**The Jaguar: Mythology and Culture in the Bolivian Amazon**

The last few decades are marked primarily by the rapid development of new technologies across a multitude of fields. Modern innovation has led to paradigm shifts in methodologies, prompting creators and researchers to reassess how they approach the practice of content creation. As access to tools that produce realistic models increases, the need to address the role of implicit biases and preconceptions in reconstructing the past becomes even more urgent. Physical artifacts that survive the passage of time are often chosen as objects of reconstruction, and their presence in our present imbues them with a certain degree of authority. In contrast, firsthand cultural knowledge is often lost, obfuscating that which is arguably essential to the understanding of a society. This loss, combined with the influence of prejudice both modern and historical, convolutes the process of reconstruction and visualization for non-material artifacts.

These biases are often woven into the fabric of the historical sources from which one draws inspiration. In the context of researching the non-Western past, religion is the primary driver for many European expeditions. In the pre-Columbian Amazon, Jesuit missionaries were often the ones who documented and preserved cultural knowledge in a format legible by Western societies. This tendency is made clear by the character of surviving sources; of the number of sources I reviewed in the course of this project, only the modern interpretations were written by individuals not associated with missionaries. They also emphasize the Jesuit origins of historical source material in this area.

 The dominance of Jesuit source material is relevant when one considers the impact one’s personal background has on one’s description of a society. Because their interest was primarily related to conversion, their documented observations of tribal religions and rituals are likely biased. Much of my research is characterized by the synthesis of various available archaeological, ethnographic, and historical sources. Within the collection of those sources, some of the most influential were the works of Karin Vélez (2015), Alfred Métraux (1943), and Jesuit missionary François-Xavier Eder (2009 [1772]). Ultimately, this project surveys and summarizes major trends surrounding the role of the jaguar in Baures and Mojos cultures.

Goals:

● To research and develop an understanding of the jaguar in Baure and Mojos mythology

● To create a jaguar model that could potentially be used in virtual human-jaguar interactions

Background

The Llanos de Mojos is a seasonally inundated savanna located in the northeast region of the Bolivian Department of Beni and populated by Arawak speaking Mojo and Baure, the latter of whom are of specific interest to this paper. The native peoples of Baures were commonly believed to be a nomadic hunter-gatherer society, a view that has since been challenged by the discovery of massive earthworks in plain areas that experience seasonal flooding. These earthworks included raised field systems for crop growth, as well as various canals and causeways used for transportation.

 Early accounts written by Jesuit missionaries in the fifteenth and sixteenth centuries detail aspects of the Baure culture, from their ritual practices to the minutiae of their daily attire (Eder 2009 [1772]) The society was hierarchical, with hereditary chiefs referred to as *aramas* wielding significant power. Each year at harvest time an elder man of the tribe was selected to function as a curb on the chief's power (Métraux 1943:6).

 Villages of the Mojo tended to be well established, and each notably contained public drinking places, called bebederos. Decorated with the skulls of enemies and jaguars, these bebederos held an important place in ritual and tribal customs (Métraux 1943:10).

The Jaguar

The jaguar is the largest cat natively found in the Americas. The only American member belonging to the genus *Panthera*, its body and head can measure up to six feet in length, and the addition of its tail adds up to another 75 inches (Johnson 2008). Its coat is marked by spots that form rosettes containing black markings, and its build is stocky and muscular in form.

The large carnivore has historically been highly relevant to cultural belief and tradition. Many pre-Columbian societies cast the jaguar in a deified role, one typically associated with fear and death. Its name originates in the Guarani word *yaguara*, which can be translated to mean "a wild beast that kills its prey in a single bound" (Baker 2008). As most Europeans were unlikely to have encountered the jaguar prior to their arrival in the Americas, Jesuit sources tend to refer to the jaguar as a “tiger'” The fact that the indigenous Amazonian people assigned significant meaning to the role of the jaguar thus comes as no surprise.

