

Overcoming Issues in Ancient Puerto Rican Boulder Art Research:

Reflections from the La Mina Petroglyph Project

Rhianna C. ROGERS

SUNY - Empire State College

James SCHUETZ

Rex CAULDWELL

Independent researchers

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Abstract

Puerto Rico has long been understood by archaeologists as a key geographical location for understanding the succession of cultural occupations in the Caribbean (Alegría, 1965; Curet, 2006; Siegel, 2005.) Unfortunately, despite the importance of archaeology in this region, the island has been continuously effected by socio-economic instability, lack of archaeological funding opportunities, few specialized academic programs, and a heavy focus on cultural resource management (CRM) rather than academic research. Though more Puerto Rican-focused archaeologists have joined the academic discussion, publications in this area are still relatively low and heavily focused on CRM and salvage work. Poor funding and resources for non-consulting archaeological projects has relegated Puerto Rico to the "island with the lowest number of publications in the Spanish Caribbean." (L.A. Current, 2006 pg. 656). This paper will highlight some of the limitations of working in Puerto Rican archaeology. We will use the experiences we gained from our research project at the La Mina archaeological site to shed light on some of the difficulties we encountered as well as (hopefully) encourage an increase in academic and financial support for this understudied region of the Caribbean.

Keywords

Puerto Rico; Petroglyphs; Public Archaeology

Introduction

Archaeologists have long understood Puerto Rico as a key geographical location for understanding the succession of cultural occupations in the Caribbean (Alegría, 1965; Curet, 2006; Siegel, 2005). Unfortunately, despite the importance of archaeology in this region, socio-economic instability, lack of archaeological funding opportunities, few specialized academic programs, and a heavy focus on cultural resource management (CRM) rather than academic research have continuously effected the island. As articulated by L. Antonio Curent in his book chapter, *Colonialism and the History of Archaeology in the Spanish Caribbean*:

Despite the surge in the number of archaeologists, archaeological projects, and increase in awareness among the general public produced by both the federal and Puerto Rican conservations laws, academic (non-consulting) archaeology is still suffering from a lack of strong programs with a well-defined vision and set goals. I dare to say that while over 95% of the work is CRM related, only two universities in the island have serious, but poorly funded, academic programs or research centers (Universidad de Puerto Rico and Universidad del Turabo). The Division of Archaeology at the *Instituto de Cultura*, the only government program for the preservation and study of archaeological sites in the island, [is] working almost entirely on CRM issues, including evaluating hundreds of CRM reports. A sign of the seriousness of the crisis in Puerto Rican archaeology is the low number of archaeological work that actually sees it way to academic or popular publications. (L.A. Curent, 2006, pg. 656)

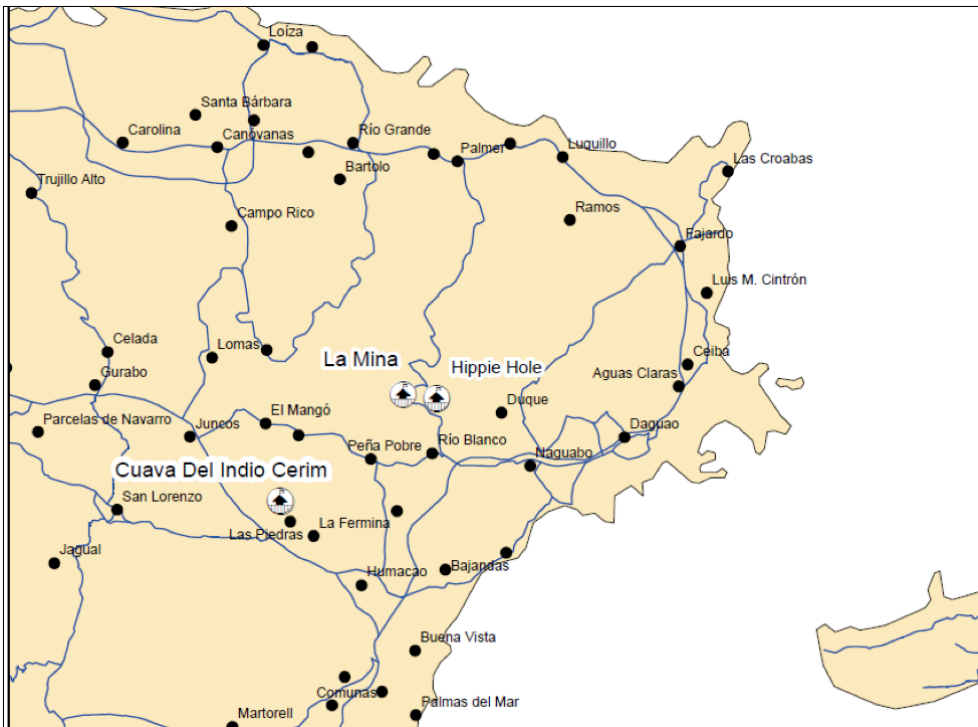
Though written over a decade ago, little has changed in academic archaeology in Puerto Rico. Yet while more Puerto Rican-focused

