Kinki region, who succeeded in extending his power over local elites. This network under the *daiō* reached its peak in the 5th century AD and declined over the course of the 6th century, as reflected in the reduction in scale of the mounded tombs.

This early state system, dependent on the material display of its power and prestige, is considered to have gradually transformed into a mature state based on legal codes and a world religion (Buddhism) imported from China and to have reached fruition in the 7th century, according to written documents such as the *Nihon shoki* (Chronicles of Japan).

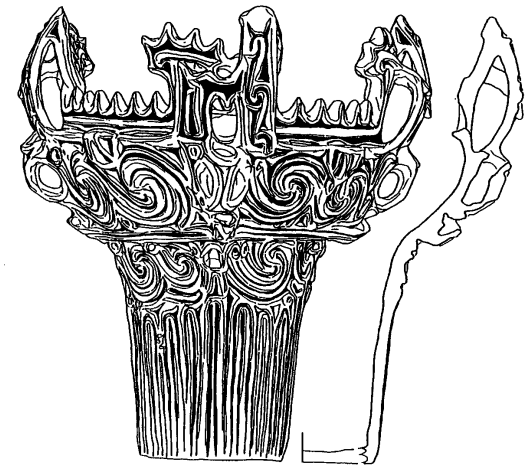
Artistic Expression

Structural features of the artistic expression of a society can be extracted by analyzing the morphological patterns expressed on pottery. Designs on Jōmon pottery grew complex after 6000 BP, when large sedentary settlements emerged and became densely distributed in the northeastern areas of the mainland, such as the Chūbu, Kantō, and Tōhoku regions, indicating population increase in these areas.

Asymmetry, broken patterns, curving lines, and up-and-down motion are dominant in the design of the Jōmon pottery from this period (Figure 7.1) In terms of cognitive psychology, these kinds of expressions are believed to activate semantic processing in human brains, much more than symmetry, unbroken patterns, straight lines, and horizontal motion (Matsumoto, 2008). This suggests that the pottery elaborated with these evocative designs functioned not only as food vessels but also as a medium of social communication among the people sharing them, acting to intensify their communal identity (Matsugi, 2016). Furthermore, biotic imagery and representations, such as *dogū* figurines and clay animals, as well as intertwining floral patterns on pottery, are dominant in the artistic expression of objects from this period. They are interpreted as fertility symbols representing the worldview within which their reproductive foraging society organized and maintained itself.

Figure 7.1.

Illustration of pottery from Sasayama site, Niigata prefecture. Tokamachi City Museum (1996). New Perspective of the Research on "Flame Style" Pottery.



After 4500 BP, the large settlements reduced in number, signaling a decrease and dispersal of the population under the global degradation of the environment, as previously mentioned. In parallel, the evocative designs also went into decline, giving way to plain patterns arrayed horizontally, and functionally differentiated pottery, such as vessels, pots, bowls, and saucers, with less elaboration emerged. This indicates that the pottery from the last stage of the Jōmon period began to lose its traditional function as the medium of social communication intensifying communal identity and came to act mainly as objects of daily use.

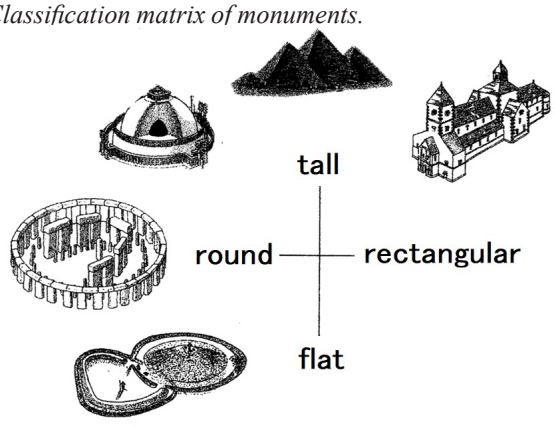
The same features seen in Final Jōmon pottery persisted into the following Yayoi period in the central parts of the archipelago. Biotic figures such as *dogū* figurines and clay animals were almost absent during the Yayoi period, suggesting that the traditional worldview held by foraging groups changed into one compatible with an intensive agricultural society (Matsugi, 2004).

After the emergence of bronze implements and weapons in the 4th century BC, they came to be heavily invested with artistic expression. Symmetry, unbroken plain patterns, horizontal and vertical lines, and saw-tooth patterns, which had not been seen in the previous Jōmon period, were dominant on the surfaces of *dōtaku* bells and other bronze objects (Matsugi, 2016). In terms of cognitive psychology, these shapes arouse feelings of rule, distinction, and aggression, as saw-tooth patterns or triangles are conspicuous in the visual field (Mitani, 1998) and can recall a sense of pain according to the results of Gestalt psychology experiments. These artistic expressions seen in Yayoi bronze objects are considered to have been material representations of the worldview within which the Yayoi agricultural society increased its scale and complexity through social stratification and integration involving rule, distinction, and aggression among groups.

After the 3rd century AD, with the transition from the Yayoi to the Kofun period, artistic expression in artefacts became restricted to elite goods, such as mirrors, weapons, armor, and funeral equipment. The uneven distribution of artistic expression on materials is considered not only to indicate an economic disparity between elites and the general population, but also to represent the hierarchically structuralized worldview of an emerging class society.

Figure 7.2.

Classification matrix of monuments.



Note. Adapted from (Matsugi, 2009).

Monuments

Prehistoric and protohistoric monuments can be classified into four types using a classification matrix, in which planar shape is represented on the horizontal axis from round to rectangular and elevation is represented on the vertical axis from flat to tall. From a global standpoint, the oldest monuments from egalitarian societies during the Neolithic were mostly flat and round, such as enclosures, henges, and stone circles. Stratified societies, such as chiefdoms, often built slightly elevated monuments, including burial mounds, whose planar shapes were mainly still round. Archaic states and empires preferred tall monuments with rectangular shapes and straight lines, such as the Egyptian pyramids and the imperial mausolea of the Qin and the Han dynasties of ancient China. Finally,

tall rectangular buildings with magnificent facades were often constructed as the monuments of world religions, such as Christian cathedrals and Buddhist temples from the end of the ancient period to medieval times (Figure 7.2; Matsugi, 2009).

The morphological transition of monuments, from round to rectangular in planar shape and from flat to tall in three-dimensional form, is closely related to the defining nature of a particular society in the three following ways (Matsugi, 2009).

First, the human brain has developed to utilize metaphors of physical schema (Lakoff, 1987; Matsumoto, 2000), the cognitive base of bodily sensation, in order to realize social relationships. For example, the "top-and-bottom schema" is often used to express the distinction between rich dominant persons and poor subordinate people, such as "top" or "high" class and "bottom" or "low" class. Likewise, the "inner and outer schema" is used to stress the relationship between "us" and "them". The fundamental form of each monument type is considered to be determined by the physical scheme most representative of the essential nature of a particular society. For instance, flat and round monuments in the Neolithic were the materialization of the "inner and outer schema" compatible with egalitarian communal society. In contrast, tall monuments from archaic states and empires derived from the "top-and-bottom schema" of class society.

Second, the structure of monuments is thought to reflect the social relationships behind their construction. Flat and round monuments of Neolithic societies were not related to any specific individuals, but rather involved numerous people participating in a communal activity. On the other hand, tall monuments of archaic states and empires were linked to a particular god(s) or individual(s), such as a king or emperor, by way of ritual activities conducted in and on the monument specifically for him/her.

Third, the shape and scale of the monument largely depended on the intensity of labor and the technological level of the society. Most of the Neolithic monuments, such as stone circles and earthen henges, do not seem to have required any intensive labor or specialized techniques. In contrast, tall architecture beginning in archaic states is assumed to have required advanced design techniques and construction skill, such as stone masonry, which could be actualized only under a class society with the power and mechanisms to integrate and provide these.

The oldest monuments in the Japanese archipelago were flat stone circles and earthen henges mainly found in the Kantō, Tōhoku, and Hokkaidō regions of northeastern Japan and dating to the late Jōmon period after 4500 BP. They are classified into the flat and round type, specific to egalitarian communal societies, into which the Jōmon is categorized. Considering that some of them, such as the Ōyu site in the Tōhoku region, were arranged in the direction of the sun on the solstice, they are presumed to have been communal centers for ritual, where people might have met together periodically (Matsumoto, 2005). They disappeared by the transition from the Jōmon to the Yayoi period, which is marked by the establishment of an agricultural society utilizing wet rice cultivation.

While monumental construction is rarely found in the Early and Middle Yayoi period, large enclosed settlements with multiple moats and banks might have functioned not only as substantial defense facilities, but also as demonstrations of communal identity. These settlements fall into the same category as the Jōmon monuments in that they are roughly round and flat and not related to any particular individuals.

Individual monuments appeared as large chiefly burial mounds in the San'in and Setouchi regions during the Late Yayoi period, as mentioned above. Their planar shapes are round or square with rounded corners, and sometimes they

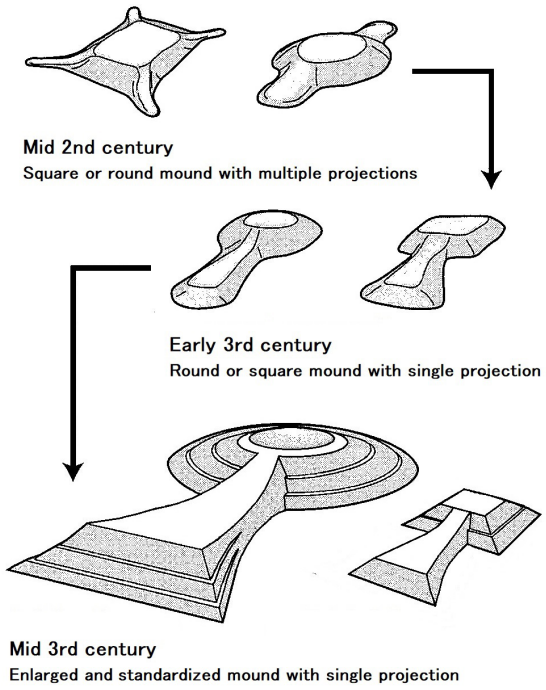
have one small projection at each corner or two large ones in opposite directions (Figure 7.3). One to several wooden coffins were buried on their flat tops elevated just several meters from the ground.

In the middle of the 3rd century AD, Yayoi burial mounds were enlarged and standardized into fixed styles, such as the keyhole-shaped examples with a round mound and singular projection that emerged in the central Kinki region (Figure 7.3). They were copied in other regions, marking the beginning of the Kofun period and foundation of the early-state status system. Although the mounds grew to extraordinary size, some over 500m in length, they were still relatively flat and hardly related to the "top-and-bottom" schema. Despite their elaborated chambers and coffins, rich grave goods, and magnificent exterior with enormous haniwa clay figures, they hardly fall into the same category as the pyramids from Egypt and Teotihuacan and other tall monuments dominant in more mature states and empires.

These mounded tombs declined in size and number during the 6th to 7th centuries and came to be replaced by Buddhist temples under the rule of the newly established institutional state. From the standpoint of monument morphology, prehistoric Japan underwent the transition to a class society without going through the stage of tall-monument construction, which was prevalent in the class societies of archaic states and empires. This anomalistic process is thought to reflect the inherent nature of the formation process of complex society in the Japanese Archipelago.

Figure 7.3.

Transformation of burial mounds from the Late Yayoi to Early Kofun period.



Note. Adapted from (Matsugi, 2007). Illustrated by Yūji Hōshō.

Warfare

Makoto Sahara, one of the leading Japanese archaeologists of the late 20th century, suggested six archaeological correlates of warfare: Antipersonnel weapons, skeletal evidence of trauma, fortified settlements, burial offerings of weapons or armor, worship of armaments, and artistic representations of warfare (Sahara, 2005). Sahara discovered that most of these appeared in farming societies, such as the Yayoi of Japan, and demonstrated that warfare was triggered by the accumulation of wealth innate to agriculture (Sahara, 2005).

According to Sahara, hardly any evidence is found from Jōmon settlements, indicating that substantial fighting was not frequent in the period. Antipersonnel weapons, fortified settlements, and burial offerings of weapons were all introduced together with wet rice cultivation by immigrants from the Korean Peninsula at the beginning of the Yayoi period, after 2950 BC.

Skeletal remains showing trauma also appear at this time. Examples increase from the Early to Middle

Yayoi period, mainly in northern Kyūshū, where social stratification progressed faster than other regions, suggesting the influential role of substantial conflict among local groups. Skeletal trauma and weapons penetrating the body found in coffins show a broadening distribution after the Middle Yayoi period in the San'in, Setouchi, and Kinki regions, suggesting that substantial fighting came to be conducted in a more extensive area outside northern Kyūshū. The most striking example comes from the Aoya-kamijichi site in the San'in region, where 109 people, including more than ten injured by weapons, were abandoned in a bog, suggesting a massacre in the 2nd century AD.

In parallel, bronze weapons, such as swords, spears, and halberds, became enlarged not to improve actual function, but rather to their increase visual effect as symbolic objects for communal rituals, especially in northern Kyūshū, San'in and Setouchi. Fortified settlements also became equipped with multiple moats and banks, with a central shrine for ceremony mainly in the central Kinki region. This suggests that the idea of communal defense and military prestige of each group had become materialized in the form of symbolic weaponry and monumentally elaborated fortified settlements against a backdrop of competitive relationships that developed into substantial conflicts.

It was during the transition from the Yayoi to the Kofun period in the 3rd century AD when materialization related to warfare was drastically reconstructed. Ritual bronze weapons and fortified settlements with multiple circular moats disappeared. Subsequently, the only moated structures were the rectangular residences of elites, which displayed the military prestige of the rulers residing within. Simultaneously, a considerable amount of weapons came to be offered at the elite burials conducted in the large standardized mounds (Figure 7.4; Matsugi, 2020).

This shift in the distribution of archaeological evidence of warfare from the Yayoi to the Kofun period can be explained in the following manner. Defensive constructions of the Yayoi period, such as moated settlements, are considered to have served as a material manifestation and visual representation of communal identity. This identity was represented in the form of collective self-defense and the sharing of a common goal within their worldview. In the Kofun period, by contrast, identity was manifested in the central display of elite military authority and heroic prestige through burial ceremonies centering on the offering of weapons and armor. In other words, the warfare landscape as material manifestation converged upon individual elites through mounded tomb construction.

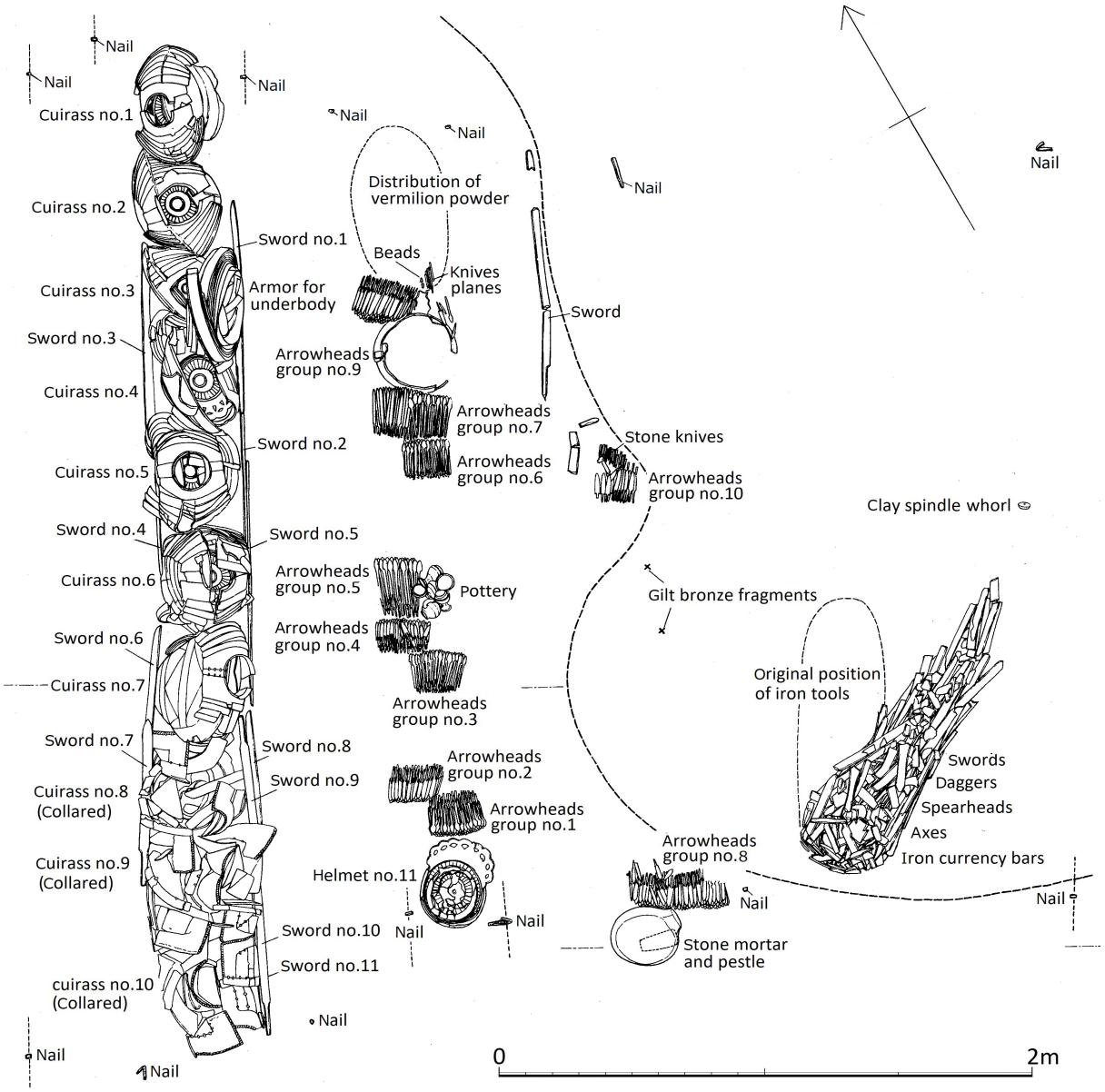
Interestingly, skeletal evidence of trauma decreases significantly in the following Kofun period, indicating that elites had become able to control intergroup violence through their political confederacy and emerging socio-political order under the paramount elite, which was reflected in the system of mounded-tomb construction.

After the 6th century AD, the practice of depositing large numbers of weapons and armor subsided and was replaced by the offering of one or two decorated swords in the funerals of the elite. These decorated swords were regarded as status symbols within the new political structure. The formation of a mature state based on legal codes and Buddhism brought from the continent during the 7th century was decisive in bringing about the decline of the mounded-tomb tradition.

The landscape associated with the emerging state of ancient Japan was novel in that cities were not fortified or walled. The only exception was the construction of a dozen or so hillforts by the late 7th century in northern Kyūshū and the Setouchi region in the western part of the archipelago. They may have been built in response to the threat of invasion from Silla on the Korean Peninsula and Tang China.

Figure 7.4.

Large numbers of armours and weapons.



Note. Large number of armor and weapons offered in an elite burial. Nonaka mounded tomb, Osaka Prefecture.

Adapted from (Kitano, 1976).

Discussion

Based on changing patterns found in the archaeological evidence of art, monuments, and warfare, the process of increasing complexity in the prehistoric and protohistoric society of the Japanese Archipelago can be reconstructed as follows.

The first phase corresponds to the middle of the Jōmon period (6000–4500 BC), when pottery decorated with evocative designs developed to represent the worldview within which the foraging society sustained itself. The second phase after 4500 BC is characterized by the appearance of communal monuments as periodic ritual centers, in parallel with the transformation seen in pottery from evocative designs to plain patterns.

The shift from the first to second stage can be interpreted as the shrinking of a reproductive society with large settlements and a dense population into dispersed small groups against a backdrop of global cooling, which is supported by various methods of climate reconstruction. The focus of material representation as a vehicle of social communication shifted from pottery shared by groups residing together in large villages to monuments, where people who lived daily life separately would periodically assemble.

The third phase represents the introduction of a new worldview from the continent, which included discriminative and confrontational relationships between humans and nature, as well as between human groups. Monumental development of fortified settlements and symbolic weapons, which evoked distinction and aggression, were prevalent during the Yayoi period, until the 2nd century AD. Social stratification and integration progressed within this worldview, which was closely compatible with the expansion of an intensive agricultural society centered on wet rice cultivation and communal power.

In consequence, the focus of the worldview shifted from the community to individuals, mainly to the elite, with the transition to the Kofun period. The fourth phase beginning in the 3rd century witnessed the construction of elite mounded tombs containing a significant amount of weapons and armor. The material manifestation of the worldview of protohistoric Japan is unique in the dominance of mounded tombs and the absence of fortifications and walls. This uneven distribution of power in the construction of monuments stemmed from the nature of ancient Japan’s sociopolitical system of being an early state without cities.

Finally, during the 7th century AD, the new Buddhist worldview introduced from China replaced the former paradigm represented by mounded tombs, marking the beginning of the fifth phase. Supported by a writing system, it broadly came to dominate Koguryŏ, Paekche, and Silla on the Korean eninsula and reached all the way to Japan, where both artistic expression and the focus of monumental construction became centered on Buddhist temples and imperial palaces. These states shared a global worldview and an accompanying material landscape, under which they developed political systems based on legal codes, territorial governance, and military organization.

Conclusion

Japanese archaeology has traditionally stemmed from the historical materialism of Marxism and the social evolutionism of American anthropology, both of which adopted conventional categorizations such as "tribal society", "chiefdom", and "state", and focused on such functions as "labor division", "redistribution", and "urbanization". Archaeological shreds of evidence from surveys or excavations have thus been classified and interpreted into the compositional elements of such categories. As a result, invaluable information concerning human thought and worldview, which is indispensable

to comprehensively reconstruct past societies and their change, may have slipped out of our archaeological body of knowledge.

In this paper the author highlighted the unique nature of the transformation process of complex society in the Japanese archipelago, the drastic reorganization of material expression from group-oriented to individualizing at the beginning of the Kofun period, the absence of defensive and urban-centered landscape during the Kofun period, and the lack of the tall monuments characteristic of early class societies. All are important areas that traditional approaches based on conventional categorization have overlooked. It is time for Japanese archaeology to employ a new approach to the reconstruction of the rich past.

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8
"Tribe" or "Chiefdom"?
Lost Possibilities of Ainu Society and Influences from Outside Worlds

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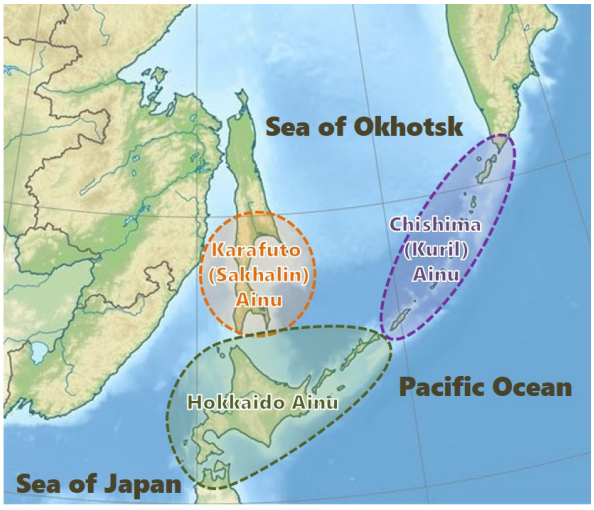
This paper is focused on the Ainu and the conventional understanding of them as foragers in Northeast Asia, examining the factors and processes that led to the formation of their pre-state society. While the Ainu was fundamentally a hunting-gathering-fishing society, extensive agriculture was also partially conducted. Ainu society never established a large-scale complex society such as a "chiefdom" or "kingdom". These characteristics of Ainu society, however, were not necessarily shaped solely by internal conditions. Rather, external factors can be said to have significantly influenced the formation of Ainu society, in particular the market economy and political power of mainland Japan. This paper examines the mechanisms and processes resulting from the relationship with the mainland Japanese economy and politics that prevented the further development of Ainu society and fixed their subsistence activities solely on foraging. Similar conditions can also be seen in various indigenous societies, not only around the high latitudes from Northeast Asia to North America, but also in the low latitudes, including Oceania and Africa. Additionally, in some areas kingdoms were established under the influence of Western colonialism. These case studies present examples of social development resulting from relationships with outside worlds and are instructive when considering the processes of state formation and the formation of civilization.

Este artículo se centra en la cultura Ainu y la comprensión convencional de ellos como una comunidad de recolectores en el noreste de Asia, examinando los factores y procesos que conducen a la formación de sus sociedades preestatales. Si bien los Ainu eran fundamentalmente una sociedad dedicada a la caza, recolección y pesca, también se llevó a cabo la agricultura extensiva de forma parcial. La sociedad Ainu nunca estableció una sociedad compleja a gran escala como una "jefatura" o un "reino". Sin embargo, estas características de la sociedad Ainu no fueron necesariamente determinadas únicamente por las condiciones internas. Por el contrario, se puede decir que los factores externos han influido significativamente en la formación de la sociedad Ainu, en particular la economía de mercado y el poder político central de Japón. Este artículo examina los mecanismos y procesos resultantes de la relación con la economía y la política central de Japón que impidieron un mayor desarrollo de la sociedad Ainu y fijaron sus actividades de subsistencia únicamente en la búsqueda de alimento. De igual manera se pueden observar condiciones similares en varias sociedades indígenas, no solo en las latitudes altas desde el noreste de Asia hasta

América del Norte, sino también en las latitudes bajas, incluidas Oceanía y África. Además, en algunas áreas se establecieron reinos bajo la influencia del colonialismo occidental.
Estos casos de estudio muestran ejemplos de desarrollo social que surgen como resultado de las relaciones con el mundo exterior y son un ejemplo didáctico al considerar los procesos de formación del estado y la formación de la civilización.

It can safely be said that the process leading to state formation is one of the most important issues in anthropological studies. This issue has been consistently and vigorously studied not only in prehistoric and ecological fields, but also in sociocultural anthropological fields (e.g., Bouchard, 2011; Jennings & Earle, 2016; Scott, 2009, 2017), despite serious criticism of social evolutionism. In particular, the factors and processes leading to civilization or state formation can never be ignored by sociocultural anthropologists who have conducted ethnographical research on small communities in the non-Western world, often called by the derogatory term "primitive societies". They have discovered various patterns in the formation processes of civilizations and states and collected substantial data in their respective ethnographic fields all over the world.

Figure 8.1.
Original settlement areas of the Ainu.



Considering this theoretical background, this paper focuses on the Ainu and the conventional understanding of them as foragers in Northeast Asia through the ethnohistorical study of their society in the pre-modern period. In particular, it will examine factors and processes in Ainu society that propelled its sociopolitical development. Furthermore, this paper elucidates the relationship between the development of Ainu society and the political system of the neighbouring Tokugawa Shogunate in mainland Japan.

This case study can be recognised not only as an individual example within the Japanese Archipelago in Northeast Asia, but also as a commentary on similar examples seen worldwide throughout history, from the Chinese dynasties and the Roman Empire to Western colonialism. In other words, this approach is an attempt to elucidate the formation process of civilization through analysis of social change preceding state formation.

1. A Point of Dispute in Ainu Studies

The Ainu are the indigenous people of Hokkaidō, the southern part of Sakhalin, and the Kuril Islands (Figure 8.1). They are a distinct ethnic group within contemporary Japanese society and regarded as a political and sociocultural minority. They sustained a relatively independent society and culture and maintained relationships with neighbouring groups and societies, including mainland Japan, China, and Russia, until their lands were colonized by the Japanese government in the Meiji period (AD 1868–1912).

On the one hand, Ainu culture and history are two of the most important subjects in Japanese anthropological and ethnohistorical studies and extensive scholarly inquiry has led to important findings (e.g., Yamada, 2003). These studies, however, do not sufficiently consider the relationship between cultural change in Ainu society and the influence of Japanese colonization in the pre-modern period.

Additionally, while Ainu society has been understood to have been a fundamentally hunting-gathering-fishing society, they partially engaged in extensive farming. Furthermore, it is commonly assumed that the Ainu did not establish a relatively large-scale complex society, such as a "chiefdom" or "kingdom"[1]. This image of Ainu society was established by Japanese anthropological researchers based on interviews with participants from older generations (e.g., Izumi, 1952; Watanabe, 1972)[2].

However, this view of the Ainu as a reconstructed model, which ignores their historical transitions, has received criticism from various fields, including anthropology and history (e.g., Fukasawa, 1998; Hudson, 2014). While the Ainu community in the modern era, which was the focus of the studies conducted by Japanese anthropologists, was unquestionably a small-scale foraging society, it appears to have had received significant external influences from the neighbouring Chinese dynasty, Russian empire, and nation of Japan (Deriha, 1994; Sasaki, 1999; Ōnishi, 2014, pp. 280–281). It is therefore necessary to examine and elucidate the factors and processes caused by external influences that led to the nature of Ainu society in the modern era.

2. Ainu Social Structure

Before examining the relationship between Ainu society and outside influences, I would like to briefly introduce an anthropological model of their society. The most clearly defined model of Ainu society has been suggested by cultural anthropologists (e.g., Yamada, 2002).

This article shall therefore refer to the "Ainu ecosystem" model designed by the Japanese ecological anthropologist Hitoshi Watanabe (Watanabe, 1972). This model integrates previous anthropological findings (e.g., Izumi, 1952) and is at present the most generally accepted model of Ainu society. It can safely be considered the most representative anthropological model[3].

(1) Social Organization

The social organization of Ainu society can be categorized into five units: 1) *Chise*, meaning "single household" in Ainu; 2) *kotan*, meaning "settlement"; 3) the local group; 4) the *shine-itokpa* group; and 5) the river group (Watanabe, 1972, pp. 7–18). While these units were originally scientific concepts and terms established through ethnographical research by Watanabe, they have been disseminated as common knowledge outside of academia and even adopted by contemporary Ainu people promoting cultural reconstruction activities based on their own traditions.

It can be understood that the relationship from the single household to the river group, excluding the *shine-itokpa* group[4], is a spatially and socially stratified continuum. However, while the household forms the most basic unit and a settlement is made up of those households, it is the local group that administers the social and political territories throughout the daily life of the Ainu. The river group consists of several local groups and is ordinarily the largest political and social unit; it therefore represents social integration at the highest level in Ainu society (Watanabe, 1972, pp. 16–17). It is generally assumed that there is no larger unit than the river group in daily life.

(2) Sociopolitical Roles of Units in Ainu Society

Each unit in Ainu society has various significant sociopolitical roles, particularly the management of

territories and resources as part of subsistence activities. The Ainu did not only take advantage of natural resources and sources of food, but, simply put, categorized each type of resource and controlled it. Such roles were conducted by each social unit.

Salmon fishing in rivers provided the most stable food source in Ainu society. As shown in Figure 8.2, activities were controlled by the local group (Watanabe, 1972, pp. 59–60). In addition, individual-level gathering and trap fishing, primarily of salmon, were conducted[5]. The river group was able to maintain its exclusive rights over other groups and controlled everything within its area (Watanabe, 1972, pp. 56–59). This implies that the Ainu never had one integrated society throughout Hokkaidō, but was rather fragmented into numerous areas controlled by river groups, under which local groups and individuals engaged in various activities in order to take advantage of resources.

Figure 8.3 also depicts the management of other resources related to Ainu subsistence activities. This well-known drawing of the Ainu ecosystem shows how each piece of land around a river is used. It is evident that each *kotan*, or local group belonging to a river group, possessed and used *iwor* as their territory or living space (Figure 8.4; Watanabe, 1972, p. 58). From these cases, it can be understood that the Ainu used and managed various resources over wide-ranging land and the way these subsistence activities were conducted differed by social unit.

These various subsistence activities were controlled by social units such as the *kotan* and river group. No activity surpassed the management of the river group. From the perspective of the role of social units concerning resource and territory management in subsistence activities, it can be inferred that there was no higher unit than the river group in Ainu society.

Figure 8.2.

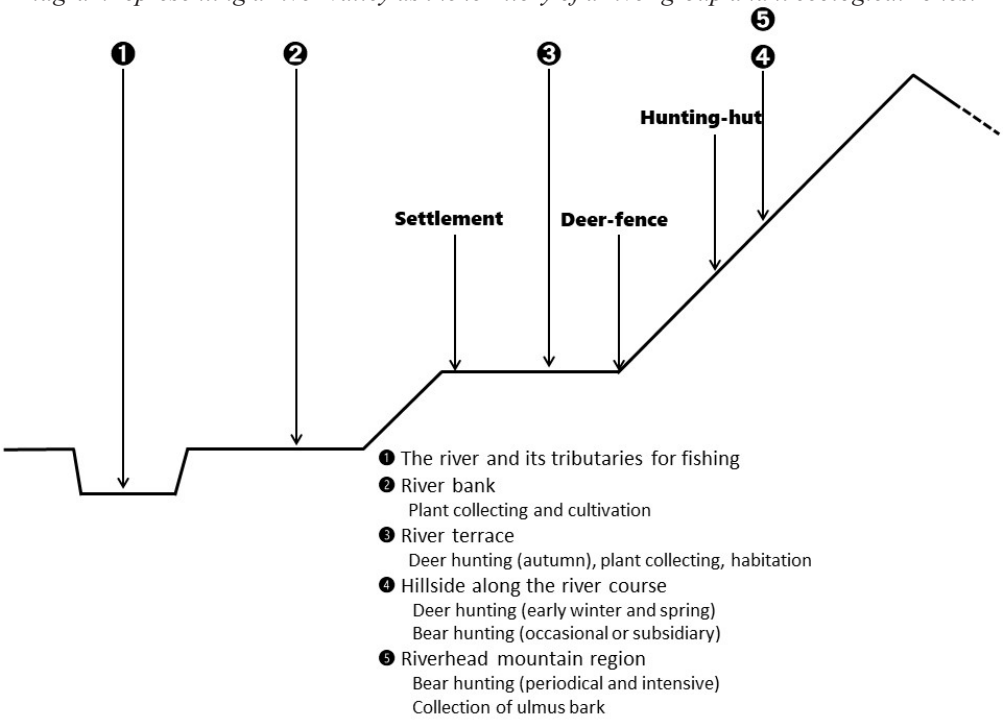
Territory and resource management in Ainu society.

Territory Maintained by the River Group as a Whole	Territories Maintained by Smaller Groups within the River Group	Controlling Body	Condition of the Place
River basin as prescribed by the Ainu	Site for peep-hut (*worun chise karn ushi*)	Individual simple family	Unstable
	Site for fish trap (*urai karu ushi*)		
	Site for fish trap (*urai karu ushi*)	Cooperative group	
	Site for weir (*tesh karu ushi*)		Stable
	Place for deer-fence (*kuteki ushi*)		
	Named concentration of spawning beds of dog salmon (*yaicharo iki, ichan or ichanuni*)	Local group	Very stable

Note. Original information from (Watanabe, 1972).

Figure 8.3.

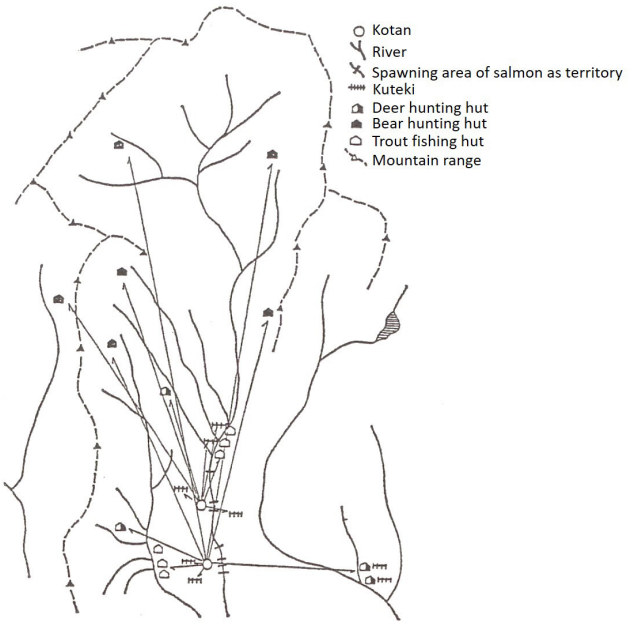
Diagram representing a river valley as the territory of a river group and it ecological zones.



Note. Original information from (Watanabe, 1972).

Figure 8.4.

Ainu subsistence activities and resource management of wide-ranging land.



Note. Original information from (Watanabe, 1972).

The nature of the Ainu ecosystem, as discussed above, can be verified from numerous historical documents of the Late Edo period (circa 19th century AD) during the pre-modern era (Ōnishi, 2008, 2014). Therefore, the society described within the Ainu ecosystem model can be regarded as a sociohistorical entity at least as early as the Late Edo period.

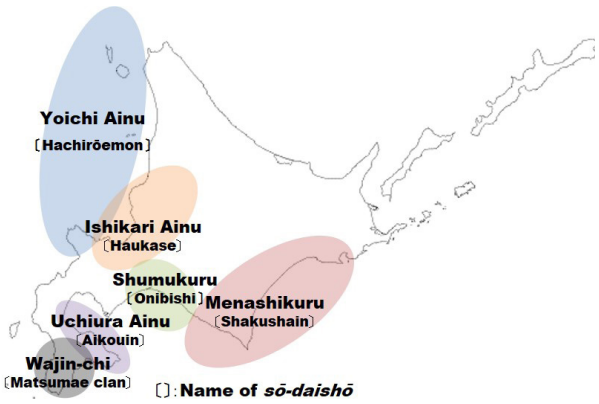
3. Ainu Chiefs Drawn from Historical Documents

In the anthropological model based on the Ainu ecosystem, the household is the smallest and the river group is the largest social unit in Ainu society. As a historical fact, the Ainu never achieved an integrated society, such as a nation-state, throughout Hokkaidō until the modern period. Thus, it can be assumed through ethnographic models that the chief of the river group had the highest political status in daily social life.

The four stages of social development proposed by Service, consisting of the band, tribe, chiefdom, and state (Figure 8.5; Service, 1962), are often employed to examine social development level by sociopolitical organization and subsistence economy. Although social evolutionism has received strict criticism from various research fields, including anthropology and history, these stages are often used as the most popular conceptual model to estimate a society's socio-organizational level. Based on an anthropological model such as the "Ainu ecosystem" model, Ainu society can perhaps be situated at the "tribal" stage according to the definition by Service.

Figure 8.5.

Sō-daishō and their sphere of influence in Shakushain's revolt.



Note. Original information from (Kaiho, 1974).

On the other hand, we can identify the existence of Ainu chiefs such as *sō-daishō* (惣大将) and *sō-otona* (惣乙名) in historical documents. From these documents, it can be concluded that these chiefs were able to politically influence large areas, including numerous river groups.

The *sō-otona* was the leader of several river groups and was fairly recognized until the modern period in the Hokkaidō hinterland, which had not yet faced Japanese colonization. However, they had lost any substantive power by the time Japanese anthropologists began research of their society (Harada, 1994, pp. 764–766).

Meanwhile, in the Early (circa 17th century AD) and Middle Edo period (circa 18th century AD), *sō-daishō* and *sō-otona* sometimes displayed extensive political leadership. In particular, this kind of leadership can be recognised in such extraordinary situations as Shakushain's Revolt (AD 1669–1672)[6] and the Menashi-Kunashir Rebellion (AD 1789)[7].

In the former revolt, powerful chiefs, such as the *sō-daishō*, in addition to Shakushain, wielded influence based on their sociopolitical leadership over huge areas and asserted their independence against the Matsumae clan (Figure 8.6). The Japanese historian Mineo Kaiho suggested from the existence of these chiefs that the Ainu originally had been able to grow into a complex ranked society led by multiple *sō-daishō*, which was influential over a relatively large area surpassing the river-group territory (Kaiho, 1974, pp. 72–78). On the other hand, in the Menashi-Kunashir rebellion, powerful chiefs called

sō-otona and *otona,* who were very similar to the *sō-daishō* of Shakushain's revolt, were depicted in official Japanese documents. Remarkably, they independently contacted Russian traders and established trading relationships outside the control of the Tokugawa Shogunate.

Through these cases, we arrive at an important question: Did powerful chiefs, such as the *sō-daishō* in Shakushain's revolt and the *sō-otona* in the Menashi-Kunashir rebellion, hold positions of leadership even during ordinary situations, without a declared state of emergency? In other words, could Ainu society before the Late Edo period be positioned at the "chiefdom" level? If so, why did the Ainu revert from "chiefdom" to "tribe" after the Late Edo period?

4. Socio-Organizational Level of the Ainu

Two differing approaches can be employed to investigate the socio-organizational level of the Ainu, as symbolized by the powerful *sō-daishō* and *sō-otona* in the two rebellions before the Middle Edo period. Alternating between these different perspectives enables us to focus on both internal and external factors.

(1) Views on Environmental Possibilism

A representative approach is to investigate a society's own social capacities from an internal perspective. Such cases usually focus on the factors of technology, environment, etc., and examine the formation process of social organization and structure. In other words, this approach explores causes through an examination of a particular society in and of itself. Incidentally, this type of approach in cultural geography has been called "environmental possibilism" (Hanks, 2011) and appropriated within cultural anthropology by Marshall Sahlins, who, alongside Service, was a pioneer of cultural ecology (Sahlins, 1964).

Hitoshi Watanabe, who formulated the Ainu ecosystem model, also attempted to explain the formation of ranked society, including within the Ainu in the North Pacific zone, from an internal perspective based on a socioecological approach similar to environmental possibilism and cultural ecology (Watanabe, 1983, 1990). Through his case study of foragers in this zone, he suggested that they had been able to build a relatively complex ranked society due to the socioeconomic surplus produced by the large biomass of environmental resources in their living area. Additionally, as a precondition, he indicated that these societies were based on equal or similar environmental conditions. In particular, a large amount of aquatic resources, such as salmon from rivers and/or the ocean, were acknowledged as an indispensable requirement for the building of ranked society (Watanabe, 1990, pp. 24, 25, 60, 68–69). As this kind of ecological condition exists only at high latitudes, he asserted that no foragers, except for those in the North Pacific zone, had been able to build a ranked society (Watanabe, 1990, p. 64).

Figure 8.6.

The four stages of social development as defined by Elman Service.



Ainu social stratification was characterized by an upper stratum that mainly specialized in hunting big game, such as bears or sea mammals, as a symbolic practice[8] and a lower stratum that usually engaged in fishing as a daily food-production activity. Although stratification did not necessarily involve fixed political and economic differences, members of the upper stratum held the exclusive right to trade with neighbors; luxuries, which were imported from outside by trading, were regarded as prestige goods called *ikor* (Watanabe, 1990, pp. 52–56). Members of the upper stratum also played an important role in ritual practices. As a result, the upper stratum of Ainu society obtained sociocultural prestige and the most predominant members took the position of chief, called *otona* or *ottena*[9].

On the other hand, foragers in low latitude zones had not been able to establish any kind of ranked complex society, such as a chiefdom or kingdom. In the South Pacific zone, in cases such as Hawaii, Fiji, and Samoa, some kingdoms were formed under the influence of Western colonization (Sahlins, 1958); they were all, however, based on agrarian societies. Considering the historical facts, it can be established that no ranked complex society was able to form in the low-latitude zones due to differences in environmental factors. In both coastal and inland areas in the low latitude zones, there are no food resources, such as salmon, that produce a stable socioeconomic surplus[10]. In addition, even if a large-calorie food resource is available, no surplus cannot be created in environmental conditions, such as tropical forests.

Through the above discussion based on Watanabe's examination, we are led to the conclusion that the type of stratification found in Ainu society was based on the large amount of aquatic resources. Needless to say, Ainu society possessed the necessary technology and social systems to intensively utilize and accumulate these resources as the basic requirements for building a ranked society. It can be concluded from this socioecological approach to internal factors that the Ainu had sufficient potential to establish a ranked society.

(2) Colonialism as an External Influence

Due to the tendency to focus on internal factors[11], ecological approaches and environmental possibilism have received sharp criticism in anthropological fields as an essentialist approach that neglects external influences (e.g., Headland & Reid, 1989; Hoffman, 1984; Peterson, 1978; Wilmsen & Denbow, 1989). Such criticisms have also been levelled by researchers of the North Pacific foragers, whose investigations include social organization and sociocultural history. It has become clear that external perspectives that shed light on influences received from neighbors are important and essential.

For example, it is well-known that the Northwest Coast Native Americans were significantly affected by European colonialism (e.g., Fisher, 1977; Gibson, 1988; Tachikawa, 1999). In particular, the fur trade with Europeans strongly influenced their society and caused drastic social change (e.g., Fisher, 1996; Gibson, 1992; Kishigami, 2001, 2004). Such trade provided many kinds of goods, including luxuries and daily necessities. Above all, forager societies on the Northwest Coast bought iron tools and industrial products, such as knives, axes, brackets, and guns, through trade with Europe, which allowed for higher productivity than the traditional tools produced in their own societies. These tools enabled them to drastically accumulate wealth and produce a surplus for social development (Kishigami, 2001, pp. 320, 339–340). In addition, these foragers could obtain necessities for daily life by concentrating solely on hunting in order to procure goods for trade.

Similar situations can be seen not only in North America, but also in the Ainu and forager societies on the North Pacific coast of Northeast Asia. These case studies

were examined from a socioecological approach by Hitoshi Watanabe, who expressly recognised the relationship between foragers on the North Pacific coast, including the Ainu, and neighboring societies, mainly involving trading (Watanabe, 1990, pp. 39–40, 52–56). Furthermore, he suggested that the relationship with the Tokugawa Shogunate played an important role in the stratification or complexity of Ainu society, similar to the case of the Northwest Coast Native Americans (Watanabe, 1990, pp. 45, 56).

In fact, the Ainu had already been sustaining their society with various commodities introduced through trade with mainland Japan even before the Edo period (e.g., Sasaki, 1999; Tezuka, 1998). In particular, archaeological studies have revealed that knives, adzes, axes, and other indispensable materials of daily life were replaced with non-locally produced iron tools from the proto-medieval Satsumon period (7th–13th century AD) (Ōnishi, 2014). Additionally, rice wine, tobacco, and lacquerware, which were necessary and important items for Ainu rituals, had also been introduced through trade with the outside.

Therefore, in order to procure various items for their daily needs, they had to produce and exchange commodities for trade with outside societies such as mainland Japan and the Chinese dynasties (Sasaki, 1999). In other words, Ainu society needed only to concentrate on hunting and fishing in order to procure trade commodities. As a result, they were able to acquire not only daily necessities, including iron tools, but also nonessential luxury items, such as ritual equipment including rice wine, tobacco, and lacquerware. The aim of Watanabe's research, however, was to finally explain that foragers on the North Pacific coast had sufficient socioecological factors to establish a ranked society. It can be suggested from these studies that the relatively complex ranked societies on the Northwest Coast were established and accelerated by trade activities with the European colonists. Moreover, this hypothesis can be applied to the relationship between the Tokugawa Shogunate and Ainu society.

Similarly, Watanabe proposed ecological capacity as a precondition for a ranked society (Watanabe, 1990, pp. 68-69). It can be assumed that the foragers on the North Pacific coast would not have been able to build such a society based solely on the influence of colonialism if they did not originally have the support of rich ecological factors. This assumption can be corroborated by case studies in other areas: In the tropical zone, no foragers built a ranked society, despite having received similar colonial influences[12]. In other words, as forager societies in the North Pacific, including the Ainu, had sufficient ecological capacity for subsistence in the environment they inhabited, they were capable of producing a surplus for sociocultural development.

5. Conclusion

The analyses presented above lead to the conclusion that the Ainu had sufficient potential to form a hierarchical society as a result of sociopolitical surplus based on rich ecological conditions, including aquatic resources and trade activities with outside societies. Nevertheless, it remains unclear why the Ainu after the Late Edo period reverted back to the tribal level.

In this paper, the author approaches this problem based on relationships with the outside world. Relationships with outside societies produced the potential to form a hierarchical society for the Ainu until the Middle Edo period. In addition, it is important to note that the potent ecological conditions for Ainu subsistence did not face any drastic change between the Middle and the Late Edo period[13].

This examination first focuses on the relationship with the Tokugawa Shogunate because this system had

the largest cultural impact on Ainu society, changing its structure throughout the pre-modern era. In fact, Ainu coastal fishing from the middle of the Edo period was carried out as forced labor under merchants from mainland Japan called *ukeoi-shōnin* (e.g., Deriha, 2009; 2014; Kikuchi, 1994). Additionally, the Tokugawa Shogunate forced the Ainu society to pursue commercial hunting since fur was regarded as a trade commodity under colonial policy.

From a different point of view, Ainu society was forcibly incorporated into the inter-regional division of labor of the Japanese archipelago. It should be recognized that the aim of their subsistence activities was the production of food and trade commodities to obtain iron tools, cereal crops, and other daily necessities from mainland Japan. This situation had already begun in the Satsumon period, regarded as the proto-Ainu stage, when the socioeconomic system between Hokkaidō and mainland Japan underwent drastic changes during the transition to the medieval era (Kikuchi, 1999; Ōnishi, 2014). Such trends in Ainu society accelerated over time from the medieval era to the Late Edo period.

Through the examinations presented above, it is evident that Ainu society was able to obtain not only necessities such as iron tools, but also prestige goods and luxury grocery items by procuring commodities for trade. Moreover, their social life could not be sustained without this trade with mainland Japan since they were not producing the necessary goods independently. In other words, the Ainu had no choice but to actively produce commodities for trade. Based on this understanding, we may conclude that the Ainu community was incorporated into and subordinated to a division of labor based on the trade network of mainland Japan, which precluded the development of a complex and independent hierarchical society after the Late Edo period. In other words, the imbalanced relationship with the Japanese economy and political situation prevented the development of Ainu society and fixed their subsistence activities on foraging alone.

However, it can be assumed that the Ainu through the Early Edo period, prior to their complete incorporation into the division of labor based on mainland Japan, had the potential to develop a more complex hierarchical society. If that were the case, it could mean that the *sō-daishō* and *sō-otona* possessed extensive political power in the Early Edo period and thus can be regarded as evidence for the aforesaid potential of the Ainu society at that time.

Similar cases to the Ainu after the Late Edo period have been seen in indigenous societies all over the world, including Northeast Asia (Sasaki, 2009). Some of these cases seen in various indigenous societies led to the formation of chiefdoms or kingdoms through the influence of colonialism and commercialism, not only around the high latitudes from Northeast Asia to Northern America, but also in the low latitudes, including Oceania and Africa.

Kingdoms were established in various areas all over the world, mainly in agricultural societies, under the influence of Western colonialism. These can be regarded as cases of social development based on relationships with the outside world and provide instructive ways to consider the processes leading to the formation of civilization, including state formation.

Similar investigations into the formative mechanisms of Ainu society must continue, taking advantage of comparative case studies of other regions. Such studies can be expected to provide significant new perspectives enabling further understanding of the factors leading to the formation of polities and the processes of social change, specifically from complex hierarchical societies to kingdoms under external influence, such as European colonialism. Such analyses will no doubt also contribute

comparative data in order to more deeply understand other case studies, such as state formation without external factors in the American continent before the Columbian era.

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[1]This topic will be discussed in greater detail later.

[2]By the time Japanese and non-Japanese anthropologists conducted their ethnographic research on Ainu communities, their social structure had changed drastically under significant influence from colonization by the Japanese government since the Meiji period (AD 1868–1912).

[3]Incidentally, this model has been subjected to a great deal of criticism both socially and academically. Refer to (Fukasawa, 1998; Ōnishi, 2008, 2014; Yamada, 2003) for a discussion of this issue.

[4]On the other hand, the shine-itokpa group is an intangible social unit whose socio-ideological organization was constituted by patrilineal kinship. Thus, this group differs from the other geographic groups and more likely can safely be regarded as one of the ideologies that bind human relationships (Watanabe, 1972, pp. 15–16).

[5]An important fact here is that no one is entitled to certain resources throughout the year. Individuals or households cooperated to take advantage of certain resources that were available for a certain time of the year. It follows that the rights to use each resource in various places changed constantly between a stable and unstable state.

[6]Shakushain's revolt was the largest Ainu rebellion against Japanese authority, namely the Matsumae clan, who was granted the area around Hokkaido as a fief under the Tokugawa Shogunate system in the Early Edo period.

[7]The Menashi-Kunashir rebellion was a battle in the Late Edo period (1789) between the Ainu and Japanese migrants who were employed as fishers and traders around the Nemuro Strait in northeastern Hokkaido by the Hidaya trading company of mainland Japan.

[8]As this kind of hunting doesn't contribute food resources for subsistence, it is theorized to be a symbolic practice.

[9]In Ainu society, community leaders or chiefs usually were elected from persons who had achieved honor and distinction. Prestige goods (ikor) imported through trade were indispensable to win renown.

[10]Large mammals such as elephants in the low latitude zone, mainly tropical forests, can be a significant source of calories. Their population size, however, is too small to compare with aquatic resources such as salmon and they are difficult to secure as a stable food resource. As already mentioned, big game in the high latitude zone, including the Ainu's living area, was also not a stable food source able to sustain society, with the exception of small population groups such as the Inuit in the circumpolar zone.

[11]The theoretical background of ecosystem approaches is based on the assumption of a closed system of energy flow in the environment (e.g., Odum, 1973). Therefore, such approaches inevitably focus on internal factors rather than external influences.

[12]Incidentally, farmers in the tropical zone, such as Africa and Oceania, also built more complex hierarchical societies that were regarded as chiefdoms and kingdoms under the influence of Western colonialism. From these case studies, it became clear that foragers in this area were unable to form a ranked society, even though they had received similar influences from Western colonialism as their neighboring farmers.

[13]However, there were some local environmental changes in the Ainu's living area through the Edo period, including catastrophic volcanic eruptions (Endo & Doi 2013; Tokui, 1989) and drains on resources by the commercial activities of Japanese migrants (Takakura, 1960, 1966).

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9
Pastoralism of Camelids and the Emergence of Political Power in the Northern Peruvian Andes: A Discussion Featuring Archeology from the Viewpoint of Ethnography

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The indigenous people of the high plateau south of middle Peru, have been pasturing camelids (alpacas and llamas) for thousands of years. Livestock plays an important role in the region, as it is a source of meat, hide, textile fiber, and dung. Additionally, the animals are used in ritual practices and specially llamas serve as pack animals.

The Andean indigenous pastoral people have been the principal focus of my studies since 1979, when I did fieldwork for about 16 months in the district of Puica in Cotahuasi Canyon, Arequipa, southern Peru. I have also studied pastoral communities in Asia, doing fieldwork in the Himalayas, Tibet, and Mongolia. Comparative studies have revealed the unique characteristics of alpaca and llama pastoralism in the Central Andes, such as sedentarism and no utilization of milk.

In the Central Andes, the earliest large monumental structures were built around 3000 BC in northern Peru. Alpacas were first domesticated in middle Peruvian puna in about 4000 BC, and one thousand years later llamas were domesticated in the northern parts of Argentina and Bolivia, according to recent studies. Prominent studies from the 1980s suggest that, based on archaeological and ethnographic data, camelids would have been locally bred on northern Peruvian coasts, where climatic and environmental conditions were drastically different from their original habitat.

Recently, studies on two intensively excavated archaeological sites in the northern Peruvian highland: Kuntur Wasi and Pacopampa, have found tangible evidences of the emergence of social hierarchy and political power around 800 BC (the beginning of the Late Formative period). Among the evidences of social hierarchy were the special tombs with offerings of precious metals, including gold and copper, and exotic items, such as tropical sea shells and obsidian, obtained from long-distance trade.

Evidence of the beginning of camelid husbandry during the same period has also been identified by the stable isotope analysis. This evidence evoked discussions on the significance of camelids in the formation of the Andean civilization in northern Peru.

In this paper, first I present ethnographical data on pastoralism in Puica. Then I provide an overview of recent research on the domestication of camelids and its spread to northern Peru, and the emergence of political power there. Finally, I discuss themes related to the significance of pastoralism for the formation of the Andean civilization, on the basis of ethnographical data.

Based on the studies in Kuntur wasi and Pacopampa, researchers have indicated the relationships between the rise of political power, the use of llamas for long distance trade, and the practice of letting llamas graze on maize fields so that the land would be fertilized with their dung, helping boost agricultural productivity. They also have assumed the use of llamas as sacrificial animals whose flesh was consumed in feasts and hair were used to produce textile. The ethnographic data provide material for discussion of archaeological studies, and include some images of scenes such as llama caravans, llamas grazing on maize fields, sacrifices, etc. Present-day Andean pastoralism lacks some elements of ancient camelid herding, such as llamas with fine wool (used for textiles) and llama breeding in coastal areas, which we know about from archaeological data from coastal and low areas where the climate is very dry and the remains of animals are well-preserved. These data contribute to anthropological studies of animal domestication and pastoralism.

After the Spanish invasion, in northern Peru, the raising of camelids was completely replaced with the husbandry of cows, horses, sheep, and goats brought from Europe. However, in southern Peruvian highlands, indigenous people have maintained the traditional pastoral practice of keeping camelids, llamas, and alpacas. Therefore, ethnological studies on pastoralism and archaeological studies would complement each other and the collaboration would yield deeper insights. Furthermore, the unique characteristics of pastoralism in the Andes play a vital role in the study of animal domestication and pastoralism in general; thus, cooperation between researchers in the fields of archaeology and cultural anthropology would be fruitful.

En la actualidad los camélidos andinos (alpacas y llamas) son criados por grupos indígenas en la región puna o altiplano andino, hacia el sur desde la zona central del Perú. El ganado andino juega un papel importante, pues es fuente de recursos como carne, fibra o estiércol. Además forma parte del ámbito ritual y especialmente las llamas sirven para el transporte de carga.

Mi estudio se ha centrado en la sociedades pastoriles andinas desde 1979, cuando pude realizar trabajo de campo durante unos 16 meses en el distrito de Puyca, valle de Cotahuasi, departamento de Arequipa, en el sur del Perú. Asimismo he estudiado otras sociedades pastoriles en Asia al hacer trabajo de campo en el Himalaya, el Tibet y Mongolia. Resultados de los estudios comparativos han revelado que las características peculiares del pastoreo de alpacas y llamas en los Andes centrales son el sedentarismo y la no utilización de leche.

En los Andes centrales las primeras estructuras monumentales de gran envergadura se construyeron en el norte del Perú. Por otro lado, las alpacas fueron domesticadas por primera vez en la puna central del Perú, alrededor del año 4000 a. C. y posteriormente las llamas fueron domesticadas en las zonas del norte de Argentina así como en Bolivia, según estudios recientes. Con base en datos arqueológicos y etnográficos los trabajos pioneros realizados en la década de 1980 sugerían que los camélidos habrían

sido criados localmente en las costas del norte del Perú, cuyas condiciones climáticas y ambientales eran drásticamente diferentes de las de su hábitat original.

Recientemente, la información obtenida en sitios arqueológicos intensamente excavados como Kuntur Wasi y Pacopampa, ubicados en la sierra norte del Perú, ha presentado evidencias tangibles en cuanto al surgimiento de jerarquías sociales y poder político alrededor del año 800 a. C., a comienzos del Periodo Formativo Tardío. A modo de evidencia jerárquica se encontraron tumbas especiales con ofrendas de materiales preciosos como oro y cobre, además de materiales exóticos como conchas tropicales y obsidianas, producto del comercio en zonas distantes.

Las pruebas referentes al inicio de la cría de camélidos durante el mismo período también han sido identificadas por el análisis de isótopos estables, que generó debates en cuanto a la importancia de los camélidos para la formación de la civilización andina en el norte del Perú.

En este artículo primero describo algunos datos etnográficos del pastoreo Puica, luego presento un panorama general de los estudios recientes sobre la domesticación de camélidos y su expansión hacia el norte del Perú, así como el surgimiento del poder político en esta región. También se discuten algunos temas relacionados con la trascendencia del pastoreo para la formación de la civilización andina al mostrar datos etnográficos.

Con base en los estudios de Kuntur Wasi y Pacopampa, investigadores han señalado relaciones entre el auge del poder político y el uso de llamas para el comercio en zonas distantes, además de la manutención de estos animales con maíz en terrazas de cultivo después de las cosechas, lo cual aumentó la productividad del maíz al emplearse estiércol como fertilizante. Asimismo se han utilizado llamas como ofrendas de sacrificio, banquete en las festividades y fuente de fibra en el campo de la textilería. Los datos etnográficos dan recursos para la discusión de estudios arqueológicos, así como también pueden mostrar imágenes concretas de prácticas como las caravanas de llamas, su manutención con maíz, sus sacrificios, etc. Por otro lado, el pastoreo andino en la actualidad carece de algunas características que tuvo el pastoreo de camélidos en el pasado como llamas de lana fina (utilizada para textiles) o la cría de estas en zonas costeras, lo cual se conoce por datos arqueológicos de zonas costeras bajas donde el clima es muy seco y permite que los restos de animales se conserven mejor. Así estos datos contribuyen a los estudios antropológicos sobre domesticación y pastoreo.

Después de la invasión española en el norte del Perú, la crianza de camélidos fue reemplazada en su totalidad por la crianza de vacas, caballos, ovejas y cabras traídas de Europa. Por otro lado, en la sierra sur del Perú grupos indígenas han mantenido sus prácticas pastorales tradicionales al cuidar de llamas y alpacas. Desde esta perspectiva, la colaboración que involucra estudios etnológicos sobre el pastoreo junto con los estudios arqueológicos sería más valiosa en el futuro. Además, las características únicas del pastoreo en los Andes serían cruciales para el estudio de la domesticación y pastoreo de animales en general. Por lo tanto, la cooperación entre investigadores en los campos de la arqueología y la antropología cultural sería más útil.

1 Introduction

Four kinds of camelid inhabit the Andes: two of them, llamas (*Lama glama*) and alpacas (*Vicugna pacos*), are domesticated, while the other two, guanacos (*Lama guanicoe*) and vicuñas (*Vicugna vicugna*)[1] , are wild. Genetic studies suggest that vicuñas may be ancestral to alpacas, with guanacos as the ancestors of llamas (Kadwell et al. 2001, Kawamoto et al. 2005)[2] .

Today, camelids are raised by indigenous people in the region of the *puna* or Andean high plateau south of central Peru[3]. Andean livestock plays an important role as a source of meat, hide, fiber, and dung; serving for rituals; and as pack animals.

Wild camelids have been inhabiting the region of the Andes south of central Peru and were domesticated inside the region. An important pioneering work on domestication by Wheeler and colleagues (1988, 1995) suggested that the first domestication of camelids (alpacas) occurred on the central Peruvian *puna* (high plateau) in around 4000 BC. Later studies suggested other centers of domestication, including the highlands of northwestern Argentina and Bolivia, where llamas were domesticated (Moore 2016)[4] . Camelids domesticated in the Andean highlands south of central Peru spread to the valleys and coast, and also to northern Peru, which is an area outside of the habitat of wild camelids. They were the main resource for Andean economies and social lives, and played a key role in the expansion of early states, starting with Tiwanaku and then the Incas (Yacobaccio 2004).

In the central Andes, the earliest monumental structures were built in northern Peru[5]. Complex societies first emerged in the coastal and lower mountain areas based on the rich marine resources and early horticulture, and then they spread to the highlands.

As Dufour and Goepfert (2019) mentioned, pioneering works carried out in the 1980s and 1990s suggested that camelid livestock breeding would have been possible locally on the northern Peruvian coasts, even though the climatic and environmental conditions were drastically different from those of the original place of domestication and husbandry (Bonavia 1996). Shimada and Shimada (1985) argued that camelid (llama) breeding and herding, introduced from the south, played various important roles in the rise of civilization on the north coast of Peru based on their analysis of data from their own excavations and other archeological studies published, as well as physiological and ethnological data[6] .

Then, local breeding was demonstrated by recent stable isotope analyses performed in northern Peru (Dufour and Goepfert 2019, Takigami et al. 2019), along with the excavation of important archeological sites. One of the most interesting themes is the relationship between the rise in political power and pastoralism of camelids in this region.

Data obtained by the studies of two archeological sites that have been intensively excavated, Kuntur Wasi and Pacopampa, located in the Northern Peruvian highland, revealed the tangible emergence of social hierarchy and political power in around 800 BC (the beginning of the Late Formative Period) (Onuki 1997, Onuki and Kato 1995, Inokuchi 2008, Inokuchi and Druc 2019, Seki ed. 2017). Among the evidence of social differences were special tombs with offerings of precious materials, including gold and copper, and exotic materials such as tropical shells and obsidian, brought in via long-distance trade. Evidence of the beginning of camelid husbandry during the same period has also been identified, leading to discussions of the significance of camelids in the formation of the Andean civilization in Northern Peru (Uzawa 2008, Takigami et al. 2019).

I have been studying mainly Andean indigenous pastoral society since 1979, when I engaged in fieldwork

for about 16 months in the District of Puica, Cotahuasi Canyon, Arequipa, southern Peru (Inamura 1981, 1986, 1988, 1995, 2006). I have also studied pastoral societies in Asia, conducting fieldwork in the Himalayas, Tibet, and Mongolia. Comparative studies have revealed the unique characteristics of alpaca and llama pastoralism in the Central Andean area, such as sedentarism and the lack of milk utilization (Inamura 2002, 2014).

In this paper, I first describe some ethnographical data on pastoralism in Puica[7] . Then, I present an overview of recent studies on the domestication of camelids and their spread to northern Peru, and the emergence of political power there. Finally, drawing on ethnographical data, I discuss some themes related to the significance of pastoralism and the roles of camelids therein.

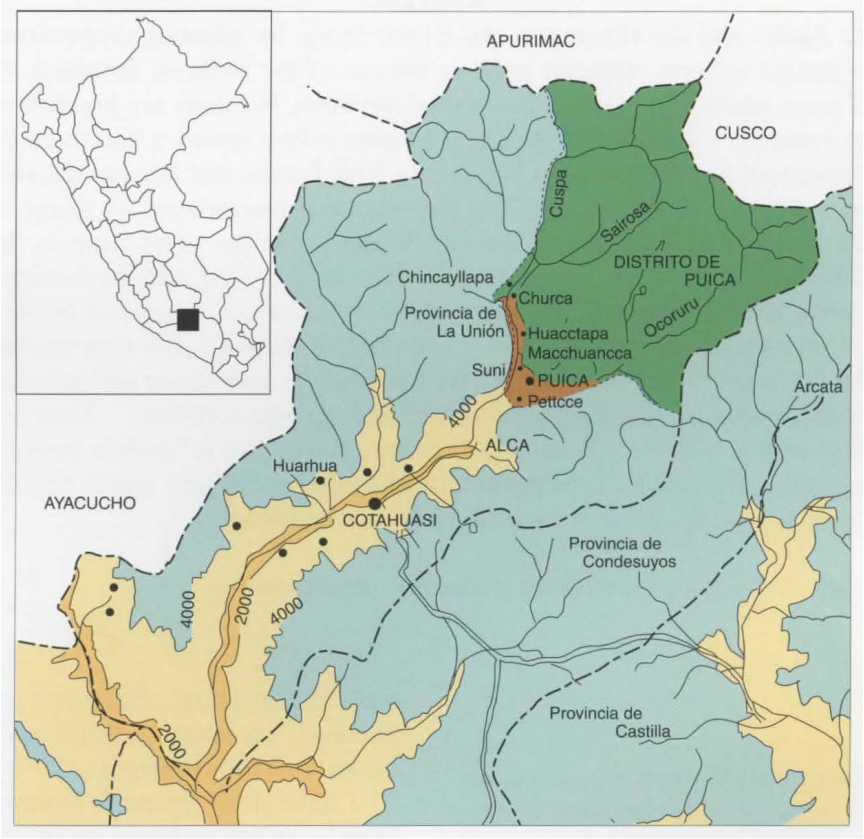
2 Traits of Andean Pastoralism

2-1 Pastoral communities in Puica District

The ecological environment of the Central Andean highlands is roughly divided into two ecosystems: the high plateau, called *puna,* and the valley, called *quebrada*. The Puica District extends about 30 km from south to north and from east to west, located in an area from around 3,000 to over 5,000 m above sea level (Figure 9.1). Thus, Puica includes both ecosystems and indigenous inhabitants in each area engaging in pastoralism and agriculture. These two communities in the district have a close reciprocal dependence on each other. A large part of Puica has a high plateau at more than 4,000 m, where herders raise alpacas and llamas, and the rest is valleys, where farmers cultivate potatoes, maize, and other crops on terraced farmlands.

Figure 9.1.

Map of Puica district, La Unión county, Arequipa.



In *puna,* there are u-shaped valleys that were formed by glacial erosion in the Pleistocene era, where rich *bofedals* (alpine wetlands) are scattered (Figure 9.2). Alpacas are mainly pastured in *bofedals* with rich vegetation, which are maintained throughout the year thanks to the melted ice derived from the snow-covered high mountains. Llamas are bigger than alpacas and are more adaptable to the diversity of the environment, so they are usually pastured in arid higher areas surrounding *bofedals.*

Figure 9.2.
Alpacas grazing in a bofedal (wetland).