Jaguars played an important role in the relationship between Jesuit and indigenous populations, as well as between people and nature (Vélez 2015:768) While by modern standards the jaguar is not typically a major threat to humans, the frequency at which jaguar attacks are discussed by Jesuit sources in conjunction with the gravity that characterizes those descriptions suggests that the attacks left a significant psychological and cultural impression. As Vélez points out, “It is not the quantity of attacks that mattered, but the paradigm-shattering point they conveyed”, namely that humans functioned as prey to a far stronger beast (2015:785). Regardless of the actual frequency of jaguar attacks, the perception among the Jesuits and the indigenous peoples that jaguars were a real and persistent threat to their survival was well-documented. The emphasis Eder places on this killing capacity of the “tigre tacheté” (2009 [1772]:205) demonstrates the power of this perception. In his writings, he repeatedly underscores the bloodthirsty nature of the jaguar, and the large number of native people who fell victim to the jaguar’s attacks (Eder 2009 [1772]:139).

The Jaguar and Shamanism

For the Baure and Mojo, the jaguar was often associated with shamanism. A shaman, termed *tiharauqui* or *motire* (Eder 2009 [1772]), discovered their vocation as a result of some supernatural compulsion, manifested either as a near-death experience or a call from spiritual powers. These shamans, male or female, fulfilled a variety of societal functions that depended primarily on individual inclination and specialization (Métraux 1943:14). Their connection with the spiritual realm was a major part of their function in society, and the shaman was responsible for communicating with spirits.

Métraux notes that while Jesuit sources overemphasized the jaguar cult relative to other traditions and beliefs, the role the jaguar played was salient and essential to the structure of the Mojo religious system (1943:12). Those favored by jaguar spirits were endowed with supernatural powers, typically in the form of power over disease and relative omniscience with regards to the names of jaguars. Using these powers, the shaman could gain insight into the intentions of jaguars, warn their community of impending attacks, and perform a variety of other spiritual functions.

Referred to as *aramamaco* (meaning "big chief"), the jaguar’s influence permeates many aspects of the Baure and Mojo religious systems. The Mojo may have believed in a godlike celestial Jaguar, but the interpretation that each jaguar was a spirit incarnate with whom certain members of the shaman vocation could communicate is more compelling (Métraux 1943:12). One of the ways in which an individual could demonstrate a shamanistic inclination was by surviving an attack by a jaguar. Being victim to an attack was not the only path to shamanism; a sudden stupefaction followed by a crisis of tears or a sudden and inexplicable loss of memory could suffice . This revelation of sorts can be seen in Métraux’s description of one girl’s indication of shamanistic potential:

A girl had gone to the river where she saw a female spirit who called her by name. She returned home and there started to chant in a weeping tone constantly rubbing her eyes and repeating, " Come, come, my god! " The girl's father, greatly pleased, declared proudly that she had become clairvoyant. He helped her strip all her ornaments and set away from the house the fish which he had been about to eat. After a few days of fasting, family gave a feast at which the daughter was recognized as a full-fledged shaman (Métraux 1943:15).

 The process of becoming a shaman is therefore not completed by simply being engaged by a spirit; while it may be a necessary condition, to become a full fledged shaman one must undergo ritual fasting and ceremonial training (Métraux 1943:15). Other sources further detail the process for other future shamans:

They earn the priesthood and remain as consecrated by the hand of the elder priest (who is the most famous sorcerer) who anoints their eyes with the juice of a root of a spicy and biting vine, to make clear, at the cost of much stinging and crying, the vision to see and to know the things that their God reveals to them (Hirtzel 2016:242).

An interesting component of shamanism present in both passages is the importance of and relationship between sight and naming. The spirit who communicated with the aforementioned girl knew her name, much like shamans were said to know the names of jaguar-spirits. In this context, the repeated rubbing of her eyes seemingly connotes the relationship between sight and identification. After seeing a spirit who identified her by name, the girl was driven to functionally blind herself, closing her eyes and passing her hands in front of them. This concept of identification and naming can also be seen in the ritual practices following the killing of a jaguar.

