

## **Monte Verde Archaeology Project:**

### **Identifying Early Humans in the Americas and Investigating the Chronology of Arrival and Subsequent Migration Patterns**

#### **Principal Investigator:**

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#### **Introduction:**

The Monte Verde Archaeology Project (MVAP) is a two month project centered in Monte Verde, Chile, which is near the southern tip of the country. Funds are requested from the Archaeological Research Association to initiate fieldwork and analysis for approximately two months from the beginning of January, 2016 to the end of February, 2016 by American researchers focusing around the following project ideas:

1. To investigate whether there is any evidence of a culture (either “pre-Clovis” or Clovis) arriving in the Americas chronologically earlier than previously thought.
2. To explore the possibility of a culture existing prior to the Clovis culture, and determine if said culture is actually a unique culture, or if it is simply the same culture whose features have changed over time.
  - a. Also, if the culture is a separate culture from the Clovis, to identify if the two cultures co-existed, or if one (the “pre-Clovis”) ultimately evolved into the other (the Clovis).
3. To investigate the chronological arrival of the earliest culture in the Americas, and their migration patterns from their entry point (theoretically North America via a land bridge) to Monte Verde.

Support from the Archaeological Research Association is requested for the field work and analysis of this project centered on Monte Verde, a relatively small site near the southern coast of Chile (near Puerto Montt) in South America. The importance of the site lies in its connection with the origins of American human inhabitation, as it is one of the handful of sites in the Americas that offer evidence of such a time. Discovered in 1975, excavation began in 1977 by Tom Dillehay, and since has been the subject of interest for many scholars in regards to human migration, the chronology surrounding the migrations, and origins of people in the western hemisphere. Further research into the site could greatly improve the scholastic knowledge regarding early humans in the Americas, their migration patterns (which can be applied elsewhere to help understand emigration from other continents), and further understand the chronology of human movement. The work in regards to this project will consist of excavations of the site in order to obtain materials correlates and, hopefully, biological evidence to be examined for relationships. Being located approximately twenty one kilometers (thirteen miles) from Puerto Montt, it is relatively close, making it logistically accessible to researchers.

The following section provides a look at the environment in which the site and the surrounding area is located, a history of the site and the surrounding region in relation to the research that has been conducted thus far, and addresses the theoretical and methodological approach to the proposed research. It will include a discussion of the data recovery and analysis methods, relevant hypotheses and expectations, and a proposed plan for dissemination of findings.

### **Background- Prehistory and Environment of Monte Verde:**

The site of Monte Verde is located in Chile in South America, close to the southern edge of the country, relatively near the coast, just north of where the country starts to break up into many

small islands. This region of Chile has a temperate climate, and oftentimes is quite moderate in terms of temperature differentials, and since it is close to the ocean, is also quite wet, especially during the winter months, stretching from May until August. This is important to note because typically, environments that are wet and warm are not conducive for the preservation of biological or soft material (cloth, silk, etc.) preservation, as it allows bacteria to thrive, hastening the decomposition of the organic and soft materials. The site is situated on the banks, and surrounding area, of the Chinchihuapi Creek, an estuary of the Maullín River.

### **Previous Archaeological Exploits and Theories of Monte Verde:**

Since its discovery in 1975, this site has been a major participant in the discipline-wide debate concerning the initial time and place of humans arrival in the western hemisphere (Dillehay 2015, Fiedel 2000, Meltzer 1997). The most popular theory, up until recently, suggests that a group of migrants crossed over to the Americas, from Asia, across the Bering Sea land bridge (what is sometimes referred to as Beringia, the name given to the region consisting of the Bering Strait, the Bering Sea, and the Chukchi Sea) into what is now Alaska, circa the end of the Last Ice Age, approximately 13,000 years ago (Dillehay 2015). With the discovery of Monte Verde, and a number of other sites (some such sites include Paisley Caves in Oregon and Cactus Hill in Virginia), this theory has been adapted to coincide with new information: the migration path has largely remained the same, but the timeline has been pushed back a couple thousand years, roughly 15,000 years ago (this number is relatively flexible; some sources say 14,000 years ago [Stuart 2000], others indicate as far back as 19,000 years ago [Dillehay 2015]), due to radiocarbon dating of evidence found in these locations (Dillehay 2015, Meltzer 1995).