Figure 9.3.
Llama caravan, A carguero (leeder llama) goes first and a herder is going behind.



In *puma,* each pastoral family (extended family) raises on average about 300 to 400 domestic animals, or up to around 2,000 at maximum; 70–80% are alpacas, with the rest being llamas. Some families also keep a small number of sheep, cows, and horses.

The purpose of alpaca herding is for wool production, because the quality of alpaca wool is superior to that of the llama in its strength, warmth, and texture. The wool of alpacas was once an important article in trading with farmers for agricultural products, but as it began to be exported abroad, it came to be sold mainly for cash, starting in the 1960s.

Llamas are used for transportation. A mature llama can carry up to about 40 kgs on its back and travel about 20 kms a day. A caravan is usually composed of 10 or more llamas (Figure 9.3).

Both alpacas and llamas are consumed for meat, although, not for milk. This is a unique feature of Andean pastoralism, very different from pastoralism in Eurasia and Africa (Inamura 2002, 2014). Another unique characteristic of Andean pastoralism is its sedentary nature. As explained in the next two sections, these characteristics are related to the ecosystem of the Central Andes and the close relationship between herders on the high plateaus and farmers in the valleys.

2-2 Composition of an *estancia* and sedentary pastoralism involving “micro-scale seasonal movement” inside an *estancia*.

In Puica, although farmers usually live in nuclear families, herders of *puna* tend to form extended families. An extended family is composed of two or more married brothers with their wives and children.

The household together with the surrounding

pastureland of a herder's extended family is called *estancia.* The average size of each *estancia* is approximately 20 km^2 in Puica. Herders living side by side recognize the boundaries of *estancias* based on natural features such as rivers, rivulets, ridges, and big rocks. The reason herders have extended families is to avoid dividing their *estancias* into smaller parts.

I drew a survey map of an *estancia* situated around 4,500 m above sea level (Figure 9.4, Inamura 1995, 2002). A extended family of herders usually has two domiciles within its *estancia*: the main domicile, called *qatun wasi* (casa grande), and a sub-domicile, called *asatana*. The main domicile is located near a rivulet, which flows from the slopes of the U-shaped valley, so it is easy to obtain water for daily life. The rivulet sustains the alpine moor plant community throughout the year, making the area suitable for raising alpacas[8]. At the main domicile, there are six stone houses, including deposits of food, with some large and small stone corrals for livestock (Figure 9.4A). Livestock sleep in big corrals, called *warans*, at night. Small corrals, called *rutuna cancha* (corral for cutting), are used for cutting alpaca wool, loading and unloading the freight of the llama caravans, or for rituals involving livestock. These corrals are small so that the herders can control the movement of the domestic animals inside of them.

Food and daily necessities are kept in the main domicile, and some of the family members, and all of the livestock, move seasonally between the two domiciles. During the dry season from May to October, they move about every month for grass rotation between these two domiciles. During this season the domestic animals sleep inside a half-opened *waran*.

During the wet season from November to April, some of the family members with livestock stay at the sub-domicile, located on a well-drained, gently rising hill. The

Figure 9.4.

Map of an estancia (drawn by Inamura).

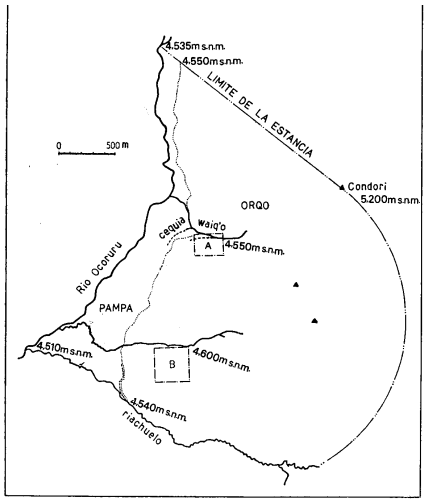


Figure 9.4A.

Main comicile of the estancia.

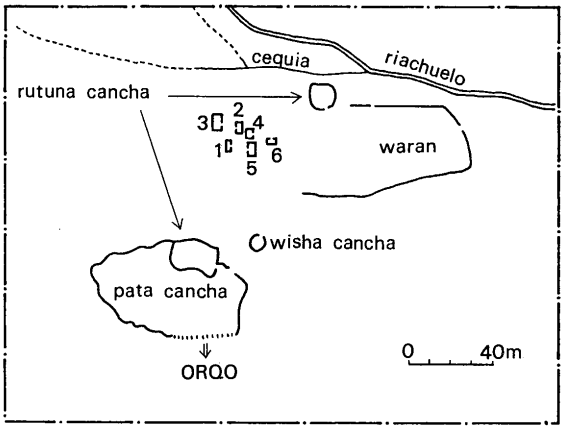


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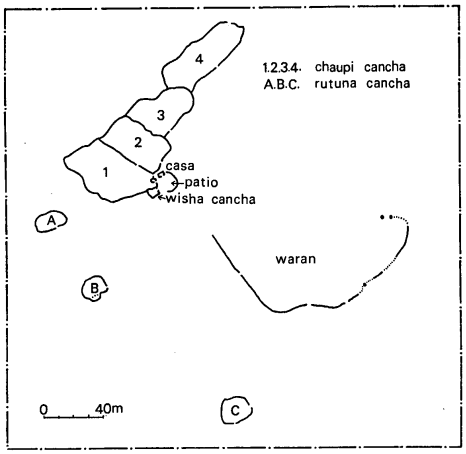
Figure 9.4B.

Sub domicile of the estancia.



sub-domicile has only one house and many large and small corrals for livestock (Figure 9.4B, Inamura 1995, 2002). They use the corrals in rotation for the following reasons:

The wet season is the time of lambing for domestic animals. To protect newborn animals from foxes and condors, livestock are kept inside a large, neatly closed corral *chaupi cancha* (central corral) at night. On the other hand, Andean camelids have a habit of leaving their dung in one area. In the wet season, the ground of the corral gets muddy with a mixture of dung and water, causing the risk of pollution with contagious bacteria. Therefore, it is important to maintain clean corrals in order to reduce the death rate of newborn animals. This is the reason why the sub-domicile is located on a well-drained site and has many corrals for rotation. The herders rotate *chaupi cancha*, or big corrals (1, 2, 3, 4), as well as *rutuna cancha*, or small corrals (A, B, C) (Fig. 4B).

The seasonal movement of the herders occurs on a micro-scale, limited to the area of one *estancia*, and its most important objective is to secure better conditions for the corrals in the wet season. This seasonal migration is far different from the pastoral transhumance practiced by Himalayan yak herders. The distance between the domiciles is only slightly more than 1 km, and there is hardly any difference between the altitudes of these places. Therefore, we can consider Andean pastoralism of this type as sedentary.

Figure 9.5.

Llamas on a terraced field, pasturing maiz after harvesting during the herders are staying in Puica village for the transportation of crops.



2-3 Lack of milking and the importance of llamas for obtaining agricultural products

Andean pastoralism also has the unique feature of not utilizing milk. Even though some herders engage in complimentary agriculture, possessing farmland derived from intermarriages between farmers, a large number of herders are specific pastoralists (without farmland) in Puica. Even though they have many animals, they cannot consume meat as their main diet because if they constantly slaughter their livestock, they cannot be maintained. Thus, their main diet is agricultural products such as potatoes and maize obtained from farmers. There are two traditional ways to acquire agricultural products. One is to get them in exchange for fresh meat, dried meat, and other objects such as rock salt, dry fruits, and pottery that are carried from other places by llamas. The other is transportation services using llamas, as follows:

In the valley, the farmers harvest potatoes and other tubers in April and maize in May and June. At each harvest time, the herders go down to the village and stay at the house of a close farmer for around one month. Answering the requests of some farmers, they engage in carrying crops on the backs of their llamas during their time in the village. If the herders carry 10 sacks of crops from a farmer's terraced fields to his house, generally 1 sack from the farmer is gifted. Thus, by providing transport services to several farmers, considerable quantities of produce can be acquired. During their stay in the village, the herders lead their llamas to the terraced fields after a harvest to feed them leftover maize cane (Figure 9.5).

2-4 Rituals involving domestic animals in the Andes

Herders practice rituals on various occasions related to important pastoral activities, such as the departure and arrival of the caravan for bartering products, for participation as *carguyoq* for the catholic feasts held in farmers' villages (which I explain in the next section), for shearing the wool of alpacas, for the treatment of skin diseases among livestock. The rituals are composed of *t'inka* (offering *chicha* or liquor made of corn; the action of pouring it), *q'ompo* (burning incense), and *mesa. Mesa* is a ritual performed on a table (*mesa* in Spanish) made of stone placed inside a corral. On the flat stone, they spread a *mesa q'epi* (package wrapped by a cloth) and set wooden plates and shells, on which they arrange maize grains, incense, flower petals, alpaca and llama fat, coca leaves, *llampu* (corn flour), and the powder of different kinds of ore. These are the offerings to spirits such as *Pachamama* (goddess of the earth), sacred mountains, etc. Participants bring these offerings near their mouths and chant the names of the spirits successively. They then cast the offerings into a fire burning in a niche in the stone wall of the corral.

The most important ritual for the herders is *puqllay* (meaning play or recreation), performed as a prayer for the healthy growth of livestock. I participated in this ritual in February 1979 at an *estancia* on the *puna* Ocoruru in the Puica District. The extended family occupying this *estancia* was composed of three component families that independently owned their livestock animals, although all the extended family members jointly raised their animals together. The rituals continued for 12 days as they were performed for all of the animals belonging to the component families. I will present an overview of the most important parts of the rituals held for a group of female llamas of a component family.

On the first day, they sacrificed a male alpaca. They pulled the alpaca down with its right side up and tied its legs. The head of the component family cut its side and inserted a hand to cut a blood vessel. He then pulled out the heart of the alpaca and put a paddle of blood into the intestine taken from the body of the alpaca. Next, they placed the heart in a ceramic basin. They then poured the blood from the intestine onto the center of the corral where they performed the ritual.

The following morning, they gathered in the corral, bringing a *mesa q'epi*, and started a fire in the center, which they called *qonu pacha*, meaning a hot place (of *Pachamama*). After *q'ompo* and *t'inka*, they performed *mesa*. They prepared offerings consisting of many plates for the various spirits and multiple llamas and alpacas, and offered them to *qonu pacha* after chanting.

In the afternoon, they grilled the meat and intestines of the sacrificed alpaca, and ate them together with a special food called *sanku* (corn dumpling). This holy meal is called *samekuy*. After the meal, they drove a group of female llamas into the corral where the women purified them by performing *q'ompo* and scattering *llampu* (corn flour) over the llamas.

Thereafter, they pulled down three infant llamas at the center of the corral, where they were rubbed with a paste of ground corn, *chicha* (liquor made from corn), and *wera* (fat from camelids), and coca leaves were placed on their heads. The chief of the component family then prayed by raising the basin containing the heart of the sacrificed alpaca and *uña llamita* (coat of an alpaca fetus) (Figure 9.6). The oldest man of the extended family pressed an apple against the people holding down the llamas and against the llamas themselves, saying "*Samerikusun kallpan kananpaq* (Let us renew)."

Such rituals are held for all the different groups of both sexes of llamas and alpacas belonging to different component families.

Figure 9.6.

The ritual of Puqllay, blessing three new born alpacas with uña llamita and heart of an alpaca sacrificed in a clayware.



2-5 Indigenization of Catholic tradition, reciprocity, and redistribution

The feasts of Catholic saints are important events to strengthen the ties of members of a community. Farmers as well as herders participate in the feasts held in the village of Puica, so the feasts work to reinforce the relationship between them. They nominate people called *carguyoq* (*cargo* holders), who embrace *cargos* or roles in the feasts in Puica. Three important feasts are celebrated in Puica Village: *Virgen de Concepción*; *Santiago*; and *San Juan* and *Santa Bárbara*. The feast of *Virgen de Concepción* is exclusively celebrated by the farmers of Puica village. The feast of *Santiago* involves both farmers and herders. *San Juan* and *Santa Bárbara* are patron saints of herders, who therefore hold their feasts. To celebrate the last two feasts, some herders are nominated as *carguyoq*. When a herder assumes a *cargo* in a feast, he should come down to the village to carry out his obligation, such as preparing a special altar or participating in a procession of a Catholic saint with his llamas. He also offers a banquet for more than a week in a house of his close farmer, *compadre* in many cases, inviting all the inhabitants to attend. He should bring the meat of an alpaca from his *estancia*, prepare enough food and *chicha* (alcohol made from corn) in collaboration with his *compadres* and other close farmers, and offer music, inviting musicians to play the indigenous harp and violin.

There are four main *cargos* arranged in order and ranking. The system of *cargos* is relative to "redistribution." A *carguyoq* does not receive any remuneration; rather, he should spend a lot on the banquet for the feast. In return, he will gain prestige in the community[9], and by completing all the *cargos* in his lifetime, he becomes an elder of the community and gains respect and influence.

3 Significance of Llamas to the Formation of Political Power in the Andean Civilization

3-1 Domestication of camelids in the Andes

Wheeler (1984, 1988) concluded that the domestication of alpacas began in the Central Peruvian highlands in about 4500–4000 BC, based on data from the excavation of Telarmachay cave on the high plateau of Junin. To uncover evidence of domestication, she analyzed the proportion of camelids in animal bone assemblages (increase in camelids in comparison to cervids), the age distribution of camelids' bones (abrupt increase in the death rate of newborn camelids), and morphological changes in the teeth (emergence of alpaca-type incisors), although she could not determine the domestication of llamas because it was impossible to distinguish differences in the teeth of llamas and their ancestral wild animals or guanacos.

Recent studies have elucidated the domestication of llamas. Moore (2016) suggested, based on the current evidence, three separate possible camelid domestication events: first in the central Peruvian *puna* (as Wheeler suggested), second in northwestern Argentina, and third on

the Bolivian high plateau (Browman 2016). She suggested that the Argentina camelid evidence obtained from fibers and bones supports the domestication of llamas as early as 5,000 years ago, and the development of cargo llamas as a relatively later stage (3,000 years ago) in the control of llama behavior and ecology. She also said that the evidence indicates clear apparent domestication of large camelids (llamas) by at least 3,000 years ago in Bolivia, which is generally too dry for vicuñas (and thus also alpacas).

Researchers believe that the camelids found at the archeological sites in Northern Peru are llamas, judging from their bone size, although discerning the remains of llamas from alpacas is not easy because there is little difference between the bones of the two, except for the incisors of alpacas (Uzawa 2017).

Ethnographic evidence coincides with this opinion because actual alpacas are confined to pasture in the *bofedal* (alpine moors) on *puna* (high plateaus). On the other hand, llamas can feed in rather arid areas and can be taken almost anywhere, as they are adaptable to various environments, even arid and hot climates. Wild camelids also show the same tendency. The vicuña's range covers the highest and coldest regions of the Andes, and the guanaco is less water dependent and more heat tolerant than vicuñas (Moore 2016). Llamas exhibit greater flexibility, while alpacas are restricted grazers (Vining 2016).

3-2 The spread of llama herding in northern Peru

From the samples of the excavation at the Pacopampa Site, located outside the habitat areas of wild camelids, researchers revealed not only the appearance of camelids but also the beginning of camelid breeding in northern Peru (Takigami et al. 2019). They extracted the remains of camelids from the PC-I (Middle Formative Period of Pacopampa: 1200-800 BC) and PC-II (Late Formative Period of Pacopampa: 800-250BC)[10]. Isotope analysis was used to identify the type of plants that the animals ate. The PC-I data showed that the main diet of camelids was C_3. They presumed that a small number of camelids that were raised in a region with predominantly C_3 vegetation (maybe the Andean high plateau) were brought to the site during the Middle Formative Period. On the other hand, dietary estimation of camelids of the PC-II indicated that they consumed C_4 plants (maize)[11] . This evidence suggests that they were likely fed maize leaves, stalks, etc., and that camelid breeding began at the site during the Late Formative Period. They assumed that the maize-foddering system led to a beneficial cycle: camelid dung works as a fertilizer and would have helped to increase maize production (ibid.).

This hypothesis of maize-foddering husbandry coincides with ethnographical data because I have observed scenes of llamas eating maize cane and leaves after harvest in the terraced fields on multiple occasions, when they were used to transport maize from the fields to farmers' houses, as described previously (Figure 9.5). However, in Puica, llamas are pastured for only one or two months in the terraced fields after harvesting, and it is not possible for llamas to be fed maize throughout the year. In Pacopampa, the isotope data showed that llamas used to eat C_3 food as well as C_4 food, so we can imagine the cycle of both maize-feeding and pasturing with natural resources.

3-3 Emergence of political power and social differences during the Late Formative Period in Northern Peru

The researchers who carried out the excavations at the Kuntur Wasi archeological site in the Northern Highland indicated evidence of certain social hieratchy, as follows: The architecture was developed in the Kuntur Wasi Phase (800–550 cal BC), and the main structure

was aligned symmetrically to a main axis. Four special tombs associated with several offerings were unearthed on the main platform. Cranial deformation was only found for individuals buried in these tombs, indicating the beginning of social differentiation (Seki et al. 2019). Rich archeological remains, including artifacts made of gold, tropical shells, precious stones, and obsidian, were found in burial and other contexts of the Kuntur Wasi and Copa Phases (Uzawa 2019).

Precious offerings—like Strombus and Spondylus shell artifacts from the Ecuadorian coast and stone ornaments made of sodalite from Bolivia—indicated the importance of extensive interactions such as long-distance trade, as well as being evidence of the power exercised by leaders who controlled these materials (Seki et al. 2019).

The data from Pacopampa almost correspond to that from Kuntur Wasi: the relatively egalitarian societies of the Early and Middle Formative Periods were transformed into societies of the Late Formative Period, when social differences were tangible (ibid.). However, the characteristics and source of the power that leaders used at both sites are different[12] .

According to Seki (2006), the appearance of these exotic artifacts in the Late Formative indicates the development of an elite class who used these luxury items to form the base of their political power and control long-distance trade. Based on the notion of Burger (1992)[13] , Uzawa (2019) indicated that domesticated camelids, more precisely llamas, would have contributed noticeably to transporting materials between widely separated societies.

3-4 Camelid (llama) herding and the roles of llamas

In addition to the important role of llamas as pack animals in the formation of political power, researchers have argued about how llamas were bred and what other roles they had. According to Uzawa (2019), the introduction of llamas was not necessarily intended to resolve the need for meat but rather to fulfill social functions. The thinking is that the demand for meat could be satisfied by deer hunting, which continued until the end of the Sotera Phase, the last phase of the Formative Period at the Kuntur Wasi site. In Pacopampa, researchers presume that llamas would have initially been used as a tributary or ritual animal rather than as a food resource in the Middle Formative Period (PC-I), as sufficient protein resources were available, such as deer, freshwater fish, and guinea pigs, living around the Pacopampa site. Also, in PC-II (Late Formative Period), camelid husbandry would have been introduced for other purposes, such as transportation, trade, or the production of woolen fabrics (Takigami et al. 2019) [14].

We can grasp the real images of the diverse utilization of camelids by way of the archeological data from later periods. Burials of camelids accompanied by high-status humans is widely reported in the Andes in various cultural periods (Browman 2016). The discovery of 26 perfectly preserved, naturally desiccated alpaca and llama mummies at the Chiribaya culture (AD 700–1300) site of El Yaral, located in the extremely arid coastal desert of southern Peru, provided the first reliable example of the existence of camelid herding there during the pre-Inca period, as well as evidence of their sacrifices. Researchers could classify the animals according to the quality of the fiber, and indicated the existence of fine-fiber llamas (Wheeler 2012).

At Huachaquito-Las Llamas (AD 1400–1450) on the northern Peruvian coast, the animals sacrificed were mostly young (less than one year old) and selected according to their coat colors; only those that were brown, beige, or mixed were used (Goepfert & Prieto 2016, Dufour et al. 2019).

Chronicles written after the Spanish conquest also report various cases of camelid sacrifice. For example, José

de Acosta (1951) mentions that people paid much attention to the coat colors of the camelids sacrificed according to the season and purpose of the ritual. According to Wheeler (2012), under Inca rule, an annual census was taken of the state and shrine herds. Special emphasis was placed on breeding pure brown, black, and white animals for sacrifice to specific deities, as well as on quality fiber production for the state-controlled textile industry and the production of sturdy pack llamas for the Incan army.

Uzawa (2017) assumed the use of llama fiber as a textile because many spindles were found in Pacopampa, although it is possible that the spindles were for cotton. Today fine-wool llamas have disappeared, and llama wool is only used to weave sacks for transporting things like crops using llama caravans. Hence, the ethnographic data do not coincide with the hypothesis, but archeological data from coastal areas during later times may support the use of llama fiber as a textile.

4 Conclusion and Perspective

Ethnographic data can provide a concrete image of the usage of camelids, although they cannot be used directly as evidence for archeological studies. The main diet of herders was agricultural products that they obtained from farmers by means of barter trade and the transportation of crops, although camelid meat was an important nitrogen source. On the other hand, we also have knowledge that they consumed much camelid meat on the occasions of feasts in farmers' villages. We can also observe the actual Andean herders' rituals, including the sacrifice of an alpaca with its heart extracted, offering it to sacred mountains and *Pachamama.* After the ritual, all members of the extended family eat the meat of the sacrificed animal together with the spirits that they worship.

We could also consider the weight of domesticated camelid meat as a special food for feasts, rituals, and sacrificed objects in the context of the archeological sites in Northern Peru. Uzawa (2017) focused on a semi-underground patio in Pacopampa, identified as a place for feasts, where many fragments of earthenware and animal bones were found. Llamas and deer were the most important among the nine species of mammals. I think that feasts had symbolic and economic functions relating to redistribution, both of which were important for the prestige of political leaders.

In this article, I discussed the significance of camelid herding in the rise of the complex society and political power in northern Peru. I hope that the ethnographic data have evoked discussions that lead to archeological studies and provided concrete images of the activities of domestic camelids and their herders, such as feeding cornstalks in the terraced fields after the harvest, traveling in caravans, conducting rituals, and holding feasts.

On the other hand, actual Andean pastoralism lacks some elements that past camelid herding had, such as llamas with fine wool (used for textiles) and llama breeding in coastal areas, which we know about from archaeological data in coastal and low areas where the climate is very dry and the remains of animals are well preserved. Textiles are another source of information. These data contribute to anthropological studies of domestication and pastoralism. The establishment of trade between different ecological levels in the Andes, described using the concept of "Andean verticality and the archipelago" for the Inca period (Murra 1975, 2002), has been considered as the basis for the emergence of complex societies in the central and south-central Andes (Dufour & Goepfert 2019). Domesticated camelids played an especially important role in this development. However, we do not have a clear picture of when, where, and how this development occurred. Northern Peru may be the most important area for that theme because

it is where the earliest large-scale public and monumental structures were constructed. Additionally, northern Peru is not in the habitual region for wild camelids, which clarifies that all the remains of camelids excavated in archeological sites were domesticated.

After the Spanish invasion, in northern Peru, the raising of camelids was completely replaced with the husbandry of cows, horses, sheep, and goats brought in from Europe. On the other hand, in Southern Peru's highlands, the indigenous people have maintained the traditional pastoral practice of keeping camelids (llamas and alpacas). Therefore, collaboration involving ethnological studies on pastoralism in Southern Peru and archeological studies would be more valuable hereafter. Furthermore, the unique characteristics of pastoralism in the Andes could be vital to the study of animal domestication and pastoralism in general; thus, cooperation between researchers in the fields of archeology and cultural anthropology would be useful.

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[1]They are extant New World camelids (order: Artiodactyla, family Camelidae), a mammalian family whose lineage can be traced to the Eocene of North America (Stahl 2008).

[2]Renaming of the alpaca (V. *pacos*) has been fixed to accord with molecular studies (Kadwell et al. 2001, Stahl 2008). Traditionally, the ancestry of both llamas and alpacas was attributed to the guanaco, while the vicuña was assumed never to have been domesticated (Kadwell et al. 2001).

[3] The pioneering ethnological studies were practiced by J. A. Flores Ochoa and his colleagues (Flores (ed.) 1988).

[4] The evidence shows that domestication of the llama took place in several Andean locations, while evidence for the domestication of the alpaca comes only from the ***puna*** de Junín (Yacobiccio 2004).

[5]The period, known as the Late Preceramic period (roughly between 3000 and 1800 BC), has recently attracted much attention because of massive amounts of public construction documented at major sites on the north-central coast, such as Caral (Shady et al. 2001), and claims that these constructions constituted evidence of Peru's "first civilization" (Burger 2012).

[6]Some of the ethnological data is what I offered them when we met in Lima just after I finished my fieldwork in Puica (Shimada and Shimada 1985).

[7]There are agro-pastoralist societies in the Central Andes, in areas such as the eastern slope in southern Peru, studied by some researchers (Webster 1973, 1983; Yamamoto 1982, 1985). It is interesting to compare pastoralism and agro-pastoralism (Inamura 2002), although, I cannot deal with that theme because of the length limits of this article.

[8]Efficient mastication, fine fleece, and resistance to disease are attributed to pasture composed primarily of *'k'unkuna (Distichia muscoides and Plantago rigida)*, found in the high-altitude moors (Webster 1973). Llamas, with their broader tolerance for forage and terrain, are sometimes pastured in the intermediate or lower zones when their services in burden bearing are needed locally (ibid.)

[9]Details on the *cargo* system in Puica are provided in my previous articles (Inamura 1986, 1995).

[10]In the Central Andes, large-scale monuments and constructions began to be built around 3000 BC. Instead of the Period of Early Horizon, which is based on the concept of the geographic spread of Chavín de Huantar's cultural elements, some researchers who have been engaging in the study of the formation of Andean civilization have proposed the chronology of the Formative Period, based on recent studies (Seki ed. 2017), as follows:

Initial Formative Period: 3000–1800 BC
Early Formative Period: 1800–1200 BC
Middle Formative Period: 1200–800 BC
Late Formative Period: 800–250 BC
Final Formative Period: 250–50 BC

[11]Although maize and amaranth were cultivated C_4 plants in the ancient Andean region, in Pacopampa, only maize has been observed in analyses of starch granules on human teeth and ceramics (Takigami et al. 2019).

[12]Seki and his colleagues mention the differences in the sources of power used by the leaders of the two sites: the leaders at Kuntur Wasi focused on long-distance trade in precious goods and rejected previous architectural structures (and probably the earlier ideology as well). The leaders at Pacopampa focused on the production of copper objects as well as long-distance trade, and they chose to partly respect the traditional ideology. Reusing the axis and some architectural components indicate the incorporation of the landscape and its related ideology or cosmology in the new social arena (Seki et al. 2019).

[13]Burger (1992) suggest that an impressive variety of foreign ceramics allowed scholars to trace the wide-ranging ties maintained by the center and that these patterns of exchange may have been important in terms of maintaining the prestige of Pacopampa and its leaders.

[14] There are different opinions; for example, Moore (2016) believes that the introduction of llamas to the coast of Peru 3,000 years ago does not necessarily imply that the llamas there were only used as cargo animals, but perhaps the main focus in introducing and pasturing them was for meat.

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10
Evolution of the Human Cognitive System and Human Civilizations Viewed as Phase Transitions of the Primate Brain's Neurobiological Mechanisms

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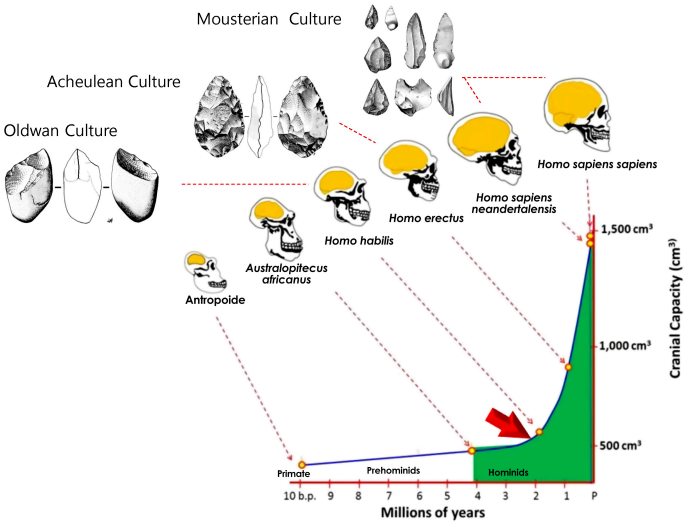
The brain capacity of human ancestors underwent two phase transitions, resulting in the emergence of modern civilizations: (1) The emergence of the primate cerebral cortex, with its unique characteristic of additional cortical areas accompanying size expansion; and (2) the replacement of natural selection as the main evolutionary mechanism by "Triadic Niche Construction", an interactive expansion of ecological, neural, and cognitive niches. The latter seems to have been triggered by the use and manufacture of tools, which led cognitive capacities to exceed the threshold for the emergence of language and self-consciousness that eventually allowed the formation of modern civilizations through intentional modification of the environment. Elucidating these developments would enable us to predict a third phase transition, which may be induced by the current explosion of artificial intelligence, accelerating human cognitive capacities to cross the next threshold required to overcome the "Limit of Growth" that our current civilization seems to be facing.

La capacidad cerebral de nuestros antepasados humanos experimentó dos fases de transición, lo que generó el surgimiento de civilizaciones modernas: (1) El surgimiento de la corteza cerebral de los primates, con su característica única de áreas corticales adicionales que acompañan a la expansión de tamaño; y (2) el reemplazo de la selección natural como el principal mecanismo evolutivo por la "Construcción de Nicho Triádico", una expansión interactiva de los nichos ecológicos, neuronales y cognitivos. Esto último parece haber sido desencadenado por el uso y fabricación de herramientas, que llevaron a las capacidades cognitivas a superar el umbral para el surgimiento del lenguaje y la autoconciencia que finalmente permitió la formación de civilizaciones modernas a través de la modificación intencional del entorno. Aclarar estos desarrollos nos permitiría predecir una tercera fase de transición, que puede ser inducida por la actual explosión de la inteligencia artificial, acelerando las capacidades cognitivas humanas para cruzar el siguiente umbral requerido para superar el "Límite de Crecimiento" que nuestra civilización actual parece estar encarando.

The brains of human ancestors were developed through preadaptations with (1) a tendency for gradual expansion, (2) the potential for gene-culture (through vocal communication) coevolution, and (3) the unique characteristic of novel cortical areas being added along with volumetric enlargement. These brains encountered an opportunity for phase transition (Evolution du volume cérébral des Hominidés, n.d.) when ancestral hominids started making and using stone tools (Figure 10.1). Despite the human brain not being an outlier among those of primates in regard to its cellular composition and size, the manufacturing and usage of tools could have induced fundamental differences, such as the corticalization of motor control, combined with an already moderately advanced cognitive and vocal communication capacity. Thus, tool usage led to the development of the human mode of language in our ancestors through the allocation of overlapping and recently expanded brain areas.This consequently provided the means for the transmission of knowledge and eventual formation of modern technological civilizations. We previously proposed the theory of triadic niche construction (Iriki & Taoka, 2012)—an accelerated positive feedback loop for expansions among (i) neural (brain), (ii) cognitive, and (iii) environmental niches—as the mechanism responsible for such phenomena. In other words, human evolution is characterized by continuous processes of adding new modalities of cognition, including the manufacturing and usage of tools and linguistic faculties, supported by dramatic brain expansion and the accompanying addition of new functional areas. Such extended brain functions have driven rapid and drastic changes in the hominin ecological niche, which have in turn demanded further brain resources to adapt to them.

Figure 10.1.

Cranial capacity of hominids and lithic technology.



*Note.*Transition of cranial capacity (vertical axis) along the evolutionary process of various ancestral prehominids and hominids (horizontal axis). Adapted from (Evolution du volume cérébral des Hominidés, n.d.). Inset illustrations of a skull and brain depict representative hominids plotted on the graph. Brain expansion suddenly accelerated when *Homo habilis* started manufacturing and using stone tools (oblique red arrow). Insets of stone tools (top left) depict the development level of stone tools in each culture. Oldwan culture: The earliest widespread stone tools were simple, usually made with one or a few flakes chipped off with another stone, and used by *Homo habilis*. Acheulean culture: Stone tools characterized by distinctive oval- and pear-shaped "hand-axes", manufactured and used by *Homo erectus*. Simple syntax in vocal communication, a primitive form of human language, is thought to have been required for the transmission of this culture. Mousterian culture: Technically complex and significant archaeological industry of lithic tools developed from *Homo sapiens neanderthalensis* through early *Homo sapiens sapiens*. Complex and rich semantic contents and syntax, close to modern human language, were necessary for the transmission and inheritance of this culture. Adopted with permission from (Bretas et al, 2019, Figure 1).

Thus, in this manner, the evolutionary mechanism has shifted from passive "natural selection" to an active triadic niche construction phase, which has led and continues to lead humans' cognitive, communicatory, and technological capacities into a continuous innovation loop throughout its history. Human language emerged during this shift in the evolutionary force, featuring an additional layer over the existing animal proto-language layer. Language then became a powerful instrument in this continuously accelerating triadic niche construction. Despite understanding the connection between language and evolution, some critical factors remain unknown: For instance, how did this accelerated expansion exceed the "threshold capacity" for the emergence of a novel mode of communication (human language) derived from (and in addition to) the original mode (animal language)? What was this threshold and how was the emergence of discontinuous qualitative differences induced from continuous quantitative differences? Extrapolating these developments would further enable us to predict the next phase transition, which may be induced by the current explosion of artificial intelligence, accelerating human cognitive capacities to the next threshold required for a novel mode of civilization.

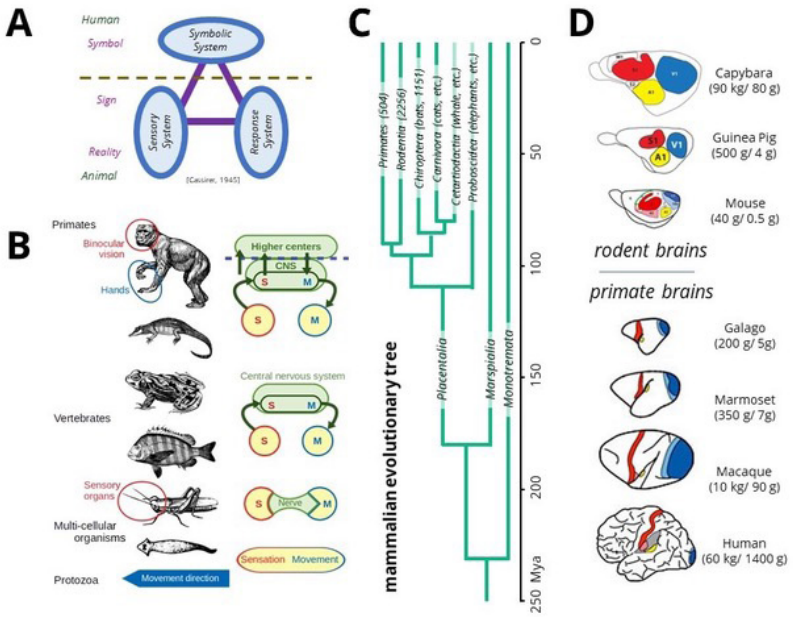
The First Phase Transition: The Uniqueness of the Primate Brain Among Mammals

The brain is a rostral-most ampulla of the nervous system that emerged during animal evolution for processing information to regulate various internal (via the autonomic nervous system) and external (via the somatic nervous system) bodily movements. While animals' bodies evolved to become larger and more complex, the nervous system also increased in size and complexity to connect input (sensory) and output (motor) organs to survive in and adapt to given environmental conditions. As evolution has proceeded, species one after another have appeared equipped with a neuraxis, higher centers, and eventually brain and cerebral cortices (Figure 10.2B). Such enlarged brain parts, initially devoted solely to sensory-induced motion generation, gradually developed the capacity for cognition and communication, and some species acquired language-like capacities. Finally, in humans, overlaying sensorimotor processing machinery formed a symbolic system (Figure 10.2A) that is predominantly governed by human language (Cassirer, 1944).

While numerous preadaptations of brain mechanisms seem to be implemented in multiple animal species that exhibit language-like vocal communications, why has human language emerged only in our evolutionary lineage? Was there anything special about primate brains? The three most successful (radiated in most numbers of species) extant mammalian orders (Figure 10.2C) (Estrada et al., 2017) have in common an ecology largely dependent on different sensory modalities (i.e., haptics in rodents, audition in bats, and vision in primates). The design of their brains could thus be different, adapting to different styles of interactions with their environments. A comparison of various-sized brains of primates and rodents (Dooley & Krubitzer, 2013; Ventura-Antunes et al., 2013), primates' closest mammalian order (Figure 10.2C), clearly depicts such differences (Figure 10.2D). Larger primate brains possess more different cortical areas (Fox et al., 2005; Kaas, 1997; Petrides & Pandya, 1999), whereas larger rodent brains remain rather straightforward analogous expansions of smaller brains (Dooley & Krubitzer, 2013). In the case of primates, maintaining sensory and motor precision, despite an increased body size without a proportional increase in spinal and peripheral fibers, could have been a significant factor in brain expansion and corticalization (Herculano-Houzel et al., 2016). Thus, once conditions became permissive, primate brains

Figure 10.2.

Evolution of the nervous system



Note. **A**: Cassirer's philosophy of the human being (Cassirer, 1944); the worlds of humans and animals are divided by the horizontal dashed line in the center. Animals experience the world through a direct connection of sensory and response systems, surviving through the detection of their current environment and optimally responding to it. These systems link only the physical environment and information encoded intrinsically therein. Humans possess a symbolic system in addition to the animals' sensory and response systems. A symbolic system can process abstracted symbolic cognition, which is disconnected from the subject and information in the real physical world, although it relies partly on it. **B**: Evolution of the animal nervous system; it first emerged to regulate bodily movements within an environment by connecting input (sensory) and output (motor) functions, originally linked directly within the cell in protozoa. As evolution made animals' bodies larger and more complex, the nervous system also increased in size and complexity to connect input (sensory organs accumulated at the front of the body in the moving direction) and output organs (motor organs located around the center of gravity of the body for efficiency), now separated by a substantial distance. Along the continuous evolutionary process, neurons were grouped closer together for efficiency and information processing speed, forming the central nervous system and eventually the telencephalon and cerebral cortex. The nervous system, initially devoted solely to sensorimotor processing, developed an overlay machinery of higher centers able to manipulate symbolic information detached from the physical environment (top right diagram; note that this structure resembles Cassirer's philosophy of the human being depicted in A). **C**: Phylogenetic tree of mammalian orders (vertical axis indicates millions of years in the past, from top to bottom). Rodentia (2256 species), Chiroptera (1151 species), and Primates (504 species) are the three most radiated orders among extant taxa (Estrada et al., 2017). Rodents are phylogenetically the most proximal order to primates, diverging less than 100 million years ago. **D**: Diagrams illustrating different brain organizations between rodents (top) and primates (bottom). Colored areas in the brain indicate primary sensory areas (red: somatosensory; blue: visual; yellow: auditory) in representative extant primate and rodent species of different body (first number in brackets) and brain (second number in brackets) sizes. Note the difference in the proportion of these primary (colored) and associated (in white) areas in differently sized brains between primates and rodents (Dooley & Krubitzer, 2013). Adopted with permission from (Bretas et al, 2019, Figure 3).

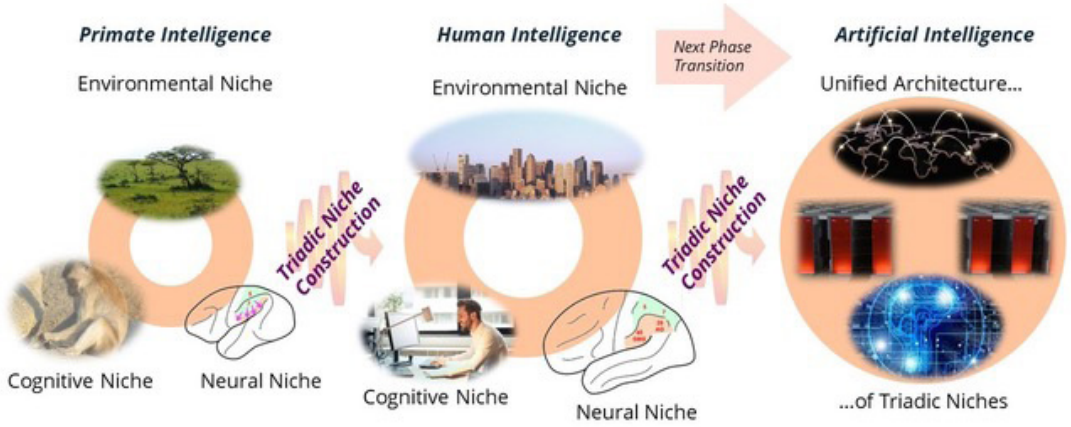
were ready to incorporate additional brain areas, thereby additional novel functions, one after another. Although the mechanisms of how this unique feature is implemented in the primate brain during evolutionary processes remains yet unknown, this constitutes the first major phase transition-like preadaptation that occurred in mammalian brains.

The Second Phase Transition: From Natural Selection to Triadic Niche Construction

As described above, brains of human ancestors were furnished through preadaptations with (1) a tendency of gradual expansion, (2) the potential of gene-culture (through vocal communication) coevolution, and (3) the acquisition of the unique designing principle of developing additional novel cortical areas along expansion. Such a brain encountered an opportunity for the next phase transition when ancestral hominids happened to start making and using stone tools (Figure 10.1). The usage and manufacturing of tools, when combined with already moderately advanced cognitive and vocal communication capacities, led our ancestors to develop a human-mode of language, which later allowed the eventual formation of human civilization. We have proposed the theory of triadic niche construction (Iriki & Taoka, 2012) as a mechanism to realize such phenomena (Figure 10.3). That is, human evolution is characterized by continuous processes of adding new kinds of cognitive capacity, including those relating to the manufacturing and use of tools and to the establishment of linguistic faculties. These processes were supported by a dramatic expansion of the brain that accompanied the addition of new functional areas, with such extended brain functions driving rapid and drastic changes in the hominin ecological niche, which in turn demanded further brain resources to adapt to it.

Figure 10.3.

Triadic niche construction feedback loop.



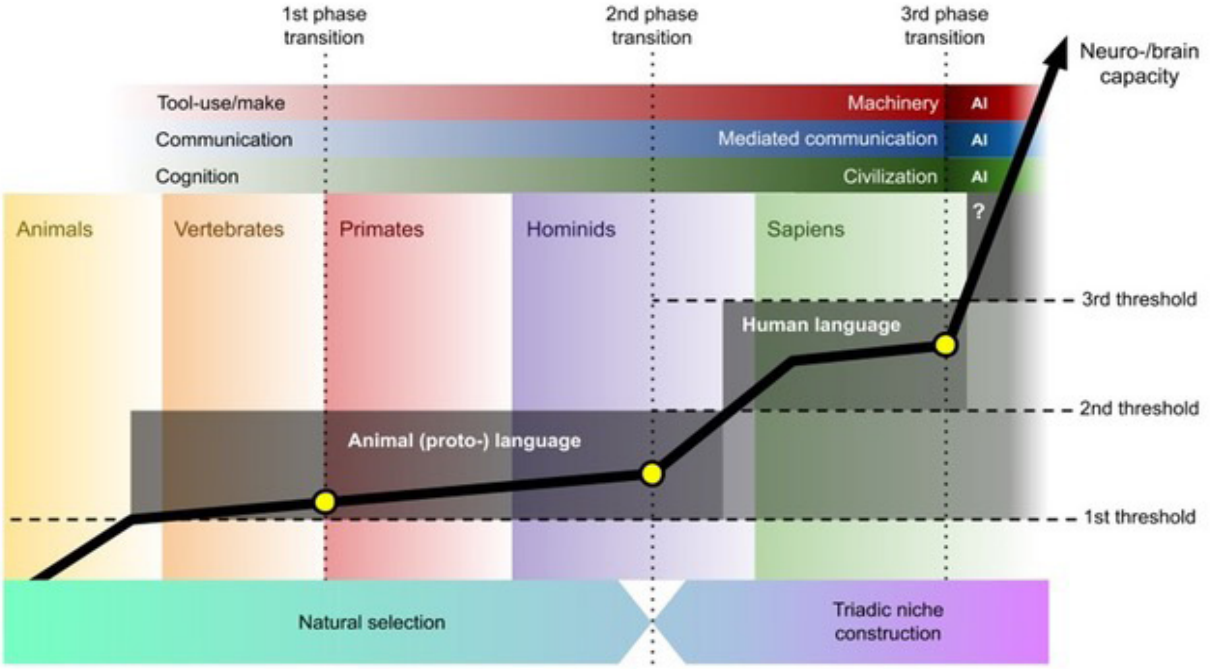
Note. Schematic depicting the concept of triadic niche construction (Iriki & Taoka, 2012), a continuous process of the addition of new types of cognitive capacities (cognitive niche), supported by brain expansion along with additional functional areas (neural niche). Those extended brain functions drove rapid and drastic changes in the environment (ecological niche), which in turn demanded further brain resources to adapt to them. Thus, a positive feedback loop was formed among the three niches, each of which would have continuously expanded through such interactions. A primitive form of triadic interaction in ancestral primates (left small open circle) gradually expanded through triadic niche construction, forming that of modern humans (middle larger open circle). The recent explosion of AI technologies may in the future link, subsidize, and replace human brain capacities, unifying different niches into a single interconnected architecture (right filled circle). Adopted with permission from (Bretas et al., 2019, Figure 4).

Thus, in this way, the phase of evolutionary mechanisms has shifted from passive "natural selection" into active triadic niche construction, which led human cognitive, communicative, and technological capacities for continuous innovation throughout its history. Human language, which emerged among these interactions and constituted an additional layer over the existing animal proto-language layer (Figure 10.4), would have made for a powerful mediator in such a continuously accelerating triadic niche construction (Iriki & Taoka, 2012).

Several critical factors yet to be known include how this accelerated expansion exceeded the "threshold capacity" for the emergence of a novel mode of language (human mode) deriving from and in addition to the original mode (animal language), and what such a threshold was and how those emergences of discontinuous qualitative differences have been induced based on continuous quantitative differences. The accumulation of knowledge through animal language studies is expected to provide an insight into this emergent property.

Figure 10.4.

Phase transitions of neuro-/brain capacity.



Note. Diagram illustrating the relationships between neuro-/brain capacity (vertical axis), evolution timeline (horizontal axis, not to scale, boxes represent different types of animal), phase transitions of brain mechanisms (vertical dotted lines), and hypothetical brain capacity thresholds (minimum level required) for the emergence of novel modes of language (horizontal dashed lines). During evolutionary history, phase transitions of brain mechanisms occurred twice and another third phase transition is expected in the near future. For most of the timeline, natural selection (bottom of graph), a passive combination of genetic mutations and environmental changes, dominated as the main evolutionary force. The first phase transition (the addition of new functional areas in the primate brain following size increments) precipitated qualitative changes in the manner in which primates interacted with their environment (Iriki & Taoka, 2012). In unison with more complex tool development, the mechanism of triadic niche construction (bottom right of the graph) accelerated changes in the hominid ecological niche (second phase transition), consequently becoming an active

evolutionary force. This resulted in a swift increase in brain capacity, creating the ideal substrate for human language to develop (middle gray shadow, second threshold). Continuous improvements in earlier tool usage/making, communication, and cognition (top of graph) are eventually expected to merge into a unified architecture with the aid perhaps of AI (third phase transition). This trend of brain capacity increasing in the near future, taking human language through a third phase transition, may lead to a more efficient, and still unknown, mode of language (top gray shadow marked "?", third threshold). Adopted with permission from (Bretas et al., 2019, Figure 2).

In humans, recent changes in diet, geographical dispersion, and population density have been inferred as the main causes for the recent rapid selection of multiple genes, some of which relate to lactose digestion in adults, tolerance to temperature extremes, and disease resistance (Laland et al., 2010). As evolutionary pressures mounted, the hominin brain also enlarged rapidly (Grabowski, 2016; Torrey, 2019, pp. 35–36, 59–61). Thus, the brain is not an exception to the biological principle that useful organs enlarge when supplied with increased demands and resources, such as the need for behavioral plasticity coupled with a richer diet (Riska & Atchley, 1985; Grabowski, 2016). As to how such genetic traits can be selected in only a few generations, extragenomic evolutionary mechanisms may account for the fast rate of change by exploiting latent features. The development of rich linguistic cultural diversity allowed post-Neolithic humans to adapt to swiftly changing ecological conditions (Roffet-Salque et al., 2018); new opportunities arose for genomic adaptation because augmented behavioral plasticity provided a buffer for natural selection processes (Crispo, 2007; Waddington, 1953). This process allowed for the rapid colonization of novel niches and demographic expansion, namely gene-culture (language) coevolution.

The Third Phase Transition: An Ongoing Shift by Artificial Intelligence

As depicted in the previous sections, the human brain, with the distinct cortical areas that characterize primate brains, together with its products, including civilization, economy, and industry, are all subserved by and based on the "principle of growth" (Meadows et al., 1972). While environmental resources could have been reasonably regarded as infinite when the human/primate population was small, we have now become conscious of the "limit of growth" (Meadows et al., 1972) after substantially exploiting terrestrial resources at the maturity of the Anthropocene (Crutzen, 2006). However, humans cannot be free from the "principle of growth" as long as they are a primate species. There could be a way to solve this problem by applying the theory of triadic niche construction (Iriki & Taoka, 2012)—i.e., to create novel dimensions of mental space with abstract and spiritual axes such as value, quality, or happiness, enhancing the human sense of a unified self the same way as the development of religion, seduction, or empathy did when humans developed a theory of mind (McNamara, 2009, pp. 28-29, 247; Torrey, 2019, pp. 35–36, 59-61). This novel cognitive niche could be exploited through the usage of human language-based mental functions (Cassirer, 1944).

Another further efficient and practical way to overcome the limit of growth is to expand such abstract niches with the aid of artificial intelligence (AI). The recent explosion of AI technologies has already begun linking with, subsidizing, and sometimes even replacing human brains. It now seems possible to unify different domains across cognition, technology, and environment into a single interconnected architecture (Figure 10.3), thereby accelerating the speed of triadic interactions close to an infinite level. In this architecture, novel dimensions to constitute abstract/

symbolic niches will be constructed and exploited to the theoretical extremity. By directly extrapolating the lessons reviewed over the previous sections on the transition from animal language to human language, it could naturally be assumed that we are now in the midst of experiencing a third phase transition, leading to the eventual exceeding of the next threshold capacity of our brain function required for the next mode of language to emerge in the near future. Such a next novel mode of "language" might be based on in silico algorithms or programming of sorts to be built overlaying the bases of animal and human languages (Figure 10.4), assisting humans in overcoming the natural limits that governed the evolution of the brain until now (Dunbar, 1998, pp. 197–199, 203–207).

Conclusion

The semantic richness and syntactic complexity of human language far exceeds that of the communication and cognition of non-human animals, most likely due to the vastness of the human brain (Dunbar, 1993). However, fundamental brain machinery subserving human and animal linguistic functions should share common fundamentals, where latent capacities that lead to such quantitative and qualitative differences should reside, through preadaptations in animal brains in precursory forms. A sudden phase transition-like explosive expansion seems to have happened in the paleolithic hominid brain (Figure 10.1; Evolution du volume cérébral des Hominidés, n.d.), which coincided with the onset of making and using various stone tools. This rapid expansion would have driven the human brain to cross a putative threshold capacity required for the human mode of language to emerge, which is thought to have coevolved with the development and transmission of stone tool cultures.

As summarized in Figure 10.4, animal proto-language emerged as a rather advanced communication/cognition ability when brain size exceeded the first threshold capacity during its gradual expansion through natural selection. Thereafter, brain structures and functions subserving language faculties went through two phase transitions (first and second phase transitions) in the animal proto-language period (lower shaded block) when gradual expansion continued, with some species exhibiting tool-using abilities. The first phase occurred when the primate brain (in which the mode of brain expansion shifted to allow additional new brain areas to emerge upon expansion; arrow in Figure 10.1) encountered tool usage by ancestral hominids. The second phase happened when the evolutionary mechanisms (formerly passive natural selection) shifted into a novel mode of active triadic niche construction—interactively accelerated expansion of neural/brain, cognitive, and environmental niches. This resulted in an explosive increase in brain size during which the threshold brain capacity for human language to emerge (second threshold) was easily surpassed. The reciprocal advances in tool usage and language allowed the transmission of technological knowledge required for the formation of human civilization (Corbalis, 2014). These processes can be immediately extrapolated to predict the future of human language and the consequent cultural and social changes, namely the expected third phase transition, perhaps aided by the development of artificial intelligence. In this way, human language can be viewed as an intermediary layer of a three-layered structure based on the proto-language of non-human animals with the next additional mode of language by artificial intelligence to be superimposed when future AI-aided brain capacity exceeds the next putative threshold capacity (third threshold).

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11
Potential Roles of the Gut-Brain Axis in the Cognitive Evolution of Primates

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The gastrointestinal tract has been proved to influence behavior through the interactions with the brain by several pathways including symbiotic microbiota. Animals forage on prey using their cognitive and motor skills, and the gastrointestinal tract subsequently engages in nutritional intake together with the residential microbiota. The maintenance of adequate nutritional conditions enables the learning of new skills and the acquisition of cognitive abilities for further adaptation to different environments. The relationship among the brain, gut, and microbiota, the so-called "brain-gut axis", formed during the evolution of each species. Using nonhuman primate species as models, we are analyzing the relationships between unique foraging behavior and gut microbiota, both of which adapted to the specific environmental conditions of their habitats. By doing so, the historical steps of human civilization can be viewed from new perspectives involving behavioral acquisition through interaction between the gut and the brain.

Se ha demostrado que el tracto gastrointestinal influye en el comportamiento mediante las interacciones con el cerebro a través de varias vías, incluyendo la microbiota simbiótica. Los animales se alimentan de sus presas utilizando sus habilidades cognitivas y motoras. Posteriormente el tracto gastrointestinal se encarga de la absorción nutricional junto con la microbiota residente en el organismo. El mantenimiento de unas condiciones nutricionales adecuadas permite el aprendizaje de nuevas habilidades y la adquisición de habilidades cognitivas para una mayor adaptación a diferentes entornos. La relación entre el cerebro, intestino y la microbiota, el llamado "eje cerebro-intestino", se formó durante la evolución de cada especie. Usando especies de primates no humanos como modelos, analizamos las relaciones entre el comportamiento de alimentación único y la microbiota intestinal, ambos adaptados a las condiciones ambientales específicas de sus hábitats. Al hacerlo, los pasos históricos de la civilización humana se pueden ver desde nuevas perspectivas que involucran la adquisición del comportamiento a través de la interacción entre el intestino y el cerebro.

The Gut-Brain Axis Regulates Behavior

The brain is obviously the locus of adaptive and effective behavior. Recent findings, however, show that our behavior is influenced by other organs that were not previously thought to be involved in brain function (e.g., Dum et al., 2016, 2019; Levinthal & Strick, 2012). Among the organs, the gut is one of the most important for digesting food items and absorbing nutrients necessary for maintenance of the host body, including the brain. In the gut, we have microbes that colonize us soon after birth and play an important role in nutritional intake.

In addition to these functions, the gut and cohabiting "microbiota" (a concept for the community of microbes as a whole) have pathways to communicate with the brain in several manners, both directly and indirectly (Collins et al., 2012). For example, the vagus nerve has been known to communicate with the brain (Bonaz et al., 2018), and a recent study described novel enteroendocrine cells in the small intestine rapidly signaling sensory stimuli to the brain stem (Kaelberer et al., 2018). Oral intake of a species of bacteria, *Lactobacillus reuteri*, improved the microbiota composition and social behavior of mice previously showing dysbiosis (Buffington et al., 2016), and it had similar positive effects on symptoms of a mouse model of autistic spectrum disorder through stimulation of the vagus nerve by the bacteria, inducing an increase in oxytocin levels and modulation of the reward system (Sgritta et al., 2018). Compared to the specific pathogen-free (SPF) population, germ-free mice showed altered performance, such as an exaggerated hippocampal-pituitary adrenal (HPA) response to mild stress (Sudo et al., 2004), increased motor activity, and reduced anxiety (Diaz Heijtz et al., 2011), all of which were reversed after colonization of microbes in the gut.

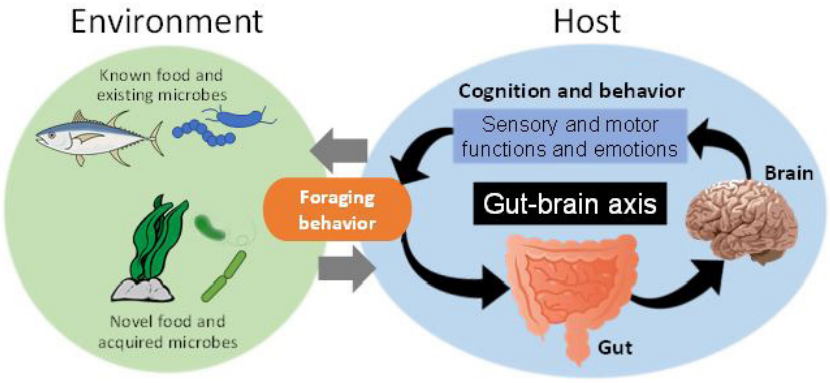
Although many of the studies listed above were of rodent models, interactions between the brain and gut in various aspects, the so-called gut-brain axis, is expected to also be important for primate species to develop various behaviors requiring motor, cognitive, emotional, and sensory functions. Among these sets of behaviors, foraging would be a good example to investigate the gut-brain axis because successful foraging enables individuals to take in nutrients necessary for maintenance of the host body, resulting in normal development of brain functions as a species.

Foraging behavior in each species shows unique characteristics that have been developed through interactions between organisms and the environment over a long period of time. Because environmental conditions are quite variable, acquired foraging behavior must be adjusted and modified. To change behavior in an adaptive manner, one must have excellent 1) sensory organs to process the environmental conditions, 2) motor organs to execute responses to obtain food items, 3) sensorimotor ability to coordinate these organs, and 4) cognitive ability to remember the results of the executed behavior and to integrate all information throughout the course of the interactions.

Species meeting these conditions may have been able to survive in their ecological niches over the course of their evolution. In turn, environmental microbiota helped them develop their own microbe communities in and on their bodies. These can be transferred across generations through social transmission by families and social units (Moeller et la., 2016; Yatsunenko et al., 2012). This microbiome community influences brain development by supplying neurotransmitters and metabolites, and the developed brain can learn new behaviors to adapt to variable environmental conditions efficiently. Thus, foraging is one of the key behavioral sets that can mediate the body, the brain and its functions, and the environment of each organism (Figure 11.1).

Figure 11.1.

Foraging is the Key Behavior at the Interface between the Host and the Environment.



Note. On the one hand, inside the host body, the gut is responsible for brain development through nutritional intake and the reception of various signals from cells and microbiota. The developed brain enables the host to exhibit cognitive, sensory, motor, and emotional functions, allowing for enhanced foraging behavior to be acquired. Meanwhile, food items eaten by the host contain microbes that are integrated into the gastrointestinal microbiota of the host. Through the acquired ability of foraging, the host can take in novel food items, and novel microbes contained within are transferred to the host's gut and become commensal, which in turn supports additional brain function to be exhibited.

To address the question of how behavioral characteristics related to foraging customs unique to each species have been formed with the help of the gut microbiome, we focus on two primate species: common marmosets originally from Brazil and long-tailed macaques living in Thailand.

Impact of Food Intake on the Gut Microbiome in Marmosets

Common marmosets are a species of New World monkey and have been widely used in various fields of biology and medical sciences for decades by breeding them in captivity ('t Hart et al., 2012). There are many types of complete foods commercially available for marmosets, but additional food items are highly recommended in order to supplement vitamins and minerals and stimulate appetite (e.g., Bairrão Ruivo, 2017; National Research Council, 2003; Rensing & Oerke, 2005). While captive marmosets accept most food items, including fruits, vegetables, milk products, and produce, control of balanced food intake for captive marmosets is essential not only for maintaining their bodily health condition, but also for full expression of brain function, including perception, motor control, and cognition. It is necessary to think about food resources for marmosets obtained in wild habitats because they must have developed anatomical and physiological characteristics for digesting those food items over the course of their evolution.

The habitat of wild marmosets is in the northeastern part of Brazil, spreading into areas where food resources are not abundant, especially in the dry season (Arruda et al., 2019). They are omnivorous and eat fruits, insects, small reptiles, eggs, etc. (Rylands & de Faria, 1993; Stevenson & Rylands, 1988). As a species of the genus Callithrix, common marmosets are distinct in that they are highly exudativorous, relying heavily on gum or tree exudates,

which are relatively stable food resources throughout the year (Ferrari, 1993). They have anatomical characteristics adapted as gummivores, such as dentition for tree gouging (Resing et al., 2005) and large intestines for fermentation of gum by commensal microbes (Ferrari et al., 1993 for similar characteristics in a species of genus Callithrix). Insects are important protein resources, accounting for 30–70% of their diet (National Research Council, 2003). They eat various insects, such as grasshoppers, crickets, cicadas, and cockroaches (Stevenson & Rylands, 1988).

Role of Intestinal Microbes in Common Marmosets

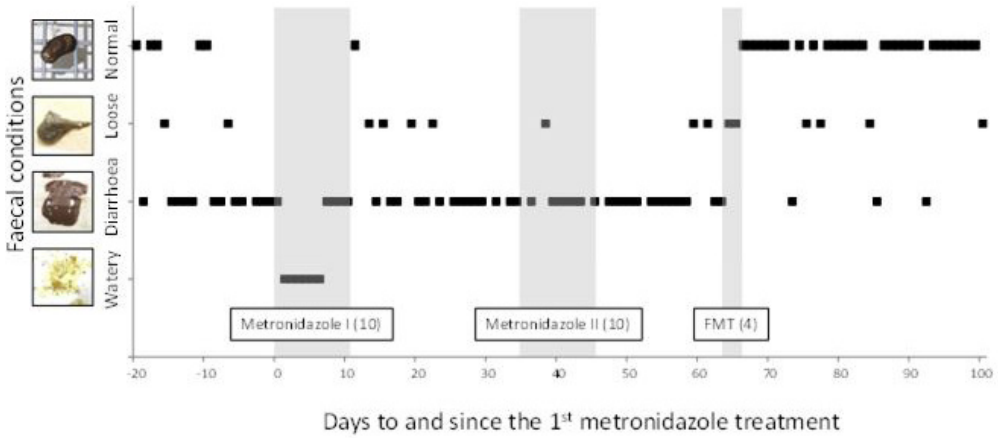
How does the microbiome interact with the host body system in common marmosets? Lewis et al. (1987) examined the microbiota of individuals with a disease that was unique to captive marmosets known as "marmoset wasting syndrome" (MWS) or "wasting marmoset syndrome" (WMS). MWS has been a well-known health problem endemic to captive marmoset colonies for several decades (Cabana et al., 2018; Shimwell et al., 1979; Tucker, 1984). The syndrome is quite problematic because a specific cause has not yet been determined, but affected animals show various symptoms, such as diarrhoea, anorexia, and anemia, which can become fatal (Chalmers et al., 1983; Juan-Salles et al., 2003). Of the several suggested causes for the syndrome, malnutrition might be one of the important factors (Cabana et al., 2018; Shimwell 1979). Lewis (1987) compared the microbiota of fecal samples from individuals with and without MWS and revealed differences in the abundance of only anaerobic, not aerobic, bacteria. Shigeno et al. (2018) reported that the group with a higher rate of chronic diarrhoea had a lower proportion of Bifidobacterium than the other group, but there was no significant difference between the groups in terms of microbiota diversity. These studies clearly indicate that captive marmosets with diseases would have different microbiota compositions from those without diseases.

Distribution of Microbiota Considerably Affects the Bodily State of Common Marmosets

Our case study (Yamazaki et al., 2017) clearly showed striking changes in the composition of microbiota on the whole body. We had a male common marmoset who experienced chronic diarrhoea after antibiotic treatments, experiencing severe weight loss despite his normal appetite. We found that the antigen of *Clostridioides (C.) difficile* and its toxin were positive, but could not confirm the presence of protozoa and gastrointestinal parasites from his fecal samples. We first administered metronidazole orally because it is the first-choice antibiotic for *C. difficile* infections in both humans and small animals (Johnson-Delaney, 1994). Although the medicine was effective in suppressing the symptoms of diarrhoea to some degree the first time, it was no longer effective when he showed recurrence of the symptoms. Then, we decided to administer an oral fecal microbiota transplantation (FMT) by feeding him fresh feces from healthy individuals of the colony mixed with the marmoset complete food that he used to eat. FMT was chosen because it is an emergent treatment for diarrhoea caused by various agents (e.g., van Nood et al., 2013) and a study reported immediate, successful recovery from recurrent *C. difficile* infectious disease (Kahn et al., 2012). A few days of treatment had a clear effect on the symptoms of severe diarrhoea, and the test for *C. difficile* became negative for both toxins and antigens. The symptoms never recurred again after the treatment and he regained weight to the level before the disease. To our surprise, after the treatment, the marmoset also recovered from sinusitis and bilateral dacryocystitis, which were concurrently evident with the severe diarrhoea. These conditions also did not recur. The implication of the evidence is that dysbiosis of microbiota in intestinal

Figure 11.2.

Results of Several Treatments for Chronic Diarrhoea Caused by C. difficile Infection in a Captive Marmoset.



Note. The "0" on the horizontal axis indicates the first day of the first treatment using metronidazole, which is the first-line drug for the disease. The feces was divided into four categories based on the appearance—normal, loose, diarrhoea, and watery—as represented in the pictures next to the vertical axis. Shaded vertical lines show the two periods of metronidazole treatment and the fecal microbiota transplantation. The numbers next to the names of the treatments indicate the period in days. Adapted from Yamazaki et al. (2017) with permission.

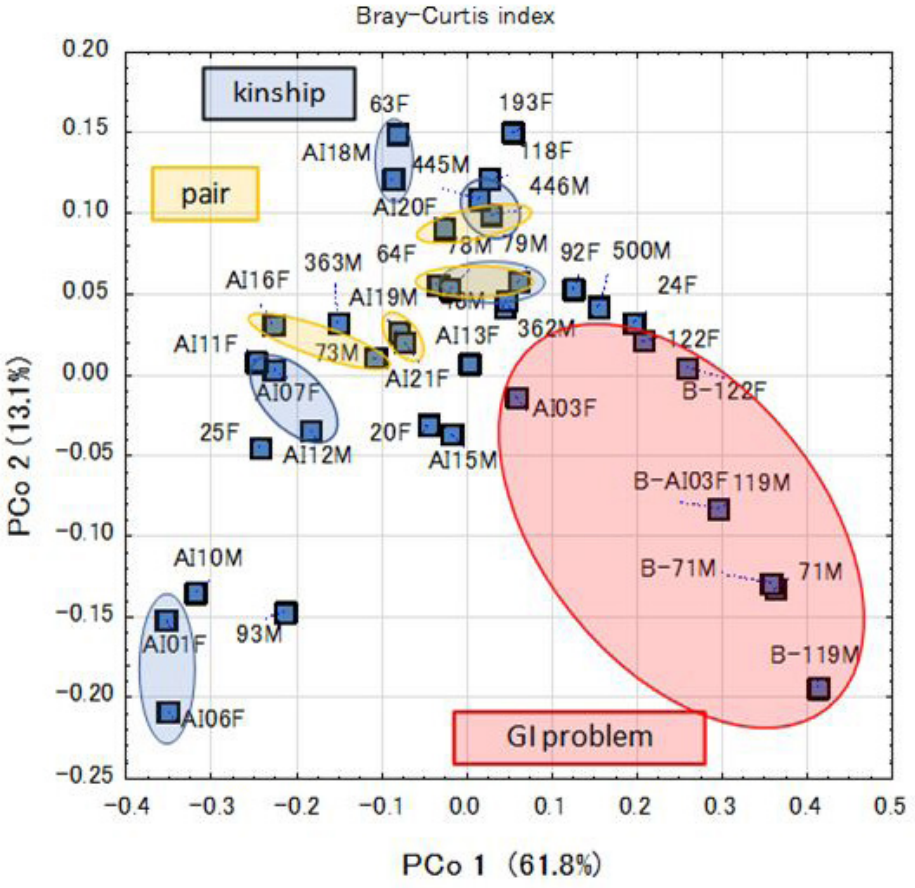
tracts—atypical increase in *C. difficile* with toxin related to preceding antibiotic treatment—induced severe symptoms quite similar to those of human patients and the marmoset recovered only through treatment aimed at inducing symbiosis of the intestinal environment, not through antibiotic treatment. Recovery from sinusitis as a byproduct of the treatment suggests that symbiosis of microbiota in the gut of marmosets has a tremendous role in immunity regulating the whole body.(Figure 11.2)

Characterizing Microbiota of Captive Marmosets

The microbiota of captive marmosets differs in each facility, as they are influenced by breeding conditions and food regimens. As a result, we tried to determine the characteristics unique to our own colony. We conducted 16S rRNA sequencing on fecal samples to analyze possible factors affecting the similarity of intestinal microbes of each individual. Figure 11.3 shows the principal coordinates analysis using the Bray-Curtis index. Because microbes are vertically transmitted from mother to offspring, some individuals were closely located in the graph, as grouped by blue circles. Additionally, pairs had similar microbe distributions, as shown by yellow circles. These observations are in accordance with observations in other primate species where social units and sociability determined microbiota similarity (humans: Yatsunenko et al., 2012; chimpanzees: Moeller et al., 2016). Moreover, we found that individuals showing chronic gastrointestinal problems (such as vomiting and bowel distension) were also closely distributed, as grouped by the red circle. Thus, other than vertical transmission from mothers, several acquired factors, such as cohabitation and gastrointestinal diseases, could modify microbiota in captive common marmosets.

