

BLACKBEARD'S BEADS: IDENTIFICATION AND INTERPRETATION OF THE
BEADS RECOVERED FROM THE SHIPWRECK 31CR314 *QUEEN ANNE'S REVENGE*

by

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Glass trade beads are one of the most notable artifacts of the Transatlantic Slave Trade and played an important role in African culture spiritually, metaphysically, and historically. Since its discovery in 1996, 798 glass beads have been recovered from the *Queen Anne's Revenge* Shipwreck. This thesis seeks to identify the beads recovered from the *Queen Anne's Revenge* shipwreck and interpret their relationship to the ship and the Transatlantic Slave Trade. The thesis opens with the history of the slave trade, specifically the role of the French, as well as an historical overview of Blackbeard, the *Queen Anne's Revenge*, and of bead manufacture. Following the archaeology and recovery of the shipwreck along with its conservation program and previous research conducted on the *Queen Anne's Revenge* bead assemblage is discussed. Other contemporaneous archaeological sites, both terrestrial and maritime, are presented to compare the *Queen Anne's Revenge* bead assemblage to other sites. This research is designed to provide data on the types of beads recovered from the *Queen Anne's Revenge* shipwreck for both conservators at the Queen Anne's Revenge Conservation Laboratory and future archaeologists. This research provides insight into the ship's former role as a slaver and addresses the ship's link between Africa and the slave trade.

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BEADS RECOVERED FROM THE SHIPWRECK 31CR314 *QUEEN ANNE'S
REVENGE***

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CHAPTER ONE – INTRODUCTION

Beads are one of the first forms of ornamentation created by humans (Stein et al. 1996). They were small, durable and easy to transport. Although beads are categorized as personal items, they had multiple uses and meanings. Beads were sewn onto clothing, woven into men's and women's hair and used for jewelry and religious items such as rosaries (Handler 1997:115). In Africa, beads were highly valued items, were often circulated monetarily, and has strong cultural and spiritual meanings. Archaeologists in the past have suggested cultural and religious connections between color, shape, size, and material. Beads were also thought to offer protection from harm and promote growth and fertility (Stein 1996). In addition, beads were a way to display wealth: the more precious the bead and the more beads one possessed reflected high-status. For these reasons, beads became an important trade commodity during the Transatlantic Slave Trade.

Throughout the seventeenth and eighteenth centuries, hundreds of ships were involved in the Transatlantic Slave Trade, moving people, cargo, and cultures between Europe, Africa, and the Americas (Wilde-Ramsing and McNaughton 2016:15-56). Ships from Europe carried goods to Africa in exchange for human cargo and then transported the slaves to the Caribbean and America. The ships then returned to Europe with New World goods, completing what was known as the "Triangle of Trade" (Wilde-Ramsing and McNaughton 2016:1)

In the seventeenth century, the French successfully challenged the Dutch and Spanish for their place in the slave trade (Rawley and Behrendt 1981). Establishing themselves in the Caribbean and portions of the West Indies, they rose to the third rank as an importer of slaves to the New World. Textiles, firearms, metals, and beads were traded in exchange for sugar, coffee, indigo, cotton (Rawley and Behrendt 1981). One French ship involved in the slave trade was *La Concorde*.

La Concorde was a 300 to 200-ton French privateering vessel turned slaver. On her final slave trading expedition in November of 1717 off the island of Martinique, she was captured by English pirates (Page 2014: 24; Wilde-Ramsing 2009:112, Wilde-Ramsing and Ewen 2012). Captained by Blackbeard, the pirates converted the ship into their flagship and renamed her the *Queen Anne's Revenge*. Blackbeard released the French crew on the island of Bequia along with 455 enslaved Africans and kept an estimated 60 to 160 slaves (Page 2014:24). Under the command of Blackbeard, the ship spent the next year collecting prizes in the Caribbean as well as successfully blockading the port of Charleston in May of 1718. Soon after, in June 1718, *Queen Anne's Revenge* ran aground during its attempt to enter the Beaufort Inlet in North Carolina and was subsequently abandoned where she would lie on the sea floor for nearly 300 years.

In November 1996, remains of *Queen Anne's Revenge* were found off the coast of Beaufort, North Carolina by a private research firm, Intersal Inc (Lawrence and Wilde-Ramsing 2001:3). Since its discovery, the State of North Carolina has led the excavation of the site through the North Carolina Department of Natural and Cultural Resources (NCDNCR) Underwater Archaeology Branch with collaboration from East Carolina University and North Carolina Marine Fisheries (Wilde-Ramsing and Ewen 2012:115). In 2003, the NCDNCR Queen Anne's Revenge Conservation Laboratory (QAR Lab) was dedicated on the West Research Campus of East Carolina University, through a partnership agreement between NCDNCR and ECU.

In 2007, Linda Carnes-McNaughton of the Fort Bragg Cultural Resources Program and Susan G. Myers of the NC Office of State Archaeology analyzed five beads, the only ones recovered from *Queen Anne's Revenge* shipwreck at the time. The analysis provided the identification of the specimens as to the type and use as well as offered a chronology and origin of manufacture (Carnes-McNaughton and Myers 2007). A coding format was created

by combining information from numerous typology and classification systems. Two of these classifications, Kidd and Kidd (1983) and Karklins (1982), will be used for this study.

Carnes-McNaughton and Myers' (2007) suggest that the types of beads found at the shipwreck site, were being made from the late seventeenth to mid-eighteenth century in manufacture and represent social concepts of personal ornamentation of the ship's crew or passengers or related to the cargo and transshipment of African slaves.

This research identifies the type(s) of beads recovered from the *Queen Anne's Revenge*, their distribution on the site, and comparative examples from other contemporaneous archaeological sites. Furthermore, this research explores the usage of beads and their relationship to piracy and the Transatlantic Slave Trade. It is hypothesized that the beads are remnants of *Queen Anne's Revenge* former role as the French slaver *La Concorde* and provide information on the role of piracy within the Transatlantic Slave Trade as well as additional link between Africa and the slave trade in general.

Contents

Chapter two, *Historical Background*, provides an historical context of the Transatlantic Slave Trade, with emphasis on the involvement of the French and pirates within the trade, Blackbeard, *Queen Anne's Revenge*. In addition, the chapter provides a history of glass beads and discusses their use and function in African culture as well as their manufacturing process. The third chapter, *Archaeological Background*, discusses the discovery and excavation of *Queen Anne's Revenge* as well as the conservation protocols of glass beads at the Queen Anne's Revenge Conservation Laboratory. Chapter four, *Bead Assemblages from other Relevant Archaeological Sites*, presents six archaeological sites used as comparative examples for this study. Each site is connected to the Transatlantic Slave

Trade, are either maritime or terrestrial sites, and are in Africa, the Caribbean, or North America. The *Methods* chapter presents previous research by Linda Carnes-McNaughton and Susan G. Myers (2007) which served as a basis for this research. The chapter also covers the methods of this study including the Digital Archaeological Archive of Comparative Slavery (DAACS) Bead Cataloging Manual (2003), used to catalog all whole and fragmented beads, and “A Classification System for Glass Beads for the Use of Field Archaeologists” by Martha and Kenneth Kidd (1983) to classify the beads. The chapter also discusses the methods used to create a distribution map of the beads in order to examine the distribution of beads on the *Queen Anne’s Revenge* excavation site. Chapter five, *Results*, presents the identification of the glass beads in the *Queen Anne’s Revenge* assemblage, an analysis of the distribution of the beads on the *Queen Anne’s Revenge* site, and a comparison of the *Queen Anne’s Revenge* bead assemblage to bead assemblages from the archaeological sites discussed in chapter three. Finally, *Discussion and Conclusion* addresses the *Queen Anne’s Revenge* bead assemblage origins and usage, examines the similarities and differences between the *Queen Anne’s Revenge* bead assemblage and the sites mentioned in Chapter three, glass bead distribution and site formation of *Queen Anne’s Revenge*, and presents the significance for this project, as well as areas of further research.

CHAPTER TWO – HISTORICAL BACKGROUND

Transatlantic Slave Trade

The Transatlantic Slave Trade was the largest forced displacement of people in world history as well as a major global economic system (Curtin 1991:9; Walvin 2011:7). The slave trade formed a part of the European Commercial Revolution which came about through the growth of nation states that replaced the feudal system as well as the opening of the Atlantic to Europeans during the Age of Reconnaissance (Rawley and Behrendt 1981:2). Between 1500 and 1850, between 9.5 and 11 million Africans became the main export from Africa to the New World (Rawley and Behrendt 1981:4; Walvin 2011:7).

For four centuries, European goods such as textiles, beads, metals, alcohol, and guns were exchanged in Africa for slaves, gold, pepper, gum, and ivory. The slaves were forcibly transported through the Middle Passage to work on farms and plantations in the Americas, cultivating crops such as sugar, cotton, rice, indigo, and tobacco. These items were then transported back to Europe as luxury items (Walvin 2011:7). The slave trade remains as one of the greatest mass migrations in history, forcing people to move and work in a new environment and diluting both the local and regional African culture, ultimately creating an inferior social class (Rawley Rawley and Behrendt 1981:4). None the less, the transatlantic slave trade was essential to New World commerce and fundamental to the making of the modern world.

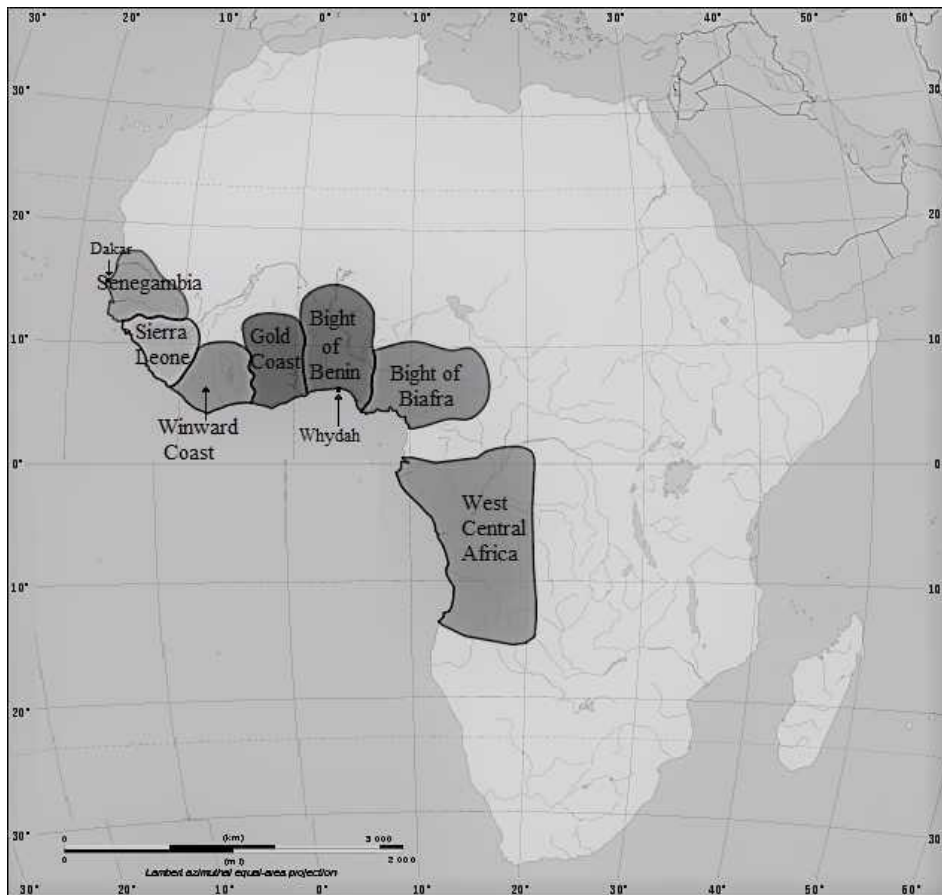


FIGURE 2-1: Major areas of slave trading activity in Africa (Gaba 2011).

France in the Eighteenth Century

France officially entered the slave trade after her acquisition of Saint Dominique (modern-day Haiti) in western Hispaniola (Rawley and Behrendt 1981; Stein 1979:3). Over the course of the next century, French merchants sent over three thousand ships to the African coast trading textiles, jewelry, and hardware for African slaves (Stein 1979). The French transported an estimated 1.25 million captives of which 66 percent were males, 27 percent were children, and an estimated 13 percent died in transit (Geggus 2001:121-122). French trade was almost exclusively to her own territories—the French West Indies. This lawful trade lasted no more than a century and after which was followed by an illicit trade. Internal problems, lack of ships, investment capital, and manufactured goods, forced the French to depend upon the Dutch and the English for slaves in the eighteenth century. During that time,

she became the third most important trading nation but never met the demands of her colonies.

In the early eighteenth century, Nantes, France was the main site for the sale of goods imported from the West Indies. It was the largest slave port in the early eighteenth century from which two-thirds of all French slavers departed. (Stein 1979:16). The port of Whydah was the most frequented African port by the French (Geggus 2001:122). Located on the Bight of Benin, twice as many captives were sold out of the port as were sold out of Malembo, the second most prominent port in West Central Africa. In the early eighteenth century, West Central Africa became the second most important source of captives for the French behind the Bight of Benin. However, by the last half of the century, the West Central African coast became the French trade's leading supplier; attracting one-third more ships including the largest French vessels and provided 50 percent more slaves (Geggus 2001: 122-123).

Although disembarkation for the French slave trade included Spanish America, Brazil, North America, and non-French Caribbean, the principal destination were the French Caribbean islands of St. Dominique, Martinique, Guadeloupe, Guyane, and Grenada. St. Dominique, the most frequented destination, accounted for more than one-third of all French slaving voyages (Geggus 2001:126). The size of the local market, rapid sales and reloading, local prices, credit given to local planters who bought slaves, and the availability of specie needed to pay port taxes, attracted slave ships to St. Dominique. The hierarchy of the slave market in St. Dominique is not only reflected by the amount of ship arrivals and quantity of slaves sold in markets but also in the age, sex, and ethnicity of Africans.

In the second half of the eighteenth century, West Africans became increasingly prominent in St. Dominique with an annual arrival of Africans doubling from 13,600 to 27,500 and in 1790 more slavers left the port of Nantes than any other year (Geggus

2001:131; Miller 2008:85-86). However, just three years later, the French slave trade stopped, due to a mixture of factors including loss of interest in the islands, the French Revolution, and the abolition of slavery on February 4, 1794 (Miller 2008:86).

