REPORT ON TRINIDAD CROSS ARTIFACT (HO2010.10)

By
Alexandra Cox
Trinidad Museum Society
400 Janis Court
Trinidad, CA 95570
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"Spanish Discovery of Trinidad Bay, California 1775" by Caleb Whitbeck.
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ACKNOWLEDGMENTS

Members of the Trinidad Museum Society
   Joan Berman, Treasurer and Librarian
   Patricia Fleschner, President- Heritage Room

Allyson Carroll of the HSU Department of Forestry and Wildland Resources

Eureka Woman’s Club
   Susan Willan, House Chair

Clarke Museum
   Ben Brown, Director and Curator of Clarke Museum
   Pam Service, previous Curator of the Clarke Museum

Eureka Veterans Memorial Building
   Robert Dunn, member

Archaeology Research Laboratory Collections Room, HSU

Members of HSU Cultural Resource Facility
   Bill Rich
   James Roscoe
INTRODUCTION

Within its collection the Trinidad Museum has an artifact that consists of three individual wood pieces that are believed to be the remnants of the original wooden cross erected by the Spanish in 1775. The Trinidad Museum was uncertain as to the validity of this claim and so a thorough investigation of the artifact was undertaken to determine if in fact these wood pieces are indeed the remnants of the original Spanish wood cross. A number of methods were employed, including physical analysis and ethnographic research, to try to solve this mystery. All evidence gathered has yielded positive results in that the artifact is possibly the remnants of the original cross. Before the data gathered through these methods can be examined a review of the historical background concerning the significance this artifact represents must be put forth and explained.

In March of 1775 the Spanish Navy conducted an exploration of the Northwestern coast seeking sites for possible settlements, chart the coast, and report on the native peoples, fauna, flora, and minerals (Heizer & Mills 1991). The 1775 expedition was commanded by Don Bruno de Hezeta, Captain of the frigate Santiago. The schooner Sonora, Captained by Don Juan Francisco de la Bodega y Quadra, accompanied the expedition. The expedition landed the first Europeans on the Northwest Coast and discovered the mouth of the Columbia River (Heizer & Mills 1991). On June 9, 1775 the ships entered a bay later named Trinidad and remained there until June 19 (Heizer & Mills 1991). Here they encountered the Yurok village named Tsurai. On June 11th 1775, Holy Trinity Sunday, which is where the name Trinidad originated from, Hezeta took possession of this land in the name of Carlos (Charles) III, King of Spain (Heizer & Mills 1991). A cross was constructed on shore then erected on Trinidad head, and the first Mass in Northern California was celebrated. The Mass was conducted by Reverend Father Miguel de la Campa (Heizer & Mills 1991). Upon the cross an inscription was placed in the wood that read:
“Carlo Rex Dei G. Hyspaniarum Rex (Charles the Third, by the Grace of God, King of Spain). On September 9, 1913 the Women’s Clubs of Humboldt County, with the assistance of other local clubs including the Pioneer Club and the Native Sons, erected a granite replica of the cross on Trinidad Head which stands to this day.

PHYSICAL ANALYSIS

There are three wood pieces in total that make up the supposed remnants of the cross, one large squarish piece and two smaller highly degraded pieces. No information could be gathered from the two smaller pieces due to their deteriorated physical state. The larger piece, 22 inches in length from tip to tip, is in better physical condition. One half of the wood artifact is square in shape with four faces that each measure 7 inches x 12 inches and extends an additional 11 inches as a rotten angled section that was likely below ground. The wooden artifact is made of is redwood. One square facet shows evidence that it has been sawed off and two other facets that are opposite to each other have nails in them. All three pieces appear to be the same type of wood and were all likely in similar environmental conditions. Based on the state of degradation, I conclude that they were likely found together and are from the same structure and possibly the same tree.