Figure 11.3.

Individual Distribution of Microbiota Similarity in our Colony Using the Bray-Curtis Index.



Note. Blue circles indicate individuals with kinship ties. Yellow circles indicate pairs of individuals. Individuals in the red circle share gastrointestinal problems, such as vomiting and bowel distension, with no kinship or pair relationships.

We found that acquired factors influenced the microbiota composition in captive marmosets. Acquired factors must interact with existing microbes in the intestinal tract. Thus, to clarify the interaction, we focused on the insect-eating habits of marmosets in the wild population. While wild marmosets eat many insects every day, as discussed above, captive marmosets do not necessarily eat insects in the facilities, although some guidelines recommend providing them with insects together with complete commercial food and produce (vegetables and fruits) (Bairrão Ruivo, 2003; National Research Council, 2003). Although insects seem to play important nutritional roles in their health, the unique impact of insects on the physiological functions of marmosets has not been clarified. Thus, we aimed to determine the effect of insect feeding on captive marmosets by analyzing the microbiome extracted from fecal samples (Yamazaki et al., 2019).

We had two groups, Group Insect Feeding and Group Control, which differed in the number of insects (crickets and mealworms) provided in the seven-day intervention period. By analyzing microbes and transcripts taken from feces sampled before, during, and after the intervention

using the total RNA-seq technique (Elekwachi et al., 2017; Li et al., 2016), we found that the intervention made distinct changes in the composition of the microbiome in Group Insect feeding. We also found changes in transcripts coincident with those in microbes. Our preliminary experiment suggested that food items that are similar to those originally eaten in wild habitats can dramatically change the composition of microbiota. Although the functional significance of the observed changes after insect-feeding on the whole body remain to be clarified, the results suggest that information concerning the feeding ecology in wild habitats is important to maintain the health of captive marmosets by developing food regimens appropriate for the microbiota. By using techniques for preserving fecal samples and analyzing the microbiome and transcriptome developed in the study, future studies will reveal relationships between the microbiome and other variables, such as physical (body weight, dentition, measurements of body parts, etc.) and behavioral (sociality, anxiety, vocalization, etc.) traits of wild populations of the common marmoset, and contribute to our understanding of the evolutionary history of interaction between host and microbes.

Development of Novel Technology for Foraging Found in a Limited Population of Wild Macaques in Thailand

Humans use different kinds of tools for various purposes, some of which nonhuman animals have never used (Asano, 1994; Yamazaki et al., 2009). Stone hammers, however, are also used by some nonhuman animals (e.g., Haslam et al., 2019; Inoue-Nakamura & Matsuzawa, 1997; Moura & Lee, 2004) and can be examined from multiple perspectives: How the technology evolves (a view from anthropology); how the underlying cognitive abilities develop (behavioral and developmental psychology); how sensory-motor control and brain structures change (neuroscience); how new food resources contribute to host metabolic functions (physiology and microbiology); and how prey respond to novel foraging pressures (ethology and evolutionary biology).

Ancient hominins started using tools related to foraging and food-processing approximately 3.3 MY ago (Harmand et al., 2015) and stone hammers have been found from many archaeological sites worldwide. In nonhuman primates, evidence of stone hammers is scattered in various sites on several continents. For example, chimpanzees (*Pan troglodytes*) living in Guinea use stone hammers together with anvils to aid in food-processing (Inoue-Nakamura & Matsuzawa, 1997). Nutcracker-use in bearded capuchin monkeys (*Sapajus libidinosus*) is spreading in several areas in Brazil, which might be related to terrestrial habits of the populations, rather than food scarcity in the regions (Ottoni & Izar, 2008).

Stone-tool use in long-tailed macaques was reported for the first time on an island in Thailand in 2007 (Malaivijitnond et al., 2007). They use stone hammers for processing oysters, snails, sea almonds, and palm nuts (Falótico et al., 2017; Gumert et al., 2012; Proffitt et al., 2018). It is noteworthy that only the monkeys living on the islands show stone tool use (Bunlungsup et al., 2015), although monkeys living inland can access the same food items. The tool-users proved to have a common genetic origin (Bunlungsup et al., 2015). These findings lead to many further questions, such as who was the first to start using stone tools, why stone tools are limited to the islands, how the skill spread to groups beyond the family, and so on. From the perspective of the gut-brain axis in the evolutionary history of primates, we can assume that the shared microbiome among the populations on the islands helped to enhance the learning of stone tool-use within groups (Moeller et la., 2016; Yatsunenko et al., 2012). By using stone tools repeatedly, microbes

that had originally been novel to the monkeys would have transferred from processed food items and become commensal to their gastrointestinal tracts. These microbes created a new ecosystem in their gut, resulting in special internal factors supporting sustained learning of tool use. While this hypothesis is speculative, it is testable through analysis of the microbiome of tool-users, comparison with microbiomes of non-tool-users, and detection of the functional significance of observed differences in the microbiome.

Conclusion

The nonhuman primate models discussed above provide ideas to examine the gut-brain axis along an evolutionary timeline: Specifically, how foraging strategies and techniques construct unique host bodies and microbiomes, resulting in the development of various kinds of psychological functions. By studying the current relationships between the behavior and microbiome of these species, we could restructure the evolutionary history of the adaptation of a given species in a given niche. This approach would also shed light on the evolution of human behavior, both ancient and modern, from the perspective of how they attempt to maintain their biological activities through foraging and to establish systems for building communities by inventing and spreading technological skills.

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12
Drawing Tests to Evaluate the Cognitive Traits of People from Different Backgrounds

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This paper aims to examine how environmental or cultural differences are reflected in drawings by conducting drawing tests with people from different backgrounds. To determine the cognitive traits affecting the processes of representation and symbolization, it is important to design drawing tests appropriate for comparison. We will introduce our former studies that used stimulus figures or set tasks to illuminate basic cognitive functions in drawing from the aspect of development and evolution. The first study compared the drawing behavior of chimpanzees with that of human children and revealed that the imagination was essential for the emergence of representational drawing. The second study focused on orientation-indifferent representation in human children and discussed how representational schema are reflected in their drawings. Since childhood, we tend to draw objects symbolically reflecting the schema of objects; this conversely causes difficulty in drawing objects realistically. As drawings reflect the cognitive traits and schema of the drawer, they can provide clues to understand how ancient people recognized objects through their processes of representation and symbolization.

Este artículo tiene como objetivo examinar cómo las diferencias ambientales o culturales se reflejan en los dibujos mediante la realización de pruebas de dibujo a personas de diferentes orígenes. Para determinar los rasgos cognitivos que afectan los procesos de representación y simbolización, es importante diseñar pruebas de dibujo adecuadas para la comparación. Presentaremos nuestros estudios anteriores en los que utilizamos figuras de estímulo o tareas establecidas para enfocar las funciones cognitivas básicas en el dibujo desde el aspecto del desarrollo y la evolución. El primer estudio comparó el comportamiento con respecto al dibujo en los chimpancés con el de los niños y reveló que la imaginación era esencial para el surgimiento del dibujo representativo. El segundo estudio se centró en la representación indiferente a la orientación del dibujo en niños y se discutió acerca de cómo el esquema de representación se refleja en sus dibujos. Desde la infancia, tendemos a dibujar objetos que reflejan simbólicamente el esquema de los objetos; esto, por el contrario, causa dificultad para dibujar objetos de manera realista. Dado que los dibujos reflejan los rasgos cognitivos y el esquema del dibujante, pueden proporcionar pistas para comprender cómo los pueblos antiguos reconocían los objetos a través de sus procesos de representación y simbolización.

Humans have produced drawings, paintings, sculptures, or body paintings in most cultures through different eras, at least since the Upper Paleolithic. What makes humans create visual art and what brings out diversity and universality in their expressions? This project aims to examine how environmental or cultural differences are reflected in drawings by conducting drawing tests with people from different backgrounds. To determine the cognitive traits affecting the process of representation or symbolization, it is important to design drawing tests appropriate for comparison. We will introduce our former studies that used stimulus figures or set tasks to illuminate the basic cognitive function in drawing from the aspect of development and evolution.

Why Do Chimpanzees Not Draw Representational Figures?

Chimpanzees (*Pan troglodytes*) are the closest living relative of humans and are able to manipulate pens or brushes to draw/paint without any training or food rewards. While their drawings are similar to the abstract paintings or scribbles of young children, they display their own style, allowing us to distinguish individual chimpanzees from their work. However, despite their manipulative skills to trace the model lines, chimpanzees do not draw representational figures. We designed several drawing tests to clarify why chimpanzees do not draw representational figures as compared to young human children (Saito et al., 2014).

A free-drawing experiment involving incomplete facial stimuli revealed a remarkable difference between the two species. Humans over 2.5 years in age tended to complete the missing parts even with immature motor-control, whereas chimpanzees never completed the missing parts and instead marked the existing parts or traced the outlines with fine motor control (Figure 12.1). Human children sometimes drew representations spontaneously inspired by even simple abstract figures. Figures on a paper may trigger imagination in humans and lead them to complete the missing parts, and this cognitive tendency may be absent in chimpanzees.

Imagination can be described as perceiving a percept as "something" and categorizing lower-level visual information into the concept of "something" by associating it with a symbol otherwise represented in the mind. This symbolic cognitive system is further evident in the case of human language and is indeed the premise behind it. Humans tend to imagine something even in response

Figure 12.1.

Drawing Task Using Incomplete Facial Stimuli in Chimpanzees and Human Children.



Note. Observing free drawing on incomplete facial stimuli (left), one of the chimpanzees traced the outlines (central) and a 3-year-old human filled in the missing parts (right) (Saito et al., 2014).

to ambiguous figures. There is significant evidence in Paleolithic rock art that ancient people also used their imagination to draw animals on the ambiguous rock surface.

Why Do Children Draw Orientation-Indifferent Representations?

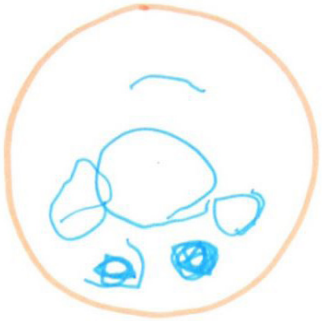
From a longitudinal observation of children, we reported the phenomenon of orientation-indifferent representation that arises in the early representational period, where children draw a figure in an inverted or horizontal orientation (Figure 12.2) (Saito et al., 2011). This phenomenon could be induced by presenting stimulus figures, such as illustrations of the ears of a cat, in different orientations. Some younger children drew facial parts in a rotated orientation on rotated stimuli and in an upright orientation on upright stimuli. It seems that younger children are indifferent to the orientation of the face on the drawing plane. Because they may know the relative order of the facial parts in the whole face, they show no difficulty drawing the rotated face in a given orientation. In contrast, older children always drew facial parts in an upright orientation; they reoriented the sheet into the upright position before they started drawing (Figure 12.3).. These age differences in reaction to inverted stimulus figures indicate a relationship between the production and development of the facial symbol.

Symbolic systems in humans are much more prevalent and reflected in representational drawings by children. As representational drawings by children are very symbolic, as opposed to being a copy of the real object, they might directly reflect the development of knowledge as their conception of objects as symbols is expanding.

Children draw what they know, not what they see, such as the representational schema of an object: For example, "a face = a circle (contour) + eye + eye + nose + mouth"

Figure 12.2.

Inverted face drawn by a child.



Note. After an experimenter drew a large circle, a 3-year-old child filled in the facial parts in inverted orientation (Saito et al., 2011).

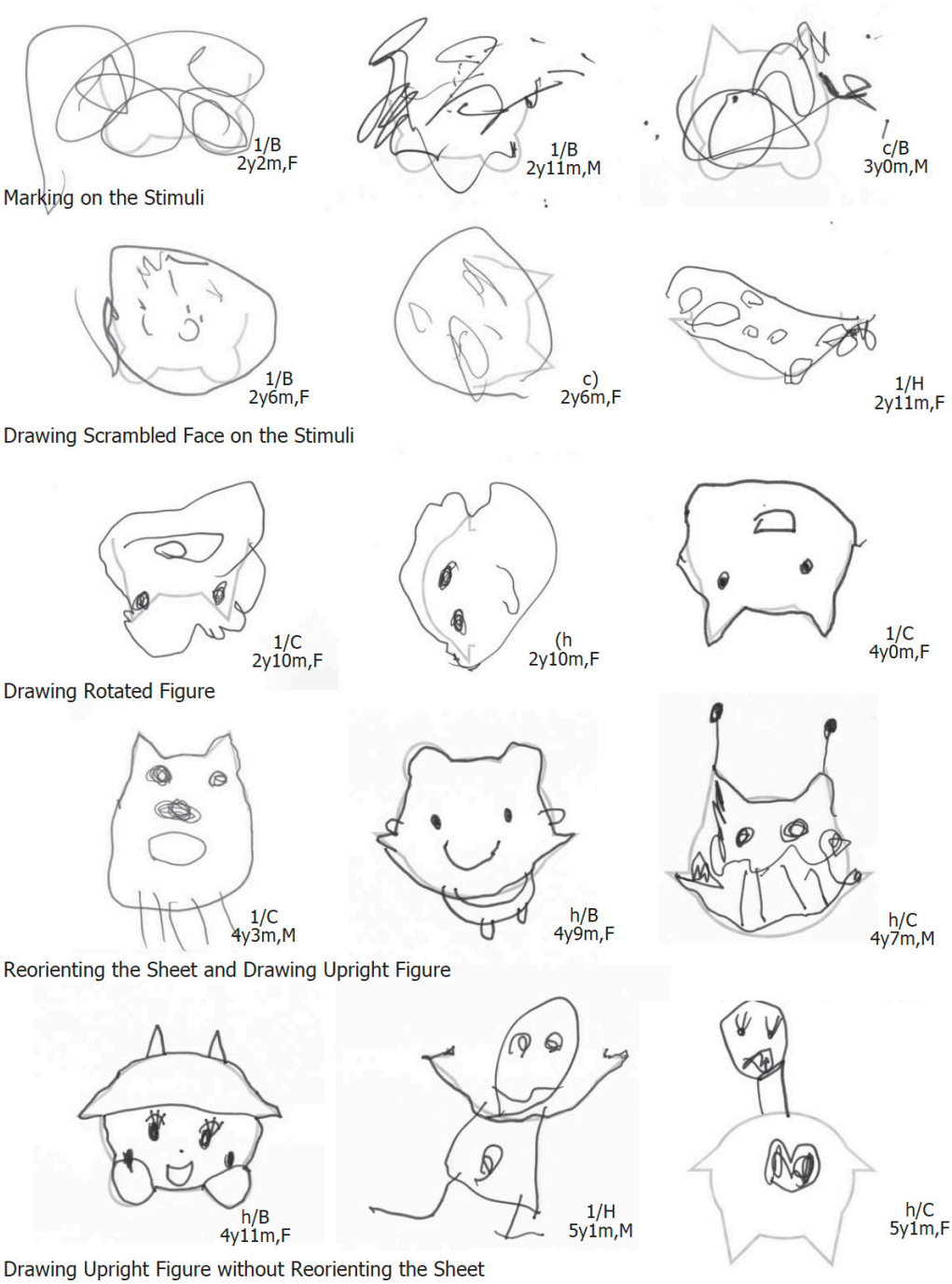
(Figure 12.4). The well-known phenomenon "tadpole man" also arises during the development process of the schema of a human image. Young children add arms or legs directly to a face—a torso is only added later as it is a more complicated schema (Figure 12.5).

How Can Realistic Drawings Be Difficult?

As it is hard to sketch objects realistically, there are many people, excluding young children, who do not like drawing. What makes it hard to sketch realistically? Due to our cognitive traits, it seems that we tend to draw things symbolically reflecting the schema that we have held since childhood. We recorded the drawing process and eye movements of art experts and compared them with those of non-experts while they were copying figures. We also analyzed the influence of bias in perception and cognition by creating drawing tasks that applied stimulus figures with optical illusions. When people drew an ambiguous figure, the same shape was drawn in different proportions depending on the emphasized meaning. The

Figure 12.3.

Examples of the drawing of children (black) on the rotated/conflict stimuli (gray).



Note. The attached text refers to the type of stimuli, age (y = years; m = months), and sex (F = female; M = male) (Saito et al., 2011).

experts seemed to be able to modulate this cognitive bias but were still affected by perceptual biases. Thus, in order to draw realistically, we need to cancel the cognitive bias and become free from the schema of symbolic drawing.

Areas for Future Research

As drawings reflect the cognitive traits and schema of the drawer, they can provide clues to understand how the person recognizes objects through their process of representation and symbolization. Future research will focus on the representative drawings/paintings in archaeological contexts that remain unclear regarding what they actually represented or what their purpose was by comparing them with the representational drawings of modern people.

Additional research involves designing drawing tasks to compare the cognitive traits of people from different backgrounds to illuminate the universality and diversity of human representation or symbolization in art production. Imaginative drawing tasks on abstract figures may illuminate the process of how shapes reconstruct into representations reflecting the individual schema of objects. Test participants will copy figures to illuminate how people extract visual information and channel it into drawing figures. We would like to establish these new approaches in order to understand the minds of ancient people not only through archaeological objects but also through the conducting of simulative drawing tasks with living people.

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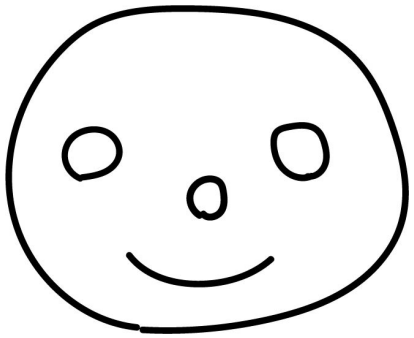
Figure 12.4.

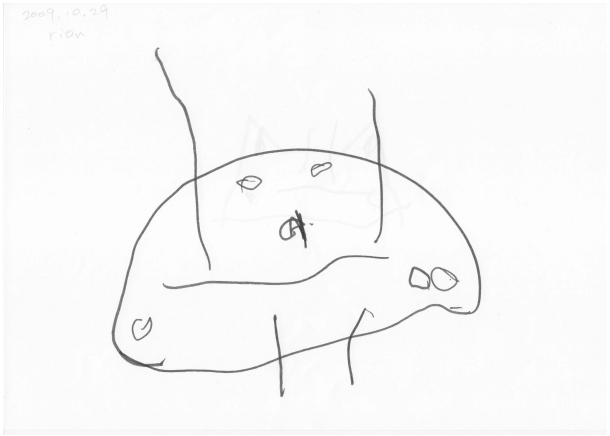
A typical face drawing.



Note. Children draw what they know, not what they see, as reflected in the schema of a face consisting of “a circle (contour) + eye + eye + nose + mouth”.

Figure 12.5.

“Tadpole man” .



Note. “Tadpole man”, the well-known phenomenon seen in young children’s drawings, suggests that the human schema held by children comprises “a face + arms + legs”, but not a “torso” yet.

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13
A Craniofacial and Postcranial Survey of North and South American Inhabitants from the Perspective of Possible Old World Ancestors

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This study aims to shed light on early migration to the Americas and the population history of inhabitants in the Americas, and evolutionary trends in climatic adaptation using skeletal remains from the American continents, with geographically diverse skeletal samples from East Asia including the Japanese archipelago, Northeast Asia, Southeast Asia, Australia, Oceania, Africa, and Europe. Cluster analysis (the neighbor-joining method) was applied based on biological distances generated by R matrices from craniofacial metric data in order to explore migration to the Americas and investigate population history and structure. We also explored climatic adaptation using body proportions and an index generated from postcranial measurements by principal component analysis and non-parametric regression analysis. The Jōmon of Japan display craniofacial similarity to Paleoindian/Paleoamericans and Archaic Americans. Moreover, the Jōmon and the inhabitants of North and South America display relatively "wider" body breadths as cold-derived adaptation. All results suggest that the ancestors of the Jōmon were the Late Pleistocene inhabitants of the northeastern and the northeastern coast of Asia, with some moving to the Japanese Archipelago and others moving to the New World as "the initial settlers" and they might be biologically related to some of the New World inhabitants.

Este estudio tiene como objetivo enfocar la migración temprana a las Américas y la historia de sus habitantes, además de las tendencias evolutivas en la adaptación climática, utilizando restos esqueléticos de los continentes americanos, con muestras esqueléticas geográficamente diversas del este de Asia, incluido el archipiélago japonés, noreste asiatico, sudeste asiático, Australia, Oceanía, África y Europa. Se aplicó el análisis de conglomerados (el método de unión de vecinos) basado en distancias biológicas generadas por matrices R a partir de datos métricos craneofaciales para explorar la migración a las Américas e investigar la historia y estructura de la población. También exploramos la adaptación climática utilizando proporciones corporales y un índice generado a partir de mediciones poscraneales mediante análisis de componentes principales y análisis de regresión no paramétrica. El individuo Jōmon de Japón muestra

una similitud craneofacial con los paleoindios / paleoamericanos y los pobladores americanos arcaicos. Además, los Jōmon y los habitantes de América del Norte y del Sur muestran una amplitud corporal relativamente "más amplia" como adaptación derivada del frío. Todos los resultados sugieren que los antepasados del Jōmon eran los habitantes del Pleistoceno tardío de las costas norestes, de los cuales algunos se trasladaron al archipiélago japonés y otros al Nuevo Mundo como "los primeros pobladores" y podrían ser biológicamente relacionado con algunos de los habitantes del Nuevo Mundo.

Introduction

The Peopling of the New World

Human populations began to move from East Asia across Beringia into the New World sometime between 23,000 (Raghavan et al., 2015) and 17,000 years ago (Goebel, 1999). Questions concerning the human settlement of the New World have been long explored and certain topics are particularly discussed:

1. What is the initial date of entry?
2. What are the routes of access? (Quick migration via coastal route or via interior routes)
3. What are the genetic relationships to both living American groups to Asian and Pacific populations and possibly to other Old World peoples?
4. How much time is needed for notable genetic adaptations to occur?
5. What kind of changes in morphology might have taken place during/after the glacial period or migration from the Old World to the New World?

Among these questions, this study aims to shed light on early migration to the Americas and the population history of its inhabitants, and evolutionary trends in climatic adaptation using skeletal remains from the American continents, with geographically diverse skeletal samples from East Asia including the Japanese archipelago, Northeast Asia, Southeast Asia, Australia, Oceania, Africa, and Europe. This paper's focus on understanding the development of morphological diversity in Asia and the Americas will aid in the interpretation of adaptation and patterns of morphological variation throughout the world, including the major human geographic dispersals during the Late Pleistocene and Early Holocene and the peopling of the New World.

We aim to 1) document human cranial and postcranial biodiversity in the New World and further illuminate the population history between the Old and New Worlds; 2) document evolutionary trends using postcranial morphology, ie., climatic adaptation, drift, and gene flow; 3) interpret early New World diversity; and 4) further illuminate the population history between the Old and New Worlds and provide a comparative basis for the morphologies of later populations.

Materials

In this paper, we used craniofacial linear measurements (metric data) from the UMMA (University of Michigan Museum of Anthropology) dataset. There is limited skeletal evidence in Asia that corresponds to Paleoindians/ Paleomericans dated c. 12,000–8,500 years in the New World. In East Asia, the Prehistoric Jōmon of Japan are contemporaries of the Paleoamericans in the New World. Although the Jōmon Era dates from 16,500 to 2,300 BP (uncalibrated radiocarbon dates), our Jōmon sample runs

from c. 6,000 to 2,300 years ago. The Neolithic Chinese, dated c. 7,000–5,000 BP, is another sample contemporary to archaic Americans of the New World in our dataset. Our archaic samples of the New World are represented by the Indian Knoll (5,000–4,000 BP), Windover (6,000-5,000 BC), Port au Choix (4,400–3,300 BP), and Tennessee archaic samples, including samples from the Eva Site (Tennessee Archaic 9,000 BP) and the Middle Archaic Period, c. 6,000 BC–3,000 BC. The Mongol Bronze Age Chandman from Western Mongolia, dated around 2,600–2,300 BP, is also included. We also used Paleoamericans of Lagoa Santa from Brazil (9,000-7,000 BP); and historic populations, such as Alaska, Aleut, Blackfoot (Montana and Canada), Chumash (Santa Cruz), Ossossané of the Great Lakes region, Mississippian of 900 BP, Athabascans, Haida, Hopi, Mexico, Peru, Patagonia, and Tierra del Fuego, with geographically diverse skeletal samples from Africa, Europe, Asia--including Yayoi rice agriculturalists of Japan (900 BC-250 AD), modern Siberia, Southeast Asia, Australia, and Polynesia (1,074 female individuals and 1,465 male individuals, totaling 2,539 individuals).

For postcranial data, we used variations in body and limb proportions of samples from Jōmon hunter-gatherers, Yayoi rice agriculturist of Japan; Lagoa Santa, Brazil; Eva Site (Tennessee Archaic 9,000 BP); Windover (6,000-5,000 BC); Indian Knoll (5000–4000 BP); Santa Cruz Islanders, California (Late Prehistoric 1500-1100 AD); and historic Tierra del Fuego with geographically diverse skeletal samples from Africa, Europe, Asia, and Australia. (549 female individuals; 743 male individuals; totaling 1,292 individuals.)

Methods: Craniofacial and postcranial analysis

Reconstruction of population history using craniofacial data

The craniofacial metric traits chosen by biological anthropologists have little adaptive significance and instead provide phylogenetic reconstructions. Craniofacial metric traits--configuration of face and skull--appear to be neutral. Therefore, craniofacial metric traits are useful to investigate population history and structure, and the quantitative treatment of craniofacial form can effectively produce a picture of human population movement (Betti et al., 2010; Brace et al., 2001; 2006; Seguchi and Schmidt, 2016; Relethford, 2005). It is compatible with the picture produced by molecular genetic comparisons of nucleotide haplotypes in modern human populations.

Reconstruction of morphological variation using postcranial data

It is well-known that human body size and shape exhibit considerable global variation. According to Bergmann's and Allen's rules (Bergmann, 1847; Allen, 1877), populations in cold climates exhibit larger body and smaller/shorter extremities than populations in hot climates. Therefore, skeletal limb size proportions may shed light on human evolution and climatic adaptation (Auberbach, 2007; Fukase et al., 2012; Holiday, 1999; Trinkaus, 1981, 2002; Temple et al., 2008, 2011; Ruff, 1991, 1994, 2002; Seguchi et al., 2017). Phenotypes of postcranial traits are influenced by natural selection, gene flow, random genetic drift, relatedness among populations, nutritional adaptation, etc.

Methods: Craniofacial metric analysis

These craniofacial metric analyses follow the methods of our past research (Seguchi et al., 2011; Brace et al., 2014). First, we used pelvic morphology to estimate sex using standard osteological protocols (Buikstra and Ubelaker, 1994). Twenty-one or nineteen craniofacial variables are used in this study. In order to maximize the sample size, all data were standardized to z-scores within

each sex to remove sex-related size variation (Williams-Blangero and Blangero, 1989). To compute biological distances and reconstruct biological phylogeny, I employed the R-matrix method on the craniometric data in this study. Using the R-matrix method, overall environmental effects are removed by using an estimate of the overall average of heritability of all variables (Relethford, 2007). Many researchers using the R-matrix method for human craniometric data to average the reported narrow-sense inheritabilities (i.e., h2= 0.55). Then, the biological distances were obtained after an R-matrix analysis (Relethford, 1991; Relethford et al., 1997). The biological distances between samples generated by R-matrix analysis are roughly proportional to Mahalanobis distances (Relethford, 1991). The neighbor-joining method (Saitou and Nei, 1987) was applied based on biological distances generated by R matrices.

Methods: Postcranial metric analysis

These postcranial metric analyses follow the methods of our previous research (Seguchi et al., 2017). The postcranial measurements used in this study are maximum humeral length (abbreviation, HumL), maximum radial length (RadL), maximum femoral length (MaxFemL), bicondylar femoral length (FemL), antero-posterior femoral head breadth (FHB), and maximum tibial length (TibL). We calculated the ratios of FHB to FemL and FHB to lower limb length for an estimation of body mass divided by height that were used in previous studies (Auerbach, 2011b; Auerbach & Ruff, 2004; Fukase et al., 2012b; Ruff, 1994; Ruff et al., 1991, 2012; Temple & Matsumura, 2011). also calculated brachial and crural indices for estimation of upper and lower limb proportions (see Power Point for equations). Body mass was estimated using an equation: 2.3 × FHB-41.72 for combined sex proposed by Ruff et al. (2012). This equation is more suitable for estimating the body mass in European populations. Therefore, we caution that it might be problematic when applied to diverse global populations.

At first, data were subjected to boxplots for indices, ratios, body mass, and principal components analysis and principal components plot to display the distribution of data based on minimum and maximum, median, and 25th and 75th percentiles. We performed Manly's non-parametric regression tests (Manly, 1997) to determine ecogeographic significance (latitude, minimum and maximum temperatures) associated with particular PC scores. Significance was calculated after 10,000 permutations in a two-tail test ($\alpha = 0.05$) distribution. The Relethford-Blangero analysis was also performed using heritability of h2= 0.55 in order to see gene flow and genetic drift.

Results

Craniofacial perspective

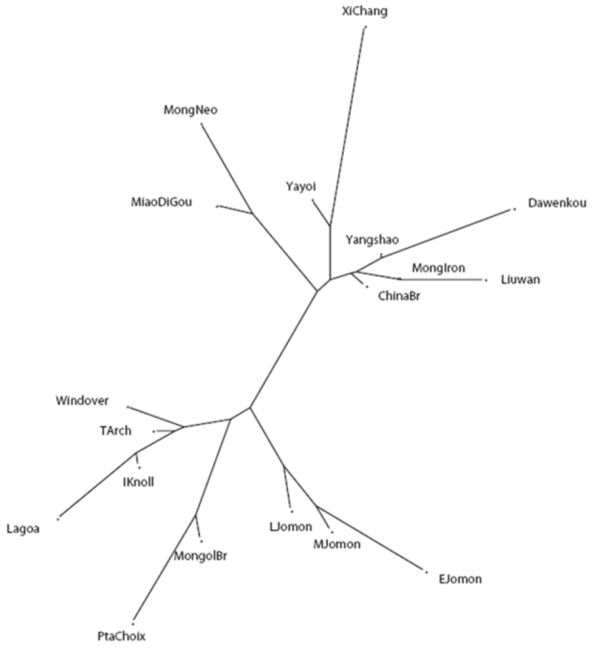
The neighbor-joining trees which were generated by the R-matrix using 21 variables that include the Jōmon hunter-gatherers of Japan, Chinese Neolithic groups from various areas, the prehistoric Yayoi agriculturalist of Japan, Bronze Age Chinese, Bronze age Mongol Chandman, Neolithic Mongol, Archaic Americans, and Brazilian Lagoa Santa, separated Chinese prehistoric groups, Neolithic Mongol with Yayoi of Japan and Jōmon, archaic Americans and Lagoa Santa (Figure 13.1). When we added the Jōmon, East, Southeast Asia, Africa, Pacific, Europe, and South Asia samples without the New World samples, Lagoa Santa is shown to tie to the Jōmon, Ainu, South Asia, and Europe samples. The tree of previous samples, added to the New World samples, including archaic American samples, and historic and modern native samples of North America, Central America and South America, resulted in showing that samples of the New World tie together, except for

Aleut, Eskimo, and Athabascan samples. The Athabascans, Aleut, and Eskimo samples tie more closely to the Chinese core samples. Lagoa Santa closely ties to the archaic Indian Knoll, and is located at the next branch with the cluster of the Jōmon and Ainu. These samples make a cluster of the historical Central and South American samples and the California coastal group, the Chumash. Other archaic samples such as Windover, Tennessee archaic, Port au Choix, and Mississippians, the historic Great Lakes Ossosone, historic Blackfoot that had migrated from the Great Lakes region, and the Mongol Bronze Age make a sub-cluster. Australian, Melanesian, and African samples form one cluster separated from the New world cluster (See Figure 13.2).

The NJ tree including the Kennewick individual and other Paleoindians in North America using 19 craniofacial variables display that all Paleoindians tie to Archaic American groups (Figure 3). However, the Kennewick individual ties to Ainu and Polynesian groups, and the Jōmon of Japan clustered with a 300 to 1,700 year old sample from Contra Costa county in San Francisco Bay and the Brazilian Paleoamerican Lagoa Santa (Brace et al., 2014). Other branches in the Jōmon clusters are the Haida from the Northwest Coast and other North American groups, Mexico, Peru, and the people of Tierra del Fuego and Patagonia at the southern end of South America.

Figure 13.1.

Craniometric analysis: Prehistoric East Asian samples, Yayoi agriculturalists of Japan and Jōmon of Japan including the Paleoamerican of Lagoa Santa and Archaic New World series.



Postcranial perspective

The box plots of z scores for each index, ratio, and body mass are shown in Figures 4. The box plots of each group are according to latitude from higher to lower, in other words, north to south. First of all, although box plots of brachial index show north to south clines, Jōmon and Kumejima of Japan do not fit this clinal distribution. Jōmon hunter-gatherer of Japan exhibits greater brachial value and similarity to groups from tropical environments at lower latitude as observed in earlier studies (e.g., Fukase et al., 2012b; Seguchi et al., 2017; Temple & Matsumura, 2011; Temple et al., 2008, 2011; Yamaguchi, 1982, 1989, 1994). However, Yayoi agriculturalists of Japan display similarity in brachial index with groups from colder environment at high latitude as observed by Temple et al. (2008). The Kumejima Island (Okinawa) belongs to a subtropical environment; however, the islanders display similarity with groups in higher latitudes and colder climates.

Figure 13.2.

The NJ tree based on craniofacial metric analysis. The prehistoric Jōmon of Japan and the living Ainu, clearly resemble the New World populations (See Seguchi et al., 2011).



Figure 13.3.

The NJ-tree based on craniometric analysis (Brace et al., 2014) including the Jōmon, Paleoamericans-9400 years old Kennewick, and 10,000-9,000 years old Lagoa Santa.



Figure 13.4. (a, b, c, d, e).

Boxplots of Z scores of all regional variation in brachial index, crural index, the ratio of FHB to FemL, the ratio of FHB to lower limb length, and body mass. Upper and lower margin of boxplots represent the 75th and 25th percentiles. The median is the line bisecting the box. Populations are presented in Table 3: From left (north: higher latitude) to right (south: lower latitude).

Figure 13.4a.

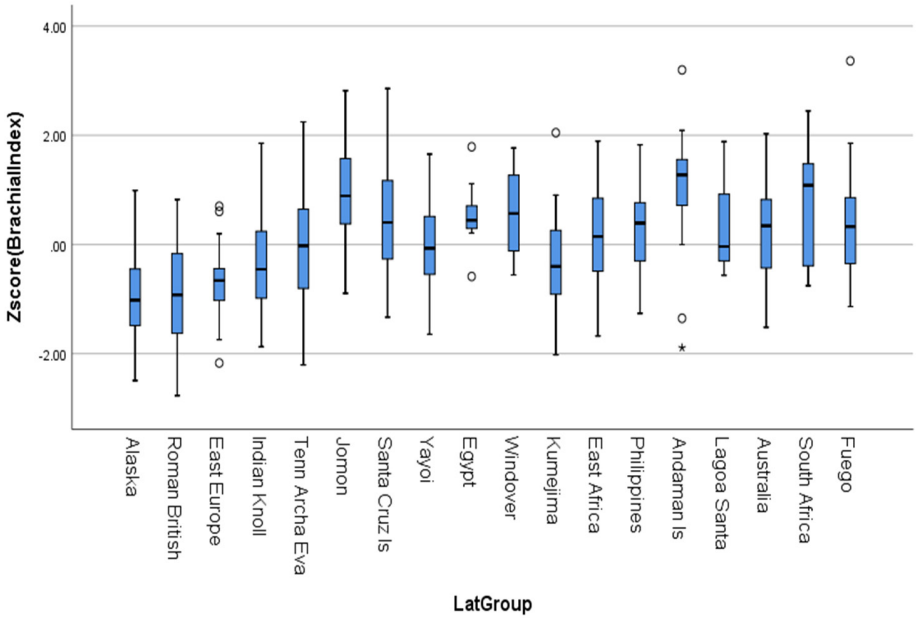


Figure 13.4b.

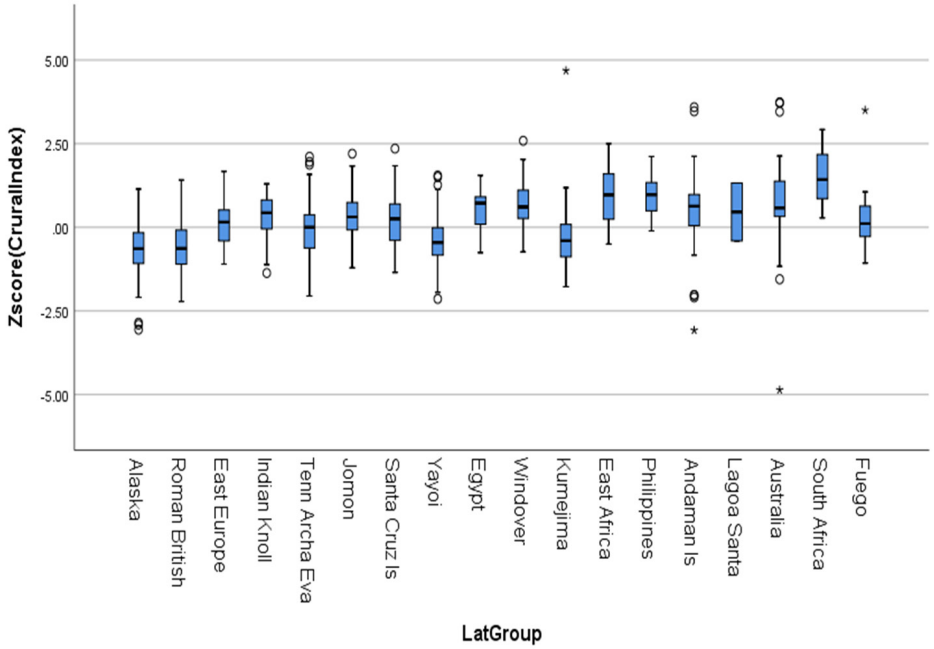


Figure 13.4c.

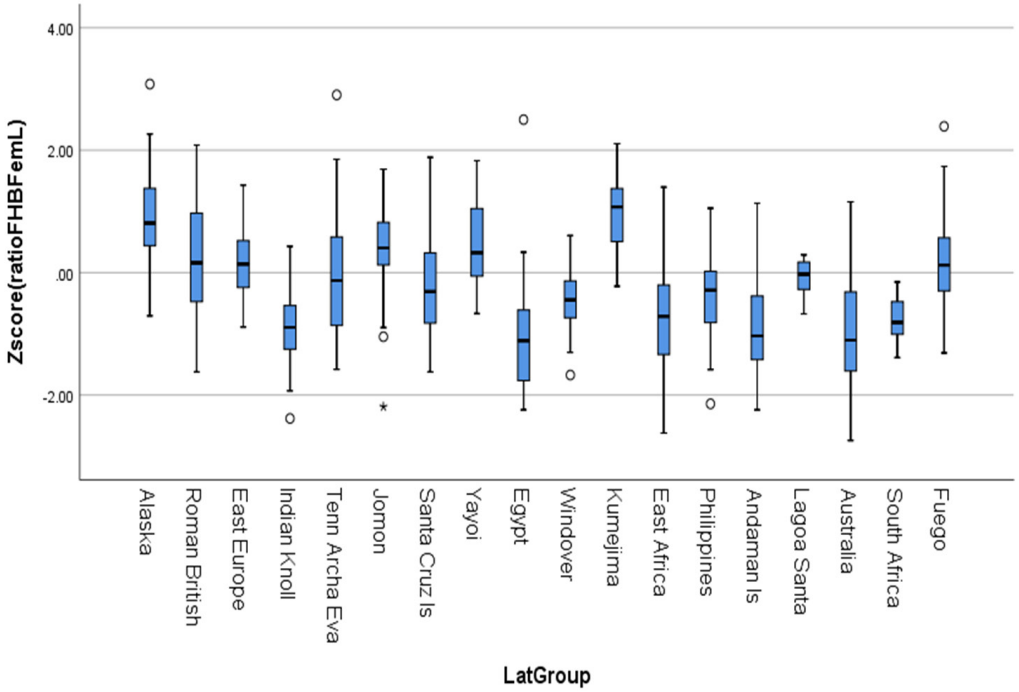


Figure 13.4d.

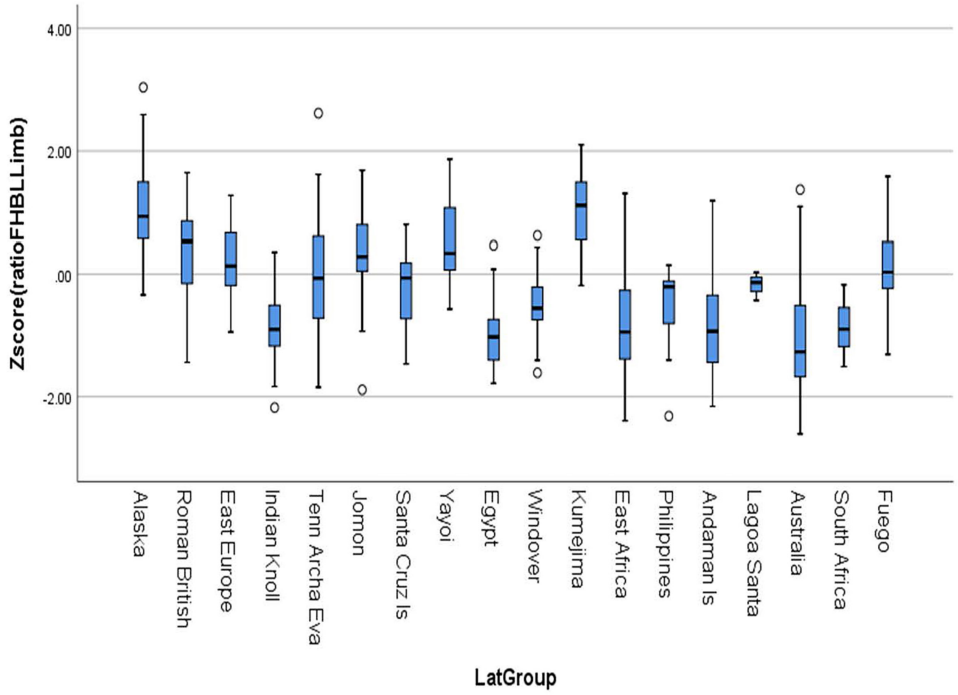


Figure 13.4e.

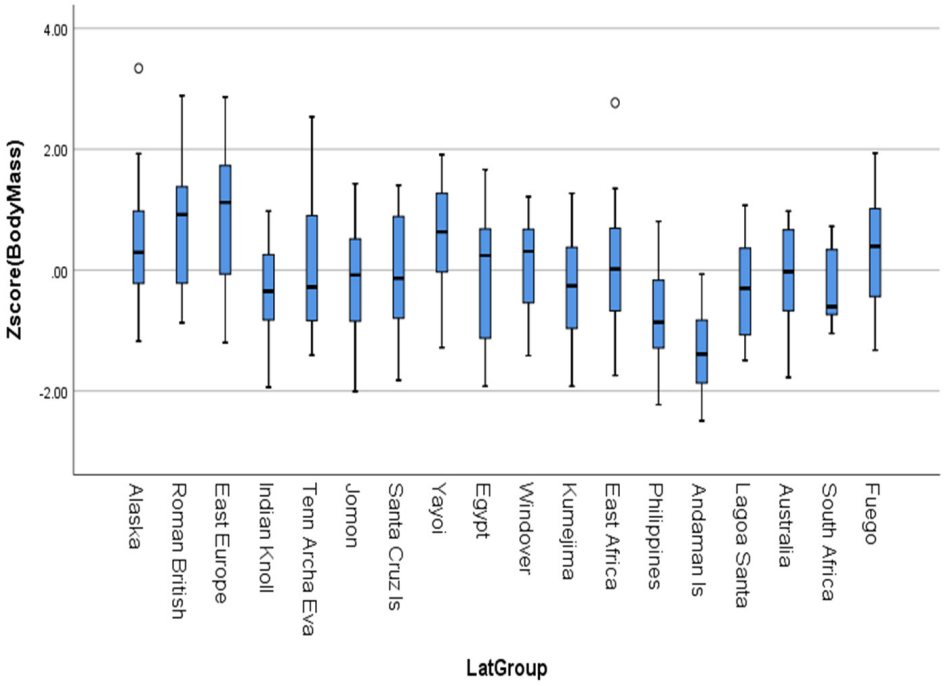
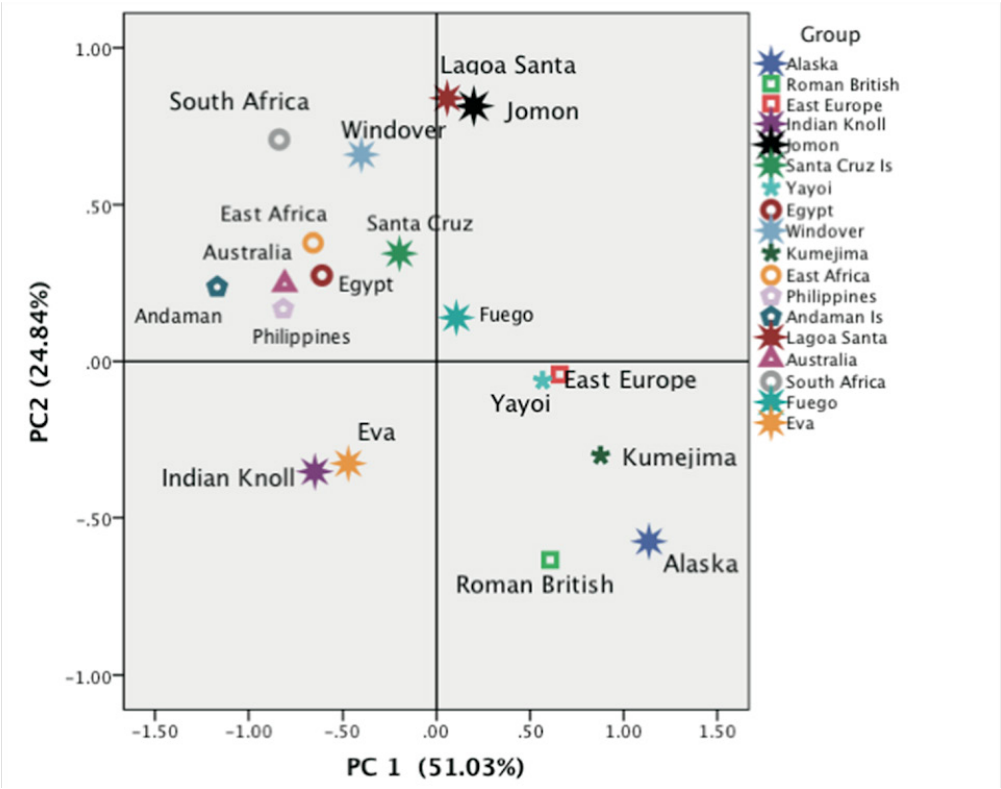


Figure 13.5.

Principal components plot of limb proportions, body proportions, and body mass.



The principal components plot separates well the warm-adapted and cold-adapted groups (Figure 5). For instance, groups that inhabit warmer climates such as East Africa, Egypt, Australia, Philippines Negritos, and Andaman Islanders are plotted in one cluster. Groups that inhabit colder climates such as Alaska, Roman-British, and East Europe are plotted in a separate cluster. Indian Knoll and Santa Cruz Islanders are plotted between the warm climate and cold climate groups. Yayoi is plotted with cold climate groups and, surprisingly, Kumejima is plotted among colder climate groups despite a smaller body mass.

Among those samples, Prehistoric Jōmon hunter-gatherers of Japan and Lagoa Santa Paleoamericans of Brazil are plotted far from either cluster, illustrating wider cold-adapted body proportions and warm adapted limb proportions. Lagoa Santa shows similarity with Jōmon in both body proportion and limb proportion. Alaskans display cold adapted wide-body proportion and cold adapted short-limb proportion. Tierra del Fuego of southernmost South America also displays cold adapted body and limb proportions. In summary, body proportions (relatively wide body; warm-adapted brachial index) of Jōmon, Lagoa Santa, Santa Cruz, Windover, and Tierra del Fuego are relatively similar. Indian Knoll and Eva sites are located close geographically and display similar body and limb proportions (relatively wide body, but warm adapted body mass; cold adapted brachial index). Samples of North America and South America show significant variation in body proportion.

Results of R-matrix-Relethford-Blangero analysis

R-matrix-Relethford-Blangero analysis shows a Fst of 0.3785 among sample groups (data not shown) which assuming average heritability of 0.55—incorporating all samples and assuming all samples have equal effective population size. Lagoa Santa is not included because the sample size is too small.

Furthermore, the results of Relethford-Blangero analysis show that most of the sample groups experienced little gene flow but a few including Kumejima of the Ryukyus may have received some gene flow. Santa Cruz shows statistically significant smaller observed variance than expected variance. On the other hand, Tierra del Fuego show significantly larger observed variance than expected variance. The negative residuals indicate some degree of genetic drift or isolation in these groups and their regions and more restricted gene flow. In other words, Santa Cruz may have experienced genetic drift or isolation or more restricted gene flow, while Tierra del Fuego may have received gene flow from other samples not included in this analysis.

Discussion and conclusions

From these analyses, the period of initial entry could not be concluded. However, the start of the Jōmon Era of Japan has a calibrated date of 16,500 years ago. Considering the craniofacial similarities between Jōmon and Paleoindians/Paleoamericans and the New World populations, a Jōmon Era "common" ancestor could be tied to the initial population that entered the New World in the terminal Pleistocene. They might have used watercraft to migrate via the Pacific Northwest coast to the San Francisco Bay down to Brazil and the southern end of South America (Patagonia) experiencing genetic drift or gene flow, because those coastal groups display craniofacial similarity to the Jōmon of Japan. These data and results suggest that the ancestors of the Jōmon people appear to be important in the peopling of the New World. We (Brace et al., 2001; Seguchi et al., 2011; Brace et al., 2014) have hypothesized that the "common" ancestors of the Jōmon are the Late Pleistocene inhabitants in the northeast coast of Asia and further west and some of them moved to the Japanese Archipelago and

others moved to the New World as “the initial settlers.”

This analysis does not support affinities between the Early Brazilians and Australians and Melanesians (Neves et al., 2003; 2005; 2007; Neves and Hubbe, 2005). Rather, it shows they are related to the Late Pleistocene descendants of Northeast Asia, such as the ancestor of Jōmon (Seguchi et al., 2011; Brace et al., 2014). Results show morphological continuity from these Paleoindians/Paleoamericans to the Archaic across the north down to the Windover site in Florida. This indicates that this Jōmon-like morphology has been in place in the New World for at least 9,000 years. Paleoindians/Paleoamericans could be the ancestors of the Archaic people and the Canadian-US border Natives in the New World (Brace et al., 2001, 2014).

All significant correlations between PC 1 score from postcranial proportions and indices, and latitude, minimum and maximum temperatures indicate some trends in the dataset for a potential selective mechanism or adaptive pathway based particularly on body mass/height proportions. The limb proportion elements such as brachial and crural indices did not strongly correlate to the above ecogeographic variables, however the use of all ratios, body mass, and indices might be a good indicator of climatic adaptation as seen in the principal components plots. A mismatch in limb proportions and body proportions of the Jōmon is confirmed again as observed in earlier studies that is having cold-adapted body with tropical-adapted brachial index. Body proportions of the Jōmon and Lagoa Santa display relatively “wide” body breadths which are cold-derived adaptations. Ruff (1994) suggested that body breadth requires more generations to be changed by climatic factors. Groups in North and South America maintained wide bodies, despite living in different environments. This might suggest that initial populations of the New World obtained wider bodies when they were first inhabited and adapted in the colder climate in Northeast Asia before migrating to the American continents or possibly were trapped in a cold environment such as Beringia before they migrated to the New World. Then, they might have dispersed to various climatic environments in the New World at a later time. All results suggest that the ancestors of the Jōmon were the Late Pleistocene inhabitants of the northeastern coast of Asia, with some moving to the Japanese Archipelago and others moving to the New World as “the initial settlers".

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Part II

Landscape, Monuments, Arts, and Rituals in Bio-Cultural Perspectives in Mesoamerica

Part II Introduction
Mesoamerican Landscape, Monuments, and Rituals in Bio-Cultural Perspectives

Saburo Sugiyama and Claudia García-Des Lauriers

The "Out of Eurasia" program centrally deals with agents who created civilizations, focusing specifically on the relationship between human biology and culture that developed during the last 10,000 years in the New World and islands in the Pacific Ocean. We explore peoples' unique brain capacities and behavioral dynamics that consequently created stratified complex societies, or "high-cultures" composed of landscape modification strategies, advanced technologies, belief systems, and complicated social structures. These emerged independently from the primary civilizations in Afro-Eurasia (mainly Egypt, Mesopotamia, Indus, and China) from which our current conceptualization of civilization deeply stems. We realized after 1519 there were two more primary cultural units that are also highly developed in the New World; Mesoamerican and Andean civilizations. We here review different kinds of studies of Mesoamerican societies to critically reevaluate explanatory models of evolutionary trajectories proposed mostly on the basis of the Old-World data.

One of the most important characteristics of Mesoamerican complex societies is the symbolic city-scaping and monumental constructions with palaces and plazas, surrounded by other functional facilities. Public activities carried out around them were the cultural focus of ruling groups, specialists, and the general public (See Tsukamoto this volume; Joyce 2004). These zones functioned not just for political/administrative or economic transactions but were pivotal points for the formation of meaning that further structured and were themselves structured in the minds of agents and through their social behaviors. In this first meeting, we concentrate on monumentality, the metaphor of the "sacred mountain," and their related ideological issues in Mesoamerica (Broda et al., 2001; Hlúšek, 2020; López Austin, 1997, this volume).

Most contributors to these proceedings discuss distinctive local features and materials related to landscape, monuments, rituals, pilgrimage, human bones, or ancestor worship that are a reflection of human cognition, imagination, memory, collaborative behavior, and/or altruism. We hope this first transdisciplinary gathering in Mexico brings new ideas and data useful in comparative contexts to illuminate human nature or the mechanisms employed by agents who created Mesoamerican civilization. We gathered at Teotihuacan with the aim of exploring the 3,000 year long (1,500 BCE~1,500 CE) evolutionary processes in material culture of distinctive Mesoamerican centers like San Lorenzo, Monte Albán, Teotihuacan, Cholula, some Maya cities, and other related centers, providing examples of advanced human cognition, behavior, or psychology (brain-body-environments interactions) and propose that these can lead to a better understanding of the dynamic interactions between people and nature through time.

The chapters in this section of the proceedings are organized by geography and theme (Figure Part II.1). They cover the local variations of the "sacred mountain" theme at various sites throughout Mesoamerica from the arrival of first people to the continents until the time of conquest (c.

15,000 BCE-1521 CE). Sugiyama's introductory chapter, uses interpretative "niche construction" models (Iriki and Taoka 2012) to understand the social evolutionary processes of hunter-gatherer communities that migrated into the New World. These communities gradually developed local subsistence strategies that formed the basis for later stratified societies. While the dating of these migrations has often been the focus of significant research, more recently the processes of migration have taken a more central role (Des Lauriers 2011).

Des Lauriers (this volume) provides an overview of issues surrounding the initial entry from Asia via a coastal route along the North Pacific continental edge. The first people on the American continents may have hailed from the shores of the Western Pacific Rim traveling along a coastal route, perhaps before the "ice-free" corridor became available for communities who came into the New World through the terrestrial routes via Beringia (Davis et al., 2019). Genetic and craniofacial evidence further reinforce some of these archaeological findings (Seguchi and Quintyn this volume). The increasing likelihood of an aquatic migration indicates a sophistication of *H. sapiens* to be able to travel great distances using early watercraft and exploiting a diversity of marine resources. People migrating into the Americas were not a tabula rasa; they brought with them their imagination, ingenuity, and funds of knowledge that they adapted, modified, and improved as they travelled along the new coastal landscapes (Des Lauriers, 2009, 2010; Vélez-Ibáñez and Greenberg, 1992).

The importance of watercraft to the initial populations, provided a technology and concomitant knowledge that would later enhance the abilities of Mesoamerican societies to themselves establish long distance trade routes, prestige goods economies, and a more rapid transference of ideas throughout Mesoamerica and beyond. In Mesoamerica, these civilizations developed, alongside their complex technology, systems of ideas that were made manifest in strategies of landscape modification and urbanization. Sugiyama's introduction particularly emphasizes the central role of monuments that, throughout the world, had multiple functions and for millennia, served as markers of developing cognitive frameworks through which they understood the outside world (nature, time, and space), religious thought, and social organization. Using the case of Teotihuacan, he ponders why Teotihuacanos created monumental constructions (metaphorically seen as "sacred mountains"), and the material correlates of bio-cultural evolutionary trajectories.

While the concept of a sacred mountain has global manifestations (Eliade 1959), López Austin (this volume) expounds on the Mesoamerican variant of the "sacred mountain" at various religious centers. López Austin carefully frames the Mesoamerican ontology underlying the cosmologies commonly shared among diverse indigenous groups that synthesized the concept of the "sacred mountain" as a metaphor for the center of universe. Although Mesoamerica shows great diversity in terms of geography, ecology, climate, cultures, languages, and material culture, all of which could have easily functioned as barriers, instead we see a rather consistent conception of time and space. The "sacred mountain" played a special role serving as an *axis mundi*, centering the world, unifying the various layers of the cosmos, and anchoring the urban landscape with material and deeply sacred points of reference. Mesoamerican architecture, colossal sculptures, murals, other types of fine arts, and iconographic/epigraphic records suggest that the concept of the "sacred mountains" persisted for three millennia at least and possibly into contemporary times (See García-Des Lauriers this volume).

Some of the earliest fully formed conceptions of the Mesoamerican "sacred mountain" date back to Olmec

times. Cyphers (this volume) convincingly explains how San Lorenzo became one of earliest metaphoric manifestations of the "sacred mountain." Swampy terrains in the wetlands were selected for their natural qualities and given symbolic significance and consequently becoming a populous center integrating locational advantages for subsistence and transportation routes. Powerful and consistent messages about the cosmic view of time, space and nature were evinced by the Olmec colossal sculptural programs and fine arts. The Olmec, in this important place, built an innovative monumental center on an unprecedented scale. Monumental architecture embodied the metaphor of the "sacred mountain;" one that endured throughout Mesoamerica for millennia. These "sacred mountains" became the *mise en scéne* for the performance of rulership and its related sacred honor system that consolidated the hierarchical social structure (Tsukamoto this volume). Olmec rulers became, as Cyphers notes, "intermediaries between the earthly surface, the gods and the forces of the Universe associated with Sky, Earth and Underworld."

From these Olmec origins, urban centers throughout Mesoamerica further developed, modified, and reimagined the "sacred mountain," in part inspired by the local landscape, but also incorporating a local architectural vernacular as well. Monte Albán is another well-preserved example of primary development through niche construction in a somewhat closed natural/social environment (Robles this volume). From its early phases, Monte Albán became an eminent symbolic center with monumental buildings on the summit of 500 meters high on the hill tops. Summarizing distinctive archaeological features of the Monte Albán complex, Robles explains the long adaptation process and varied creative strategies of niche construction programs. She suspects that through the unification of villages, Monte Albán functioned, not as a single "sacred mountain", but a group of "sacred mountains" combined to consolidate growing ruling classes. Supported by the results of on-going research at Atzompa, Robles demonstrates how an honor system that originated at Monte Albán was expanded among aligned "sacred mountains," and permeated into local contexts within the Oaxaca valley.

At the great metropolis of Teotihuacan, Gómez and Gazzola (this volume) focus on the changing social contexts of the Citadel with its main temple, the Feathered Serpent Pyramid, one of the largest monumental complexes at this urban center. They describe the astonishing discovery of an ancient tunnel 15 meters under the monument, and discuss its possible significance and changing functions through the early foundation period. Based on extensive excavation data and materials recovered in the tunnel, they suggest that the sacred cave functioned as a ritual space, possible funeral deposit for rulers, and as part of an ancestor cult. Their data expands on the previous extensive research conducted by Sugiyama (2005), who analyzed the complex symbolism of this building in light of iconographic evidence from its sculpted façade and an extensive set of burial offerings discovered in the Feathered Serpent Pyramid. The reenactment of the creation myth in this "sacred mountain" illustrates the deep roots of cosmogonic thought shared by Mesoamerican communities. The ancient tunnel, a symbolic cave is explained as a ritual place of political power-transmission, funeral ceremonies, and possible burial of rulers, but also is the point of entry to the warehouse of riches at the interior of the mountain as described by López Austin (this volume).

Volcanoes as living mountains whose creative and destructive forces have shaped landscapes, settlements, and histories have often inspired Mesoamerican peoples' awe and been sites of pilgrimage and veneration (Gill and Keating, 2002; Henderson, 2016; Plunket and Uruñuela, 2002; Sheets, 2006). Uruñuela and Plunket (this volume)

propose that the possible eruption of the volcano Popocatépetl during the first century CE may have triggered the erection of the Great Pyramid in Cholula, a completely man-made "sacred mountain." Its final form represents the largest pre-Columbian monument by volume in the New World. The monument shows morphological variation and complexity that indicate multiple functions. Using solid archaeological data, they propose two meanings of this grand "sacred mountain." First as a mountain connected to the watery underworld and the ancestors, and Popocatépetl as a symbol of fire and cosmic center. Based on an analysis of the pyramid's morphology, they proposed that the monument served as the site of collective rituals that involved the bulk of the local population, and that the monumental construction was an unfinished project, always under construction.

On the Pacific coast of Chiapas, Cerro Bernal, the location of a number of important sites including Los Horcones an Early Classic center with economic and ideological ties to Teotihuacan, was a natural "sacred mountain" upon which man-made "sacred mountains" were erected (Garcia-Des Lauriers 2007, 2020). Garcia-Des Lauriers (this volume) points out that beyond serving as a strategic location where terrestrial and coastal trade routes were controlled, this ritual center profoundly embodied the Mesoamerican concept of the "sacred mountain." Using archaeological, iconographic, ethnohistoric and ethnographic data, she shows that this mountain on the southern side of the Pacific Coastal plain, drew the attention of Teotihuacanos also for its ideological potency and its characteristics that evoked a terrestrial paradise, not unlike Tlalocan. Its dramatic peak draws the rain clouds whose moisture fed the Río Horcones and the estuaries at its foothills making it an ideal water mountain—*an altepetl.* Exactly the same metaphoric landscape can be observed at Teotihuacan in the Moon Plaza and Cerro Gordo whose peak draws the rain clouds that provide precipitation to the Teotihuacan valley. It is thus no surprise that Stela 3, carved with a Teotihuacan-style Tlaloc, was originally located in Group F at Los Horcones, a group which is a provincial tribute to the Plaza of the Moon (García-Des Lauriers, 2007, 2012, 2016).

"Sacred Mountains," both natural and built landscapes are deeply shaped and shape the lives of agents through the performance of small daily rituals and large-scale public performances. Tsukamoto (this volume) addresses the practice of rituals stressing the critical role of interactions between performers and audience especially those taking place in plazas. Tsukamoto zooms in on architectural complexes and tries to understand practices taking place in the plazas, attached to those monumental complexes. Plazas are defined in many ways by their relation to pyramids and other monuments, not unlike highland valleys are in part defined by their relation to mountain landscapes. Tsukamoto notes that a deeper understanding of ritual performances from El Palmar, a Maya center that flourished during CE 250-900, serves to elucidate the politico-social negotiations between governing entities and intermediate elites. Evidence from historical narratives at the site speak of complex histories of connections and conflicts negotiated in part through feasting and campaigns for warfare, critical factors for complex societies. Kings' theatrical performances at the plaza-monument complex at El Palmar served to enact the sacred underpinnings of Maya rulership.

Using data from Chichen Itza, Stanton, et al. (this volume) focus on how ancient Maya communities utilized collective memory and imagination to recreate, in their architecture and iconography, elements of Teotihuacan ideology at this Late Classic Maya center several centuries removed from the great central Mexican metropolis. The artistic connections between Chichen Itza and Central

Mexican art have often been linked to Toltec connections. However, Stanton et al. (this volume) position the Maya as more actively involved in adopting elements of accumulated knowledge and ideas crystalized earlier at Teotihuacan. Concepts such as the solar paradise, flower mountain, and butterfly warrior imagery were given new life at this Maya center.

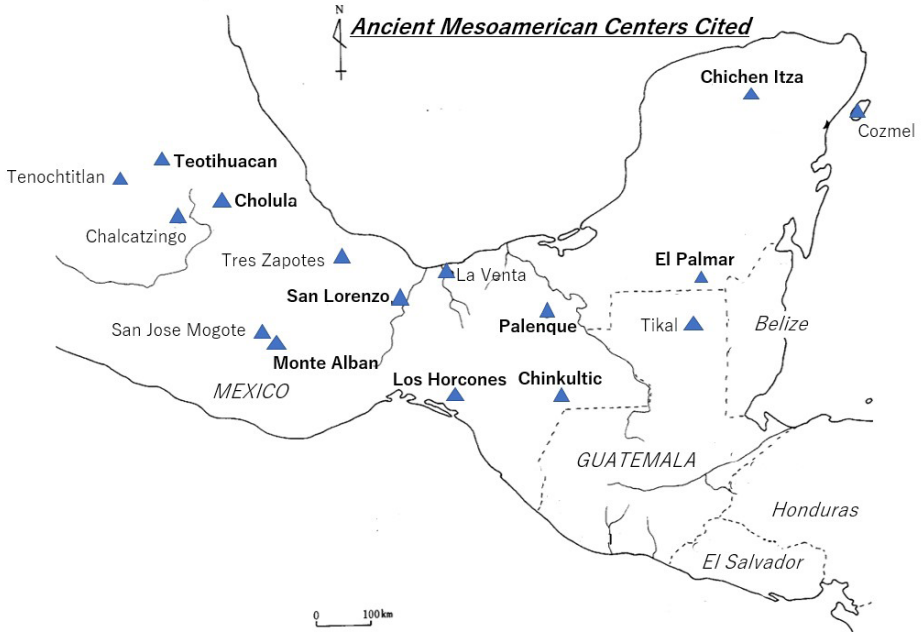
Mesoamerican people enacted the sacred landscape through rituals conducted in the plazas and on artificially constructed "sacred mountains", however they also journeyed in pilgrimage to visit "sacred mountains." Palka, in his contribution to this volume, explores the enduring role of pilgrimage in Mesoamerica for the last several thousand years using archaeological, ethnohistorical, and ethnographic perspectives. He stresses that agents had to travel together to "sacred mountains" to communicate with animistic or ancestral forces. Pilgrimage consists of a journey to a significant landscape feature, such as mountain, cave, spring or ancient shrine to carry out rituals, leave offerings, and to interact with spiritual forces in their dwelling. Pilgrimage has been described as a "kinetic ritual" (Turner and Turner, 1978, p. xiii), where agents in motion whether in long distance travel or in processions in plazas evoke the dynamism of the cosmos as embodied by the world trees' double helix shape (See López Austin this volume). Palka presents pilgrimage as creating world balance and promoting community solidarity, ultimately accentuating the power and status of authorities and social organizations in Mesoamerica.

Pilgrimages were not the only journeys undertaken by agents in Mesoamerica. Death brought with it a journey of the soul into the underworld. Astor-Aguilera provides ample evidence and insightful perspectives about very complicated funerary practices in Mesoamerica. Through ethnographic, ethnohistorical, and archaeological inferences dealing with bone treatment, cremation, exhumation, mortuary bundling, trophy heads, funerary rites, reuse of human bones, etc., he discusses the interrelation between the living and the dead demonstrating how symbolically and deeply people created cosmologies including conceptions of the Mesoamerican Underworld. Anthropological investigations confirm that biological death does not mean the end of the spirit. Using comparative examples, Astor-Aguilera insists that life continues and regenerates. The body-bones-spirit conceptually connect to nature, fertility, and power controlled reciprocally through social actions.