 After its death, a ceremony took place outside the bounds of the local village; to bring the body into the village itself was to bring disease. During the ceremony, the hunters fasted the first day, drank the first night, and were painted black by women of the village on the third day. only then would those who killed the jaguar would skin it, and purportedly eat its flesh (Métraux 1943:14). Afterwards, the bones of the animal were gathered, and ceremonial rites were performed upon them. The skull and paws would be placed in the *bebederos* as trophies. For the Yurakaré, one of the performed rites involved the shaman and the killer of the jaguar. The shaman would reveal the name of the slain jaguar to its slayer and, referring to another Jesuit source, the killer would henceforth take for themselves the name that was revealed (Hirtzel 2016:240). Hirtzel points out the importance of knowing the jaguar’s name for both the Yurakaré and the Chimane, and speculates that this importance would be similar for the Mojo. The name then corresponded not only to the skull-trophy of the jaguar, but also to its killer. The action of taking on name of the slain jaguar was not an erasure of the individual’s original identity, but instead an addition. The onomastic identification between the jaguar, its human slayer, and the skull-trophy suggests an intimate and complex connection between the jaguar, identity, and corporeality.

The Jaguar in Culture

A major theme in Amazonian myths is humankind’s progression from nature to culture. Deon Liebenberg (Liebenberg 2016) analyzes the role of the jaguar within the framework of culture. He cites the overarching culture of animal and human as characterized by "a spiritual unity and a corporeal diversity", a culture defined as common to both man and beast. While his discussion is primarily of Gê and Bororo mythology, those groups were in close geographic and temporal proximity to the Baure and Mojo. The Bororo are a group indigenous to Brazil, but their historical location extended into Bolivia. The significance of the jaguar in their traditions and mythology speaks to the overlapping importance of the jaguar among local indigenous societies.

Liebenberg holds that each myth realizes a singular underlying theme of the passage from nature to culture at the price of the dissolution of celestial ties. Of particular note is the Gê story of the bird-nester who acquires fire and learns to hunt with tools from the jaguar. Prior to these acquisitions, humankind was in a state far from civilized, which Liebenberg identifies as pre-cultural immersion in nature. The price of culture for humanity, however, was the regression of the jaguar to its present state. No longer able to use fire or hunt with a bow, the jaguar is reduced to a non-verbal animal, and becomes the "sworn enemy of humankind" (Liebenberg 2016:15). Human culture, however, is not celestial in nature; it acts instead as a mediary between the pure culture that belongs to the celestial realm and the pure nature existing on earth. Human culture is thus contained in material artifacts that were stolen or bestowed upon humankind, as in the case of the jaguar and the bird-nester. Without these cultural artifacts, humankind would, like the jaguar, be reabsorbed into nature.

This notion of cultural artifacts and their significance to the emergence of human civilization from nature casts a different light on certain traditions of the Baure. Eder discusses a custom wherein the possessions of one who dies by the paw of the jaguar are left out for the jaguar to claim (2009 [1772]:139). In the context of the earlier theme, by killing a human the jaguar is seemingly able to lay claim to their possessions, perhaps spiritually crossing over into the realm of culture.

Schema and jaguar depictions

One potential demonstration of the influence of top-down bias in reproduction and recording lies in seventeenth century renderings of jaguars. Vélez comments on the relative frequencies of accurate vs fantastical images of jaguars, mentioning that although realistic depictions existed, they were the minority at the time (2015:776). Most depictions favored the use of exaggerated spots and stripes. Was this an attempt to capture some degree of presence experienced when viewing a jaguar, or instead an unconscious choice, driven by visual familiarity with other more vibrantly pelted animals? The influence of schema-driven, or biased rendering potentially explains this tendency towards exaggeration. Ernst Gombrich cites Albrecht Dürer’s 1577 woodcut of the rhinoceros in his argument that an existing representation of an object (based upon the artist’s schema) will always have influence over the artist, even when the intent of the image is to depict reality (Gombrich 1964:72). Vélez establishes the prevalence of predatory cats in European art and culture, specifically discussing the social and cultural significance tied to the tiger, whose name the jaguar often shared after the European conquest of South America (Vélez 2016:778). She maintains that both the use of the word “tiger” to refer to jaguars and the choice to exaggerate physical features were motivated by the European desire for verisimilitude. While possible, her interpretation alone does not require that we ignore the potential influence of established schemata on visualization.