Due to the state of this artifact I can reasonably conclude that it could possibly be the base of the cross. The top portion of the artifact shows evidence that the top section of the structure broke off while the bottom portion of the artifact is highly degraded in a way that hints that it had been in the ground. This is not all that surprising since in many wooden structures it is the foundation that lasts the longest. More detailed physical analysis of the large wood piece was conducted to determine the plausibility of it being a remnant of the original Spanish cross; these methods include dendrochronology and analysis of the nails in the wood.
The artifact was taken to the Humboldt State University Forestry Department where Allyson Carroll of the Department of Forestry and Wildland Resources used dendrochronology to date the age of the tree used to make the artifact. Dendrochronology is the study of growth rings in trees either to analyze past climate conditions or determine the date of past events or things. It’s not just counting the tree rings that give you a date, it’s matching “fingerprints” of ring-width variation caused by surrounding environmental and climatic conditions that provides confidence for dating the rings (Carroll 2015). Matching the pattern in trees whose age is known to the pattern in wood found at an archaeological site can establish the age at which the tree was cut and thus the approximate date of the site. In other words records of tree-rings with known annual growth years provide templates upon which other pieces of wood can be compared for dating purposes (Allyson Carroll 2015). The crossdating analysis performed by Allyson Carroll suggested the years 1580 to 1711 A.D. as potential dates for the remnant, placing it within the proper time period to be the cross. These dates mean that the tree the wood came from was alive during these years. These dates are not conclusive due to limitations of correlation-based crossdating, short window of analysis, distance of reference chronologies as well as physical damage on the wood interfering with the analysis (Allyson Carroll 2015). This evidence, as Allyson puts it “…leaves open the option that the remnant is part of the cross rather than discounting that theory”(Carroll, pg.2). No viable dates were generated placing the remnant after 1775, which would have suggested that it was not the cross. The best dates from this analysis place the remnant at 1580 to 1711 A.D. The remnant does not show any bark or cambium so it is not possible to determine the date of harvest of the tree. If it was harvested at all, it is more likely that the Spanish used a downed tree to construct the cross.

*Figure is Correlations of the remnant dated 1580 to 1711 A.D. with crossdated chronologies. Dashed line represents cutoff for statistical significance (P<0.01). Image provided by Allyson Carroll.*
ANALYSIS OF NAILS

On two facets of the square cut section of the wood artifact nails have been embedded into the wood, possibly 12 nails in total, but due to the highly degraded state they are in it is difficult to say how many there were originally. The placing of the nails is interesting in that they are at the base of the cross in a relatively vertical pattern, traveling up and down the sides of the artifact and only on two sides. The two facets that have nails embedded in them are opposite to each other. It is indeterminable if the side that has been sawed off had nails in it. Overall, the position they are in and the fact they are there at all is strange in that the Spanish would not have used nails in that portion of the cross, if they used nails at all, since they would have been an important commodity aboard the ship. The nails are important in that they can be used as another dating method. Nail chronology is based on nail types that are identifiable and are based on the structure and the physical characteristics of the nail that result from dateable technological developments on nail manufacturing (Wells 1998). The structural features used to date a nail are: material (iron or steel); general uniformity (or lack of it) of the head and shaft; shaft shape, cross section, and taper; the pinch, if present; shape of the point; burr, if present; cold shuts or cracks; and heading method (Wells 1998). No one of these features should be relied on for determining the age of a nail. Except for the use of iron or steel, none of these features are chronologically significant individually. When the nail features are used together, one may determine the nail type and its time of use (Wells 1998).

Due to the highly degraded state of all of the nails there are not many structural features left to use to date the nails. All the data that can be gathered from what remains of the nails is that they are made of iron, the shafts are relatively square in shape with not a lot of uniformity, but that could be due to the effect of corrosion. There are no nail heads left to speak of. While there is not enough data to place the nails into a specific type, they can be placed within a general time range with the feature data available by using the material the nails are made of and the shape of the point and shaft. The transition from the use of iron to steel in the nail industry was not immediate, having begun in the mid-1880s and continuing into the 1890s (Wells 1998). Hand-
made nails, naturally, exhibit the greatest variation in all aspects of shaft form. Generally, hand-
made nails tend to taper on all sides to the point and maintain a square cross section (Wells
1998). The nails embedded in the wood are iron and are possibly handmade due to the tapered
point, square cross section and slight non-uniformity. Using this information I can place the nails
as having been made between the mid-1700s to the early 1800s. This places the nails in the right
historical context for the cross, although why they are there to begin with is unclear. It is possible
that the nails were part a repair done on the cross sometime after it was erected. It is unclear as to
what function the nails served or whom or where they were made. The fact that the nails were
made between the mid-1700s to the early 1800s adds credibility to the theory that this artifact is
indeed the original Spanish cross in that the nails were made during a time before Trinidad was
settled by Europeans.