As previously stated, the site was discovered in 1975, and the first excavations and research into the area began in 1977, and lasted until 1985, by Tom Dillehay and his colleagues

(roughly eighty other scholars across the discipline) (Meltzer 1997, Taylor 1999). Despite the fact that it is a temperate environment, the team found a great deal of organic material remains, due to the river water and natural peat covering the remains and preserving them extremely well (Meltzer 1997, Dillehay 2015). This is important because it allows evidence that would normally be difficult, if not impossible, to find to be examined and record; in particular, it allows the DNA of organic human remains to be sequenced in order to determine, and hopefully pinpoint precisely, the ancestry of the early Americans (Callaway 2015, Meltzer 1995).

Other research has been done in the way of understanding how the early humans arrived in the Americas; where did they come from? How did they get here? As far as ‘where’ and ‘how’ are concerned, most theorist agree that migrants arrived from Asia via the Bering Sea land bridge that connected Asia to Alaska, which is now underwater (Powledge 1997, Meltzer 1997, Fiedel 2000, Dickinson 2011, Dillehay 2015). Understanding when and how the early Americans arrived in the Americas is important because it provides migration patterns that could help understand humans migration throughout the rest of the world. By understanding the early people’s habits (for example, where they prefer to travel [down the coast, along rivers, through forests, etc.]), researchers can begin to piece together the possible migration routes from the beginning of human existence, narrow it down, and possibly even find older settlements, pushing known timelines even further back.

In conjunction with the ‘when’, ‘where’, and ‘how’ is the underlying question of ‘who’. Up until recently, the ancestral Americans were a culture referred to as the Clovis people, a Paleo-Indian culture identified by their unique stone tools (particularly arrowheads) found near Clovis, New Mexico. However, with the discovery of Monte Verde and other contemporary sites (Paisley Caves, etc.), many theorists have started questioning the Clovis-first theory and have

concluded that these sites belong to a “pre-Clovis” culture (Meltzer 1997, Fiedel 2000). Despite the new evidence, some scholars still believe that the Clovis were the first people in America, supporting the Clovis-first theory and believing that the two cultures are relatively the same (Dickinson 2011).

Research conducted on the Monte Verde Archaeology Project will help provide more evidence to add to the ever-growing pool of knowledge, and may help decipher some of these conundrums. Further excavations looking for biological and material evidence can enhance the collective understanding of early American settlers in regards to identity and origins. Material evidence can help solidify cultural origin by looking at the style of the artifacts (how they were made, from what material, and what they look like), and biological evidence, through the use of DNA analysis, can determine biological origin and relation; it can help settle the debate about whether there are two cultures or not, among other debates.

### **Hypotheses and Data Expectations:**

The following hypotheses are derived from the aforementioned information and research themes defined previously, taking into consideration the prior research of other researchers. Test expectations and overlying theoretical issues will be outlined and taken into account in the following section.

#### **Hypothesis 1:**

*The Paleo-Indian culture, whose remnants have been discovered at Monte Verde and contemporary sites, is the same culture as the Clovis culture.*

#### **Test Implications:**

- 1.) The material correlates (arrowheads, remaining architecture [if any], pottery, etc.) found at Monte Verde will be similar in style compared to Clovis materials, signifying they were created by the same people.
- 2.) Organic material, particularly DNA samples, found at Monte Verde could be identical (or as similar as possible) to organic material associated with the Clovis people. If the DNA samples are identical, then they are the same culture (Callaway 2015, Taylor 1999).
- 3.) Examination of other materials from different cultures thought to be contemporary, or approximately, show difference of style, indicating a unique culture.

### **Hypothesis 2:**

*The aboriginal Paleo-Indians arrived in the Americas prior than previously thought, approximately 15,000 years ago.*

### **Test Implications:**

- 1.) The material correlates found in Monte Verde and contemporary sites will date, via radiocarbon dating and other such methods, to much earlier than previously thought, approximately 15,000 years ago, and potentially even farther back.
- 2.) As more sites are being discovered, more evidence reveals more ancient origins in the Americas, and Monte Verde has uncovered evidence dating back, definitively, to 15,000 years ago, with some evidence pointing back as far as 19,000 years ago (Dillehay 2015). Material correlates found during the Monte Verde Archaeological Project will confirm the proposed time, though it may possibly alter it.

### **Hypothesis 3:**

*The initial Paleo-Indian culture arrived in the western hemisphere by crossing a land*

*bridge across the Bering Sea connecting Asia to present-day Alaska, and ultimately made their way down to South America by travelling along the then-coast line to eventually inhabit both continents.*

#### Test Implications:

- 1.) Examination of the oceanography and geology will provide evidence of a land bridge connecting the East and the West, offering sufficient proof of the land bridge theory for how the Paleo-Indians arrived (some potential evidence [possible material correlates found during investigation may give some hints at chronology as well) (Dickinson 2011, Powledge 1997).
- 2.) Examination of contemporary coastlines (which will now be underwater) will reveal evidence of migration down the coast via settlement remnants and human manipulation evidence (Dickinson 2011, Erlandson 2008).
- 3.) Investigation of organic evidence, such as DNA (mitochondrial and bone), could help understand the migration patterns by tracking the lineage path (Callaway 2015, Fiedel 2000).