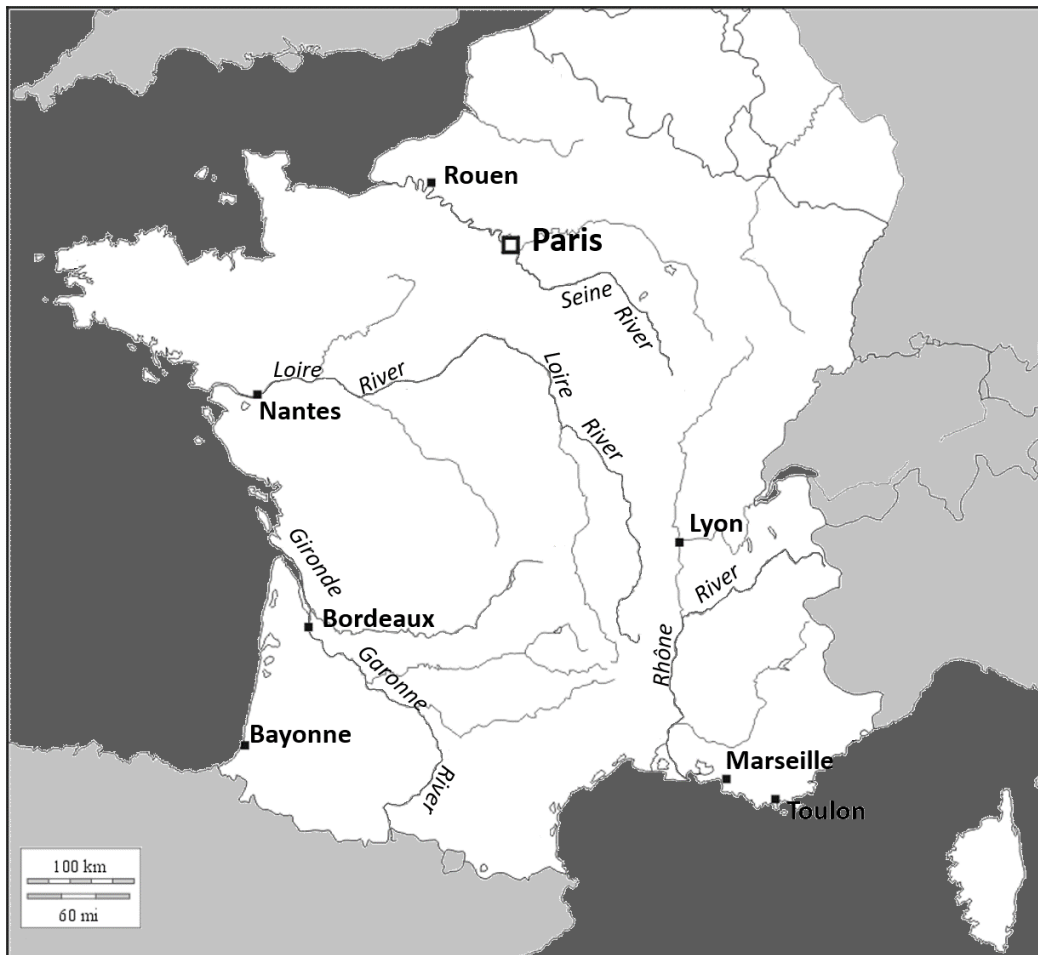


FIGURE 2-2: Most active French ports during the slave trade.

Piracy and the Slave Trade

The transatlantic slave trade was crucial to Western Europe in the seventeenth and eighteenth centuries as countries sought to create overseas empires and improve their economies. When discussing those involved in the slave trade, emphasis is placed on chartered companies such as the Dutch West Indies Company (WIC), East India Company (EIC), and Royal African Company (RAC), as well as prominent private merchants.

However, another group exploited the slave trade: pirates.

From the beginning of the slave trade, slavers fended off attacks both at sea and on land including the persistent issue of piracy as pirates often plundered goods such as ivory, gold, and silver, and sometimes commandeered the ships. However, many historians and archaeologists are skeptical as to the degree of involvement by pirates within the slave trade. In 1685 and 1686, two pirate ships captured two WIC slavers at Ouidah (Postma 1990:79). In February 1717, the *Whydah* was captured by pirate Samuel Bellamy near Crooked Island in the Bahamas (Muncher 1991:335). Bellamy would command the ship until its wrecking off the coast of Cape Cod on April 16, 1717. Later, in 1721 and 1722, WIC slavers *Elisabeth* and *Rotterdam* were robbed off 10,000 pieces of eight while carrying payment for slaves back from the Caribbean (Postma 1990:79).

Historian Marcus Rediker (2004) states that pirates had no way to sell slaves and hence, no use for them. However, correspondence found between the RAC suggests that while some pirates were not engaged in the slave trade and targeted slavers for their goods, other pirates in fact took human cargo. The high demand for slaves in the Americas and Caribbean often meant that slave origins were not questioned and owners would take what was available. Therefore, if illicit merchants could easily trade slaves in the Caribbean, it is possible pirates could as well. Several incidents of RAC's slavers being targets for pirates were reported. For example, correspondence between Thomas Bucknell and RAC on May 12, 1687 (Law 2001:47) depicts the kidnapping of Africans by a suspected pirate ship:

To understand that this evening came downe from winward a ship under Dutch colours, wich the Blackes thinking to be a Dutch interloper, went on board to buy brandy, butt the canoe were no sooner along his side but he lett down a tackle and hooked upon the canoe and hosted itt aboarde with the men in her and fyred att the rest. What country is he I know nott, for since he anchored he hath putt outt boath English and French colours, which makes mee suspect him to be a pyratte.

Another account of pirates taking human cargo occurred in 1717, near the island Bequia,

when the pirate Blackbeard captured the slaver *La Concorde* on its way Martinique. Although most of the slaves were taken off the ship and left with the French crew, it is believed that the pirates kept some of the slaves.

Blackbeard

Little is known about the life of Blackbeard before 1716 except that he served as a seaman on privateering vessels out of Jamaica during the Queen Anne's War (Lee 1974:1). Records of his early life place his birth in Bristol, Jamaica, Philadelphia, and London (Page 2014:14; Butler 2000:29-30). Likewise, his given surname is unknown as it was common for pirates to adopt multiple surnames. Records from the seventeenth century identify him as either Blackbeard or Edward Teach, Thatch, Thach, Thache, Thack, Tack, Thatche, and Theach (Lee 1974:4). Archaeologist David Moore states that over 90 percent of primary documents refer to Blackbeard as Edward "Thatch" such as the first edition of *A General History of the Pyrates* by Charles Johnson (Page 2014:14; Moore 1997a:31; Butler 2000:29-30). However, in his later editions, Blackbeard is referred to as Edward Teach, a Bristol born man (Johnson 1724). The surname "Teach," which is widely used today, first appeared in the November 1717 issue of the *Boston News-Letter* (Moore 1997a:31).

According to Johnson, Edward Teach met and formed a friendship with Captain Benjamin Hornigold, joining his crew in late 1716 (Johnson 1724:71). In that same year, Hornigold put Teach in charge of a sloop Teach had taken as prize and began building a reputation as a fierce pirate. In the spring of 1717, Hornigold and Teach sailed from New Providence for mainland America plundering a sloop from Havana with 120 barrels of flour, a sloop from Bermuda carrying barrels of wine, and a sloop from Madeira along the way. Off the coast of Cape Charles, Virginia in September 1717, Teach reportedly captured the sloop

Betty of Virginia taking goods and then scuttling her (Lee 1974:13-14). In the October 1717 issue of the Boston News-Letter Teach was reportedly captaining the *Revenge* a sloop originally captained by pirate Stede Bonnet and possibly accompanied by Hornigold (Page 2014:15; Moore 1997a:32-33; Masters 2005). During that time, he captured the sloop *Robert* of Philadelphia and the sloop *Good Intent* from Dublin (Lee 1974:14). Hornigold and Teach returned to the West Indies in the latter part of 1717, taking the French slave ship, *La Concorde*, on its way to Martinique carrying gold dust and other valuable goods. Teach assumed control of the ship renaming it *Queen Anne's Revenge* and returned *Revenge* to Bonnet (Page 2014:15; Butler 2000: 34-35).

Blackbeard and Bonnet sailed together for several months, capturing ships including *Adventure* which Blackbeard kept. Blackbeard then removed Bonnet from his command of *Revenge* and placed his own men as captains of *Revenge* and *Adventure* (Page 2014:15; Moore 1997a:34). Blackbeard and his new three-ship fleet sailed north towards the North American coast taking several more ships and keeping a small Spanish sloop to carry supplies (Page 2014:15; Butler 2000:37). In May of 1718, Blackbeard and his fleet arrived in Charles Towne, present day Charleston, South Carolina. Blackbeard set up a blockade of the port, taking hostages and demanding a chest of medicine. (Johnson 1724:58; Butler 2000:37-38). Upon receiving the medicine along with between £1,000 and £1,500 of gold, silver, and other supplies taken from ships plundered in the port, the pirates released their hostages and sailed up the coast to Topsail Inlet, present day Beaufort Inlet, North Carolina. There, Blackbeard ran aground the *Queen Anne's Revenge*, either intentionally or accidentally. Attempting to free *Queen Anne's Revenge*, Blackbeard ordered *Adventure* to assist, but the ship also became grounded and was abandoned (Butler 2000:38-39).

At the time of the grounding, David Harriot, captain of the *Adventure* along with sixteen other men were marooned as Blackbeard, Bonnet, and a select few of Blackbeard's

original crew left the inlet on a Spanish sloop (Butler 2000:39). With his downsized crew, Blackbeard sailed to Bath, North Carolina where they were pardoned by Governor Charles Eden and briefly settled into domestic life. Blackbeard returned to the sea in the fall of 1718 capturing two French ships, claiming that they were empty when his crew came upon them but secretly shared the plunder with the North Carolina governor. In November of 1718, Virginia Governor Spotswood offered a reward for capturing and killing pirates, and secretly planned an invasion of the North Carolina colony to capture Blackbeard. On November 21, at Ocracoke Island, Lieutenant Robert Maynard and his crew came upon Blackbeard's ship. Maynard and his crew boarded and engaged in a battle. According to Johnson, Blackbeard was wounded 25 times, five from gunshots, and died. On an order from Maynard, Blackbeard was beheaded and hung from the bowsprit of Blackbeard's ship (Butler 2000:44-46). Out of the nineteen pirates, only nine survived the battle and were put on trial for piracy in March 1719. All but one was executed (Butler 2000:48).



FIGURE 2-3: Blackbeard, as engraved by Benjamin Cole (Johnson 1724: 70).

Queen Anne's Revenge

Queen Anne's Revenge was originally the French ship *La Concorde*, a privateer vessel launched during the Queen Anne's War and then turned slaver, sometime before 1710 (Lawrence and Wilde-Ramsing 2001). The ship first appears in the record on July 21, 1710 where it is described as a "French frigate of 300 tons, armed with 26 cannon" and owned by a prominent Nantes merchant, Rene Montaudoin (Page 2014:23; Wilde-Ramsing 2009:107). Under the command of Captain Le Roux, *La Concorde* was sent on a privateer mission capturing a Portuguese and a Dutch slaver before sailing to Martinique in February 1711 (Page 2014:23). In Martinique, Le Roux sold the slaves from the Dutch ship and then remained in the Caribbean with *La Concorde* until November 1711 when it returned to Nantes.

At the end of the Queen Anne's War, Nantes became the epicenter of the French slave trade. Records indicate three slave trading expeditions by *La Concorde*. Between 1713 and 1715 two voyages were completed bringing a combined total of 749 slaves to the French Caribbean (Page 2014: 24; Wilde-Ramsing 2009:112, Wilde-Ramsing and Ewen 2012). During her third and what would be final slaving voyage in November of 1717, the vessel sailed from Whydah under command of Pierre Dosset with a crew of 75 men and 516 Africans (Lusardi 2006:196). Destined for Martinique, the vessel was captured by English pirates approximately 60 miles off the coast of the island. Under command of Edward Teach (Blackbeard), his crew of 250 men converted *La Concorde* into their flagship and renamed her *Queen Anne's Revenge*.

The pirates plundered the stash of gold dust the crew had been hiding and kept between 60 and 160 slaves (Page 2014:24). Both the historical record and researchers debate on the actual number of slaves Blackbeard retained. Four French crew members voluntarily joined the pirate crew and an additional 10 were forced into service. The pirates left the remaining French crew and 455 slaves on the island of Bequia, now part of Saint Vincent and the Grenadines with the smaller of two sloops, originally under the command of the pirates. The French transported the remaining slaves to Martinique in two trips using the sloop they renamed *Mauvaise Rencontre* (Bad Encounter) (Page 2014: 24-25; Lawrence and Wilde-Ramsing 2001:2; Moore and Daniel 2001:25).

Under the command of Blackbeard, the ship increased its armament to a reported forty cannon and spent the next six months collecting prizes in the Caribbean. By December, the ship's crew sailed toward the eastern end of Puerto Rico after which there are no records of the ship's activities until March 1718 when the crew captured several ships near Honduras. One of those ships was *Adventure*, captained by David Herriot. Blackbeard added *Adventure* to his fleet and forced Herriot to become a pirate with his crew. Captures from the Cayman

Islands, Cuba, and the Bahamas added to the fleet before sailing to Charles Town (present-day Charleston), South Carolina in May 1718 (Wilde-Ramsing 2001:3).

In Charles Town, the pirates laid siege and took several ships as they entered or exited the port. As ransom, Blackbeard and his crew were given liquor and food, a chest of medicine worth three or four hundred pounds, and 1500 pounds sterling, and gold pieces of eight, that were taken from ships plundered as they were leaving the harbor (Wilde-Ramsing and Ewen 2012: 114).

Blackbeard and his fleet left Charles Town and sailed up the coast of the Carolinas to Topsail (now Beaufort) Inlet, North Carolina (Wilde-Ramsing 2009:131-132). All of Blackbeard's ships safely entered the inlet except for *Queen Anne's Revenge* which ran aground on a sandbar a mile from land. The ship *Adventure* was sent to assist *Queen Anne's Revenge* but the ship also ran aground a short distance from *Queen Anne's Revenge*. Captain Herriot's deposition from the wrecking states that the grounding was done intentionally as an act to break up the band of pirates Blackbeard accumulated and to secure what money and goods he had taken for himself (Page 2014:26; South Carolina Court of the Vice Admiralty 1719:376). Additionally, there is no mention of lost lives or circumstances that led to the wrecking of *Queen Anne's Revenge* (Wilde-Ramsing 2009:131). Both vessels were then abandoned by the pirates after they ran aground.

Glass Trade Beads

Manufacture: Glass is made from silica, an alkali, a stabilizer, and a coloring agent fired into a liquid (Kidd and Kidd 2012:40). While in its molten state, glass is highly ductile and when cooling, can be manipulated into a variety of shapes. European glass beads are primarily made through two methods: drawn and wound. The drawn method requires two

people. One gathers a small amount of molten glass on the end of a blowing rod and then blows into the rod to enlarge the molten glass into a bubble (Kidd and Kidd 2012:40). More molten glass is placed on the bubble either of the same color or a different color. The addition of a different color is called “layering” and multiple colors can be used (Kidd and Kidd 2012:40). To create a simple round tube bead, a second person attaches a second rod to the end of the glass bubble and then the two people move in opposite directions stretching out the glass until it becomes cool and no longer pulls (Figure 2-4). The tube can also be twisted while being pulled. The glass tube is then laid on a slab of wood to cool. After cooling, the tube is broken up into short lengths and then chopped into desired sizes. Beads can either be left in this condition or subject to further treatment to reduce them into either oval or rounded beads. Ground charcoal and fine sand is worked into the beads and then placed into a rotating metal container and re-subjected to heat. This method reduces the beads into a round shape. After cooling, the beads are washed and then spun again to polish the surface. Other treatments given to drawn glass beads include “inlays” which produce striped beads and “marvered” which results in a rosetta, star, or chevron beads. The finished products are then sorted using sieves of graded sizes, then by hand, and are strung into “hanks” which are a grouping of 12 stings of beads consisting of approximately 4,000 beads per hank.