![Image: portion of nail from artifact](image)
(Note: pieces are ~5cm in length and ~3cm in width)
ETHNOGRAPHIC RESEARCH

An investigation into the oral and written documentation of the artifact was done to track the journey the cross made since its erection on Trinidad Head to when it ended up in the care of the Trinidad Museum and all the places in between. The cross’s story starts with its erection on Trinidad Head on June 11th 1775 (Heizer & Mills 1991). In May 1793 Captain George Vancouver of the British Navy ship the Discovery made note in his journal of seeing the Spanish cross on Trinidad Head and being able to read the inscription upon it (Heizer & Mills 1991). In 1817 Peter Corney, First Officer of the British schooner Columbia, made note in his journal of seeing the wooden Spanish cross up on Trinidad Head (Heizer & Mills 1991). The next recorded sighting of the cross was in 1913 when the Club Women of Humboldt County erected the granite cross to replace the original Spanish cross. Apparently when the workmen were building the road up to the head they found the remnants of the original cross. The source, a narrative on Trinidad history given by Mrs. George Murray a previous president of the Eureka Woman’s club and director of the 1913 granite cross erection, did not say what was done with the cross remnants after they were found. I can speculate that they were probably given to one of the individuals in charge of organizing this event, most likely someone from the Woman’s Club. There is another source of information that contradicts this. A document that came with the box containing the remnants states that the remnants were “located” and “removed” in Jan. 9th 1934. It is unclear as to the credibility of this information; it is most likely a typo.

In 1933/34 The Eureka Woman’s Club donated historical relics of Humboldt County that were placed in the Eureka Veterans Memorial Building on the second floor which had been turned into a museum. It is highly probable that the cross remnants were part of these historical relics of Humboldt County. A mid-1960s to the later 1970s travel pamphlet about Trinidad places the remnants of the original cross in the Veterans Memorial Building in Eureka. In an article by Sibyl Jamieson, written May 1st 1983, called “Historical Happenings: Our Town” she places the remnants of the original cross at the Clarke Museum in Eureka. The remnants were most likely moved because the museum in the Veterans Memorial Building had been closed, but there are no records of when the remnants moved from the Veterans Memorial Building to the Clarke Museum. The cross remnant was given to Trinidad Museum in 2010 by the Clarke Museum which had the object in storage. While the evidence showing the sequence of events starting with the cross’s erection, to subsequently ending up at Trinidad Museum, has gaps in it, it does demonstrate a plausible story line maintaining the possibility that the remnant is indeed a portion of the original cross erected on Trinidad Head in June 1775.
TIMELINE OF CROSS REMNANTS

1770
Cross erected June 11, 1775

1790
May 1793 Captain George Vancouver sights cross.

1810
1817 Peter Corney, First Officer of the British schooner Columbia, sights cross.

1910
1913 base of cross found by work crew building road. Granite cross replica erected.

1930
1933/34 The Eureka Woman’s Club give historical relics of Humboldt County, including cross remnants, to be placed in the Eureka Veterans Memorial Building

1960
A mid-1960s to later 1970s travel pamphlet about Trinidad places the remnants of the original cross in the Veterans Memorial Building in Eureka.

1980
In an article by Sibyl Jamieson, written May 1st 1983, called “Historical Happenings: Our Town”, she places the remnants of the original cross at the Clarke Museum in Eureka.