Visualizing the Jaguar

The process of archeological reconstruction and visualization is one that requires not only attention to detail and accuracy but also a high degree of self-awareness. Archeological images themselves function as a form of argument distinct from accompanying text, and like text are laden with theory (Gamble and Moser 1997). They often perpetuate ideas through their very composition and demonstrate the persistence of basic explanatory themes regarding human history and existence. The reach of our implicit biases is broad, and extends not only into interpretive reconstruction, but also into what we typically consider to be “scientific.” Depiction becomes a complex and nuanced issue when these preconceptions are considered.

This difficulty in depiction is further complicated when that which is being depicted holds significant psychological, cultural, or emotional value. This complex, socially imbued value is highly relevant to the process of archeological or historical visualization. Any past we construct is heavily influenced by not only our own past, but also the social, political, and economic circumstances in which we operate. The reconstructed past all too easily becomes a product shaped by its surrounding society's ideological influence (Solometo and Moss 2013; Gero and Root 1990). Further obstacles to reconstruction include the difficulty of balancing appeal and accuracy; as many visualizations rely on some form of funding, it becomes crucial to capture the interest of those who themselves are likely uninvolved in research. Whether accruing interest means appealing to broader audiences through mass production, or convincing independent investors that that project is worthwhile, a work's marketability is typically relevant to its funding. As a result, the line between accessibility and accuracy is a precarious one to toe.

In the case of Baure mythology, the limited information to which we have access adds additional layers of complexity to the issue of visualization. Certain aspects of Baure culture and belief are irrevocably lost to the ravages of time, and due to the origin of existing sources. The bias of those sources is clear in their tone and language; Eder's accounts of Baure customs and ritual beliefs often read as cynically patronizing. His descriptions of jaguar-shamans in particular demonstrate this tendency:

The masters in superstitions, these slaves recognized by laziness, which we call *motire*, as I have already said, were able to obtain abundant harvests thanks to this famous tiger. To quell their hunger, one of their means, among others, the easiest and most profitable, is to invent a tiger, made almost mad by anger and violence, told him he was going to make a carnage and destroy everything, unless, as soon as possible, one can remedy his anger with the usual dishes and chicha....Because the *motire*loves such treats, but he can not impose them as he pleases, for fear that the Indians, petty guards of their property, will sometimes refuse him, he pretends to have spoken with the tiger many secrets. And even, to gain even more respect from his own and authority over them, often the *motire* itself claws slightly everywhere with his nails and pulls out his hair, acts that he attributes to a tiger in anger and he claims that if he had not spontaneously sacrificed himself in the place of others, the beast would have killed everyone (Eder 1888:140).

His condescension regarding the position and behavior of the *motire* heavily colors his description of cultural traditions. Eder’s language clearly communicates his lack of respect for the practices of the locals, referring to highly respected community members as “ces esclaves reconnus de la paresse”, or “slaves characterized by laziness”, and to the *motire*’s practices as feigned (“il feint alors de s'être entretenu avec la tigre”). Eder later explicitly recounts the ways in which he has mocked and disrespected the beliefs of the locals, and mockingly asks why he has not been made to suffer:

In conclusion, I will only add what I once said to the Indians about their insane credulity in achane [spirits?]: if they were really so many and so powerful, as they believe, why, to this day, did not these adversaries do anything to me? To me, who had slaughtered so many of their trees, ripped off their plants, entered their lake, dug up and threw away the bones of their proteges, destroyed all their witchcraft, and even worse, hunted down and killed the tigers...wherever they were found (Eder 2009 [1772]:147).