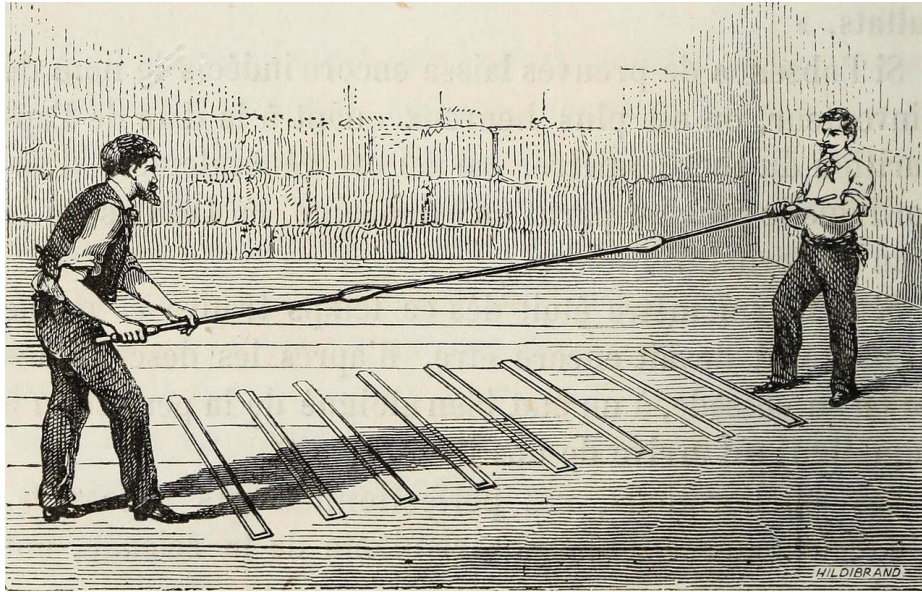


FIGURE 2-4: *Depiction of drawing glass by A. Sauzay, 1869 (Suzay 1869).*

Usage: Glass beads were an important item in West African culture, finding their way into the region prior to the 15th century through the trans-Saharan trade with North Africa (DeCorse 1989:41). They functioned as ornamental items to ritual and socio-economic goods, and could be strung into jewelry, belts, and rosaries, woven in hair, and sewn onto clothing and headdresses (Handler 1997:115). Beads often distinguished low and high-status individuals by the type and quality of beads they wore. Low-status men wore necklaces strung with poor-quality beads and “ordinary women” would string only one strand of beads in their hair and strings of common beads around their necks, arms, and legs (Alpern 1995:22). Distinguished men wore gold and aggrey beads (Ghanaian manufactured glass beads), which were prized ornaments in West Africa, in their hair and beards, on their necks, arms, hands, and legs (Alpern 1995:22). Elite women, like the high-status men, wore precious stones and ornaments, and beads of all kinds in their hair and around their necks (Figure 2-5). In addition, people on the Gold Coast re-melted glass beads into desired shapes and sizes (Alpern 1995:22). Beads were used in rites of passage or initiation ceremonies, used in protective charms and talismans, and found on statues and figurines. In addition, they were

markers of wealth and social status, used as currency, and identified members of political offices, religious practitioners, cult members, and deities.

Prior to European importation of glass beads, Africans made their own from bone, ivory, seeds, shell, stone, wood, and sometimes glass (Handler 1997:116). During the Transatlantic Slave Trade, Europeans made a conscious effort to trade items already in demand, thus expanding an existing trade network in beads. As glass beads entered Africa in an unprecedented quantity, their importance and value was elevated for Africans, both slaves and their captors (Handler 1997:116).



Figure 2-5: Depiction of capture of slaves in Africa, 1860 (Wellcome Library 1860).

As beads were an important aspect to African culture, slaves would want to take these items with them on their voyage to the New World. However, before boarding ships, enslaved peoples were typically divested of clothing (aside from a loincloth) and jewelry of any kind, especially that which had value to African captors or Europeans (Handler 2009:5). Nonetheless, beads made their way onto slave ships and to the Americas appearing on

archaeological sites such as Newton cemetery in Barbados, the African Burial Ground in New York City, and Stagville Plantation in North Carolina. Handler suggests that jewelry including beads and amulets were occasionally allowed on board or may have been smuggled aboard (Handler 2009:6).

Beads may have also been acquired aboard slave ships during the Middle Passage. Although the evidence is limited and only appears in the last half of the eighteenth century, beads were occasionally distributed to enslaved Africans during the voyage (Handler 2009:6). A report produced by English surgeon Alexander Falconbridge aboard slave vessels in the 1780's stated that "women are furnished with beads for the purpose of affording them some diversion" (Handler 2009:6; Falconbridge 1788). Additional evidence is presented by a witness testimony to the British Government's major in the late eighteenth century to inquiry about the slave trade. James Penny who made eleven voyages to the West Indies and Americas in the 1770's and 1780's described conditions aboard ships and reported that "after the late morning or mid-day meal, 'the women are supplied with beads, which they make into ornaments'" (Handler 2009:6). A second witness testimony provided by Captain Robert Norris who sailed five slave voyages in the late 1760's and 1770's also reported that between meals, "the women and girls amuse themselves with arranging fanciful ornaments for their persons with beads, which they are plentifully supplied with" (Handler 2009:6).

Evidence suggests that European glass beads in the New World were not in the possession of enslaved Africans when they boarded ships in Africa but rather acquired by slaves during the middle passage. Handler suggests that beads distributed during the Middle Passage reflects the effort by slavers to "lighten the oppressive physical and mental conditions aboard the ships" (Handler 2009:27). However, these acts were done in interest of the Europeans given the threat of revolts or unrest among the slaves.

CHAPTER THREE – ARCHAEOLOGICAL BACKGROUND

Discovery and Excavation

Operating under a permit to survey and search the Beaufort Inlet area for the Spanish treasure ship *El Salvador* and other shipwrecks from the North Carolina Department of Cultural Resources' Underwater Archaeology Branch (then Underwater Archaeology Unit) (UAB), private research firm Intersal, Inc. discovered the remains of *Queen Anne's Revenge* on November 21, 1996 (Lawrence and Wilde-Ramsing 2001:3) (Figure 3-1). Since its discovery, of the state shipwreck site (31CR314/0003BUI) intense archaeological research has been conducted to determine its identity, condition, age, affiliation, and environment. A large pile of concreted debris was first found on the western edge of the original eighteenth-century inlet along with anchors and cannon. Further research of the site uncovered additional cannon, a bronze bell, gun barrel, lead items, barrel hoops, and cannon shot (Butler 2001:42). The bronze bell bore the inscription "IHS MARIA" and the date 1709, identifying it as of Spanish origin (Page 2014:28). In addition, the size of the anchors and the eighteenth-century material indicated a ship the size and age of *Queen Anne's Revenge*. During a press conference in March of 1997, the ship was tentatively identified as *Queen Anne's Revenge* based on the study of cultural materials and historical research of known wrecks in the Beaufort Inlet (Lawrence and Wilde-Ramsing 2001; Wilde-Ramsing and Ewen 2012:113).

Initial assessment of the wreck by the UAB took place from 1997 to 1999 with the intent of determining the sites natural and cultural significance and integrity (Wilde-Ramsing and Ewen 2012:115). The pile discovered in 1996 and a portion of the hull structure exposed prior to the 1998 season by Hurricane Bonnie were mapped. During the 1998 field season, a permanent grid system with elevation datum was established (Wilde-Ramsing 2009:80-81). Based on the results from assessment, full recovery of the wreck was recommended due to

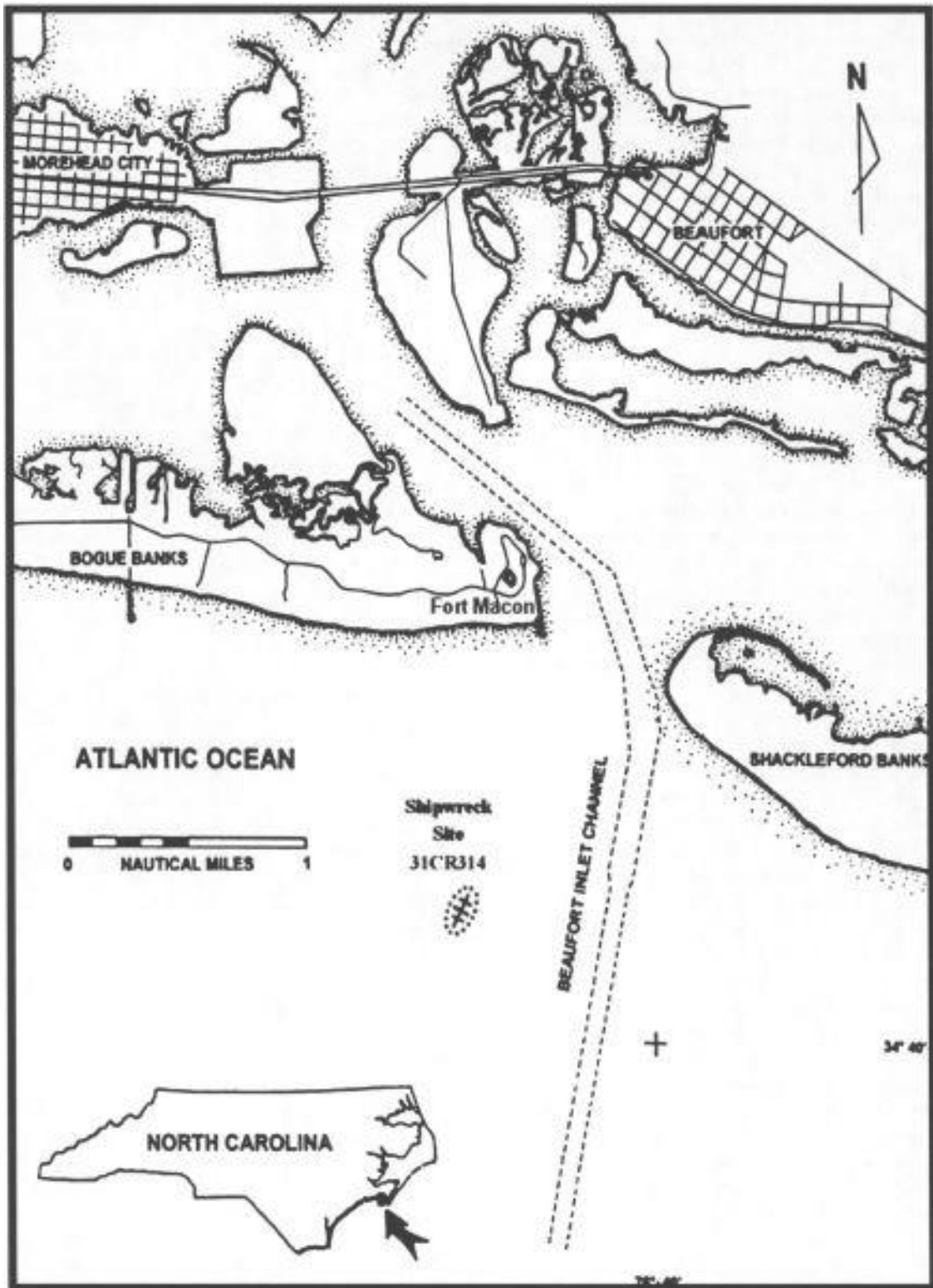


FIGURE 3-1: Location of shipwreck 31CR314 *Queen Anne's Revenge*, in the Beaufort Inlet, North Carolina. Site map shows east-west orientation of ship (Lawrence and Wilde-Ramsing 2001:4).

the age of the wreck, threat to integrity from currents and tropical storms, and suspected association with piracy and the Carolina proprietary period (Wilde-Ramsing and Ewen 2012:115; Wilde-Ramsing and Lusardi 1999:4-6).

Full-recovery operations began in 2006. Units of 5x5 feet were established in the southern portion of the debris field where a distinct artifact distribution was observed (Page 2014:29; Wilde-Ramsing and Ewen 2012:115). Sand over-burden was removed using six-inch dredges until artifacts were exposed and then a three-inch dredge was used to remove the sand around the objects for mapping purposes. The dredging outflow was directed to the surface where it was sent through sluice boxes to gather any small-artifacts present in the sand (Southerly et al. 2006:9). Artifacts greater than 0.5 feet, clusters of artifacts, and features were mapped in situ, and when possible, photographed. All artifacts were given a tag with a continuing artifact number and placed outside the unit for recovery. Clusters of artifacts were given a single provenience and artifact number and bagged together. Artifacts were brought to the surface, transferred to the dock, photographed, and placed in temporary wet storage containers before being transferred to the conservation laboratory (Page 2014:29; Southerly et al. 2006:10). Over 400,000 artifacts have been recovered between 1996 and 2016 including 798 glass beads and bead fragments.

The discovery of the wreck prompted a partnership between the North Carolina Department of Natural and Cultural Resources (then Department of Cultural Resources) (NCDNCR), Intersal, Inc. and Maritime Research Institute (MRI) in 1998. In the negotiated agreement, the NCDNCR retained all rights to all artifacts recovered and Intersal, Inc. was granted rights to the profits from artifact replicas and commercial documentaries relating to *Queen Anne's Revenge* project (Wilde-Ramsing and Lusardi 1998:82). In 2004, the site was listed on the National Register of Historic Places as *Queen Anne's Revenge*.

Conservation

Artifacts recovered from the site between 1997 and 2003 were taken to various temporary conservation facilities in North Carolina. These include laboratories at UAB headquarters in Fort Fisher, Beaufort, and Morehead City. In 2003, a Memorandum of Agreement was created between the NCDNCR and East Carolina University (ECU), establishing a location for a conservation laboratory (Page 2014:31; Watkins-Kenney 2010:4-5). The Queen Anne's Revenge Conservation Laboratory was officially dedicated on the West Research Campus of ECU in 2004 and remains responsible for the conservation of recovered materials.

The QAR lab has a 4-stage treatment process for all artifacts recovered from the shipwreck (Courtney Page 2017, pers. comm.). The first stage involves the initial storage process after artifacts are transferred from the wreck to the lab. Artifacts that arrive at the lab are documented, weighed, measured, and given a QAR number that is used for tracking. This information is recorded on both a paper record (Figure 3-2) and in a digital database. Both the paper and digital database belonging to the NCDNCR Office of State Archaeology is used to record all information pertaining to an artifact.

