EXPLORING AN OCEANIC INFLUENCE ON THE PEOPLING OF SOUTH AMERICA

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

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Literature review

This thesis has been produced based on the work of previous researchers who have either been seeking to answer the same question, or to disprove the idea of an Oceanic influence on the Americas. So far, there is little consensus in the literature as to a definitive entry place and time into the Americas. The Beringia model is the most popular, but there is a great body of work that refutes or criticizes it, and it is from this work that I have drawn my data. Radiocarbon dates from sites in South America, such as Monte Verde, Chile, indicate a much earlier habitation of the South American continent that could be possible following the Bering Land Bridge model.

While the archaeological materials supporting an earlier migration and habitation of South America are scarce compared to the materials found in North America, one must consider the accessibility of sites due to modern disturbances and political unrest in the regions in question. My choices for papers to review for this thesis revolved mainly around understanding the existing models and analyzing evidence from South America that has the potential to indicate a southern contact of Oceanic origin. Such contact would likely result in different genetic signatures in South American groups as well as different cultural elements.

Thesis statement

The focus of this research is to explore the possibility that Australasians contributed to modern indigenous South American populations during and after the time when the major peopling events of the Americas are thought to have occurred. This paper proposes a deep evolutionary connection between Oceanic and South American peoples, and challenges the idea that the Bering Land Bridge or passage along the coast of the Bering Strait was the only way that humans reached the Americas in the Late Pleistocene. Additionally, evidence from Australasia is presented to prove that long-distance sea migrations were feasible at the time of the peopling of the Americas, as they had been successfully completed nearly 40,000 years earlier in the peopling of Sahul, or modern day Australia and Papua New Guinea. After a thorough review of published work in the fields of archaeology, craniometrics, genetics, linguistics, and ecology, it is evident that there is not sufficient evidence to support the Beringia model as the sole source of the peopling of the Americas and of the development of the many and divers indigenous cultures found therein.

Theoretical framework

This project has a strong basis in archaeological findings and their significance, as well as in thorough analysis of published research regarding morphology and cultural attributes of people who could be the earliest settlers of South America. It requires familiarity with migration models, and also with Oceanic customs and culture and how they compare to South American cultures from the same time period.

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CHAPTER I

INTRODUCTION AND BACKGROUND

The debate over the movement of humans into the Americas has stagnated as the field of American archaeology has settled on the Beringia model, first put forth by Fray Jose de Acosta in the late 1500's (Jarcho, 1959). The perpetuation of the idea of a land bridge connecting northeast Asia to the Americas has led many to believe that it is the only way that humans could have reached the 'New World', in spite of archaeological evidence from Australia indicating that humans were completing equally difficult sea voyages as early as 60,000 years ago (Clarkson et al., 2017).

The Bering Land Bridge model suggests that humans migrated from northeast Asia through an ice-free corridor during the late Pleistocene. Upon arriving in what is now North America, these early pioneers scattered at a prodigious rate, reaching the southernmost tip of South America in only a few thousand years (Goebel et al., 2008). Kitchen et al. (2008) projected that the initial founding group was between 1,000 – 5,400 individuals. This rate of expansion is ambitious, especially considering the difficult terrain covered, novel pathogens and disease bearing insects encountered, and the insistence by some archaeologists that no watercraft were used.

This supposed dependence on the migration occurring across a land bridge has recently been refuted by evidence that, while there was a clear path between northeastern Asia and what is today Alaska during the time of migration proposed by the Bering Land Bridge model, the passage was not ecologically viable, and therefore would have been impassable (Dixon, 2013; Pedersen et al., 2016).

For this reason, along with the unusual swiftness the Beringian model attributes to the original settlers of these two large continents, I feel it is necessary to look to other populations as players in the peopling of the Americas. The wide and varied societies of the Pacific provide a viable source of cultural and morphological input into the peopling of South America. As proven by Clarkson et al. (2017), the peopling of Sahul occurred nearly 60,000 years ago and required the kind of open ocean travel that has been declared impossible in the peopling of the Americas. While the final stages of the settlement of Polynesia did not occur until an estimated 1,400 years BP with the occupation of Rapa Nui (Easter Island) (Hurles et al., 2003), the navigational skills of Oceanic people are legendary and this long experience of open ocean sailing makes it likely that they reached the coast of South America. Cultural and linguistic similarities between Melanesian, Polynesian, and Micronesian cultures to those of the western portions of South America are present, as are morphological similarities, which are unlikely to be simply the result of life at similar latitude.