archaeologists have joined the academic discussion, publications in this area are still relatively low and heavily focused on CRM and salvage work. Poor funding and resources for non-consulting archaeological projects has relegated Puerto Rico to the “island with the lowest number of publications in the Spanish Caribbean.” (L.A. Current, 2006 pg. 656). Unfortunately, many of these issues have been further compounded by the recent socio-economic devastation of Hurricane Maria in 2017. In addition to the serious issues that plague this region, including lack of water, electricity, and food, many industries on the island, including archaeological work, have come to a standstill. This paper will highlight some of the limitations of working in Puerto Rican archaeology through the use of specific experiences that the co-authors’ gained from our own research at the La Mina project conducted near the El Yunque Rainforest. In addition to discussing the issues encountered during our project, the authors discuss the site, methodologies, tentative findings, and include narratives from each author about the challenges and delays encountered while working within the underfunded Puerto Rican archaeological system. In this way, the study (and this paper) goes beyond the scientific data and interpretation to provide the reader with real-world challenges one might face conducting scientific research on the island. We hope that our reflections from working at this archaeological site shed light on some of the difficulties we encountered as well as, hopefully, encourage an increase in academic and financial support for this understudied region of the Caribbean.

Brief History of the La Mina project

This project consisted of a Phase I geological and archaeological survey of the La Mina petroglyphic site, a previously unrecorded preTaino/Taino site located on private property near the El Yunque National Forest in Municipio de Naguabo, Puerto Rico. The La Mina petroglyphic site is located just northwest of the Rio de Cubuy in the foothills of the La Mina Mountain. It lies at the edge of the Luquillo Mountain range and experiences tropical to humid climates. Coined “La Mina” by locals, this region (including both the mountain and site) was named after a now closed historic mine in the mountain just to the north of the site. Local informants, tentative archaeological

site analysis, and historical records indicate that the La Mina site had been occupied by both preTaino and Taino peoples, utilized by the Spanish as a coffee and tobacco plantation, and later privatized as a homestead and listed in the Naguabo municipality in the Barrio Cubuy.



Caption: La Mina regional site map (courtesy of James Schuetz, 2015)

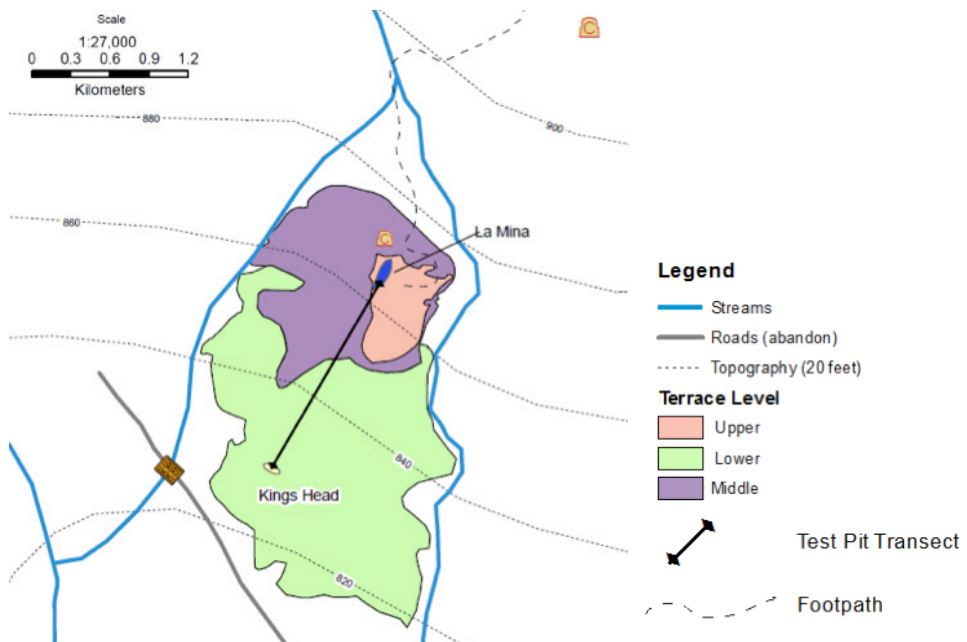
La Mina Project Description

In order to contextualize our reflections, it is important to discuss the research design employed at the La Mina site. The Phase I survey consisted of the following:

1. Photographic documentation of the existing petroglyphs within the site terminus;
2. A reconnaissance survey involving mapping the surface characteristic of Terrace 1, 2, and 3 using both GPS receiver/

GIS points and tape and compass measurements (geological components of this project are described in the further below);

3. Assessing subsurface composition by test pitting along a 49 meter transect from La Mina to the Chief's Head Glyph (Transect 1 included below without test pit labels); and
4. Collecting surface and sub-surface samples for interpreting the site's age and function which are now curated by Victor Torres, Cueva del Indio Site Archaeologist.¹



Caption: La Mina site map (courtesy of James Schuetz, 2015)

The major focus of the survey consisted of mapping the three terraces of the site and test pitting along Transect 1. We also spent time engaging with the general public by speaking with locals about what we were finding, sharing information with tourists traveling in the area, and taking a few locals on a site tour.

¹ Schuetz Note: As indicated in the image, Terrace 1, the highest elevation of the site and location of the La Mina boulder, lay at the center, while Terrace 2 included remnants of the possible fallen cave behind the La Mina boulder and the adjacent water ways; Terrace 3 included Chief's Head boulder and the site terminus, which appears to have ended at the historic milling road.

Due to the dense foliage at the site, we elected to employ a non-probabilistic sampling method throughout. In addition, along the transect we made surface collections on all three terraces and along the two streams surrounding the site. For all test pits along Transect 1, soils were screened through ¼ mesh over plastic sheeting. Boulders prevented us from digging much beyond 5-40 cm down, which inhibited our ability to find artifacts sub-surface. That said, we did find a few artifacts² close to the surface along Transect 1 including shells and what appears to be a carved crystal-like gem transported to the area. Along the waterway just south of the small cave, we also found two hand-wrought nails, a contemporary modern tile, and modern debris. Nothing of note was discovered associated with the La Mina site in our survey collections.

That said, the connection between archaeological site formation, petroglyphs carved on both the La Mina and Chief's Head Glyph boulders, and surface-subsurface relationships is undeniable. The lack of visibility at the site could indicate that additional features may exist below the current leaf/debris coverage. All glyphs currently visible on both the Chief's Head Glyph boulder and the La Mina boulder were drawn to scale on clear plastic using Roe's (2005) petroglyph drawing methodology. Photographs were taken with a high resolution camera by co-Principal Investigator, Rex Cauldwell, at the site in order to document additional petroglyphs not visible to the survey team while on site. Video of the site was also shot using a Zoom Q2HD Handy Video Recorder. Older photographic records were also consulted for this project in order to assess deterioration of glyphs over time. It is important to note that one portion of the site terminus was not fully studied, the Upper Cacique Cave. On the second to last day of the survey, Sr. Rodriguez, a local community member and project consultant, informed us of the Upper Cacique Cave and its local ethnographic history. He mentioned that many locals believe it to be the home site of the local provincial rule, the Cacique of La Mina. Due to limited time remaining at the site, photos and a GPS point were taken, but no sub-surface work was conducted. We hope to return to this cave for another field season

² It is unknown if these artifacts are naturally occurring at this point without further test pitting at the site.

to further document this area; however, this is very dependent on its accessibility, post Hurricane Maria.

Initial Project Findings

Based on the Phase I survey and our tentative analysis of the petroglyphs at this site, we have tentatively determine the La Mina site was primarily used during the Early Elenan/Late Chican Ostionoid occupation (~600-1200 A.D.) and later reused by the Taino as a religious location for the Cohoba Ceremony, post Spanish contact (Cauldwell 2015.) We noted a clear connection to water as indicated by the channeling and focus on water within the glyphic elements.