**NORTH CAROLINA DEPARTMENT OF CULTURAL RESOURCES
 UNDERWATER ARCHAEOLOGY BRANCH
 QUEEN ANNE'S REVENGE CONSERVATION LABORATORY**

Sheet # 1

OSA Site No: 31CR314 Site Name: Queen Anne's Revenge Shipwreck

QAR No: _____

NC Accession No: _____

Recovery Date: _____ Recovered By: _____

Provenience: _____

Remarks (Identity): _____

Initial Description/Condition: _____

Class-Category: _____ Material Type: _____ Count: _____

	Beginning	Unit	Ending	Unit
Length				
Width				
Height				
Thickness				
Diameter				
Weight (TOTAL)				

Date out of QAR Lab: _____ Received by: _____

Destination: _____

Date into QAR Lab: _____ Received by: _____

Date out of QAR Lab: _____ Received by: _____

Destination: _____

Date into QAR Lab: _____ Received by: _____

Notes: _____

Date of Transfer to Repository: _____ Received by: _____

Destination: NCMM

Figure 3-2: Queen Anne's Revenge Conservation Laboratory artifact record form (image courtesy of NCDNCR)

Most of the artifacts arrive at the laboratory waterlogged, salt-impregnated, and covered in a thick layer of corrosion and marine growth known as concretion. Artifacts not properly conserved deteriorate rapidly and become useless for analysis and display (Hamilton 1996: 1). Glass, in particular will devitrify and in extreme cases degenerate into pieces. To prevent further degradation or deterioration before treatment, artifacts are placed in wet storage containers, typically filled with plain tap water. Artifacts remain in this stage until they are x-rayed and are ready to begin treatment. X-radiography is used to identify artifacts in concretions such as lead shot, glass beads, iron objects, and even voids left by totally deteriorated artifacts (Figure 3-3). The x-rays allow conservators to identify locations within the concretion so they can physically remove the area without damaging or destroying the artifacts. The second stage is the cleaning or treatment process. Depending on their material, artifacts undergo a diverse set of conservation treatments. Beads from QAR have been removed from both dredge spoil (seafloor sediment) and concretion. Dredge spoil is typically sorted through sieves which catch beads of different sizes (Courtney Page 2017 pers. comm.). Beads that pass through all sieves are recovered under a microscope. Often these beads are clean of concretion and can move on to the third stage of treatment. Beads encased in concretion are recovered through physical cleaning using a Pneumatic Air Scribe which is ideal for removing the concretion from small, fragile artifacts (Figure 3-4 and Figure 3-5). To further clean beads without damage, a solution of 10% hydrochloric acid (HCl) is used (Kimberly Kenyon 2017, pers. comm.).



Figure 3-3: X-ray image showing beads and other artifacts before physical cleaning (image courtesy of NCDNCR)



Figure 3-4: Conservator using Pneumatic Air Scribe to clean artifact (image courtesy of NCDNCR)



Figure 3-5: Glass beads exposed in concretion using pneumatic airscribe (image courtesy of NCDNCR)

After beads are removed from dredge spoil or concretion, they begin the third phase of treatment. Although glass is not a porous material, salt can build up in cracks, fissures, and between layers of glass. When soluble salts crystallize as water evaporates, the pressure from the increased salt volume can breakdown the material, obscure the objects surface, or discolor the artifact (Cronyn 1990:23). To remove these salts, the artifacts undergo a process called desalination. The following desalination procedure is specific to the QAR lab. Tap water is used due to its moderate amount of chloride which allows the salt to slowly leach from the glass. The water is monitored once a week using a conductivity meter to determine chloride levels and other dissolved solids. Measurements are plotted on a graph and when dissolved solid levels plateau, indicated by three subsequent stable readings, the water is changed to fresh tap water. Once the chloride count nears that of the tap water, the solution is changed to reverse osmosis (RO) water. RO water is deionized and desalinated water which allows the remaining chlorides to leach from the glass. RO water is created within the lab but is a slow

and expensive process, therefore, both tap water and RO water are used for desalination. The water is again monitored once a week for chloride and other dissolved solids until it has three stable readings of zero. The desalination process, on average, takes a year to complete.

After the chlorides are removed from the beads, the glass is dried using a process called solvent dehydration. For solvent dehydration, the glass is first given four baths in ethanol to allow the water to slowly be removed from the glass. Each bath lasts one week. The first bath contains a solution of 75% RO water to 25% ethanol, the second a 50% to 50% RO to ethanol solution, the third a 25% RO to 75% ethanol, and a final bath of 100% ethanol (Kimberly Kenyon 2017, pers. comm.). The second step in the solvent dehydration process is the addition of acetone. Like the RO and ethanol solution, the glass is placed in four baths, each lasting one week. The first bath contains a solution of 75% ethanol to 25% acetone, the second a 50% to 50% ethanol to acetone, the third a 25% ethanol to 75% acetone, and a final bath of 100% acetone (Kimberly Kenyon 2017, pers. comm.). The glass beads are then impregnated with a solution of 2.5% B72 and acetone which helps stabilize the material and are left to off-gas. Drying weights are taken, ideally daily, to determine the amount of acetone left in the glass. Once three consecutive stable weights are taken, the glass is ready for the third stage of the conservation process.

The third stage of the conservation process is storage at the Lab. All dry artifacts are placed in a perforated plastic bag to prevent molding with artifact tags detailing the artifacts QAR number, artifact type, and its provenience information. The fourth and final stage of conservation occurs when the artifacts are transferred to the North Carolina Maritime Museum in Beaufort, North Carolina where they will be either stored or placed on display for public viewing (Page 2014:31; Watkins-Kenney 2010:6-7).

The *Queen Anne's Revenge* Shipwreck Project strives to promote education and

public outreach. Reports and project updates are available to the public on their website, www.qaronline.com and Facebook page. The NCMM was designated as a repository for all *Queen Anne's Revenge* artifacts by Secretary Betty Rae McCain of the NCDNCR (Page 2014:32). Artifacts from the wreck are displayed at the museum as well as other state-owned museums, and in traveling exhibits to private and national museums, schools, and state-sponsored festivals. A permanent exhibit at the NCMM opened in June 2011 to promote education about the ship, piracy, archaeology, and conservation.

CHAPTER FOUR – BEAD ASSEMBLAGES FROM OTHER RELEVANT ARCHAEOLOGICAL SITES

This chapter will discuss bead assemblages from archaeological sites in North America, the Caribbean, West Africa, and shipwrecks in the Atlantic Ocean. These sites were selected for comparison to the *Queen Anne's Revenge* glass bead assemblage due to their connections to the slave trade, age, and bead assemblages.

Henrietta Marie

The slave ship *Henrietta Marie* first appeared in the historical record in 1699 when ledgers indicated that between July 15 and September 1, the ship was loaded with a variety of European manufactured goods including 2,074 lbs (4,573 kg) “Great Bugle” beads in London (Malcom 2003:4-6). As of 2008, over 11,000 glass beads have been recovered from the wreck site (Moore and Malcom 2008:29-30). Most beads are non-diagnostic “seed beads” and appear in at least eight colors including white, blue, amber, gray, green, and yellow. According to Corey Malcom (2003) predominate colors are green, yellow, and blue. Moore corroborates this statement by comparing beads from the *Henrietta Marie* to another ship the *Albion*. The *Albion* was an English slave ship which operated around the same time as the *Henrietta Marie* and had a difficult time trading its green and yellow bead cargo in Nigeria. The difficulty of trading these beads is due to the color preferences in parts of West Africa, which changed seasonally (. As ships would not know what colors would be of interest to West Africans, ships were well stocked with different types of goods and would have to carry the unwanted goods back to Europe after finishing its trading in the Caribbean.

In addition to seed beads, a few larger stripped bead varieties known as “gooseberries” and one tube type bead were also recovered (Moore and Malcom 2008:29-

30). The gooseberry was a large, round, translucent, gray bead manufactured as early as 1597. The stripes vary in number from 12 to 15 and the color from light to dark with a yellow cast. In 1703 and 1704, goods favored at the time of slave purchasing including “beads, gooseberry-colour, large and small” (Moore and Malcom 2008:30). It is believed that many of the beads were strung on iron wire due to the extremely hard concretion surrounding the beads

Elmina Shipwreck

The Elmina shipwreck bead assemblage was collected from a seventeenth-century shipwreck near the town of Elmina, Ghana by archaeologists from Syracuse University, assisted by Panamerican Consultants Inc. The beads were classified according to the Kidd and Kidd 1983 typology and the asterisk system established by Karklins’ 1985 guide. A total of 16 types were identified consisting of four forms of construction including simples, compound, complex, and composite. Types 1-7 are small monochrome drawn seed beads that average 2-3 mm in diameter and 1.5-2.5 mm in length (Hopwood 2009:60-62). The beads are equivalent to Kidd and Kidd type IIa or Karklins type IIa* and are translucent orange, translucent yellow, opaque yellow, translucent dark green, opaque light green, transparent blue, and opaque light blue.

Types 8-10 are small (2-4 mm) to medium (4-6 mm) simple monochrome drawn non-seed beads (Hopwood 2009:63). They differed in shape and size from types 1-7. Type 8 is opaque white and round, and is equivalent to Kidd Type variety IIa13. Type 9 is opaque and ellipsoidal. It is equivalent to Kidd Type variety IIa15. Type 10 is opaque white and short tubular or barrel shaped. It is considered a Kidd Type IIa*.

Types 11 and 12 are small striped drawn seed beads and equivalent to Kidd Type IIbb

(Hopwood 2009:63). They are also deteriorated. Type 11 is an opaque yellow bead with an inlay of three stripe sets of yellow/NA/yellow. Type 11 has stripes raised above the surface; a characteristic indicating that the middle stripes and other glass sections are missing. Type 12 consists of beads with an opaque green core and also have three striped inlay of yellow/red/yellow. The surface between the stripes is discolored black or dark gray and only where the patina has flaked off can the opaque core be seen.

Types 13-16 are compound beads that have three layers of blue/white/blue (Hopwood 2009:63). Type 13 is cylindrical (tubular) and equivalent to Kidd Type variety IIIa10. This type makes up the majority of non-seed beads. Type 14 and 15 are compound seed beads equivalent to Kidd Type varieties IVa6 and IVa11 (Hopwood 2009:63). Type 14 are opaque red on transparent green and type 15 are opaque white/opaque bright white/opaque white. Lastly, type 16 is a composite seed bead equivalent to Kidd Type variety IVb16 (Hopwood 2009:63). Type 16 are opaque white on transparent blue with a design of alternating stripes, three blue and three red. Two hundred and nine beads in the Elmina assemblage could not be identified.

Almost all of the beads in the assemblage (99%) are drawn monochrome seed beads. The bead types are most likely from Venice or Bohemia. Hopwood (2009) states that it is unlikely that the beads are of Dutch origin because shipwrecks that post-date 1700 will not contain drawn beads of Dutch manufacture since the Dutch bead industry died out at the end of the seventeenth century.

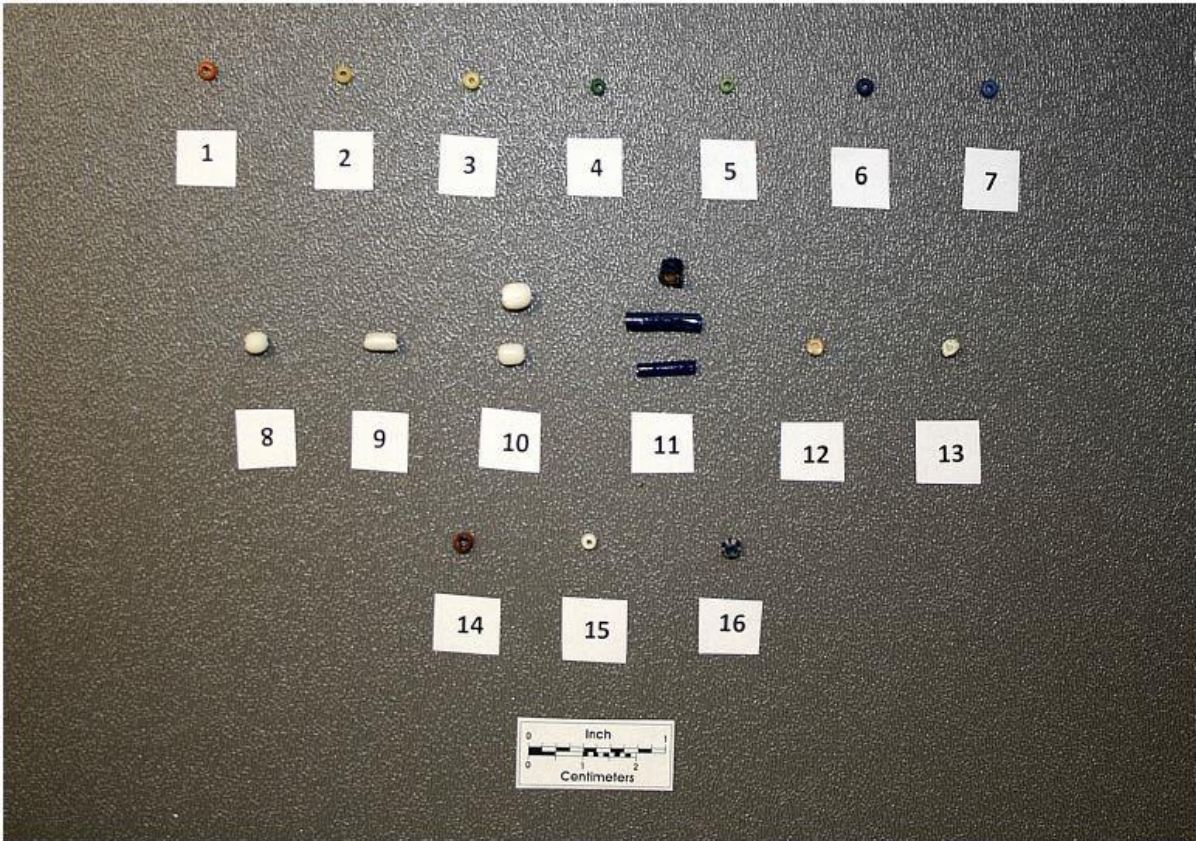


Figure 4-1: Elmina Bead assemblage (Hopwood 2009:62)

Elmina, Ghana

Under the direction of Christopher DeCorse, archaeologists completed 15 years of archaeological excavation in the city of Elmina, Ghana. During excavations, over 30,000 beads consisting of 400 types from both Europe and Africa were recovered (DeCorse 1989:45-49). The extensive assemblage of European trade material such as ceramic and glass recovered at Elmina provided a more precise date than what was usually possible for an African site (DeCorse 1989:40). These materials and their chronologies were used to determine temporal distributions of bead varieties and evaluate beads as chronological indicators.

Glass beads from Elmina varied in color and were largely wound similar to Kidd and Kidd Type WIIIb. Mold-pressed beads, specifically mandrel-pressed, were also recovered.

Research on earlier beads recovered in Elmina had similar temporal distributions to beads found in North America (DeCorse 1989:47).