This paradigm takes direction mainly from genetic findings, most of which indicate a northeast Asian ancestry for the people of the American continents. However, DNA is not infallible; in order for true understanding about the peopling of the Americas to take place, we must consider all elements of human life. The archaeological base of the Beringian paradigm has been shaken with the discovery of pre-Clovis sites in both North and South America, though doubt in the dates of these sites is present in the archaeological community.

In the present study, I consider various elements of culture, genetics, linguistics, and morphology typically disregarded by those studying the peopling of the Americas for their failure to conform to the Beringian paradigm. This includes examining the viability of certain pre-Clovis sites and the technologies and food resources used therein; studying genetic and

morphological profiles of South American people for indicators of contact with Polynesian or Oceanic people; analyzing linguistic similarities between certain South American groups and their Oceanic contemporaries; and reviewing new data that proves certain elements of the Beringia model unlikely, such as ecological data from the Bering Strait. Through this study, I hope to reveal areas of weakness within the Bering Land Bridge hypothesis while also providing evidence for how Oceanic populations could have influenced the development of culture in South America both during and after the proposed peopling events.

CHAPTER II

THE BERINGIAN MODEL: ARCHEOLOGICAL EVIDENCE

While the Bering Land Bridge is the most commonly accepted model of the peopling of the Americas, flaws exist that undermine its credibility as the sole way that humans entered the continents. These flaws, present in most archaeological paradigms, have been largely ignored due to the sheer dominance of the Beringian model within North American archaeological literature. Until recent times, the most common model for the peopling of the Americas required a single source population from Siberia crossing the Bering Land Bridge about 13,500 years ago and spreading rapidly from their entry point to the southern tip of South America in a few hundred years. Along the way, they developed the Clovis technology and used that, along with later flaking technologies, to hunt the native North American megafauna to extinction (Goebel et al., 2008). The simplicity of this early model has more recently been complicated by the introduction and use of molecule genetics; however, the basic tenants have remained. The idea of a single migration through an ice-free corridor that spread rapidly across the vast expanses of the North and South American continents is still frequently taught, with little notice given to sites that show that such a simple model is not the case.

The model was dependent on the identification of Clovis technology, which was considered the hallmark of the first Americans. However, recent studies in both North and South America have dated artifacts and sites to several thousand years before the earliest Clovis points were discovered (Dillehay et al., 2015; Neves et al., 2005; Gonzalez et al., 2015). These pre-Clovis sites have since been attributed to Paleoindians, though what constitutes a Paleoindian versus a Paleoamerican is not accepted in all circles (Gonzalez-Jose et al., 2005).

Clovis technology

The Clovis technology has its type-site in eastern New Mexico. Clovis points are characterized by fluting around the edges and a distinctive channel flake. They are typically thicker than the later Folsom flakes, and were used mainly for medium to large projectiles (Howard, 1990). Clovis points are found throughout the North American continent, but are less common in South America. It is projected that this technology spread throughout North America in as little as 200 years, and recalibrated dates for the Clovis technology span from 11,050-10,800 ^{14}C BP (Waters and Stafford, 2007). However, sites pre-dating Clovis have been found in both North and South America, and have been the subject of intense scientific inquiry.

The sites presented in this paper represent the variety of pre-Clovis sites in South America. Some are coastal, others inland; some feature human remains, while others provide only hearths and worked pieces of stone. The presence of these sites in the archaeological record, along with the ecological work done by Pedersen et al. (2016) on the ice-free corridor indicate that multiple migrations into the Americas are almost certainly a fact.

Pre-Clovis sites

Pre-Clovis sites range from Washington state to Pennsylvania and as far south as Chile. These sites have ages as far back as 23,150 years cal. BP (Gonzalez et al., 2015). There are three sites in particular that demonstrate the different types of pre-Clovis localities that have been recently studied and that provide data on some of the earliest settlers of the Americas. Unfortunately, skepticism towards any pre-Clovis sites is rank within the North American archaeological community and has led to many pre-Clovis sites being dismissed or ignored for failing to fit into the Beringian paradigm.

Figure 1: Pre-Clovis sites in the Americas

Monte Verde, Chile

The pre-Clovis site of Monte Verde, extensively studied by T.D. Dillehay, provides faunal and botanical evidence, as well as stone tools and the remains of fires that have been dated to well before the accepted beginning of the Clovis technology. Radiocarbon and luminescence dating were used on burned areas, thought to be hearths, as well as faunal remains found in association with the hearths, to determine an age of between 18,500 and 14,500 years BP for the site (Dillehay et al., 2015).