2010
2010 Cross remnants donated by Clarke Museum to Trinidad Museum

2015
Cross remnant authenticity researched by TMS intern Alexandra Cox.
CONCLUSION

The data collected during this research project revealed significant evidence that supports the theory that this wood artifact is indeed the remnants of the original Spanish cross erected on June 11th 1775. The physical analysis of the artifact while not entirely conclusive individually, the dendrochronology and the analysis of the nails together make a strong case in support of the remnants being part of the original cross. The crossdating analysis, while not conclusive, places the remnant at 1580 to 1711 A.D. and the analysis of the nails places their manufacturing date between the mid-1700s to the early 1800s. This data together places the artifact within the correct time frame for the original cross. An investigation into any recorded documentation concerning the cross remnant provided further evidence supporting the possibility that this artifact is a remnant of the original cross. Records show a trail from when the cross was erected in 1775 to when it ended up at the Trinidad Museum. Combining the physical and ethnographic evidence demonstrates that this artifact could be the original Spanish cross erected on Trinidad Head in 1775.
BIBLIOGRAPHY


Carroll, Allyson. (April 17, 2015) “Crossdating analysis of the wood remnant thought to be the Trinidad Cross”. Department of Forestry and Wildland Resources, Humboldt State University, Arcata, CA. Save the Redwoods League.


APPENDIX

Crossdating analysis of the wood remnant thought to be the Trinidad Cross

Allyson Carroll

Department of Forestry and Wildland Resources
Humboldt State University, Arcata, CA
Save the Redwoods League

April 17, 2015

Summary

A piece of wood thought to be the part of the cross erected at Trinidad Head, CA, by the Spanish in 1775 was investigated by crossdating analysis and maintains the possibility that the remnant is indeed part of the cross. Correlation analysis between the 132-year tree ring series on the remnant and four individual and one composite reference redwood chronologies from the region suggests the years 1580 to 1711 A.D. as potential dates for the remnant, placing it within the proper time period to be the cross. These dates are not conclusive due to limitations
of correlation-based crossdating, short window of analysis, and distance of reference chronologies. Effectively, this analysis leaves open the option that the remnant is part of the cross rather than discounting that theory. Investigation of the typology of the nails embedded in the remnant and written and oral history of the cross, led by Alexandra Cox, intern at the Trinidad Museum and graduate student of Applied Anthropology at Humboldt State University, will bolster this examination.

**Background**

On June 9, 1775, Spanish explorers anchored in what is now known as Trinidad Harbor in northern California where Yurok people lived in the village of Tsurai. During their 10-day long stay, the Spaniards built and erected a wooden cross on Trinidad Head and declared the land in the name of King Charles III on June 11, 1775, the day of the Catholic Feast of the Holy Trinity, leading to the name Trinidad (Armand, 2010). A granite replica of the cross currently stands on Trinidad Head, raised in 1913. A remnant piece of wood, maintained by the Trinidad Museum, is thought to be the base of the original wooden cross. Due to its historical significance, efforts have been undertaken to crossdate the piece of wood in an attempt to verify its authenticity as piece of the original wooden cross erected by the Spanish in June of 1775.

Records of tree-rings with known annual growth years provide templates upon which other pieces of wood can be compared for dating purposes. Collections of >1000 tree cores from >100 coast redwoods gathered from long-term research and monitoring plots installed during Save the Redwood League’s Redwoods and Climate Change Initiative (RCCI) established the first range-wide crossdated tree-ring chronologies for this species (Carroll et al. 2014).
Accurate years of annual growth on these trees were determined by the process of crossdating, where the pattern of relative tree-ring widths among a population of trees is used to assign a calendar year to each tree ring. Rather than merely counting rings, it is this distinctive “fingerprint” of ring-width variation dependent upon surrounding environmental and climatic conditions that provides confidence for dating the rings. For a species such as coast redwood, this process is essential due to many ring anomalies and “missing” or “locally-absent” rings. These chronologies provide the closest references to compare the tree-ring patterns of the remnant wood, also thought to be coast redwood.

**Methodology**

The remnant piece of wood has four ~7 inch x ~12 inch faces and extends an additional ~11 inches as a rotten angled section that was likely belowground as the base (Figure 1).