Several types of glass beads, including Kidd and Kidd Types IIb18, IIb'7, WIId*, and WIIfc2, were recovered from burials. Using associated ceramics, the beads were dated between ca. 1700 and 1775. Although all the beads had counterparts in Amsterdam from the 1600s, DeCorse believes the late-eighteenth century examples came from Venice, Germany, or Bohemia due to the collapse of the Dutch bead industry by the 1750s.

Elmina excavations also provided information on the local bead industry including the manufacture of beads, such as powdered glass, using imported materials. DeCorse notes that beads made from powdered glass are best known from ethnographic studies in Ghana, but are widely distributed in West Africa (DeCorse 1989:28). He presumes that the powdered manufacturing technique was dependent on imported glass, but states that silica slag from local iron smelting could have been used for bead manufacturing. DeCorse does not provide the number of West African manufactured beads recovered in Elmina but does note that a large variety of non-European beads were found (DeCorse 1989:48). The two most common fired beads were made from glass chips and powdered glass. Based on associated ceramics, both types were dated to the eighteenth century or earlier. Unfortunately, the powdered beads presented in DeCorse's work do not match the type of powdered bead found on *Queen Anne's Revenge*.

Newton Cemetery

As of 2009, the Newton Cemetery is the only plantation cemetery discovered in Barbados despite intense archaeological, historical, and ethnographic research between the 1970s and 1990s. The cemetery is also the earliest and largest undisturbed plantation slave

cemetery known in the Americas. In the early 1970s, burials dating between 1660 and 1820 numbered 104 individuals. Twelve of these burials were associated with almost 900 beads (Handler 2007). The most frequent bead colors were blue, brown, and red/green. Two burials, 60 and 61, contained the majority of beads, 599. Burial 72 contained a male, approximately 50 years of age who was identified as an Obeah practitioner or folk doctor. Burial 72 consisted of a large amount of grave goods including 14 glass beads.

The large amount of grave goods in this burial contrasted greatly with other burials which either lacked grave goods entirely or had a few such as European-manufactured coffin hardware, pipes, and glass beads. The most interesting artifact is an elaborate necklace adorned with seven cowrie shells, five drilled fish vertebrae, 21 drilled dog canine teeth, one large reddish-orange carnelian bead with milky narrow, concentric bands, and 14 European manufactured glass beads representing four or five types (Handler 1997:109).

The Newton Plantation bead assemblage consists of 15 bead types (Handler and Lange 1978). Types are largely based on structure and shape. The assemblage includes simple, compound, and complex hollow cane (drawn) beads, as well as both simple wound and wound “mulberry” beads. The assemblage consisted of a variety of colors: turquoise, blue, light blue, clear, clear/cloudy, light green, light blue, yellow/amber, dark brown, white, red, red and green, milk white, red/amber, amber, and grey blue (Handler and Lange 1978).

New York African Burial Ground

The New York African Burial Ground in New York City is arguably one of the best examples of Colonial African communities in the New World. Between 1991 and 2003 hundreds of graves and human remains dating from the eighteenth century were uncovered. Several burials contained personal items, specifically beads, buttons, cuff links, and rings.

These adornment items were recovered from 25 of the 376 graves (LaRoche 1994). Beads were discovered around the cranium, throat, wrist, and most often the hips/pelvis area. The majority of the beads were found with one child and one female adult who had strands of beads around their pelvis. Along with the strand of beads, a glass bead bracelet was also found with the adult. The strands of beads found on these individuals were common attire in West Africa, specifically Ghana and Nigeria.

A total of 143 European glass beads as well as one amber bead, one bone bead, and nine West African beads were recovered from the New York African Burial Ground. The European-made beads consist of two manufacturing types (wound and drawn beads) Using the Kidd and Kidd 1983 classification system and Karklins' 1985 terminology, Cheryl LaRoche (1994) identified 14 types within the New York African Burial Ground assemblage. The bead types are as follows: Ia1, Ila6, Wib*, Ila*, Ila55, Iij2, Wib6, WIIBb*, WIIC2, amber and bone. In addition, eight beads were given the possible classification of Wib and three beads the possible designation of WIIC. These beads were not able to officially be identified because they were heavily weathered and eroded. The bead assemblage also includes the colors redwood (one bead), opaque black (24 beads); transparent light gold (20 beads); transparent yellow (eight beads); transparent blue green/ turquoise (25 beads); transparent cobalt blue (59 beads); opaque blue (one bead); and translucent light gray (two beads); and red (one amber bead) (LaRoche 1994). The color of three additional beads could not be identified as it was obscured by weathered surfaces. Almost all the beads were made in Venice

The predominance of blue beads (55% or 78% if turquoise is added) is an interesting observation (LaRoche 1994:15). In addition, all blue beads were found in one burial on the waistband of an adult woman. According to historical documents, there was a preference for blue beads among Africans between the fifteenth and eighteenth centuries, the period in

which the woman would have been alive. The predominance of blue beads at New York African Burial Ground suggests that the importance of blue beads continued in the New World.

The nine West African beads were made by recycling European glass. These beads were discovered in two burials. Burial 434 contained one white powdered glass bead and Burial 226 contained a strand of yellow powdered glass beads. The beads found in Burial 226 were placed near the neck of an infant less than two months of age. It is hypothesized that the strand of beads was part of a necklace.

House for Families, George Washington's Mount Vernon

The House for Families at George Washington's Mount Vernon plantation was constructed by the 1760's as the main slave dwelling located at Washington's Mansion House Farm (Pogue 2003). The structure was demolished in 1793 after slaves were moved to new quarters located in wings attached to a nearby greenhouse.

Archaeological excavation at the House for Families began in 1984 and were completed by 1991 (Pogue 2003). The excavation uncovered a brick-lined root cellar located below the slave quarter. Documentary evidence indicated that the quarter was no longer occupied by 1739. The artifacts recovered from the cellar are hypothesized to date between 1759 and 1793 (Pogue 2003). The cellar contained more than 60,000 artifacts including 133 drawn glass beads (Digital Archaeological Archive of Contemporary Slavery). All artifacts have been catalogued using the DAACS bead manual and uploaded to the DAACS online database. The assemblage consists of one compound red tubular bead with a dark blue core (Digital Archaeological Archive of Contemporary Slavery 2015). The remaining beads are simple and include the colors aqua/light green green/olive green (48 beads); modern green

(seven beads); (17 beads); black (34 beads); brown (two beads); dark blue (five beads); light blue (five beads); clear (three beads); purple (one bead); red (three beads); white (five beads). The color of 3 beads was unidentifiable. The beads were identified as both small sub-spherical and barrel seed beads as well as tubular beads.

The excavation at House for Families provided information on the slave's daily lives and diets. It has also become an integral component of Mount Vernon's interest in understanding all who lived and worked at the plantation including planter household, indentured servants, hired laborers, and enslaved peoples.

CHAPTER FIVE – METHODS

Previous Research

In 2007, Linda Carnes-McNaughton of the Fort Bragg Cultural Resources Program and Susan G. Myers of the NC Office of State Archaeology analyzed five beads, the only ones recovered and available for study from the *Queen Anne's Revenge* at the time. All five beads were glass, three complete, one severely damaged, and one in three pieces. Three beads were recovered from the stern portion of the site, two from the bow. All of them were encased in concretion. The analysis provided the identification of the specimens as to the type and use as well as offered a chronology and origin of manufacture (Carnes-McNaughton and Myers 2007:1-8). All beads except one bead were manufactured using the “drawn-tube” technique whereas one, originally thought to be wood, was determined to be manufactured from powdered glass.

Specimen QAR286.005 was identified as a Kidd and Kidd type IIa19 (Brain type IIa2), translucent, monochrome bead with one layer of light gold or yellow glass (Munsell color 5Y 7/6) (Carnes-McNaughton and Myers 2007:4) (Figure 5-1). The authors noted that post-depositional staining was present, the bore hole was plugged with concretion, and that the bead was partially broken, revealing its true color. A date range of 1700-1890 with a mean date of 1763 was given for this bead.

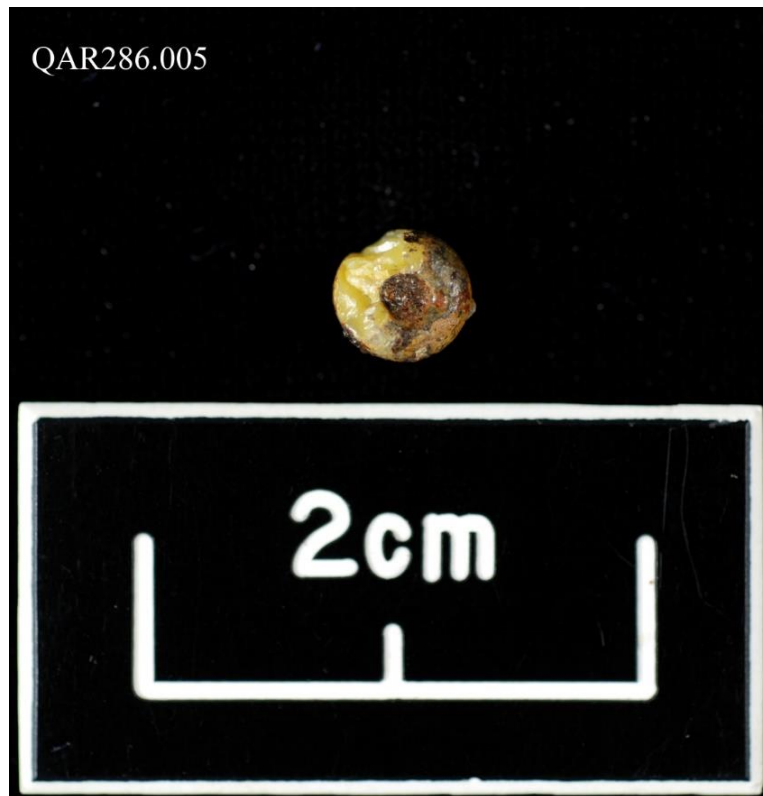


FIGURE 5-1: Specimen QAR286.005, yellow, monochrome, glass bead identified as Kidd and Kidd Type IIa19 (Image courtesy of NCDNCR).

Although initially described as translucent black, bead specimen QAR345.024 was identified as Kidd and Kidd type IIa7 (Brain type IIa5) (Carnes-McNaughton and Myers 2007:5) (see Figure 5-2). The authors note that when held under illumination, the true color of dark burgundy/brown is revealed (Munsell color 2.5YR 3/4. A date range of 1700-1740 with a mean date of 1734 is given along with the possible city of manufacture, Amsterdam.

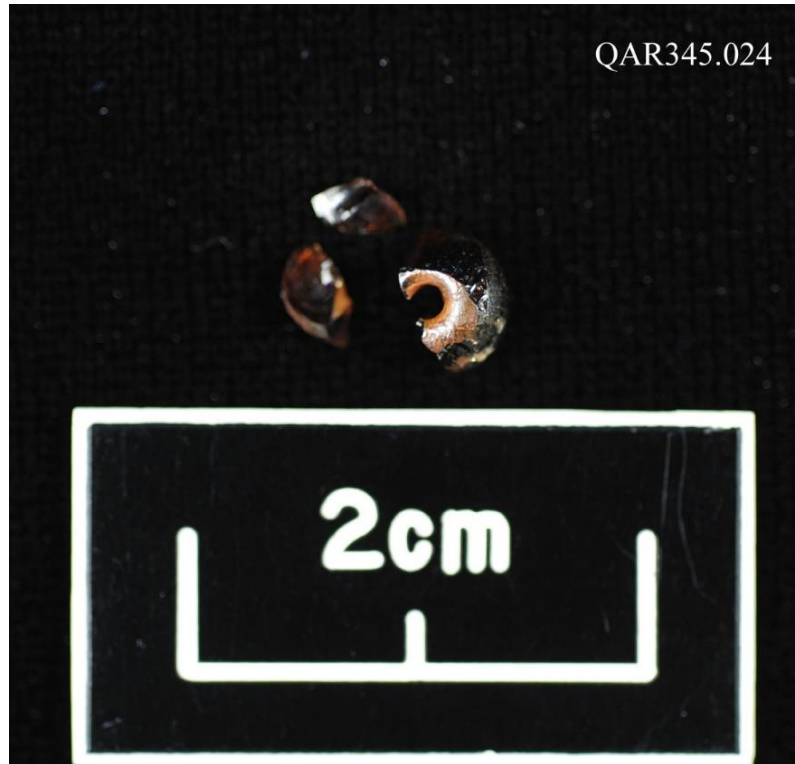


FIGURE 5-2: Specimen QAR345.024, dark burgundy/brown, monochrome, glass bead identified as Kidd and Kidd type IIa7 (Image courtesy of NCDNCR).

Bead QAR347.002 was identified as Kidd and Kidd type Iva13 (Brain IVA1) and described as having an “opaque core of light gray color with an outer layer of translucent oyster white” (Carnes-McNaughton and Myers 2007:5) (see Figure 5-3). However, the Munsell color given for this specimen is 5Y 8/2, pale yellow. The authors note that this color is possibly due to depositional staining (Carnes-McNaughton and Myers 2007:6). The authors also note a crack in the outer layer which they attribute to a manufacturing flaw. Date range given for this bead is 1600-1890 with a mean date of 1754.



FIGURE 5-3: Specimen QAR347.002, opaque light gray core with an outer layer of translucent oyster white, glass bead, identified as Kidd and Kidd type Iva13 (Image courtesy of NCDNCR).

The most interesting bead in the study is QAR387.001, a simple, monochrome, fired glass bead (Figure 5-4). The bead is noted as “severely degraded, granular, and flattened on its two tangential portions” with a visible and slightly “sprung” longitudinal crack along its equator (Carnes-McNaughton and Myers 2007:6). The author’s note that the overall color is whitish tan to pale yellow but do not provide a Munsell color designation. Comparative samples of this bead are found in the African Burial Ground in New York and indicate that this bead was manufacture in West Africa, most likely Ghana, in the early 1700’s.



Figure 5-4: QAR387.011 a simple, monochrome, African made fired glass bead (Image courtesy of NCDNCR).

The final bead of their study is QAR904.001, a simple, opaque, monochrome, drawn glass bead (Figure 5-5). Although the bead appeared dark in color, the authors note that under magnification the bead is almost metallic gray Carnes-McNaughton and Myers 2007:6-7). Air bubbles, a product of manufacturing, was also displayed in this bead. The bead was identified as Kidd and Kidd type IIa7 and given a date range of 1700-1740.

