Shucked, Cracked, Steamed, or Roasted? Archaeological Experiments in Processing and Butchering the Eastern Oyster

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More. From day one.

Introduction

An important staple for many Native Americans, shellfish provided important protein and other nutrients for ancient peoples around the world. Although shellfish occur in abundance in archaeological sites, we know relatively little about how ancient peoples processed or butchered them. This includes the eastern oyster (*Crassostrea virginica*) that is common in archaeological sites throughout eastern North America. Knowing the ways ancient peoples processed oysters is important because we can use it to infer information about human lifeways, seasonal migration patterns, and resource use and harvesting intensity. Kent (1992) briefly documented four basic methods of processing oysters through limited experimentation. Building on his work, we replicated and expanded on the processes he described with larger samples and systematic examination of the damage present on oyster shells.

Research Questions

- How did Native Americans butcher and process oysters?
- What damage occurs on shells that can be identified in the archaeological record?
- How does this damage bias reconstructions of oyster shell size, age, and other variables?

Fig. 1: Cracking oysters with a hammersone.

Materials and Methods

We processed 94 fresh oysters from the Coan River, VA using four techniques (Ingersoll 1881; Kent 1992; Waselkov 1987). The oysters ranged in length (mm) from 40.7 to 89.6, with an average of 63.0.

Fig. 8: Shucking was performed by commercial oyster shuckers using a typical metal shucking knife.

1. Roasting: Oysters (*n*=25) were placed on a wood-burning fire and removed once opened **(Figs. 2-3)**.

Fig. 2: Roasted, moderate intensity.

Fig. 3: Roasted, low intensity.

2. Steaming: Oysters (*n*=19) were wrapped in wet sea grass, exposed to coals from wood-burning fire, and removed once opened **(Fig. 4)**.

Fig. 4

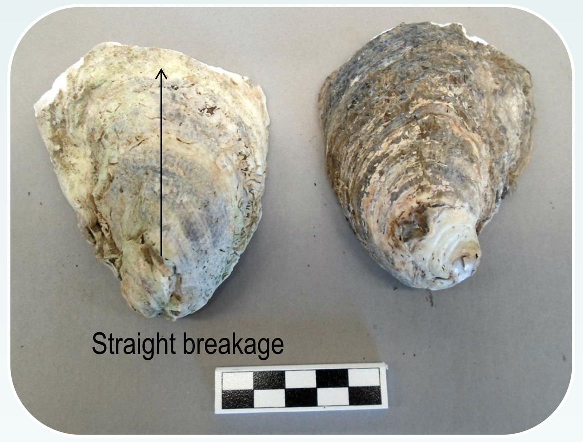

Fig. 5.

3. Cracking: Oysters (*n*=20) were held by dorsal end while striking the ventral end with a quartzite hammerstone similar to those found in Native American archaeological sites (Waselkov 1987). Ten were cracked with a round cobble **(Fig. 5)** and ten with a flat, angular stone **(Fig. 6)**.

4. Shucking: Also known as stabbing, this technique involves the insertion of a metal knife into one of the hinges and prying the oyster open **(Fig. 7)** (*n*=30).

Fig. 6.

Fig. 7.

The wood burning fire measured ~ 60 cm in diameter. Wood burning fires of this size tend to be between 400-700°C (Tylecote 1962). We cooked the oysters at three different flame intensities: moderate (mature fire with prominent flames); low (most large flames had burned out); and smoldering (no observable flames). The first group (*n*=15) was roasted at moderate intensity, the second (*n*=10) at low intensity, and the steamed group (*n*=19) was cooked at smoldering intensity **(Fig. 9)**.

Fig. 9.

Fig. 10: Round (R) and flat (L) hammerstones used in the experiment.

Results

1. The oysters roasted at moderate intensity opened within the first three minutes, their shells displaying scorch marks consistent with descriptions by Kent (1992). Ten oysters opened between 3.5 – 12 minutes, three between about 12 – 15 minutes, and two roasted for more than 15 minutes. These last five shells were charred, and the meat itself was overcooked.

2. The oysters roasted at low intensity yielded one oyster that opened within seven minutes, and nine opened within 17 minutes. Scorching was also present, but not to the extent of the oysters cooked at moderate intensity.

3. Steaming did not leave any observable marks on the oyster shells regardless of cooking duration.

4. Shucking produced a characteristic V- or U-shaped notch almost exclusively in the ventral edge of the right hinges.

5. Cracking produced two different types of breakages depending on the type of hammerstone used, but not as consistently as Kent (1992) described. The round hammerstone had more instances of a straight edge break than did the angular stone, which caused a jagged edge break. However, both stone types produced both breakage characteristics.