Caption: Water flow on La Mina Boulder (courtesy of Rex Cauldwell, 2015)

In reference to petroglyphic research, there is ample evidence to connect spirals and other geometric designs to hallucinogenic ceremonies which, in turn, are immortalized into the boulder

(Faulkner, 1989; True, 1954; Fett & Fett, 1979; Ferg, 1979; Kennedy, 1973; Lewis-Williams, 2012.) Interestingly enough, the phallic glyphs on the La Mina Boulder intentionally connected to the channel of running water along the top edge (labeled above), which then connected to the entrance of the collapsed La Mina cave a few meters below. This is important since research in native cosmologies indicate that caves, sinkholes, and watering holes were portals to the spirit world as well as ritualistic representations of the birthing process (Healy, 2007; Brady, 1997; Hudson & Underhay, 1978). Thus, these specific glyphs were not created for art's sake as some believed; these glyphs represent a specific thought, idea, or purpose, and should *not* be called *Boulder Art*. We believe a new classification for this type of glyph is needed. Additionally, we believe that, based on the symbolism and location of components, this could be a symbolic representation of the birthing process—the La Mina collapsed cave, the birthing cavity, and the phallic glyph located on the boulder itself. This may indicate a convergence of male and female fertility (cosmic dualism). However, we need to further investigate if this was associated with a larger religious and/or royal complex to substantiate our claims above.

Issues with Preservation and Deterioration of La Mina

The La Mina survey was only part of our story, our experiences illustrate that factors and lack of resources in Puerto Rican archaeology can lead to contention that impedes the progress of scientific research in the region. However, some of these issues can be avoided by engaging the local community in the process, our ability to construct a large scale archaeological and geological study in this site and its surrounding areas still seems nearly impossible under current conditions (i.e., the economic, political, and academic limitations current in Puerto Rico). As noted in the sections below, weathering of the La Mina boulder is a major deteriorating factor at the site and is likely to continue, causing the loss of more glyphs. This weathering could significantly affect the ability to interpret the glyphs in a relatively short period, which, when considering the limitations previously discussed, represents a loss of history if not properly studied and archived. The main issue is that Puerto Rico lacks funding to support large-scale preservation projects like the

one required at La Mina. So what can we do to prevent this and other losses to the record? We would argue that more financial efforts need to be earmarked by both the US and Puerto Rican governments in order to preserve sites like this one. As we have seen post Hurricane Maria, US financial support is critical under Puerto Rico's current territorial status and in its current financial crisis. Our hope is that with the publication of this article and subsequent book on the topic that we can encourage a discussion about this before it is too late.

Personal Reflections

Insights regarding challenges of conducting scientific research in an environment of socio-economic instability, little to no funding, and lack of academic research are provided as a means of information sharing to future researchers. The following narratives include individual experiences during the research to expose difficulties and resolutions to the work environment as well as, hopefully, demonstrate the need for an increase in academic and financial support.

Rogers Reflects

Though I have been regularly traveling to Puerto Rico for over a decade, I had never conducted archaeological work on the island. My archaeological career, until that point, had focused on the Maya of the Northern Maya Lowlands, the Aztecs of Tenochtitlan, and tribal archaeology in the Southeastern United States. Somewhat serendipitously, while vacationing near the El Yunque rainforest in the summer of 2014, I ran across a flyer indicated that there were daily petroglyphic tours. It was then that I met professional photographer and petroglyphic tour guide Rex Cauldwell (co-author of this paper.) During our time together, Rex took me to a variety of archaeological and petroglyphic sites around the Barrio Cubuy and El Yunque, but I found nothing quite as impressive as the La Mina boulder.



Caption: La Mina Boulder (courtesy of Rex Cauldwell, 2015)

After spending quite some time at La Mina, I was shocked to learn from Rex that it, aside from local knowledge, had never been systematically studied (a fact that I later confirmed during my desktop analysis in 2014/2015). Even more interesting was that other scholars had seen the site, including some academics recently from the University of Puerto Rico-Mayaguez, but none of them had decided to pursue it as a research topic or publish about it. I found this odd since, in all of my time working in Mexican archaeology, I had never come across an intact carving that had not been published about— let alone one that was covered with carvings. On the contrary, most Mexican archaeologists went out of their way searching for intact Maya and Aztec stelae, because of not only their rarity but also these discoveries could make a person's career. Since this did not match my prior experiences, it made me even more curious as to why no one had published this finding before. Was there something I was missing about doing archaeology in Puerto Rico? I was committed to finding answers to this question.