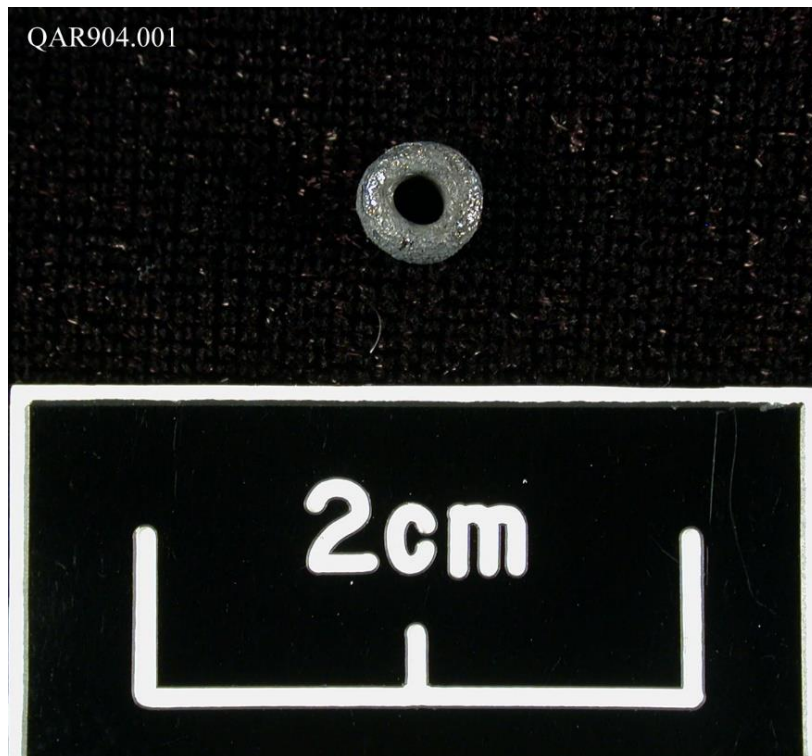


FIGURE 5-5: QAR904.001, dark metallic gray, simple, opaque, monochrome, drawn glass bead identified as Kidd and Kidd type IIa7 (Image courtesy of NCDNCR).

The results of Carnes-McNaughton and Myers study suggest that the beads date from the late seventeenth to mid-eighteenth century in manufacture and represent social concepts of personal ornamentation of the ship's crew or passengers or related to the cargo and transshipment of African slaves.

Data Acquisition

Sampling: This research examined 798 trade beads from the *Queen Anne's Revenge* Shipwreck recovered between 1997 and 2015. Due to both time constraints and the availability of beads for study, two beads, QAR387.011 and QAR904.001 were not available for physical examination. However, previous examination by staff members at the QAR Lab along with photographs provided information for analysis. These beads were removed from

dredge spoil prior to the start of this project. Four hundred and thirty-four beads are stored at the Queen Anne's Revenge Conservation Laboratory. Three hundred and sixty-four beads are either on display or stored at the North Carolina Maritime Museum. Both collections were used for this analysis. Forty are whole beads while 758 are fragments.

Analysis

Cataloging: Beads were named using their respective "QAR number" designated by the Queen Anne's Revenge Conservation Laboratory. Because multiple beads (complete or incomplete) could be under a single QAR number, each individual bead was also given a sub-number. This allowed the author to individually describe, identify, and classify individual beads. The Digital Archaeological Archive of Comparative Slavery (DAACS) catalog manual (2003) was used to document the beads. Two classification systems authored by Karlis Karklins were consulted for further information during the catalog process: "A Classification System for Drawn Glass Beads", and "Glass Beads: Guide to the Description and Classification of Glass Beads." A OMANO dual powered stereo microscope with a 0.5x lenses was used to accurately record the manufacturing techniques and decoration details. Classification was provided by "A classification system for glass beads for the field archaeologist" by Martha and Kenneth Kidd (1983). The Munsell Color Chart (2000) was used to record bead color. A Sartorius Analytical Balance with precision of 0.0001g was used to weigh the beads and a Westward Digital Calipers was used to provide accurate dimensions to one-one hundredth of a millimeter. A Nikon D80 10.2 Digital LSR with an AF Micro-Nikkor 60mm F/2.8D Fixed Lens was used to photograph beads on a white background with a centimeter scale and a color scale. Detailed photographs of bead QAR# 2891.004 were taken with an OptixCam Summit SK2-5.2X5.0MP Digital Microscope Camera. Other photographs were taken prior to the start of this project by staff at the Queen Anne's Revenge

Conservation Laboratory. These images are stored on a server at the Queen Anne's Revenge Conservation Laboratory. All data were recorded on a Microsoft excel spreadsheet and is attached in appendix A. The following attributes outlined in the DAACS manual were examined on each bead:

count, completeness, material, manufacturing technique, structure, form, shape, complex shape, Kidd and Kidd Type, color, end treatment, heat treatment, diaphaneity, mend, decoration, measurements (length and width), number of facets, condition, post-manufacturing modification, conservation, and casing information (Appendix A).

Using the Kidd and Kidd classification system, colors, and shaped, the beads were classified into a unique QAR typology. The typology allows similar beads to be grouped together and helps to organize the data.

Comparison: The beads were compared to bead collections from other relevant archaeological sites including terrestrial sites in America, the Caribbean, and West Africa, as well as pirate and slave ships. Using the DAACS artifact query, a terrestrial site from North America was employed for comparisons. The Newton Cemetery in Barbados will serve as the Caribbean site. New York African American Burial Ground in New York City and the House for Families at George Washington's Mount Vernon in Virginia will represent North American sites. A site in Elmina, Ghana will be used to compare the *Queen Anne's Revenge* assemblage to a West African Site. Maritime sites that will be compared include the *Henrietta Marie* and Elmina Shipwrecks.

Artifact Distribution Analysis

An artifact distribution map was created by plotting bead densities per unit on the

2010 site map created by David D. Moore. Units are numbered using the southwest corner.
The density of beads per unit is indicated by a color gradient of light yellow to dark purple
and bead counts are in increments of ten.

CHAPTER SIX–RESULTS

As discussed in Chapter Five, the beads were documented and using The Digital Archaeological Archive of Comparative Slavery (DAACS) 2003 catalog manual and classified the beads using the Kidd and Kidd 1983 typology. In this chapter, each of the twenty-two attributes used for bead identification will be presented and the beads will be discussed according to their QAR type. In addition, the distribution of beads on the site will be discussed. Lastly, the Queen Anne's Revenge bead assemblage will be compared to beads from sites mentioned in Chapter Four.

Most beads in the QAR assemblage (758) are incomplete whereas forty are complete. In addition, 797 were made with glass and one was made from powdered glass. The assemblage consisted of three manufacturing techniques: 796 drawn, one wound, and one fired powdered glass.

One bead has a complex structure (more than one layer of glass) whereas 797 have a simple structure (one layer of glass with no designs). All have straight curvilinear form (a round or oblate cross-section and straight body). None had a complex shape or decoration. In addition, all show signs of eroding or weathering from their time underwater. Most of the whole beads were small (2-4mm) or medium in size (4-6mm).

Bead Identification and Classification

The assemblage contains 9 QAR Types (Table 6-1). QAR Types 1 and 2 are simple, drawn, yellow seed beads that average 2-4 mm in length and 2-4.5 mm in width (see Appendix A). They are equivalent to the Kidd and Kidd Type IIa but differ in variety. QAR Type 1 is equivalent to the Kidd and Kidd Type variety IIa19. These beads have a sub-

spherical, barrel, or disk shape, have been heat treated and a rounded end treatment. QAR2705.005a and QAR1540.003abcd are the type specimens for this Type (Figure 6-1). QAR Type 1 contains 34 complete and 124 incomplete beads for a total of 158.

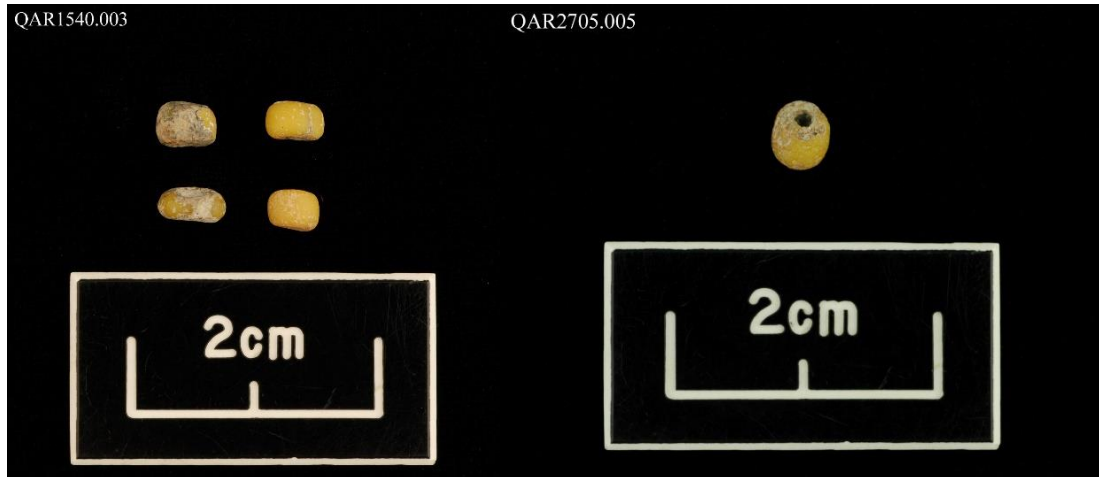


FIGURE 6-1: QAR Type 1

FIGURE 6-2: QAR Type 1

QAR Type 2 is characterized as opaque, simple, drawn, and white and are equivalent to the Kidd and Kidd Type variety IIa12 (see Appendix A). These beads have a sub-spherical shape, have been heat treated and a rounded end treatment. The type is also collared and incised in clear glass. There is one QAR Type 3 in the QAR assemblage. QAR2891.004abc (is the type specimen for Type 2 (Figure 6-4).

QAR Type 3 are opaque compound beads with a light gray core and white surface. They are a barrel shape, have been heat treated and have a rounded end treatment. The bead is equivalent to the Kidd and Kidd Type variety IVa13 (see Appendix A). There is one Type 3 bead in the QAR assemblage. QAR347.002a is the type specimen for QAR Type 4 (Figure 6-3).

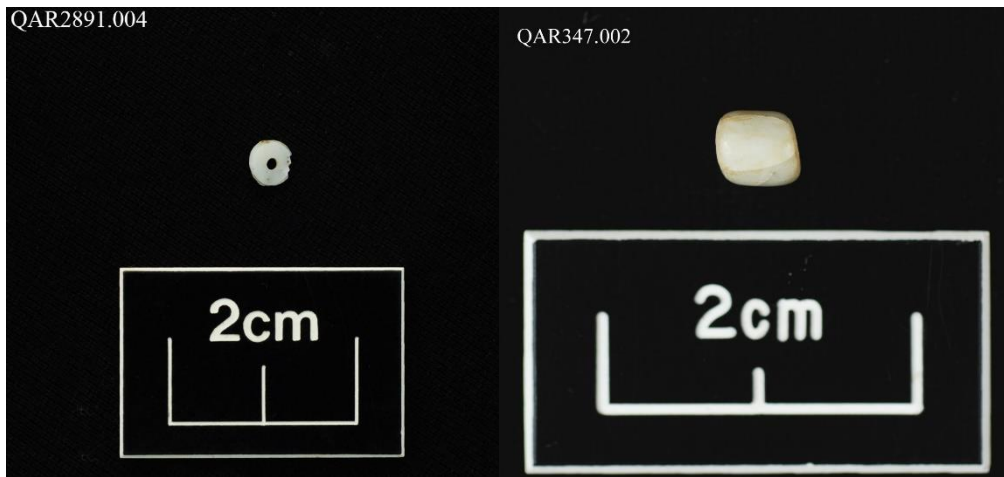


FIGURE 6-3: QAR Type 2

FIGURE 6-4: QAR Type 3

QAR Type 4 and 5 are simple, drawn beads, equivalent to the Kidd and Kidd type IIa. However, they differ in variety. Type 4, equivalent to the Kidd and Kidd Type variety IIa45, is grayish blue, translucent, sub-spherical shaped, has a rounded end treatment and has been heat treated (see Appendix A). One bead in the assemblage is equivalent to QAR Type 4. QAR2161.001a is the type specimen for QAR Type 4 (Figure 6-5). Type 5 is equivalent to the Kidd and Kidd Type variety IIa51 and one bead in the assemblage matches this type (see Appendix A). Although the author was not able to physically examine the bead, information was gathered from images, the Conservation Laboratory Database, and previous research by Linda Carnes-McNaughton and Susan G. Myers (2007). The bead is opaque, sub-spherical in shape, and has been heat treated and rounded. On its color, Carnes-McNaughton and Myers state that although the bead appears to be dark blue with the naked eye, under magnification the bead is almost “metallic gray in color” (Carnes-McNaughton and Myers 2007:7). QAR904.001 is the type specimen (Figure 6-6).

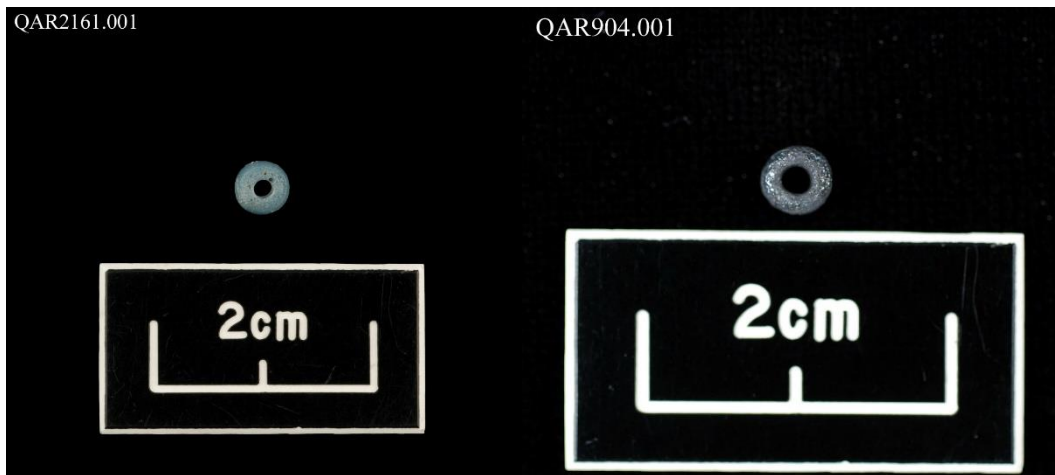


FIGURE 6-5: QAR Type 4

FIGURE 6-6: QAR Type 5

QAR Type 6 are translucent, simple, drawn, dark burgundy (Munsell color black) beads. They are equivalent to the Kidd and Kidd Type variety IIa6 and represented by QAR345.024 (Figure 6-7). There are three incomplete mendable beads that are equal to QAR Type 6. These beads are spherical, have been heat treated and a rounded end treatment (see Appendix A). QAR Type 7 are opaque, simple, drawn, black beads (see Appendix A). They are equivalent to the Kidd and Kidd Type variety IIa7. One complete and one incomplete match QAR type 7. These beads have a sub-spherical, have been heat treated and a rounded end treatment. This type is represented by QAR2756.006 (Figure 6-8) and 3323.012 (Figure 6-9).