The hypocrisy of his status as a religious missionary is evidently unclear to him, and his documentation of Baure religious tradition is highly prejudiced by his skepticism and language. This makes it difficult to determine the validity and accuracy of his descriptions.

Additionally, with visualization comes an assumption of sight's universality. The notion that peoples existing hundreds of years ago share the same modes of representation and visualization as we do seems to rely on the large assumption that humans' relationship with images is purely the result of the visual system’s physiology. While physiology undoubtedly makes a significant contribution to the ways in which we see, that humanity's relationship with images is consistent throughout history is not necessarily true. The concept of the "period eye" was developed by Michael Baxandall (Baxandall 1988; 1985) to describe the impact of cultural factors on modes of representation throughout history. the culturally constructed elements of vision are emphasized, and underscores the social influences and cultural practices that shape attention to visual form within a given culture. Baxandall posited that the cultural knowledge of viewers specifically attunes them to aspects of images produced in their cultural environment, aspects that modern viewers would not necessarily notice or understand. However, he held that this understanding can be recovered through the study of texts and context. Without context, fully understanding and interpreting images that result from a specific societal environment becomes difficult.

This notion of the period eye seems as though it has significant repercussions for the task of accurately representing mythologies in a visual medium. Without a comprehensive understanding of visual culture in Baure society, can authentic modes of visuality be accessed? Without reference to existing culturally-emergent images, the communication of symbolic meaning is severely limited.

While limited, visualization can still be an effective tool for those looking to gain insight into a given culture, especially in the contexts of education. One can see in the popularity and reach of films like Patricia Amlin's *Popol Vuh: The Creation Myth of the Maya* (Amlin 1987). The animated film is based on a cultural narrative that recounts the mythology and history of the K'iche' people who inhabit the Guatemalan Highlands northwest of present-day Guatemala City. Written and orally preserved in the mid-16th century, prior to the Spanish conquest of Guatemala, the film details a Mayan creation myth, the oldest one to be preserved in its entirety. Centering on the adventures of the Hero Twins, Hunahpú and Xbalanqué, the film utilizes traditional and authentic imagery, drawn from preserved Maya ceramics (Figure 1). In doing so, the tale is arguably made accessible to a wide public not through diminishing, but through visualizing. Drawing heavily on existing artifact and imagery is one way to privilege the role of a culture’s visuality, and the availability of source material is crucial to the film’s successful execution.

Another relevant example of visualization of cultural artifact is the documentary film *The Spirit Hunters* (MacQuarrie 1994). The film follows anthropologist Glenn Shepard as he cohabitates with and explores the culture of the Machiguenga. The Machiguenga are a remote ethnic group that inhabit Peru’s Amazon jungle, near the borders of Bolivia and Brazil. Like the Baure and Mojo, the Machiguenga speak a language belonging to the Arawakan language family.

The film uses voiceover narration and digitally manipulated images to communicate Machiguenga spiritual beliefs and origin stories. Classified as animist in nature, Machiguenga beliefs center on their view of the rainforest and the animals that inhabit it. While interesting in its own right, the imagery found in *The Spirit Hunters* pales in comparison to the strength of images found in *Popol Vuh.*

Planning

 My initial intent was to develop a nuanced understanding of Baure origin stories and mythologies, and subsequently to storyboard visualizations of those myths. I later narrowed my interests, specifically focusing instead on the jaguar in mythology. My original goal was primarily to create an animation not unlike Amlin’s *Popol Vuh*. Using the descriptions of various stories drawn from Jesuit sources, I intended to plan, storyboard, and create an animated visualization of Baure myths. My first obstacle was the lack of recorded imagery; unlike in the case of *Popol Vuh,* any images and depictions of stories in Baure society have largely either remained undiscovered or lost to time.

