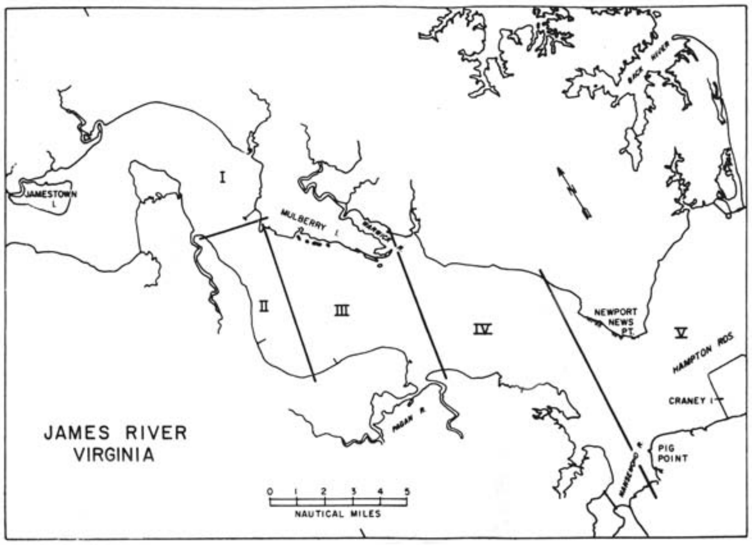

Figure 5. Divisions of the James River, Virginia, based on studies of hydrography, salinity, and estuarine circulation by M. M. Nichols (1972).

Of the sponges noted by Hopkins (1962) in the Chesapeake, three are low salinity species—*C. trutti, C. vastifica,* and *C. lobata*—whereas the fourth, *C. celeta*, occurs only in high salinity regions. Hopkins (1962: 123-24) notes that in the absence of large bore holes of *C. celata* the other species of *Celoni* will be restricted to sponge which can tolerate low salinity. They can endure salinity below 15ppt and even below 10ppt for short periods of time. These include *C. trutti, C. lobata*, and *C. vastifica*. The latter two appear not to be widely distributed. Kent (1992: 31) uses the term "*C. trutti* type" to include the three low salinity species. The current project employs this term in the same manner. Kent's 1992 summary of Hopkins' studies includes the following classificatory distinctions:

1. No boreholes: Salinity below 10ppt for about half a year and rarely above 20ppt.

2. Valves with small boreholes and no large boreholes: Salinity below 10ppt for about one-fourth of the year, below 15ppt for about half the year, and occasionally above 20ppt.

3. A mix of small and large bore holes: Salinities occasionally below 15ppt and above 20ppt for one-fourth to one half a year.

4. Valves with large boreholes as common or more common than valves with small boreholes: Salinity rarely below 15ppt and above 20ppt for most of the year (Kent 1992: 30).

In relation to these salinity ranges, the presence of *C. trutti* and the absence of *C. celata* offer additional insight into the original harvest loci for the oysters. The probable origin of the oysters becomes apparent when observed sponge distribution is put into perspective alongside a salinity study that investigated the relation of salinity to the attachment of oyster larvae to shell in the James River (Haven and Fritz 1985: 275). The analysis recorded and averaged over 13,000 seasonal salinity measurements of the James River from 1963 to 1980 (Figure 4). The salinity data drawn from the VIMS hydrographic files was calculated for five specific sections of the James River based on hydrographic charts done by Nichols in 1972 (176).

Figure 5 divides the James River into five sections and reveals that the seasonal variation in salinity in Area III is compatible with the growth of *C. trutti* sponge. The lower part of Area II may also support a limited quantity of *C. trutti* sponge. However, studies by Haven (2002 personal communication) examining oyster size each fall from 1950 to 1982 indicated that most oysters from Area II were less than 60mm long and would not be optimal for food.