FIGURE 6-7: QAR Type 6

FIGURE 6-8: QAR Type 7

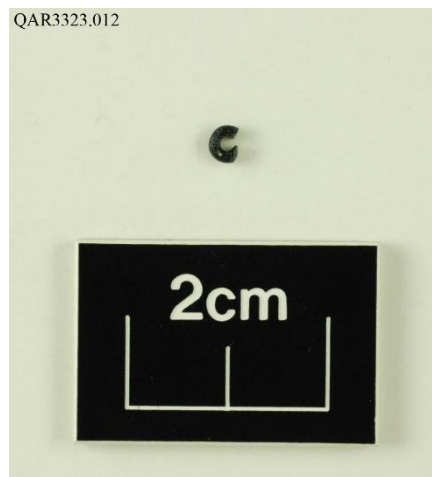


FIGURE 6-9: QAR Type 7

QAR Type 8 are opaque, simple, wound, disk shaped, pale yellow bead and is equivalent to the Kidd and Kidd Type WId and Kidd and Kidd Type variety WId1 (Figure 6-10). They type is also characterized by an extreme heat treatment and a rounded end treatment, giving a polished and glossy appearance (see Appendix A). There is one bead in the assemblage equating to QAR Type 8. QAR2926.011 is the type specimen.

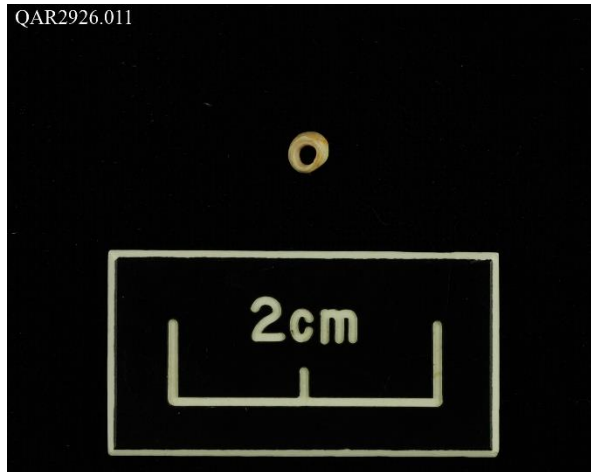


FIGURE 6-10: QAR Type 8

QAR Type 9 is opaque, powdered glass beads (Figure 6-11). There is one bead in the QAR assemblage matching this type. Although the author was not able to physically examine the bead, information was gathered from images, the Conservation Laboratory Database, and previous research by Linda Carnes-McNaughton and Susan G. Myers (2007). McNaughton and Myers state that the bead is “overall whiteish tan to pale yellow,” though it appears to be brown in images (Carnes-McNaughton and Meyers 2007:6). As the Kidd and Kidd Typology does not include powdered glass beads in their typology, the equivalent Type would be IIa (see Appendix A). There is no Kidd and Kidd Type variety equivalent to this bead.

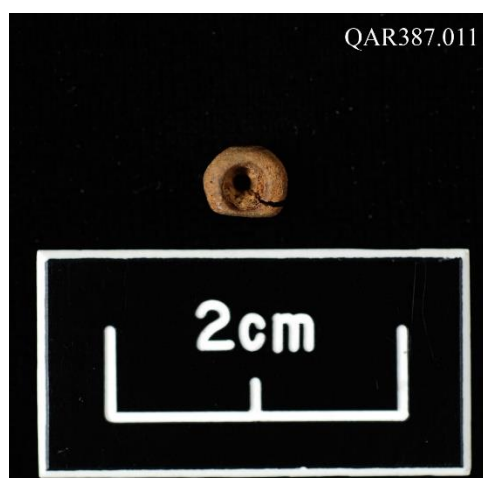


FIGURE 6-11: QAR Type 10

Many incomplete beads were too small to accurately identify their shape, Kidd and Kidd Type, end treatment, and heat treatment. Therefore, they were not placed into the QAR Typology. However, some data was gathered from these fragments. Six hundred and twenty-seven were fragments of translucent drawn glass beads with a simple structure and straight curvilinear form (see Appendix A). QAR2250.003 is representative of these fragments (Figure 6-12).

The bead types for this assemblage date between the late seventeenth and late eighteenth centuries and all, with the exception of the powdered glass bead, are most likely Venetian, Bohemian, or Dutch. However, due to the wreckage of *Queen Anne's Revenge* postdating 1700, it is less likely that the beads are of Dutch manufacture as the Dutch drawn bead industry died out at the end of the seventeenth century (Karklins 1974:66).

QAR Types	Kidd Type	Kidd Type Variety	General Color	Shape	Diaphaneity	Count (incomplete)	Count (Complete)
1	IIa	IIa19	Yellow	Sub-Spherical and Disk	Translucent	124	34
2	IIa	IIa12	White	Sub-spherical	Opaque	3	
3	IVa	IVa13	White	Barrel	Opaque		1
4	IIa	IIa45	Blue	Sub-Spherical	Translucent		1
5	IIa	IIa51	Blue	Sub-Spherical	Translucent		1
6	IIa	IIa6	Black	Sub-Spherical	Translucent	3	
7	IIa	IIa7	Black	Sub-Spherical	Opaque	1	1
8	WI	WId1	Pale Yellow	Disk	Opaque		1
9	IIa	None	Brown	Sub-Spherical	Opaque		1
Unid	None	None	Yellow and Gray	Unidentified	Translucent and Opaque	627	

TABLE 6-1: QAR Typology of the *Queen Anne's Revenge* Bead Assemblage

Table 6-2: <i>Queen Anne's Revenge</i> Bead Assemblage Colors					
QAR Type	Munsell Color	Munsell Color Name	General Color	Count (Incomplete)	Count (Complete)
1, Unid	5Y 7/8	Yellow	Yellow	344	10
1 & Unid	2.5Y 7/8	Yellow	Yellow	132	3
1 & Unid	5Y 6/8	Olive Yellow	Yellow	158	6
1 & Unid	2.5Y 6/8	Olive Yellow	Yellow	113	15
1 & Unid	2.5Y 6/1	Grey	Grey	1	
1 & Unid	2.5Y 3/2	Very Dark Grey	Grey	1	
1 & Unid	5Y 4/1	Dark Grey	Grey	2	
2	2.5Y 8/1	White	White	3	
3	5Y 8/2	White	White with light grey core		1
4	Gley 2 5/5B	Grayish Blue	Blue		1
5	Unidentified	Unidentified	Metallic Gray		1
6	2.5Y 2.5/1	Black	Dark Burgundy	3	
7	5Y 2.5/1	Black	Black		1
7	10YR 2/1	Black	Black	1	
8	2.5Y 8/2	Pale Yellow	Light Yellow		1
9	Unidentified	Unidentified	Brown		1

TABLE 6-2: Colors of beads in the *Queen Anne's Revenge* Bead Assemblage

Color

Yellow is the most abundant bead color in the assemblage, making up 98 percent of the total assemblage. Munsell colors indicated that the yellow beads varied in shade from olive yellow, yellow, strong yellow, and pale yellow. Black and white were the second most prevalent color followed by gray, blue, and brown. The coloring of the gray beads are attributed to the presence of concretion on the beads, devitrification, or patination. The true color of the gray beads is most likely yellow.

Comparative Analysis

Henrietta Marie: Similar to the *Queen Anne's Revenge* assemblage, the beads recovered from *Henrietta Marie* are largely non-diagnostic drawn glass beads of like colors: white, blue, gray and yellow. In addition, predominate colors of the *Henrietta Marie* assemblage are green, yellow, and blue. This corresponds to *Queen Anne's Revenge* predominate color, yellow.

Elmina shipwreck: Elmina Types 1-7 correspond to QAR Types 1, 3-7 in shape, diaphaneity, and Kidd Type. However, the Elmina types are smaller than the QAR Types are different varieties of beads. Elmina Types 8-10 are similar to QAR Type 3. These beads are small to medium monochrome drawn beads and are all equivalent to the Kidd and Kidd Type IIa. However, they are not equivalent in Kidd and Kidd type variety. Elmina Type 15 is similar to QAR type 4 in that they are compound opaque white beads. However, Elmina Type 15 has a bright white core whereas the QAR bead has a light grey core. Therefore, they differentiate in Kidd and Kidd Type variety. Elmina Type 15 corresponds to Kidd and Kidd Type variety IVa11 and QAR Type 4 is equivalent to variety IVa13. Elmina type 15 also contains a clear casing similar to QAR Type 3. In addition to the similar types, the most common bead color recovered from *Elmina* was yellow, similar to the *Queen Anne's Revenge*.

City of Elmina: At the time of publication DeCorse (1989) described 29 out of the 400 styles found in the city of Elmina. None of the beads described were non-diagnostic glass beads nor has there been any further publication on these beads. The lack of information hinders a good comparison between Elmina, Ghana and *Queen Anne's Revenge*. Only two beads described, corresponded to the *Queen Anne's Revenge* bead assemblage.

Unfortunately, the powdered beads presented in DeCorse's work do not match the type of powdered bead found on *Queen Anne's Revenge*. However, one type of bead found in the Elmina excavations, Kidd and Kidd Type WId* is comparable to QAR Type 8 (Kidd and Kidd Type variety WId1).

Newton Cemetery: The classification system Newton Cemetery used for describing their beads was developed by Lyle Stone in 1974. Therefore, it is difficult to make direct comparisons between the Newton Cemetery beads and the *Queen Anne's Revenge* assemblage.

New York African Burial Ground: Similar to the *Queen Anne's Revenge* assemblage, 99 percent of the total beads recovered from the New York African Burial Ground are simple monochrome beads. Comparable colors include: black, blue, and yellow. Kidd and Kidd Type IIa6 is similar to QAR Type 6 in size, shape, and color but not in diaphaneity. Kidd and Kidd Type IIa* is similar to QAR type 1 with the exception of diaphaneity. LaRoche also calls IIa* light gold, but the Munsell color 2.5Y 7/8 is given the color name yellow and is the same color of QAR Type 1.

House for Families: The House for Families bead assemblage consisted of mostly simple drawn monochrome seed beads. Many of these beads were comparable to the *Queen Anne's Revenge* assemblage in color, shape, and diaphaneity. However, many of the beads were much smaller than the ones recovered from the *Queen Anne's Revenge*. QAR type 5 is similar to one translucent dark blue bead found at the House for Families, except, QAR type 5 is twice the size. In addition, QAR type 4 was similar to the shape, color, and diaphaneity as two translucent, light blue, sub-spherical beads from the House for Families but again the bead was much smaller than the QAR Type. Five opaque white beads both sub-spherical and barrel are similar to QAR Type 2, with the exception of their size.

Bead Distribution Analysis

The Bead Distribution Map (Figure 6-12) indicates that beads were found in 91 units and are predominately concentrated in the center of the site. Although the recovery area of beads is widespread, it is not evenly distributed. Darker shading shows the more heavily concentrated area of beads on the excavation site. Analysis of the bead distribution map indicates that there are four areas of heavy concentration (Figure 6-13). Area A includes four units 132, 156, 157, and 166. There is a total of 179 bead in area A which is 22 percent of the total amount of beads recovered on the site. Area B or unit 109 has 43 beads, Area C or unit 9 has 33, and Area D or unit 184 has 37. Collectively areas A, B, C, and D, contain 282, or 35 percent, of the total 798 beads. The remaining 65% of beads are more scattered but are still restricted towards the center of the excavation site.

An overlay of the wreckage indicates that the beads were confined to the stern and between the aft and midship (Figure 6-14). Because the ship rolled onto its port side after grounding, it is difficult to determine which side of the ship the beads were stored. However, associated artifacts such as cask hoops and ballasts suggest the beads were among the cargo. In addition to beads, four shackles have been recovered from *Queen Anne's Revenge* and removed from concretion thus far. These artifacts may also be reminiscent of her former life as a slaver. One shackle was found in unit 157 (see Fig 6-12). This unit is in concentration area A which contains the most number of beads (see Fig 6-13). The other three shackles are in units 129, 205/262, and 130/131 (see Fig 6-12). These units surround area A (see Fig 6-13). It's possible that these shackles were not used during the last voyage and were also in storage (see Fig 6-14).

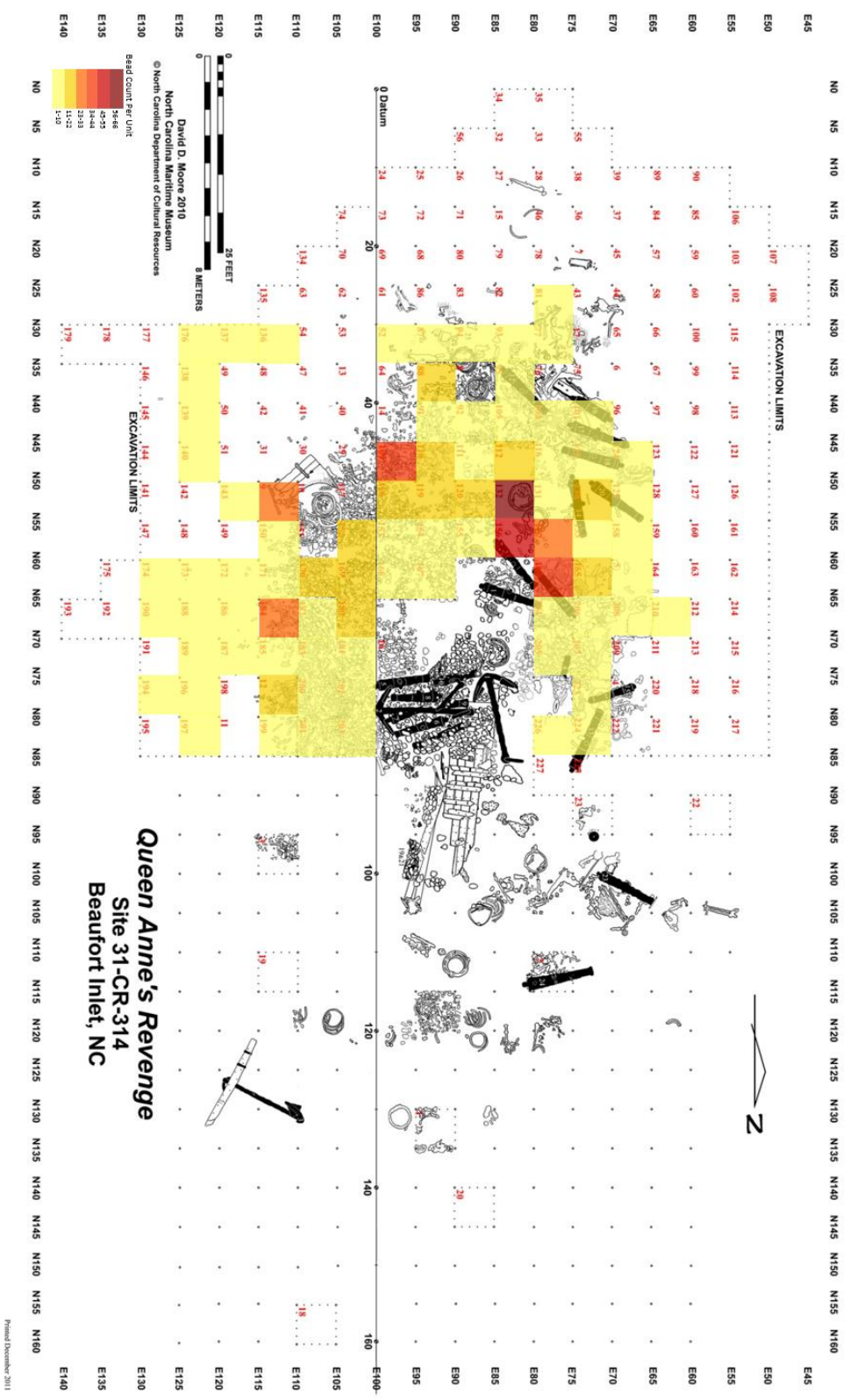


FIGURE 6-12: Distribution of beads on site. Color gradient of light yellow to dark red. Bead count per unit in increments of 10.