In addition to the hearths, 9 species of algae were discovered throughout the occupational layer, returning dates between 12,310 – 12,290 carbon-14 years ago. These algae were discovered in the hearths and throughout the occupational layer at Monte Verde II and indicate that the inhabitants used resources from local estuarine areas and distant beaches, likely for food and medicine (Dillehay et al., 2008). The discovery of these coastal species of algae at a fairly inland site has been taken as an indicator of human migration down the Pacific coast of the Americas, rather than an interior route; knowledge of which species were edible or useful would

have come either from living in contact with the coast or trading with coastal people (Dillehay et al., 2008; Dixon 2013).

It was originally thought that the site was only 12,500 years old, which only predates Clovis by 1,000 years; however, this would still have required an entry into the Americas dating back to 20,000 years ago to account for how well the individuals undertaking the migration dealt with new pathogens, how far they had to travel, and potential issues with inbreeding or infertility within small groups (Meltzer, 1997). Whether the occupants of Monte Verde reached it by land or by a coastal migration is not currently known, but their apparent familiarity with coastal resources indicates a close association with the ocean.

Even if the earlier dates had not been discovered for this site, it still well pre-dates the Clovis period of entry to the Americas, indicating that multiple migrations into the Americas are far more likely than a single migration event. The distinctive nature of the fire-marked areas discovered at this site is indicative of human occupation in the area. The climate at the time of occupation was not conducive to the preservation of the site, but it Monte Verde is still an informative site for studying the behavior of the hunter-gatherer occupants during the Late Pleistocene (Dillehay et al., 2015). No human remains were recovered at this site, making it impossible to comment upon any morphological similarities to either native North Americans or Oceanic people.

Lagoa Santa, Brazil

The site at Lagoa Santa in southeastern Brazil, closer to the Atlantic than the Pacific, dates to approximately 12,000 years BP. The area has been of archaeological interest since the 1800's, when it was initially investigated by Lund. The rock shelters and calcareous caves provided shelter for bones of both humans and animals, and have long been acknowledged as

areas of Paleoindian and Early Archaic occupation in South America (Neves and Pucciarelli, 1991). Due to a miscommunication, the human remains found at the site were dated twice, once using carbon-14 and again using accelerated mass spectronomy. Both tests provided the date mentioned above. The occupation of this site was thought to last from 12,000 to 7,000 years BP, beginning only slightly before the times of the Clovis technology's entry in to the Americas (Neves et al., 2005). With the earliest dates for Clovis being cited at 11,050 years BP, this site predates the first appearances of Clovis technology in the Americas, and as discussed above, would require an initial entry time of roughly 20,000 years ago to allow the people to reach the area that is now Brazil (Meltzer, 1997).

While not as far south as Monte Verde, the individuals studied from Lagoa Santa did show a marked resemblance to modern aboriginal Australians, rather than the northeast Asian morphology seen in natives of North America (Neves et al., 2005). This trend is seen throughout many older indigenous South American groups and will be discussed further in following sections.

Quebrada Jaguay, Peru

The site of Quebrada Jaguay 280 in southern coastal Peru dates to 13,000-11,000 years BP and provides evidence of Paleoindian people utilizing and depending upon marine resources. Sandweiss et al. (1998) found that the majority of the faunal remains from the late Pleistocene-early Holocene occupations were of marine food sources. Of those remains, most were of a species most easily caught with nets and fittingly, remains of knotted fibers were found that Sandweiss et al. suggest might have been sections of fish net.

The occupants of Quebrada Jaguay 280 also used stone tools, though the examples presented are not as complex as the Clovis points. The lithics from QJ-280 are bifacial tools or

flakes, and there were no projectile points found at the site. Fragments of non-local obsidian were also discovered at the site, indicating that either these people migrated between the highlands and the coastal area or had trade relations with other groups in the interior of Peru, though a lack of other Terminal Pleistocene sites in the area makes trade unlikely (Sandweiss et al., 1998; Rothhammer and Dillehay, 2009). The inhabitants of QJ-280 demonstrated that different subsistence patterns developed during the Terminal Pleistocene and early Holocene, and also lend more credence to the idea of a coastal migration into South America.

Tlapacoya, Mexico

The farthest north of these pre-Clovis sites, Tlapacoya was discovered in the 1960's as the result of a highway construction project. The initial excavation of the site by Mirambell (1986) was reported in Spanish, but subsequent reports provide information about the context and details of the discovery (Gonzalez et al., 2015).