Another intriguing part of this first encounter was that it was (and still is) an *active site*, meaning that the carvings were and are constantly changing/weathering due to its location in the rainforest. Rex and I were specifically intrigued by the changes occurring to the boulder; as a result, I took a series of photos in 2014 and sent them to a geologist colleague of mine in Buffalo, James Schuetz (another co-author of this paper), and asked his opinions about the weathering process and geochemical accretions Rex noted at the site. We were all interested in the impacts of this weathering process on the petroglyphs themselves and how much longer they would last before the symbols disappeared. I felt it imperative to study this site before the glyphs were lost to history.



Caption: Spiral on La Mina Boulder with geochemical accretions (Courtesy of Rex Cauldwell, 2015)

Once I returned from vacation, I began the long process of building a viable research design. Between 2014 and 2015, James, Rex, and I developed the following research question and objectives: "What is the cultural context and significance of the La Mina petroglyph site?"

Based on this question, we developed the following research objectives. Our hope was to:

1. **Understand** and/or construct a localized geological, historical, and archaeological chronology for the La Mina site and its surroundings;
2. **Identify** the cultural and temporal phases of the represented boulder art and classify their symbolic and stylistic elements; and
3. **Determine** how La Mina fits into the greater archaeological boulder art sequence for Ancient Puerto Rico.

During the desktop analysis, I began to realize how little information was known about this region of Puerto Rico and La Mina site specifically, save for a few sixteenth century chronicler's notes and Rex's own research.³ I continued to be intrigued by this

³ The PI, Dr. Rhianna C. Rogers, completed the initial desktop analysis for the Phase 1 La Mina project between August 2014 and September 2015. Resources utilized for this research included a preliminary collection of ethnographic data from locals living in the area (Summer 2014), a review of scholarship about Caribbean and Puerto Rican boulder art (Pinart 1890; Frassetto 1960; Roe 1980), a review of the National Register of Historic Places, a review of online Puerto Rico State Historic Preservation Office and *Instituto Cultura Puertorriquena* records, a review of the 1988 USGS maps of Puerto Rico, and a review of available Puerto Rico GIS layers. The search results indicated that four (4) sites were listed on the National Register for Historic Places in the Municipio of Naguabo where the La Mina site is located. Of those sites on the NRHP list, only one was archaeological, the Icacos Petroglyph Group (#15000855). During this search and in subsequent ethnographic interviews with locals, no known historical structures were located on the La Mina site; however, we did observe a historical milling road no longer in use at the southeastern terminus of the site. The current landowner, Alex Lopez Rodriguez, indicated that the road was over 100 years old and was once used during the plantation phase of La Mina.

site and attempted to find out all I could by reaching out to the Universidad de Puerto Rico and Universidad del Turabo as well as the Division of Archaeology at the Instituto de Cultura and the State Historic Preservation Office of Puerto Rico (Oficina Estatal de Conservación Histórica – OECH.) Unfortunately, I learned very little from the University of Puerto Rico system and never received any responses from the government institutions. It is worth noting that on most projects that I have been a part of in Mexico, it is customary to have in-person meetings to secure support for projects. In the past, I would reach out through contacts or directly to offices to secure meetings and fly down to meet people. Once there, I would schedule more meetings with locals in the area (e.g., community leaders, property owners, provincial mayors, cultural leaders), since they too represent different stakeholder perspectives in this project. However, in this case, I had extreme difficulty reaching anyone in formal government. For months, I attempted to contact individuals in government offices in order to secure permission to work on the island to no avail. It was not until I had two conversations in early 2015 with a former Puerto Rican archaeologist and a former state employee that I learned this behavior was typical. They both indicated that, due to severe financial issues on the island, many archaeological-related offices lacked funding and were severely understaffed. Additionally, when political parties changed, they indicated that many of these employees were “let go” or moved to new positions, making the continuation of former work and seamless transitions between workers even harder. The former state employee informed me that he lost his job because of a political change in the government and that some of his projects were discontinued. He said that this practice was quite common across divisions of Puerto Rican government, meaning that if someone was to leave in the middle of work, things most likely could be lost (like my emails). He continued to say that before he left his position, he knew of only two regular office workers in the OECH overseeing and reviewing all work – CRM and academic archaeology combined. Supporting these claims, the former state archaeologist informed me that work was prioritized based on need and project size (usually CRM projects went first since they involved the most money and prestigious stakeholders) and that, due to time constraints, many smaller projects fell to the wayside. Having spent