One potential source for visual reference are the Bolivian petroglyphs documented by the Bolivian Rock Art Research Society (SIARB), an independent private institution dedicated to the research and preservation of rock paintings and petroglyphs. While most are located in the Andean highlands, a smaller number of documented sites have been found in the Amazon lowlands of the Beni Department (Alvarez 2008). One site, identified as ‘Sama’ [Figure 3], primarily features primate and mammal figures [Figures 4 and 5). These figures are simplistic in form, and in the case of the quadruped are unidentifiable in species. Other Bolivian rock art is more diverse in both mode and subject of representation [Figure 2].

Another conceptual difficulty I encountered is the integration of a final product with the existing Baures research and virtual reality environment. While recognizing that a 2D animation could suffice as a supplementary component, I was interested in exploring virtual reality technologies for my project. The first iteration of my project proposal involved the use of Google's Tilt Brush technology. Using the Tilt Brush, one can create immersive 'painted' scenes in 3D space. This medium seems particularly apt for historical visualization; by retaining painterly elements, its products maintain their status as art without claiming verisimilitude. Clarifying to the viewer that the work is not intended to be a literal depiction, but rather an interpretation, the style of representation makes explicit the influence of the artist while still creating an immersive environment.

As of January 2017, Tilt Brush Toolkit has enabled artists to animate their virtual reality creations in Unity. The Tilt Brush Unity SDK includes the original materials as well as scripts that automatically assign them to imported sketches, allowing the work to look and behave as it does in the original file. This integration makes Tilt Brush an even more attractive medium for story visualization.

Unfortunately, due to my timeframe, using Tilt Brush was not feasible. As a result, I chose instead to produce a 3D model of a jaguar in addition to my research. While not directly engaging with mythology, through the creation of a jaguar model I was able to produce an artifact significant to Baure culture.

Modeling Process:

 Although Autodesk Maya is the primary software used for modeling in this course, I have consistently encountered difficulties with running the program on my laptop. As such, I decided to instead model in C4D, then export into Maya for rigging and final touches. Prior to modeling, I researched the compatibility of Cinema 4D files with Autodesk Maya and Unity, and as C4D and Unity both use an FBX file format, encountering obstacles to export is unlikely.

 I began my modeling process with a google search of “jaguar”. For my first draft, I decided that adapting a pre-existing quadruped model would hasten and improve the quality of the modeling process. Using a pre-made model from C4D’s content browser, I adapted it to fit the basic silhouette of a jaguar [Figure 6]. I realized quickly that working with the pre-made mesh was going to be a difficult process, as in the past I have mainly used low-poly cage models with a subdivision surface modifier. I ultimately continued with the original model, subdividing and adjusting vertices as I modified the existing mesh [Figure 7].

I found an existing texture file for a jaguar online. While the mapping differed, I decided that it would function as a good enough approximation when cut down and simplified. Using Adobe Photoshop, I pieced together a mapping to fit the model [Figure 8]. As my experience with UV mapping and texturing is limited, the current appearance is very much a placeholder, and could easily be improved upon in the future [Figure 10].

Conclusions

The cultural significance of the jaguar for the Baures people has been well-documented and discussed. Through reading firsthand accounts of rituals and stories, I was able to more deeply understand the emotional and ritual ties that link the jaguar not only to the Baure, but also to various other Arawak-speaking tribes. The prejudices and biases embedded in many historical sources was also reaffirmed through the research process. As a result, those interested in visually reconstructing aspects of the societies must account for not only their own preconceived notions, but also those of the sources’ authors.

While not rigged, the 3D model fulfills the intended purpose as a base for any future projects involving interaction with jaguars. As the jaguar occupied a significant portion of the Baures people’s cultural consciousness, any project that aims to authentically reconstruct their experience should attempt to include the jaguar. This inclusion need not be explicit; by referencing relevant rituals and beliefs, one may conceptually include the jaguar. This could potentially be accomplished through modeling traditions and ritual interactions among the Baure and including those interactions in a larger village scene. Future projects could also include the storyboarding and creation of an immersive rendering of myths using Tilt Brush. This project could later be embedded in the existing Baures virtual environment, literally contextualizing the story.

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