A notable find from this site is a human cranium, named the Tlapacoya Skull, which dates to approximately 10,200 yrs BP. This postdates the accepted introduction of the Clovis technology into the continent. However, as the skull date is only slightly over 1,000 years after the initial Clovis date, it is likely that the people in question had entered the continent during the pre-Clovis time period. The Tlapacoya Skull was found in an area of that would have been subject to frequent, heavy falls of ash at the time in question, making it a less than ideal area for prolonged habitation for both people and animals. Lorenzo and Mirambell (1986) originally presented this lakeside area as idyllic, but later research indicates that habitation of that area would not have been pleasant at the dates returned by testing on the Tlapacoya skull (Gonzalez et al., 2015).

Others

Other South American pre-Clovis sites include Guittarrero Cave and Pikimachay Cave, both in Peru, as well as Pedra Furada in Brazil. Unfortunately, most of the preliminary and follow-up articles about these sites are only available in Spanish. This does not, however, diminish the importance of these sites in disproving the paradigm of the Bering Land Bridge model of the peopling of the Americas.

Sites pre-dating Clovis technology provide evidence for an earlier migration into the Americas. Morphologically, the majority of the pre-Clovis specimens in South America and their more recent counterparts bear an affinity towards modern Aboriginal Australians, rather than the northeast Asia source population that would have crossed the Bering Land Bridge.

Ice-free corridor

The Bering Land Bridge covered an expanse 1,000 miles in width when the water was at its lowest point. Recent studies and dates of pollen, macrofossils, and metagenomic DNA from lake sediment samples indicate that a viable, ice-free corridor did not exist at a time that would allow Clovis-era humans to pass through. Samples were taken from a lake located at a bottleneck area of the proposed corridor and indicate that passage through that area would have been impossible for Clovis people; however, the authors do acknowledge that various sections of the corridor were ecologically viable sooner that others based on the rate of ice-melt and how quickly resulting flood waters receded (Pedersen et al., 2016). Once ecologically viable, it is likely that the corridor was used by later waves of people moving into the North American continent and beyond.

The lack of a viable ice-free corridor during the Last Glacial Maximum encourages investigation into a coastal migration as the method of entry into the Americas (Dixon, 2001;

Dixon, 2013; Erlandson et al., 2007; Erlandson et al., 2008). This focus on a coastal migration is the beginning of a paradigm shift from the landward migration presented in the Beringia model, and also allows for comparison between the settlement of the Pacific and the settlement of a large coastal stretch of the American continents.

CHAPTER III

BIOLOGICAL EVIDENCE OF THE PEOPLING OF THE AMERICAS

The archaeological evidence of the peopling of the Americas clearly indicates an earlier entry to the continents than postulated by the early Beringian model. As much of the evidence for this probable earlier migration into the Americas appears in southern North America and throughout South America, it seems right to look at a source population that was already adapted to life at warmer latitudes and utilizing coastal resources. Through the years, researchers have considered and sought to answer the question of whether an Oceanic influence was present in South America, and to what degree such an influence might have effected the peopling of that continent. In this section, I will assess the evidence from cranial morphology, genetics, linguistics, and cultural elements that have fueled the arguments both for and against an Oceanic influence in the development of South America.

Cranial morphology

The cranial morphology of indigenous South American tribes differs from that of modern Native North Americans. The natives of North America show cranial features that can be traced easily to northeast Asia; this fact makes it easy to see why it would be thought that all of the earliest Americans migrated from northeast Asia. However, their older South American counterparts have a different morphology, which is much more similar to modern aboriginal Australians (Neves et al., 2005).

There are many arguments about whether this difference is the result of an adaptation of facial features to the differing environments of the North vs. South American continents, or if it is caused a separate, earlier source population reaching and settling in South America.

Environmental causes

The marked similarities between aboriginal Australians and these early South Americans could be attributed to their occupation of similar latitudes with similar environments. This argument is less effective when the entire range of different ecological zones that exist in South America, some of which, like the Tierra del Fuego region, don't have latitudinal or longitudinal Australian counterparts. It is unlikely that the cranial morphology of South Americans changed as a result of their environment; human morphology is not as plastic as previously thought, meaning that much harsher environmental contrasts would be necessary to produce change in morphology (Roseman and Harpending, 2004).