The above hypotheses will be tested through excavations of the proposed site (Monte Verde), and by analyzing the evidence procured during the excavations. It is uncertain whether the data obtained will prove or disprove the aforementioned hypotheses, however, the data acquired as a result of this project will provide more information regarding the site, in conjunction with the numerous debates surrounding the subject.

#### **Data Recovery Methods and Proposed Plan:**

This project will incorporate the use of a variety of research strategies and methods of

uncovering data that will be used in relation to the previously stated hypotheses.

**Standard Excavation:** A productive amount of excavations will be conducted utilizing the standard 2 by 2 meter units along the Chinchihuapi Creek and the surrounding area in order to determine the presence of archaeological remains, though size may vary if it is decided during the excavation to expand due to potentially finding new evidence. Excavation sites will also be determined based on previous archaeological endeavors in the area (such as the ones done by Dillehay [2015]) in order to determine appropriate positioning. A TOPCON total station will be used to record the location of any evidential finds within the site and recorded on the overall map (Renfrew 1991, Heizer 1958).

**Mapping and Visual Records:** A TOPCON total station will be utilized to lay out grids and measure the site (along with tape measures for accuracy [never hurts to double check]) in order to map the site where the Monte Verde Archaeological Project excavations will take place and record any as-yet-unknown or unmapped areas, especially in relation to potential geographical changes (the creek shifting due to weather, erosion, etc.). Photographs of the excavations and of the general site in relation to excavation will be taken with a Digital SLR camera and combined with field drawings and notes to illustrate the context in which the evidence was found. All of the data will be imputed into a computer using ArcGIS software which will assist in analysis and record-keeping for the project, as well as integrate any digital pictures taken into a concise map. Photographs and maps will ultimately be integrated into the publication as a supplement to the research.

#### **Classification and Analysis of Correlates:**

Based on much of the research done in preparation for the project, much of the material



correlates found in the Monte Verde region, and other contemporary sites, take the form of stone remnants. However, biological evidence has been procured in some instances (Callaway 2015, Fiedel 2000). Upon extraction, artifacts will be properly cleaned (if necessary), measured, labeled, counted, and sorted according to primary examinations. Upon completion of the field work, artifacts found will undergo a more intensive analysis, utilizing specialized laboratories in [location] and stored at [location].

**Lithics:** Broken stone shards, ground stone, precision flakes, and arrow heads (often made of limestone or unknown origin) are common finds and will be analyzed to determine origin (of stone, in order to understand whether to source is local or required travelling) and, in the case of the arrow heads, to determine potential use (which will define whether they were actually arrow heads or not). Lithics will be analyzed using LA-ICP-MS, the GUR method (in the case of flakes), and visual sourcing.

**Coastal Landscapes:** The ArcGIS software will also be used in conjunction with high-resolution photographs taken by Google Earth and NASA's ASTER GDEM to reconstruct the coastal landscape when identifying migration patterns (Meredith-Williams 2014, Schmitt 2013).

Glaciology and paleo-geology will also be analyzed (most likely through scholarly research of other researcher's publications due to cost) to supplement the previous findings in relation to possible migration paths (Renfrew 1991).

**Radiocarbon Dating:** Radiocarbon dating will be utilized in the case of any organic material, whether it is floral or faunal, that is recovered during the excavations as a way of dating the evidence. This is paramount for the project, as a critical aspect of the research is determining chronology of initial arrival by early migrants, as well as migration from North America to South America. Not only are human remains plausible, but other organic material that might be

associated with the presence of humans (i.e. animal bones that show signs of hunting) can help pinpoint human arrival in the New World. Any samples found will be properly labeled, stored, and exported to the United States, where it will be analyzed by Beat Analytic Incorporated laboratories in Miami, Florida.

**Genetic Sequencing:** Humans biological remains obtained during the excavations will be genetically sequenced by GenQuest laboratory. This is also a crucial component to the project because any evidence uncovered that can be sequenced will assist the Clovis-first debate. If the genetic material found at Monte Verde is sequenced and found to be identical to genetic material found that is believed to belong to the Clovis people, then the debate is nullified, because it would illustrate that there is only one culture; the Clovis and the “pre-Clovis” Paleo-Indians would prove to be the same culture, or quite the contrary if the opposite result occurs and the genetic material is not identical (Callaway 2015). Genetic analysis can also be used in relation to understanding ancestry and migration patterns by analyzing genetic variation between the ancestral DNA and modern DNA samples.