a decade traveling to Puerto Rico, I understood how economic and political issues were affecting people on the island, including major rises in unemployment and the “brain-drain” of young intellectuals, but I did not know how it directly was influencing archaeology until these conversations. It took me some time to figure out an ethical alternative to complete this work, given that I could not rely on the proper government channels to submit a project proposal. I still wanted to make sure that the Puerto Rican authorities would be aware of this work, but I was unwilling to abandon this project for fear of further degradation of the La Mina site. I emailed *OECH* another copy of my project design in mid-2015 and then went to work with Rex, who lives near the La Mina site, to secure permissions from the private landowners, the town of Cubuy, and the nearest state archaeologist in the area, Victor Torres, Director of the Cueva del Indio site in Las Piedras. I also insisted that if anything was found, that it would be turned over to Sr. Torres for safekeeping and recording. Having done this, we elected to begin work at the site in the summer of 2015. Without these conversations and quick thinking, I am not sure that this project would have ever been conducted.

Adding to the difficulties above was our issues with securing funding for this work. As a professor in Buffalo, New York, working on a site in Puerto Rico was not cheap. Not only did I need to fly down to this site, but I also wanted to bring my colleague James Schuetz to study the geological findings. In addition, working outside of my normal research area with both an amateur archaeologist and geologist made it difficult for me to convince my regular funding channels to support this work. After looking for new funding opportunities and partnerships with other Puerto Rican archaeologists, we found that few were interested in this site; many did not know it existed, and funds on the island were earmarked for more well-known sites and archaeologists. This made us make a critical decision – continue the project unfunded, delay the start of the project while looking for funding elsewhere, or abandon the project entirely. Thinking about this for some time, James, Rex, and I discussed our options and we decided to continue the project, funding it primarily ourselves. I applied for a small grant of \$500 from my college, purchased the tools for the work, and reserved rooms to stay near the site. Despite working on a minimal budget,

James, Rex, and I pooled our resources and were able to: 1) map the site terminus using GPS and compass, 2) test pit a transect (Transect 1) and the La Mina and Chief's Head Glyph boulder , 3) draw representative petroglyphs using Roe's (2005) drawing methods, 4) take nearby GPS points at known archaeological sites in the vicinity of La Mina, and 5) analyze our findings in the "lab" (aka Rex's garage.) Needless to say, our expenses well exceeded the \$500 grant from my college, but our commitment to this work illustrated our belief that the site was worth it. I have known many scholars who have passed up research projects based on lack of funding, but our willingness to focus on the preservation of this site more so than how much grant money we could get for our work is something I think more scholars should take into consideration.

Cauldwell Reflects

Since moving to Puerto Rico 15 years ago, I became increasingly interested in the Puerto Rican petroglyphs. I have always enjoyed photography and began to photograph ancient glyphs and rock art throughout the island. During this time, I began to note how rapidly they were disappearing. Out of a personal desire to preserve this knowledge for future generations, I took it upon myself to find, photograph, and log as many petroglyph locations throughout the island as I could. I told OECH what I was doing and they gave me their blessing to photograph glyphs. Over time, I developed a group of local informants who told me about commonly known and unknown glyphs on the island. This is what led me to the La Mina boulder.

I first became aware of the La Mina site through Robin Phillips, a local in the Cubuy area. He knew nothing about it except that it was a large boulder with glyphs all over it somewhere in the jungle. At that time, the local growth was so thick you could only see a foot or two into the jungle, making anything hard to find; however, after two years of searching, we re-found it. Robin stated that he had showed a few archeologists its location over the years, but all they did was admire it for a few minutes and leave--never making it into a study. I, however, recognized its importance immediately and began to study it myself. Fifteen years later, I developed my own interpretations of the glyphs and began to share them locally

with others. However, as an amateur archaeologist and interpreter, I did not have a formal platform to share what I had learned. That changed after meeting Rhianna and eventually James. In 2015, I decided to present my findings in a paper I delivered at the *International Association for Caribbean Archaeology Congress* in St Martin. While writing this conference paper, I consulted both of my co-authors for input. The presentation was the first to highlight the importance of this site and it was well received by both academics and nonprofessionals alike. During my research at the site, I also discovered the Chief's Head Boulder further into the jungle, which had also never been documented. As I continued to search the area and I found several owl glyphs a considerable distance downstream and, in late 2015, I found a large monkey glyph and a carved stone head high up the La Mina Mountain. These new discoveries were co-presented by my co-authors in February 2016 as part of the New York State Archaeological Association-Houghton Chapter speaker series at the Buffalo Museum of Science (Rogers, R. C., Schuetz, J. & Cauldwell, R, 2016.)⁴