Paleoamericans vs. Paleoindians

The differentiation between Paleoamericans and Paleoindians is made on a primarily morphological basis. Paleoindians are the older of the two groups; how they came into the Americas is a topic of debate among archaeologists and physical anthropologists, as is their relationship to Paleoamericans. Some scientists argue that they represent a distinct population which is not ancestral to modern Native Americans (Powell and Neves, 1999; Gonzalez-Jose et al., 2005; Neves et al., 2005; Matisoo-Smith and Ramirez, 2010), while others will only agree that, particularly in South America, there is a high degree of morphological variation which could have resulted from certain microevolutionary processes (Sardi et al., 2005; Greenberg et al., 1986).

Another differentiating factor between Paleoamericans and Paleoindians comes from the field of dental anthropology. For the most part, native North Americans display dental traits attributed to Sinodonty, which are also found in northeast Asians, but not their southeast Asian, African, or European counterparts (Turner, 1983). Older individuals, such as Kennewick Man

(Chatters, 1997), display Sundadonty, a less complex dental pattern not found in northeast Asia. The common occurrence of Sinodonty in native North Americans is considered by Turner (1983) to be the result of a more recent occupation of the Americas than of Asia and of a definitive northeast Asian origin for Native Americans as a whole (Dixon, 2001). The earlier skeletons displaying Sundadonty are thought to have come from an earlier source population that was ancestral to the people of South America and some areas of southern North America (Turner, 1983). As far as the evidence of dental anthropology extends, it is likely that multiple migrations into the Americas occurred, though it is unclear how and from where.

Mocha Island, Chile

While the similarities between indigenous South Americans and modern aboriginal Australians and Polynesians may be the result of shared ancestry (Neves and Pucciarelli, 1991), admixture between the two group is also likely, though not necessarily at the time of the initial settling of South America.

Mocha Island is a small island located nearly 35 kilometers off the coast of Chile. The island was excavated and the human remains removed from the site were stored in the Concepcion Museum. The remains had been previously described in the 1990's but craniometric measurements were not taken. Matisoo-Smith and Ramirez (2010) performed craniometric analysis and comparison on the six complete skulls and concluded that they were likely of Polynesian ancestry. They were not the first to make this connection; in 1903, Vergara also noticed similarities between the skulls from Mocha Island and Polynesian skulls (Vergara, 1903).

The similarities between the individuals from Mocha Island and Polynesia extend beyond the crania to the post-cranial remains. The Mocha Island individuals displayed extreme robusticity in the post-crania that, while not uniquely characteristic of Polynesian populations, is

most common in Oceania and areas of South America. Not all areas of South America demonstrate this increased robusticity; it is most common in southern South American populations, in areas like Patagonia and Tierra del Fuego (Matisoo-Smith and Ramirez, 2010).

This recurrent theme of similarities between South American crania and those from Oceania is highly indicative of interaction between these peoples. Whether this interaction was present during the early stages of the settlement of South America or if it occurred later cannot be properly determined at present and has not been confirmed by current genetic research.

Genetics

Most of the genetic research reported to date does not favor Oceanic admixture in South America. Neves et al. (2005) explain the lack of congruence between molecular and morphological data as the loss of DNA lineages through time. This may be attributed to specific traits, but considering the timeline of the population of the Pacific, it is unlikely that signs of admixture would have been completely lost in the intervening centuries. Other proponents of a morphological similarity between Polynesians and South Americans state that most of the ancient DNA studies performed on early South American remains have been on mitochondrial DNA, which is inherited only from the mother. In the cases of admixture proposed by models of Polynesian interaction with indigenous South Americans, the Polynesian DNA would have been coming from the males who sailed from the Pacific Islands to South America. They would not show up in mtDNA studies (Matisoo-Smith and Ramirez, 2010).

Australasians, including populations from Australia through Melanesia to Polynesia, have been found to share genetic variants with inhabitants of Amazonian Brazil, particularly ones speaking in the Tupi language group (Skoglund and Reich, 2016). The authors found the proportion of variants shared to not be statistically significant; however, they did acknowledge

that interaction was possible. Australians also descended from the same Asian group as Americans, albeit at an earlier interval. The biological affinity between the early South Americans and early Australians indicate that the Americas were populated by members of a 'pre-mongoloid' group before the entry of those morphologically associated with modern Native Americans (Neves and Pucciarelli, 1991).