**Project Plan and Time Line:** The project field work will be conducted from the beginning of January to the end of March in 2017, during which PI, two student assistants, and four local workers will excavated the Monte Verde site and participate in the initial field analysis of any evidence found. The field reports will be compiled after the field work is completed, utilizing field notes taken periodically and at crucial moments, and after examining the photographs taken and analyzing the artifacts discovered.

#### **Dissemination of Results:**

The results of this research project, as well as the methods and theories that are involved,

will be published both virtually/electronically and tangibly in hard copy form in scientific journals (though not greatly, due to cost of publication). This will allow access to the information for both professional scholars, who may want to utilize the result for personal research, and the general public, who may be interested in the subject and want to learn more. Funding is requested to set up a website for the project that will include the research results as well as pictures illustrating the activities, which will be accessible to the general public, via the internet, allowing anyone interested to examine it. The research results will also be published in a number of journals, in both hard copy and digital formats, including *Journal of Field Archaeology*, *Latin American Antiquity*, *Ancient America*, and *PLOS ONE*, among others. Copies of the research will be donated to local institutions as a way of providing the community who helped the project with a way of understanding the importance of the research and what was obtained as a result of their help, as well as a form of appreciation and gratitude for the assistance to the project.

### **Conservation of the Site:**

The Monte Verde site is located along the Chinchihuapi Creek, an offshoot of the Maullín River, so flooding, inundation, and erosion cause constant problems to the surrounding area, which could potentially result in damage to the site and loss of artifacts and evidence. It is also vital to train and educate the local workers who will be assisting on the project on how to properly excavate the artifacts and the site, in general, so as not to unnecessarily damage any artifacts of the environment. It is also essential to educate the entire community on how to properly preserve their local environment and whatever might be there, so as to reduce unnecessary destruction and reduce their impact on cultural and natural transformation to the environment.

### **Summary and Conclusion:**

Monte Verde is an incredibly important site for understanding the prehistoric past in the Americas. The site provides evidence that will help researchers and scientists understand the migratory patterns of humans from Asia to the Americas (which can be applied to migration in other parts of the world) as well as expand the current knowledge surrounding chronology and initial presence on this side of the world. It can also help identify who exactly it was that ended up in the western hemisphere first; the evidence can help settle the Clovis-first debate. This information is important because it ties into most other archaeology done in the Americas; the initial culture is the ancestor to all subsequent cultures, whether it is the Olmec, the Navaho Indians, the Aztecs, or any other culture that has arisen in the West, so identifying them can illustrate a more precise genealogical picture for all groups and understand how and when each group might have possibly originated.

## **Budget Justification**

### **A. Travel Expenses:**

1. Flight from Los Angeles International Airport to Puerto Montt, Chile for PI and two (2) student assistants = \$3, 147.48 (round trip)
2. Salary for PI for primary researcher, preliminary analysis, supervising field work = \$1,800
3. Additional funds for student assistants = \$2400
4. Per diem cost for four (4) local workers = \$3,674.4
5. Hotel rental in Puerto Montt for three people (two rooms for two months) = \$3,600
6. Travel Insurance for protection against misfortune = \$831
7. Rental car for two months for transportation of people and equipment = \$2,529.13

### **B. Supplies:**

1. Tool kits containing a multitude of necessary excavation tools (trowels, measuring tools, small excavation tools, etc.) \*3 = \$150.96
2. 12 piece brush set = \$7.19
3. Flint knapping kit = \$57.51
4. Shovel ( \*7 for Americans and local workers, just in case) = \$70.42
5. Hand picks \*3 = \$34.5
6. Archaeological Find Trays = \$25.88

7. Survey Tape = \$4.28
8. Gloves \*3 sets = \$69.03
9. Writing utensils (pens and pencils) = \$19.00
10. Notebooks and Sketch pads = \$43.14

**C. Equipment:**

1. ArcGIS Mapping software for mapping the location and analyzing coastal patterns =  
\$3,500

**D. Services Rendered:**

1. Radiocarbon Dating Analysis = \$1,100
2. DNA and Gene Analysis = \$500

**E. Other Costs:**

1. Publication Costs ( in numerous journals) = \$1,500

**Total: \$24,163.92**

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