The chapters in this section make clear that Mesoamerican cosmology and conceptions of the "sacred mountain" have a deep and complex history. From the earliest people traveling along the coast to the rise of urban Pre-Columbian centers, the reciprocal engagements between people and landscape framed a discursive relationship that was materialized in the shape of cities, heights of monumental architecture, and replicated through rituals public, private and kinetic. The simultaneously developed and shared niche construction of the "sacred mountain" and related ideological worlds in coastal wetlands, at the base, hilltop, or in the lake in the Central Mexican highlands provide insight into the mechanisms linking brain-mind-body and environments. Peoples' mental power and collective actions helped them overcome hard environmental conditions. Future interdisciplinary research will continue to engage with the themes presented preliminarily at this conference and build on collaborations with experts of evolutionary anthropology, physical biology, neurosciences, evolutionary psychology, and archaeology. These proceedings represent only the first of what we hope will be many multidisciplinary, international engagements in research, collaboration, and publications that emerge from this "Out of Eurasia" program.

Figure Part II.1.

Ancient Mesoamerican Centers Cited



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14
The Possibility of Pacific Rim Origins for New World Ancestral Populations

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The colonization of the Americas by the ancestors of today's First Nations has been a central theme of investigation for centuries. In the last 20 years, archaeologists working on the issue of initial arrival in North and South America have shown the increasingly high probability of an entry from Asia via a coastal route along the North Pacific continental edge (Davis et al., 2012; Madsen, 2015; Davis et al., 2019). The first human communities of the Americas were recent migrants and, in turn, were the descendants of trailblazing populations that rapidly radiated out of the mother continent of Africa sometime after 70,000 years ago (Lopez et al., 2015). Following a route that passed through the 'lost' subcontinent of Beringia, these Upper Paleolithic hunter-gatherers left their homelands on the shores of the Western Pacific during a time of climatic and social instability. Recent investigations on Isla Cedros, Baja California (Des Lauriers, 2010; Des Lauriers et al., 2017; Des Lauriers et al. 2020) have discovered several sites that date to the Terminal Pleistocene and contain evidence for specialized technology for harvesting offshore marine resources. Combining the implications of recent research demonstrating that 1) the "ice-free" corridor was not available as a route for the initial migration to the Americas (Map 3); 2) that shell hooks were used during the last glacial period in southern Japan (Fujita et al. 2016) and across the Western Pacific Rim (Smith and Allen 1999; O'Connor et al., 2011); and 3) given that these were also used in Cedros Island in the final centuries of the Pleistocene, we must consider the possibility that the initial routes of movement into the Americas had at least some of their points of origin among the coasts and islands of the Western Pacific Rim, instead of exclusively originating in the interior of Siberia.

La colonización de las Américas por los antepasados de las Primeras Naciones actuales ha sido un tema central de investigación hace varios siglos. En los últimos 20 años, los arqueólogos que trabajan en el tema de la llegada inicial a América del Norte y Sur han demostrado la probabilidad cada vez mayor de una entrada inicial desde Asia a través de una ruta costera a lo largo del borde continental del Pacífico Norte (Davis et al., 2012; Madsen , 2015; Davis et al., 2019). Las primeras comunidades

humanas de las Américas fueron migrantes recientes y, a su vez, descendientes de poblaciones pioneras que se irradiaron rápidamente del continente madre de África en algún momento después de hace 70,000 años (López et al., 2015). Siguiendo una ruta que pasó por el subcontinente 'perdido' de Beringia, estos cazadores-recolectores del Paleolítico superior abandonaron sus tierras natales en las costas del Pacífico Occidental durante una época de inestabilidad climática y social. Investigaciones recientes en Isla Cedros, Baja California (Des Lauriers, 2010; Des Lauriers et al., 2017; Des Lauriers et al. 2020) han descubierto varios sitios que datan del Pleistoceno Terminal y contienen evidencia de tecnología especializada para la cosecha de recursos marinos en alta mar. Combinando las implicaciones de investigaciones recientes que demuestran que 1) el corredor "sin hielo" no estaba disponible como ruta para la migración inicial a las Américas (Mapa 3); 2) que los anzuelos de concha se utilizaron durante el último período glacial en el sur de Japón (Fujita et al. 2016) y en todo el borde del Pacífico occidental (Smith y Allen 1999; O'Connor et al., 2011); y 3) dado que estos también se usaron en la Isla Cedros en los siglos finales del Pleistoceno, debemos considerar la posibilidad de que las rutas iniciales de movimiento hacia las Américas tuvieran al menos algunos de sus puntos de origen entre las costas e islas que rodean el borde del Pacífico occidental, en lugar de originarse exclusivamente en el interior de Siberia.

The Great Diaspora and the Furthest Migration

The first human communities of the Americas were, by definition, recently arrived migrant populations and the descendants of trailblazing modern human populations that rapidly radiated out of the mother continent of Africa sometime after 70,000 years ago (Lopez et al., 2015). Following a route that passed through the lost subcontinent of Beringia, these Upper Paleolithic hunter-gatherers, left their homelands on the shores of the Western Pacific during a time of climatic and social instability. To get from the north Pacific Rim to South America, these settlers were forced to cross borders between inhospitable, barren, truly unknown and desolate lands. There was a lack of advance knowledge of the details of landscape, of flora and fauna, sources of reliably potable water, and deposits of raw materials. The ancestral migrants overcame these shortcomings, learning and adapting with a masterful skill, found only among determined people. Only their existing knowledge and skill could be brought with them from their ancestral homelands. These "communities of practice" (Wenger, 1998) thus would have predated the arrival in the Americas. Human history in the Americas is a history of migrants, a history of how and why various aspects of the cultural systems that they brought with them changed or persisted.

The first settlers arrived as complete societies, not blank slates; they were communities in transit, communities with great funds of knowledge (Vélez-Ibañéz and Greenberg 1992), looking for a new life in a new world. It is not easy to begin to overcome boundaries of unknown scale, but the ancestors of the original people of the Americas did exactly that. There exsits a reciprocal relationship between the cultural legacies of a people and the conditions encountered in a diasporic context. It is the degree to which the new situations can be accomodated within pre-existing systems of knowledge, technology, and social organization that largely determines how much selective change, or adaptation, will be required of the migrating population.

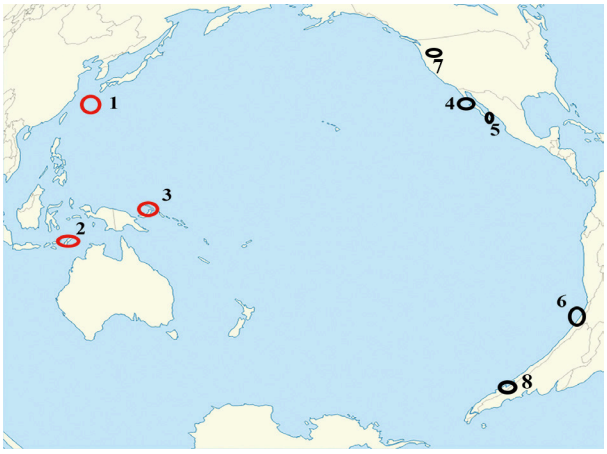
Settlement of the Americas

The colonization of the Americas by the ancestors of today's First Nations has been a central theme of research for centuries. In the last 20 years, archaeologists working on the issue of initial arrival in North and South America have shown the increasingly high probability of an initial entry from Asia via a coastal route along the North Pacific continental edge (Davis et al., 2012; Madsen, 2015). Recent discoveries at the Cooper's Ferry site in Idaho clearly show human presence south of the North American ice sheets by ~16,000 cal yr BP (Davis et al., 2019) – more than 1000 years before the opening of an ice-free corridor. This and other recent discoveries further support the hypothesis that people initially migrated into North America along a Pacific coastal route (Map 14.1).

Early sites like Cooper's Ferry, Idaho (Davis et al., 2019), Monte Verde, Chile (Dillehay, 1997, 2000), and Paisley Caves, Oregon (Jenkins et al., 2012) among other localities, hold evidence that humans were present in the Americas before the appearance of Clovis Paleoindians. Despite the fact that Clovis peoples were not the first inhabitants of the Americas, the Clovis Paleoindian tradition is a very interesting historical and anthropological phenomenon in terms of the brevity of its few centuries of history (Waters and Stafford, 2014), and its geographical extension from the Sonoran deserts with the extraordinary site known as El Fin del Mundo (Sanchez et al., 2014), to the forests of the Pacific Northwest and the Great Lakes between Canada and the United States. There are even limited numbers of isolated fluted points from the Baja California Peninsula, though their connection to the larger Llano tradition is unclear (Gutiérrez and Hyland, 2002; Des Lauriers, 2008). The Clovis Culture is still fascinating, but now it is also recognized that the mammoth hunters seen in countless museum dioramas were not the first inhabitants of the Americas, but the descendants of the pioneer groups

Map 14.1.

Some of the archaeological sites or geographic locations mentioned in the text. (1) Ryukyu Archipelago, Japan; (2) East Timor sites; (3) New Ireland; (4) Isla Cedros, Baja California, México; (5) La Paz region sites, México; (6) Morro Colorado, Chile; (7) Cooper's Ferry, Idaho, USA; (8) Monte Verde, Chile.



that had different life paths, and a route of entry to the Americas that only recent findings in sites in North and South America have brought to our awareness.

The earliest archaeological evidence for the arrival of people in the Americas has been discovered at the Cooper's Ferry site in western Idaho dating to 16,000 years ago, more than 1,000 years before an "ice-free corridor" opened between the two North American Continental glacial masses (Davis et al., 2019). This may be interpreted to support the hypothesis of the Pacific migration route to the Americas along its coasts, since the antiquity of the find precludes an interior route of arrival for the earliest occupants of Cooper's Ferry. If the initial human migration to the Americas actually followed such a coastal route, then we might expect to find the first sites along the coast and that these sites should produce evidence that the first

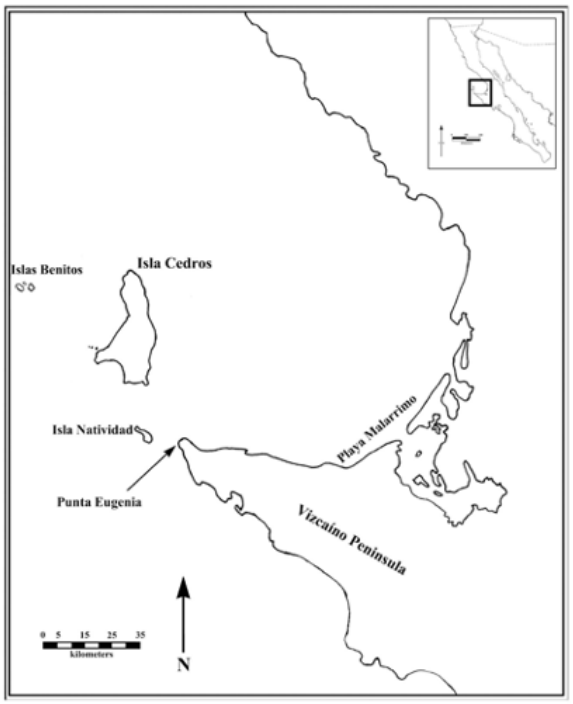
coastal settlements possessed deep traditional ecological knowledge about marine environments and their resources. Critics often point out that the Pacific coastal sites are not as early as Clovis and other previous inland sites; however, in recent investigations on Cedros Island, Baja California (Des Lauriers, 2010; Des Lauriers et al., 2017; Des Lauriers et al., 2020), several late Pleistocene sites have been discovered that date close to and overlap with the Paleoindian Clovis Tradition period.

Isla Cedros, Baja California, México

Cedros Island, Baja California (Map 14.2), is a unique and special place. Measuring 35 kiliometers north-south and by 16 kilometers east-west, it also reaches to almost 1400 meters in elevation. It is a large, rocky, 'high' island in the Pacific Rim sense of the term. Marine layer fog consistently blankets the island, shrouding its flanks with a thick, life-giving girdle of water, upon which the plants of the island rely almost entirely, for it very seldom rains. Its vegetation ranges from desert flora at sea level, to small pockets of pine forest along the crests of the central spine. Its surrounding seas are prodigiously rich, and sea life abounds. In the thinking of the Cochimí, the contact period indigenous inhabitants of the region, this island was the Western Mountain, a sacred place, and cradle of origin of one of their lineages that gave structure to their social life. It is, in fact, a mountain drowned by the rise in sea level, becoming an island during the final centuries of the Ice Age, when the glacial masses of the Northern Hemisphere were rapidly ablating.

Map 14.2.

Isla Cedros, Baja California, México.



Four sites on Cedros Island have revealed human occupation dated to the final centuries of the Ice Age: Cerro Pedregoso (PAIC-44); Richard's Ridge (PAIC-49); Sitio Peregrino (PAIC-88); and Colina Castor (PAIC-91). In 2019, a binational team led by Matthew Des Lauriers (California State University, Northridge), Loren Davis (Oregon State University, Corvallis), and Antonio Porcayo Michelini (National Institute of Anthropology and History), conducted excavations in three of these sites (-44, -88, and -91). The results of these investigations have been surprising with extremely relevant findings for our understanding of the entry and settlement of some of the first human communities on the coast of the Americas (Des Lauriers et al., 2017).

In all coastal regions, throughout time, people have found essential resources necessary for the flourishing of human communities. Even along the most arid coastlines, it is water that is often a limiting factor, not food or other nutrients. As global ice masses began to melt at the end of the Würm glaciation, many archeological sites associated with these first coastal occupations of the Americas were incontrovertibly submerged or destroyed by rising tides (Westley and Dix, 2006). To the great benefit of our

investigations, however, Late Pleistocene sites on Isla Cedros display a pattern of being located in the vicinity of ancient springs (now extinct), located several dozen meters above even current sea level. Archaeological excavations show that the people who occupied these sites fished, hunted and collected marine food resources and took them inland to live next to these springs. Our research has focused on these ancient occupations because they are surviving evidence of early coastal occupations that have more often been submerged on the continental shelf. Rather than live closer to the source of marine foods, the early inhabitants of Isla Cedros appear to have prioritized potable water and decided, based on available labor power and technology, that it was easier to move the food to the water than the converse. Observations like this one become of increasing interest as we pursue lines of investigation that focus on the nature and process of migration and settlement (sensu Rockman, 2003), rather than simply prospecting for radiocarbon dates. Excavations at these early sites show a series of cultural material buried and stacked in fine sands and silts, which reflect the repeated human occupations around the springs within a dry coastal environment. It was the attraction of water that caused these early inhabitants to move large quantities of seafood, raw materials, and other resources to relatively stable campsites in immediate proximity to large freshwater springs, paralleling early settlement patterns in other arid regions bordering the Pacfic Basin (i.e. Veth, 1989). In regions of the Eastern Pacific Rim where fresh drinking water was not as scarce (e.g. Fedje et al., 2011), it is possible that occupations may have been more fluid in terms of location, and quite possibly located closer to the now drowned paleocoastline. This would have the effect of making early coastal sites in these more well-watered regions more susceptible to inundation and destruction by eustatic sea-level rise. The constraints of the arid landscape of Baja California may have resulted in a higher survival rate for Terminal Pleistocene residential sites.

At Cerro Pedregoso (PAIC-44), one of the most salient and surprising discoveries of the 2019 field season was shockingly abundant evidence for the manufacture and use of single piece shell hooks (Figure 14.1), and the exploitation of a wide range of marine and terrestrial resources between the Terminal Pleistocene and Early Holocene. Early sites on Isla Cedros show a varied lithic toolkit that includes abundant bifacials, knives, projectile points (Figure 14.2), 'conchotechnic' tools produced by flaking of thick *Tivela* clam shells and uncommon examples of ring-shaped, enigmatic groundstone artifacts. Of special interest is the unifacial lithic industry (Figure 14.3), which is the single most diagnostic artifact type for the Terminal Pleistocene sites on Isla Cedros. The microscopic analysis of the unifacial lithic scraping tools reveals wear and polish on their margins resulting from the processing of *Agave* fibers to make ropes, nets, fishing line, etc (Elzinga, 2011).

Figure 14.1.

One of the most well-preserved shell fishhooks from Isla Cedros, Baja California. It is among 38 other similar hooks manufactured from both Mytilus and Haliotis shell from 3 Terminal Pleistocene-aged sites on the island.



Figure 14.2.

Common projectile point forms from Terminal Pleistocene sites on Isla Cedros, Baja California. Scale in cm.



Figure 14.3.

Diagnostic unifacial tool (in early use-life stage) from Terminal Pleistocene sites on Isla Cedros. Scale in cm.



To date, Cerro Pedregoso has a collection of faunal remains that is the most diverse compared to any other archaeological site on Cedros Island over the last 12,000 years. The site has given thousands of fish remains identified in 25 different taxa, accompanied by a wide range of mollusks, crustaceans, marine mammals, sea turtles, birds, rabbits, and endemic deer that still inhabit the island. Outside of mollusks, fish, and crustaceans, the most consistent faunal elements recovered are those of turtles and marine mammals.

Shell fishhooks are among the first specialized technologies in evidence on Isla Cedros and were used during a period of dramatic changes in climate, ecology, and coastal geomorphology (Mandryk et al., 2001; Westly and Dix, 2006; Fedje et al., 2011). The lower layers in the Richard's Ridge (PAIC-49) are dated in excess of 12,700 years old, while Sitio Peregrino (PAIC-88) has produced the oldest date thus far obtained for a cultural deposit on the island that would place occupation at least as far back as 13,400 CalBP. Our data indicate that hook and line technology appears on Cedros Island at least in the late Pleistocene along with harpoons, as suggested by bifacial projectile points, turtle remains and marine mammals, in conjunction with nets probably made of fiber from *Agave*, which are further evidenced by the vertebrae of abundant small fish (Atherinopsidae). Other sites in Baja California Sur, notably on Espiritu Santo Island in the Sea of Cortez, have produced shell fishhooks dating to the early periods of occupation. These other hooks date in excess of 10,000 kya (Fujita, 2014), but have not yet been recovered from contexts as old as those on Isla Cedros. Likewise, single-piece shell fishhooks form the earliest recognizable fishing tackle along the Pacific Coast of South America, but dating to between 8,000 and 9,000 years old (Flores et al., 2016).

During the late Pleistocene and early Holocene, the bathymetry near the shore of the paleo-Island lacked the

steep topographic relief that would have been necessary to fish deep-sea species. Between 13,000 and 10,000 years old, there were an extremely small number of places where deep water of 25 meters was less than about 1 kilometer distant from the Paleo-shoreline of the island. Along the southern part of the island, and in almost all other areas, the first foragers would have travelled by boat at least 2 kilometers offshore to find waters of that depth to fish (Des Lauriers et al., 2017).

The abundant remains of shallow water species associated with muddy or sandy substrates, in addition to sea turtles associated with seagrass meadow habitats, support the interpretation that the environment near the shores of the Paleo-Cedros Island was not exclusively dominated by a steep and sloping bathymetry, or deep water. However, ocean whitefish (Caulolatilus princeps) is one of the representative fish in the icthiofaunistic collections for the early period, and is a species that is most commonly found in waters that they measure between 28-62 meters deep near rocky reefs and offshore banks in Alta California (Wertz and Kato, 2004), and in waters between 80-150 meters deep in Baja California Sur (Elorduy-Garay et al., 2005). The only practical method for harvesting them in the Terminal Pleistocene would have involved the use of hooks, stone weights and fishing line, as well as the use of boats to reach the outer edge of the kelp forest and deep rocky reefs.

Of special importance is a significant contrast with some of the early sites on the coast of Peru (e.g. Reitz et al., 2016) – the remains of fauna from Cedros Island are characterized by an extreme diversity, not only of species, but of entire classes of fauna. The consistent and sustained exploitation of a wide range of resources represents a long familiarity with the ecozone, which indicates one of two possible explanations: 1) they arrived in the peninsula of Baja California without a maritime adaptation, but arrived long before they developed any of the archaeological evidence that we have recovered so far, provided an adequate period of time for landscape learning (Rockman, 2003; Milne 2008, 2011), and the always associated development of technology and traditional ecological knowledge; or 2) the human populations that migrated along the Pacific coast of North America were already familiar with aquatic resources (Ames, 2002) and simply adjusted existing strategies and technologies to the needs and restrictions of the new ecological conditions and availability of raw material. The second possibility would have dramatically reduced the duration of landscape learning required for pioneer groups to establish stable ecological and social structures, both essential for a rapid and successful dispersion of human beings along the Pacific coast of the Americas. Both explanations remain viable, since human occupation in places like Paisley Caves, Oregon, (Jenkins et al., 2012) is dated at least 500 years before the oldest sites thus far investigated on the Baja California Peninsula. Testing these two possibilities against one another will only be possible though further investigations on the Peninsula and other portions of the North Pacific Rim, where geography, climate, and steep continental shelves provide enhanced opportunity to discover sites dating to the Late Pleistocene. Beringia itself lies largely beyond the practical range of even underwater archaeology, but the Pacific Coast of Mexico and the Japanese Archipelago are among the ideal regions to search for connections. This is especially true, since there have been nearly 17,000 Late Pleistocene deposits identified in Japan (Nakazawa, 2017, p. 545), and these range geographically from the Ryukyu Islands in the south to Hokkaido and Sakhalin in the north – a substantial portion of the Pacific Rim.

The Wider World and Traditions of the Sea

Archaeological sites in the Western Pacific, such as Lene Hara Cave in Indonesia (O'Connor and Veth, 2005; O'Connor et al., 2011) along with other Melanesian sites (Smith and Allen, 1999) have produced single-piece shell fishhooks dating to the Terminal Pleistocene. Even closer to the North American coastline by way of the Pacific Rim route is the site of Sakitari Cave on Okinawa, largest of the islands in the Ryukyu Archipelago (Fujita et al., 2016). At this locality, not only does evidence for the manufacture of single-piece shell fishhooks extend back further than at any other deposit on the Western Pacific Rim (and quite possibly the world), but the insular context demonstrates unequivocally that seaworthy watercraft were employed by the inhabitants, who harvested a diverse range of marine resources with a sophisticated technological system enabled by a depth of ecological knowledge borne from long residence in the dynamic coastal environments of the Pacific Rim seas bejeweled with inspiringly beautiful islands.

Figure 14.4.

Typical flaked shell tool from Terminal Pleistocene contexts on Isla Cedros. Scale in cm.



The similarities between the Terminal Pleistocene Okinawan assemblages (Fujita et al. 2016) and the Isla Cedros material (Des Lauriers 2010; Des Lauriers et al. 2017) are not limited to the generalized idea of "fishhook." Both sets of hooks are manufactured from nacreous shells of abalone, though the Cedros hook assemblage also includes mussel shell as a raw material. Both sets also have the same types of attachment shanks. Both sets appear to conform to a very similar range of size and form, within which both populations would have recognized similar design characteristics. Additionally, even the faunal assemblages from both Okinawa and Isla Cedros share interesting lines of convergence, including crustaceans as a significant resource and the use of shell (Figure 14.4) as a raw material for flaked tools (Takamiya et al., 2019). In fact, it would appear that the kind of broad-spectrum adaptation so clearly demonstrated in the Isla Cedros assemblage (Des Lauriers, 2010; Des Lauriers et al., 2017), where every kind of plant and animal available to the Terminal Pleistocene inhabitants was actually harvested, was paralleled in the Okinawan deposits (Takamiya et al., 2015; Fujita et al., 2016).

Island populations necessarily demonstrate a settlement pattern that runs counter to our expectations of Pleistocene hunter-gatherers, being locations were the legendary 'highly mobile' foraging groups would have been severely constrained by the very nature of insular geography. As a result, we have to reconfigure our image of these populations, and create one where while some mobility may have been employed seasonally for convenience, it would not have resulted in movements of any great distance, certainly nowhere near the scope and scale of the mobility practiced ethnographically by populations in the high Arctic (Binford 1977, 1978) or arid regions of Africa (Lee 1972) and Australia (Allen 1997; Veth 1989). In the latter cases, however, mobility is still constrained by

available water sources, even when physical barriers to movement are minimal. No, for those groups occupying the Western Pacific Rim, and their descendants in the Pleistocene landscape of the Americas, would have had strong senses of "place," and their active acquisition of knowledge about the new lands before them would have proceeded as that of expectant new residents rather than the cursory examination performed by peripatetic visitors (Rockman, 2003; Fujita and Ainis, 2018).

New Perspectives, New Routes

By discarding some of the assumptions and misapprehensions of previous generations of scholars, we may be able to form an increasingly complex and historically accurate image of the timing, and nature of human population movements and socio-ecological adaptations that we include under the heading of "Peopling of the New World." No longer confined to points of origin in the Taiga of Siberia and ways of life predicated on a terrestrial mode of production, we can expand our search and interpretive processes beyond the orthodoxy of the 20th Century. Shifting our view in this way would suggest that the image of the initial migrants into the Americas which held our attention for so many decades was seriously flawed. While some of the descendants of the early settlers did indeed forge a new lifeway focused on big-game hunting in the interior of the North American continent, it was one which flowered and faded in one glorious, but brief, cultural spring. The Clovis phenomenon was one which occurred at least a thousand years after the initial arrival of people on the continent, adding further strength to the suggestion that the apparent rapidity of its spread was due to it being a technology that spread among populations already in possession of the land and a detailed knowledge of basic resource distribution (Amick 2017).

Combining the implications of recent research demonstrating that the "ice-free" corridor was not available as a route for the initial migration to the Americas (Map 3); that shell hooks were used at the height of the last glacial period in southern Japan and across the Western Pacific Rim (O'Connor et al., 2011) and that these were also used in Cedros Island in the final centuries of the Pleistocene, we must consider the possibility that the initial routes of movement into the Americas had at least some of their points of origin among the coasts and islands of the Western Pacific Rim, instead of exclusively originating in the interior of Siberia. Interesting parallels in specific functional uses and manufacturing processes in lithic technology have even begun to tie some of the early traditions of Hokkaido (Buvit et al., 2014; Nakazawa 2017) to early archaeological sites along the Pacific Slope of the Americas (Davis et al., 2019). Some recent genetic results may actually support multiple points of origin for the settlement of the Americas, with some participants in fact derived from Pacific Rim populations (Skoglund et al. 2015). Additionally, studies of human skeletal morphology actually provide some evidence for population links between the pre-Jōmon occupation of the Ryukyu Archipelago (Takamiya, 2015, 2019) and Austro-Melanesian populations (Kaifu et al. 2011). In practical terms, both as regards their demonstrated possession of transportation technology in the form of seaworthy watercraft and the fact that their homelands were more immediately susceptible to Terminal Pleistocene climate disruptions than those people living hundreds of kilometers from the ocean, the people of the late Pleistocene Pacific Rim were undoubtedly among the populations that were forced into diasporic movements as geography changed in face of global climate change.

This is a story within which we are not merely observers, and we may faintly hear echoes of our collective past and glimpse images of our possible futures, both potentially enlightening and disturbing at the same time. As we

continue to search for and investigate new Pleistocene-aged deposits in Baja California and elsewhere in Latin America, we may find that the first inhabitants, like other Pleistocene peoples of the Pacific basin, were always seafarers. Their great funds of knowledge (Vélez-Ibañéz and Greenberg, 1992) and far-flung communities of practice (Wenger, 1998), instead of being erased by the experience of migration, were precisely what empowered them, allowing them to begin the settlement of some of the first truly unknown lands since our ancestors ventured beyond the mother continent of Africa.

Map 14.3.

The Northeastern Pacific Rim at approximately 12,000 CalBP. This is shortly after the opening of the corridor between the Cordilleran and Laurentide Ice Masses. Sites dating to this time are found throughout the Northeastern Pacific Rim, from British Columbia to Baja California Sur (see Fujita and Ainis, 2018).



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The Mesoamerican Conception of the Sacred Mountain, its Projections and Architectural Manifestations[1]

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This text presents initially a synthesis of the known cultural traditions known in Mesoamerica, explaining its chronological limits, maximum extension, geography and economic foundations, in order to elucidate what Mesoamerica as a concept is. The cultures that comprised it included the Olmec, Zapotec, the Teotihuacanos, the Maya, Toltec, Aztec etc. The text continues to refer to the common characteristics in cosmovision of the diverse indigenous groups throughout their history and the sources relied upon by researchers to understand the Mesoamerican worldview.

One of the principal ideas of Mesoamerican peoples was the conception of the cosmos as a great machine, whose center was the pivot or axis mundi, that descended to the cold Region of the Dead and upwards to the igneous sky. This is due to the fact that Mesoamerican cosmologic thought was ruled by the principal of opposite and complimentary forces, similar to the Asian idea of yin/yang. Precisely, the center of the axis mundi was formed by a rope of two chords, one fire and one water, that formed the motor of the cosmos. The axis mundi reproduces itself in the four extremes of the terrestrial surface, forming four columns that separate earth from sky.

In actuality, it is possible to know how old these concepts were, since they are reproduced in the symbols of the ancient Olmec. Through them, the symbols appear in later cultures, principally the Maya and the Teotihuacanos and would be found among the Aztec clear until the eve of the European invasion.

Some of the most important realms for the expression of these ideas are the visual arts and architecture. The Maya, for examples, beautifully reproduced ideas related to the axis mundi in their temples and palaces, like a cosmologic obsession they gave form to sacred figures in sculpture and painting. They did so, for example representing in stone and in painting the axis mundi, the sacred mountain that is the axis, the mountain's cave, the sacred tree on its summit etc. It was a custom shared by the other peoples of Mesoamerica. In this manner, Mesoamerican people imagined themselves as living parts of the world mechanism, collaborators of the gods who maintained the dynamism of the cosmos. These ancient cultural expressions were reproduced until the cultural destruction provoked by the European invasion and Christian evangelization.

Este texto presenta inicialmente, en forma sintética, qué se entiende por la tradición cultural mesoamericana, explicando sus límites cronológicos, su extensión máxima, su geografía y sus bases económicas, para dar a entender qué fue Mesoamérica, cultura que comprendió pueblos como los olmecas, los zapotecos, los teotihuacanos, los mayas, los toltecas, los aztecas, etc. El texto continúa refiriéndose a las características comunes de la cosmovisión de los diferentes grupos indígenas a lo largo de su historia, y de las fuentes con las que los investigadores cuentan hoy para conocer el pensamiento mesoamericano.

Una de las ideas principales de los mesoamericanos fue concebir el cosmos como una gran maquinaria, cuyo centro era el Eje o axis mundi, que descendía hasta la fría Región de la Muerte y llegaba hasta el Cielo, considerado ígneo. Esto se debe a que el pensamiento cosmológico mesoamericano se regía por un principio de opuestos complementarios, semejante a la idea asiática del yin/yang. Precisamente, el centro del axis mundi está formado por una cuerda de dos corrientes, una de fuego y otra de agua, que forman el motor del cosmos. El axis mundi se reproduce en los cuatro extremos de la superficie terrestre, formando cuatro columnas que son las que separan la Tierra del Cielo.

Actualmente se puede saber qué tan antiguas eran estas concepciones, ya que están reproducidas en la simbología de los antiguos olmecas. A partir de ellos, los símbolos aparecerán en culturas muy posteriores, principalmente entre los mayas y los teotihuacanos, y llegarán hasta los aztecas, ya en vísperas de la invasión europea.

Unos de los ámbitos más importantes para la expresión de estas ideas son las artes visuales y la arquitectura. Los mayas, por ejemplo, reprodujeron bellamente ideas relacionadas con el axis mundi en sus templos y palacios, como una obsesión cosmológica de plasmar las figuras s en la escultura y la pintura. Así lo hicieron, por ejemplo, representando en la piedra y en la pintura el axis mundo, el Monte Sagrado que está en el axis, la cueva del Monte, el árbol sagrado que está en la cúspide del Monte, etc. Fue una costumbre compartida por los demás pueblos de Mesoamérica. En esta forma, los hombres mesoamericanos se imaginaban como partes vivas del mecanismo del mundo, colaboradores de los dioses en la función de mantener la dinámica del cosmos. Estas manifestaciones culturales, tan antiguas, se hicieron hasta la destrucción cultural provocada por la invasión europeo y la evangelización cristiana.

Today we call Mesoamerica a culture whose maximum extension occupied a territory of approximately 1,300,000 km^2 of which, around one million belong to the southern half of the territory of modern Mexico and the rest of the eastern part of Central America. Such a territorial extension is comprised of very contrasting climates, from semiarid deserts in the north to exuberant tropical jungles in the south, to the marine coasts of the Gulf of Mexico, Pacific Ocean and Caribbean sea, and highland valleys of more than 2000 masl. The territory's relief is highly mountainous, and its summer pluvial regimes go from abundant to scarce.

Current calculations suggest this territory was occupied since 34,000 years ago by hunter-gatherer-fisher societies, but the term Mesoamerica designates the cultural traditions of the sedentary agriculturalists that initiated this way of life 4500 years ago and proceeded their autonomous development until the beginning of the XVI century of our era (Map and Chart)—the period when the Spanish conquest initiated a difficult colonial life. The indigenous societies of agriculturalists were very diverse, ethnically as well as linguistically. Some were descendants of the ancient hunter-gatherer-fishers of this territory, while others arrived here later.

Agricultural life was based on a system known as *milpa*, in which the cultivation of corn, beans, squash and chile were combined with other products, already common and particular to the various climatic zones. These societies transformed themselves from organizations of simple households and small egalitarian villages to primary hierarchical societies, and from these complex societies were borne the great cities and militaristic states.

Despite their great ethnic, linguistic, regional historical, and climatic differences, Mesoamericans forged, thanks to their constant interactions of all types, a culturally homogeneous base, formed by common social practices and a central cosmovision, over which they constructed different practices and cultural expressions. Along with many other peoples, the Olmec, Zapotec, Teotihuacanos, Maya, Huastec, Totonacs, Mixtec, Tarascans, and the Nahuas stand out historically. Of the Nahua peoples in Central Mexico, the Toltec of the Early Postclassic Period (900-1200 CE) and the Mexica (known also as the Aztec) in the late Postclassic (1200-1521 CE) stand out (Figure 15.1).

One of the common foundations of the Mesoamerican cosmovision was the conception of unperceivable entities whose actions explain the creation and transformation of the world inhabited by their creations; these beings are the Gods. People, in their desire to propitiate or avoid the actions of those deities, attempted to influence in their actions using the human faculty that they considered the most powerful—language. To give value to this resource, they had to imagine gods with similar human faculties, among them intelligence, emotions, the power of perception, volition, social existence, the understanding of human language, etc. They had characteristics that one can describe as *anthropic.*

A good part of the gods were conceived with human forms (*anthropomorphic*), although they were also imagined in animal forms (*zoomorphic*), vegetal forms (*phytomorphic*), mountain or rock form (*lithomorphic*), or those that combined parts of distinct beings (*teratomorphic*). Often these were represented with a distinct appearance indicating their diverse characteristics, powers, and functions. I should add that the gods also had the capacity to change form and could make themselves visible to people as human bodies, animals, plants, rocks, or mountains.

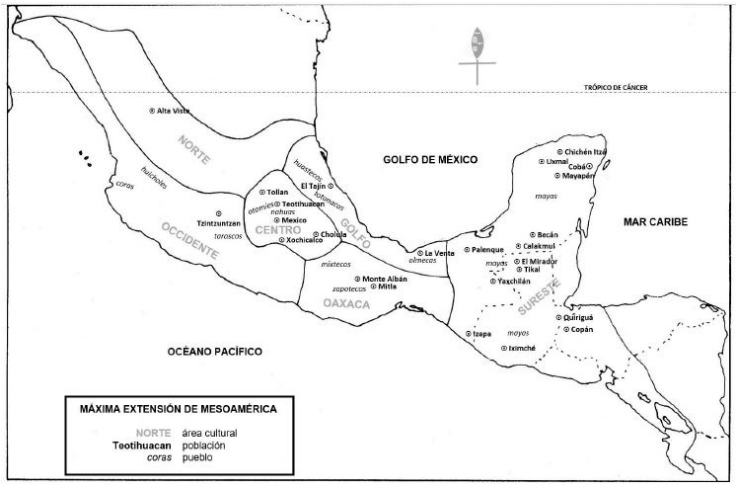
Today we know some of the cosmologic ideas of the ancient Mesoamericans through their primary iconographic complexes that have survived into our days. One of the most ancient conceptions identified among the Olmec

in the Middle Preclassic (1200-400 BCE) is the sacred mountain. Given that the belief in the sacred mountain is widely distributed throughout the world with similar characteristics, it suggests that it is a very ancient conception found among hunter-gatherer communities and enduring in many different traditions across the planet. In Mesoamerican, from very ancient times and until the European invasion, the conception of the sacred mountain relates to the idea of the cosmic motor. It is the great prometory that is located at the center of the world (Figure 15.2). Its surface marks the limits between the sky and underworld. It stands tall over the earthly surface inhabited by the living beings. Over it, the astral region can be found and beyond that the realm of the celestial gods. In its interior and base is the realm of the dead.

The Sacred Mountain is seated on a layer of the primordial waters from which the clouds, the springs, the rivers, and the subterranean currents and the sea all fill. Below this layer are the dead and the gods of the dead. There, in the underworld, souls or seed-hearts of the deceased creatures are cleansed until they lose all worldly experience. When they are totally purified, the various seeds move upwards to the hollow interior of the mountain. This hollow is a great warehouse where the seed-hearts await the opportunity to emerge again and form part of the creatures of their respective species. In its exterior aspect, the sacred mountain has on the lower part of its slope an opening through which the forces of germination and the invisible hearts of the seeds come out into the world. Through this mouth enter the offerings given by people in

Figure 15.1.

Map of Mesoamerica.



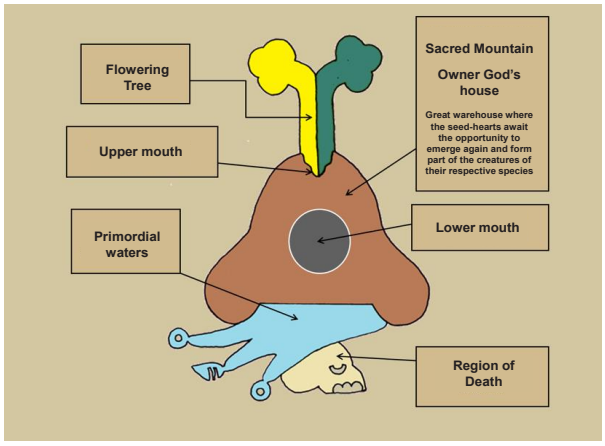
Periods		Dates	Important characteristics
Preclassic	Early	2500 –1200 BCE	Sedentary life, agriculture. Egalitarian tribal communities. Households and small villages. Ceramics appear in Puerto Marqués, Tehuacán and Tlapacoya. Agriculture based principally on seasonal rainfall. Trade between villages. Funerary burials below house floors.
	Middle	1200–400 BCE	Considerable changes in agricultural technology. Growth of social hierarchy. Labor specialization. Trade controlled by regional centers. Artistic refinement. Flourishing of Olmec culture. Population centers with monumental architecture. Astronomical orientation of La Venta.
	Late	400 BCE–200CE	Growth in the size and complexity of settlements. Raids and bellicose conflicts over political and economic rivalries. Monumental architecture at Teotihuacan and El Mirador. Obsidian is one of the principal trade goods. Notable religious sculpture at Izapa. Writing is developed. The concept of zero invented.
Classic	Early	200 – 650 CE	Notable social divisions. Growth of labor specialization. Urban/Rural differentiation. Organized long-distance trade. Important cities emerge: Monte Albán, Teotihuacan and a number of Maya cities. Commercial dominance of Teotihuacan. Great cultural, urban, and artistic developments. At the end, fall of Teotihuacan.
	Late	650–900 CE	With the fall of Teotihuacan, Monte Albán and the Maya flourish. Cultural and artistic splendor. Growth in writing, mathematics and astronomy. Growth of centers previously in Teotihuacan's orbit: Cholula, Xochicalco and Teotenango in the center, and in Veracruz, El Tajín.
Postclassic	Early	900 –1200 CE	The period of military expansion begins. Tollan flourishes, capital of the Toltec. After reaching its maximum extension, Mesoamerica retracts its northern frontier possibly due to droughts. Significant movements of northern agriculturists accompanied by hunters. Copper metallurgy appears in the West.
	Late	1200–1521 CE	Period of political instability. Distinct hegemonic powers emerge: The Mexica lead the militaristic Triple Alliance which expands and submits its neighbors to paying tribute, in the West the Tarascans, in Oaxaca, the Mixtec, in Yucatan Chichén Itzá. Considerable growth of human sacrifice. Spanish invasion.

reciprocity of the gifts received. On the cusp of the Sacred Mountain is another opening. From it, sprouts the cosmic or flowering tree. The tree has a double, hollow trunk which is the dual road through which celestial bodies circulate from the underworld to the sky and through which they return to their declination. The road is a double helical path that leads from the sky to the deepest realms of the underworld and from the underworld to the sky.

Its branches twist one over another without ever joining (Figure 15.3). The ascendant path is that of the cold water, part of the underworld which is a cold place, and represents the blue-green hue. The descending path proceeds from a luminous, hot sky, and is fiery and yellow in color. For this reason, the sacred mountain is the dynamic center of the cosmos, meeting line of the opposite and complementary forces—cold/hot, life/death.

Figure 15.2.

Schematic of the Sacred Mountain.



In Olmec iconography, the sacred mountain is represented geometrically or like an anthropomorphic, zoomorphic, lithomorphic or teratomorphic being. Some of its features endured into the Late Postclassic and into contemporary times among indigenous communities. The elements represented are the lower mouth of the cave, the opening at its cusp, the tree, and the surroundings of the sacred mountain frequently appeared to be flanked by four figures that correspond to the columns or trees that hold up the sky on the four corners of the surface of the earth. This last composition is known as a *quincunx,* and represents the center of the earth's surface and the four columns or trees (Figure 15.4).

Figure 15.3.

The representations of Malinalli.



The principal Olmec representations of the sacred mountain are found carved into ritual celts or as small stone figures (Figure 15.5), although its elements also appear in the great stone monuments known as "altars." In its geometric form, the sacred mountain is simply an elongated figure that alludes to its role as the *axis mundi*. Given that the image is two-dimensional, it is represented in a horizontal position. It is flanked, to create a quincunx, by four other figures that correspond to the columns or cosmic trees. Frequently the sacred mountain has been represented as a human, jaguar or teratomorph head. In

those instances, the lower mouth of the mountain is the jaws of the head while the upper opening is a cleft at the apex in the form of a V very peculiar to Olmec symbolism. From said cleft, emerges a maize plant in the form of a cross—the Olmec version of the cosmic tree. Centuries later the figure of the tree is also represented among the Maya as a maize plant. This is how it appears at the city of Palenque, where one example appears on the sarcophagus lid of king Pakal (Figure 15.6).

Figure 15.4.

Quincunx.

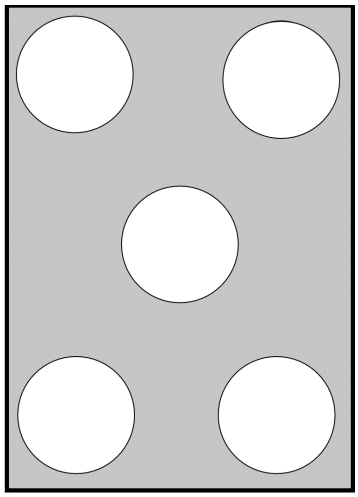


Figure 15.5.

Olmec figures on ritual celts with sacred mountain motifs. Karl A. Taube (2004) identifies the figure of the quincunx on these celts.



It is assumed that the predominance of the jaguar features of the sacred mountain is a very ancient inheritance of hunting peoples, ancestors of Mesoamerican farmers. In Mesoamerica as well as other parts of the world, it is believed that the sacred mountain is governed by a god called the Lord of the Animals. In Mesoamerica, he is also called the Dueño or owner and one of his multiple functions is to protect the fauna (García de León, 1969).

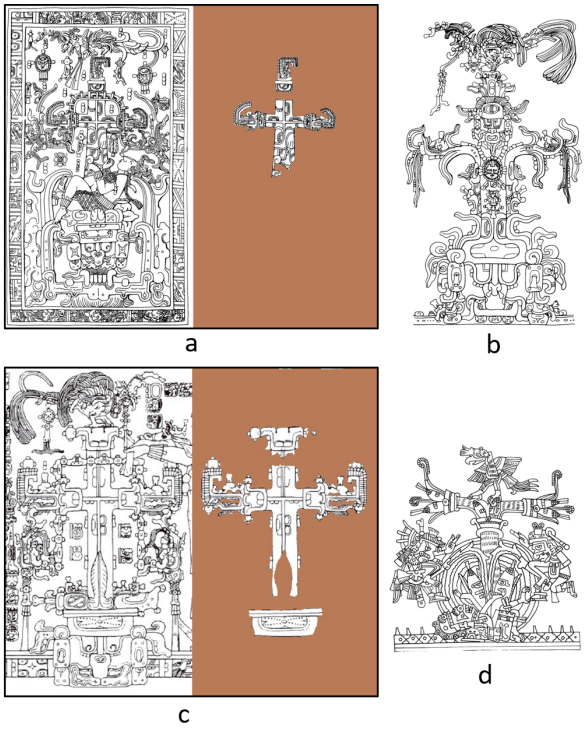
The ancient Nahua identified him with Tlaloc, god of rain. Tlaloc's name, strangely, has no pluvial associations, instead he is qualified as the lord of the earth (Sullivan, 1974, p. 217). The same is true among the Maya of Belize who call Mam the god of rain and *mam* means "earth" (Graulich, 1990, p. 277). This suggests that that the ancient origin of the Mesoamerican pluvial deities may have had various functions, among the most important were to be the guardians of the great warehouse in the sacred mountain and protectors of the animals. Their pluvial character is thus derived from them dispensing the water from the warehouse. As to their persistence as protectors of fauna, it is worth noting a myth found among the XX century Nahua of Veracruz. In Zongolica, they tell that the dogs assembled a meeting to avoid the abuse given them by people. They agreed to take the complaint to their protector deity; more importantly they called him Tlaloc (Uejkauitl nauaueueitlajtoli, 1982, pp. 20-21).

The teratomorphic representation of the sacred mountain was passed on by the Olmec to other Mesoamerican cultures. Special attention is paid to the lower opening of the sacred mountain where the vegetal richness emerges (López Austin y López Luján, 2009, pp. 255-264). In Late Preclassic (200-400 BCE) Izapa, the maw of the earth monster is shown in a simple geometric style (Figure 15.7a). During the Classic (200-900 CE) among the Maya, the face of the monster acquires a motley architectural complexity at the entrances of those

temples (Figure 15.7b). In contrast, during the same time period, there is the more simplified "mouth of the sky" of the Zapotec (Figures 15.7c-e); while in painting it is shown in abbreviated form and geometric lines around the cornices of buildings (Figure 15.7f). The same simplicity appears at Teotihuacan (Figure 15.7g) and in an archaizing Mexica mural on the eve of the Spanish conquest (Figure 15.7h). In the same time period, a frank figure of the maw at Malinalco in central Mexico at the entrance of the chapel of the Temple of the Eagles and Jaguars (Figure 15.7i).

Figure 15.6.

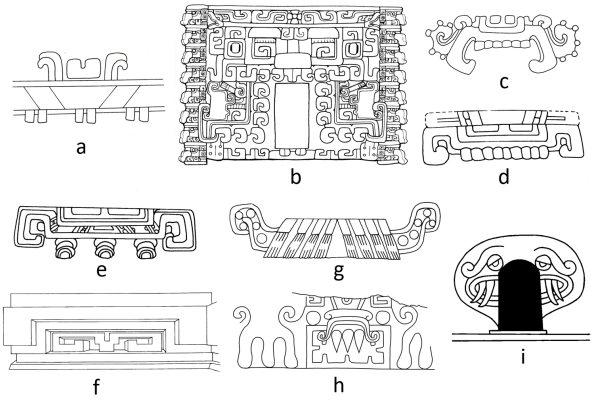
Three Classic Maya examples and one from Postclassic Central Mexico representing the sacred tree as a cruciform maize plant.



Note. a. Sarcophagus of Pakal ; b. Tablet of the Foliated Cross, Palenque; c. Tablet of the Cross, Palenque; d. *Codex Borgia*, Plate 53

Figure 15.7.

Representaions of the lower maw of the sacred mountain cave.



Note. a. Izapa; b. Façade of Maya temple, Structure 1 from Tabasqueño; c-e. Details of Zapotec murals: f. Zapotec stacked cornices; g. Detail of Teotihuacan mural; h. Detail of archaizing mural from the Templo Mayor, Mexico-Tenochtitlan; i. Entrance to the Temple of the Eagles and Jaguars, Malinalco.

The human representations of the sacred mountain or those with humanoid features have also been inherited by later Mesoamerican cultures. One example from the Classic Maya is an image from Altún Ha (Figure 15.8) in which on the lower part of the *axis mundi* appears the face of the Lord of the Underworld. Over him the figure of the sacred mountain stands with a human face, and above the cosmic tree with its helical trunk and a bird perched in the tree. Also from the Classic, the Tepantitla murals from Teotihuacan (Figure 15.9) show the sacred mountain as a face and arms, and by the Late Postclassic in *the Codex Cospi*, from central Mexico, two humanized paintings appear—one of the sacred mountain and the other of the cosmic tree (Figure 15.10).

Figure 15.8.

Maya sculpture of Altún Ha, Belize.

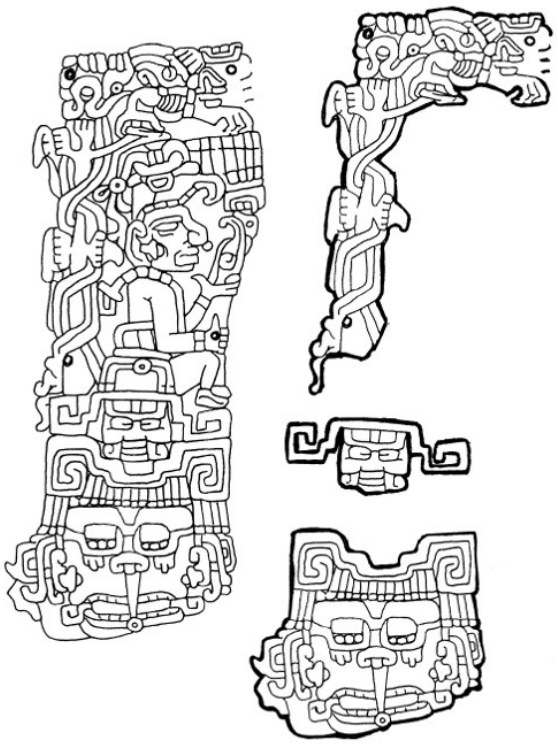
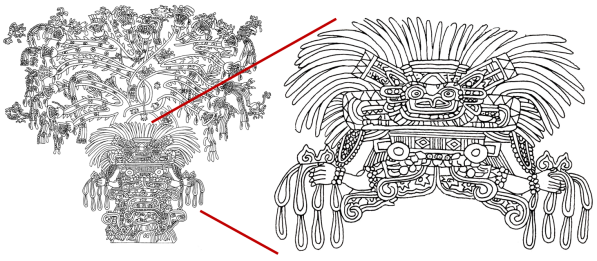


Figure 15.9.

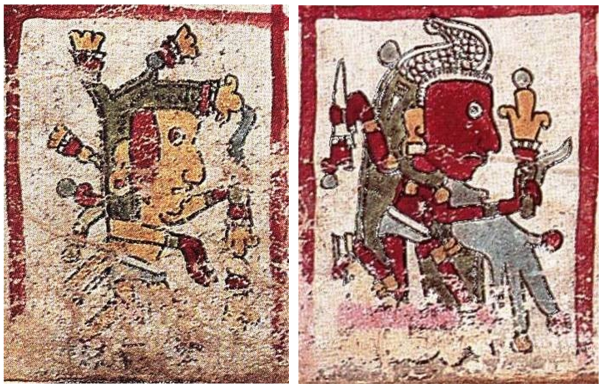
Detail of Tepantitla mural, Teotihuacan.



The *zoomorphic*, teratomorphic, and anthropomorphic representations of the sacred mountain are intended to personify a cosmologic entity. In other words, these images recognize the sacred mountain as an anthropic character to whom one can ask for children, rain, germination of plants, reproduction of animals, regularity in the luminous bodies of the heavens; to whom one can propitiate for plagues or disease to emerge from its warehouse, and to whom one gives offerings and sacrifices that enter through the mouth of its cave. In summary, the sacred mountain is a god. This god is identified with its Dueño. As Johanna Broda affirmed, both are aspects of the same divinity (Figure 15.11) (Broda, 1971, pp. 301-302). The most overwhelming proof is the conception of the god Tepeyólotl of the Mexica (Figure 15.12), which as at the same time the mountain and an anthropomorphic god dressed in a jaguar's pelt.

Figure 15.10.

Two anthropomorphic representations from the Codex Cospi.



Note. a. Flowering Tree, Plate 1; b. Sacred mountain, Plate 2.

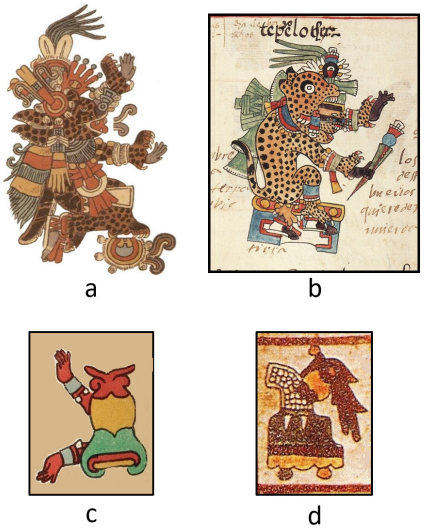
Figure 15.11.

Tlaloc and Sacred Mountain. Codex Vaticano Latino 3738, fol. 48v .



Figure 15.12.

Images of the god Tepeyólotl.

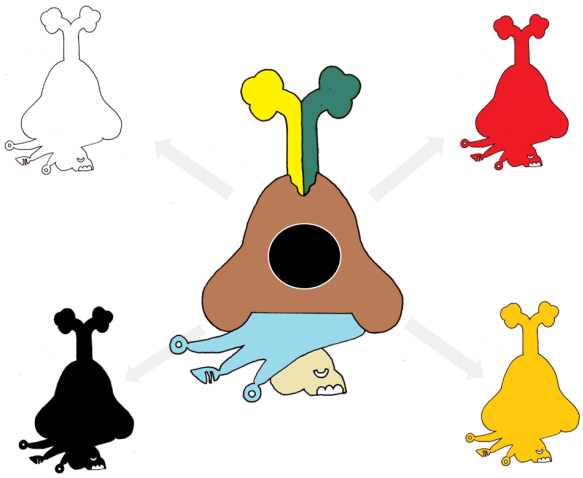


Note. a. *Codex Borbonicus*, Plate 3; b. *Codex Telleriano-Remensis,* fol. 9v; c. *Codex Borbonicus*, Plate 5; d. *Codex Cospi*, Plate 5.

Like all deities, the sacred mountain has the power to project its own being, to reproduce itself in other beings that will give it other faculties. The first projection of the mountain is towards the four extremes of the terrestrial plain, since the trees and columns that sustain the sky are merely reproductions of the *axis mundi* (Figure 15.13). They are also the communication lines through which the gods move, places in which the contrary forces of hot and cold struggle, the doors of communication between the divine and the world of the living etc. In addition, with the projection, the functions of the sacred mountain are delegated to the four trees. Through the red tree of the east emerge the astral beings ascending into the sky while their return to the underworld is via the black tree of the west. The white tree of the north is the realm of the dead while life manifests itself through the yellow tree of the south. Time emerges from all four—one day through the red tree, the next through the white, then the black, and the fourth day emerges from the yellow and from there a return to the red.

Figure 15.13.

Schematic projection of the cosmic tree of the four corners forming the columns that sustain the sky.



In the world of the living, the sacred mountain is projected on all of the prominent mountains. These, in turn, are projected on the lesser mountains in such a manner that every population recognized their sacred mountain in those that were close to them. They considered it the center of their world and the home of their specific Dueño. Local sacred mountains were then projected onto the pyramids and the specific Dueño is the image of the local protector deity. It is a game of fractals.

Mesoamerican people imagined human beings as collaborators with the gods. Their efforts, offerings, and sacrifices contributing to the divine labor that permits the continuity of the world. They believed that without their participation, the existence of other beings would not be possible. Two maximum expressions of this idea are architecture and urbanism, arts that served to create ideal models of the world of the gods on earth. Their temples were not just imitations of the houses of the gods, but the homes themselves, charged with sacredness by the force of divine projections, and the alignment of their streets and buildings that corresponded to the points of rising and setting of the celestial beings on the horizon of determined dates, consecrated by the calendar. In this manner, the common actions and the ritual acts had a place on a microcosmic stage that was derived and coessential with the macro-cosmos. Each human being, with their work, was a piece of this great machine.

[1]English translation by Claudia García-Des Lauriers.

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Chart. [Content]
Periods || Dates || Important characteristics

Preclassic || Early|| 2500 –1200 BCE || Sedentary life, agriculture. Egalitarian tribal communities. Households and small villages. Ceramics appear in Puerto Marqués, Tehuacán and Tlapacoya. Agriculture based principally on seasonal rainfall. Trade between villages. Funerary burials below house floors.

Middle || 1200–400 BCE || Considerable changes in agricultural technology. Growth of social hierarchy. Labor specialization. Trade controlled by regional centers. Artistic refinement. Flourishing of Olmec culture. Population centers with monumental architecture. Astronomical orientation of La Venta.

Late || 400 BCE–200CE || Growth in the size and complexity of settlements. Raids and bellicose conflicts over political and economic rivalries. Monumental architecture at Teotihuacan and El Mirador. Obsidian is one of the principal trade goods. Notable religious sculpture at Izapa. Writing is developed. The concept of zero invented.

Classic || Early || 200 – 650 CE || Notable social divisions. Growth of labor specialization. Urban/Rural differentiation. Organized long-distance trade. Important cities emerge: Monte Albán, Teotihuacan and a number of Maya cities. Commercial dominance of Teotihuacan. Great cultural, urban, and artistic developments. At the end, fall of Teotihuacan.

Late || 650–900 CE || With the fall of Teotihuacan, Monte Albán and the Maya flourish. Cultural and artistic splendor. Growth in writing, mathematics and astronomy. Growth of centers previously in Teotihuacan's orbit: Cholula, Xochicalco and Teotenango in the center, and in Veracruz, El Tajín.

Postclassic || Early || 900 –1200 CE || The period of military expansion begins. Tollan flourishes, capital of the Toltec. After reaching its maximum extension, Mesoamerica retracts its northern frontier possibly due to droughts. Significant movements of northern agriculturists accompanied by hunters. Copper metallurgy appears in the West.

Late || 1200–1521 CE || Period of political instability. Distinct hegemonic powers emerge: The Mexica lead the militaristic Triple Alliance which expands and submits its neighbors to paying tribute, in the West the Tarascans, in Oaxaca, the Mixtec, in Yucatan Chichén Itzá. Considerable growth of human sacrifice. Spanish invasion.

16
Early Olmec Landscape Urbanism

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The early Olmec had a settlement preference for islands in the coastal plains of Mexico's southern Gulf Coast. Taken in conjunction with the symbolically charged monumental art and architecture, this preference suggests that the Olmec built landscape was created as nested levels of material replicas of a basic cosmic notion that was crucial to reinforcing their beliefs, behaviors and values. The layers of the central Olmec metaphor revolve around the reproduction of the "sacred mountain" notion at several scales. The nested levels of the sacred metaphor will be discussed starting with small low artificial mounds built in the wetlands for subsistence purposes, followed by the San Lorenzo Island, then the Great Plateau of San Lorenzo and finally, in specific works of art.

Los olmecas tempranos tenían cierta preferencia para asentarse en islas posicionadas en las llanuras costeras de la costa sur del Golfo de México. Tomada en conjunto con el simbolismo de la arquitectura y algunos ejemplares de arte monumental, esta preferencia sugiere que el paisaje construido de los olmecas de San Lorenzo se creó como niveles empalmados de réplicas materiales de una noción cósmica básica que fortalecía sus creencias, comportamientos y valores. Los niveles de la metáfora central olmeca gira en torno a la reproducción del concepto de "montaña " en diferentes escalas, desde los islotes construidos en los humedales para fines de subsistencia, seguido por la Isla de San Lorenzo, luego la Gran Meseta de San Lorenzo y finalmente, en varias obras de arte.

More than a setting, backdrop or context, geographical location and landscapes interact with social practices and structures, norms and values, power and inequality, difference and distinction, and influences human history (Gieryn, 2000; Strang, 2008). Locational aspects serve exclusionary and segregation functions, by keeping out and setting apart certain people. As well, spatial form influences the organization of political and economic activities. In short, landscape derives from human actions and institutions just as it propitiates them. The concepts involved in sacred geography, the built environment and the animate universe in Mesoamerican thought are examples of this dynamic interaction (Dunning and Weaver, 2015; López Austin and López Luján, 2009; Sugiyama, 1993; among others).

The Olmec civilization developed a specific way of life on the southern Gulf Coast of Mexico and a political territory that was ruled consecutively by the Early Preclassic archaeological site of San Lorenzo, Veracruz, 1800 to 1000 BC, followed by La Venta, Tabasco, in the Middle Preclassic, 1000-400 BC (Figure 16.1). It stands out for having produced an amazing quantity of magnificent

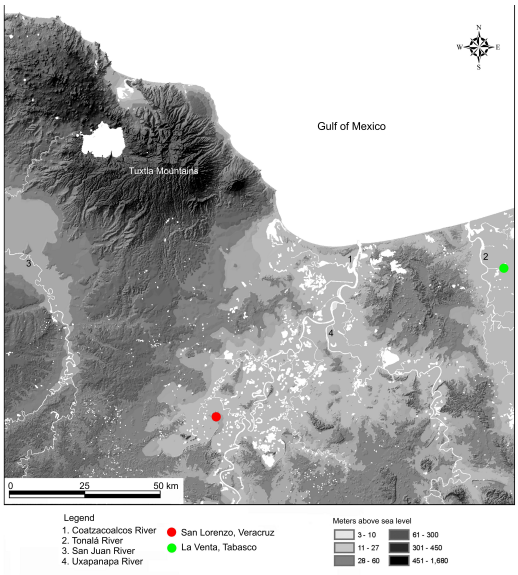
stone sculpture characteristic of the Olmec art style, a symbolic system endorsing a stratified society led by hereditary rulers backed by divine legitimation (Caso, 1965; Coe, 1965a, 1965b, 1968, 1972, 1989; Covarrubias, 1957; Cyphers, 2010, 2012, 2018b; Diehl, 2004; De la Fuente, 1992; Grove, 1989; Lowe, 1989; among others).

Hills and mountains hold a special place in Olmec beliefs, as evidenced by the shape of their capital cities, the unique archaeological sites of San Lorenzo (Figure 16.2) and La Venta, each located on a low promontory set in the vast soggy coastal plains. The deliberate construction of these political capitals on the low hilly terrain of islands emerging from the wetlands was not just the result of economic considerations but also blended and integrated the symbolism of hills, water, founding ancestors and cosmic deity in the monumental construction of each place.

The Olmec settlement preference for islands, taken in conjunction with the symbolically charged monumental art and architecture, suggests that the Olmec built landscape was created as nested levels of material replicas of a basic cosmic notion that was crucial to reinforcing their beliefs, behaviors and values. Such nested levels conform to Houston's layers of reciprocal metaphors (1998). The layers of the central Olmec metaphor revolve around the

Figure 16.1.

Map of the southern Gulf Coast of Mexico.

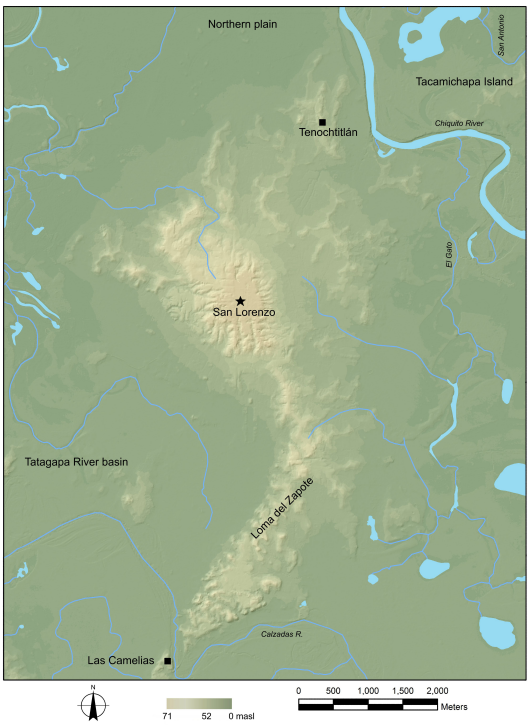


Note. Map of the southern Gulf Coast of Mexico showing the location of the coastal plains (3-27 masl), the Olmec island capitals of San Lorenzo and La Venta and the major rivers. (Map: G. Jiménez).

Figure 16.2.

The San Lorenzo Island.

Map: G. Jiménez.



Note. The San Lorenzo Island is an elongated body of low terrain set in the wetlands of the lower Coatzacoalcos drainage. Three major sites occupy the island, the capital of San Lorenzo and the lesser centers of Loma del Zapote and Tenochtitlán. The highest elevation corresponds to San Lorenzo's Great Plateau.

reproduction of the "sacred mountain" notion at several scales.

In the following pages the nested levels of the sacred metaphor will be discussed. In the San Lorenzo region, the earliest manifestation consists of small low artificial mounds built in the wetlands for subsistence purposes. Its maximum expression is the San Lorenzo Island, followed in magnitude by the Great Plateau of San Lorenzo during its apogee. Another level is represented by specific works of art.

The earliest manifestation of the sacred metaphor

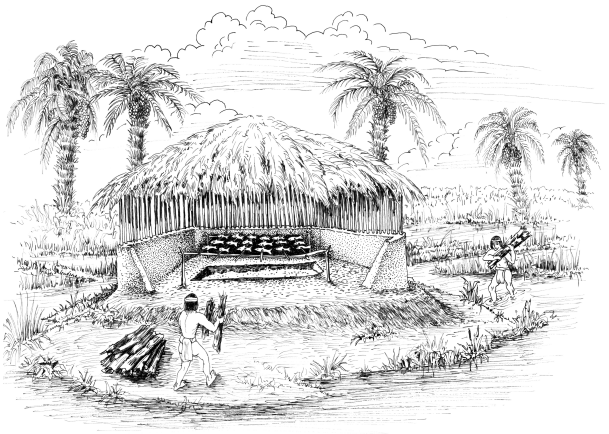
The earliest manifestation of the metaphor is found in the wetlands located at the northern end of the San Lorenzo Island (Cyphers et al., 2013). Numerous low earthen mounds were intentionally built in the swampy terrain as base camps for the extraction and production of storable smoked aquatic foods such as fish, key for surviving crisis times in the risky coastal plains (Figure 16.3). Each one was a small safe haven above the flood line that was built by self-sufficient households as a strategic tool for the capture of channel resources and recession harvesting strategies capable of obtaining a high protein yield with a low labor investment. Most of these mounds were built by the earliest families that arrived in the region, 1800-1600 BC, as subsistence infrastructure. Thus, there is a social and symbolic association between the founders and these tiny artificial islands. It is likely that these mounds are the earliest material manifestation of the sacred mountain metaphor in the Olmec world.

The seeds of social stratification are found in the kinship structure of the founder families, 1800-1600 BC. It is expected that the demographic cycle of the household and production differentials created transitory asymmetries of labor and wealth in these groups that were made permanent under specific conditions (see O'Shea, 1990, pp. 353).

Not all households were capable of achieving the same degree of annual subsistence success due to variable luck at fishing, hunting and cultivation, and to their place in the domestic cycle. Their subsistence deficits had to be covered by the more successful households, hence generating patron-client relationships.

Figure 16.3.

Seasonal base camps.



Note. Artificial low mounds located in the wetlands north of San Lorenzo were used as seasonal base camps for the exploitation of aquatic resources and for the preparation of smoked foods. (Drawing: F. Botas).

The founder families constantly invested labor in these low mounds, actions which established property rights over them and over the surrounding wetland locations necessary for the production of critical crisis foods. This became one of the initial bases for the differentiation between the founders' kin and those people who arrived at a later time. The hereditary control over these mounds gave the first families an important advantage over one the most important means of subsistence at the same time that the mounds were the initial basis for establishing rights based on genealogical distance to the founders and their real or mythical place of origin. As more people arrived at the San Lorenzo Island, only the founders' descendants had hereditary rights to the mounds and surrounding wetland.

Through time the growth and expansion of these families led to the formulation and reformulation of concepts of lineage and clan centered on the legendary founders, who became lineage emblems. In this way, the wetland mounds were more than just a means to create symmetrical rights over the natural abundance, but also may be considered one of the early foundations of sociopolitical differentiation. These ancient miniature "hills surrounded by water" linked the concept of exclusive property rights to the founders' families, which later would become the royal lineages.