Both Skoglund and Reich (2016) and Neves and Pucciarelli (1991) support the Beringia model, though with modification to allow for an earlier entry into the Americas. de Saint Pierre et al. (2012) also support a Beringian entry, though again with adjustment. Focusing on genetic evidence from people indigenous to Chile and Argentina, they concluded that Patagonia was settled 15,000 years ago by people following a coastal Pacific route; however, these early migrants could not extend past Monte Verde due to glaciation and opted to travel over the Andes, thus populating the interior of southern South America. The current inhabitants of regions below 38 degrees S, including Tierra del Fuegians, are likely direct descendants of that original group. Due to the harshness of their environment, the authors suggest that the later migrations would not have had major impacts upon the lineage of those individuals. This isolation with little to no migratory flow likely lasted until the beginning of the Spanish invasion (de Saint Pierre et al., 2012). This paper dismissed the marked morphological similarities between the natives of Tierra del Fuego and modern aboriginal Australians completely, as the authors did not view morphology as a reason to question their genetic findings.

Another genetic theory supporting the use of the Bering Land Bridge also promotes a pre-Clovis entry into the Americas. This study is reliant on partial mtDNA, the issues of which were elaborated above. The pre-Clovis entrants into the Americas were the first settlers, likely following a coastal migration, while later groups entered after residing on Beringia. That time

was thought to allow for the origin of autochthonous lineages, or lineages that would look indigenous rather than like they were descended from migrants, before that population entered North America (Gonzalez-Jose et al., 2008). It is unclear what purpose this would serve, or why early migrants would stay in such a harsh environment rather than moving directly into the Americas.

Serology

Serology, while considered outdated, is extremely useful in the examination of the peopling of the Americas. Matson et al. (1967) discusses serological similarities between native South Americans, particularly in the regions in and around Chile, and Polynesians from Easter Island. The key likeness is a lack of blood group B, which is a marker of Northeast Asian populations, but is not found in either native South Americans or Polynesians. As the Beringian model indicates that all indigenous people of the Americas must stem from a northeast Asian source population, this lack of a blood group in the Chilean area of South America is a strong indicator of either an earlier migration of non-northeast Asians or of extreme admixture with people of Polynesian ancestry, where that blood group is not found (Matson et al., 1967).

When the science doesn't align

There is a clear rift in the research between the morphological studies of the early Americans and the genetic studies; Gonzalez-Jose et al. (2008) attempts to bridge the gap with a new model of human entry into the Americas. However, from a morphological perspective this model is lacking, attributing the vast cranial variation within North and South America to drift, gene flow, and possibly directional selection. Even from the genetic perspective, there is still not a single, clear way that the peopling of the Americas must have occurred; Greenberg et al. (1986) suggest three distinct migrations, while Gonzalez-Jose et al. (2008) push for several waves of the

same group, and other like Skoglund and Reich (2016) propose multiple migrations at various times with potential for outside admixture rampant throughout. This lack of agreement within a single subsection of the study of the peopling of the Americas is frustrating, but should also be considered by those who would dismiss all other evidence in favor of genetic data.

Culture, linguistics, and food

Nordenskiold's similarities

Nordenskiold (1931) presented a list of cultural artifacts and elements that he thought indicated Oceanic contact with and influence over native South Americans. He found 49 parallels between Oceanic cultures and those of South America, mainly to central South America and the Amazon. Unlike later scientists (Storey et al., 2007; Matisoo-Smith and Ramirez, 2010), Nordenskiold thought that greater contact was had between Melanesians and South Americans than Polynesians and South Americans. This belief stems from the idea that indigenous Melanesians settled the areas now referred to as Polynesian, which has been disproved (Emory, 1942).

The parallels recounted by Nordenskiold came from various regions throughout South America and Oceania, even proposing Asiatic origins for certain cultural devices such as a litter, a parasol, and the use of cormorants in fishing (Nordenskiold, 1931). While Nordenskiold did not believe that the cultural influences from Oceania were the result of calculated trips made by Pacific Islanders, 31 of his 49 parallels are of Oceanic origin and were the result of multiple interactions. Such Oceanic parallels included the use of the calabash vine, elaborate masks, fishhooks, conch trumpets, and paddles (Nordenskiold, 1931). Some of these parallels, including the conch trumpets and paddles, demonstrate differences in detail that some consider enough to discount them as the product of Oceanic intervention in South America. For example, the species

of shell used in South America differs from that commonly used in Polynesian cultures; the paddles in South America have a crotched handle, which is not seen in their Oceanic counterparts; finally, the fishhooks reported by Nordenskiold are similar between Peru and Tahiti, but the Peruvian version lacks a hole near the base (Emory, 1942). These differences are likely a result of differing materials available to and aesthetics valued by South Americans, rather than to independent origin of all these similar artifacts in multiple places.