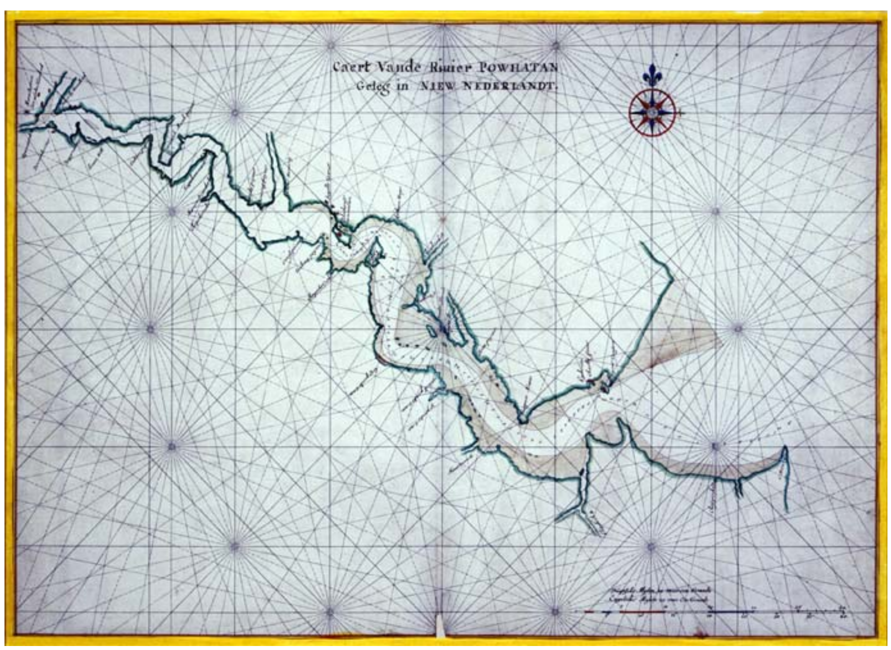

Figure 6. Atlas of the Dutch West India Company by Johannes Vingboons, drawn after ca. 1638 from ca. 1617 ships logs.

According to the salinity data, oysters in the JR731L collection came from the eastern James River in the low salinity region from Area III and possibly the lower part of Area II (Haven and Fritz 1985: 275). Area III extends from Mulberry Point to the mouth of the Warwick River on the north side of the James River and from about Deep Creek to Pagan Creek on the south side. The upper limit of Area III is approximately twelve miles from Jamestown Island. The absence of predatory oyster drills (*Urosalpinx cinerea*) and high salinity mollusks, such as hard clams (*Mercenaria merceneria*), further supports the likelihood of Area III as the oyster source. Both of these organisms seldom occur in salinities below 15ppt, like Area III. In fact, one would have to travel a distance of more than 20 miles to Area V before encountering oyster drills or hard clams.

Haven and Whitcomb (1983: 142-143) charted the locations of current oyster reefs in Area III of the James River. Some of the reefs they identified appear to be depicted as islands on an early 17th-century Dutch chart of the James River by Johannes Vingboons (Figure 6). Of particular interest is the area known today as "Point of Shoals," located just off of Mulberry Point on the south side of the James River. This is the general area that was the most probable source for the oyster shells under study. Today, only flat shelly areas mark the location of these old massive reef systems (Haven and Whitcomb 1983: 149) (Figure 7).

Conclusion

On the basis of height/length ratios and the presence or absence of various boring sponge, oyster drills, and hard clams, certain tentative conclusions can be made. First, the oysters of JR713L most likely came from various levels on an old intertidal oyster reef twelve miles east of Jamestown Island. These massive structures existed in colonial times but have been lowered as a result of over-harvesting. Second, the oysters in this study were likely selected for size, and the harvesting was probably done by hand. Before they were harvested, these oysters were likely located just below the surface of the water at low tide or within reach slightly below the low-tide level. Third, following harvest and consumption, inhabitants of James Fort deposited the shells in a pit. The oysters in layer JR731L appear to be a primary deposit resulting from nearby consumption.

The preliminary results of this study add to discussions of early colonial food procurement strategies in the multicultural Chesapeake. The oysters that ended up being consumed at James Fort were collected and transported from a relatively remote source, revealing one of the ways in which the settlers' diet was augmented with food from outside of their immediate environment. In addition, the distance and direction between Jamestown Island and the oyster source at Mulberry Point may spotlight the identity of certain intra- and intercultural trade routes and exchange partners. Overall, it is hoped that other scholars will build on this study and related analyses to gain additional insight into subsistence at James Fort and environs.