The construction of the low wetland mounds was not simply an appropriation of a geographic space but also included the alteration of the natural environment for practical and symbolic reasons. Their construction may be compared with the building of a model of the Olmec cosmos on a small scale, each one a small hill surrounded by water, each one a symbol of the primordial cosmic monster and sacred mountain emerging from the watery Underworld (see Gillespie, 1993; Bassie-Sweet, 1996). In this fashion cosmology participated in the establishment of exclusive rights based on descent and first occupation of the wetland zone and materially anchored these rights in the heart of the early Olmec world. The identity of the founding families and their "living ancestors" (see Helms, 1998) was imbued in the wetland mounds. This identity and its attendant rights later became the basis for asymmetrical relationships, sociopolitical differences and monumental declarations of power.

As time passed, between 1400 and 1000 BC, the original founding families, who had become the elite lineages of San Lorenzo, maintained possession of the wetland mounds which play an important role in acquiring labor for monumental works such as terrace construction and stone transport. The elite lineages could cash in social debts created through the unbalanced reciprocal exchanges of vital subsistence resources with genealogically distant groups. Through their ownership of subsistence infrastructure, they were able to re-organize the means of production of essential crisis resources at this time, control their disbursement and automatically gain the future labor and pledges of allegiance (see Gilman, 1981, pp. 4) of clients participating in the same social hierarchy (see Hirth, 1993).

The San Lorenzo Island

The San Lorenzo Island is located in the dynamic coastal plains of the southern Gulf Coast of Mexico (Figures 16.1 & 16.2). It is set in the lower Coatzacoalcos River drainage, covering an area of over 21,000 km2 with a mean annual discharge of more than 22,000 m3. Only 10-15% of the lower Coatzacoalcos drainage contains high ground safe from flooding, which makes risk a way of life in this region. From Olmec times to the present, the inhabitants of this region have been careful observers of dry land and register even the tiniest piece of land that stays dry during floods.

From time immemorial, the nature of the wide floodplains of the southern Gulf Coast of Mexico required careful and constant observation of water levels in order to identify the few existing safe places. This primordial factor in decision making became a central element in the Olmec world view as the margin of safety above the flood line became directly associated with relative social and political positions. Specifically, the island position of the capital of San Lorenzo, on an elongated promontory circumscribed by water, was an ideal location within the semi-radial fluvial network for subsistence and communication.

The island home of the first Olmec capital has been shown to be coterminous with cultural boundaries encasing cognitive phenomena wedded to the sociopolitical organization while at the same time showing intensive connectivity with the surrounding landscape (Symonds

et al., 2002; Cyphers et al., 2013). The exceptional characteristics of the natural environment indicate the inherent potential for the San Lorenzo Island to have functioned in the past as a transportation-communication hub and seat of Olmec culture. San Lorenzo's development was not directly prescribed by the geographical characteristics of the Island-- the Olmec created their own trajectory. Yet this specific course of sociopolitical and economic development took clear advantage of distinctive geographic features. The Olmec fully occupied the San Lorenzo Island and modified, developed and utilized its natural resources. This landscape constituted the Olmecs' ideological and material homeland, the early hearth of Olmec identity.

Specific traits of the river system influenced and shaped the growth of settlement hierarchies, specifically the networked fluvial courses. The Island location, circumscribed by natural river and floodplain barriers, attracted population to this area of high resource concentration, while river flow imposed directionality on the movement of people and goods. Site development on the slender ridge bisecting the Island seems akin to the well-known geographical tendency for settlements to place themselves along transportation arteries in a linear fashion (Collins, 1959, pp. 38). The Island was a central node in a dendritic, central place pattern of settlement (Johnson, 1973) surrounded by diverse means of transportation and communication to the outer hinterland and beyond. Cosmologically this was expressed as a hill surrounded by water, a sacred Olmec concept.

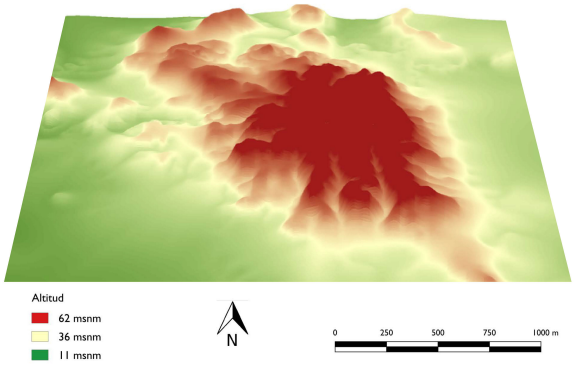
The position of the major and minor centers-- occurring in a linear pattern along elevated lands that parallel the fluvial thoroughfares, at the ends of the Island, and at strategic spots in the fluvial system-- formed a complex network geared toward control of aquatic resources and opportunities related to trade, transportation, interaction and exchange, all of which was overseen by the island capital. Secondary and tertiary settlements strategically founded at narrow straits and river confluences managed downriver traffic, linked to terrestrial routes and captured upriver goods. Stone monuments-- purposeful conspicuous markers calling attention to the importance of these sites and their ruling establishment-- reinforced a cognitive phenomenon uniting polities.

San Lorenzo's Great Plateau

The next level of the metaphor corresponds to the Great Plateau of San Lorenzo, a human-made construction rising to an altitude of 65+ meters above sea level and 40 meters above the surrounding wetlands (Figure 16.4). Its earliest occupation dates to 1800-1600 BC, a period when the inhabitants leveled and filled in the irregularities in the land (Cyphers, 2012; Cyphers et al., 2008-78; Cyphers et al., 2014). By 1600 BC, it was the most important site in the region and location of the earliest known appearance of monumental stone sculpture. By 1400 BC, San Lorenzo had become a large village with about 1200 inhabitants and a population density of 15-26 people per hectare. The high status groups founded their dwellings on the highest ground. The inhabitants applied 1,300,000 m3 of earthen fill as part of a master plan to create a terraced plateau. By 1200 BC, San Lorenzo's development was quite impressive, with a 350% population increase, an area of nearly 200 ha and a population of 3400 people. The landform looked like a terraced plateau. Between 1200 and 1000 BC, a major construction stage increased the height of the plateau and leveled the highest terraces even with the top. By the end of the apogee phase at 1000 BC, San Lorenzo had attained its maximum expression as the first urban center in Mesoamerica. Its size had quadrupled, reaching more than 775 ha, with a resident population of nearly 12,000 people (Arieta and Cyphers 2017, 2000).

Figure 16.4.

The Great Plateau was the highest sector of the San Lorenzo Island.



Note. It was designed and constructed to replicate the central cosmological notion of the sacred hill surrounded by water. Habitation was organized according to status and according to elevation and distance to the center of the plateau. The rulers and foremost elite occupied the top of the plateau (red), less elite on the terraces (pale red and yellow) and the commoners in the periphery (light green). (Map: V. Arieta).

The episodic construction of multiple levels of horizontal habitation terraces around the heights of the Great Plateau was achieved with the placement of 6 to 8 million cubic meters of artificial earthen fill. It required 14 to 18 million person-hours of labor to build. The average estimate of its volume, 7 million cubic meters of fill, is equivalent to 50 times the volume of Temple I of Tikal or 7 times the volume of the Pyramid of the Sun at Teotihuacan (Cyphers et al., 2008, pp. 7).

The Olmec had remarkable reasons for building the Great Plateau. In basic terms, this artificial structure is high ground, safe from flooding. Ideologically speaking, it is a replica of the sacred mountain as in Olmec mythology. Its location on the San Lorenzo Island makes it a sacred hill surrounded by water, a lasting concept in Mesoamericancosmology. The sacred mountain paradigm was solidly imbedded in the Olmec built landscape in the form of this important material replica. The interplay of the built landscape with this cosmological notion was crucial in reinforcing beliefs, behaviors and values (Cyphers, 2012, 2018a, 2018b).

The design and diachronic construction program of the Great Plateau provided tangible parameters for modeling and remodeling the human settlement distribution such that social and political status diminished with decreasing elevation and distance from the center. This roughly concentric pattern, yet another manifestation of sacred metaphor, gave shape to quotidian life and reinforced the principles of social and political differentiation by directly shaping patterns of behavioral interaction. On the plateau heights, the design and symbolism of the most ostentatious constructions provided further reinforcement of the metaphor. Residential and ceremonial architecture replicated the sacred notion in many ways, thus adding another nested layer to the metaphor. In this fashion the different construction scales were imbued with and formed part of the metaphor. Such metaphors are not unidirectional but rather are reciprocal in the sense of a mutual interaction with the built environment and behavior (Houston, 1998).

Artistic manifestations

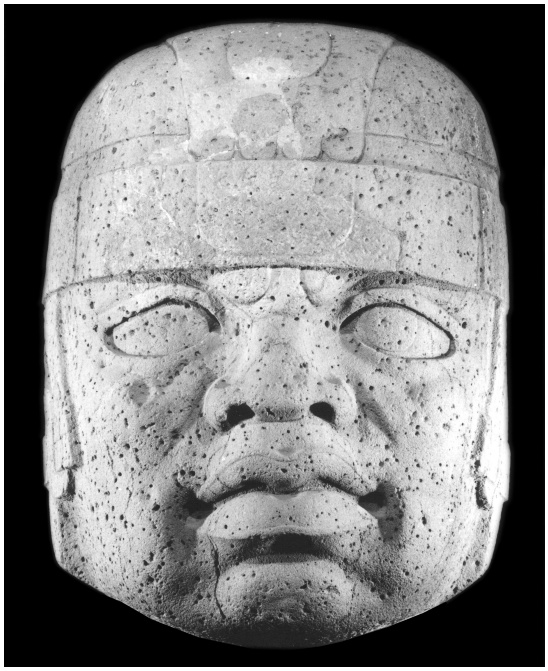
The study of Olmec religious concepts based on the analysis of stone monuments and other artistic manifestations has advanced understanding of ancient cosmology. It has been proposed that the rulers, sometimes interpreted as shaman kings, acted as intermediaries between the earthly surface, the gods and the forces of the Universe associated with Sky, Earth and Underworld (Furst, 1968; Reilly, 1989, 1995). The colossal heads appear to be portraits of Olmec rulers (Figures 16.5) and

the so-called “altars” were their thrones (Figures 16.6 & 16.7) (Coe, 1968, 1989; De la Fuente, 1977, 1992, pp. 102; Grove, 1970, 1973, 1981; Cyphers, 2004; Wicke, 1971). Transcendental concepts related to rulership include the “sacred hill surrounded by water” or “sacred mountain”, the multi-level cosmos and caves, craters and other openings as portals to the Underworld (Grove, 1999; Heizer, 1968; Reilly, 1994, 1999).

Olmec ruling lineages calculated their descent from divine ancestors, the legendary founders of the social group. The ancestors provided the cosmological model for authority and privilege based on their cave and mountain origins and Earth deity associations. The iconography and form of the rulers’ thrones is the basis for identifying

Figure 16.5.

Monument 1 from San Lorenzo.



Note. Monument 1 from San Lorenzo, a colossal head representing an ancestral ruler. (Photo: B. Martínez).

Figure 16.6.

Monument 14 from San Lorenzo.



Note. A monolithic stone throne that functioned as the seat of authority and emblem of the ruler and, at the same time, symbolized the sacred hill and earth monster. The seated figure in the niche is the symbol of the ruler’s sacred ancestor emerging from the cave of origins located in the Underworld. (Photo: B. Martínez).

Figure 16.7.

Altar 4 from La Venta.



Note. A throne with explicit iconography of the primordial cosmic monster on the upper ledge. (Photo: H. Kotegawa)

this monstrous creature as symbol of the Universe and important god with terrestrial and celestial connotations (Grove, 1970). The throne represented the monster which was a metaphor of the sacred hill (Cyphers, 2008) and contained important icons of divine descent such as the frontal niche and seated figure, which represented the entrance to the cave/monster mouth and the apical ancestor, respectively.

Thus, Olmec rulers considered themselves descendants of a divine ancestor whose origins lay in a cave entrance to the Underworld, synonymous with the monster's mouth. Throughout Mesoamerican time, the cave is the symbol of Creation and of life itself (Heyden, 1975, pp. 134). It persisted in time, for example, in the Pyramid of the Sun, a monumental construction of the Classic period of Teotihuacan that rests upon a cave containing a water source. The association of hill and cave with water is related to the monster in the Olmec world-view. As the Earth itself, a sacred hill, the monster opens its cave-like jaws to show the passageway into the watery Underworld. This divine monster, in all its symbolic facets, was the emblem of the rulers.

The identification of the sacred ancestor in the large thrones led to the discovery of the principle of divine descent in Olmec elite social organization. The amalgamation of ancestor veneration, origin myths and religious concepts in these monuments is the foundation for privileged kin relationships. Royal lineages confirmed their superiority through the principle of divine descent, which automatically differentiated between the aristocratic lineages and the common people based on distance to the divine ancestor, equivalent to the founding fathers (Cyphers, 2008; Cyphers et al., 2013).

Early Olmec landscape urbanism

The high terrain of the San Lorenzo Island cutting through the wetlands was synonymous with the prime Olmec deity, the Earth Monster, a natural and cultural reproduction of this creature floating on the primordial waters. No cave has ever been found on San Lorenzo's Great Plateau, and it is doubtful that one exists because of the sedimentary natural of the underlying geologic deposits. However, the Olmec would have easily identified springs emanating from the soils across the Island, which was clear proof to them of the proximity of the Underworld, origin of the sacred ancestors, the great monster deity and the vital forces of the land. The modeling of the high terrain of the Island to give a terraced shape to the Great Plateau and to increase its size was a way to materialize the early Olmec cosmological concept of monumental architecture as a replica of the sacred hill surrounded by water. The rulers and their families occupied the highest sector of the Plateau, an elevation befitting their status. The Red Palace was the home of one of the first rulers of this capital. The Group E architectural precinct, the rulers' ritual-administrative center, was designed as four low earthen platforms organized around a sunken patio, symbol of the watery underworld.

The organization of population by status, elevation and distance to the center of the Great Plateau was a means to give social and political meaning to space and conserve the social order. The nearly 12,000 inhabitants of San Lorenzo itself, plus another 5,000 people in the other island communities, gave shape to the first Mesoamerican urban center, far surpassing all its contemporaries.

The specific urban style of San Lorenzo was integrated into the natural and built landscape and particularly pertinent to ideological and administrative considerations. It is unlike other models of Mesoamerican urban tradition (e.g. Sanders and Webster, 1988) for many reasons. Life at San Lorenzo was intimately adjusted to the hydrological rhythms of the coastal plains for security and subsistence

reasons. The island setting, a hill surrounded by water, was a guarantee against the risks of the natural environment. As such, the landscape was natural and cultural and completely integrated in their way of life and thought. The sacred metaphor reflects the replication of material and ideological continuity at all levels, from the natural to the cosmological. For this reason, the urban development of San Lorenzo and the planning and construction of the Great Plateau gave social and political shape to the metropolis while imbuing it with a cosmological aura. This early model of landscape urbanism permeated Olmec life and thought for at least 1000 years at San Lorenzo. However, it did not disappear but rather persisted in the subsequent capital of La Venta and then, in one form or another, in later Mesoamerican civilizations.

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17
Monumentality, Elite Tombs, and Domestic Memories: Understanding Social Formation at Monte Albán

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In this work, we will present the elements that allows us to identify social differentiation at Monte Albán, as a reflection of an advanced society and one of the most sophisticated civilizations in the Americas as was the Zapotec. We will discuss concepts of scale, monumentality, city and elite tombs and their paraphanelia, as well as, the diverse discoveries of the formal composition of residences, such as the principal indicators of social differences among the inhabitants of the capital city of the Zapotec. These tangible materials have allowed us to advance our archaeological understanding of Monte Albán and established fixed elements for indicating the markers of elite life in the social pyramid and profuse rituality that was practiced in the city.

On the basis of carefully excavated contexts at Atzompa recently, we are able to reconstruct ritual life, and we propose elements for diferentiating public ceremonies done in the center of the city and its plazas, from those done in private, at the family level, which took place in the family temples. These are formal architectural elements that indicate different social levels. In addition, we propose that the gods Cocijo (rain), Bat, and Jaguar were the most important deities in Zapotec cosmogeny.

The recent archaeological discoveries in an elite barrio at Atzompa allows us present new elements and arguements to contrast to what we currently know of Monte Albán, in such a manner that we present an extention of the elite areas of the same city. While simiar, offer also important differences for determing the level of dependence that Atzompa showed towards the capital, or if possible, we can discuss some autonomy of the barrios implicit in the urban proposition.

En este trabajo se presentan los elementos que nos permiten interpretar la diferenciación social en Monte Albán, como reflejo de una sociedad avanzada y una de las civilizaciones más sofisticadas de América, como lo fue la Zapoteca. Se discuten conceptos de Escala, Monumentalidad, Ciudad y Tumbas de élite y su parafernalia, así como los diversos hallazgos de la composición formal de las residencias, como los principales indicadores de las diferencias sociales entre los habitantes de la ciudad-capital Zapoteca. Estos rasgos tangibles han permitido avanzar en el conocimiento arqueológico de Monte Albán y establecer elementos fijos para identificar marcadores de la vida de las élites en la pirámide social y profusa ritualidad que mantuvo a la ciudad.

En base a los contextos cuidadosamente excavados en Atzompa recientemente, se llega a escudriñar la vida ritual y se proponen elementos para diferenciar los ceremoniales públicos realizados en el centro de la cuidad y las plazas, de aquellos privados, de nivel familiar, que se llevaron a cabo en los Templos Familiares, componentes

formales de la arquitectura de las residencias de los diferentes niveles sociales. Aún más, se propone que los dioses Cocijo (lluvia), Murciélago y Jaguar hayan sido los más importantes dentro de la cosmogonía zapoteca.

Los recientes descubrimientos arqueológicos en el Barrio de élite de Atzompa nos permiten presentar nuevos elementos y argumentos para contrastar lo que hasta ahora se conocía de Monte Albán, de tal manera que, se presenta una imagen extendida de dos áreas de élite en la misma ciudad, mismas que, aunque similares, no dejan de ofrecer diferencias importantes para determinar el grado de dependencia que Atzompa tuvo de la capital, o si es posible hablar de cierta autonomía de los barrios implícita en la propuesta urbana.

The image of Monte Albán, a city on the top of a hill, constitutes perhaps the best example of the Sacred Place, or the materialization of the Mesoamerican cosmogony cult related to the mountain landscape (López & López, 2001; Broda et. al., 2007). Through a long-lasting urban and ritual construction project that took at least thirteen centuries (500 B.C. to 850 A.D.), the Zapotecs consolidated Monte Albán, their capital, as the axis mundi, the navel of an entire civilization. In order to do so, they not only chose a landscape constituted by a series of hills located at the center of the flat Valleys of Oaxaca, but modified them to perfect the shape of those hills in order to create their impressive sanctuary, which at the same time, was the political capital and economic center of the Zapotec world.

In Monte Albán there was no room for simplistic architecture; every single construction built across the centuries was monumental, as monumentality was the normal expression for a ritual world that consolidated religion, power, knowledge, and control over the entire territory of what is today the state of Oaxaca and beyond. Monumentality is reflected in scale, construction and social organization. Every building in the Principal Plaza was devoted to certain public or private rituals so they had to be massive and tall, maintaining harmony with the entire built and natural landscape. At the same time, builders had to respond to the architectural and technical requirements presented by the effects of a seismically active region.

As we learn more about the construction systems, the more we realize enormous investment in human energy, planning, knowledge, social stratification, and leadership that was needed to achieve the goal of creating this monumental world. Recent excavations shed light on the extended construction processes required in order to organize the city as an urban center, sanctuary, market, and above all as the political capital of a true state. So important was the value of this place, that about 500 B.C. the modification of the hill´s shape was initiated, representing one of the most ambitious long-term urban projects ever carried out in the Americas. This Mesoamerican ceremonial center constituted a heart, the place of power and religion; at least 1300 years of constant construction is reflected in Monte Albán, fueled by the unquestionable duality of life-death, dark-light, pyramid-plaza, or construction-void.

The city

According to human ecologists (Blanton, 1978, 2004; Marcus & Flannery, 1996; Marcus, 2008), the formation of the city of Monte Albán is the result of the evolution of a complex society. However, it was not unilinear development but reflected a process of adaptation and creativity drawn from the built environment (Blanton, et.al., 1993, pp. 14). This city was created through the unification of the several villages in the Valley of Oaxaca (Marcus & Flannery, 1996) to fulfill the need of a settled leadership,

or ruling class that based its power on religion. Overall, the most important goal was the consolidation of a ruling class or the physical expression of social stratification.

The location and shape of the city was at the confluence of the three valleys of Oaxaca (Etla, Tlacolula and Valle Grande), centered on three hills (Monte Albán, Atzompa and Monte Albán Chico) rising at least 500 meters up from the valley floor. (Figure 17.1) At Monte Albán, by 500 B.C. the Zapotecs started modifying the hilltop, accomplishing the perfect leveling of an enormous central plaza of 60,000 square meters (300 meters N-S by 200 meters E-W) by 200 B.C., to create the ceremonial, sacred place, a common destination for all Zapotec. (Figure 17.2)

Based on the lifespan, size, and geographic influence of the site, it is not unreasonable to think of Monte Albán as the religious center for the Zapotec, similarl to what we think on the Vatican for Roman-Christian Catholics, or Mecca for Muslims. The remainder of the city emerged through periods on different hills surrounding the Plaza. Each of them was a monumental compound considered the center of "barrios," the principal locations for these barrios were identified by Blanton (1978) at Cerro del Gallo, Atzompa, El Plumaje, El Mogollito, Monte Albán Chico, and El Paragüito. Surrounding each center (Figure 17.3), along the slopes were more than two thousand agricultural and residential terraces, built as productive areas that assured the city´s survival. Production from these terraces was supplemented by tribute paid by the conquered communities from the regions around Oaxaca, subjugated by the incipient state. As we can still see at Building J (dated 200 BC to 200 AD), traces of sculpted stelae depict the many territories conquered by Monte Albán (Caso, 1928; Whittaker,1981; García Moll et.al., 1986). Other urban features, e.g. roads, irrigation canals, dams, defensive walls, and sanctuary caves were distributed around the city center, enabling it to function as a whole.

Figure 17.1.

Map of the Central Valleys of Oaxaca, Mexico. Location of Atzompa in relation to Monte Albán. (Atzompa Archaeological Project Archive. INAH).



Figure 17.2.

Topographic map of the Great Plaza at Monte Albán, Oaxaca, Mexico. (Atzompa Archaeological Project Archive.

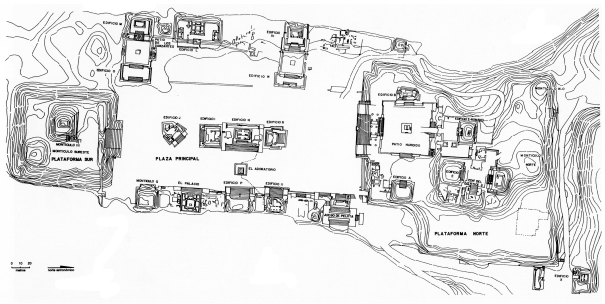
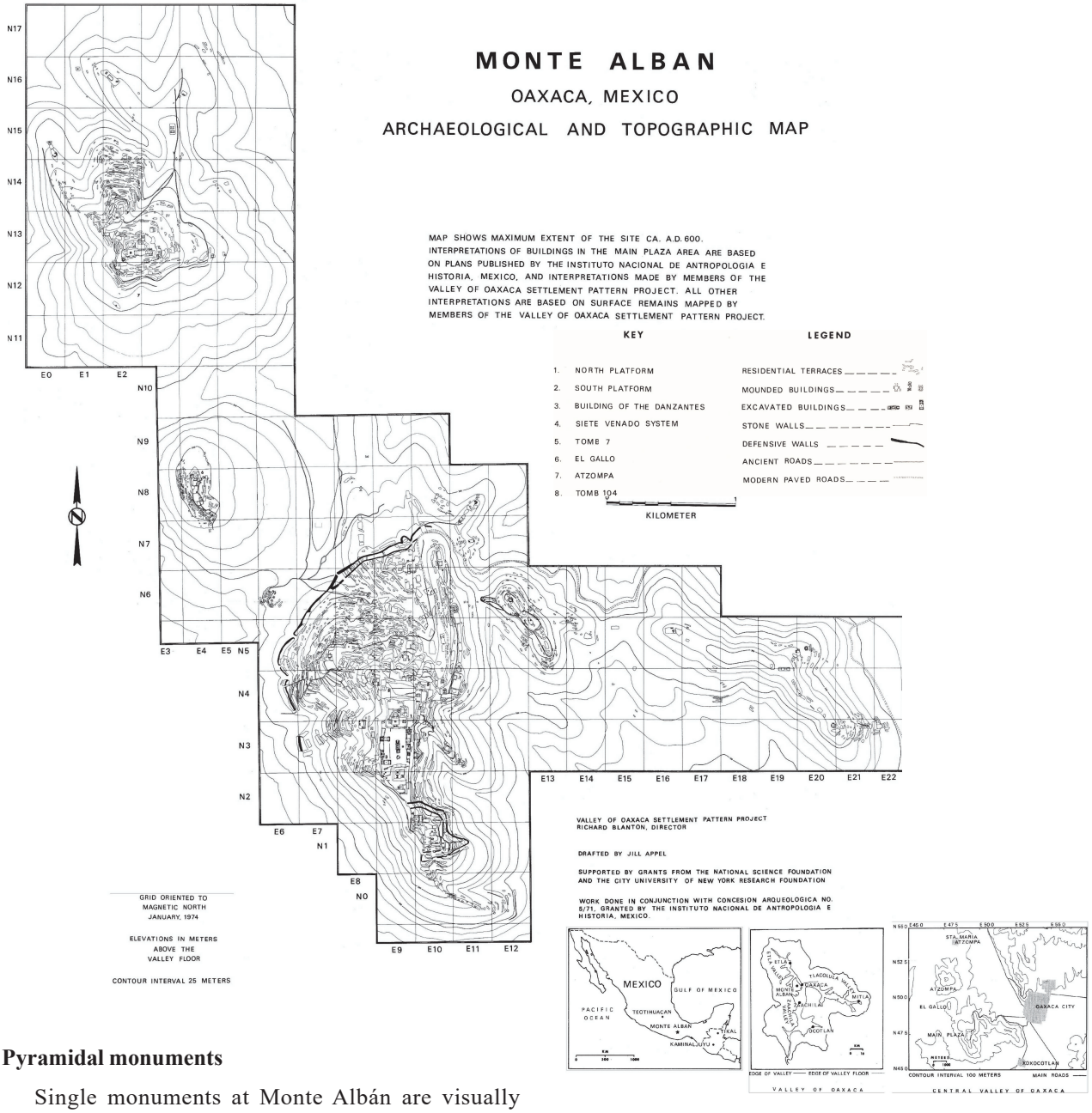


Figure 17.3.

Monte Albán archaeological map. (Blanton, Richard E. 2004).



Pyramidal monuments

Single monuments at Monte Albán are visually recognized by their typical pyramid-shape profile platforms, representing the sacred mountains carrying the temples on top. However, those buildings do not mean to be understood or read separately but as a group or groups of "mountains" perfectly aligned, combining "mountains" and empty areas as they understood their cosmos. Zapotec builders drew on their extensive knowledge of Mesoamerican construction systems, and particularly on their exceptional expertise in stone masonry using local materials, assuring that when the construction of a new temple was decided, the construction teams already knew about the plan, shapes, function, and many other details on how a proper temple should look and be built.

Scale

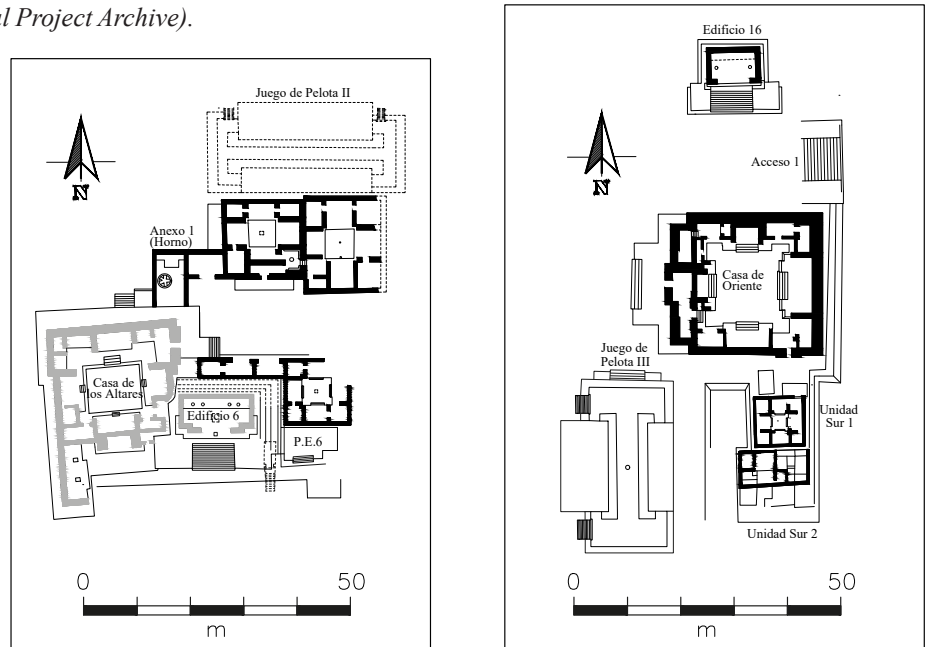
Consistent with their dedication to the worship of supra-human deities each monument at Monte Albán honored a basic principle of scale (not human) but in monumentality appropriate to gods such as Cocijo, the Rain God, the Jaguar God, the Bat God, and many other deities devoted to life and death, war, agriculture, storms, earthquakes, among others in their ritual life. Attention to cosmogony, not humans, defined monumentality. However, the height of the built environment never broke the landscape mountain lines, keeping a respectful relationship between construction and natural sky limits. Human construction, even of temples, could not intrude on natural boundaries.

A different treatment was reserved for the palaces, or the places where top-level dignitaries lived. Those were human-scale constructions, with rather small rooms and inner open patios. A general square plant was the basic form. However, each palace or high-status residence was designed to meet its inhabitants needs in terms of number of rooms, and maybe the nature of the family, or single basic family, extended family, or multi-familiar (Robles & Mendoza, 2016). The recently-excavated residences in Atzompa shed light on the understanding of the actual configuration, distribution, sizes and scales of palaces, in contrast with what was interpreted years ago by Caso, 2003, Marcus, 2008, pp.110; Winter,1986, pp. 353-370 and others. Casa de Oriente, Casa de los Altares, re-excavated by the current Atzompa Project, and Casa del Sur are among the newly investigated high-status houses. (Figure 17.4)

Partially excavated by Jorge R. Acosta, Casa de Oriente and Altares have been found to be more complex and complete than originally interpreted. The basic components of a palace were defined through excavations by the Atzompa Project; features such as patios, rooms, specialized activity areas (pottery making), service structures, temazcal (sweat bath), small ball court, and the family temple (Robles and Mendoza, 2016, pp. 156), the latter defined the existence of permanent constructions for the performance of a private ritual life.

Figure 17.4.

Architectural plans of Residences Casa de Oriente and Casa de los Altare at Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



Public/Private rituals

It had been understood that pyramid-shaped buildings were dedicated to several cults in Monte Albán and Mesoamerica. Pyramids then were interpreted as temples; however, in the city centers there was a mix of both pyramids and low one-story buildings, a fact that gives us the idea of domestic architecture mixed with that devoted to the gods, their proper paraphernalia for collective worship and public ceremonies. At the Central Plaza of Monte Albán and up to the North and South Platforms we find more than twenty different temples, grouped in three main sacred spaces: the Main Plaza, the North Platform and the South Platform. There is no question that the Main Plaza was the center of Zapotec ritual life. This huge plaza is the most sacred space, surrounded by geometrically defined lines of buildings at the East-West limits, with three central pyramids. (Figure 17.5) The open space is of approximately 60 000 square meters, a very generous area that easily could hold about twenty thousand people in occasional massive ceremonies for local and visiting participants. However, each ceremonial building includes a defined space that could serve for a public but, very select attendance. Each of them could hold a gathering of at least one thousand people for their cult; good examples of those are the Complex IV and Complex M, with their own confined yards and stairs that could receive a significant number of people.

Figure 17.5.

The Great Plaza at Monte Albán, Oaxaca, Mexico. View from South to North. (Atzompa Archaeological Project Archive).



Other important ceremonial spaces include the two main constructions delimiting the Plaza and the two most important pyramid-shape platforms (North and South), constructions that represent an extraordinary commitment of human energy. These gave access to an upper level of temples. At 12 and 15 meters high respectively, these boundary platforms supported a number of temples that were built above the Plaza, where their height gave the desired effect of a dramatic change of scale. Although we still do not know much about the actual ceremonies, archaeology has provided a number of effigies found over several years of research. Cocijo has the strongest presence among the effigies. He represents the Rain God, water, and lighting. His importance and constant presence along the life of Monte Albán goes accordingly with Tlaloc, the Rain God for Teotihuacan and later sites in the central Basin of Mexico; and Chaac, same god among the Maya. (Figure 17.6)

Figure 17.6.

Effigy vessel of Cocijo, the Monte Albán's Rain God, excavated at Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



Also the Jaguar and the Bat were protective deities that permeate both ritual and daily Zapotec life. It has been suggested that, the city was originally named the Jaguar´s Hill, that however, has not been proven. The importance of the Jaguar among the Zapotecs is reflected in the many feline traits that appear in the original art, as early as Monte Albán I or 500 BC in ceramics and carved stones. Its image was linked to the power of earth and its fertility, and its roar was considered the voice of the mountain. A famous Jaguar figure was found just outside the Plaza, as it was likely discarded after its useful life, during the end of the Preclassic period (around 100 B.C.-200 A.D.). (Figure 17.7)

Figure 17.7.

Monumental Jaguar effigy. A ceramic masterpiece from Monte Albán, Oaxaca, Mexico. (National Museum of Anthropology, INAH).



The Bat is an early god linked to darkness and knowledge. The most famous of its representations, a green jade mosaic of 25 articulated pieces representing the Bat was found in the Central Plaza, just outside the central adoratory, near Mound II (Acosta, 1949). (Figure 17.8) The three deities, Cocijo, Jaguar, and Bat were permanent images throughout the life of the great city. Recent excavations in Atzompa had shown the recurrence of the Jaguar during the late Classic, associated to the most prominent temple (Robles, et.al. 2016). This means that all around Monte Albán, a shared iconography, or the sharing of values and sacred deities is evident.

Figure 17.8.

The Bat God, a jade and sea-shell assembled piece from Monte Albán, Oaxaca. México. (National Museum of Anthropology, INAH).



Elite Tombs

The archaeological contexts where rituals are clearly associated to religion without doubt are the tombs. Funerary chambers at Monte Albán are for archaeology extraordinary sources for understanding social stratification, as they carry distinguishing social markers. They allow us see social classes, mortuary rituals, gendered treatments, associated technologies and paraphernalia, besides many other aspects of ritual life as well as data on sex, diet, health/diseases, deposition patterns and associated architecture.

The close to 250 tombs excavated throughout Monte Albán over its period of archaeological investigations of more than ninety years -taking into account that Dr. Alfonso Caso started excavating tombs since 1928, had given archaeologists and bio-archaeologists the extraordinary opportunity of ordering data in different kinds of categories such as shape, architecture, decoration, period, funerary offerings, diseases, to name some possibilities (Rubín de la Borbolla, 1969; Bernal, 1979; Márquez y González, 2018; Robles & Mendoza ibid; Higelin et.al. 2017).

Tombs undoubtedly direct us to evidence of a stratified society, accordingly from the funerary treatment we can discern a cosmogony, social classes, and roles played in society. Monte Albán tombs were located under houses, preferably under the central patios, showing a clear representation of the life-death cycle, with the living caring for their dead. Every chronological period in the city had its own features, according with Paddock (1966), tombs from early period I were "little more than stone or adobe boxes." Tombs from period II had, for the first time, peaked or vaulted roofs and side niches, features that remained for subsequent periods. Period III tombs were the most advanced in architectural terms, not only larger in size, but some with sculpted decoration on the façades and mural paintings in the interiors (Paddock, 1966:140). The Classic (100-500 AD) is the best-known period for burials and tombs at the city; earlier funerary contexts are usually covered by subsequent buildings, or even removed in later times.

Tombs 104 and 105 in Monte Albán, as well as tomb 242 in Atzompa give the best examples of elite tombs. All three of them were built and used during the late Classic or Monte Albán IIIb-IV (500-850 AD), providing unique opportunities to examine the visible pattern of elite treatments of the latest period.

Tombs 104 and 105 have been widely known in the literature; each of them representing the most exquisite murals that accompany the dead, and were devoted to high-ranking persons, perhaps rulers of the city (De la Fuente, 2008; Caso, 1942; Paddock, 1966). The mural´s motives relate to worshiping, processions, priests, or performing ritual activities in a realistic style. However, Tomb 242, located in Atzompa, in several ways broke with the pattern evidenced at Monte Albán, not only in the formal architecture, but artistically as well. This funerary chamber was built under a pyramid-shape basement constructed as a part of the mortuary context attached to the main residence or Casa de los Altares. Inside, it held three funerary chambers whose entrances were distributed along a stair cube, although each was built and used in different times. Chamber 1 contained an intact burial of two individuals (male and female) in primary context, and one of the best sets of accompanying urns or effigy vessels composed of the 8 Earthquake (Ocho Temblor) and Lady Water (Señora Agua) effigies, and two exquisite polychrome figures (Robles, Pacheco and Olvera, 2015). (Figure 17.9A, 9B)

Chamber 2 was a simple box-shape chamber, with flat roof and no niches. However, its jambs and internal walls are covered with murals depicting abstract art. The abstract motifs refer to the Earth Monster, and evoke the ballcourt´s plan. Great moon circles are the central motifs, accompanied by what could be a jaguar´s pawprints.

Figure 17.9A.

Architectural profile of the Tomb 242 mound and interior chambers from Atzompa, Oaxaca, México. (Atzompa Archaeological Project Archive).

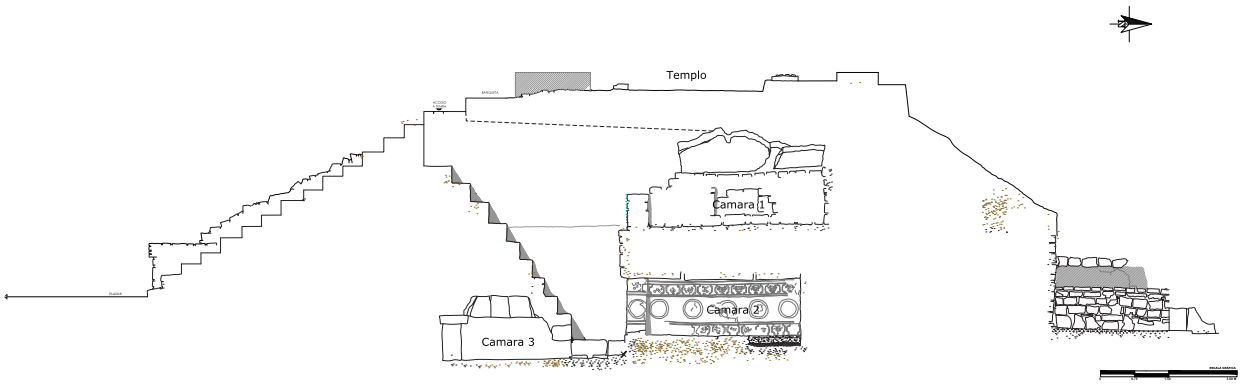


Figure 17.9B

The 242 funerary mound in relation to the residence Casa de los Altares at Atzompa, Oaxaca, México. (Atzompa Archaeological Project Archive).



Along the walls, like in Monte Albán, there is a clear line dividing the upper and lower worlds. This chamber had depictions of calendar names on the back wall that were intentionally erased in later times. The tomb was emptied and vandalized at the end of its use. (Figure 17.10A, 10B)

Chamber 3 was built above Chamber 2. A large funerary construction with exquisite vaulted roof and large side niches; from the façade there are the two jambs, but the rest was intentionally destroyed. If the chamber was ever used is unknown, as in the archaeological context there were only minor vestiges.However, in terms of the funerary traditions, Chamber 3 was built above Chamber 2. A large funerary construction with exquisite vaulted roof and large side niches; from the façade there are the two jambs, but the rest was intentionally destroyed. If the chamber was ever used is unknown, as in the archaeological context there were only minor vestiges.However, in terms of the funerary traditions, the 242 Tomb in Atzompa represents a new concept both in architecture and mortuary systems for the city. It is the first example of a formal pyramid-shape basement and temple devoted to the funerary aspect of a family, or lineage, that was still occupying the proper house of the Casa de los Altares residence.

Figure 17.10A.

Interior of the Tomb 242. Chamber 1 stone-constructed walls and vaulted roof. Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



Figure 17.10B.

Interior of the Tomb 242. Chamber 2 mural paintings on ballgame motifs. Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



Funerary Urns.

Also known as effigy-vessels or accompanying urns, these are unique pieces of art characterize the mortuary system in Monte Albán. The concept of the dead needing to be accompanied by their tangible goods, such as carrying food and liquids for their passing to the underworld, is clearly shown in the funerary urns and their contexts. A chronological sequence of these objects was offered by Alfonso Caso and Bernal as early as 1952, from his

works both in ceramics and specifically in urns we know about the most important ornamental characteristics. Urns were basically containers for liquids or sometimes food or burned offerings, as they meant to accompany the deceased. They were heavily ornamented with effigies and gods' traits. Sometimes they represent persons with ornaments, clothing, and, above all, identifying iconographic traits. Perhaps during the period IIIb-IV, Atzompa was a site of the production of these exquisite objects, as we found, besides 8 Earthquake, a great variety of finely made urns at this urban center, a town that still today is dedicated to the production of large amounts of pottery vessels and fine clay jewelry. A rare urn, beautiful and illustrative of the combination of iconographic traits, is a jaguar-serpent-eagle, and possibly pheasant (faisán) effigy vessel found in a domestic context at Atzompa (Figure 17.11, 17.12). The challenging iconography of the object shows the implicit need of mixing deities in protecting supernatural beings in order to get the most security in the afterworld. In this sense, Atzompa is still a tremendous source of iconographic knowledge and a living center of ancient pottery techniques.

Residences.

A recent publication (Robles & Mendoza, 2016) reported an updated version of elements of urban residences. Contrary to the earlier interpretations already cited (Marcus, 2008; Winter, 1986) on the sizes and formal architecture of upper class houses, we argue that those had greater complexity in architecture, shape and functions than previously believed. Two main residences at Atzompa (Casa de Oriente and Casa de los Altares) showed novel patterns and elements that had not been documented before, such as the coexistence of two or more houses in the same compound (service houses); the clear attachment of small ball courts (family size), and the family temple, characteristics that show us the need they had for the

Figure 17.11.

Jaguar-Serpent-Eagle effigy vessel from Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



Figure 17.12.

The funerary Eight-Earthquake effigy vessel, excavated at Chamber 3, Tomb 242, from Atzompa, Oaxaca, Mexico. (Atzompa Archaeological Project Archive).



performance of private (family) rituals and worshiping, as opposed to the public ceremonies performed in the open areas temples.

These two main residences, and Casa del Sur, currently under excavation, have shown their undeniable relationship with ballcourts, perhaps for private rituals and/or training. Let us remember that the residence of Tomb 105 at Monte Albán is also spatially related to what had been called "small juego de pelota", a family temple inside the main house, and houses around, similarly to those excavated in Atzompa. This exposes an architectural and distributive pattern inside the residences as well as outside areas and facilities that had not been recognized before. Thus, elite houses at Monte Albán reveal being significantly more complex than imagined in previous research.

Preliminary conclusions

As a final thought, the relationship between monumentality in constructions and settings are clearly tied to public ritual life in Monte Albán. There are, however, at the level of elite residences, clear signs of a private counterpart, a very active and permanent family-level or private ritual life performed at the family temples. Rituality for the dead implied the modification of the house's distribution and temporarily function, due to the funerary rituals that were performed inside the house, at the tombs' patios and chambers in Monte Albán. Tomb 242 at Atzompa broke that pattern and for the first time an entire pyramid-shape basement was built on top of the funerary chambers, separate from the proper house.

The recent discoveries at Atzompa will tell us a lot more on elite privileges at Monte Albán than we ever knew before.

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18
Examining the Symbolic Constructs of Cholula's Great Pyramid

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In October of 1519, as Hernán Cortés' troops traveled from Tlaxcala to Tenochtitlan, a gigantic edifice heralded the proximity of Cholula. Abandoned for nine centuries, it appeared as a hill, but its name betrayed its human construction: Tlachihualtépetl ("man-made hill"), today known as the Great Pyramid. From its summit one could appreciate the urban grid harboring administrative buildings, schools, workshops, the market, some 40,000 houses and nearly 400 temples. Of these, that of Quetzalcóatl—the local titular deity for over four centuries—attracted thousands of pilgrims, including foreign caciques who came to receive the facial piercings for the ornaments of their new office.

We do not know the antiquity of Cholula's authority to validate foreign investitures, but the sequence of the Great Pyramid, the largest pre-Columbian mound by volume in the Americas (400m on a side and 60m high), reveals that at least its sacred quality does have a long history that transcended political, ideological, and ethnic changes, and expresses the unique character that made Cholula comparable—according to the sixteenth-century Spaniards—to Rome and Mecca. The roots of that sacredness appear to date back to the first century, when after a colossal eruption of Popocatépetl volcano, the first monumental stage of the Tlachihualtépetl was raised; but although the motives behind this construction would confer Cholula with a special renown, they do not explain how this fame would increase over time.

The analysis of the pyramid's development can help with that enigma. Between 1931 and 1971, Ignacio Marquina excavated almost 10km of tunnels in it, determining that it had various sub-structures and outlining their shapes and chronology. Our mapping has refined that information, recording that there are a minimum of eight major stages from the first to seventh centuries, and making viable their morphological characterization.

On other occasions we have addressed how the new data contribute to understand how Cholula generated its sacred aura, perspectives that here we summarize emphasizing the Great Pyramid's symbolic constructs: its unifying origin in the post-eruption reconfiguration; its development and the inclusive strategy expressed by its architecture; and its attention to the human and the divine. We then outline how the incessant construction over six hundred years at the Tlachihualtépetl indicates that the religious magnetism reported in Colonial times must have identified Cholula since the first century; and how the design of the pyramidal complex and its references to the underworld and to Popocatépetl suggest its dedication to the volcano and its "self-designation" as the center of the cosmos.

En octubre de 1519, habiendo las huestes de Hernán Cortés dejado Tlaxcala rumbo a Tenochtitlan, una gigantesca edificación les anunciaría la proximidad de Cholula. Abandonada por nueve siglos, parecía una loma, pero su nombre traicionaba su confección humana: Tlachihualtépetl ("cerro hecho a mano"), hoy llamado Gran Pirámide. Desde su cima podía apreciarse la retícula urbana albergando edificios administrativos, escuelas, talleres, el mercado, unas 40,000 casas y casi 400 templos. De estos, el de Quetzalcóatl —deidad tutelar local desde cuatro siglos atrás— atraía miles de peregrinos, incluyendo caciques extranjeros que acudían a que les hicieran las horadaciones faciales para portar los ornamentos de nuevos cargos.

No sabemos la antigüedad de esa potestad de Cholula para validar investiduras foráneas, pero la secuencia de la Gran Pirámide, el montículo precolombino americano de mayor volumen —400m por lado y más de 60m de altura—, revela que al menos su calidad sacra sí tiene una larga historia que trascendió cambios políticos, ideológicos y étnicos, y expresa el singular carácter que hizo a Cholula equiparable, según los españoles del siglo XVI, a Roma y Meca. Las raíces de esa sacralidad parecen remontarse al siglo I, cuando tras una colosal erupción del volcán Popocatépetl se erigió la primera etapa monumental del Tlachihualtépetl; pero aunque los motivos para dicha construcción conferirían a Cholula una notoriedad especial, no explican cómo ésta se acrecentaría centuria tras centuria.

El análisis del desarrollo de la pirámide puede ayudar en ese enigma. Entre 1931 y 1971, Ignacio Marquina excavó en ella casi 10km de túneles, fundamentando que tenía varias subestructuras y bosquejando sus formas y cronología. Nuestro mapeo ha refinado esa información, registrado que hay mínimamente ocho etapas mayores del siglo I al VII, y viabilizado su caracterización morfológica.

Otras veces hemos abordado cómo los nuevos datos contribuyen a entender cómo Cholula generó su aura sacra, perspectivas que aquí resumimos enfatizando los constructos simbólicos de la Gran Pirámide: su origen unificador en la reconfiguración post-erupción; su desarrollo y la estrategia incluyente que su arquitectura expresa; y su atención a lo humano y lo divino. Esbozamos después cómo la incesante construcción durante seis siglos en el Tlachihualtépetl indica que la atracción religiosa reportada en la Colonia debe haber identificado a Cholula desde el siglo I; y cómo el diseño del complejo piramidal y sus referencias al inframundo y al Popocatépetl, sugieren su dedicación al volcán y su "autodesignación" como centro del cosmos.

On a mid-October day in 1519, people in the western Puebla-Tlaxcala Valley must have paused their chores to admire the unusual troops heading south: Tlaxcaltecan Indians, and others whose attire signaled varied origins, escorted a group of pale individuals, some on foot and others mounted on strange beasts, and whose never-before-seen clothing and weapons shimmered under the autumn sun. The Spanish army commanded by Captain Hernando Cortés and bound for Tenochtitlan, must have been a spectacle worthy of attention, more perhaps because of the curiosity to verify the spreading rumors about the arrival of exotic human beings, with discolored skin and unintelligible language, than for the foreboding that the Mesoamerican world would soon be dramatically transformed.

After the caravan left behind the Tlaxcalan domains, it is easy to imagine that someone among the European's indigenous allies must have pointed out the elevation that, from a distance, heralded the proximity of Cholula (Figure 18.1), one of Mesoamerica's most sacred cities: an ancient and gigantic construction, once majestic, and to which the decay from almost nine centuries of abandonment had given the appearance of just another of the hills that here and there punctuated the plains. Nevertheless, exposed fragments of adobe and stone betrayed its human manufacture (de Benavente, 1969, p. 51), as did its name: Tlachihualtépetl or "handmade hill" (de Rojas, 1927, p. 160), today called the Great Pyramid (Figure 18.2).

At that time, the enormous mound, eroded and covered with vegetation, was crowned only by a modest decrepit shrine (de Benavente, 1969, p. 52) to Chiconahui Quiahuitl, "He who Rains Nine Times" (de Rojas, 1927, p. 162), without revealing the many superimposed constructions that formed it. From its summit one could grasp Cholula's splendor: its grid-iron plan that hosted administrative buildings, schools, workshops, and around 40,000 homes

Figure 18.1.

Location of Cholula in Puebla, Mexico; below, the center of the prehispanic city as illustrated in the sixtheenth century Mapa de Cuauhtinchan 1, showing a reticulated Tlachihualtépetl to signal it was a man-made hill (redrawn from Solís & Velasquez, 2006, p. 30).

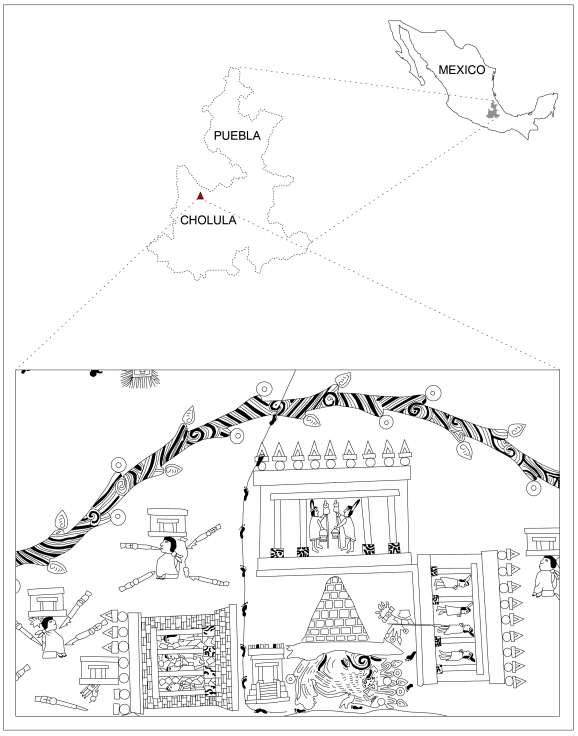


Figure 18.2.

Aerial view from the south of the Tlachihualtépetl (photo by Shigeru Kabata, Tetimpa Project archive).



(Cortés, 1975, p. 45); and its lively market where foreign and local goods circulated, like the region's coveted cochineal that gave a brilliant garnet tint, and the magnificent Cholultecan ceramics, which were used even by the Aztec emperor in Tenochtitlan (Díaz del Castillo, 1974, p. 167). But what most astonished Cortés (1975, p. 45), was the quantity of temples, almost 400. The greatest of these, nearby to the northwest and dedicated to the patron deity Quetzalcóatl (de Rojas, 1927), had been raised under Toltec rule since almost four centuries before, when it had replaced the cult at the Great Pyramid. The Quetzalcóatl precinct afforded an enormous attraction for thousands of pilgrims, including rulers from distant regions, who, upon inheriting their realm, journeyed to this city so that its high priests could pierce their ears, nose, and/or lower lip to insert the ornaments that would ratify their new authority (de Rojas, 1927), and some of them even kept their own palaces in this metropolis (de Benavente, 1969, p. 39).

As modern Cholula covers the vestiges of the ancient settlement whose beginnings reach back to 1000 B.C. (Plunket & Uruñuela, 2018, p. 24; Uruñuela et al., 2009, p. 138), we do not know the longevity of Cholula's role in validating foreign sovereigns. Nonetheless, the sequence of the Great Pyramid is like a stone and adobe document that mirrors the settlement's social evolution, and its study shows that at least its quality as a sacred place does seem to have had a long history that was preserved in local memory, transcending political, ideological, and even ethnic changes. The Tlachihualtépetl, whose almost 400m-square base and more than 60m elevation (Marquina, 1990, pp. 123-124) make it volumetrically the largest pre-Columbian monument on the American Continent, would express, from its beginnings and throughout its different stages, the trajectory that would convert Cholula into such an illustrious sanctuary that, the Spaniards who beheld it in the sixteenth century, compared it to the Rome of Christianity or the Mecca of Islam (de Rojas, 1927).

The roots of that holy aura appear to date back to the beginning of our Era, linked to the consequences of a colossal eruption of Popocatépetl Volcano (Panfil, 1996; Plunket & Uruñuela, 1998) that altered the cultural trajectory in the Mexican Highlands. The cycle of new creation that arose to confront this calamity witnessed the birth of the first monumental stage of the Great Pyramid (Uruñuela et al., 2009). However, although—as we shall see—the reasons that prompted that edifice were of sufficient weight to then give Cholula a special stature (Plunket & Uruñuela, 2006; Uruñuela et al., 2013), they are not enough to explain how it conserved and increased, century after century, its reputation as an acclaimed and teeming pilgrimage hub.

The analysis of the Tlachihualtépetl's growth can help unravel this enigma, but while its imposing presence drew the attention of travelers and explorers after the Conquest, it was not until between 1931 and 1971 that the excavations directed by Ignacio Marquina ([Ed.], 1970) perforated it with almost 10km of tunnels (de la Luz & Contreras, 1968) and provided the fundamental data to show that it had been subject to several constructive moments with a sui generis morphology; yet, given their complexity, their specific form and dating were only roughly outlined. In recent decades, our mapping has refined this information and established that the sequence consists of at least eight main stages, spanning from the first century until the end of the sixth or the beginning of the seventh, recovering also the morphological, dimensional and chronological characterization of these.

Considering monumental architecture as a materialization of governmental power, on other occasions we have addressed how the new interpretations enabled by this work contribute to our understanding of Cholula's rise as a sacred city, a quality that it maintains even today

(Plunket & Uruñuela, 2018; Uruñuela & Plunket, 2018). Taking into account both the objectives of the Out of Eurasia project, and that perhaps many colleagues who study other cultures in other places and times may not be familiar with Cholula, we will first offer some context.

The Origins of the Tlachihualtépetl

Cholula is the oldest continuously inhabited settlement in Mesoamerica. Yet, until the beginnings of our Era, it was just one of several villages on the valley floor; larger sites tended to be located closer to the piedmont. Thus, Cholula had a millennium of unexceptional life before it became a city. And its history would have been another, perhaps less famous, if during the second half of the first century A.D. a Plinian eruption of Popocatépetl had not intervened (Plunket & Uruñuela, 1998, 2006; Uruñuela et al., 2009).

The explosion produced an almost 30km-high column whose collapse deposited 3.2km^3 of pumice over 240km^2 northeast of the crater, and then, a lava flow altered the hydrology of the area (Panfil, 1996). Thousands of families fled from the slopes and moved down to communities that would have to confront unexpected challenges caused by the migratory influx; some 40km from the crater, just outside the hazard zone, Cholula was one of those recipient localities (Plunket & Uruñuela, 2006; Uruñuela et al., 2006).

The catastrophe not only compelled the rearrangement of the settlement pattern but, accordingly, a socio-political reconfiguration. With the abandonment of most of the primary centers after the disaster, the scenario, until then controlled by competing chiefdoms, shifted towards a concentration of population and power at Cholula, converting it into the region's key community, and initiating its path as an urban cult center whose sacredness would become legendary (Plunket & Uruñuela, 2018).

It is no coincidence that the first monumental version of the Great Pyramid, Los Chapulines, was initiated in the years after the eruption. Undertaking a large project to placate the divine anger expelled by the volcano could take advantage of the extra workforce constituted by the refugees and, at the same time, produce a symbol of common identity for the heterogeneous society formed by immigrants and locals (Uruñuela et al., 2009). From Los Chapulines onwards, certain distinctive traits would characterize the successive stages of the mound (Uruñuela et al., 2006, 2009, 2013; Uruñuela & Plunket, 2018); as they differ from those of other Mesoamerican pyramids, we will recapitulate them.

1)The fundamental one is that the Tlachihualtépetl is not properly a pyramid. Its morphology is much more intricate and consists of a complex of connected structures: a central pyramidal module with multiple buildings attached to each of its four sides.

2)Second, even the central module was unlike other pyramids: a) as an axis mundi, it did not have one main façade but four; b) it was asymmetrical; c) it privileged the message conveyed by its global form over the precision of the details; d) instead of a single staircase, the several stairways on its four facades and leading to huge terraces that could accommodate hundreds of parishioners stated an inclusive message, which was reinforced by the open space on its summit; e) that inclusive character is also reflected in its manufacture, as it shows the collaboration of diverse crews or individuals with different techniques and/or abilities; f) each stage left exposed some section of its predecessor, as if to validate the continuity between the old and the new; g) each stage is not just a larger reproduction of the previous, and sometimes even the style radically changed; and h) two themes constant throughout the sequence are the references to the Underworld and the link with Popocatépetl.

The Tlachihualtépetl's Sequence

With those traits in mind, we can now briefly attend the sequence we have reconstructed up until now (Figure 18.3) and our main observations about its symbolic constructs (Plunket, 2012; Plunket & Uruñuela, 2018; Uruñuela et al., 2006, 2009, 2013; Uruñuela & Plunket, 2018, 2020; Uruñuela & Robles, 2012)[1] . Marquina's (1970, 1990) results presented three major building cycles for the central module, yet, the more than 5km of tunnels that we have already mapped show at least eight.

The first monumental stage, Los Chapulines, actually covered a small platform—La Olla—that already demarcated the settlement's ceremonial core prior to the eruption. Los Chapulines articulates an ecumenical message, not only by its combination of volumes and large open spaces and its multiple staircases—that remind us of the so-called acropolis of southern Mesoamerica—but also through its ornamentation (Figure 18.4, top). On its north façade, bands of human skulls, painted by different hands, adorn the sixth and seventh tiers and the small Chapulincitos Platform on the fourth. These bands, facing the direction that later cultures associated with the world of the dead (León-Portilla, 1963, p. 57), seem to be a massive communication effort that linked the building with the Underworld and the ancestors, a topic easily understandable by locals and refugees, as ancestor veneration was an ancient Mesoamerican tradition. The skulls do not represent particular individuals, they are anonymous, a congregation of generic ancestors that could anchor, on this "man-made hill", a new common identity, a bond for a mixed population in which the prior importance of village genealogies had to be rearranged to configure a new society.

Another allusion to the Underworld is found in Los Chapulines' architectural plan, as the upper three tiers seem to represent, in cross-section, a shell—an element associated with that watery realm—and a cave—a portal to it (Figure 18.4, bottom). Could these be references to a later Náhuatl name of the Underworld: *in atlan in oztoc* (in the water, in the cave) (Montes de Oca, 2009, p. 227)?

The dedication to Popocatépetl is also recognizable. Although Los Chapulines has four facades, its largest stairway is located on the western one, facing the volcano that had just so violently transformed life in the valley.

Over the next five hundred years, the sacred city that was a shelter after the eruption would materialize its prestige and religious power by expanding the monument that, towards the end of the first century, apparently had succeeded in placating nature's rage and in generating a unifying identity.

The third stage, Los Tableros Lisos, emulated the morphology of Los Chapulines, but its north flank added an elevated plaza facing Popocatépetl. A plaza in this area would be maintained in the following superstructures.

The fourth stage was the Escalonado 1, with an innovative design. Its nine tiers—perhaps a reference to the nine levels of the Underworld—were covered on all sides by steps, thus inviting free access and intensifying the participative message previously expressed by the several staircases.

Contemporary with the Escalonado 1, a palace extending south from the central module exhibits the Bebedores Mural, a 56m-long and 2m-high composition of 112 individuals drinking an alcoholic beverage. We are still virtually reconstructing it (Figure 18.5), but we have identified at least seven different painters; thus, this was also a collaborative effort.

Another important aspect is that, at least from the Escalonado 1 onwards, the entire sequence of buildings attached to the south side of the central module was decorated with motifs related to the Underworld (Figure 18.6). Vertical and inverted T's form a play of cave-

Figure 18.3.

Isometric northwest view of the central module's sequence according to our mapping (we are still working on Stages 6, 7 and 8, and on many of the extensions towards the fourth directions).

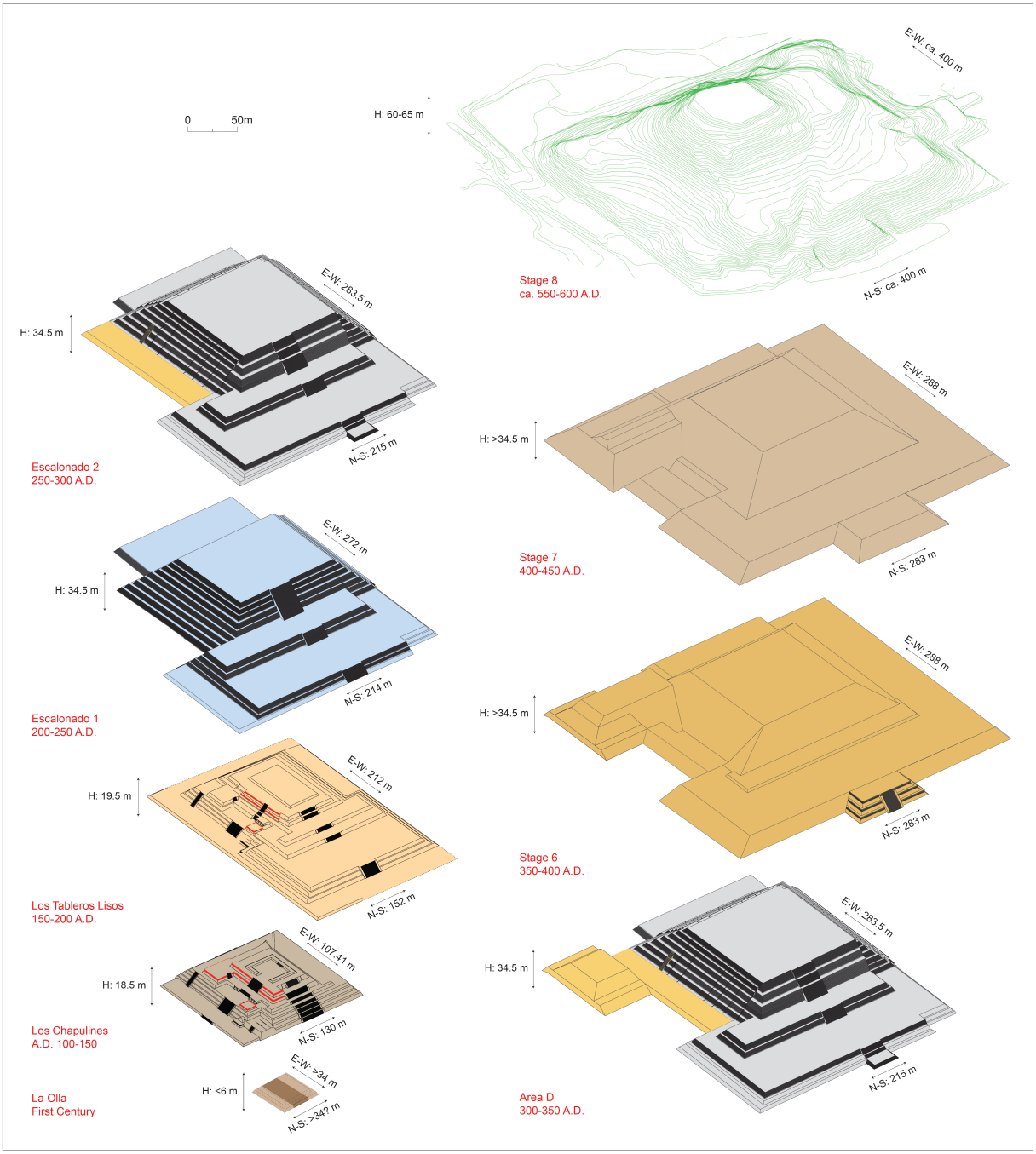


Figure 18.4.

Los Chapulines. Top: Isometric view of the building. Bottom: Plan of the building, showing in cross-section a shell (in blue) and a cave (in brown). (Drawings based on Uruñuela et al., 2006, Fig. 13, and Uruñuela et al., 2009, Figs. 5, 12)

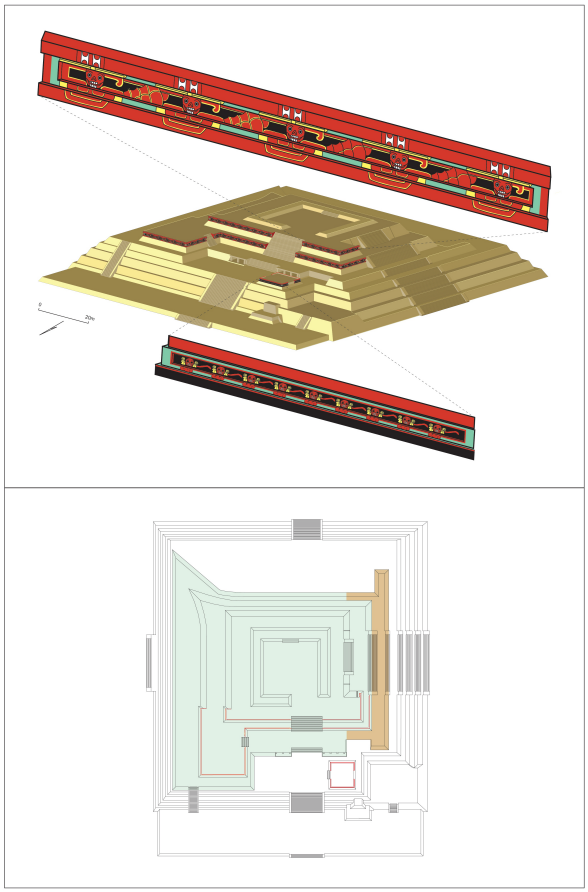


Figure 18.5.

Detail of the Bebedores Mural (drawing by Gabriela Uruñuela).



mountain; and starfish set on diagonal bands, indicating stone, might illustrate the Náhuatl metaphor *atl-tépetl* (the water, the hill) which means city-state (Dehouve, 2016, pp. 60-61), or, in a polyvalent sense, the starfish, animals from the primordial sea, could again cite the Underworld.

The fifth stage, the Escalonado 2, repeated the design of the Escalonado 1, but attached a small platform to the elevated western plaza. Towards the end of the Escalonado 2's existence, a flight of 52 steps—a reference to a full cycle of Mesoamerica's solar calendar—was superimposed on its north side; where these stairs lead to, still remains a mystery.

Between the fifth and sixth stages there was a vast amount of construction in Area D, at the northeast corner of the Tlachihualtépetl. Those buildings were eventually annexed to the central module.