Emory (1942) refuted elements of Nordenskiold's work; he argued that any contact between early native South Americans and Oceanic people was not enough to be deemed consequential in the development of South American culture. Emory broke down Nordenskiold's parallels and came away with only 13 that were viable; of those 13, only six of which would have passed through Polynesia. While Emory was willing to concede some elements of South American culture, such as use of the calabash vine, as indicative of contact between Oceanic people and South America, he states that any such contact occurred after South America was populated by an unknown third party.

Kumar vs. kumara

While Nordenskiold did not consider linguistic evidence when finding his similarities between Oceanic and South American cultures, many other scientists have, and have reached the conclusion that the indigenous names for the sweet potato are clear evidence of contact between these populations. The sweet potato itself is native to South America and was transported to Oceania, likely on the return voyages made by Polynesian navigators. While currents and winds would have favored the sailing of South Americans towards Polynesia, the balsa wood with which they would have constructed boats or canoes is easily waterlogged (Emory, 1942).

The presence of indigenous South American plants in pre-contact Polynesia is relevant evidence for interaction; such interaction is further confirmed by the use of similar vocabulary. Many artifacts that would have been helpful in determining Polynesian contact with South America were placed in museums and repositories before current archaeological methods were set in place, making this linguistic and ecological similarity even more valuable in discovering the extent of contact between Oceania and South America (Matisoo-Smith and Ramirez, 2010).

Hurles et al. (2003) performed linguistic studies specifically focusing on the name for sweet potato in several Oceanic dialects, most of which are very similar to the Quechuan *kumar*. They found that the term was not derived from proto-Oceanic, but rather represented a more recent borrowing. Based on the ecological evidence of the origin of the sweet potato and the linguistic similarities to the Quechuan *kumar*, they determined that Polynesians must have traveled to South America in prehistory and returned with the sweet potato. Further evidence for this hypothesis came from an ecological study done by Roullier et al. (2013), who determined that Polynesian sweet potatoes originated in the Peru-Ecuador region of South America. Later strands of the potato were introduced by European settlers, which muddled the original signature, but the lexical similarity along with the DNA makes it clear that these particular roots were from South America.

Chicken bones

The earliest definitive evidence of Polynesian contact with South America came from chicken bones discovered in south-central Chile. The chicken (*Gallus gallus*) has never been found in association with Paleoindian remains or in paleontological surveys in South America, negating claims that it might be native to the region. At the site of El Arenal-1 in Chile, excavators discovered 50 chicken bones in 2002. The bones are the remains of a minimum of

five individual birds, and radiocarbon dating placed the bones between AD 1321-1407. These remains coincide with the last stretch of settlement of Polynesia, including Pitcairn and Easter islands. As this was pre-Columbian contact, the only viable way for the chickens to have reached South America was via Polynesian transport (Storey et al., 2007).

The El Arenal bones were found to be exact DNA matches to chicken bones found at two prehistoric sites on separate Pacific islands—Tonga and Samoa. The amplified mtDNA sequences studied were identical to the sites mentioned above, as well as within one base pair of remains found in Hawai'i, Easter Island, and Niue. It is evident that chickens reached South America from a Polynesian source rather than from European conquerors (Storey et al., 2007).

Fitzpatrick and Callaghan (2009) completed computer simulations to determine if such seafaring was possible and to determine what time of year the Polynesians were most likely to make the voyage. Their research indicates that such trips were indeed possible, though they were more likely to be one-way; successful return voyages were rare in their simulations. The simulations also indicate that further evidence of the introduction of chickens into South America could be found farther north than El Arenal, as that is where a large portion of their simulated voyagers landed.

The evidence presented for the dispersal of Polynesian chickens in South America confirms Polynesian contact with the Americas before Columbus and the Europeans arrived. As such journeys were possible in pre-Columbian times, it seems likely that contact between Oceanic people and people of South America occurred multiple times and with benefits for both groups.

CHAPTER IV

DISCUSSION AND CONCLUSION

Discussion

An Oceanic influence was present in the evolution of the culture of the western coast of South America, and as the evidence of *kumara* in Oceania suggest, this relationship was not entirely one way. Whether the Oceanic people's first trip to South America was intentional or not can never be known; however, follow-up voyages would not have been impossible for people so skilled in the navigation of the open ocean, as modeled by Fitzpatrick and Callaghan (2009).