As previously mentioned, one reason this petroglyph boulder is unique is that it is *active*: it was designed to do something specific and *is still doing it today*. The most obvious is that it channels water. The top of the boulder sends water into a groove cut into the knife-edge bow (it is worth noting that some of the knife-edge bow could be a natural formation). As the rainwater flows down the groove it pours into various glyphs where the sides of the channel have been ground out. Given that few intact boulders like this still exist, I feel that this singular attribute may make the La Mina glyph boulder one of the most important representatives of this type of site in the Caribbean. The reason for the water channeling appears to be related to Taino, pre-Taino, and Igneri religious beliefs about water. My research and information points to the fact that native peoples believe water was magical. In the Rio Cubuy, a short distance down the mountain, additional evidence of water channeling in the igneous boulder can be found. There are locations around the world that have what some call water glyphs

⁴ Rogers note: It is worth noting that there is a tension between professional, amateur, and academic archaeology. Some academics will not support professional and amateur research, no matter its accuracy and quality. I have found in a lot of research in and out of the US that this bias has greatly limited scientific knowledge in areas, especially in regions with little to no funding opportunities for academics.

or water/cup glyphs—in particular, the Southwest United States—these do not seem to be related to these specific glyphs (Terlep, 2012). An issue we have encountered with this knowledge is there is a very limited amount of publications in this region of Puerto Rico, meaning we have little to compare our findings to or ways to know if other boulders like this exist in the area. Our hope is that we can continue to locate and make connections with other similar sites in the Caribbean in order to build up the archaeological record and verify this interpretation.

Though lack of resources has hindered parts of this project, including its preservation, the lack of knowledge about this site has been its overall savior. The isolation of the boulder and its location on private land has kept vandals away. This coupled with the fact that the boulder is not on Puerto Rico's list of known petroglyph sites, has kept this site relatively private.⁵ Additionally, the artwork itself has helped with its own preservation process. The cuts in the rock were so deep in the La Mina boulder that weathering has influenced some, but not all of the glyphs. This is not the case with the Chief's Head boulder a small distance away. Many glyphs that were obvious 15 years ago are now worn away to an extent that they can only be seen in old photos or a macro lens of a camera. Fortunately, I have been photographically documenting them as a personal way to preserve the site for future generations.

I also encountered issues regarding securing permissions from stakeholders. Like Rhianna, prior to the formal survey of the project, I spoke with a number of locals (e.g., landowners in the area, community leaders, archaeologists, and officials) to let them know about this project and determine the best approach to proceed. It took a large amount of time to find the owner of the property and get permission to study the site. With a lot of land still under the old Spanish land grant, system (created between 1500-1900) and without a modern survey of the region, many of the property lines around La Mina were questionable. Not to mention that some

⁵ Cauldwell Note: In addition to La Mina, a large number of glyphs, some known by archaeologists, but never studied, are approximately 15-minutes away in and along the Rio Cubuy, Rio Icacos, and Rio Blanco rivers. With this large proliferation of glyphs in the area, I believe that a large village with one or more dance courts may have been present. However, since most of these sites are located on private property, as with the glyphs themselves, no study has ever been made to study this assumption.

properties have been abandoned in the area and records of former owners were not well documented. In addition, many local informants and property owners could not identify where one property ended and another began. Despite my efforts to look up official records in Cubuy and San Juan, I was unable to definitively determine property lines for La Mina in the local township. Meaning, inadvertently, we could have been working on more than one property, but there would be no formal way to tell. Even house locations are in question since the system is so outdated; for example, some houses are listed on one person's property and taxes were assessed to that plot of land, yet in reality the house is located on another person's property and local agreements have been made to adjust lines to compensate the inaccuracies on file with the government. This, obviously, leads to extreme confusion and in some cases houses and land cannot be sold. What is worse is that even with accurate, modern surveys, some properties like these cannot transfer custody since many local agreements are never formalized in writing. These issues made it even more difficult for me to find and secure permissions for the site. After numerous conversations with community officials, I ultimately was led to speak with Alex Lopez Rodriguez who the community determined owned the parcels of land that contain both the La Mina and Chief's Head boulders.⁶