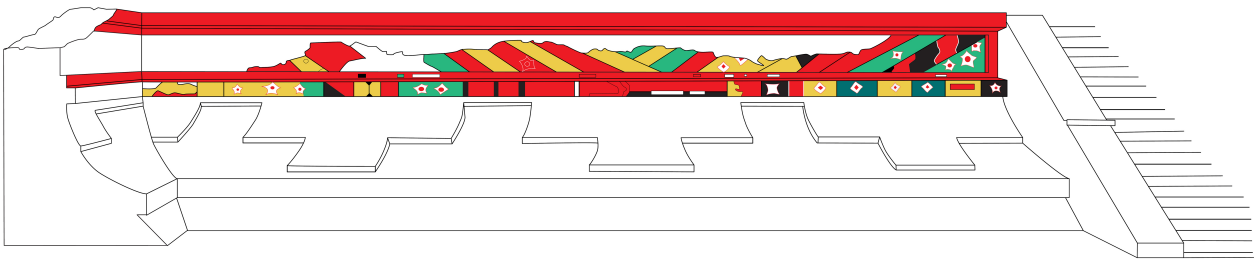
We can only offer a sketch of the sixth and seven stages since we have not finished mapping them. In the sixth, its new version of the abutting platform on the west is the so-called Toltec Pyramid—not because of any ethnic association but a reference to the cement brand used in its restoration. Regarding the seventh, it apparently enlarged only the lower half of the monument, and its western abutting platform was dismantled during Marquina's explorations to leave visible the earlier "Toltec Pyramid" (Marquina, 1970, p. 41).

The eighth stage was the last in the central module, and it was the one Marquina used to obtain the dimensions of 400m-square base and more than 60m elevation by also including the buildings attached to it. Its stone facing was removed in prehispanic times, but its adobe core, visible today, in conjunction with Bandelier's (1976, Plates XIII and XIV) nineteenth-century drawings (Figure 18.7), shows that it too had a radial design with four facades.

In the times of Stage 8, around the turn of the seventh century, the Central Highlands were in turmoil. The

Figure 18.6.

Ornamentation on the buildings of the pyramidal complex's south side (redrawn from Rodríguez, 2006, p.154).



Tlachihualtépetl was subjected to an irreverent fury that is apparent in the profanation of the four stone monuments in the Patio of the Altars on the south side of the pyramidal complex (Figure 18.8). These monoliths were originally arranged in two altar-stela sets, one on the east side and one on the west, and Marquina's project called them *teoicpallin* (Salazar, 1968, p. 8), sacred seats or thrones. On the east pair, intertwined volutes that recall the metaphor *in ayahuitl-in poctli* (the mist, the smoke) (Sullivan and Knab, 1994, p. 207) evoke a deceased ruler´s glory and thus the world of the ancestors. On the altar of the west, plumed serpents, symbols of authority, undulate through cloud scrolls. Given the antipodal positioning of the pairs, one could have been used for the enthronement of new leaders, and the other for the funerals of deceased sovereigns. The violation of these monuments before they were finished evidences a severe ideological crisis, and we can assume that it provoked a significant decrease in donations to the sanctuary, eventually leading to its neglect.

However, unlike other cities affected by the chaotic climate of that period, Cholula was never abandoned; instead, it perpetuated, even until today, its sacred status acquired at the dawn of our Era. To us, this was possible

Figure 18.7.

The Great Pyramid according to Bandelier: cross-section on top and plan at bottom (north towards top) (re-drawn and simplified from Bandelier, 1976, Plate XIII, Figs. 4-5).

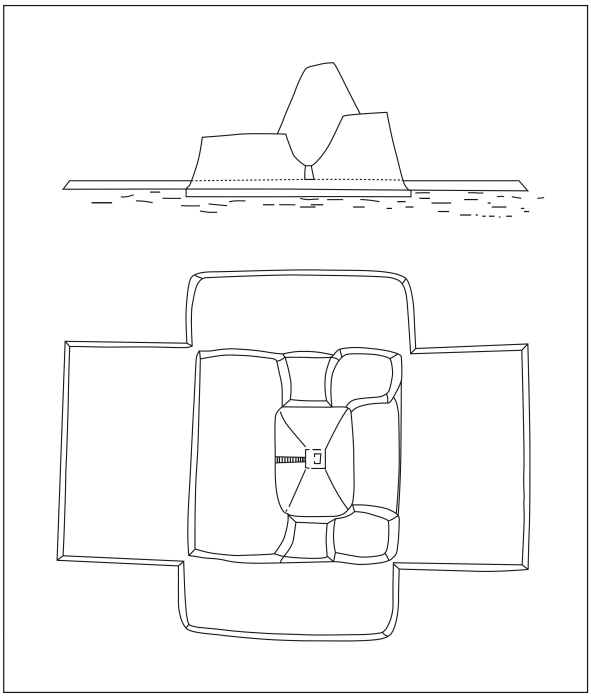
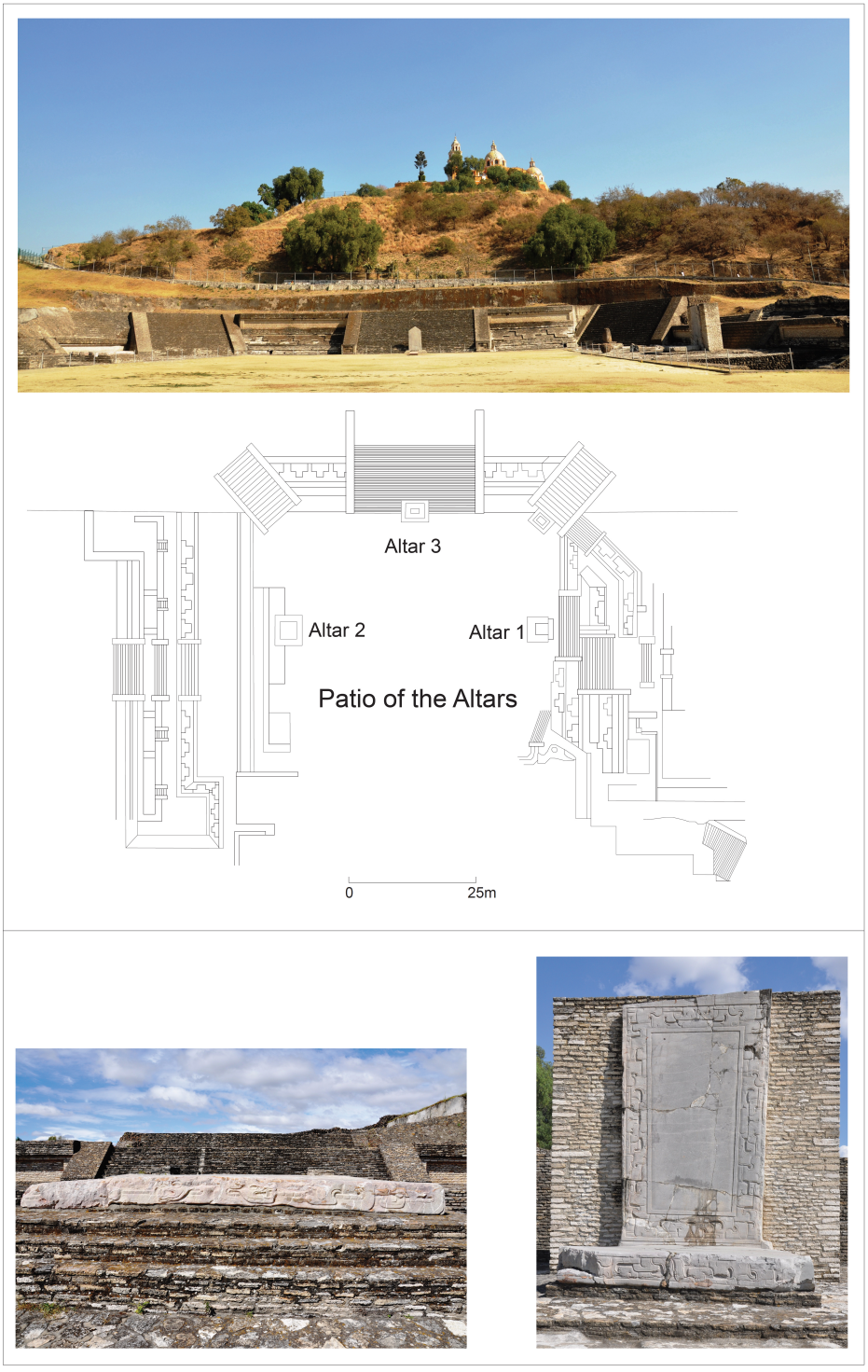


Figure 18.8.

South side of the Tlachihualtépetl, with corresponding plan of the Patio of the Altars. Bottom: Altar 2 (left) and Altar 1 (right).



due to the strategy that Cholula used—and still does: while accomplishing the mission to propitiate the supernatural, be sure to actively incorporate the community. The Tlachihualtépetl's supernatural references are related to the Underworld, a very ancient belief so fundamental to all Mesoamericans, that it could function as what Harari (2015, Position 645) calls a "mythical glue" to bind together large numbers of otherwise dissimilar groups of individuals. To reinforce that tie in practice, the message of inclusion was made apparent all through its sequence, both in its manufacture by heterogeneous crews, as in the message of its morphology that, countering the exclusion of other pyramids, indicates that the bulk of the population could access the monument, not only the officiants and their attendants. These projects, with so many access points and large open spaces, were meant to motivate collective ritual observation and participation.

Final Comments

Cholula shared with many other cultures from different periods and places the impulse to erect monumental religious buildings—perhaps not only because the materialization of power validates governmental stability, but maybe also because the employment of a suprahuman scale might be a more appropriate expression for the veneration of superhuman entities—but the Great Pyramid has a peculiarity. The radiocarbon dating and the ceramic chronology for the first six stages and for the initial constructions in Area D, indicate building cycles of about half century each, and perhaps it would not be too far-fetched to propose that the main stages were built every 52 years. Still, countless modifications were made to its main stages (for instance, Stage 6 had more than 10 major renovations). Many of those alterations were covered by new structures even before they were completed. Thus, throughout its entire history, this was an unfinished project, always lively, always under construction.

Given the lack of written records (there are no glyphs in Cholula until several centuries after the Tlachihualtépetl's last stage), how would the donations and labor required for those unceasing building activities over such a very long term have been recorded and administered? How were gifts appraised, materials calculated and bought, or salaries determined? This makes us think of the Sumerians, who employed standardized bowls as fixed measurements of barley that could be used to evaluate specific goods and services (Harari, 2015, Position 2795-2804). Could the immense amount of apparently homogeneous brown bowls at Cholula have been used in a similar fashion? This question perhaps could be addressed by a statistics-loving archaeologist younger than us.

On the other hand, and more to the point of the Out of Eurasia project, why was this constant process of creation perpetuated by the various successive authorities who produced the always-growing Tlachihualtépetl? That building rhythm must have required vast amounts of resources provided by the faithful. To us, it indicates that the intense religious attraction reported in the sixteenth century must have been an attribute of Cholula since the early substructures of the Great Pyramid, and that perhaps the incessant construction was a mechanism to visibly guarantee to worshippers the rightful use of their donations and, thus, stimulate their future generosity.

Of course, the continuous activity could have been prompted also by the spiritual interest to permanently propitiate the Tlachihualtépetl´s holy patron, but another pending enigma is that the scarce iconography on the monument does not indicate if it was consecrated to a particular god. Indeed, the representation of deities in Cholula before the tenth century is almost non-existent.

At the pyramidal complex, plumed serpents are portrayed only in three cases, and none seem to manifest

the god of the Pyramid (Figure 18.9). One is the Jaguar Platform—a first century building that was left visible on the southwest corner of the later Escalonados—painted with feathered ophidians defeating jaguars; given the subsequent exclusion of these felines from Cholula's iconography during the epoch of the Tlachihualtépetl's construction, it is plausible that this refers to a confrontation of human power groups symbolized by their emblems. Another case is on the Chapulincitos Platform, also from the first century, and the third instance appears in the sixth or seventh century on one of the Patio of the Altars' monuments; in these two cases, both suitable locations to inaugurate a new ruler, the plumed serpent seems to have been employed as a symbol widely recognized in Mesoamerica to validate authority.

This aniconic panorama is even more intriguing when we turn to the Bebedores Mural. The scene it illustrates has been traditionally interpreted as a mundane event; however, isolated arms descend from the frame, giving the liquid to the individuals (see Figure 18.5). Why were the bodies to whom they belong not shown? Considering that the main reference of the scant iconographical information on the different stages of the pyramidal complex is not to particular gods but to unearthly dimensions, to us, those arms were depicted to figuratively express the action of giving from a non-material realm, not to insinuate supernatural beings.

Who was, then, the deity that deserved the construction of the largest prehispanic monument in the American Continent? Throughout the Tlachihualtépetl's sequence, the architectural language constantly expresses a link with Popocatépetl. This majestic still-active volcano (Figure 18.10), with an imposing height of more than 3.2km over the valley floor, was an evidently animated component of nature. Without doubt, those traits must have made it the sacred mountain par excellence both locally and well beyond the Puebla-Tlaxcala Valley. It would be too broad for this paper to expound the several aspects of the Great Pyramid that indicate that it was built to represent the volcano and, by extension, the most sacred of the sacred mountains in the Central Highlands, so we will focus only on one feature: its layout.

López Austin (this volume) presents a masterly description of the Sacred Mountain concept in Mesoamerica. As he explains, the mountain and its

Figure 18.9.

Plumed serpents (not to scale) at the Tlachihualtépetl. Top to bottom: Detail of the mural on the Jaguar Platform; Chapulicintos Platform (left: detail with green feather; right: volutes through which the red body of the serpent undulates); section of Altar 2 with plumed serpent writhing through scrolls.

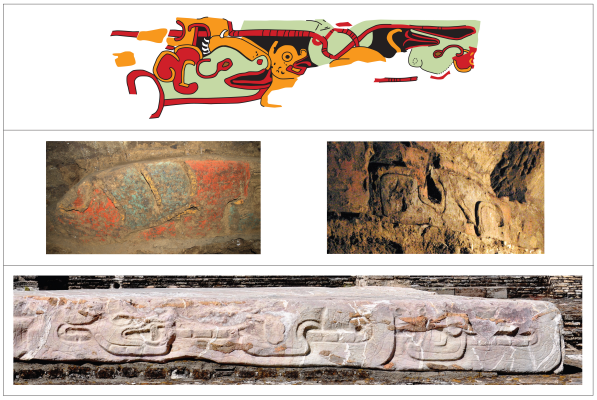


Figure 18.10.

At the center, the Tlachihualtépetl crowned by the Catholic temple of the "Virgen de los Remedios"; Popocatépetl in the background on the left.



surroundings were frequently represented as a quincunx (a composition of five elements, one in each corner and one in the middle, symbolizing the center of the earth's surface and the four cardinal points or the four corners of the world). In every stage of the Tlachihualtépetl's sequence, each of its four facades has a different morphology and ornamentation, and each shares its particular traits only with the buildings attached to it. Adding to the central module the extensions projecting from each facade, the whole design has five components, a quincunx-like format (we still need to map many of the extensions, but this layout is apparent in Bandelier's sketch [see Figure 18.7]), thus making sense of the ostensible distinctions among the four sides of the complex, since each one would epitomize a different world direction. If the central module was intended to represent the Sacred Mountain Popocatépetl, there is no need to seek another divine entity for the dedication of the monument.

Moreover, if that were the case, it would not only explain the strange morphology that makes the Tlachihualtépetl so unlike any other Mesoamerican pyramid, but it would also vindicate the enormous religious attraction that Cholula exerted. Erecting pyramids to represent sacred mountains was a deeply-rooted tradition in Mesoamerica, but Cholula went beyond that, not only creating in the built landscape a colossal reproduction of the impressive volcano, but successfully incorporating to it a peculiar architectural arrangement to ostentatiously declare that there was the center of the cosmos. As its history shows, this was a convincing statement.

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[1]As the intention of this paper was to introduce the themes we are working on to the members of the Out of Eurasia project, this section is a simplified assemblage of data that we have already published focusing on diverse topics. Thus, to avoid repetitive self-citations, here we provide the list of references used for this compilation, instead of individually citing them in each case.

19
Spatial, Temporal, and Symbolic Significance of the Myths Recreated in the Underworld and in the Space of the Citadel in Teotihuacan

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The discovery and systematic exploration of the tunnel under the Temple of the Feathered Serpent, as well as the remains of an ancient sanctuary under The Citadel square, have allowed us to recognize the practice of different rituals associated with the shared cosmogony in the Mesoamerican territory.

As we have progressed in the investigation, we have gradually been able to identify several elements of the worldview and Mesoamerican religious thought. For almost two and a half centuries the tunnel was used to carry out the rituals that included the descent into the underworld and the staging of the encounter with the lords of the underworld on the ballcourt. It should also be used for the rituals of transmission of power, the funeral ceremonies and the burial of rulers of the early stages.

Around 250 of our era, the tunnel was closed and construction began from a great ritual stage prepared to recreate the original sea from which, according to the myth, the sacred mountain emerged, establishing the beginning of time.

Different evidences indicate that it was a paradigmatic change in the way of conducting the ritual and the representation of the original myth, derived from the social complexity that Teotihuacan reached. The ritual required new elements and better discursive resources, a stage conceived and constructed to carry out the ritual representations that on specific dates updated the myth of the original creation.

In this paper we argue the way in which the Teotihuacan elites materialized symbols that would allow the ideological control of the population, justifying their class position in different ways. Through the ritual staging of the myths alluding to creation, elites obtained social legitimacy under the protection of the Feathered Serpent.

El descubrimiento y la exploración sistemática del túnel bajo el Templo de la Serpiente Emplumada, así como de los restos de un antiguo santuario localizado bajo la plaza de La Ciudadela, han permitido reconocer la práctica de diferentes rituales asociados con la cosmogonía compartida en el territorio mesoamericano.

Conforme hemos avanzado en la investigación, gradualmente hemos identificado varios elementos de la cosmovisión mesoamericana y el pensamiento religioso. Por al menos dos siglos y medio, el túnel fue utilizado para llevar a cabo rituales que incluían el descenso al inframundo y la celebración del encuentro con los señores del inframundo en la cancha del juego de pelota. El túnel también pudo usarse para realizar los rituales de trasmisión del poder, las ceremonias fúnebres y enterramiento de los gobernantes de las primeras fases.

Alrededor del 250 de nuestra era, el túnel fue cerrado y comenzó la construcción de un gran escenario de tipo ritual preparado para recrear el mar primigenio del cual, según el mito de la creación original, emergió la montaña , estableciendo el comienzo del tiempo.

Diferentes evidencias indican que se trató de un cambio paradigmático en la forma de conducir el ritual y la representación escenificada del mito original, derivado de la complejidad social que alcanzó Teotihuacán. El ritual requería de nuevos elementos y mejores recursos discursivos, de un escenario concebido y construido para llevar a cabo las representaciones rituales que en fechas especificas reactualizaban el mito de la creación original.

En este artículo argumentamos sobre la forma en la cual las elites teotihuacanas materializaron los símbolos que servían para mantener el control ideológico de la población, justificando su posición de clase de diferentes maneras. A través de la escenificación de los mitos que aludían a la creación, las elites obtenían legitimidad social bajo la protección de la Serpiente Emplumada.

Introduction

Teotihuacan was one of the most complex societies that existed during the pre-Hispanic period in the Mesoamerican territory. Its origin and development between 200 BCE and 650 CE, can be understood as the conjunction of a series of economic and social factors that favored its positioning at the center of an extensive network of local, regional and extraterritorial links.

Extending over an area of 23 square kilometers, the city of Teotihuacan was one of the largest and best planned that existed in antiquity worldwide (Millon, 1973). The city is a notable example of urban planning in which large avenues, streets, and thousands of architectural compounds of all kinds, formed a unit that integrated ceremonial civic compounds. In addition, numerous residential apartments occupied by domestic groups belonging to different social classes, and squares where markets were installed or various religious festivities were held formed an important part of the urban landscape. The entire city was conceived from an orthogonal plane layout defined by large avenues and long streets that maintained the same orientation. The construction of Teotihuacan as a great sanctuary city, constituted an event that marked the development of ancient Mesoamerica, inaugurating an urban way of life

that would transform the world of that time.

The city is made up of more than two thousand architectural compounds, among them stand out the most important large ceremonial civic precincts such as those of the Pyramid of the Moon, the Pyramid of the Sun and the Citadel. Today we know that the city was organized into neighborhoods (Gómez Chávez, 2000), each with elements that formally define it that allow us to understand that the State interfered directly in the public life of all the inhabitants of the city.

The metropolis must have had a production and distribution system for all kinds of goods manufactured in local workshops, although another important portion of products must have been imported, including many of food resources consumed by the population that at some point could have been as high as 200,000 people, a number that far exceeded the valley's capacity to support such a large population. Teotihuacan would maintain strong political and economic relations with far away places, including other cities and states in southeastern Mexico and Central America, where the Maya had developed a complex civilization for centuries.

Teotihuacan's positioning as a great economic power was preceded by other societies from which Teotihuacan would have retaken the essence of a worldview that was built over centuries. Teotihuacan would have been inspired by the essence of this way of seeing and understanding the world and materialized it in a manner never before seen.

The projection of cosmogonic concepts onto architecture and in the spatial arrangement of buildings conjured the myths that justified life, the existence of human groups, regulated social behavior, and integrated advanced astronomical knowledge, achieving an extraordinary materialization of ancient ideas, using them as ideological resources for the control of society. The whole city was a great sanctuary and in different parts ritual scenes with multiple uses were erected. Religion permeated each and every aspect of daily life. Temples, shrines, and altars were erected in each house, in each compound, in each neighborhood, and even in the streets. The death of an individual was an opportunity to express aspects of the worldview.

The Architectural Complex of The Citadel

The city has three large architectural complexes connected by the Street of the Dead; these elements were an essential part of the urban plan that materializes the worldview and were part of the ritual backdrop that would give meaning to the largest sanctuary of its time (Figure 19.1).

The architectural complex of the Citadel located to the south, possibly marked the physical and symbolic center of the urban complex. Continuing north along the Street of the Dead, the Pyramid of the Sun complex is located to the east; the layout of the great pyramid is truly exceptional, representing the movements of the sun and its association with the two calendar systems used in ancient Mesoamerica. It was projected at the precise point where the solar year is divided into two sections, one of 260 days to the south that corresponds to the number of days on the lunar or sacred calendar and another section to the north of 104 days (52 to the furthest point north + 52 at the point of return and beginning of the 260 cycle) which added to those of the previous cycle correspond to the number of days in the solar calendar (260 + 104 = 364). To the north is the architectural complex of the Pyramid of the Moon, establishing the end of the great processional avenue whose length exceeds 4 kilometers.

The architectural complex of the Citadel measures just over 400 meters per side. Four large platforms delimit a huge plaza with an altar, where the Pyramid of the Feathered Serpent stands as the main building. The pyramidal base was originally ornamented by sculptures

Figure 19.1.

View of the Citadel Complex. Photo by J. Gazzola.



protruding from the body of the pyramid. Despite the various interpretations that exist on the monument, we think that it was a building dedicated to commemorating the beginning of mythical time, the representation of a sacred mountain, the primordial mountain that according to myth emerged from the primeval sea and marked the beginning of the count of the days and the calendar.

Explorations carried out in the 1980s by Cabrera, Cowgill and Sugiyama (1990a, 1990b) at the base and inside the basement through tunnels, led to the discovery of the bodies of hundreds of people who were sacrificed, according to Sugiyama (2005) as an act to consecrate construction.

Our explorations carried out for more than a decade contribute elements to this hypothesis, we argue that there is evidence that the teotihuacanos had conceived and built the Citadel to keep it flooded. In this way, the Feathered Serpent Pyramid would have been seen emerging from the primeval sea in the first days.

The Citadel probably functioned as a great ritual space, where the myth of the original creation had to be represented and re-updated year after year. It must also have been a square where political celebrations and rituals were carried out whereby the rulers of the city and other places received the divine investiture to govern and were somehow protected by the Feathered Serpent, protective numen and symbol of power structures.

Since 2002 data obtained by the investigations we have carried out in the Citadel, have greatly expanded our knowledge of this architectural complex (Gazzola, 2009, 2017). Some of these excavations reached the oldest levels of occupation, when the settlement was used for agricultural purposes by the first inhabitants of the valley. Several architectural structures of a first sanctuary have been documented. We have also observed the subsequent transformations that the complex had until the collapse of the city. Today we not only have a more complete idea of the process of occupation and transformation of space over several centuries, but also accurate knowledge about the process of development of the urban complex and the management of the elements of the worldview, its materialization, and its integration into the religious thought.

Two important characteristics of the early phases of constructions, are that they differ up to 4° with respect to the orientation, and that were imposed after it was 15° to the east of the north. Another characteristic is that there is no use of volcanic slag (tezontle) as building material. In the first phases, blocks of volcanic tufa (tepetate) and adobes (bricks of ground cooked to the sun) were used. Both characteristics are shared by all the buildings that formed the first sanctuary built at this location and that were in operation during the Tzacualli (1-150 CE) and Miccaotli (150-200 CE) phases. Later these ancient buildings would be destroyed and on their remains the Citadel would be built.

The change in orientation could be the result of a necessary correction that had to be made to connect sunrise and sunset with the city orientation and calendar system; the use of volcanic slag would have represented a technical

innovation that would transform the construction system. These two characteristics have also been seen by Sugiyama in the first substructure of the Pyramid of the Moon. This new information has led us to question and move away from the hypothesis proposed by different authors that the development of the city would have been from north to south and the Citadel would have been built much later. Thanks to our excavations and discoveries, we know that in the Tzacualli phase (1-150 CE), there was already an important sanctuary in this place and that the urban settlement extended to the area where the Citadel would later be built.

Figure 19.2.

View of the Feathered Serpent Pyramid.



The Tunnel Under the Pyramid of the Feathered Serpent

One of the most emblematic buildings that existed not only in Teotihuacan but in Mesoamerica was undoubtedly the Pyramid of the Feathered Serpent (Figure 19.2). Its association with the Sacred Mountain and the planet Venus make it a monument exceptionally rich in meaning.

In 2003, while we were carrying out the conservation work in the Citadel Complex and the Pyramid of the Feathered Serpent, we discovered a tunnel that had been excavated by the teotihuacanos at the beginning of our era. The deep underground conduit is 103 meters long and is located between 13 and 17 meters below the surface.

The systematic investigation of the tunnel under the Pyramid of the Feathered Serpent, as well as the remains of an ancient sanctuary under the Citadel square, show the practice of various rituals associated with Mesoamerican cosmogeny. Over thousands of years, the myth of creation and the Mesoamerican concept of the structure of the cosmos were so recurrent and convincing, that they had an impact on the politics, social relations and many aspects of the daily life of people, communities, and large urban centers.

As we have made progress on the investigation of the tunnel under the Pyramid of the Feathered Serpent, we propose it could be an important sanctuary. We have gradually been able to identify several elements of the Mesoamerican worldview and religious thought. For almost two and a half centuries the tunnel was used to carry out rituals that included the descent to the underworld and the staging of the encounter with the lords of the underworld in the ballcourt. Like the tunnel of the Pyramid of the Sun, it was also used for the rituals of power-transmission, funeral ceremonies, and the burial of rulers.

From the time of the Olmecs, the rulers were represented in the entrance or inside of the caves, because it is precisely in these spaces that the gifts with which power is exercised, are obtained. It is also in caves where power is transferred and the remains of the rulers were buried. They are the portals of the underworld, residence of the owner of the mountain and of deep waters, place of the great reservoir where the riches and the nutritional seeds are kept, where the secrets of creation that gave rise to humanity are safeguarded and the place where "the ancestral strength of government structures is concentrated" (cf. López Austin and López Lujan, 2009).

The ^{14}C dating and studies of ceramic materials show that the tunnel was closed around 250 CE, and the construction of a magnificent ritual space prepared to recreate the primeval sea of which, according to myth, the sacred mountain emerged, establishing the beginning of time.

It was a paradigm shift in the way of rituals were conducted and the representation of the original myth, derived from the social complexity that Teotihuacan had reached and the need for better and more power discourse resources.

Due to the large size of the plazas and monuments, we infer that at Teotihuacan the ritual festivities consisted of the participation of much of the local and foreign population who attended the festivities according to the ritual calendar. In fact, after two centuries of being a rural-agricultural society, shortly after the beginning of our era, Teotihuacan ushered in an urban way of life with an ethnic, linguistic, and culturally heterogeneous population.

The state had to look for and secure the mechanisms of control and social integration and had to have strategies for communicating and the transmission of ideas through which elites obtained legitimacy and justified their position as the dominant class. Religion played an important role in all aspects of the life of the great city.

After more than ten years of nearly continuous systematic excavations at the Citadel, we reconstructed the temporal sequence and occupation of space. The findings have allowed us to propose a better proposal for the function and meaning of the Citadel Complex. By defining the chronology of the different levels of occupation we have been able to challenge the ideas that were held about the process of development of the urban setting. In terms of cosmogony, we have established and corroborated the binding relationship between levels, regions, and centers, in what is for us an amazing metaphorical materialization of the Universe.

As part of a first and important sanctuary, the teotihuacanos built a pyramid-mountain on a long cave excavated to a depth from which the sacred water emanated. This sanctuary was used for nearly 200 years and then destroyed. Finally, they conceived and built a major ritual stage where year after year, when the square was flooded during the rainy season, the ideal conditions were set up to ritually materialize the myth of the original creation. In this scenario, people saw how the Sacred Mountain emerged from the primeval sea, reenacting the myth of the creation of the universe and the beginning of time. In this manner, Teotihuacan elites materialized symbols used in the ideological control of the population, justifying, in different ways, their class position.

Teotihuacan: The Materialization of its Worldview

The great monuments of the city are a materialization of the way the Universe was conceived (Sugiyama, 1993, 2005). Florescano has pointed that the planning of the cities and the distribution and orientation of their buildings reproduced the quadripartite division of the cosmos, turning the sacred center of the city into a replica of the navel of the world, making each temple and building an indicator of the sun's displacements through the celestial orbit, so that the earthly city had the same axial anchors that underpinned the harmony of the cosmos (1987, pp. 62).

When we explored one of the neighborhoods of the ancient city, we confirmed that in effect the conception of the Universe moved to the realms of everyday life. In each neighborhood, in each compound, in each temple and square, the model of the cosmos, its directions, spaces, its links and its properties are reproduced. In each compound and in each house, there was an altar in the center of the small square, which gave all human activity sacredness. "Every human construction was a replica of the original

foundation of the cosmos" (Florescano, 1987, pp. 17); the rulers imposed on the earthly level the structure and the cosmic order. The mythical past was extracted and placed within the scope of the historical present. In this way, elements of Mesoamerican cosmogony can be found in architecture, ceramic objects, wall painting, and other aesthetic expressions.

The entire city was the ritual setting for great performances. The processions on the Avenue of the Dead and the ceremonies in the great squares, strongly impacted the perceptions of many local people and foreign pilgrims who daily lived the religious experience and the manifestation of the sacred.

Our findings in the sacred cave complement the conceptual program of the Universe devised and built by the ancient teotihuacanos. We have recognized the binding relationship between levels, regions, and directions, in an amazing metaphorical materialization of the structure of the Universe. The teotihuacanos built a pyramid-mountain on a long cave that represented the underworld.

The mythical stories narrated in the written sources (Sahagún, 1956) and those recovered from contemporary indigenous groups, maintain the idea of the importance of the Sacred Mountain as the axis of the world, as the abode of the gods, and burial place of the ancestors and rulers. In other cases, it is seen as a large reservoir of water and refers to the scope of the origins or the communities themselves (cf. López Austin and López Lujan, 2009).

The cave is associated with the mountain, as an entrance to the underworld, a space full of richness and abundance, a great reservoir of nutritious seeds; in the underworld the secret of creation, of the cycle of renewal, of life and death is protected. The underworld is linked to the origin of humanity and its livelihood, as well as to the cult of the ancestors. It is a humid, dark and cold space, associated with fertility and death. The underworld has its own sacred geography in which there are rivers, lakes, mountains and a celestial vault with stars. As we point out below, the teotihuacanos materialized this imaginary configuration in a surprising way.

Tunnel exploration and first results

The theoretical approach and the formulation of various hypotheses that have guided the process of research and exploration, were developed taking previous studies on the worldview of the ancient Mesoamerican peoples in mind. For nearly nine years, we have been systematically investigating the tunnel under the Pyramid of the Feathered Serpent. At the same time, we have done several field seasons of archaeological research in the plaza of The Citadel.

Under the floor level of the great plaza, we have excavated several compounds contemporary to the tunnel and that together must have been part of a first and important sanctuary. This first sanctuary had to be made up of several structures and architectural compounds distributed around three central elements: a pyramid-mountain, a cave and a huge structure that we assume was a court for the ballgame. The pyramid must have been adorned with friezes depicting snakes moving over water and the upper temple was ornamented with large sculptures of macaws.

In front of this building that Sugiyama (2005) calls Pre-temple of Quetzalcoatl, was located the entrance to the tunnel and in the same direction but further west, a structure of almost 123 meters in length, oriented from north to south that was possibly a court in which the ritual of the ballgame was staged (Figure 19.3). This structure was badly damaged, but in support of our hypothesis, we know the ballgame was associated with the underworld, besides that inside of the tunnel, we located several rubber balls and a yoke fragment.

Figure 19.3.

View of the southeast corner of what we suppose is a ballcourt. Photo S. Gómez.



The tunnel was excavated about 2,000 years ago and according to ^{14}C dates, it remained in use for about 200-250 years. The first section of the tunnel includes the entryway that functions as a threshold; this first part is 14 meters from the surface level and corresponds to the path that leads us to the real underworld.

The second section of the tunnel is located almost 70 meters from the entrance, is deeper and in some places it reaches up to 17 meters that would cause it to intentionally remain flooded. In ancient times there was a permanent layer of water created by the high water table.

Access to this section of the tunnel represents a portal, that corresponds to the liminal space that separates and serves as a bridge to enter the most sacred dimension of the cosmos, to the true underworld. To access the sacred space, it is necessary to cross this threshold that is not only deeper and remained flooded, but in terms of meaning, represents for an instant the non-time and the non-space. Crossing this threshold, the last traces of the earthly world are left behind and the access to the sacred space that brought together the vision of the underworld and every structure of the Universe completes the cosmogram.

There are three large chambers facing north, south, and east at the end of the tunnel. The intersection of the horizontal axes of the three chambers coincides with a surprising accuracy with the vertical axis of the pyramid. The corners of the three chambers make up the four supports of the sky of the underworld and the world.

The vault was covered with mud to darken it and impregnated with pyrite and magnetite powder to represent the stars in the underworld sky. The lower part of the three chambers was sculpted to symbolically represent a miniature mountainous landscape with small valleys and basins where liquid mercury was deposited (Gazzola, in press). This is probably a cosmogram in which the three levels of the Universe are linked through the vertical axis.

During the excavation process we have recovered more than 130,000 different objects and materials, many imported from faraway places mainly the Maya highlands (Gómez Chávez and Gazzola, in press), southern Puebla, northern Mexico or southwest of the United States. The offerings discovered included numerous objects, however it was in the second section of the tunnel that the quality, quantity and variety of artifacts and materials give each deposit a major importance. This space, full of seeds (more than thirty thousand including cocoa, amaranth, beans, corn, nopal, among many others) represent abundance marks this as the true underworld, the place to the west that according to myths, is where the most precious goods are protected.

The offering located at the end of the tunnel consists of thousands of objects accompanying four anthropomorphic sculptures, however originally it must have been five. Two of the sculptures, that of a man and a woman, were located standing, slightly inclined on his back directing his gaze to the vertical axis of the pyramid and the axis mundi. The other two were found at the entrance of the north and south chambers. Only two fragments were recovered from the fifth sculpture because it was destroyed by the

teotihuacanos; it must have been male and much larger than the others.

According to the features (eyes and mouth open) as well as their standing position, carrying on their backs bundles with sacred and magical objects, it is the representation of living beings, of characters that are performing a ritual. The nudity of the male and his size suggest that he is of lower status than women. We emphasize that it is not only the physical nudity or lack of clothing, but rather the symbolic way of representing that the individual does not yet possess the power and esoteric knowledge that will be transmitted to him by the female ancestors who now also safeguard the secret of creation in the underworld (Figure 19.4).

Our interpretation is that the scene represents the ritual transmission of power in the underworld, and alludes to the political-religious events that must have taken place in the presence of very few people.

This cosmogram, as well as the rest of the associated elements, constituted a symbolic complex that materializes the manner in which the underworld was conceived as place of creation, where Tláloc, the only deity represented was the owner of the waters emanating from the depths. We suggest that when the tunnel was in use, the ritual first was staged in the space we proposed was a court for the ballgame and then a few people descended into the underworld, who then ascended to continue ritual performance on the earthly level. In ancient Maya Popol Vuh a reference is made to the ballgame that takes place in the underworld, in which the divine twins face the lords of the underworld who had challenged them to play. In Teotihuacan times the descent to the tunnel and then the ascent to the surface, marked the culmination of the creation and the actualization of the myth of the original creation. The Nahua myth tells us to rescue the bones of the ancestors and the corn that were stolen from the underworld referring to the resurgence of the god of corn and the cult of the ancestors.

Figure 19.4.

View in situ of the two green sculptures. Offering 46. Foto S. Gómez.



The Transformation of Space and the Change in the Conduct of the Ritual

Inside the tunnel we have recovered fragments of a frieze and large sculptures that belonged to an old dismantled pyramid and some of its remains were integrated as fill in the tunnel around 250 CE. This building together with others that have been explored in the area of the great plaza, formed part of a first and important precinct that existed in this place since the first century of CE. The first pyramid was destroyed marking the beginning of a large-scale construction program that reconfigured the space where The Citadel would be built.

Around the middle of the third century CE, the tunnel was closed definitively and the rituals that were carried out in the underworld, would later be performed on the earthly level, in the great plaza, staging the ritual that was previously performed almost in secret, now with the presence of many people. A strategy that created greater legitimacy for the ruling elites.

At the same time the drainage that served during the construction of the Citadel was closed with the offering of a human sacrifice. Around 50 individuals were decapitaded

Figure 19.5.

View of the flooded Citadel square. Photo J. Gazzola.



and dismenbered as an offering to the hydraulic system. Without an efficient drainage system, the plaza of the Citadel was obviously flooded during the rainy season. (Figure 19.5)

Diverse lines of evidence allow us to postulate that the change in the manner that rituals were conducted and the representation of the myth of creation corresponded with increasing social complexity. The ritual required new elements and better discursive resources, of a scenario conceived and elaborated to carry out the ritual representations that on specific dates updated the myth of the original creation. Much of the population had to participate, as it would be the only way to ensure that the Universe maintained its pace and course.

The Citadel reproduced on a larger scale and on the earthly plain, the elements that had been arranged in the underworld. The plaza could hold almost 100,000 people who witnessed religious and eventually political rituals. The former must have been ritual stages of mythical passages. The latter should have included the investiture of local and foreign rulers under the protection of the politically legitimizing state and the Feathered Serpent, protective religious entity of the ruling elites. Even the funeral rituals that were carried out in this place had a political purpose.

The Citadel's construction program began with the gradual destruction of the buildings and included the sacrificial ritual of 260 people who were buried in the Pyramid of the Feathered Serpent, according to Sugiyama (1998), like consecration offerings. We postulate that they were willing to symbolically protect and guard the tomb of a ruler who had been deposited inside the sacred cave, but which for some reason was extracted, and his sculpture destroyed as an iconoclastic act. The burials of hundreds of individuals placed at the base of the building discovered by Cabrera and Sugiyama (Cabrera and Cabrera, 1991, Sugiyama, 1991), maintained a direct relationship with what had been deposited and was protecting in the tunnel.

The construction program of The Citadel took into account the flooding of the large square, enough to form a water mirror. In the middle of that primeval sea represented by the flooding of the plaza every year during the rainy season, the mountain of maintenance was seen emerging from the underworld, marking the beginning of the mythical time (Gómez Chávez, 2017, Gómez Chávez and Gazzola, 2018).

In this way an artificial landscape was built, a scenery that included the primeval sea surrounded by mountains that rise towards the four corners, leaving at the center and west the sacred mountain, which emerged establishing the beginning of mythical time, the counting of the days.

Conclusion

We have seen how the teotihuacanos materialized the way they conceived the three levels of the Universe. They created spaces and elements in which the myths associated with creation were performed. The whole city and its great monuments materialized the conception of the cosmos.
In the Citadel, the ritual linked to a passage from the myth

of creation contemplated the descent to the tunnel, the ascent to the pyramid-mountain that existed in this place and a ritual staging on the court of the ballgame.

The rituals for transmission of power, or the funerary rites for rulers were also carried out, and must have been performed in the secrecy of the tunnel and in the presence of a small cadre of people. In the descent into the underworld, the cult of the ancestors included the God of Corn.

Around 250-300 CE, teotihuacano society became more complex and required a great constructive program, in which the first sanctuary turned into the magnificent ritual scene that we know as the Citadel, which was conceived and built to be kept flooded. To reach the moment of the manifestation of the sacred, the theatricalized depiction of the ritual would have required a scenario that allowed to live or experience the ecstasy of religious experience. The construction of this ritual precinct was an exceptional idea conceived to reenact the myth of creation.

The large flooded plaza and the Pyramid of the Feathered Serpent emerging from the primeval sea formed a perfect model of the origin of the Universe. The primeval sea bounded by the mountains on the long platforms would have been an important part of the ritual scenery.

In Maya myths the large lizard vomited so much water that it watered the land. The death of the crocodile is the victory of order over chaos. Flooding is associated with the creation of the new world and the assumption of the rulers to power. According to this Maya myth the annual flooding of the Citadel reenacts the time of the creation of the new world that occurs when the ruler decapites the crocodile that had caused the flood. With this act the new ruler assumed power and obtained the social legitimacy he required under the protection of the Feathered Serpent, an act through which the new ruler would appear as a heroic being that creates the new world.

Different societies in the American continent share common ways of building and understanding the Universe. The structure and composition of different myths account for similarities that require us to ask questions that can explain why there are common rhetorical elements and resources about how the world is structured and how different conceptions seem to be shared. For example, despite ethnic, natural, geographical and social diversity, in Mesoamerica the concept of Mountain as a central element of the worldview seems to be a fundamental constant, since it appears not only as the great container, but in its vertical projection, it is the axis of the world that communicates the different levels that are distributed in the horizontal plane, establishing the regions of the cosmos united by the axis mundi.

It is interesting to note that in the Andean region, the mountain also has an important role in their cosmovision. Another element frequently shared in the myths of creation is the aquatic environment, often referred to as the primeval sea, the one from which the Sacred Mountain, the Mountain of the Maintainments, emerged.

Alfredo López Austin, who has worked diligently on the theme of the Mountain as one of the central elements of the Mesoamerican worldview, has pointed out in this regard that "it is surprising that the history shared by these peoples has produced since very early times a common cultural basis, on which diversity developed. This base has been called the hard core of the Mesoamerican tradition" (López Austin, 2008, pp. 20).

One possible explanation for the widespread ideas and beliefs is the correspondence between the development of the productive forces of a society and ideology, that is to say, forms of thought. There is also a direct correspondence between these groups or individuals who hold power and have at their disposal the ideological resources they use for their own benefit. In the early stratified societies, rulers are also priests, who also express themselves as representatives

or even personify divine entities.

Luis Millones (2008), for his part, has pointed out that in "the first four or five thousand years, formulas of understanding of the world were developed, that despite being modified they could imprint on the mind very lasting perception schemes" (pp. 126) … adding that "There is a common substrate perhaps linked to the continent's first inhabitants, which feeds the belief system synthesized in the sacred books of the two Americas" (pp. 128), but we might even think that this perception schemes could be much older.

Based on the concept of correspondence outlined above, it remains to be understood that the complex forms of thought created by the human mind are also the result of physiological processes that are generated when confronted with a particular environment, as a social response (individual or collective) to material conditions that allow the reproduction of the life and the persistence of the human being. These are undoubtedly complex aspects that may be better understood in collaboration with the disciplines dedicated to study the cognitive systems that are generated in the human brain (individually or as a collective response to an action, circumstance or stimulus), trying to structure an explanation linked to forms of economic and social development.

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20
Ritual Places, Pilgrimage, and Religion in Mesoamerica

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Pilgrimage has been significant for many human societies in Mesoamerica over the last several thousand years. The earliest rock art on cliffs and caves, in addition to the first sites with monumental architecture, in this culture area were created, in part, by and for pilgrims for their ceremonies. In Mesoamerican cultures, pilgrimage to ritual places has been important for communication with spiritual forces. The communication and maintaining of covenants between people and animistic forces have helped humans explain their world, how they live in it, and how they acquire things they need, such as prosperity, health, food, and water. Additionally, pilgrimage and the creation of ritual places, such as cave shrines, temples, and sanctuaries, have been central for the reinforcement of religious beliefs, political structure, and economic success in Mesoamerica. Besides fulfilling the communication with animistic forces, political elites or corporate groups have managed construction and access to shrines and temples. Furthermore, regionally important ritual places attract large numbers of worshipers, with whom trade and economic advancement often follows. Pilgrimage in Mesoamerica can be compared to similar religious traditions, social structures, shrine constructions, and settlements around the world.

Durante los últimos miles de años, la peregrinación ha sido importante para muchas sociedades humanas en Mesoamérica. El arte rupestre más antiguo sobre acantilados y cuevas, además de los primeros sitios con arquitectura monumental, fueron creados en esta zona cultural en parte, por y para los peregrinos con el fin de realizar sus ceremonias. En las culturas mesoamericanas, la peregrinación a los lugares donde se realizaban los rituales ha sido de suma importancia para la comunicación con las fuerzas espirituales. La comunicación y el mantenimiento de pactos entre personas y fuerzas animistas han ayudado a los humanos a explicar su mundo, cómo viven en él y cómo adquieren las cosas que necesitan, como prosperidad, salud, alimentos y agua. Así mismo, la peregrinación y la creación de lugares rituales, como ermitas rupestres, templos y santuarios, han sido fundamentales para el fortalecimiento de las creencias religiosas, la estructura política y el éxito económico en Mesoamérica. Además de cumplir con la comunicación con las fuerzas animistas, las élites políticas o grupos corporativos han gestionado la construcción y el acceso a santuarios y templos. Además, los lugares rituales de importancia regional atraen a un gran número de fieles, con quienes a menudo atraen el comercio y consiguiente progreso económico. La peregrinación en Mesoamérica se puede comparar con tradiciones religiosas, estructuras sociales, construcciones de santuarios y asentamientos similares en todo el mundo.

Pilgrimage has been significant for many human societies in Mesoamerica over the last several thousand years. The earliest rock art on cliffs and caves, in addition to the first sites with monumental architecture, in this culture area were created, in part, by and for pilgrims for their ceremonies. In Mesoamerican societies, pilgrimage to ritual places has been important for communication with spiritual forces, or what people have called "gods," "spiritual beings," "invisible persons," and "animistic forces" with whom they coexisted (see Astor Aguilera, this volume; Balsanelli, 2019; Buchanan and Skousen, 2015). The communication and maintaining of covenants between people and these animistic forces has helped humans explain their world, how they live in it, and how they acquire things they need, such as prosperity, health, food, and water (Astor Aguilera, 2010; Monaghan, 1995; Palka, 2014). Perhaps pilgrimage was associated with similar behaviors in the past. Additionally, pilgrimage and the creation of ritual places, such as cave shrines, temples, and mountain top sanctuaries, have also been central for the reinforcement of religious beliefs, political structure, and economic success in Mesoamerica. Besides fulfilling the communication with animistic forces, political elites have managed construction and access to shrines and temples. Furthermore, regionally important ritual places attract large numbers of worshipers, with whom trade and economic advancement often follows.

Pilgrimage in Mesoamerica can be compared to similar religious traditions and social structures around the world. Communication with animistic forces for explaining the cosmos, people's place in the world, and for acquiring things people need have been human concerns throughout history. Paleolithic caves with rock paintings, for instance, may mark the earliest ritual places visited by people for ceremonies to communicate with animistic forces who they lived with (Clottes, 2016; Porr and Bell, 2012). Naturalistic paintings of animals in the Chauvet, Lascaux, and Altamira caves could be the result of ritual communication with animistic forces related to human hunting success and safety. The Neolithic shrines in the Near East and Europe represent some of the earliest evidence for pilgrimage in semi-sedentary and early sedentary cultures (McCorriston, 2011). Collective rituals could possibly be linked to communication with divine forces linked to community identity and solidarity. Early shrines in China also figured in the creation of early cities since the ritual places attracted populations, economic exchange, and elites, who managed labor, trade, conflict, and communication with gods and ancestors (Wheatley, 1971).

For the purpose of this essay, pilgrimage consists of a journey to a significant landscape feature, such as a cave, mountain, spring, or shrine, to leave offerings and communicate with spiritual forces (Reader, 2015). The journey does not have to be far, but it involves visiting a ritual place and not an everyday domestic one. The worshipers return to their homes having obtained sacra from the shrine, blessings from deities, information on other areas, and economic goods (Palka, 2014). Pilgrimages can be organized by elites or religious specialists, but they also can be carried out by non-elites and communities (Turner and Turner, 1978). Likewise, shrines, temples, and ritual places for pilgrimage can be managed either by elites or commoners, depending on the cultural context. Pilgrimage helps construct community identity, but it also can enhance the power and status of elites, religious specialists, and specific social segments who organize and sponsor it (Bauer and Stanish, 2001; Eade and Sallnow, 200; Stone, 2014).

Scholars have recognized the religious, social, and economic importance of pilgrimage in Mesoamerica (Kubler, 1984; Palka, 2014; Patel, 2005; Stone, 2014). Many have described the ritual places that Mesoamerican

pilgrims have visited over time. These authors discussed the religious elements of pilgrimage in this cultural region in addition to extoling the economic, political, and social importance of pilgrimage behavior at important shrines. The investigators have also covered the material culture of pilgrimage, such as the associated shrine architecture, trade goods, iconography, and ritual items. These are important topics for understanding pilgrimage behavior and the maintenance of shrines, temples, and religious centers. However, I will focus on pilgrimage as communication with animistic forces in ritually significant places and its relation to community and polity. While community solidarity follows collective pilgrimage rites, the people involved, including elites, ritual specialists, and ceremonial sponsors, can gain power and prestige. Factionalism is often present in pilgrimage and the management of ritual places. To make my points, I will provide case studies from my research at Mensabak in the Lacandon rainforest of Chiapas, Mexico. Some perspectives and evidence outlined in this essay may be useful in looking at pilgrimage, collective ritual, socio-economic divisions, and shrines in other cultures.

Figure 20.1.

Map of Mesoamerica and some sites mentioned in the text (courtesy of the author).



Pilgrimage and Ritual Places in Mesoamerica

Mesoamerica as a culture area stretches from northern Mexico to western Central America (Figure 20.1). The first inhabitants in Mesoamerica, which were small bands of mobile or semi-sedentary hunters and gatherers who created much rock art in northern Mesoamerica, lived in the Archaic or Preceramic period (ca. 8000-1900 BCE). Subsequently, human settlements and civilizations grew across this large geographical area during the Formative or Preclassic period (ca. 1900 BCE to 200 CE). Many of the earliest temples and monumental constructions date to these times. Large cities and populations were found throughout this region in the Classic period (200-900 CE), which are known for advancements in architectural elaboration, writing, and market economies. During later Postclassic times (ca. 900-1520 CE), Mesoamerica saw competing states and large-scale interregional trade. Many aspects of Mesoamerican cultures continued into the Colonial period (ca. 1520-1820 CE), particularly with unconquered peoples on the fringes of Spanish colonies, such as the southern Maya area and the mountains of northwest Mexico. A subdivision of this period is the Protohistoric period (ca. 1400-1700 CE). The ethnographic cultures in Mesoamerica continue from the end of Colonial times to the present.

Spanish documents provide much information on late Postclassic to early Colonial period pilgrimage and ritual places in Mesoamerica. The first major pilgrimage site visited by conquistadores was Cozumel Island located off the east coast of the Yucatan peninsula. Cortés and other Spanish explorers mentioned the large number of shrines on Cozumel and their interregional religious importance (Figure 20.2). Maya elites and religious specialists managed these ritual places for pilgrimage, but they were made and visited by people of different ranks and statuses, including commoners. Animistic forces, or deities, associated with the island include Ix Chel, a Maya goddess

the island. The Spaniards compared the ceremonial and political importance of Cozumel to Rome in the Old World. Archaeologists have pointed out the island's economic draw and regional religious significance (Patel, 2005; Sabloff and Rathje, 1975).

Spanish priests among Aztec populations mentioned the existence of regionally important pilgrimage shrines in Central Mexico (Kubler, 1984; Palka, 2014). For one, Postclassic Aztec rulers and their entourages made periodic pilgrimages to the ancient site of Teotihuacan (Figure 20.3). This site exhibits monumental architecture built in the Formative and Classic periods surrounded by large mountains (Sugiyama, this volume). This large site likely was a regional pilgrimage center long before the Aztecs, which may explain the construction of temples over artificial caves, ample plazas that could hold thousands of people, the diverting of a river around a pyramid symbolizing a water mountain, the presence of people from across Mesoamerica at the site, and the framing of the monumental constructions with surrounding ritual mountains. Aztec elites also pilgrimaged to the top of Mount Tlaloc, located just south of Teotihuacan (Townsend, 1992). The ceremonies on Mount Tlaloc helped them communicate with animistic forces linked to rain, water, and the fertility of the earth. Aztecs and other people in Central Mexico viewed the pyramid of Cholula, with the Popocatepetl volcano as a backdrop, as a major place for worship to the deity Quetzalcoatl (Figure 20.4; McCafferty, 2001). Community members labored to build the shrine and they visited it for ceremonies, but this ritual place was managed by elites. The Spaniards recognized the regional religious, political, and economic importance of Cholula, hence, they made it one of their central sites for religious conversion, population aggregation, and a regional market economy. Subsequently, Spanish elites and religious specialists took over the shrine and managed its construction, maintenance, and utilization.

Figure 20.2.

Cave and sink hole (cenote) entrance near a shrine at the San Gervasio site, Cozumel, Mexico (courtesy of the author).



Today, Mesoamericans make pilgrimages to ritual places to communicate with animistic and ancestral forces. Insights from contemporary pilgrimages point to the centrality of visits to shrines for communication with these cosmic forces. Through this communication, people feel they help maintain balance in their world and acquire necessities for themselves and their communities. For instance, Huichol people travel hundreds of miles from Nayarit in west Mexico to the east in the desserts of San Luis Potosi (Myerhoff, 1976). They acquire peyote and communicate with animistic forces in ritual places,

including ancestors, to bring food, water, and community well-being. The pilgrimage also cements ties between people, their communities, and the animistic forces. Huichol people also make pilgrimages to mountains and sources of water near where they live to communicate with animistic forces related to rain, food, and human health (Powell and Grady, 2010). Huichol religious specialists, usually senior men, organize the pilgrimages for community members participate.

Mesoamerican Pilgrimage, Animism, and Shrines

Ethnographic information from Mesoamerica indicates that pilgrimage to ritual places has been important for everyday life over time. Pilgrims visit significant geographical locations, such as cliffs, caves, springs, mountains, and sanctuaries, to perform rituals to communicate with animistic forces with whom they co-exist (Astor Aguilera, 2010; Palka, 2014). The animistic forces are present in the world of people and, although they are unseen, they affect the lives of humans. They can bring disease, good crops, health, conflict, in addition to community well-being. However, they must be placated with offerings, music, and prayers. Religious specialists and select people, usually important men in the community, organize and sponsor the pilgrimages. The ritual places are viewed as homes to deities and ancestors, who impact people's day-to-day lives and provide things they need. These places are typically located outside the domestic realm since they are perceived to be potentially dangerous since they contain spiritual forces who can cause harm. According to Mesoamerican beliefs, people see cliffs, mountains, and caves, but they really are houses for the animate forces that inhabit them that people can not perceive (Balsanelli, 2019). These forces actually view these geographical features as homes, palaces, and temples, which are like those of people. The offerings people make for animistic forces at these places include incense, sacrificed animals, blood, and human food. The forces view and consume these as their meals; people see blood and incense, but the deities see tortillas and other foods.

Figure 20.3.

Pyramid of the Moon and shrines at the end of the Way of the Dead at Teotihuacan, Mexico (courtesy of the author).



Figure 20.4.

Plaza and main pyramid with a Catholic church on the summit at Cholula, Mexico (courtesy of the author).



Maya in the Yucatan peninsula travel to ritual places to contact animistic forces. In caves, springs, and near trees or rocks, people communicate with the forces to acquire

things they need and to maintain the covenants for world balance. In the case of Xokén, Maya people pilgrimage to a village with a large stone roughly shaped like a cross for ceremonies and to provide offerings to animistic forces associated with the forest and rain (Astor Aguilera and Jarvenpa, 2008). The forces converge at this ritual place. Men with ritual knowledge typically manage the rites, shrines, and pilgrimages. The communication with these forces helps with the provision of rain, water, game animals, and things people need. The pilgrimage also is seen as uniting the heavens with the earth and creating world balance and renewal (Astor Aguilera and Jarvenpa, 2008, pp. 490). The group pilgrimage and rituals also promote community solidarity among the Maya worshipers. The pilgrimage and associated rites also reinforce Maya ethnic identity in multi-cultural Yucatan, in addition to accentuating the power and status of religious specialists and ritual sponsors, typically men with high social and economic standing.

Lacandon Maya have made many pilgrimages to ritual places in Chiapas (Palka 2014; Petryshyn, 2005). Men organize and manage the visits to the ritual landscape, such as Maya ruins, cliffs, caves, and mountain tops (Figure 20.5). The men typically are religious leaders or people of high social status in Lacandon communities. They carry out the pilgrimages to communicate with animistic forces residing in these places to petition health for their families, rain, bountiful harvests, and general well-being and balance in their world. To this end, Lacandon men arrive to ritual places in the landscape away from their settlements since the animistic forces with whom they live on the earth are potentially dangerous. Here the men provide chants and offerings of incense and food in ceramic god pots to placate the animistic forces. Following the rites, they return home with stones from the ritual places to put in their god pots in their temples.

Figure 20.5.

Lacandon Maya man rowing to a mountain shrine at Lake Mensabak, Chiapas, Mexico (courtesy of the author).



Maya Pilgrimage and Community at Mensabak

Archaeology at Mensabak demonstrates the importance of pilgrimage to ritual places for past Maya populations and the comparative information discussed above helps us understand past behavior (Palka, 2014). At Mensabak, a tall pyramidal mountain, the Mirador Mountain, with an exposed cliff and large cave system is found at the edge of a beautiful lake (Figure 20.6). The cliff faces east and is stained red, which is the color associated with this cardinal direction in Mesoamerican cosmology. A large vertical cave entrance rests at the top of the mountain where Maya raised

a small temple in the late Preclassic period (Figure 20.7). This mountain shrine exemplifies the concept of the cleft water mountain in Mesoamerican lore –a hollow mountain filled with water, sustenance, and the soul energies of people, plants, and animals (McCafferty, 2001; Palka, 2014). This water mountain, or altepetl in Aztec Nahuatl and witz in Mayan languages, symbolizes a place of origin, polity, a significant ritual place, in addition to community. Importantly, the Mirador Mountain at Lake Mensabak is the origin place of the Tulijá River –a waterway of great importance leading to more densely populated areas and trade routes on the Gulf Coast of Tabasco.

Pilgrims followed the Tulijá River or trails to reach the water mountain at Mensabak over the last two millenia. The late Preclassic Maya constructed temples, plazas, and canoe ports at the base of the mountain. They also built thirteen terraces, which reflect the number of levels in the Mesoamerican sky realms, and shrines on the mountain's north side for large numbers of pilgrims to ascend (Figure 20. 7). Large numbers of worshipers could gather near temples and in plazas at Mirador Mountain and in some of the shrines further up. However, the temples, small plazas, and the summit's sanctuary had restricted access, likely for elites, religious specialists, and ritual sponsors. Interestingly, the constructions of a late Preclassic site, called Noh Kuh located one kilometer to the south, are oriented to this mountain shrine (Juarez et al., 2019). It is likely that elites managed the construction of the mountain shrine and Noh Kuh, but commoners supported the efforts and provided the labor to maintain rituals for community solidarity. Perhaps economic interaction occurred at this site and in the plazas near Mirador Mountain.

Pilgrims returned to Mensabak in Protohistoric times to visit the various mountain, cliff, and cave shrines and to repopulate the lake. They made offerings at the shrines and buried their dead in caves on Mirador Mountain.

Figure 20.6.

The Mirador Mountain shrine at Lake Mensabak, Chiapas, Mexico. Note the exposed cliff to the east and the area of the terraces on the north (right) side of the mountain (courtesy of the author).

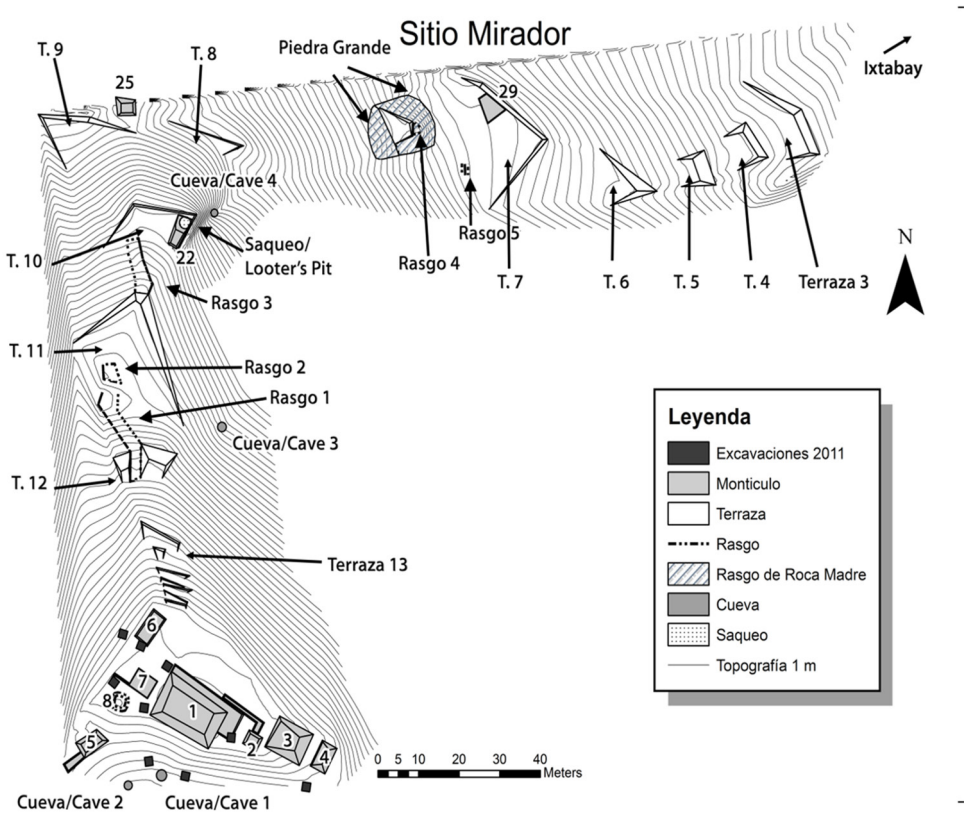


A large number of ceramic stamps at all Postclassic sites may depict Mirador Mountain, much like a toponym glyph, which symbolized this place and people's ritual ties to it. The Protohistoric Maya built a small settlement in a Preclassic plaza at the base of the mountain and constructed their political center, La Punta, on the south end of the island where the mountain rests. The elite buildings at La Punta maintain the same orientations of the shrines on Mirador Mountain.

Therefore, Protohistoric elites organized the constructions at La Punta and likely managed the rituals on the mountain shrines. However, community members participated in the collective rituals and provided labor for the constructions. Artifacts associated with the Protohistoric settlements include Fine Orange ceramics from Tabasco, copper artifacts from Central or West Mexico, green obsidian from Pachuca in Central Mexico, and shell from the Pacific Coast of Chiapas.

Figure 20.7.

Map of the terraces, shrines, and temple complex near a vertical cave entrance on the summit of the Mirador Mountain at Lake Mensabak, Chiapas, Mexico (map by C. Hernandez and J. Palka; courtesy of the author).



These artifacts point to significant interregional interaction. The high percentage of green Pachuca obsidian compared to other sites in Chiapas points to the presence of, or contact with, Aztec traders or pilgrims from Central Mexico.

Pilgrims to the mountain shrines at Mensabak likely arrived to communicate with animistic forces. The mountain of water and sustenance at this important ritual place was perhaps seen as a place of origin for local Maya. Furthermore, people likely felt that this mountain contained things that people need, such as water, food, and the life forces of people, plants, and animals, according to general Mesoamerican beliefs (Palka, 2014). Significant geographic features, such as this water mountain, were believed to contain animistic forces or having living energy in their own right. People provided offerings and possibly music, dance, and prayer at the shrines and plazas to communicate with the forces to acquire what they needed and balance in their world. The rituals also provided community solidarity among the pilgrims visiting the mountain and to the Maya communities residing at Mensabak. This sense of collectivity may have included the animistic forces at this place. Elites would have cemented their authority and high status by managing the shrine constructions, rituals, and interregional trade here.

Discussion and Conclusion: Pilgrimage, Ritual Places, and Society

In this essay, I outlined the significance of pilgrimage in Mesoamerican societies over time and pointed out its religious underpinnings and social, political, and

economic importance. In this culture area, people undertake pilgrimages to visit ritual places linked to animistic forces to placate them with offerings. These ritual places, which include temples, caves, mountains, and springs, can be viewed as communication places or the dwellings of animistic forces, such as earth lords, ancestors, and invisible non-human entities. In Mesoamerica, people travel to these places to communicate with animistic forces to obtain what they need, such as rain, agricultural abundance, health, and prosperity. Additionally, people maintain balance in their world and in the cosmos by giving food, prayer, and other things desired by the animistic forces.

The Mesoamerican case indicates the religious importance of pilgrimage in people's lives. Pilgrimage in other parts of the world is undertaken for religious reasons as well, including for contacting divine forces, such as gods, spiritual entities, and ancestors. People leave offerings to these divine forces, communicate with them, and receive their blessings. The communication with these spiritual entities in pilgrimage in different cultures is important for people to feel they achieve balance in their world plus explain their place in it. Oftentimes, people take momentos or material blessings from the pilgrimage shrines they visit, including vials of water, earth from the shrine, images of the divine forces, in addition to tokens, images, and flasks. This aspect of pilgrimage behavior has not been adequately explored for Mesoamerica. Perhaps miniature vessels and small clay figurines and unique pot sherds and stones found at Mesoamerican sites could have been brought by pilgrims as momentos and deity blessings. The retrieval of clay, water, and speleothems by pilgrims at cave sites in the region (Borhegyi, 1953; Patel, 2005) and the small stones taken by Lacandon Maya from ritual places are a few examples of these behaviors in Mesoamerica. The types of shrine construction at pilgrimage places, ritual offerings, and specific ceremonial behaviors also require more analysis in this culture area.

Pilgrimage in many areas of the globe is central to group identity and community solidarity. People travel together or meet at the shrines to join the rituals. They share religious beliefs and ceremonies whether they practice them separately or in crowds at the ritual places, which can, but not always, accommodate large groups. The pilgrimage rites create a sense of community or collective identity for the pilgrims who participate together in the ceremonies for the same cultural reasons. Often the shrines are linked to the origins of a people and are the homes of or places to contact deities important in particular cultures. The shrines are also the residences of tutelary and protective deities for people in specific societies. Pilgrimage and gatherings at significant ritual places call attention to a people's cultural and community roots and social belonging. Markets and economic exchange near the temples and shrines can also benefit society by bringing people together and facilitating important economic activity.

The construction of temples and landscape shrines is related to religious beliefs, ceremonial behavior, and maintaining collective identity in pilgrimage across time and space as presented above. Special groups and religious specialists created ritual places in non-sedentary societies and early hunter and gatherer cultures in different parts of the world, as seen in rock art sites, large earthworks, and monolithic shrines. In many cases, elites, religious specialists, and specific social groups create and maintain shrines and pilgrimage events at ritual places. While community solidarity can be reinforced by pilgrimage, ceremony, and economic exchange at these places, elites and special interest groups benefit as well. They control labor to maintain the shrines, limit access to ritual areas, and regulate trade and taxation among people who visit the sanctuaries. In this manner, pilgrimage reinforces social and economic differences among members of a society

Figure 20.8.

Hilltop temple adjacent to the cliff of a sinkhole, the Blue Cenote (right), at Chinkultic, Chiapas, Mexico (courtesy of the author).



besides merely creating community solidarity.

In Mesoamerica, pilgrimage to ritual places, ceremonies for community solidarity at culturally significant places, and the involvement of elites, religious specialists, and other social segments help explain the organization and architectural functions at some sites. At Chinkultic, Chiapas, for instance, Preclassic and Classic Maya people constructed temples on a hill overlooking the Cenote Azul, a large sink hole with permanent water (Borhegyi, 1968; Figure 20.8). Several plazas flank the temples and a grant stairway leads to the hilltop sanctuary that could have accommodated pilgrims and people participating in ceremonies. Later, Postclassic shrines and deposits were placed on the hilltop. Elites and religious specialists organized the labor and materials for these constructions and structured the rituals. Large numbers of people participated in the rites going by the size of the constructions, and they likely petitioned animistic forces to acquire things they needed. The ceremonies also helped shape community identity and belonging, as the collective events could have focused on community origins, world balance, and solidarity like in other parts of Mesoamerica. The economic importance of trade in community well-being would also be important in this regard and the artifacts found here support interregional economic interaction.