Inserting Pacific people into the occupation of South America does pose logistical issues: if such an interaction did occur, where is the DNA evidence? Why was the connection not maintained? These questions are impossible to answer without speculation. It could be that the contact was short-lived due to poor relations or failure by the Oceanians to return to the same area. However, it is evident that some interaction is likely, based on the cultural, linguistic, and morphological similarities discussed above.

The apparent event of contact between Oceanic people and the original settlers of the Americas led to cultural exchange and the adaptations of new technologies. Considering those technologies, including the shell trumpet and fishhooks, through the lens of the Beringian model leaves one with the conclusion that these ideas are similar enough that perhaps unilinear evolution is not as wrong as we thought. However, the marked similarities of these objects, in style if not in material, indicate that some form of cultural exchange took place. Further evidence of this exchange is ecological, with the movements of the sweet potato and the chicken. While the Beringian model deals with the peopling of the Americas only, it is impossible not to look at

the further evolution of the societies those individuals founded for clues as to other sources of cultural input. The South American continent in particular is large and very diverse in both cultures and climate; it seems unlikely that people from that single Siberian population could have adapted to so many different challenges in such a short amount of time without outside influence, either through admixture or through trade.

Migration and modernity

It is unfortunate that it is frequently assumed that early humans bumbled around the globe, never intentionally attempting or completing voyages, but rather accidentally discovering new lands (Emory, 1942). This assumption that early human minds were incapable of forward planning or coherent thought is baseless, and does a great discredit to our ancestors. The tendency when thinking of modernity is to take a view that is entirely unilinear, and retrospectively favors those who reached frankly arbitrary and non-universal milestones the quickest (Porr, 2011). As many Pacific island and Australian cultures did not follow the path to modernity as laid out by researchers like Klein (2000), they are dismissed as not having developed along the same lines as their European, Asian, or American counterparts.

The reality of this mindset is that trans-Pacific migrations are thought to have been entirely out of the ability of the Islanders during the time of settlement in South America, in spite of the fact that they had successfully reached and settled Australia nearly 45,000 years earlier (Clarkson et al., 2017). This assumption is limiting from a scientific perspective, as it encourages the dismissal of a potential source of cultural influence for South American populations from an Oceanic origin. Additionally, different explanations would be required to answer the questions of how sweet potatoes reached the Polynesians or how the South Americans came to have chickens, both pre-European contact.

A call for cooperation

Healthy skepticism is necessary for good science, but clinging too tightly to a paradigm while there is evidence to the contrary is asking to be made obsolete. The Beringia model for the peopling of the Americas is a valid idea; however, it fails to take into account all of the evidence currently available. For a proper model of the peopling of the Americas to exist, North and South American archaeologists will need to work together to explain the irregularities in genetics and culture. This problem will not be solved by a single scientist or group of scientists; but rather by two continents coming together with help from both Pacific and northeast Asian researchers.

Conclusion

The Beringian paradigm has dominated American archaeology for decades. Throughout its various iterations, the basic idea of a single settling force from northeast Asia has remained constant. The research presented in this paper and by many other researchers draws attention to questions not answered by the current model, particularly about number of migrations needed, if the migration was coastal, and when the process began. Also rarely addressed is the influence of different populations making contact with the early settlers.

Considering the timeline of the settlement of Polynesia, it seems unlikely that Oceanic people were involved in the initial peopling of South and Central America. However, their cultural influence is clearly present now, and admixture is apparent, at least morphologically in some sites (Matisoo-Smith and Ramirez, 2010). The ruling force of DNA frequently dismisses these morphological similarities but they are still valid and worthy of research.

Many potential clues to the solving of the mystery that is the peopling of the Americas are present in data that is deemed statistically insignificant. Collecting these discarded scraps of information allows scientists to form a more complete picture of this event. Further analysis and

research are obviously necessary, both in North and South America. The unwillingness of North American archaeology to acknowledge pre-Clovis sites and possible Oceanic influence is present throughout all the areas addressed in this paper. Further research into pre-Clovis sites in both North and South America is necessary. Only when all the facts are assembled can we start to make out a picture.

There is much compelling evidence for both the breaking of the Beringia paradigm and the outside influence of Pacific islanders on the indigenous tenants of South America. The extent to which this contact spread and when first connections were made is currently unknown; however, shedding light on the relationship between Oceania and South America will help with understanding how the occupation of such a large area was achieved. In understanding how the first Americans came to arrive at their various places across these two continents, we can begin to understand how to fit the rest of the information together into an image of how it truly happened.

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