In addition to these issues, there was also the fear-related issues of outsiders entering local properties without proper permissions and seizing lands. For example, my job was made harder because just before we did our study in 2015, a group of people (allegedly from a national organization) were walking through the mountains looking for something--without permission from any local property owners. The actions of these other individuals raised concern about our project and our true intentions. My redeeming feature was that I live in the area and locals assured others on the mountain that I was one of the "good guys" and that I truly had an interest in preserving petroglyphs for future generations and nothing more. I believe that without my local connections we would not have been able to proceed with our work at this site.

⁶ Rogers note: Based on the permissions we decided to stop surveying when we reached clear property line markers. These markers included a historic mill road, fences, and dense foliage. It is possible that the full extent of the site was not included given the fact that we stayed within Sr. Rodriguez's property lines.

Schuetz Reflects

The significance of this project, beyond the documentation of previously unrecorded petroglyphs at this site, is the anecdotal (non-scientific) observation that La Mina carvings are slowly disappearing, likely due to dissolution weathering associated with precipitation. The rate of this weathering may be faster than anticipated due to high amounts of precipitation and potential biogeochemical processes including precipitation and organic tree litter from its proximity to the El Yunque National Forest. This enhanced dissolution exasperates the need to study and archive the site. As an approximately 8 meter-long and 3 meter-high heavily petroglyph-covered surface, the La Mina boulder offers a glimpse into the lives of the people of this region. As previously mentioned, this documentation utilized a field method developed by Roe (2005) for drawing petroglyphs on heavy-gauge clear plastic affixed to a feature, in this case La Mina boulder.



Caption: Drawing Petroglyphs using Roe's (2005) methods (courtesy of Rex Cauldwell, 2015)

As part of this study, we used high-resolution imagery, Global Positioning Systems (GPS) Geographical Information Systems (GIS) (with ESRI ArcMap), and field sketches to provide a detailed analysis of the site. Furthermore, specific procedures were adopted to geologically characterize the site without disturbing the archaeological integrity. For all geological rock samples and descriptions, a non-destructive technique was developed for rocks proximal to La Mina that compared weathering patterns and outside surfaces with fresh rocks of similar type from distal locations of La Mina. In both cases, as few fresh samples were observed as possible which minimized modern changes to the site. Furthermore, a surrogate rock type was developed, such that, a fresh sample (broken with a small 5-pound boulder hammer) was comparable to La Mina, Chief's Head and adjacent rocks without impacting the archaeological site. Small samples, from outside the site, were photographed and logged. Much of this information was used to determine if a cave could have existed while the site was in use. (As indicated in the tentative interpretation below, we used these geological features to propose an archaeological religious function and/or Cohiba Ceremony site.)

From my own experiences, being part of this process was unique, in that it gave me the opportunity to work across disciplines and beyond traditional scientific processes. I could clearly see how my geological interpretations could be used to interpret human behaviors at the site. Working directly with non-geologists (archaeologists and non-scientists) provided a unique perception into how the geological data are interpolated and communicated. This allowed for a more broad introspection into science, geology, and my relationship to other disciplines and the public.

Final Thoughts

As previously stated, Puerto Rico is an important island for understanding the succession of cultural occupations in the Caribbean; however, lack of support and funding have prevented it from influencing the scientific community as much as it should. These issues are further compounded by the limited government infrastructure on the island and lack of external funding supports

from the US and abroad. Despite these issues, we hope that other scholars and amateur archaeologists understand the importance of the sites and the need to preserve them. We feel it is part of our ethical obligation to preserve these sites for future generations, even if it may cost some personal expense to do so. Additionally, we hope that our reflections also highlighted the importance of community when working in underfunded areas like Puerto Rico. Since many of these sites are being preserved by locals, many times without support from outsiders, their beliefs and practices should always take into consideration and cultural sensitivity should be practiced when working on these sites. Working in a region or culture that is different than your own requires an understanding of local beliefs and a respect for local customs and practices. If we did not take into account the narratives of former government employees, the feelings of the local community, and our own concern for the preservation of this site, this project would have never happened. Our hope is this knowledge will help others in similar situations have successful projects of their own.

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