It is possible that sites with temples, walkways, and plazas at significant ritual places in other Mesoamerican sites, such as Chalcatzingo, Teotihuacan, and Chichén Itzá, had similar pilgrimage events, collective ritual, economic exchange, and political significance. Chalcatzingo grew around impressive hills and springs (Grove, 1987). The site contains several temples, plazas, and ritual cliffs. Interregional trade is evident in the archaeological record at the site. The Way of the Dead at Teotihuacan, along with its large temples constructed according to a Mesoamerican worldview and the well-developed interregional trade (Headrick, 1999; Heyden, 1975; Manzanilla, 2017; Sugiyama, 1993) also point to its possible importance as a pilgrimage site. The Sacred Cenote, temples, and caves at Chichén Itzá also attracted pilgrims as attested in Colonial period documents and architecture (Wren et al., 2017). Walkways enabled the movement of people to the temples and shrines at sinkholes. Archaeology at this site also has demonstrated the existence of long-distance trade over time.

Similar religious, social, and economic aspects of pilgrimage and its associated ritual places can be viewed cross-culturally. These places have been important for symbolizing a people, polity, and community origins. Mecca, for instance, has a long history of pilgrimages, collective ceremonies, and economic interaction (McCorriston, 2011; Reader, 2015). This important religious site has large constructions, public buildings, and open spaces that facilitate the ritual, social, and economic interaction of Islamic people on a massive scale. Elites and religious specialists organize the events and maintain the

ritual and public places. This shrine has attracted pilgrims, worshipers, settlers, and merchants over the centuries. The sanctuary of the Virgin de Guadalupe in Mexico City provides yet another illustrative example of pilgrimage and its cultural importance (Turner and Turner, 1978). Aztec people chose this ritual place because of a natural spring on a hill. Rites here honored the earth mother, earth deities, and the moon goddess. Later, Spanish priests built a sanctuary related to the Virgin of Guadalupe and attracted large numbers of indigenous and European pilgrims. A sizeable market grew around the shrine where people bought food, clothing, and momentos. Periodic ceremonies and pilgrimage events at this church are undertaken to strengthen cultural and community ties among the participants, in addition to providing economic pursuits. Elites and religious specialists associated with the Catholic church and local governments manage the shrine and the events, reinforcing their social, political, religious, and economic statuses in the community.

Many additional examples of pilgrimage to ritual places, community dynamics, elite participation, and its social and economic importance can be seen across the world over time, reinforcing the near-universal importance of pilgrimage shrines in human societies. Importantly, pilgrimage, rituals at shrines, and interaction discussed in this essay are seen in diverse cultures, from hunters and gatherers to people living in expansionistic empires. People seek communication with divine forces for the benefits they bring, to structure the covenants or agreements for exchange between people and deities, and to build a sense of community belonging. These human behaviors and their material manifestations can be better understood with collaborative archaeological, historical, and ethnographic information. The analysis of human behavior in these cultural and material contexts have united historians, psychologists, geographers, anthropologists, economists, and archaeologists to examine the importance of pilgrimage to ritual places in people's lives and for the evolution of world civilizations.

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21
Reconfiguring Maya Urbanism at the Transition to the Postclassic: Reimagining Teotihuacan at Chichen Itza

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In this paper, we address how materiality informs us of the kinds of strategies employed and decisions made in particular historical circumstances of extreme duress. In particular, we focus on how some Maya of the collapse period utilized their collective memory and imagination of the great Classic period city of Teotihuacan to recreate their social, economic, political, and ideological realities to confront the social and environmental challenges of the Classic period Maya collapse at Chichen Itza. We propose that there is a way of explaining the central Mexican 'flavor' of material and visual culture at Chichen Itza by way of envisioning the Maya as active agents in the adoption of ideas crystalized at Teotihuacan centuries earlier. This model centers around changes in the conception of the paradisiacal realm of Flower World undertaken at this Early Classic central Mexican city, most likely as it was in the midst of becoming the large state it is well known for. Flower World is a place of origin and ancestors, closely tied to the sun and concepts of heat and brilliance. The concept of Flower World is quite ancient and extends well back into the Preclassic period. However, a fundamental change in the conception of Flower World occurred towards the beginning of the Early Classic period at Teotihuacan, when this paradisiacal realm became merged with the emerging warrior cult established at this central Mexican city. We suggest that this war cult at Teotihuacan was the origin of the one eventually inherited by the Aztec nearly a millennium later. It centered around the concept that warriors who died in battle, ostensibly in service of the state, would go to a solar realm as beautiful fiery birds and butterflies who sipped the nectar of flowers. The rulers at Chichen Itza adopted this model, leading to important similarities in monumental spaces between this site and earlier Teotihuacan, in particular between the Great Terrace and the Ciudadela respectively.

En este capítulo hablamos de cómo el mundo material puede informarnos de los tipos de estrategias usadas y la toma de decisiones en circunstancias históricas particulares bajo muchas estrés. En particular, enfocamos en el hecho de cómo algunos mayas del periodo de colapso utilizaron su memoria colectiva e imaginación de la ciudad de Teotihuacan para recrear sus realidades sociales, económicos, políticos e ideológicos para enfrentar los desafíos del colapso en Chichén Itzá. Proponemos que hay una manera de explicar el 'sabor' del centro de México de la cultura material y visual en Chichén Itzá a través de ver los mayas como agentes activos en el proceso de adoptar la ideas que formaban en Teotihuacan siglos atrás. Este modelo se centra en los cambios en las ideas de en Mundo Florido, un lugar de paraíso, en Teotihuacan mismo cuando estaba convirtiendo en un estado. El Mundo Florido es un lugar de orígenes y ancestros muy ligado al sol y conceptos de calor y brillantez. En concepto del Mundo Florido es muy antiguo y extiende hacia el periodo Preclásico. Sin embargo, un cambio fundamental pasó en el Mundo Florido a los principios del Clásico Temprano en Teotihuacan cuando este paraíso fue mezclado con ideas de un culto de guerreros que fue desarrollado en esa ciudad en esta época. Argumentamos que este culto es el que fue heredado por los aztecas casi un milenio después. Se centró en la idea de que los guerreros que murieron en batalla, en el servicio del estado, irían a un reino solar convertidos en pájaros y mariposas que tomaron el néctar de las flores. Los gobernantes de Chichén Itzá adoptaron este modelo, que significaba similitudes en arquitectura publica entre los dos sitios, en particular entre la Gran Nivelación de Chichén Itzá y la Ciudadela de Teotihuacan.

Studying past human cognition from a material perspective is challenging (Stanton, 2004; Mithen, 1996). On the one hand, using the kinds of biological proxies for cognition available to researchers is problematic. While the emergence of the more complex behaviors (e.g., art, writing, technology) in human evolution is one of the fundamental questions in anthropology, understanding how brains evolved over time has been limited to simple morphological characteristics such as cranial capacity and general form. These are very crude data that do not approximate the incredible complexities of neural networks that are difficult to study even when researchers have access to living brains. Given the lack of correlation between brain size and intelligence, we must be careful how we use these data to discuss broad patterns of cognitive changes in the deep past.

On the other hand, we must also be careful using material culture data that show us what humans were capable cognitively in the past (see Gibson, 1996; Renfrew, 1996; Zubrow, 1994). For example, while the presence of complex art at Upper Paleolithic sites shows that the people who lived at places like Altamira, Spain, and Nawarla Gabarnmung, Australia were certainly cognitively capable of creating such art, the absence of art in other places might be due to a host of other reasons that have nothing to do with cognition at all; ranging from formation processes and conditions of preservation to the simple fact that some other people may not have consciously chosen to create such art. Donald's (1993; see also Kuhn and Sarther, 2000; Thomas, 2000, pp. 148-149; van der Leeuw, 1994) discussion of 'latent cognitive capacity' suggests that we should not consider the relationship between material culture and cognition to be one-to-one. As Delbrück (1986) notes, if cognitive universals exist they must entail how the brain

works rather than in what it achieves.

In this paper, we do not attempt to think about cognition from this kind of material approach, but to address how materiality informs us of the kinds of strategies employed and decisions made in particular historical circumstances of extreme duress. In particular, we focus on how some Maya of the collapse period utilized their collective memory and imagination of the great Classic period city of Teotihuacan to recreate their social, economic, political, and ideological realities to confront the social and environmental challenges of the Classic period Maya collapse at Chichen Itza. While the various populations that migrated 'out of Eurasia' certainly had their mental packages to understand the world when they arrived to the Americas (and these packages had a great impact on later cultural developments such as shamanism and the concept of animal spirit soul companions [Houston and Stuart, 1989]), the social context of the Maya collapse was a specific historic period that, like all others, needs to be understood on its own terms as a temporal and regional space subject to the particularities of the intersectional relationships that existed then and there.

A Brief Outline of a Teotihuacan Version of Flower World at Chichen Itza

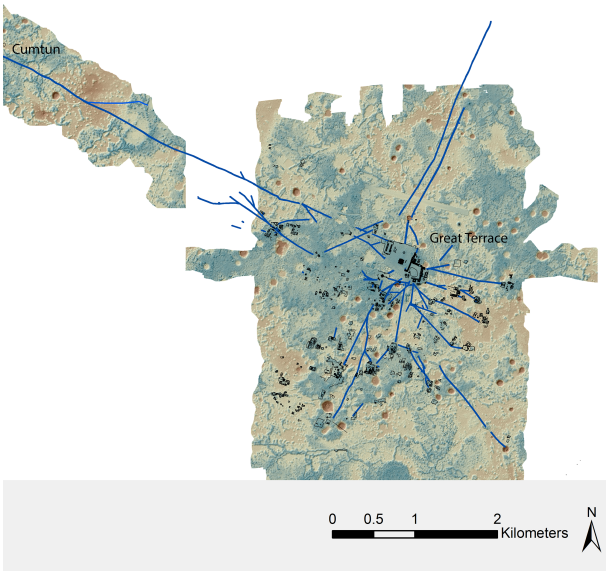
Given the space constraints, we will only offer a brief outline of our argument here. A more thorough treatment of the topic is currently being worked through for publication elsewhere (Stanton et al., n.d.a, n.d.b). Chichen Itza has been an enigma for researchers since the first research was conducted there by the Carnegie Institute of Washington archaeologists in the early part of the twentieth century (Morley, 1926). In particular, the central Mexican style architecture and iconography has caused a good degree of consternation. Once proposed to be due to a Toltec invasion (e.g., Thompson, 1941; Tozzer, 1957), Maya archaeologists working in Yucatan have now rejected the invasion hypothesis (Taube et al, 2020). New dating efforts have placed the founding of Chichen Itza as an urban center during the tail end of the Classic (Braswell and Peniche May, 2012; Cobos, 2016; Taube et al., 2020), but an adequate alternative model to the Toltec invasion has yet to be advanced.

We propose that there is a way of explaining the central Mexican 'flavor' of material and visual culture at Chichen Itza by way of envisioning the Maya as active agents in the adoption of ideas crystalized at Teotihuacan centuries earlier. This model centers around changes in the conception of the paradisiacal realm of Flower World undertaken at this Early Classic central Mexican city, most likely as it was in the midst of becoming the large state it is well known for. First identified by Jane Hill (1992), Flower World is a place of origin and ancestors, closely tied to the sun and concepts of heat and brilliance. The concept of Flower World is quite ancient and extends well back into the Preclassic period (Taube, 2004, 2005, 2006, 2010, 2020). However, a fundamental change in the conception of Flower World occurred towards the beginning of the Early Classic period at Teotihuacan, when this paradisiacal realm became merged with the emerging warrior cult established at this central Mexican city (Taube, 1992, 2004). We suggest that this war cult at Teotihuacan was the origin of the one eventually inherited by the Aztec nearly a millennium later. It centered around the concept that warriors who died in battle, ostensibly in service of the state, would go to a solar realm as beautiful fiery birds and butterflies who sipped the nectar of flowers (Headrick, 2003; Hill, 1992; Taube, 2004, 2006, 2020).

We argue that for the Aztecs, placing the warrior in a central position in rituals for cosmic wellbeing, celebrating their work as companions of the sun in its daily journey and whose hearts engendered solar movement in sacrificial rites, functioned to do several things to make the Aztec

Figure 21.1.

DEM/Hillshade image of Chichen Itza generated from lidar data flown in 2014 and 2017 with the current INAH-map of the site structures superimposed.



state successful. First, along with the increased level of social mobility allowed for successful warriors, elevating the role of the warrior in state ideology aided in to "buy" into the state structure by a critical segment of society. Second, as argued by Headrick (2003), the promise of paradise served to motivate warriors to put their lives at risk, adding a paradisiacal afterlife to the tangible gains in life afforded warriors by the state. Along with Headrick, we see the origin of this system at Teotihuacan, with Early Postclassic sites such as Chichen Itza and Tula bridging the temporal gap between the Aztec system and its Early Classic ancestor (Stanton et al., n.d.a, n.d.b). Thus, for us, understanding the Central Mexican 'influence' at Chichen Itza is much less about understanding Tula (although we do believe that there were profound links between these two cities), but more about how Chichen Itza, Tula, and contemporary communities such as El Tajín, Cacaxtla, Teotenango, Xochicalco, and Las Higueras reinvented the ideas concerning sun worship and the warrior cult at Teotihuacan, ideas that would eventually be further reworked at Tenochtitlan (see Taube, 2015).

The question is why the Maya at the turn to the Postclassic period would eschew the political and ideological structures that had been in place for centuries. We believe that the answer to this question lies in the dynamics of the collapse period. Regardless of the causes of the collapse (see Aimers, 2007; Webster, 2002), the end of the Classic period was a time of great social and political turmoil. We suggest that this prolonged crisis in Maya society opened up the door for new models to be considered, and that some Maya in the northern lowlands embraced the Teotihuacan model of political, social, economic organization as a legendary example of how to create wealth and power that both supported quite substantial inequalities and some degree of social mobility that allowed critical actors essential to the success of the state to thrive. In short, the collapse period opened up the door for change, and some Maya, much like some later European societies did with Rome and its perceived institutions, looked to the past to reimagine and recreate the structures and success at they envisioned at the ancient city of Teotihuacan.

Flower World at Chichen Itza

So how did Chichen Itza attempt to re-envision Teotihuacan? Here we focus on certain critical aspects, in particular the evidence for the adoption of solar worship in the built landscape. Although much has been made of the feathered serpent at Chichen Itza (López Austin and López Luján, 1999, 2000; Ringle and Bey, 2009; Ringle et al., 1998), we believe that the central element of the ideological narrative in the state art at Chichen Itza surrounds the sun and its daily journey. The feathered serpent is a critical part

of the narrative, but ultimately it is the sun which is central.

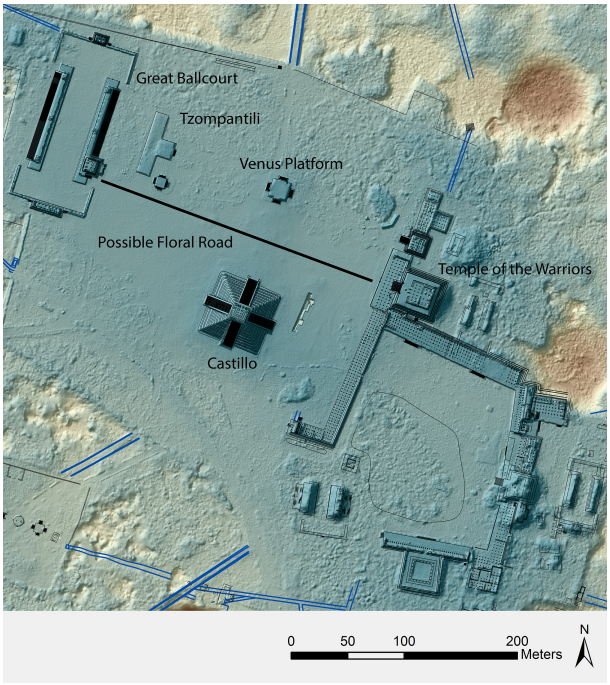
Despite the chronological legacy of 'Old' versus 'New' Chichen, the Great Terrace is undoubtedly the ideological center of the city (Stanton et al., n.d.b; Taube et al., 2020). The causeway system not only converges on the Great Terrace (Figure 21.1), but it appears to do so using foundational principles of dividing the city into four wards, as was described for the city in the Chilam Balam de Chumayel (Roys, 1933) and which can be found in other cities such as Tenochtitlan, Izamal, and Mayapan (Brown, 1999; Matos Moctezuma, 1988; Roys, 1957). Further, de Anda and his colleagues (2019) make a cogent argument that the Castillo was the focal point for a quadripartite cosmogram with four cenotes (Sacred Cenote, Cenote Xtoloc, Cenote Holtun, and Cenote Xkanjuyum) delimiting the four quarters.

Just as important as the Castillo and its relationship to the Sacred Cenote is via Sacbe 1, or possibly even more important, is the east-west axis of the Great Terrace, consisting of the Temple of the Warriors and the Great Ballcourt among other important, but smaller structures (Figure 21.2). We argue that this axis commemorates the sun's journey through the sky, accompanied by the souls of sacred warriors whose work and sacrifice engendered its daily cycle. Further, this narrative was more broadly immersed in the context of Flower World and we suggest that this axis reflects an attempt by the people of Chichen Itza to reimagine the Ciudadela at Teotihuacan.

As noted by Šprajc and Sánchez Nava (2013:48; Sánchez Nava and Šprajc, 2015, pp. 130-136; see also Galindo Trejo et al., 2001; Milbrath ,1988, 1999, pp. 68; Ringle, 2009, pp. 16, 19), the line of sight of the centerline of the Temple of the Warriors to the staircase leading up to the Upper Temple of the Jaguars has a solar association; with sunset alignments falling on May 13th and August 1st (two dates separated by 4 periods of 20 days). This

Figure 21.2.

DEM/Hillshade image of the Great Terrace of Chichen Itza generated from lidar data flown in 2014 and 2017 with the current INAH-map of the site structures superimposed. Note the alignment of the Temple of the warriors to the stairway of the Upper Temple of the Jaguars on the south side of the Great Ballcourt.



alignment is marked by a narrow flagstone walkway that leads away from the Atlantean throne on the Temple of the Warriors, straight towards the staircase leading up to the Upper Temple of the Jaguars, where it is also clearly visible (Figure 21.3). While this walkway does not continue across the plaza today, the Great Terrace has been heavily disturbed, especially in historic times then the highway ran past the Castillo.

Interestingly, the serpents at the Temple of the Warriors descend, while those on the balustrades on the Upper Temple of the Jaguars ascend. This arrangement may indicate that the walkway itself was the Feathered Serpent as the road of the sun, which was a widespread convention

Figure 21.3.

Photos of the possible floral around between the Temple of the Warriors (right) and the Upper Temple of the Jaguars (left).



in Late Postclassic Mesoamerica, including the Huastec and Aztec (Taube, 2015). This idea of the plumed serpent as a solar road continues among the Zinacanteco Tzotzil of highland Chiapas, where it is believed that a great feathered serpent as Venus serves as the celestial vehicle of the sun: "At dawn the sun rises in the east preceded by Venus, the Morning Star, a large plumed serpent called Mukta ch'on (Vogt, 1969, pp. 89)." This contemporary Tzotzil account pertains directly to highland Mexican sources of Quetzalcoatl being summoned to the east by the sun as well as warrior souls following the sun on its eastern dawn appearance, and it is likely no coincidence that the line of sight between the Temple of the Warriors and Upper Temple of the Jaguars passes the Venus platform. A clear example of this solar road is found on the Aztec Stuttgart Statuette which depicts Tlahuizcalpantecuhtli "Lord of Dawn" as a skeletal Toltec warrior (Coltman 2009). On the back of Tlahuizcalpantecuhtli is a plumed serpent carrying a solar disk with Tonatiuh, the sun god, in the center. A carved bone from Tomb 7 from Monte Albán provides a strikingly similar example (Taube, 2015, fig. 5.6b) and several monuments from the Cotzumalhuapa region provide additional support (Chinchilla Mazariegos, 1998). Further, one of the mural fragments from the Temple of the Warriors depicts a scene of human heart sacrifice, with the victim on a sacrificial stone. Directly below his body and ascending to the upper part of the scene is a green Quetzalcoatl serpent, clearly denoting this being as the symbolic sacrificial "road" of the slain captive to follow the sun's path (see Morris et al., 1931).

The arrangement of architecture from the Temple of the Warriors, including the Venus, Tzompantli, and Eagle and Jaguar platforms is very similar to that of Tula Grande, and perhaps Tula Chico (Mastache and Cobean. 1989, p. 64, 2000, 2006; Matos Moctezuma, 1974). Importantly, it is also very much like the layout of the ceremonial precinct of Tenochtitlan with the Temple Mayor taking the place of the Temple of the Warriors. Besides being on the eastern side of the plazas, both of these structures have trapezoidal sacrificial stones that would have used to extract the hearts of warriors to engender the sun's movement at dawn, rising from the underworld; both structures also have reclining Chak Mool figures also used for human heart sacrifice. On the 1524 Nuremburg map of Tenochtitlan the sun is clearly shown in an important alignment rising between the two temples on the Templo Mayor (Mundy, 1998:18). Similarly,

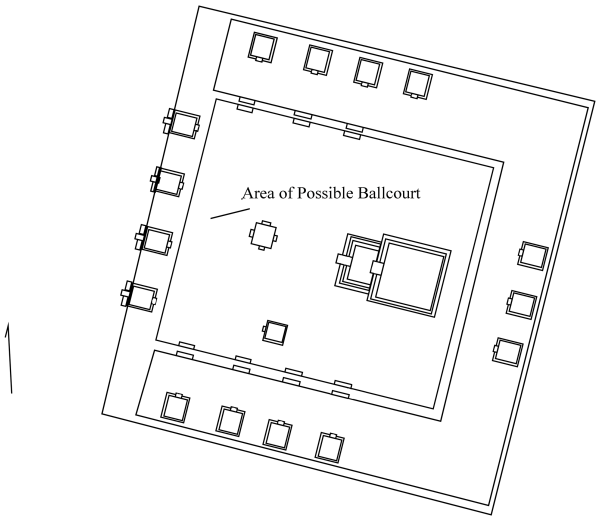
on the Codex Fejérváry-Mayer (Folio 1), the rising sun is found on the upper portion of the cosmic map; up being east in indigenous thought. This is the same position as the Templo Mayor and in the Fejérváry-Mayer the sun appears to be rising along the centerline of a temple.

For the Aztec, the tzitzimime or death goddesses of darkness, the night, and underworld are found opposite the sun in the west, waiting, as Mundy (1998, pp. 22) puts it, "to devour the sun." This would place the tzitzimimel in the place of the ballcourt on Tenochtitlan, exactly where the Great Ballcourt is in the Great Terrace layout at Chichen Itza. The ballgame appears to be essential to this narrative of the sun, as the place of the setting sun (Cohodas, 1978, 1991). While the east is a linked to maleness and heat, the west appears to be associated with a female aspect, cold, water, and death (see Alcina Franch, 1997, 1999); the west being the place that the sun entered the underworld. At Chichen Itza female skeletal goddesses are also associated with the Lower Temple of the Jaguars, suggesting that this association predates the Aztec. Ballcourts were certainly associated with water and springs being entrances to the underworld, suggesting that this potential association with the sun setting into the underworld should be given more serious consideration (Taube, 2018). That the Great Ballcourt was indeed flooded is attested by the multiple large drains located around its edges and we would not be surprised if the entire Great Terrace was intentionally flooded on occasion with massive beams at its major entrances. Finally, the position of the Tzompantli and warrior imagery at Tenochtitlan (e.g., López Luján and González López, 2014) has strong parallels with Chichen Itza, indicating that at both cities, just like the placement of Xiuhtecuhtli as a Toltec warrior in the center of page 1 of the Fejérváry-Mayer, the warrior took center stage in the narrative of the sun's journey.

Fundamentally, we think that the archetype for this plan can be traced back to Teotihuacan, specifically to the Ciudadela. The Feathered Serpent Pyramid, located in the east is clearly associated with warfare and warriors, just as the Temple of the Warriors and the Templo Mayor. The sacrificial burial of warriors underneath the temple (Sugiyama, 1989), the presence of the War Serpent on the façade (Taube, 1992), and the location of production of theater censers associated with warriors and their transformation into butterflies emerging from fiery funeral bundles within the Ciudadela (see Múnera Bermudez, 1985; Taube, 2000) all attest to this association. Further, the link to solar movement comes from various sources. First, as Laporte (1992, pp. 327) noted, the Feathered Serpent Temple appears to form part of an E-Group complex, an architectural form associated with solar movement in the eastern lowlands of Mesoamerica (in particular the Maya area) as early as the Middle Preclassic period (Freidel et al., 2017). In Laporte's reading of the Ciudadela, the Feathered

Figure 21.4.

Line drawing of the Ciudadela at Teotihuacan (drawing by Travis W. Stanton).



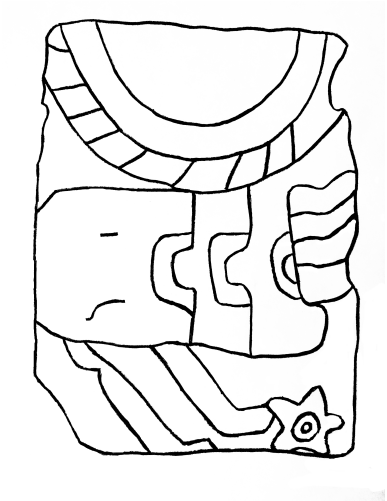
Serpent Temple takes the place of radial structure in the E-Group plan (Figure 21.4).To the east of this temple are three smaller temples in linear arrangement much like known Maya examples. Second, the Aztec remembered the Feathered Serpent Pyramid as associated with the sun, where it is depicted on the San Francisco Mazapan map of Teotihuacan (Arreola 1922). Dated to 1560, this map clearly shows the Feathered Serpent Pyramid with a "European-style sun disk, complete with rays and frontal face" (Boone, 2000, pp. 373). Arreola (1922, pp. 555; English translation by Boone, 2000, pp. 373) translated the associated Nahuatl text as "place of burials in honor of the sun" suggesting that Late Postclassic peoples may have not only known about the sacrificed warriors underneath the pyramid, but that they remembered this structure as a place associated with a celestial solar paradise where the souls of warriors who died in battle reside in the afterlife. Third, a monument found in a secondary context, but thought to be from the pre-temple of the Feathered Serpent Temple, has a sun disk carried on back of the plumed serpent as the Road of Flowers (Gazzola, 2017, pp. 44; Figure 21.5).

Recently, Julie Gazzola (2017, pp. 43-44) has reported evidence for a large ballcourt on the western side of the Ciudadela, hidden beneath the last floor surface; which importantly floods during the rainy season, creating a primordial sea within the confines of the complex. If proven to be a ballcourt, this find would provide a very strong link to the plans at Chichen Itza, Tenochtitlan, and Tula. Of equal interest is the finding of a spectacular tunnel along the east-west axis of the Ciudadela (Gómez Chávez 2017). Leading from the direction of the possible ballcourt to its terminus in the center of the Pyramid of the Feathered Serpent, this tunnel represents the underworld, that in the words of Gómez Chávez (2017, pp. 48), "where, just as on earth, there were rivers, lake, mountains, and a celestial vault and night sun that crossed its winding path from sunset to sunrise." Among the Chorti, this idea of the night sun is still present in contemporary legend:

> The old people used to tell that the world here we live, they said that under the – world which we live on, farther down, they say that there is just water. And they say that under the – water, that there is another – place […] They say that when the sun sets here, and the night grows dark, they say that in that place […] there it is growing light, and things are becoming visible. And here it is dark. And they say that when the sun passes through that place, over the heads of those men, that it – is stronger – its heat." (Fought, 1972, pp. 371)

Figure 21.5.

Line drawing of a monument fragment.



Note.Line drawing of a monument fragment found in a secondary context, but thought to be from the pre-temple of the Feathered Serpent Temple at Teotihuacan. This fragment has a sun disk carried on back of the plumed serpent as the Road of Flowers (drawn by Travis W. Stanton from photo in Gazzola 2017:44).

While the excavations and analyses of the overwhelming amount of materials have still to be completed, much of the material culture appears to relate to the watery underworld (e.g., shell) and the sun (e.g., pyrite and slate mirrors) (Gómez Chávez, 2017, pp. 50; see also Taube [2000] for the solar associations of the disks). Impressively, part of the south antechamber was covered by a powder mix of pyrite, hematite, and magnetite that in torchlight would have made it look like the night sky (Gómez Chávez, 2017, pp. 51-52). We suggest that, if the possible ballcourt can be confirmed, the tunnel represents the road of the night sun after it entered the waters of the underworld at the ballcourt, similar to the arrangement at Chichen Itza. At the end of the tunnel there was a sumptuous offering surrounding several greenstone figures that leaned back to gaze at the spot the sun would rise out of the world, ascending to the top of the Feathered Serpent Pyramid to be born again through the sacrifice and work of warriors.

Final Thoughts

In this paper we suggest that the Maya of Chichen Itza attempted to reimagine Teotihuacan. This re-imagination was not just ideological, but we suggest elsewhere that it had strong economic and political implications that reflect the decisions of some Maya during the collapse period to abandon the king and court centric model of the collapse period (Stanton et al. n.d.a, n.d.b). However, the ideological model revolved around a Teotihuacano reworking of Flower World during the first centuries A.D., merging this paradise with the warrior cult, whereby the souls of fallen and sacrificed warriors engendered the sun's journey, carried by the feathered serpent along a celestial flower road. The sun then entered the watery underworld where the ballgame was played to continue its journey as the night sun back to the mountain of the eastern solar paradise. That the Maya were familiar with this foreign take on old ideas during the Classic period is clear. For example, at El Diablo, Guatemala, an Early Classic temple, aligned to a prominent cave to the east that the sun rises over at the summer solstice, contained a tomb with Teotihuacanoid ceramics, severed heads facing the direction of the rising sun, and iconographic depictions of the Jaguar God of the Underworld (Houston et al., 2015; Newman et al., 2015), thought to be the embodiment of the Maya night sun (Stuart, 1998, pp. 408) and prominent on several witz masks at Chichen Itza itself. The memory of Teotihuacan, its organization, its wealth, the way it restructured both the cosmos and human relationships among the Maya left a profound impact on generations centuries removed from the feats of the great Central Mexican metropolis. This memory was used to reimagine the great Tollan in ways that were very historically specific to Mesoamerica and Yucatan in particular during the transition to the Early Postclassic period. Yet clearly, this model worked for a time and Chichen Itza became a historically successful place that was even remembered by the Aztec (Taube et al., 2020).

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22
Performance, Politics, and Monuments in the Ancient Maya Plazas of El Palmar

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In early complex societies, a plaza was a crucial space for community building. Theatrical performances in the plaza not only acted for political legitimation of rulers to the public but also provided opportunities for people with different backgrounds to negotiate social and political positions. This paper examines how non-royal elites' experiences in the central plaza were materialized in a city's outlying areas. In so doing, I compare and contrast processes of spatial configuration between an ancient Maya city and its outlying areas through archaeological research at the site of El Palmar, Campeche, México. The results of excavations and artifactual analyses suggest that theatrical performances enacted repeatedly in outlying plazas did not merely mimic royal performances but had substantial effects on the constitution of political circumstances and cultural values in the El Palmar dynasty.

En las sociedades complejas incipientes, la plaza era un espacio crucial para la construcción de la comunidad. Las representaciones teatrales en la plaza no solo sirvieron para la legitimación política de los gobernantes ante el público, sino que también brindaron oportunidades para que personas con diferentes antecedentes pudieran negociar posiciones sociales y políticas. Este artículo examina cómo las experiencias vividas en la plaza central por las élites que no pertenecían a la realeza se materializaron en las zonas periféricas de la ciudad. Al hacerlo, comparo y hago un contraste de los procesos de configuración espacial entre una antigua ciudad Maya y sus áreas periféricas a través de la investigación arqueológica en el sitio de El Palmar, Campeche, México. Los resultados de las excavaciones y los análisis de artefactos sugieren que las representaciones teatrales presentadas repetidamente en plazas periféricas no sólo imitaron representaciones reales, sino que tuvieron efectos sustanciales en la constitución de las circunstancias políticas y los valores culturales en la dinastía El Palmar.

Introduction

The plaza is a fundamental spatial setting for community building in many early complex societies. Studies of ancient plazas have demonstrated that their subsequent social relations maintained or changed through those shared experiences and face-to-face interactions occurring during plaza events (Inomata, 2006; Tsukamoto & Inomata, 2014). These experiences and interactions, in turn, shape and reshape perspectives on how the polity should be. In this regard, performance and practice theories provide an important framework to analyze recursive relationships between practices and perspectives. Performance theory emphasizes the significance of interactions between performers and audience during an event (Bell, 1997; Coben & Inomata, 2006; Goffman, 1959). This theory views the audience not as passive recipients of the event but active evaluators who are capable of changing the course of history. From this framework, theatrical performance in the plaza is a dynamic process that provokes changes in cultural values and political realities. While the implication of plaza activities in social changes has been discussed, less attention has been paid to the question of how the evaluations of audience, most of whom lived in a city's outlying areas, were reflected in their subsequent bodily actions and perceptions. To a certain extent, the spatial and material settings of the city's outlying areas should represent people's face-to-face interactions, evaluations, consumptions, contestations, and remembrances of large spectacles they experienced in the city's main plaza. This paper assesses the degree to which the results of those negotiations were materialized in an early city's outlying areas.

I address this question through archaeological research at El Palmar. El Palmar is an ideal archaeological site for the study of plazas because there are numerous plazas in and around its civic-core or the Main Group. In the plazas, successive rulers sponsored the erection of a considerable number of stone monuments that carved historical events with specific calendrical dates. The monuments also depict El Palmar's long dynastic sequences that helps us see rulers' specific theatrical performances. Moreover, investigations for a decade at the Guzmán Group, an outlying plaza compound of El Palmar's outlying areas or *plazuela* group, discerned who lived there. They were non-royal elites who possessed the title of *lakam*, "banner" and participated as ambassadors in the negotiation of alliances between the Snake dynasty (i.e., Calakmul), Copán, and El Palmar. Because of their important political position, these standard-bearers most likely attended or performed spectacles in the main plazas of El Palmar's civic-core or Main Group. Monica Smith (2018) states that intermediate elites were a key for deeper understanding the development of complexities in political organization and social relations in early cities of both the Old and New Worlds. Researchers have pointed out that elites who lived in the city's outlying areas played crucial roles in political organization of Classic Maya society (Houston and Stuart, 2001; Jackson, 2013; Webster et al., 1989). This paper examines how theatrical performance in large plazas were reflected in the formation and transformation of spatial and material settings of *plazuela* groups during the Classic period (AD 250-900).

Performance Theory

Performance theory has been broadly discussed among social scientists (Bell, 1992; Goffman, 1959, 1967; Hymes, 1975; Schechner, 1994; Tambiah, 1979; Turner, 1986), but its application to archaeological research is relatively recent. Inomata (2006; see also Coben & Inomata, 2006) has introduced the significance of examining theatrical performance, allowing archaeologists to explore the relationship between large public events

and the development of centralized polities. Following Hymes (1975, pp. 13-19), Inomata (2006, pp. 806) defines "performance as creative, realized, achieved acts which are interpretable, reportable, and repeatable in a domain of cultural intelligibility." Performative acts are, *per se*, a citation of iterable and regulatory norms (Butler, 1993). In the study of theatrical performance, a crucial point of performance theory is to highlight interactions as media that create the sense of realities, affecting people's perceptions and interpretations of a community. Inomata (2006, pp. 806) places particular emphasis on theatricality inherent in performance theory, which refers to "the quality of communicative acts that requires the presence of an audience acting as observers and evaluators" (see also Beeman, 1993, pp. 383-384). Theatricality distinguishes communicative acts consciously recognized by performers and an audience from unconscious acts of communication. Theatrical performance does not merely mirror and reproduce existing social norms, but creates new situations and social changes (Schechner 1994, pp. 626-632). The interaction among participants during public theatrical events produces emotional, perceptual, and interpretative outcomes that shape and reshape a collective sense of a symbolic reality (Bloch, 1974, pp. 59-60). Because performance theory sheds light on different social actors (performers, observers, evaluators, etc.), it allows us to enhance the significance of the practices of diverse actors and their interactions, and thereby we can examine how these interactions are interrelated with other social, political, and economic factors. A crucial contribution of performance theory is to place face-to-face interactions as central to the formation and transformation of politics and cultural values among different social segments.

The sociopolitical implications of theatrical performance emerge when this conscious action is examined with unconscious daily activities. Bourdieu's version of practice theory illuminates the significance of routine daily actions (Bourdieu, 1977). However, a problem lies in his theory of *habitus* that overemphasizes on unconscious bodily practice without considering people's ability to evaluate the situation surrounding them and the potential consequences of their actions (Inomata & Triadan, 2009). In contrast, performance theory and Giddensian practice theory (1984) state the importance of reflexive monitoring and how it changes subsequent practice. Thus, we should examine how politically conscious practices and less conscious daily activities interwove their cultural values and political realities.

In Classic May society, large spectacles often took place in the center's main plazas which could accommodate almost the entire population (Inomata 2006; Tsukamoto and Inomata, 2014). The main plaza was surrounded by *plazuela* groups where a substantial portion of the audience lived. The comparative study of the main plaza and *plazuela* group, therefore, elucidate cultural values and political realities in which people's evaluation of theatrical performance in the main plaza was materialized.

Site Setting

The archaeological site of El Palmar is located in southeastern Campeche, Mexico (Figure 22.1). It consists of the Main Group and its surrounding architectural groups (Figure 22.2). Since 2007 Tsukamoto and Javier López Camacho have codirected the El Palmar Archaeological Project (Proyecto Arqueológico El Palmar in Spanish, hereinafter PAEP). The project aims to understand the relationships between urbanization processes and sociopolitical organizations in the Maya lowlands (Tsukamoto, Camacho, & Olguín, 2010). The PAEP has carried out surface surveys, airborne LiDAR mapping, horizontal and stratigraphic excavations, and artifactual analyses. Recent airborne LiDAR (Light Detection and

Ranging) mapping that covered 94 km^2 exhibits over 9,000 structures that form about 500 *plazuela* groups (i.e. a small plaza compound surrounding the Main Group). Although the population estimate is always problematic in archaeological research, the conventional method proposed by Canuto and his collaborators (2018), which calculates 4.6 person/structure, provide a relative basis for comparative analyses. Based on their method there were over 40,000 people lived in this area of 94 km^2. At the Main Group, surface surveys and topographic mapping have documented 8 plazas with diverse spatial settings and over 100 structures which include two pyramidal temples of 30 m and 29 m in height, a royal palace, and ballcourt. We also recorded 35 stelae and 14 altars in the plazas. Although epigraphic studies of these monuments are still in process, current data show that El Palmar had a dynasty with successive rulers at least from AD 514 until 820. Stratigraphic excavations provided even longer periods of occupation beginning from the Late Preclassic (300 BC-AD 250) to the Terminal Classic period (AD 800-900), with rapid urbanization occurring during the Middle Classic period (AD 400-600). During the urbanization process substantial plazas were constructed at the Main Group (Tsukamoto, 2014).

Epigraphic and archaeological studies suggest that the El Palmar dynasty was involved in inter-polity interactions over centuries. After the "Arrival" event in AD 378 (Stuart, 2000), southeastern Campeche, Mexico and northern Petén, Guatemala became arenas of dynastic upheavals (Martin & Grube, 2008). The Arrival event opened with a political intervention of Teotihuacan affiliates, Sihyaj K'ahk' and Spearthrower Owl, in the Tikal dynasty. They replaced Tikal's local ruler with Spearthrower Owl's son. In AD 393, Sihyaj K'ahk' presided over Río Azul, which is located 34 km south of El Palmar, by replacing a local ruler with a new dynastic line (Adams, 1990: 34). The political alliance between Tikal and Río Azul appears to have continued at least during the Middle Classic period (AD 400-600). Becan, a major polity situated 50 km north of El Palmar, experienced political turbulence between AD 450-630, a time with material evidence of Teotihuacan influence. Several *plazuela* groups surrounding this site core were abandoned while populations dispersed into isolated mounds constructed in outlying areas (Thomas, 1981, pp. 99-100). This drastic shift of settlement patterns suggests that major ideological changes occurred at Becan during this period. A similar thing appears to have happened at El Palmar's Main Group, but more data are needed to assess it.

El Palmar's involvement in political interactions became more visible when the long adversary of Tikal, the Snake dynasty, intervened in southeastern Campeche polities. A powerful Snake king, Sky Witness, exercised his authority in this region through overseeing the accession of a local ruler in AD 561 at Los Alacranes, a site located 18 km southeast of El Palmar (Grube, 2008, pp. 193-195). The Snake dynasty's political campaign continued in the region after the relocation of its capital in AD 635 from Dzibanche to Calakmul, the largest Maya city 50 km west of El Palmar (Helmke & Awe, 2016; Martin and Velázques 2016).

The Late Classic period (AD 600-800) witnessed the emergence of non-royal elites in the Maya lowlands. Numerous titled elites were depicted on stone monuments and polychrome vessels (Houston & Stuart, 2001; Jackson, 2013; Lacadena, 2008; Stuart, 2010[1992]). Some of those elites lived in the city's outlying areas, but played critical roles in the formation and transformation of political organization and inter-dynastic interactions (Golden, Scherer, Muñoz, & Vásquez, 2008; Webster, 1989). At El Palmar one of the surrounding *plazuela* groups is the Guzmán Group, an outlying group located 1.3 km north of the Main Group. The PAEP intensively explored the Guzmán Group during four field seasons between 2010-

2016.

Theatrical performance at El Palmar's Main Group

Of the eight plazas three plazas are essential in this study. The largest public plaza is the Great Plaza which could accommodate about 36,000 people in a single event. The plaza is formed by Temple I, the largest temple at El Palmar, part of a royal palace, and other middle-sized structures. Because the stairway of Temple I appears not to face the Great Plaza, monumental structures PM5 and PM8 set stages for theatrical performance. There are 11 stelae and two altars placed in the Great Plaza and three of the 11 stelae represent rulers' theatrical performance (Figure 22.3). Stela 10, which dates to December 1st, AD 711, is located at the northeast of the plaza. It depicts an important ruler of the El Palmar dynasty, Upakal K'inich, who was also mentioned in different inscriptions. Stela 10 had a cache in which Eric Thompson (1936) found the master piece of anthropomorphic eccentric chert that resembles those found at Copan. About 25 m south of Stela 10 finds Stela 8 which also represents Upakal K'inich who conducts a sprinkle-incense ritual on October 9th, AD 721 in front of a captive, a typical representation of the Maya king as a warrior (Figure 22.4). This iconographic representation suggests that warfare was one of the important elements for spectacles and kings' theatrical performance. Decades later in AD 800 Stela 16 was erected with the same ritual practice, but its ruler's name is too eroded to read. These stelae, together with other stelae and altars, suggest that theatrical performances took place repeatedly in the Great Plaza at least from AD 711 to 800.

Plaza E, the second largest plaza at the Main Group, is adjacent to the Great Plaza. If people used these two plazas for large spectacles, they could accommodate over 50,000 people, meaning that the entire population in the area of 94 km2 could have participated in and experienced large

Figure 22.1.

Map representing the location of El Palmar and sites mentioned in the text.



Figure 22.2.

Map of El Palmar, showing the location of the Main Group and Guzmán Group.

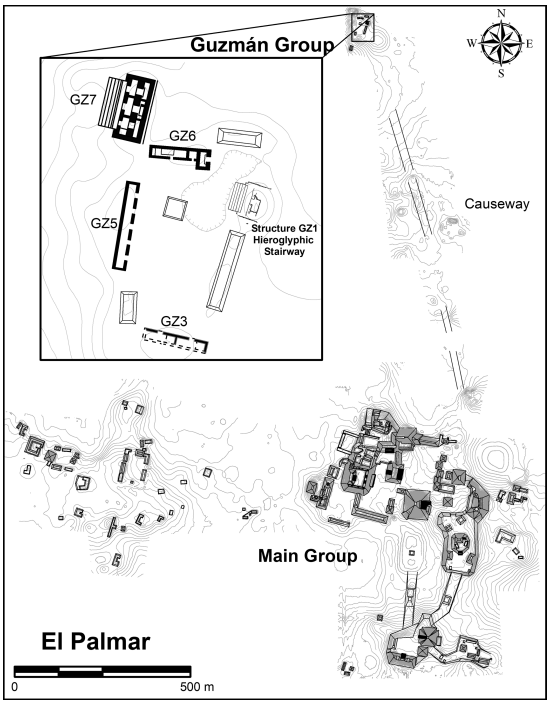

Figure 22.3.

Map of Royal Palace with the location of carved monuments.

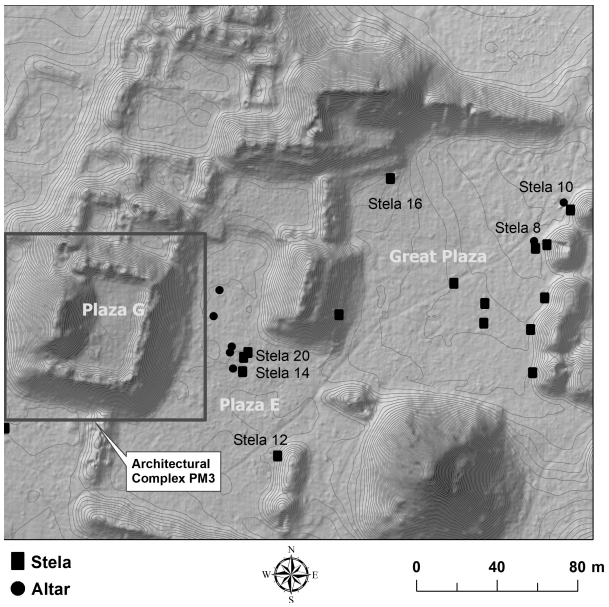

Figure 22.4.

Stela 8, El Palmar.



spectacles simultaneously. The Architectural Complex PM3 provides a stage for theatrical performances at Plaza E. Stratigraphic excavations date the first construction of these plazas to the Middle Classic period (AD 400-600). At Plaza E we found four stelae and five altars. Stela 20 represents a ruler whose name was completely eroded but survived glyphs depict that he is the 17th ruler of the El Palmar dynasty. The date when the stela erected is not clear, but was probably October 17th, AD 514 (9.4.0.0.0.). Stela 12, which is located at the east end of the plaza, depicts the most powerful Snake dynasty's king, Yuknoom Ch'een II, who probably oversaw a royal dance of an El Palmar ruler in Plaza E between AD 639-686 (Esparza Olguín and Tsukamoto 2011). The next to Stela 20 is Stela 14 which records a sprinkle-incense ceremony on May 3rd, AD 820. At the west end of Plaza E is Plaza G which is located 10 m above Plaza E and that has highly restricted accesses. The west end of Plaza G was closed by a 26 m high structure that was probably a royal residence, although it remains underexplored. Thus, the Main Group has both public and private plazas for theatrical performances that took place during the Middle and Late Classic periods (AD 511-820).

Theatrical performance at El Palmar's Guzmán Group

The Guzmán Group has a small plaza formed by a temple (Structure GZ1) and six rectangular structures (Structures GZ2-6, 9) (see Figure 22.2). The excavation of Structure GZ1 detected a stairway with extensive inscriptions that depict a history of non-royal elites (Tsukamoto, Camacho, Valenzuela, Kotegawa, & Olguín, 2015; Tsukamoto and Esparza Olguín, 2015). The stairway was designed for theatrical performance by amplifying the depth of each step more than functional purposes (Tsukamoto 2014). The inscriptions suggest that standard-bearers lived in the Guzmán Group over generations and their protagonist served as an ambassador for alliances

between El Palmar, Calakmul, and Copán in AD 726 (Tsukamoto and Esparza Olguín, 2015). Surprisingly, the texts emphasize the connection with the foreign dynasty of Copán leaving El Palmar's ruler aside. The spatial setting also attests to the significance of the Snake dynasty for standard-bearers because of the temple's entrance as well as the stairway that point not to the Main Group of El Palmar but Calakmul. The center of the stairway represents the emblem glyph of the Snake dynasty, which is flanked by the royal titles of Copan and El Palmar.

Horizontal and stratigraphic excavations revealed that the Guzmán plaza was formed around the time when the hieroglyphic stairway was attached to the temple. Before the plaza construction, some modest houses with *chultunob*, bottle-shaped underground chambers used probably for water catchment or storage, were randomly scattered on the plaza. The excavations of a structure which closes the north end of the plaza recovered an anthropomorphic eccentric chert that indicates a shared practice between the Main Group and Guzmán Group. Thompson's eccentric was deposited in AD 719 while that of the Guzmán Group was part of termination deposits that took place around AD 830-850. Elsewhere, I noted that the Guzmán Plaza and Plaza G of the Main Group had about the same accommodation size, most likely designed for accommodating elite population (Tsukamoto, 2014). The excavations and chemical residue analyses of plaza floors at the Guzmán Group also revealed that feasting took place repeatedly during the Late Classic (Tsukamoto, 2017). Burials facing the plaza tend to contain large serving plates and bowls, probably used for feasting in the plaza. Chemical residue analyses of floors recovered from the Guzmán plaza and its surrounding structures indicate that feasting was part of theatrical performance.
Structure GZ7, which is located northwest of the Guzmán plaza, resembles the Architectural Complex PM3 of the Main Group in terms of spatial layout. Structure GZ7 also has a restricted patio formed by a dominant structure (Structure GZ7a) in its east end and other rectangular structures (Structure GZ7b and c) surrounding the patio. Recent excavations at Structure GZ7 suggest that this residential building was occupied by leaders of standard-bearers (lakamob) who built it between AD 720 and 800. It consists of six rooms, three of which contained masonry benches. A bench located at the central room of the structure is characterized by a throne with backrest. I suspect that the main structure that closes the east end of Plaza G at the Main Group also contains a similar throne. As with the main temple of the Guzmán Group, a crucial spatial setting is that Structure GZ7s points not to the Main Group of El Palmar but to Calakmul.

Discussion

Periodic theatrical performances and daily practices presented in and around the Guzmán plaza provide clues as to how standard-bearers evaluated, consumed, contested, and remembered large spectacles that took place in the plazas of the Main Group. Rapid urban growth with the construction of the Great Plaza, Plaza E, and Plaza G at the Main Group slowly changed experiences and perceptions of ritual participants who lived in its outlying areas. During this period, at the Guzmán Group daily practices and periodic rituals of standard-bearers did not take place in a formal plaza, but in and around scattered houses. Although those activities might have been partially shared among standard-bearers, they were not attached to the plaza as with those of the Main Group. A critical time was when the Snake dynasty relocated its capital to Calakmul in AD 635 and its powerful ruler, Yuknoom Ch'een ascended the throne in AD 636 (Helmke & Awe, 2016). As depicted on Stela 14, the royal dance of an unknown El Palmar ruler was supervised by Yuknoom Ch'een, the event that was most likely witnessed by El Palmar's entire population,

including standard-bearers. Through this theatrical performance, the audience would have realized that their dynasty was under the umbrella of Yuknoom Ch'een who intervened other Maya dynasties. Standard-bearers built the substructure of the main temple together with other residential structures at the Guzmán Group around this time. The defeat of the Snake dynasty against Tikal in AD 695 provided an opportunity for El Palmar to be a central player of dynastic interactions. El Palmar ruler Upakal K'inich sponsored to erect two stelae at the Main Group. He was also involved in the negotiation of alliances between Calakmul, Copan, and El Palmar, as his name is depicted on Drawing 29 of the Naj Tunich cave, which is located between El Palmar and Copan. The eccentric flint found in front of Stela 10 suggests that Upakal K'inich went to Copan and received this from Copan's king as evidence of his visit.

Standard-bearers consciously and unconsciously recognized the significance of theatrical performance in the Man Group's plazas. They created a plaza in their residential area and attached the hieroglyphic stairway to their main temple. The repeatedly conducted feasting during which they could have performed political speeches on the hieroglyphic stairway. Unlike the Main Group, the audience was not targeted to the entire population at the Guzmán Group but to the elites. Their daily practices were attached to the plaza, including administrative duties which were partially visible from the plaza. Simultaneously, they mimicked the royal space of Plaza G by building Structure GZ7 outside the plaza. They also possessed an anthropomorphic eccentric flint which was probably articulated with the ritual of Stela 10.

Despite its similarities in the spatial settings, cultural values and political realities between royal elites and standard-bearers seem to be different and they are reflected in the spatial and material settings. There are some similarities of the spatial settings between the Main Group and Guzmán Group, but the latter spatial layout was designed for the representation of Calakmul and Copan. Carved monuments at both the Main Group and Guzmán Group depict El Palmar's dynastic lines, but their political meanings appear different. While Stela 20 of the Main Group emphasizes the El Palmar dynasty, the hieroglyphic stairway highlights Calakmul and Copan in addition to standard-bearers. Even though El Palmar rulers demonstrated their images as warriors or supreme priests, standard-bearers viewed the world which the Snake dynasty ordered, leaving El Palmar rulers aside.

Conclusion

This paper examined the formation of cultural values and political realities through theatrical performances in the plaza. An important study remained underdeveloped was to address the question of how the audience evaluated, consumed, contested, and remembered large spectacles. I examined this question through activities occurring in the city's outlying group. Future excavations at the Main Group will provide additional information on the city's civic-core. More specifically, excavations at the Architectural Complex PM3 will provide insights into understanding everyday practices of royal families and their transformations which were articulated with political turbulence.

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23
The Emergence of Elite Tombs in the Southern Maya Area

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Elite tombs provide evidence that indicates the social inequalities, stratifications, differentiations, and power negotiations of specific individuals or groups in societies, as well as centralized polities in human history. This paper examines more than 630 burials found at 61 sites to understand when and how elite tombs emerged in the Maya highlands and the southern Pacific Coast. Known as "Southern Maya Area," it has long been recognized as one of the important arenas for the emergence of social complexity in Mesoamerica. To provide a comparative baseline for future research, this study uses the analytical concept of "energy expenditure" for mortuary practices (e.g. Carr, 1995; Tainter, 1978) to determine the processes for the emergence of elite tombs in the early development of social complexity in Mesoamerica. I focus on diachronic change between grave form and the quantity and kinds of grave goods, which is often reflective of vertical social positions. In the Middle Preclassic, there is a slight correlation between grave form and types of grave goods, indicating that different statuses emerged among specific individuals or groups as demonstrated in mortuary practice at that time. Elaborate grave forms with many kinds of grave goods and with sumptuous goods such as jade, shell, pyrite and obsidian begin to appear in the Late or Terminal Preclassic. Importantly, elite tombs were embedded in sacred landscapes constituted by public constructions and the erection of stone monuments with rulers' images and inscriptions. Thus, the emergence of elite tombs could synchronize with these elements, which are indicators of political power. In the subsequent Early Classic period, social differentiation became more rigidly stratified as indicated by a clear correlation between grave form, kinds of grave items, and possession of sumptuary goods. In addition, for comparative purposes, this study analyzed approximately 880 burials found at other Maya sites. As a result, I identified multiple variations in correlation between grave form and types of grave goods. It could suggest that "elite tombs" did not appear suddenly, rather they were part of ongoing social relations among group members through time that shaped specific individuals or groups with political power. These processes varied through the time across the cultural and historical environment.

Las tumbas de las élite proporcionan evidencia de las desigualdades sociales, estratificaciones, diferenciaciones y negociaciones de poder en individuos o grupos específicos en las sociedades, así como políticas centralizadas en la historia humana. Este artículo examina más de 630 entierros encontrados en 61 sitios, para comprender cuándo y cómo surgieron las tumbas de élite en el área Sur Maya. A la vez que

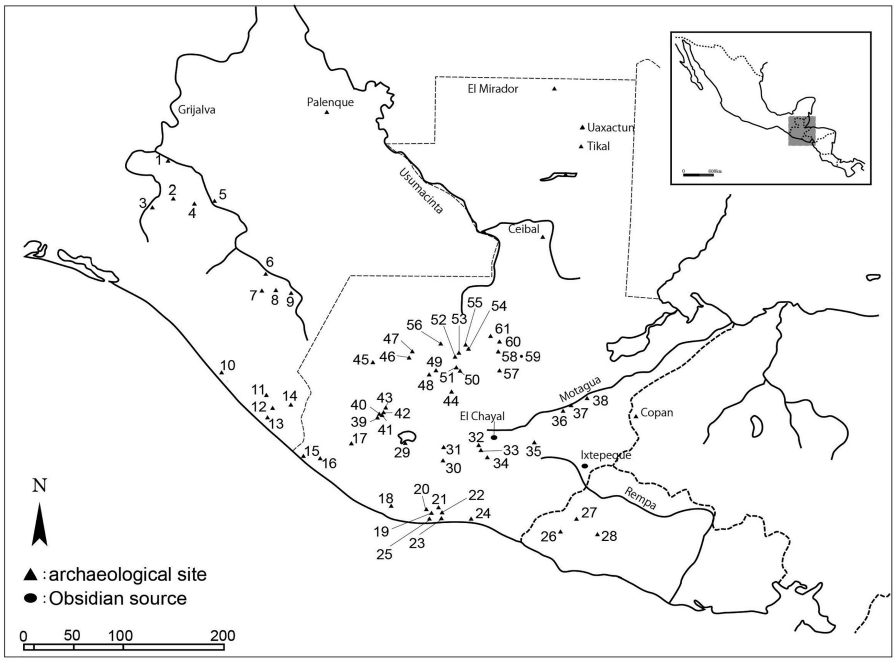
se ha reconocido por mucho tiempo como una de las importantes áreas para comprender el surgimiento de la complejidad social en Mesoamérica. Este estudio utiliza el concepto analítico de "energía invertida" para las prácticas mortuorias con el objeto de comprender los procesos para el surgimiento de las tumbas de élite en la trayectoria temprana en la complejidad social en Mesoamérica; ya que al reunir el cambio diacrónico entre la forma de entierro, la cantidad y tipo de ofrendas, reflejan generalmente posiciones sociales verticales. En consecuencia, durante el periodo Preclásico Medio, existe poca correlación entre la forma de entierro y los tipos de ofrendas, lo que indica que surgieron diferentes rangos sociales entre individuos o grupos específicos como se demostró en la práctica mortuoria en ese momento. Los entierros más elaborados con varios tipos de ofrendas y con objetos suntuosos como jade, concha, pirita y obsidiana comienzan a aparecer en el Preclásico Tardío o Terminal. Es importante destacar que las tumbas de élite estaban insertadas en paisajes sagrados constituidos por medio de construcciones públicas y monumentos esculpidos con imágenes de los dirigentes. Por lo tanto, el surgimiento de las tumbas de élite podría sincronizarse con los elementos de arriba mencionados, que son indicadores de poder político. En cuanto al período Clásico Temprano, la diferenciación social se estratificó de manera más rígida, como lo indica una clara correlación entre la forma de entierro, los tipos de ofrendas y la posesión de objetos exóticos. Además, para fines comparativos, este estudio analizó aproximadamente 880 entierros encontrados en otros sitios de áreas Mayas. Como resultado preliminar, se identificaron múltiples variaciones en la correlación entre la forma de entierro y los tipos de ofrendas. Sugiriendo probablemente que las "tumbas de élite" no aparecieron repentinamente, sino que formaron parte de las relaciones sociales en curso, entre los miembros del grupo a través del tiempo que formaron individuos específicos o grupos con poder político. Estos procesos variaron a través del tiempo a través del entorno cultural e histórico en Mesoamérica.

Introduction

The "Out of Eurasia" project (Project leader: Naoko Matsumoto, Professor of Okayama University, Japan) aims to develop an inter/multidisciplinary and comparative study across and beyond the region to understand the process and mechanism of development of civilization in the world through long-term perspective[1]. Group A03 "Growing complexity of social groups and warfare", to which I belong, aims to reconstruct the formation processes of huge, stratified, and complex societies focusing on warfare. The presence of an "elite" is evidence of specific individuals or groups in societies who sometimes play important role in warfare. Although there are several indicators of elite status, the "elite tomb" would be a feature of paramount importance for understanding early civilizations and social complexity around the world. This paper focuses on examining when and how elite tombs emerged in the Southern Maya Area (Figure 23.1), where it has long been recognized as an important indicator for the emergence of social complexity in Mesoamerica. The "Out of Eurasia" project is also aimed at developing new methodologies for comparative study, so this paper utilizes, as comparative baseline, the analytical concept of "energy expenditure" for mortuary practices, and provides preliminary comparative analysis with the larger Maya region.

Figure 23.1.

Map of Southern Maya Area.



Note:1.San Isidro, 2. Ocozocoaulta, 3. Mirador, 4. San Agustín, 5. Chiapa de Corzo, 6. Don Martin, 7. Santa Rosa, 8. Laguna Francesa, 9. Ojo de Agua, 10. Pampa del Pajon, 11. Vivero, 12. Paso de la Amada, 13. Altamira, 14. Izapa, 15. La Victoria, 16. Ujuxte, 17. Talalik Abaj, 18. Sin Cabezas, 19. Los Chatos, 20. Manantial, 21. Balberta, 22. Marinala, 23. San Jose, 24. Chquiuitan, 25. Paraiso, 26. Ataco, 27. Chalchuapa, 28. El Cambio, 29. Chukmuk, 30 Alameda, 31. Urias, 32. Kaminaljuyu, 33. El Murato, 34. Canchon, 35. El Chaguite, 36. Los Llanos, 37. Antomblan, 38. La Reforma Huite, 39. Checajá Urbina, 40. El Instituto, 41. Las Victorias, 42. Chovicente, 43. Monte Bello, 44. Zacualpa, 45. Zacleu, 46. Los Cimientos Chustum, 47. Nebaj, 48. La Lagunita, 49. Chiramos, 50. Zurin, 51. Pasmolon, 52. El Jocote, 53. Chicruz, 54. Las Tunas, 55. Los Encuentros, 56. Chiguay, 57. El Morino, 58. El Porton, 59. Santo Domingo, 60. Los Mangalres, 61. San Andres Sacabaj

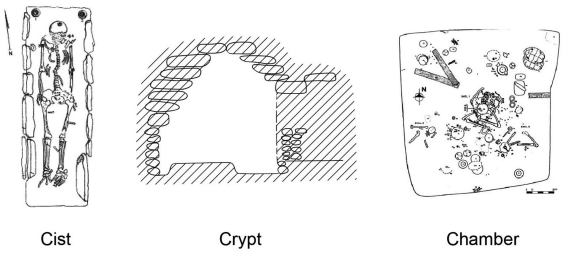
The definition of "elite" or "elite tomb" varies depending on the study area and culture. In the case of the Maya, it is relatively easy to identify elite tombs during the Classic period (A.D. 250-900/1000) for following reasons: First, there are textual and iconographic representations regarding elite, king, ruler and royal families. Sometimes these representations are associated with mortuary context. Second, elite tombs have different contexts and contents of offering goods than other burial contexts. On the other hand, it is hard to identify "elite tombs" during the Preclassic period (2000 B.C.-A.D. 250) because it is an early in the formation process of complex societies with only modest differences among burials. Therefore, to identify "elite tombs" in the early stages of the formation process of ancient civilizations, we need to compare all types of burials and focus on a diachronic perspective to identify when and how elite tombs emerged in the study area.

Analytical concept of "energy expenditure" for mortuary practices

For the purposes of comparative analysis, I will use the concept of "energy expenditure" for mortuary practices (e.g. Carr, 1995; Tainter, 1978). In general, the "death" or "loss" of a community member is a special event and the energy expended on mortuary practices and burials reflects the social status of the deceased individual (e.g. Binford, 1971; O'Shea, 1981; Pearson, 2008; Wason 1994). Christopher Carr (1995) provided comprehensive ethnographical data about mortuary practices based on the Human Relations Area File (HRAF) to test the basic premise that mortuary practice used reflected social organization. He provided several indicators of vertical social position of individuals. According to his study, overall energy expenditure is a strong indicator that reflects vertical social position (Carr, 1995, p.179). Overall energy expenditures are difficult to detect archaeologically because mortuary practices included immaterialized components such as song and dance. Carr points out, however, that grave form and kinds of grave furniture can be a strong indicator of vertical social position and more archaeologically detectable (Carr, 1995, p.180).

Figure 23.2.

Burial samples. Cist: Agrinier, 1964; Crypt: Smith, 1955; Chamber: Kidder,et al., 1946



These analytical and theoretical concepts mentioned above are out of date in recent mortuary archaeology. Furthermore, there are many criticisms, including that these studies are simplistic, static, and unworkable for seeing social complexity and overlook the importance of "death" in a society (e.g. Gillespie, 2001). In addition, mortuary practice is not necessarily related to social status or political power nor indicative of the presence of an elite (e.g. Hodder, 1982). However, the concept of energy expenditure is a key component in the studies of monumental architecture as a comparative baseline (e.g. Burger and Rosenswig, 2012), and as such, I believe that the concept of energy expenditure for mortuary practices could be still useful as discussed below.

Dataset and Methods

This study collected data from 639 burials found at 61 sites in Southern Maya Area dating from the Early Preclassic to Early Classic period (Figure 23.1 and Table

23.1). For comparative analysis, this study included 890 burials found at another six sites in Maya rea, which have a long history and will help document diachronic change. My database contains several attributes related to mortuary practice such as size of graves, location, context, body location and orientation, body treatment such as cranial deformation and so on. This study focuses on only correlations between grave form and kinds of grave furniture because these attributes may reflective of vertical social position in ancient society.

According to the general classification of grave form in the Maya area (Ruz, 1968; Welsh, 1988), four main grave types are identified; Simple, cist, crypt and chamber tombs (Figure 23.2). Simple graves are dug directly in the soil and an individual is interred directly in the pit. Cist graves are composed of stone slabs and have space for one or two individuals. Crypt toms are constructed by cutting stone blocks and have space for more than two individuals. Chamber style tombs are big rectangular graves excavated into bedrock that have space for one or more individuals and many offerings. The size difference might reflect the cost of material extraction. If so, the crypt and chamber reflect higher energy expenditures than simple and cist graves. Funerary urns are eliminated from the analysis because the majority of them are often interpreted as dedicatory to public constructions or other special meaning, that is, may not reflect on vertical social position.

Grave furniture mainly includes ceramics, jade or green stone artifacts, shell ornaments, obsidian, hematite/pyrite objects, stone artifacts (e.g. Metate and Mano), clay artifacts (e.g. figurines and ornaments), bone artifacts, and animals. To identify elite tombs, this study focuses on items to which people had limited access, for instance, jade, shell, obsidian, hematite/pyrite items or other prestige goods.

Table 23.1.

Burial samples in this study.

Southern Maya Area

Period	Simple	Cist	Crypt	Chamber	Total
Early Preclassic	8	-	-	-	8
Middle Preclassic	93	2	1	-	96
Late Preclassic	232	7	3	-	242
Terminal Preclassic	116	14	15	6	151
Early Classic	88	24	17	13	142
					639

Tikal

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	6				6
Late Preclassic	6	2	5	1	14
Terminal Preclassic					0
Early Classic	13	10	4	3	30
Late Classic	138	25	12	2	177
Terminal Classic	14				14
					241

Copan

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	13	-	-	-	13
Late Preclassic	4	-	-	-	4
Terminal Preclassic	-	-	-	-	0
Early Classic	34	8	2	-	44
Late Classic	36	11	12	-	59
Terminal Classic	-	-	-	-	0
					120

Piedras Negras

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	-	-	-	-	0
Late Preclassic	-	-	-	-	0
Terminal Preclassic	-	-	-	-	0
Early Classic	1	2	1	-	4
Late Classic	19	17	4	-	40
Terminal Classic	-	-	-	-	0
					44

Altun Ha

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	34	-	-	-	34
Late Preclassic	-	-	-	-	0
Terminal Preclassic	-	-	-	-	0
Early Classic	64	19	6	-	89
Late Classic	86	12	6	-	104
Terminal Classic	57	8	-	-	65
					292

Altar de Sacrificio

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	8	-	-	-	8
Late Preclassic	12	2	-	-	14
Terminal Preclassic	6	-	-	-	6
Early Classic	21	-	-	-	21
Late Classic	15	1	1	-	17
Terminal Classic	61	1	-	-	62
					128

Dzibilchaltun

Period	Simple	Cist	Crypt	Chamber	Total
Middle Preclassic	5	-	-	-	5
Late Preclassic	16	1	-	-	17
Terminal Preclassic	-	-	-	-	0
Early Classic	1	2	-	-	3
Late Classic	2	37	1	-	40
Terminal Classic	-	-	-	-	0
					65

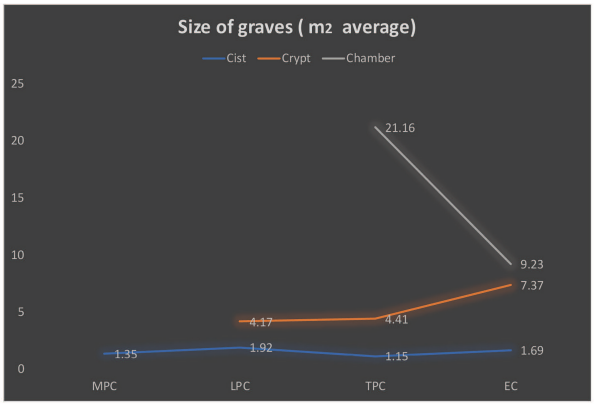
These items have special meaning in the Mesoamerican world and were obtained or exchanged through long-distance trade probably under control of the elite as prestige goods, which play an important role in the development of social stratification (e.g. Aoyama, 2001; Brumfield and Earle, 1987).

