They got nothin' on us.
Lost Civilizations

The Puzzle of the Manteño-Huancavilca
The First Puzzle Piece

• Manteño lived along coast of Ecuador (700 – 1542 AD)
• Vast trading empire
• Conquered local peoples through economics
• Pizzaro conquered in 1542
• Arrived in Port of Chanduy near Loma de los Cangrejitos
• Destroyed nearly everything → almost nothing left of Manteño civilization
Exit the Spanish;

Enter Archaeologists!

(that's us!)

- Manteño left behind platforms on Loma de Los Cangrejitos
- Cemetery nearby was pillaged, but platforms largely ignored
- If platform use was known, can give us insight into lost culture
- However, no visible artifacts
Our Hypothesis

• We thought that the platforms were used as living spaces. Therefore no artifacts were found because the house floors were swept clean.

• Our associated assumption was that even if the floors were swept, we would still be able to detect micro-artifacts.
But we need some help...
Archaeology!
(Blue's Clues Style)
Archaeology – Some Basic Terms

- **Archaeology**: study of human past
- **Archaeometry**: specific branch of archaeology
- **Artifact**: human-made or altered objects
- **Provenience**: context
- **Matrix**: level or layer
The things we are looking for are thousands of years old. How come they are still around?

Preservation of Organic Materials:

• Dry Environments

• Cold Environments

• Waterlogged Environments
Let's look for some clues!

But we need our...HANDY DANDY NOTEBOOKS!
Where can we find clues?
Excavation Site – Near Port of Chanduy, Ecuador

- Low, uneven mounds
- Crab Hill
- Ancient Cemetery
Where can we find clues?

Matrix 4

Matrix 5

Matrix 6
How can we find clues?

Hubbard Sieves and size fractions:
Easier to focus on one size particle
How can we find clues?

SEM vs. light microscope:
- Samples initially examined under light microscope
- Potential finds brought to SEM
How can we find clues?

How do we know that this is really a piece of obsidian?

Experimental archaeometry/type samples:
Comparison of our finds to controls
How can we find clues?

Newly developed methods:
- Dissolving sample in water
- HCl reaction with CaCO₃
It’s MAIL TIME!
Let's skiddoo to Dr. Miyamoto’s Lab!
Scanning Electron Microscope

- We used the SEM to compare unknown artifacts with known type samples in order to identify the objects.
Scanning Electron Microscope

38x

200x

900x
These things are so small! How do we know for sure what they are?

Type Samples vs. Artifacts

<table>
<thead>
<tr>
<th>Type Sample: Wood Charcoal (900x magnification)</th>
<th>Type Sample: Ceramic (37x)</th>
<th>Type Sample: Obsidian (37x)</th>
<th>Type Sample: Spondylus Shell (900x)</th>
</tr>
</thead>
</table>
Matrix 4
Matrix 5
Matrix 6
Matrix 6

• Pottery scattered throughout matrix
• Contains ochre-red designs

Pottery (SEM) 200X

• Color ranges: purple, orange, red
• Rare and valuable
• Used to make beads

Spondylus (light microscope)  

Shell Flakes (SEM) 200X
Bone (light microscope) Otolith-calcareous fish bones used for “hearing”

Crustacean (light microscope)

- Diet includes small mammals, lizards, fish, crustacean, birds

Charred Wood

Matrix 6 Matrix 6

- Firewood
- Parts of buildings
- Calcium Carbonate
- Quantity of Micro-artifacts
- Abundance of charred wood
- Very small amounts of other artifacts
- Obsidian Uses
Also found: obsidian (small amount), smooth stone (small amount)

- Topmost layer = most recent
- Quantity of micro-artifacts
  - Mostly wood charcoal
  - Very small amounts of other artifacts
- Natural sediment built up
- Lack of artifacts provide insight
How do we know we found all the micro artifacts in our samples?

**Recovery Rate:**

- Certain number poppy seeds per size fraction
- Calculated percentage recovered
- 40-50% considered acceptable
- 80% considered exceptional

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Recovery Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>82.9%</td>
</tr>
<tr>
<td>5</td>
<td>81.25</td>
</tr>
<tr>
<td>4</td>
<td>84.51</td>
</tr>
</tbody>
</table>
Now that we’ve collected all the clues, it’s time for our...
Conclusion

• Not much is known about Manteño
• Artifacts found provide clues
• Matrix 6
  - 700 - 900 AD
  - Remains of variety of domestic activities
• Manteño’s arrival
  - Approximately 1000 AD
  - Used economic prowess to conquer people
  - Built living surface (Matrix 5)
Conclusion...Part 2

- Cemetery
  - Created at same time as mounds
  - Burial of leaders and wealthy individuals
- Other trash piles
  - Dates of use uncertain
  - Similarity of artifacts
    - Domestic activities continued after Manteño’s arrival
- Matrix 4
  - Few artifacts found
  - Natural accumulated sediment
Conclusion of the Conclusion

• Artifacts
  - Indications about lives and daily activities
  - Platforms’ function changed after Manteño’s arrival

• Possible uses of platforms
  - Ceremonial
  - Occupied by Manteño chiefs

• Can now create new hypotheses
Professor Masucci – Director
Jean Barmash – Cameraman
Cast and Crew:
Laurel, Christine, Kelsie, Julie,
John, Odie, Sharmin, Vani,
Debbie, Yu-Ann, and Jayme
SPECIAL THANKS to Dr.
Miyamoto, Blue, and Joe
Congratulations, Professor! Good luck with your new baby!

Just kidding!

It’s NOT the end!