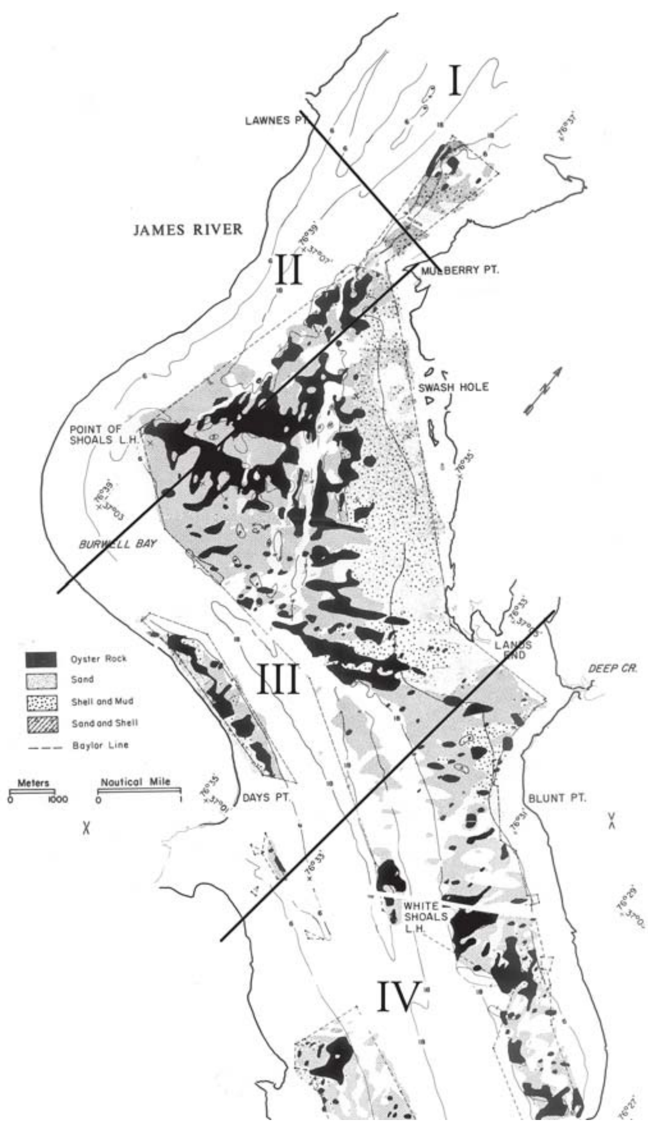

Figure 7. Chart of locations of oyster reefs in the James River, Virginia.

References

Bowen, Joanne, and Susan Trevarthen Andrews
2000 The Starving Time at Jamestown, Ms. on file, Association for the Preservation of Virginia Antiquities, Jamestown, VA.

Galstoff, Paul S.
1964 The American Oyster, *United States Fish and Wildlife Services Fish Bulletin* 64: 1-480.

Gunter, Gordon.
1938 Comments on the Shape, Growth and Quality of the American Oyster, *Science* 88: 546-47.

Haile, Edward W. (Editor)
1998 *Jamestown Narratives Eyewitness Accounts of the Virginia Colony: The First Decade 1607-1617*. Roundhouse, Champlain, VA.

Hargis, William J. Jr., and Dexter S. Haven
1999 Chesapeake Oyster Reefs, Their Importance, Destruction and Guidelines for Restoring Them, in *Oyster Reef Habitat Restoration: A Synopsis and Synthesis of Approaches*. Ed. Mark W. Luckenbach, Roger Mann and James A. Wesson, VIMS Press, Gloucester Point, VA: 317-346.

Haven, Dexter. S., and Lowell W. Fritz.
1985 Setting of the American Oyster *Crassostrea Virginica* in the James River, Virginia, USA: Temporal and Spatial Distribution, *Marine Biology* 86: 271-282.

Haven, Dexter. S., and James P. Whitcomb
1983 The Origin and Extent of Oyster Reefs in the James River, Virginia, *J. Shellfish Research* 3(2): 141-151.

Hopkins, Sewell H.
1962 Distribution of Species of Cliona (Boring Sponge) on the Eastern Shore of Virginia in Relation to Salinity, *Chesapeake Science* 3: 121-124.

Johnson, Gerald H., Blanton, Dennis B., and Hobbs, Carl H. III
1995 Late Quaternary Sea-Level Change and Human Occupation of Jamestown Island, Virginia (abs.). Program with Abstracts. Linked Earth Systems, SEPM Congress on Sedimentary Geology, 74.

Kent, Bretton W.
1992 *Making Dead Oysters Talk*. Maryland Historical and Cultural Publications, Crownsville, MD.

Nichols, Maynard M.
1972 Sediments of the James River Estuary, Virginia, in *Environmental Framework of Coastal Plain Estuaries*. Ed. Bruce W. Nelson, Geological Society of America, Memoir 133: 571-89.

Perkins, Francis.
1608 Letter from Jamestown to a Friend, 28 March 1608, in *Jamestown Narratives Eyewitness Accounts of the Virginia Colony: The First Decade 1607-1617*. Ed. Edward Haile. Roundhouse, Champlain, VA, 1998: 131-36.

Peterson, Sarah T.
1994 *Acquired Taste: The French Origins of Modern Cooking*. Cornell University Press, Ithaca, NY.

Smith, John
1624 Captain John Smith Commends America to the Shoe Manufacturers, in *Newes from the New-World*. Ed. Louis B. Wright, The Huntington Library, San Marino 1946: 19-21.