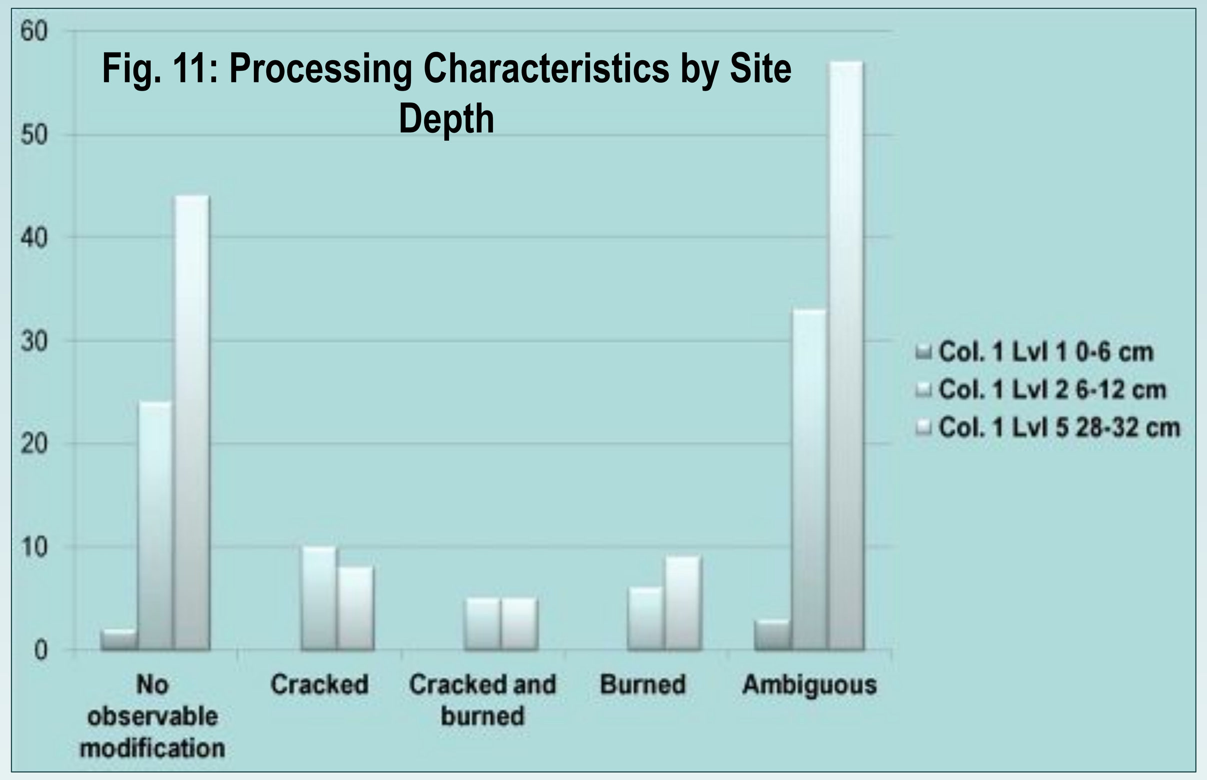

Fig. 11: Processing Characteristics by Site Depth

Discussion: Archaeological Comparison

The experimental sample was compared to archaeological oysters from site 18DO439 on Maryland's eastern shore. The site is ~1000 years old. 206 right (*n*=101) and left (*n*=105) valves were sampled from Column 1, levels 1, 2, and 5. Of these, 70 were whole or nearly whole shells with no observable modification, 18 demonstrated a high probability of being cracked, 10 exhibited signs of being cracked and burned, 15 were burned, and 93 were ambiguous. The ambiguous shells often displayed possible modifications, but not definitively enough to be categorized **(Figs. 11-15)**.

In our roasting experiment, ~44% of the roasted shells opened within the first seven minutes, and the rest had to be opened using another technique (cracked or shucked). Since 10 of the archaeological oysters also exhibited signs of roasting and cracking, Native Americans may sometimes have had to use multiple methods to open oysters.

Fig. 12: Burned experimental shell(L) vs. burned archaeological shell (R).

Fig. 13: Cracked experimental shell (L) vs. cracked archaeological shell (R).

Fig. 14: Steamed experimental shell (L) vs. unmodified archaeological shell (R).

Fig. 15: Shucked experimental shell (L) vs. possible chipped stone tool shucking damage in archaeological shell (R).

Conclusions

- Of the four processes, only roasting and cracking were discernible in the record. However, archaeological shells are exposed to variable conditions which greatly affect shell quality, such as acidic water and soils, chemical leaching, extensive weathering, etc. that damage shell crystal structure and make it more difficult to identify certain processing techniques.

- Identifying cracking in the archaeological record is a complex problem. Archaeological oysters can break from trampling, weathering, excavation, and other processes. We used shell weathering at broken areas as a general proxy for the timing of the breakage. Fresh breakages (i.e. during excavation) displayed shiny nacreous areas, whereas weathered breakages appeared dull with a powdery texture. Future research in oyster taphonomy, especially trampling, is necessary to understand the ways in which oyster shells break and how we can identify fragmentation patterns in the archaeological record.

- Our study demonstrates that shellfish processing techniques can be identified in the archaeological record. Documenting ancient oyster processing techniques can improve our understanding of the structure and function of archaeological sites, ancient technologies, and prehistoric oyster ecology. Experimental studies like ours are crucial for understanding the correlation between human behavior and the archaeological record.

References and Acknowledgments

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