The most intact face was selected and a ~3–4 inch swath was hand sanded with progressively finer grit sandpaper (220 to 600 grit) for improved resolution (Figure 2). Growth rings were
discerned under a Nikon SMZ-2B stereo microscope. The sanded section was scanned at 1200 dpi with an Epson Expression 10000 XL scanner after light dabs of water were applied to the to better discern ring boundaries (Figure 3). Growth rings were measured to the nearest 0.001mm using WinDendro image analysis software. The most recent growth ring was designated as the year 1000 to serve as a placeholder for the undated or “floating” tree-ring chronology. The series was detrended with a 32-year spline to optimize expression of high-frequency variation most useful for crossdating (Grissino-Mayer, 2001).
Comparisons of the remnant’s floating tree-ring index with crossdated tree-ring chronologies generated dating options with the highest correlations. Tree-ring chronology locations closest to Trinidad were selected and include Jedediah Smith Redwoods State Park (JS), Prairie Creek Redwoods State Park (PC), Redwood National Park (RNP), Humboldt Redwoods State Park (HR), as well as a composite northern redwood chronology (“north”) composed of JS, PC, RNP, and HR (Table1). These chronologies were also created using a 32-year spline and are detailed in Carroll et al. (2014). Each chronology was run as the “dated series” in Cofecha and the remnant’s chronology was run as the “undated series” with no further transformations or detrending applied. Cofecha generated the best 11 matches for each 50-year segment, lagged 25 years. Years that matched for at least three 50-year segments were considered for further investigation.
The possible dates were each applied to the remnant and inspected to see if strong marker years previously identified for each location were consistent with the suggested dating. The most likely date from this analysis was deduced and a new remnant chronology was created accordingly. The dated remnant chronology was added to each site chronology and re-ran in Cofecha as two dated series, allowing for inspection of the lagged correlations. Further, a Pearson’s correlation analysis compared the newly dated chronology with each site chronology, spanning the 132-year common period for all chronologies.

**Results and Discussion**

The remnant wood captured 132 annual growth rings on the sanded section. Most rings were easily discerned, however one section about 1/8 inch in length was difficult to decipher due to rot and may contain unaccounted for rings. Comparisons of the undated, floating segment with the known reference chronologies generated options for possible dates (Table 2). The most frequent option and the one with the highest correlations was + 711 years, such that the remnant dated to 1580 to 1711 A.D.
Lagged correlations of each site chronology with the remnant dated as 1580 to 1711 A.D. showed reasonably strong correlations (Table 3). However, for several 50-year segments, correlations dipped below the general cutoff of 0.3281, indicating weaker sections of crossdating. Using the full 132-year window for comparison generated significant correlations with all redwood chronologies investigated: northern composite ($r = 0.53; P < 0.001$); JS ($r = 0.51; P < 0.001$); PC ($r = 0.43; P < 0.001$); RNP ($r = 0.42; P < 0.001$); HR ($r = 0.42; P < 0.001$) (Figure 4).

<table>
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**NOTE:** Best matches for 50-year segments lagged 25 years using correlation analysis in Cofecha. Results presented if date was in the top 11 matches for at least 3 segments. 711 added for PC even though only 2 segments, as it was date of interest.

Figure 4: Correlations of the remnant dated 1580 to 1711 A.D. with crossdated chronologies. Dashed line represents cutoff for statistical significance ($P<0.01$).
The results of the crossdating correlation analysis maintain the possibility that the remnant is indeed a portion of the cross erected on Trinidad Head in June 1775. No likely dates were generated placing the remnant after 1775, which would have suggested that it was not the cross. The best dates from this analysis place the remnant at 1580 to 1711 A.D., within the time span for the wood used to build the cross (Figure 5). The remnant does not show any bark or cambium so it is not possible to determine the date of harvest of the tree. These dates presented here cannot be considered conclusive as correlation analysis is not deterministic and was limited due to the relatively short time span (132-years) available for analysis. In addition, reference chronologies range from ~13 to 52 miles away from slightly different microclimates, as compared to an optimal reference chronology from the Trinidad area.
A full investigation of the remnant including these crossdating results, nail typology, and written and oral history will be prepared by Alexandra Cox, Trinidad Museum intern and Humboldt State University graduate student in Applied Anthropology. Initial investigation of the typology of nails embedded within the remnant wood identified them as handmade wrought iron likely manufactured between the 1700s and 1800s (Cox, personal communication), again placing the sample in time period to be the cross (Figure 6). Carbon dating of the sample seems
impossible due to difficulties in calibration (Cox, personal communication). The crossdating analysis and nail typology together maintain that that remnant wood could be the Trinidad cross.

References