To find correlations between grave form and grave furniture, I counted the number of different kinds of grave furniture in each grave form and controlled for time. For example, when a burial contains 5 ceramic vessels, 2 figurines, and 1 jade artifact, I record it as 3 kinds of grave furniture. Moreover, I examined how many burials had prestige goods in each grave to identify another indicator of an elite tomb.

Some limitations of this study are, first, that it is based on only accessible data from research reports, papers, and books. Furthermore, some sites have limited information and lack necessary information. Second, especially in the case of crypt or chamber graves, there is the possibility of looting or that it was re-entered in a later period, which does not reflect the original context. Third, this analytical method might ignore variability of cultural and social meanings of mortuary practices in each site.

Figure 23.3.

Diachronic change of size of grave.



Results

Grave form and size

Figure 23.3 shows the size of grave forms through the time. It is hard to identify the size of simple burials because the majority of simple burials did not delimit clearly the boundaries of the burial. Nevertheless, size and energy expenditure for grave construction may be smaller than the other three grave forms. Cist burials first appeared in San Andres Sacabaj and Los Mangales during the Middle Preclassic period (1000-400 B.C.). The size of a cist does not change drastically through time and is approximately 1.5 m^2. The first known crypt burial was constructed in Canchon during the Middle Preclassic period, but the size of the crypt was not reported. During the Late and Terminal Preclassic (400 B.C.-A.D.250), the size of crypts is around 4 m^2. During the subsequent Early Classic period (A.D.250-600) the size of crypt graves grew, indicating that energy expenditures became higher than in previous periods. The chamber type grave appeared in Kaminaljuyu during the Terminal Preclassic period (100 B.C.-A.D. 250), and the size of this grave type is apparently bigger than other grave types.

Correlations between grave form and grave furniture

Overall, the number of different types of grave furniture increases over time and the number of burials with no grave furniture decreases over time (Table 23.2). In the Early Preclassic period (2000-1000 B.C.) it is difficult to identify clear difference between burials. In the Middle Preclassic the greater variation of mortuary practices appears but the difference of number of grave furniture among burial forms was unclear. In the Late Preclassic, crypt graves were slightly more prominent than other types.

While in the Terminal Preclassic, the chamber type grave form appears. The differences in the number of kinds of grave furniture between each grave type are bigger

than the previous periods. Interestingly, in the Early Classic period polarization between chamber type and other grave forms occurred. The diversity of grave furniture in crypt graves drastically decreased and differences among crypt, cist and simple burials became minimal.

Correlations between grave form and limited access goods

During the Middle Preclassic, there is no clear correlation between grave form and the quantity of different kinds of limited access goods (Figure 23.4). During the Late Preclassic period, crypt graves with 3 kinds of limited access goods appeared. It is noteworthy that about 20% of simple burials generally categorized as "non-elite burial" have limited access goods during the Middle and Late Preclassic period. In the Terminal Preclassic, more than 50% of large and more elaborate graves contained limited access goods. 45% of chamber and crypt type graves have more than two kinds of limited access goods. In addition, graves with four kinds of limited access goods appear in the Terminal Preclassic period. For the Early Classic, there is a clearer correlation between grave form and kinds of limited access goods. Crypt and Chamber type graves contains 100% limited access goods. Furthermore, subsequent graves have more than three kinds of limited access goods: Chamber is 90%, Crypt is 50%, Cist is 10%, and Simple with 3%.

Comparative data with other Maya sites

Tikal, the most important Maya Lowlands center located in the Peten region of Guatemala, had almost the same pattern as the Southern Maya Area (Figure 23.5). In the Late/Terminal Preclassic elaborate graves with rich offering objects--"elite tomb"-- emerged. Evidence suggests that Early Classic Tikal might be more stratified than in previous periods.In the Late Classic, the polarization between crypt and other grave types occurs. This is the same pattern for the Early Classic Southern Maya indicating that powerful and exclusive rulers governed the greatest cities in the Maya area. At Altun Ha, Belize, elaborate graves appeared in the Early Classic and polarization follows in the Late Classic period. At Copan, in Western Honduras, apparent "elite tomb" appeared in the Early Classic period with major differences between grave forms, likely related to the foundation of the Copan dynasty. Unlike Tikal and Altun Ha, in Late Classic Copan the difference in quantity of grave goods and grave types is minimal, suggesting that the ruler's power had weakened and social differences among members changed.

In the Grijalva, Usumacinta regions, and Yucatan Peninsula there are different patterns from the other areas mentioned above. On the other hand, it could be difficult to identify a pattern, even though in the Late Classic, apparently different types of elaborate tombs appeared.

Table 23.2.

Correlations between grave form and kinds of graves furniture.

Period	No. Samples	Average	Burials no items	Simple	Cist	Crypt	Chamber
Early Preclassic	8	0.3	5 (63%)	0.3	-	-	-
Middle Preclassic	96	1.1	40 (40%)	1.1	1.5	1	-
Late Preclassic	248	1.3	92 (37%)	1.1	1.8	4	-
Terminal Preclassic	145	1.6	40 (28%)	1.3	3.1	6.2	7.7
Early Classic	142	3.4	24 (16%)	2.2	3	3.9	11.9

Discussion

The results presented here provide patterns of mortuary practices in the Southern Maya Area for examining when and how the elite tomb emerged in the area. The complexity of grave form and diversity of grave furniture increased through time. This suggests that mortuary practices became more complicated, more energy was expended, and changes in the meaning and importance of the deceased for the community members occurred through time.

The development of social complexity in the Southern Maya Area begins from the Early and Middle Preclassic periods (e.g. Love, 2016). During these periods, large public buildings and stone monuments, often considered indicators of specific individuals or elites, appeared across the Southern Maya Area. However, during the Early/ Middle Preclassic period there is no major difference among burials, indicating that the boundaries between elites and commoners were less marked than they were in

Figure 23.4.

Correlation between grave form and limited access goods in Southern Maya Area.

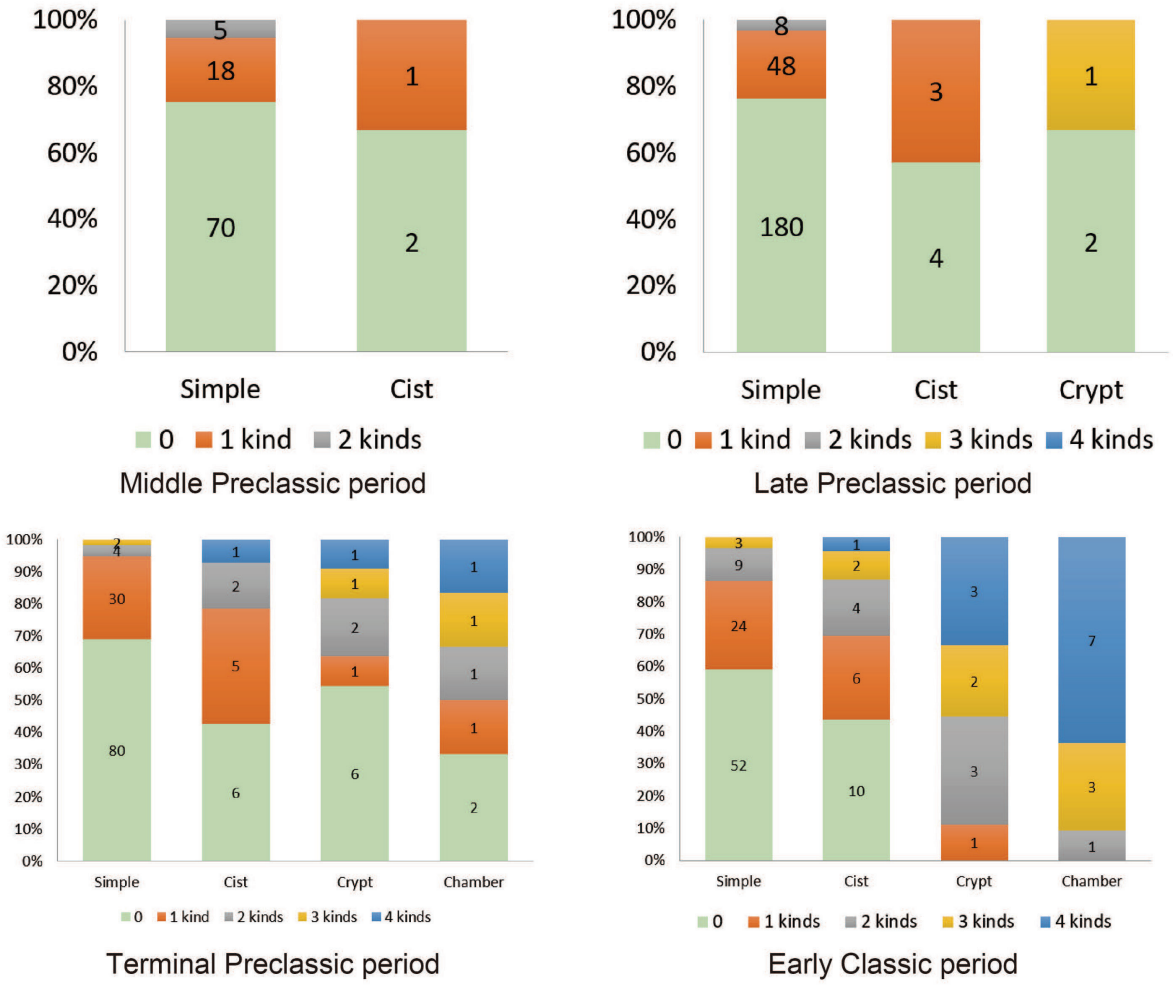
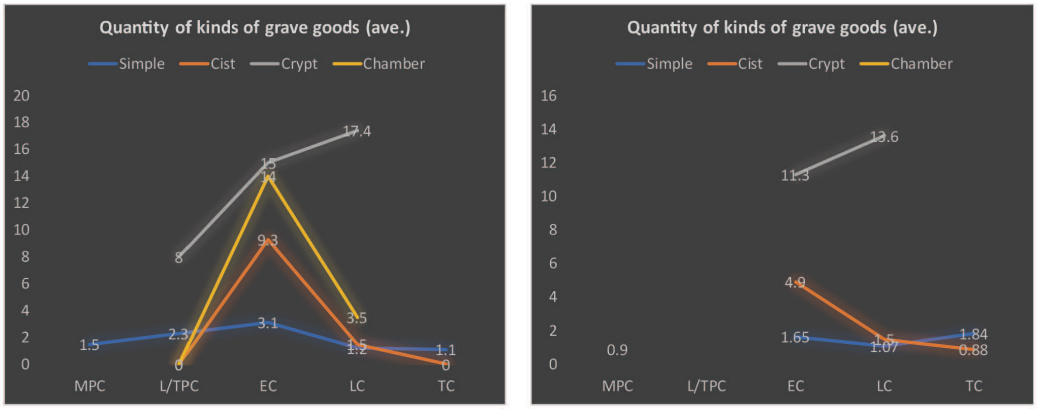


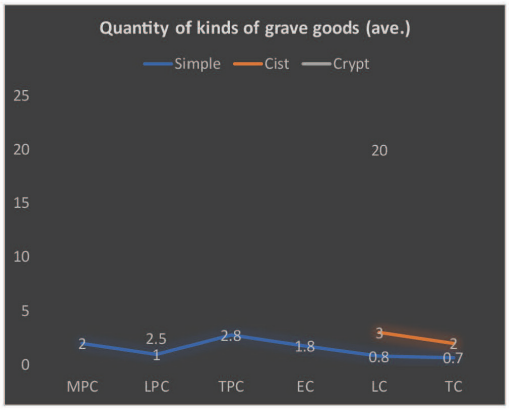
Figure 23.5.

Quantity of kinds of grave goods in the Maya Lowlands sites.

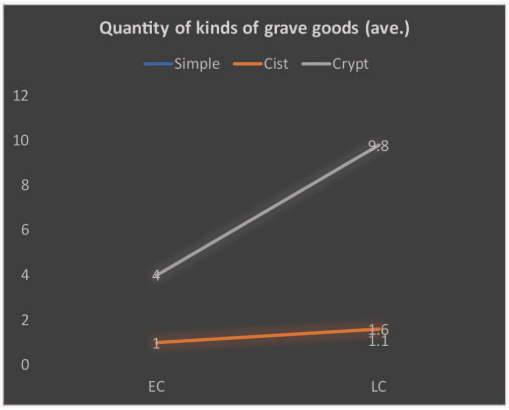


Tikal
(n = 241)

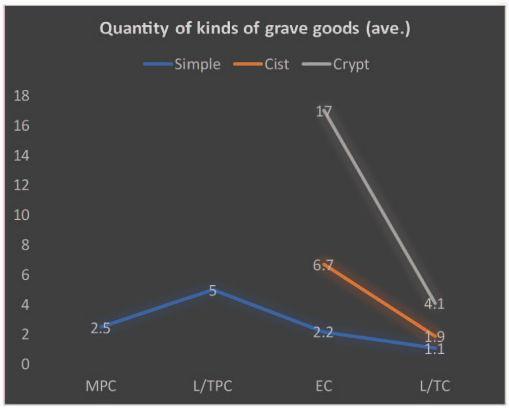
Altun Ha
(n = 292)



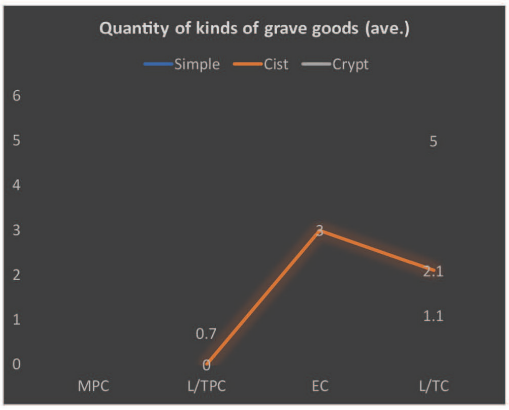
Altar de Sacrificio
(n = 128)



Piedras Negras
(n = 44)



Copan
(n = 120)



Dzibilchaltun
(n = 65)

later periods. Another possibility is that burials or mortuary practices were not an appropriate context to reflect social position or political power in the society.

Elaborate graves with rich offerings, including limited access goods, appeared in the Late Preclassic period, suggesting that social differentiation, stratification, and inequality may have accelerated and materialized in this period. In addition, social differentiation among community members became even more rigidly stratified. Distinctly elite tombs totally different from other burials appear in the Terminal Preclassic. Elaborate graves have rich offering items, are embedded within a landscape constituted by monumental buildings, and stone monument that depicted ruler's image (Inomata and Henderson, 2016).

At the end of the Terminal Preclassic and first half of the Early Classic period there was a drastic social demise in the Southern Maya Area (Popenoe de Hatch, 1997), whose cause is as yet unknown. After this decline, clear polarization in the correlation between grave form and quantity of kinds of grave furniture appears in the Early Classic, suggesting that powerful and exclusive rulers or groups appeared in that period.

For comparative purposes, this study analyzed other Maya sites. As a result, the same pattern visible within the Southern Maya Area was identified at sites such as Tikal. In the Maya Lowlands, elite tombs appeared in the Late/Terminal Preclassic period (Fitzsimmons, 2002, p. 242). The data suggests that first, social stratification accelerated and probably shaped specific individual or groups such as the elite. Then, exclusive elite rulers emerge, indicated by the polarization of correlation of grave form and grave furniture. However, at sites in the Grijalva and Usumacinta regions, there are different patterns. These varying patterns represent differences in the concepts of death, social processes, and representations of elite power or social organization differ from other sites.

Conclusion

This study identified variation of patterns in correlation between grave form and types of grave goods in Southern Maya Area. In the Early/Middle Preclassic period there is no clear differentiation of elite tombs, although monumental buildings and stone monuments, which are other indicators of elite status, existed. Elite tombs in the Terminal Preclassic period could indicate the emergence of rigidly stratified society. Moreover, in the subsequent Early Classic, exclusive and powerful elite appeared. From the Terminal Preclassic period, death and related ritual actions would become vital forces to gain power or fertility. In the Early Classic, the power of elites was expressed in an exclusive manner in mortuary practices. These processes could suggest that "elite tombs" did not appear suddenly, but ongoing social relations among group members through the time shaped specific individuals or groups with political power.

This study provides data about when and how elite tombs emerged in the Southern Maya Area. However, it remains for us to understand why they emerged. Self-interest to express authority? Or authority/interest of other living people? If so, why are they are interested? For this, the next step will be to study on a case-by-case basis with other indicators of elite status and examine other attributes related to mortuary practices. For example, warfare could be an important component to the emergence of an elite because it reinforced a sense of identity and opportunity to integrate society (also vice versa). Furthermore, it is worth mentioning that although simple burials are generally categorized as "non-elite" and often excluded from study, some of them have many quantities of grave goods including limited access goods. How are these burials designated as elite? intermediate class? or lower class?

Finally, this study found similarities and differences in correlation between grave form and kinds of grave

furniture. Although the concepts and methods are simple, I believe that they are useful as a starting point or comparative baseline for understanding the processes and mechanisms of the rise of social complexity.

Acknowledgement

I am grateful to the Dr. Naoko Matsumoto and Dr. Sugiyama for inviting me to join the international meeting of project "Out of Eurasia" held on Mexico in February 2020. This research was supported by grants from the MEXT KAKENHI (JP19H05734). Finally, I am deeply grateful to Claudia Garcia-Des Lauriers and Errin Weller for editing this research paper and useful suggestions. Any mistakes and/or inconsistencies within this work are those of the author.

[1] See project web site (http://out-of-eurasia.jp/)

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24
Cerro Bernal, Chiapas as an Embodiment of a Mesoamerican Sacred Mountain

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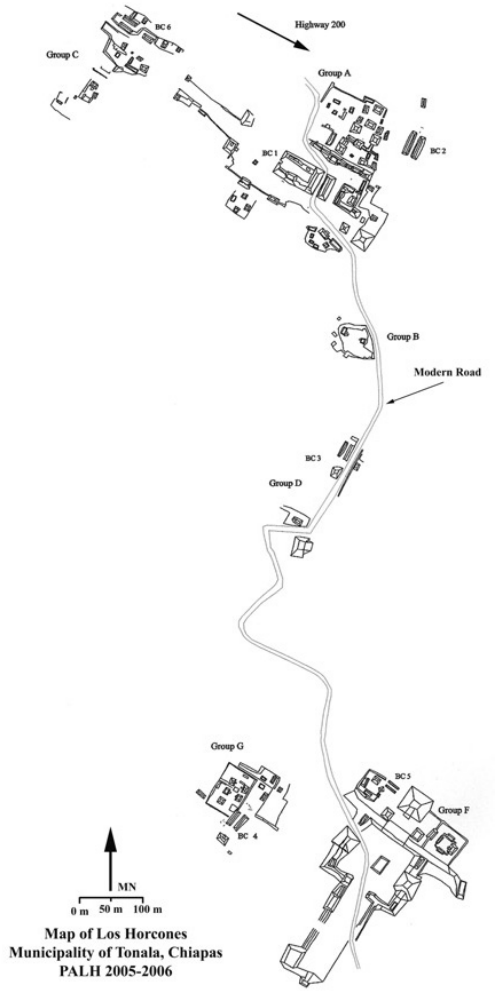
Cerro Bernal, located on the southern Pacific coastal plain is a striking feature on the landscape. Archaeological sites such as Los Horcones, an Early Classic center with strong ties to Teotihuacan, the great Central Mexican metropolis, point to the strategic location of the mountain from which the estuaries and the overland trade route could be controlled. Beyond its strategic functions, Cerro Bernal contains important features that allowed it to fit well within the known archetypes of sacred landscapes well known throughout Mesoamerica. Archaeological, iconographic, ethnohistoric, and ethnographic evidence reveal that Cerro Bernal was more than a strategic landscape. It was a sacred mountain, a place of abundance, and terrestrial paradise, not unlike the mythical Tlalocan. Its dramatic peak that drew the rain clouds whose moisture fed the Río Horcones and the estuaries at its foothills made it an ideal altepetl—water mountain. In this chapter, I explore the religious significance of this sacred mountain.

El Cerro Bernal, ubicado en la planicie costera sur del Pacifico es un monumento llamativo en este paisaje. Sitios arqueológicos como Los Horcones, un centro del Clásico Temprano con fuertes vínculos a Teotihuacán la gran metrópoli de México central, señala la localidad estratégica de esta montaña de donde las rutas de comercio terrestre y de los estuarios fueron controladas. Mas allá de estas funciones estratégicas, el Cerro Bernal tiene importantes características que le permiten encajar bien con los arquetipos del paisaje sagrado bien conocidos por todo Mesoamérica. Evidencias arqueológica, iconográfica, etnohistórica y etnográfica revelan que el Cerro Bernal fue mas que un paisaje estratégico. Fue un monte sagrado, un lugar de abundancia, y paraíso terrenal parecido al mítico Tlalocan. Su pico dramático atrae a las nubes cuya humedad y lluvia alimentan el Río Horcones y los estuarios y sus estribaciones lo conforman como in altepetl ideal—una montaña de agua. En este ensayo, exploro el significado religioso de este monte sagrado.

Since 2005, the Proyecto Arqueológico Los Horcones (PALH) has been investigating this important center located in the municipality of Tonalá, Chiapas largely looking at its role as an important interaction node in the region during the Early Classic (AD 250-650). Archaeological research conducted by earlier scholars and more recently by the author has focused on the strategic location of Los Horcones (Figure 24.1) as an important factor for understanding its relations with Teotihuacan, the Maya region, and the Gulf Coast (García-Des Lauriers, 2005, 2007, 2012a, 2012b, 2016, 2020; Navarrete, 1976, 1986; Taube, 2000).

Figure 24.1.

Map of Los Horcones, Chiapas (Drawn by H. Fukuhara & C. García-Des Lauriers).



While conducting research there, local residents shared with me stories of the importance of Cerro Bernal and its natural features as ideologically potent elements of the landscape (Figure 24.2). In 2013, I interviewed several long-time residents of Cerro Bernal and Tonalá, and recorded some of the stories that form part of the local folklore of this mountain. The overarching consensus is that "el Cerro de Bernal esta encantado," Cerro Bernal is enchanted. The qualities that continue to make this mountain a repository of legendary stories, were not overlooked by people in the past. In this paper, I will combine the information gathered from these ethnographic interviews, research on Mesoamerican sacred landscapes, and the archaeology of Los Horcones to make the argument that from Precolumbian to contemporary times Cerro Bernal has been more than just a strategic landscape—it was an embodiment of the Mesoamerican concept of the sacred mountain.

"El Cerro Bernal esta Encantado"

While doing archaeological work at Los Horcones, local residents shared many stories about Cerro Bernal its natural beauty, resources, and legends. In July of 2013,

Figure 24.2.

Photo of Cerro Bernal as seen from La Polka, Chiapas (Photo by C. García-Des Lauriers).



I recorded some of these stories in an attempt to create a dialogue between the present and the past. My informants are Aucencio "Don Chencho" Zambrano Arreoloa who is the memory of Cerro Bernal and has lived there since he was an infant, over 80 years now. His wife Marta moved there in the 1970s when she married Don Chencho. Don Felix de los Santos Gonzalez is a local landowner and resident of Cerro Bernal for over 30 years and recently "entered the road" to borrow a Maya phrase, and Ricardo Lopez Vassallo, a proud resident of Tonalá, local historian, and advocate for the preservation of cultural sources. During this process, many stories emerged about happenings on Cerro Bernal-events that people say happened, that happened to them, or to relatives. One important detail that all of the informants shared is that "el Cerro de Bernal esta encantado"—Cerro Bernal is enchanted, it is a place where strange phenomena are observed, where apparitions frighten, and where people go and sometimes do not return.

In order to summarize the ethnographic information, I will organize the stories and information thematically. The stories were related via informal interviews and long chats discussing the landscape of Cerro Bernal, how that landscape changes throughout the year, people's relationship and understanding of archaeological sites and any stories or myths that people know about the mountain.

Pacts with the Devil

Stories of pacts with the devil are well known throughout contemporary Mexican folklore, and Cerro Bernal has its own stories about apparitions of a man or figure interpreted to be the devil. Don Chencho related that a man with bright shiny spurs, riding a beautiful white horse, and wearing a large imposing hat appeared to his father while he was bathing on Cerro Bernal. After this encounter, the strikingly attired man disappeared without a trace. The story related is not unlike well-known versions of a mounted devil known as "El Sombreron" (Coutiño, 2011; Flores Estrada, 1998, pp. 39-41; Pineda del Valle 2004, pp. 73-79). In fact, Ricardo López Vasallo also mentioned the popularity of this story in the rural communities of Tonalá. In addition, Don Chencho related stories about people who had made pacts with the devil. People with money had white cattle and horses, they seemingly had lots of money, but could not enjoy it, and instead were often disheveled. This wealth is not inheritable and when the pacted person dies, their family is left with nothing. Zambrano emphasized that white was the color associated with the devil, hence the white cattle.

Stories of Fire

Both Felix de los Santos and Don Chencho related to me that Cerro Bernal regularly burns, especially in the dry season the mountain is prone to fires. When I interviewed them in 2013, both mentioned that the mountain had burned recently. Along with these fires caused by electrical wires, accidents, lightening or the relentless heat of the Tonalá region, among other potential causes, are fires that burn without explanation or fire that falls out of the sky.

Perhaps one of the most common stories is of a ball of fire that appears in the sky. Felix de los Santos and Don Chencho both had witnessed the appearance of these balls of fire or related that their workers had told them about the appearance of balls of fire in the sky. Ricardo López Vasallo recounted a story about a family from San Francisco Potrerillo were sitting on their patio chatting after dinner and suddenly a ball of fire appeared. They became terribly frightened as it seemed to head right for them and then suddenly it turned and landed on Cerro Bernal.

The mountain, I am told is also a magnet for lightening. The ball of fire might be a meteorological phenomenon called ball lightning (Singer, 1971). Ball lightning can vary in color from red, yellow, white, blue or green and unlike

other forms of lightning can stay stationary and exist for seconds even minutes (Springer, 1971). This phenomenon, would make quite an impression on the local community trying to make sense of it. The movement described by my informants for this ball of fire certainly describes this meteorological phenomenon, and ancient and modern minds would have been awestruck in its presence.

Tricksters and Transformations.

Another group of stories record instances of transformations and trickster figures that appear out of nowhere on Cerro Bernal. Don Chencho related a story about his son, the one that likes to hunt and an indigenous man who worked for them at the time. They had gone hunting at night and they found an armadillo. One of them shot at the armadillo and it fell, but then it started to move around and his son tells the helper to go and grab it before it gets away. As his helper got closer the armadillo thrashed more and more and finally, when he arrived to fetch it, it was gone. In its place was a little blond boy.

Marta Zambrano told me of another story involving her eldest son, when he was a young boy. He was sent to fetch the horse and when he approached the mountain he saw some fruit. While he tried to get the fruit, a little boy that appeared dancing on the rock. He arrived home, scared and related the happening to his mother and grandmother, about the dancing boys that called to him.

The sudden appearance of children or the transformation of animals into people or vice versa are also common themes in Mexican folklore. These are related to much deeper notions of animal co-essences known as way for the Maya region and *nahual* to the Aztec (Grube & Nahm, 1994; Martinez, 2006). The deep connections between people and animal spirits can be both positive and negative and these tricksters are often found in the forest or just beyond the limits of a town or settlement (Taube, 2003). The forest or *monte* can be the place of spooks as can mountains and caves (Taube, 2003). It is thus not entirely surprising that when in the forest or near Cerro Bernal at the edges of ranches in rural areas, people tend to encounter these unexplained phenomena.

Caves and Fruits

One of the most popular stories about Cerro Bernal is about the presence of a cave full of fruits. All of my informants related this story. The version that they recount is one where upon entering, one sees beautiful things. Fruits of all kinds that one can consume while there, eating to one's fulfillment, but if you try to take them out of the cave you will get lost or simply will not be able to take them out of the cave. Don Chencho related that his father told him this story, and that one night while out he entered the cave and saw beautiful things, and took him to see this cave. They went and saw it, but it did not open up like his father claimed to have seen.

Antonio Cruz Coutiño (2011, pp. 181-82), Cesar Pineda del Valle and Ana Maria Rincon (2002) recorded a version of this story. The story is of a family that decided to move to a finca near Cerro Bernal. They were advised to keep watch over their children, because every family who had lived there in the past had lost their children. In this case, children were sent to collect firewood and while out, they came upon a road to the mysterious mountain. The children heard a voice that invited them to continue walking, but their father's voice called them back. However, after some days, the boy's curiosity won him over, and he went to investigate. The boy entered a cave where he could hear other children playing and screaming, and his father never heard from him again. The father asked for help, looking for this cave where his son had wondered off to, but alas no one ever found it. However, people traveling near Cerro Bernal report hearing children's voices as they pass,

and because of these mysterious happenings describe this mountain as being occupied by the devil.

Taking of Souls

One last group of stories or really more like sayings is that Cerro Bernal takes people--their souls. Marta Zambrano reported to me that while riding home in a *combi*, a popular form of collective transportation, one day a lady overheard that she was going to Cerro Bernal. The woman was surprised and then mentioned that her son-in-law lived on Bernal. Marta asked who her son-in-law was because she did not know her, and the lady replied that he had died by strangulation, and that the devil had taken him to Bernal. Don Chencho reported that his grandfather related to him that in times past you might run into people working, herding goats. He described the herders,

> They were dead already those that were around there, that's why people say, when others die, and they were on wrong paths, they say "Bernal has them, the devil already has them."

The mountain as a repository of souls, either those who made pacts with the devil, children whose souls were taken by the mountain, or others whose wrongful deaths left them to live on Cerro Bernal for eternity.

From the Present to the Past: Cerro Bernal as a Sacred Mountain

Dolores Aramoni's book, *Los Refugios de lo Sagrado: Religiosidad, conflicto y resistencia entre los zoques de Chiapas* is put together from her own ethnographic work and intensive archival research of documents dating from the 15th to 18th centuries (Aramoni, 1992). In 17th century documents a man named Nicolas de Santiago is being investigated for being a witch, and in it he confesses knowledge of several locations where "superstitions were practiced, among those mentioned …Cerro Bernal on the coast… among others " (Aramoni, 1992, pp. 199). Cerro Bernal and others mentioned in the document, including Tres Picos, also on the coast and near Tonalá, are sites where indigenous people went to conduct rituals and where strange phenomena were recorded (Aramoni, 1992, pp. 199).

Recent archaeological research takes us further back in time and suggests that the enchanted mountain idea has very deep Precolumbian roots. Barbara Voorhies, Douglass Kennet, and Holly Moyes, published results of work conducted at Cerro Bernal in a series of cave sites on the southern side of mountain (Voorhies et al., 2012). Many of these so called "caves" as my informants and Voorhies and colleagues mention are more like rock shelters. Voorhies et al. (2012) note that the geology of the region is not conducive to the formation of large caves systems like those you get in the Maya region for example. While the goal of finding Archaic vestiges of early habitation and use did not bear fruit so to speak, they did find evidence of rituals in the caves and rock shelters. Much of the material culture found in the cave sites dates to the Late Formative to Early Classic and among these one stood out in part because of its location, near a spring. Inside this cave known as Casa de Piedra (TON-8) they also discovered a feature interpreted as a *haltun* or water collecting receptical and faded paintings on the wall suggesting that, along with its proximity to a spring, this cave had ritual functions. The clear link between caves as sources of water and wind and as sites of ritual seems to be borne out here in this archaeological example.

My work at Los Horcones also provides some tantalizing clues as to a Precolumbian origins for the understanding of Cerro Bernal as a sacred mountain. Stele 3 from Los Horcones, currently located in the main plaza

of the municipal head Tonalá, has become an important symbol of local identity (Figures 24.1 & 24.3). The stele was first discovered by Carlos Navarrete in the 1970s and more recently has been analyzed by Taube as an example of Teotihuacan writing outside of the city, and by the author as an index of Teotihuacan identity at this Pacific Coast of Chiapas site (García-Des Lauriers, 2005, 2007, 2012a; Navarrete, 1976, 1986; Taube, 2000). Moreover, its original location reported on by Navarrete and further verified by Don Chencho, suggested the evocation of a Teotihuacan identity at the central ceremonial core of Los Horcones. One important question posed by this stele is what was Tlaloc doing here, on this mountain? Why does his presence seem so fitting in this verdant landscape?

My contention, following the work of the eminent scholar, Alfredo López Austin, is that the characteristics of Cerro Bernal allowed local residents in his words to replicate Tlalocan as a projection onto this sacred mountain. Ethnohistoric sources describe Tlaloc as the heart of the mountain and Tlalocan as a deified hill (López Austin, 1997, pp. 202). Tlaloc himself is both a god of waters, storms and fertility, but also is a terrestrial deity associated with the underworld and war (López Austin, 1997, pp. 214; Pastory, 1974). Tlaloc's name itself suggests these connections to the earth, being translated as "Path Beneath the Earth," effectively a cave by Duran (1984, pp. 1, 81), with other scholars also noting connections to earth in the root of his name (López Austin, 1997; Sullivan, 1994).
In the *Historia de los Mexicanos por sus Pinturas* (1965: 30-31), Tlaloc is described as the lord of "hell" more a reference to the Precolumbian underworld than to the Christian one. He is a provider, a god of fertility, but also one that wields the destructive forces of lightning and thunder. Tlaloc embodies the Mesoamerican duality of life and death, and the idea that one cannot exist without the other—that from life comes death comes life in a perpetual cycle.

Tlalocan, his domain, is a mythical place, but also one that can be found or recreated on earth. The mythical Tlalocan is an underground place, according to some sources (Broda, 1982; López Austin, 1997, pp. 215), while the *Florentine Codex* describes this place as a location where one can find much wealth, agricultural fruits, flowers, and is the home of the *tlaloque* (Sahagun 2012, Bk 3, folio 27v-28r). Along with representing a verdant place, it was also a realm of the dead, especially for those that died of water related illness or those chosen by Tlaloc (López Austin, 1997, pp. 216). Tlalocan is further described as a verdant mountain and storehouse of water and rain, and "was replicated as a projection into sacred places, hills, and temples" (López Austin, 1997, pp. 226). As López Austin (1997) notes, the concept of a water mountain or *altepetl*, a well-known metaphor for settlement or town, is in part a reference to Tlalocan.

So how does Cerro Bernal embody these concepts of Tlalocan? This mountain has foothills that extend all the way to the estuaries on the south and the Río Horcones and other smaller streams run down the mountain on the north side (Figures 24.2 & 24.4). Don Chencho reported to me the existence of mineral springs on Cerro Bernal where people picnic and delight in drinking the bubbly water. Stories of caves and known caves with archaeological evidence of water rituals have been located here. During the rainy season, the verdant landscape, with the jagged peak glistening with water evoke an image of Tlalocan. During the dry season, its verdant greenery wilts into yellows and browns evoking those endless cycles of death and rebirth. However, perhaps the most compelling evidence is that on this enchanted mountain lived Tlaloc, at least as far as we can tell, since the Early Classic when Stela 3 was erected (Figure 24.3).

Preliminary Conclusions

Cerro Bernal is a beautiful place, a strategically located place, but most of all a sacred mountain. The notions that this mountain was ideologically potent has deep Precolumbian roots that have survived through the conquest and Christianization of the region. The stories collected among the present-day residents are part of the memory of this landscape that continues to shape how people understand the mountain and engage with it. It is still thought of as a place where strange phenomena occur, where the devil may take souls and where sounds may send a chill down your spine. These ideas are reflections of deep memories shaped by history, but ones that go back to ancient times when Los Horcones was a terrestrial Tlalocan marking this mountain as this rain deity's realm. Archaeological remains located in caves show the importance of these natural features to the ideological image of the mountain itself, and colonial documents show that this mountain remained an important site of indigenous ritual practices, especially those not condoned by the Catholic church. Perhaps the statement that summarizes best is "El Cerro Bernal esta encantado," Cerro Bernal has been and continues to be a sacred Mountain.

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Figure 24.3.

Stele 3, Los Horcones (Photo by C. García-Des Lauriers).



Figure 24.4.

Photo of waterfall, Cerro Bernal, Chiapas (Photo by C. García-Des Lauriers).



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(All of my informants gave me written permission to use their names, share, and publish their stories with proper attribution.)

25
Indigenous American Ritual Bone Treatment

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Indigenous American cosmovisions are based on embodied mental thoughts in relation to bodily sensory experience. This chapter focuses on the ancient to contemporary Indigenous American practice of exhuming skeletons for use in reciprocal based rituals. Ancient funerary actions, and the complexity of their different stages, are not directly visible to us; however, there are indicators of their interrelated behaviors in the archaeological record as pertaining to subjects and objects. Burial rituals can be researched through investigating how the dead are placed and positioned in the ground and, if pertinent, their later exhumation and bundling. Contextual materials are those of interred objects and contextual actions can include multiple interments and whether ritual bone treatment, such as scraping, lumping, and or burning, is present. The more pertinent burial practice indices, in relation to this volume, concern the human cognitive relationship between mind and matter as related to veneration or manipulative inter-relationships between the living and the dead. Protracted burial practices include those of exhumed skeletons kept as communicating bundles used by the living to alleviate day-to-day concerns. The veneration and manipulation of skeletal bundles has continued up to the present in the Maya area, for example, as well as other parts of Indigenous North to South America. While some of my Maya consultants venerate their ancestors, they also sometimes damage their bones as a means to manipulate them. At least three vital essences were/are present within living Mesoamerican human bodies. The ritual and ceremonial actions analyzed here are associated with osteological remnants, as containers of vital essences, and are meant to sway non-corporeal beings into actions being petitioned by their living descendants. A brief comparison of Eurasian material, as a manner of understanding similar Asian to Indigenous American cross-cultural practices, is included at the conclusion in order to place the material in a broader context.

Las visiones indígenas americanas sobre el cosmos se basan en pensamientos incorporados en relación con la experiencia sensorial corporal. Este capítulo se centra en la práctica indígena norteamericana desde la antigüedad hasta la época contemporánea de exhumar esqueletos para su uso en rituales basados en reciprocidad. Los actos funerarios antiguos y la complejidad de sus diferentes etapas no las podemos conocer directamente; sin embargo, hay indicadores de sus comportamientos interrelacionados con el registro arqueológico pertenecientes a sujetos y objetos. Los rituales de entierro se pueden conocer investigando cómo se posicionan y colocan a los muertos en el suelo y en algunos casos, su posterior exhumación y la colocación en fardos. Los materiales contextuales están constituidos por los objetos

enterrados y las acciones contextuales pueden incluir entierros múltiples y si está presente el tratamiento ritual de los huesos, como raspaduras, agrupación o incineración. Los índices de prácticas funerarias más relevantes, en relación con este volumen, se refieren a la relación cognitiva humana entre la mente y la materia en relación con la veneración o las interrelaciones que se pueden manipular entre los vivos y los muertos. Las prácticas de entierro prolongadas incluyen las de los esqueletos exhumados que se mantienen como medios de comunicación en fardos, utilizados por los vivos para aliviar las preocupaciones del día a día. La veneración y manipulación de los fardos con esqueletos ha continuado hasta el presente, por ejemplo en el área Maya, así como en otras partes del norte indígena de Sudamérica. Si bien algunos de mis consultores Mayas veneran a sus antepasados, a veces también dañan sus huesos como un medio para manipularlos. Al menos tres esencias vitales estaban / están presentes dentro de los cuerpos humanos vivientes de Mesoamérica. Los actos rituales y ceremoniales analizados aquí, están asociados con restos osteológicos, como contenedores de esencias vitales y están destinados a influir en los seres incorpóreos para realizar acciones solicitadas por sus descendientes vivos. En la conclusión se incluye una breve comparación del material euroasiático, como una forma de entender las prácticas transculturales similares de los asiáticos a los indígenas americanos, para ubicar el material en un contexto más amplio.

Each [human is]…'an embodied [bundled] paradox,'… [Our] task is to unravel this bundle (Mithen, 1996, pp. 115)

Indigenous American cognitive cosmovisions are based on embodied mental thoughts in relation to bodily experience. Ancient Indigenous American funerary actions, and the complexity of their different stages, are not directly visible to us; however, there are indicators of their interrelated behaviors as pertaining to subjects and objects. Burial rituals can be researched through investigating how the dead are placed and positioned in the ground and, if pertinent, their later exhumation and bundling. Contextual actions can include multiple interments and whether ritual bone treatment, such as scraping, lumping, and/or burning, is present. The pertinent burial practice indices to this chapter concern the human cognitive relationship between mind and matter as related to veneration or manipulative inter-relationships between the living and the dead.

This chapter focuses on the ancient to contemporary Indigenous American practice of exhuming bodies. The indigenous actions analyzed here are associated with osteological remnants as containers of vital essences. López Austin (1980, pp. 361) indicates that at least three vital essences were/are present within living Mesoamerican human bodies (Figure 25.1). As a manner of understanding similar cross-cultural practices; a brief comparison of Eurasian material will be included at the conclusion in order to place the material in a broader context.

Ancestral Living Essences

Colonial European documents stating how Indigenous Americans treated their deceased indicate an ongoing relationship with their dead. For the North American Southeast (United States), for example, Mississippian leaders kept ancestral human bones as it was through these that they legitimated their authority (Hall, 1997, pp. 146). Their ancestors were so important that during battles each side strategized on how to take control of an enemy's ancestral remains. According to Milner (2004, pp. 165; also Kehoe, 2002, pp. 167-168), having gained "entry into an

Figure 25.1.

Laud Codex [44]: Human Vital Essences.



Figure 25.2.

Boturini Codex [20]:

Communicating Huitzilopochtli Bundle.



Figure 25.3.

Tikal Altar 5: Exhumed Skull and Long Bones.



enemy's principal town, [warriors tried] to despoil the chief's charnel structure." Marring the shrine and its contents "struck at the core of a chief's power [since the] inability to protect the bones of one's ancestors [indicated] feeble leadership".

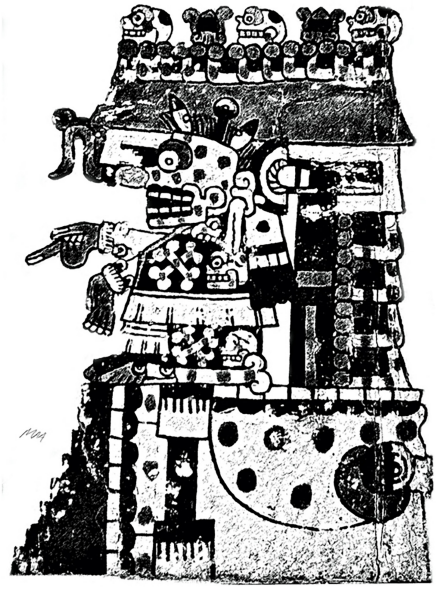
Similar practices are seen in Central Mexico where ancestral bones were kept and cared for (Iguaz, 1993, pp. 70; Headrick, 1999, 2007, pp. 51-58); for example, the México-Aztec and the Mixtec would also direct their warriors toward seizing effigy containing an enemy's ancestral relics (Pohl, 2001, pp. 46). A primary goal of pre-Columbian warfare was not so much to kill but to capture in order to gain prestige (Hassig, 1988). The capture of enemy skeletal bundles was thought similar to that of capturing a live person. The keeping of patron warrior bundles, such as the México's Huitzilopochtli power bundle (Figure 25.2), demonstrates that human bone relics were treated as if alive (López Austin, 1980, pp. 78; Knab and Sullivan, 1994, pp. 86, 241).

Ancient funerary rituals are not directly visible to us; however, there are indicators of interrelated actions in the material record (Marshall, 1989). Relative actions might include multiple interments and whether bone scraping, lumping, and/or burning are present. Protracted burial practices can include exhumation rituals, per the skull and long bones being addressed as if still alive, as depicted on Tikal's Altar 5 (Figure 25.3). Further, the Zouche-Nuttall Codex (1995, pp. 44) depicts a skeletal bundle, of Mixtec "Lady Nine-Grass, also depicted as if alive (Figure 25.4).

Figure 25.4.

Zouche-Nuttall Codex [44]:

Lady Nine-Grass Skeletal Bundle.



Body exhumation has continued up to the present in the Maya area (Figure 25.5). What we perceive dead can, in my consultants' cosmovision, be agency ridden and still have volition. Deceased humans may no longer be alive-in-the-flesh; however, part of their no-longer-human essences are perceived to remain tethered to their bones or associated material objects in an other-than-human state (Astor-Aguilera, 2010).

McKeever Furst (1995, pp. 177-178) notes that the ancient México-Aztec notion of "spirit powers" circulates about widely in the Indigenous American world. These powers are "held temporarily by individual entities, human or otherwise." These essences are similar to the "orenda of the Iroquois, wakan of the Sioux, or sila of the eastern Inuit…which, like the Mexica idea, are associated with a…cosmic breath that enters human bodies in varying quantities and lends [them] differing vital powers". These invisible essences are capable of metamorphosis. McKeever Furst elaborates, "American Indians understand natural phenomena—including man—in terms of immanent powers of transformation… The different manifestations of the biosphere are capable of metamorphosis…. [These] various phenomena are held equivalent and imbued with a life force" (1990 [1972], pp. 138).

Differences exist between Indigenous American populations; however, "the cosmologies of Mesoamerica emerged from a shared background" (Hall, 1997, pp. 162; also Kehoe, 2002, pp. 42-43, 48-53, 74-76, 80, 142-146; Young, 2000). Per Power (2004, pp. 66), though "the Southeast is referred to as a culture region," their imagery and social practices show links with other Indigenous Americans. Further, their "shared heritage explains how the Mississippian symbols, motifs, and themes were, with amazing fluidity, accepted repeated, and perhaps required across distant areas… The heritage shared throughout the Americas permitted communication between the Southeast and Meso and South America" (Power, 2004, pp. 158-159).

North to South American Shared Cosmovisions

A common postmortem manipulation found in the ancient Indigenous Americas was to conduct rituals focused on skeletal remains. For the Maya, skeletal bundles were highly important and their associated rituals and ceremonies demonstrated lineage legitimacy (Schele and Freidel, 1990, pp. 482, note 60). In Andean contexts, the care and use of skeletal remains was an ongoing activity (Forgey and Williams, 2005, pp. 263). Per Rakita and Buikstra (2005, pp. 100), "upon the death of an Inca elite, the corpse was embalmed and wrapped. These bundles were made to look as much as possible as the deceased looked in life… The bundled individuals were accorded the same treatment [as] in life. They were fed food and drink, accompanied by caretakers, and afforded respect and authority." Rakita and Buikstra elaborate, "for Andeans, death did not exist… Inca mummies were powerful social forces… The ancestors never [did] leave this world" (2005, pp. 105; also Conrad

and Demarest, 1984, pp. 113-116; Byers, 2005, pp. 128).

For the Maya, "the use of a corpse [also] had profound meaning" (Becker, 1993, pp. 47). As Schele and Freidel state, Tikal's Burial 85 consisted of a bundled "headless, thighless corpse… Bones were missing. The Maya retained bones,…so the skull and thighbones may have [remained with its] descendants" (1990, pp. 133-135, figure 4.4). As Becker elaborates, an "important observation from the Maya is the lack of cemeteries which remove the dead from the world of the living" (1993, pp. 67-68). Becker further notes that, "the lack of distinct cemeteries among the Maya means that burials are generally recovered in random manner" (1993, pp. 46, 46 note 1).

Indigenous Americans tended to enshrine bundles of select ancestors while permanently burying certain others. It is the living after all who put forth the effort to keep their dead as ancestors and maintain relationships with their non-corporeal beings (Gillespie, 2001, pp. 92). Even those entombed, however, often had their tombs visited by the living. Tomb visitation was apparently conducted to perform activities, either in positive or negative terms, toward the targeted skeletal material.

Tossing the Bones Around

Byers (2005, pp. 125) notes that if a human is perceived "as possessing multiple spirits embodied in different components of the body,… [then] a complex range of postmortem manipulation and variable burial treatments is expected." Violent behavior toward human bones can then be logical. Some of my Maya consultants, for example, will sometimes burn bones as a means to manipulate their essences (Figure 25.6).

During the conquest of the Americas, Europeans noted their native allies seeking to take as "trophies," and/or toss around, trample, and destroy an enemy's skeletal relics (Anderson, 1994, pp. 80, 1999; Brain and Phillips, 1996,

Figure 25.5.

Quintana Roo Maya Human Bone Exhumation. Photograph by the Author.



Figure 25.6.

Maya Burned Skeleton Bundle. Photograph by the Author.



pp. 174-175; Dye, 1990, pp. 219; Dye, 1994, pp. 47; King, 2001, pp. 8; La Vega, 1980 [1605], pp. 292-293, 438). The Spanish, while colonizing the Andes, would sometimes have to meet and negotiate with the natives' ancestors—sheltered and fed as if still alive—through their medium-like caretakers (Pizarro, 1921 [1571], pp. 205). Buikstra and Nystrom note that "an active partnership between the ancestors and the living interpenetrated" Andean life and this "underscored the widespread significance of mummies" (2003, pp. 36, 240). In similar manner, the

Wixárika-Huichol of Northwest Mexico, for example, also shelter and communicate with their deceased leaders (Weigand and Weigand, 1991, pp. 56-66). This practice is also demonstrated in Coixtlahuaca, Mexico (Figure 25.7), in Panama, Central America (Helms, 1979, pp. 9, 17), the North American Northwest (Drucker, 1955, pp. 175-176), for the Northeast Huron (Heidenreich, 1978, pp. 374-375), and Virginia to Florida in the now United States (Swanton, 1946, pp. 722-726).

We do not "fully understand the variety of interment employed by the ancient Maya" (Gonlin, 2007, pp. 95); however, Miller and Taube stress the importance of "idealized ancestors" (1993, pp. 90). Vital essences remain significant due to their on-going relationships with the living (Becker, 1993, pp. 52; López Austin, 1980, pp. 482). For the Maya, veneration of the dead indicates honored remembrance as an ancestor (Duncan, 2005, pp. 207, 223). As Iguaz notes for the México-Aztec, death was "an integral part of [being alive and just another] stage in the continuation of life" (1993, pp. 63). Per Duncan, however, discerning what actions are veneration, as opposed to violation, is a problem within Mesoamerican funerary studies as the "processes of violation and veneration may involve similar acts" producing matching deposits (2005, pp. 207-208).

Figure 25.7.
Coixtlahuaca, Mexico, Bundle.
Photograph by the Author.



MacNeish (1962) has found Mesoamerican burned human bones dated to 4,000 BCE and Arkush (2006, pp. 286) states, for the Andes, that this indicates a "complexity, contingency, and unpredictability of warring societies." Cucina and Tiesler suggest, for the Maya, that the context for burned human bones "was probably associated with ritual nonfunerary treatments rather than with the ancestral cult" (2006, pp. 122). Rakita and Buikstra (2005, pp. 104) add that corpses were not burned for transformational purposes but to remove them.

Monaghan (1995, pp. 98, note 2) mentions that, "the only objects that Nuyooteco-[Mixtecs] classify as truly dead were rocks cracked by fire". The Mixtec think that to get rid of a person's essences completely, its entity must be entirely burned or, if the goal is simply to punish/torture said person, then one sporadically, burns and reburns it. For the Maya, Mock (1998a, 1998b, pp. 119) suggests that some interment rituals were violence related and done with the aim of erasing "personhood through flaying/ mutilation of the face and head, [for] not only humiliation but [the] destruction of individual identity. " As Duncan adds, bone "violation for the Maya created an enduring objects' weakness… [Thus,] finding a cache of mandibles removed from the skull of various individuals and buried under a shrine would suggest…an attempt to appropriate the individuals' power essence. An individual's mandible with cut marks, crushed or having teeth extracted, would be congruent with an attempt to deface the individual by destroying [its] source of power" (Duncan, 2005, pp. 221-222).

Nelson and colleagues (1992, pp. 308) state that "the ethnohistoric and ethnographic accounts provide an invaluable background against which to frame hypotheses…[since the differences] seem minor in comparison to the similarity in underlying structure." Ethnographic data concerning not only the keeping but the display of human remains, of both ancestors and enemies, is known not only for the Americas, as in the Andes (Harner, 1972), but in various parts of Oceania (see Bateson, 1932, 1958; Haddon 1901; Holmes, 1924; Landtman and Haddon, 1927; Saville, 1926; Seligmann, 1910; Trompf, 1991).

Vital Essences and Structure Burning

Personhood within Indigenous American ontologies is not just relegated to humans (Astor-Aguilera, 2010). Mock points to this scenario in the cutting and burning of monumental mask imagery at Cerros, Belize (1998b). As Sugiyama mentions for Teotihuacán, a primary objective during raids of this city was the burning of structures—per the destruction by fire mentioned by Cowgill (1992, pp. 109, personal communication 2007); further, the "looting of the inner [structure] burials [through a] tunnel was committed because the looters knew the burials were there" (Sugiyama, 1998, pp. 157-159).

The looters being from opposed factions within the city and their ascendance thus emphasized vandalizing existing polity features, monuments, and ritual objects (Sugiyama, 1998, pp. 161). Bundles and their shrines were, therefore, looting and burning targets when Teotihuacán experienced political upheavals (Headrick, 1999). Per Sugiyama (1998, pp. 159), the vandalism was not "sporadic actions for procurement of objects, as the [English] word looting suggests… The looters [also] disturbed skeletons and took bones of buried people…[and this, thereby,] had sociopolitical significance."

Lockett and Hargrave mention that Ancient Puebloans would remove post-interment skulls and long bones from their dead, in order to protect the bones from being attacked, as burned human bones have been found in nearby caves (1953; also Guernsey and Kidder, 1921; Gumerman and Dean, 1989, pp. 113). Torture-like actions toward human remains were probably done to manipulate agency laden essences found within the bone matter. Hall (1997, pp. 32) notes, for example, that a typical result after being taken prisoner by Indigenous Americans was being "subjected to prolonged and agonizing torture" that often "involved burning coals."

San José Mogote, Oaxaca, Mexico, for example, exhibits torture tactics. Monument 3 depicts a noble that was apparently taken captive, stripped, tortured, and killed (Redmond and Spencer, 2006, pp. 381-382; also Peebles and Kus, 1977, pp. 439; Redmond, 1994, pp. 116). The so-called "Danzantes" of Monte Albán, Oaxaca, display not only knife cuts but apparently fire torture. The burn symptoms seem exhibited by the individuals' oddly hanging appendages as those seen when whole body burn victims have their ligaments exposed to intense heat (Figure 25.8). Other evidence for the burning of human bodies at San José Mogote's is exhibited at Feature 47 (Flannery and Marcus, 2005, pp. 60, 228; Redmond and Spencer, 2006, pp. 386 note 6).

A problem remains, however, regarding the burning of human bones, as to whether a differentiation is made in Indigenous American cosmovisions concerning smoking, singing, extreme burning, or complete cremation. Landa says, for example, that the 16th century Maya would cremate some of their deceased, place their ashes within images, and venerate these burnt remains (in Tozzer, 1941, pp. 130-131). In several Mixtec codices, bundles of deceased nobles are depicted about to be cremated (Figure 25.9) (Laud Codex, 1994, pp. 41; Zouche-Nuttall Codex,

1995, pp. 82, 84). Duncan and colleagues, however, note that the "violation of enemies' mummy bundles…could involve burning the body of the deceased in different ways" (2008, pp. 5315-5317); as seems to apply for the multitude of "miscellaneous human skeletal material" at Piedras Negras, Guatemala (Coe, 1959, pp. 121).

Figure 25.8.

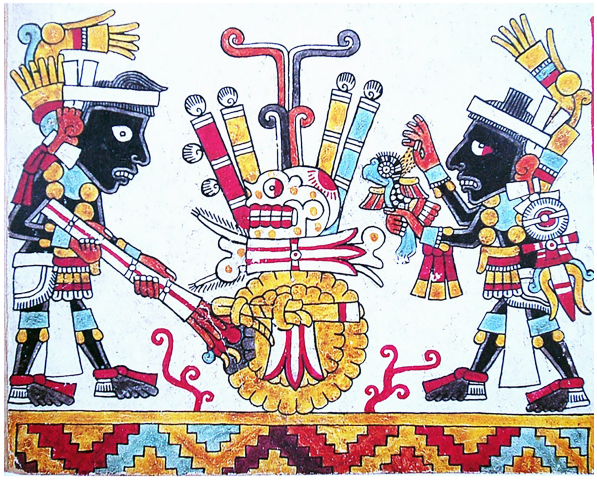
Monte Albán "Danzante".

Photograph by the Author.



Figure 25.9.

Zouche-Nuttall Codex [82]: Cremation Ritual.



Miscellaneous Maya human remains are often found, as at Tikal, Guatemala, as "an enormous number of human bone fragments scattered at random throughout the site. An occurrence duplicated in any [Maya] archaeological context where soil conditions foster bone preservation and where burials commonly were made within the habitation area" (Becker, 1993, pp. 50-51). The problem, however, as to whether human remains are enemy bones or revered ancestors is not clear. Bauer and Bauer, for example, note that their uncovering of an ancient Peruvian cache was composed of ten skulls with no bodies and no artifacts (1987; also Arkush, 2006, pp. 321 note 4; McEwan, 1991, pp. 109); making it difficult to discern if the remains pertain to ancestors or enemies. As mentioned by Cieza de León, during the conquest of Peru, native captors communicated with their slain foes in equivalent manner with which they communicated with their ancestors (1883 [1553], pp. 96, 195).

Ritually Charged Caches

In Monte Albán, Oaxaca, Caso noted a skull alongside vertebrae (1938, 1939). At Uaxactun, Guatemala, similar data was reported of skulls with vertebrae (Smith, 1950, pp. 93). At Tikal, Guatemala, human heads were placed between ceramic vessels (Becker, 1993, pp. 59, 59-60 note 12). From Baking Pot, Belize (Ricketson, 1929, pp. 5), to Chichén Itzá, Mexico (Ruppert, 1935, pp. 85-86), human skull fragments, rather than whole pieces, were placed in caches. Similar Maya bone caches were also found at Nebaj, Guatemala (Becker, 1986; Smith and Kidder, 1951, pp. 29-31); Tayasal, Guatemala (Cowgill, 1963, pp. 436-437, personal communication 2009); Mayapán, Mexico (Smith, 1962); Topoxté, Guatemala (Jones et al., 1981, pp. 543); and Copán, Honduras (Becker, 1993, pp. 59-60 note 12). Landa (in Tozzer, 1941, pp. 111-130) says skulls were ritually used by the 16th century Maya but did not know to

whom the individual craniums belonged.

Ancient Mayan inscriptions and imagery suggests the ritual execution of captives by decapitation (Sharer, 1994, pp. 92, 105, 396-397, 516, 522-525, 543). Skulls in caches are not always placed face-side-up. Cucina and Tiesler suggest that face-down meant "disrespect [toward] the individual" and that the manner in which human remains are disposed of is "related to their [ritual] function" (2006, pp. 122). Nelson and colleagues, referencing La Quemada, Mexico, state that Mesoamerican burial practices exhibit a wide-range of practices representing differential relationships between the living and the dead (1992, pp. 298); that is, differential "burial patterns may indicate…a friendly vs. hostile relationship to the living people who conducted the ritual" (1992, pp. 310). Per Seeman (1988), for the Hopewell, cranium cache burials do not indicate reverence but hostility. As witnessed by Cavelier de La Salle, the Iroquois would dig up their enemies' graves and burn the disinterred corpses (La Salle, 1901 [1682], pp. 223-225; also Hall, 1997, pp. 16; Parkman, 1925, pp. 230-234).

Bundles and Indigenous Cosmovisions

Indigenous Americans tend to ritually break and/or throwaway items when no longer needed (Astor-Aguilera, 2010, pp. 222; Harrington, 1914, pp. 126). The Sioux kept spirit-essences, "wakan," ceremonially attached to certain items and ritually released them when they were no longer required (Black Elk, 1953, pp. 29-30; Densmore, 1918, pp. 77). The wakan of the Oglala is similar to the manitou of the Algonquians and the orenda of the Iroquois. These terms refer to invisible person-like essences that have skills, powers, and volition. These essences are potentially present in trees, stones, animals, bodies of water, etc, and human bones (McKeever Furst, 1995, pp. 177). For this reason, for example, the Southeast Mississippian dead remained powerful forces (Power, 2004, pp. 143).

Indigenous American invisible forces were present irrelevant of whether associated with a dead friend or foe. Duncan states that these essences could be "appropriated from an enemy" (2005, pp. 226). La Salle, for example, witnessed the Iroquois raid a Miami village and the killing of Ouabicolcata their chief. Ouabicolcata's dead body, as if a live captive, was then taken to the Iroquois camp and kept hostage (1901 [1682], pp. 287-289). The previous reminds of Betanzos' (1996 [1551-1557], pp. 94-95) and Gamboa's (1988 [1572], pp. 105) account of a Cuzco structure, the llasahuasi, where the Inka kept the decapitated heads of their Titicacan enemies. Brown thus sees a connection between the caretaking of an ancestor's head with that of taking an enemy's head (1995). Per Hall, "the gaining of those parts…is tantamount to keeping the individual" (1997, pp. 156). Underhill (1979, pp. 46-47) reported similar for the Tohono O'odham in that they sheltered and fed the scalps of their killed enemies in order to harness their powers.

Regenarative Power

For Andean cosmovisions, Tello (1918) concluded that enemy decapitated heads held regenerative power. Per Proulx, human bones were linked by Andeans to fertility and regeneration (1989; also Silverman, 1993, pp. 218-226; Carmichael 1995). As Proulx elaborates, heads held regenerative properties and "the Nasca people placed great importance on the human head as a source of power… Trophy heads in [burial] caches resulted in the concentration of power… [Associated] motifs display sprouting beans in the form of a trophy head or an ear of corn with the face of a trophy head. This suggests a metaphor [linked to] various agricultural plants" (1999, pp. 9).

Human skulls with botanical features are also often

depicted in Mesoamerican imagery. Maya cache vessels and cache-like burials, according to Becker (1993, pp. 48), share indigenous cognitive meanings as related to botanical regenerative cycles and this pertains to not only the skull but the whole human body. Densmore, for the Sioux, says that bundled hair taken from dead relatives were addressed as if the individual were still present (1918, pp. 78). Per Hall, the Menominee and Dakota dead remained around their personal items and the bundle containing their objects was held by their descendants' as if it were the person itself (1997, pp. 27-29; also Harrington, 1914, pp. 127-128).

Contemporary Bone Keeping and Reciprocative Actions

Hall (1997, pp. 31) mentions that the Lakota continue bundling practices, "spirit keeping," in subtle and modified form. The contemporary Maya of Quintana Roo, Mexico, also continue this practice, however, in not so subtle or modified form (Astor-Aguilera, 2010). Maya bundles, sometimes along with associated personal items, are sheltered and fed food and drink (Astor-Aguilera, 2010, pp. 161). Maya bone bundles are often scooted aside and the long bones then piled on top of one another. The skulls likewise. Sometimes these bones are removed or never placed within the bundles and taken elsewhere (Figure 25.10).

Figure 25.10.
Piled-Up Maya Femurs and Skulls.
Photograph by the Author.



Kehoe (2002, pp. 202-203) mentions that the Iroquoi-Huron also exhumed their dead and reburied skeletons together in mixed manner. Nelson and colleagues observed similarly archaeologically at La Quemada, Mexico, where bundled "bones were disarticulated [and] grouped in like elements" (1992, pp. 304). Furthermore, "the bone concentrations were dominated by the upper and lower limbs, skull fragments, mandibles, scapulae, ribs, and hip bones, [while] the vertebral column, hands, and feet were consistently missing" (Nelson et al., 1992, pp. 302). Similarly, for the Southeast, Hall says that the leg and arm bones and skull were "tied into a bundle" while "the ribs, axial skeleton, foot and hand bones were not saved" (1997, pp. 25). Nelson and colleagues conclude that some bones are "intentionally set aside during bundling… This matched distribution [of bone] may be [a] conscious choice [with some] elements perhaps being discarded" (1992, pp. 305).

Final Thoughts: Out of Eurasia

Wrapped skeletal remains are agency laden power bundles to many Indigenous Americans from North to South. Bundled remains can be political players in the social life of those who help shelter and take care of them. Many Indigenous Americans see no polar dichotomy between life and death (Astor-Aguilera, 2010). Per Paul, a Tz'utujil-Maya once came upon "a very shiny bone." He picked it up, treated it "with respect, and placed it in a box."

He then heard the bone talking. "He took it out, wrapped it in cloth, [and then] the bone told him to guard it well" (Paul, 1976, pp. 78-79).

The Maya can ritually use bones to cause good or harm as one can beseech and/or threaten the ancestors, whether verbally and/or physically, to do the bidding of whomever has access to them (Astor-Aguilera, 2010, pp. 179). The Maya can deny food and drink to their bundled objects. Bones can be set aside and forgotten and/or they can be tossed into the forest to rot and/or be gnawed at by animals. Rather than codified doctrine that restricts adaptive behavior; Indigenous American actions follow cognitive intersubjective patterns and conventions that exhibit fluidity in the shaping of ideas and relations and, like live people, funerary bundled remains were/are treated as sentient persons.

The human cognitive field patterns cosmological conventions onto the material world. Almost identical to Mesoamerica, Oldstone-Moore (2015, pp. 152) points out that Chinese human essences "are not systematic as there is no agreed upon number per person… While a person is alive, these are joined together and provide him/her with animate consciousness and rational capacity. At death they separate, the *hun* rising and the *po* settling into the earth." The Chinese to Mesoamerica similarities are not coincidences. From about the first-millenium CE to about "two thousand years ago, a circum-pacific art style spread coastwise…[and] survives in New Guinea and Melanesia, in the Ainu of Japan, and the Northwest American Coast" (Kehoe, 2002, pp. 106).

Per Kehoe, the "Ainu of Japan, accustomed from ancient times to using boats, [are] 'generalized Eurasian'—relatively light-skinned, dark hair, brown eyes, neither very tall nor very short, a range from which descend the Indo-Chinese, Polynesians, Siberians, and American Indians" (2002, pp. 10, 15-16; also Graves, 1995, pp. 34-36 and Mithen, 2003, pp. 227). Shared ideas are their engaging "spirits' to help them heal, divine, or retrieve wandering" human essences (Kehoe, 2002, pp. 106; also Graves, 1995, pp. 6-8, 13-14). The Out of Eurasia connections to the Indigenous Americas, regarding human essences being present in skeletal remains and other objects, are strongly exhibited within the Jōmon, the Ainu, and the Okinawa cultures of Japan which, per Susumu, are the "animistic foundation of Japan" (2006, pp. 227; also Matsumoto, 2018, pp. 3-5 and Mithen, 2003, pp. 380).

In rural Japan, Shintō retains the ancient tribal cult of the ancestors where at death a person's essences become "kami" (Bowen, 1998, pp. 58; Kitagawa, 1988, pp. 229, 232). Like their Indigenous American counterparts, kami are venerated as linked to fertility in relation to "wind, thunder, lightning, rain, the sun, mountains, rivers, trees, rocks, [and] certain animals" (Picken, 1980, pp. 41; also Jinja Honcho, 2011, pp. 3). Also similar to Indigenous America is that kami essences are not always beneficient. Per Havens, "kami have an 'unpredictable nature' (Satō, 2000, pp. 20)… As Itō (2002, pp. 4) states, ancient associations of kami with epidemics, floods, and drought indicate that venerating 'kami was for no other reason than for placating' them" (2006, pp. 19). Indigenous American and Eurasian embodied cultural experiential values and meanings, as with all other humans, are created, recreated, and transmitted in and through the human mind. Human mental perceptual cognition includes embodied relational experiences with people, animals and plants, landscape features, meterological phenomena, and man-made material culture.

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Front cover: Ceremonial gathering on the Spring equinox 2000 taken from the Moon Pyramid illustrating the Avenue of the Dead and the Sun Pyramid.
Front background: Eagle sculpture from the Quetzalpapalotl Palace in Teotihuacan.
Back cover: Mural painting of the sacred water mountain at Tepantitla, Teotihuacan.
Photographs by Saburo Sugiyama

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