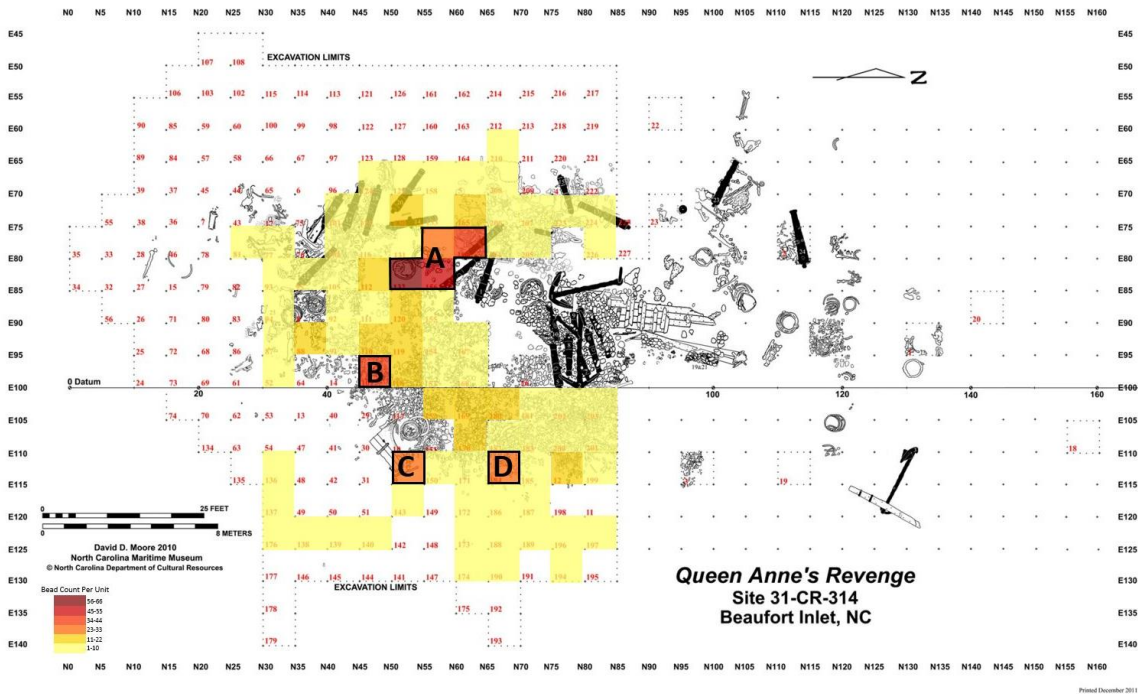


FIGURE 6-13: Concentrated areas of beads on site.

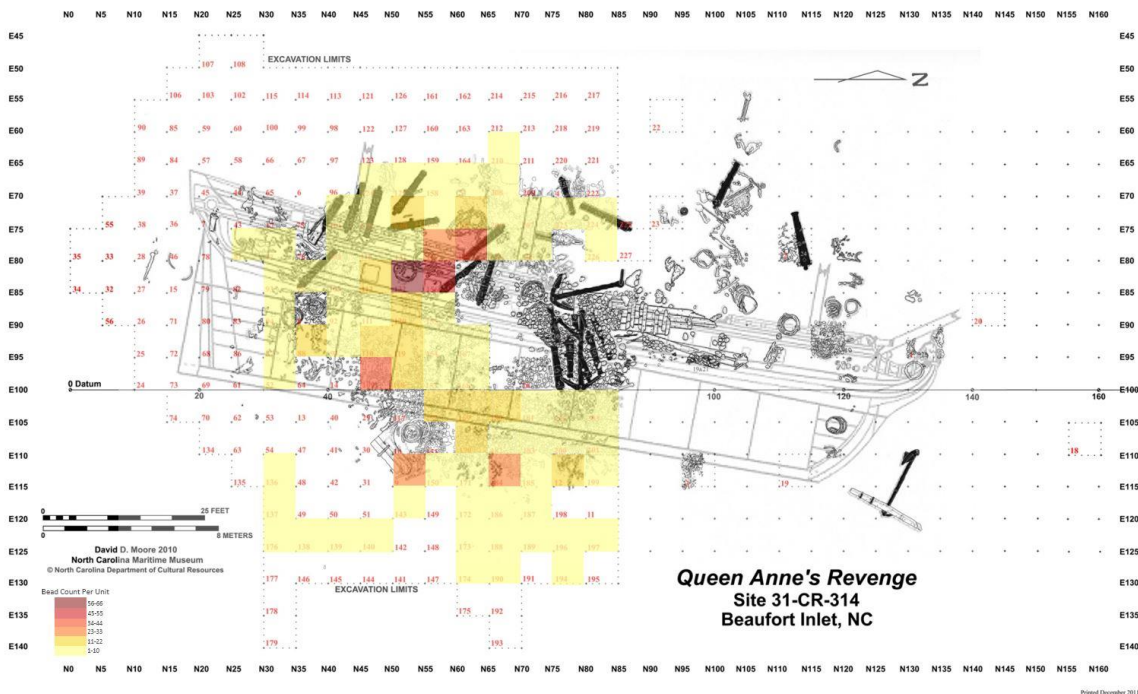


FIGURE 6-14: Distribution of beads on site with ship overlay.

CHAPTER SEVEN: DISCUSSION AND CONCLUSION

This final chapter discusses the identification of the *Queen Anne's Revenge* bead assemblage and their usage on the ship and within the slave trade. This chapter also examines the similarities and differences between the *Queen Anne's Revenge* bead assemblage and the sites mentioned in Chapter Three as well as the distribution of the glass beads on the *Queen Anne's Revenge* site. Finally, this chapter explores the interpretive potential of the *Queen Anne's Revenge* glass bead assemblage and material culture overall.

Identification

Research on glass trade beads can provide substantial temporal and cultural interpretive insights as they occur so frequently on historical sites. Archaeological investigation coupled with ethnographic research maximize the interpretative potential of beads. To adequately study bead assemblages, descriptive typologies and cataloguing techniques must be utilized. The Kidd and Kidd Typology is often used by bead researchers. This method utilizes manufacture type to sort the beads with physical attributes secondary. Therefore, it lacks good descriptive details on many physical attributes, leaving researchers to guess. The most useful item however, are the extensive color plates illustrating bead varieties. This allows the researcher to match their beads to a similar illustration making classification easier. However, the wound bead illustrations is inadequate, as wound-on-drawn, mold pressed, blown, and Prosser-molded are exempted from the classification (Karklins 2012: 62).

The DAACS catalog, though not widely utilized, helps to combat some issues other methodologies have. One of the main issues the DAACS catalog attempts to solve is the

differentiation between bead shapes, specifically between spherical, sub-spherical, and disk. Therefore, they developed a standardized length to width ratio. Beads which had a ratio of 0.95 would be classified as spherical. Those with a ratio of 0.45 would be considered disk. Beads lying in between would be classified as sub-spherical. In addition, they emphasize the need to be more objective when describing color. Therefore, they suggest that all artifacts (bead and others) be matched to a Munsell code in either The Munsell Book of Color, The Glossy Collection or the Munsell Soil Color Charts. In addition, DAACS provides four areas of color data which range from highly specific color classifications to basic color groups. This includes: Munsell color name (range or single color), Munsell color code (range or single color), Common English color names (i.e. Red), and the color coding system that was used for observation (i.e. Munsell Soil Color Chart). Finally, DAACS uses exact measurements of beads in millimeters unlike other methods which use a number range.

This project identified and classified 798 glass beads and fragments recovered from the Queen Anne's Revenge shipwreck 31CR314. Most beads recovered thus far are small simple monochrome drawn glass beads. These beads provide considerable insight into the transactions between Europe and Africa as well as African culture.

According to primary accounts, blue beads were preferred among African between the fifteenth and twentieth centuries (LaRoche 1994:15). In addition, blue beads are statistically the most common color to show up on historical archaeology sites. Although there are two blue beads in the *Queen Anne's Revenge* assemblage, yellow seed beads were by far the most common bead in the *Queen Anne's Revenge* assemblage. Hopwood (2009) suggests that simple yellow monochrome beads were used for a type of powdered glass bead called *Bodom*. However, she states that Bodom beads did not come into popularity until the nineteenth century.

Glass beads were culturally significant and valuable in Africa. Simple monochrome glass beads, such as the ones that dominated the *Queen Anne's Revenge* assemblage, likely did not have much intrinsic value in their original form and were repurposed into powdered glass beads, therefore increasing their value. However, the beads, in their original form, would have had social value. African culture commonly used beads for spirituality purposes as well as personal adornment. Beads would be use by women to help their children grow or by shaman to ward off evil spirits. Often, beads were a symbol of elite status as larger, more decorative, or unique beads would be more valuable monetarily. The beads in the *Queen Anne's Revenge* assemblage were destined to be traded in the African markets where Africans would have purchased them for adornment or coloring agents for their beads. However, they were unable to make it into the market. Corey Malcom notes that it is possible slave ships flooded African markets of one time, which in turn, lowered the value making it undesirable. In addition, Africa's change in taste, especially color, style, and design, changed often. This can result in residual cargo that simply never left the ship (Malcom 2003:3). It is likely that the *Queen Anne's Revenge* assemblage is unsold cargo from the *La Concorde's* final voyage and because these beads were not seen as valuable items to the pirates, they were most likely left in the cargo hold after Blackbeard took the ship and not considered worth salvaging when the ship ran aground.

Comparison of Bead Assemblages

Although not all sites presented in Chapter 3 contained comparative bead assemblages, they do provide insight as to why the beads remained on the ship. The Elmina Shipwreck assemblage allowed the author to compare the *Queen Anne's Revenge* assemblage to a cargo ship bound for Africa. The similarities of assemblages between the two sites

indicated that beads similar to those on *Queen Anne's Revenge* were used as trade items for the slave trade. They also indicate that there was an emphasis on yellow beads in the mid-seventeenth century.

Henrietta Marie is an example of beads left on the ship after trading in Africa and transporting slaves to Jamaica. The beads indicate that it was not uncommon for beads to be left on the ship or unable to be traded, whether that was due to flooded markets, change in taste, or change in cultural or monetary value. Beads recovered from Newton Plantation, New York African Burial Ground, and House for Families reveal that Africans were able to retain or regain glass beads in the New World. They also reveal that beads held a strong connection to African culture and represented a continuation of that culture for Africans in the New World.

Artifact Distribution Analysis

Area A is believed to be the central holding place for the beads, particularly in units 132 and 156. Areas C and D could potentially be secondary holding areas. The scatter of beads may be due to the settling of the objects through post-depositional factors. Beads are lightweight materials and are non-ferric. Therefore, unless they are “caught” with large iron objects and concreted, they are more likely to be found loosely in dredge spoil. Because the beads are loose, they are more likely to move from currents and distribute across the site. As most of the beads in the assemblage were recovered from dredge spoil, it is more likely that the beads would move on the site causing the widespread scattering. However, the author notes that the map is incomplete as only 60% of the site had been excavated and the map only includes beads that have been conserved and documented in this research. Therefore, as more

beads are recovered, it is recommended they be added to the map to fully understand the distribution of beads on the *Queen Anne's Revenge* site.

Interpretations

The beads represented here provide insights into European and African transactions as well as the cultural significance for European items sold in the West African marketplace. As a raw material, Europeans trading simple monochrome glass beads were necessary to a society that did not possess the technology to produce their own glass. As a culturally significant item, beads representing important spiritual or social meaning were invaluable. Therefore, beads were high demand trade items on the African coast. However, different colors, types, and styles of beads were sought after at different times. Therefore, it was not uncommon for beads to remain unsold, only to be brought back onto the ship in which they came. It is proposed that the beads from the *Queen Anne's Revenge* assemblage represents items that were not able to be sold in the African market. As the pirates had no use for the beads, they would have become forgotten cargo, remaining as a reminder of the ship's former life as a slave ship.

Significance

The main contribution of this project is that it cataloged, identified, and classified the beads recovered from the *Queen Anne's Revenge* Shipwreck for the first time in ten years. As a slaver turned pirate ship, the *Queen Anne's Revenge's* bead assemblage demonstrates a material culture that has been left over from its former life as a slaver.

Artifacts recovered from *Queen Anne's Revenge* are one of the few examples of a pirate ship as well as a slaver turned pirate ship. A slave ship's cargo would be representative

of items available on the African market. Not knowing what items would sell, Europeans often loaded ships with a wide array of items that they know will sell or believe hold a value to the region in which they are traveling. However, fluctuations of both the amount of goods in the marketplace and demand prevent items from being traded. The comparison of bead assemblages from archaeological sites further reflect this view. *Henrietta Marie* is a prime example of beads remaining on ships long after leaving Africa and transporting its human cargo to the Caribbean. The bead assemblage on *Queen Anne's Revenge* reflects these changes in the marketplace. Rather than being traded, the beads were placed back on the ship will they remained until they were recovered by archaeologists 300 years later.

Recommendations for Future Work

Ultimately, more beads may be added to the *Queen Anne's Revenge* bead assemblage should further excavation and conservation of the *Queen Anne's Revenge* take place. Additional data recovered from these beads will make more definitive conclusions about the types of beads contained on the ship and its role within the Transatlantic Slave Trade. It is recommended that this research continues as new beads are found. It is also recommended that other forms of bead analysis be sought. X-ray fluorescence (XRF) analysis is one method that is being used more frequently in bead research. XRF is a non-destructive analytical technique used to determine the elemental composition of materials by measuring the fluorescent X-ray emitted from an artifact when it is excited by a primary X-ray source. XRF can provide additional information about beads other than their physical characteristics. Elemental composition analysis can be used to further determine date and location of manufacture. XRF analysis can also provide information as to the types of beads that can be viewed on X-rays, a crucial process to the conservation process and safe recovery of the beads.

Conclusion

Bead research has been an important part of historical archaeology for years. Glass beads reveal cross-culture relations, social and economic constructs, spiritual meanings, and human behavior. Through the analysis of glass beads on the *Queen Anne's Revenge*, the author uncovered information about the role of the *Queen Anne's Revenge* and her cargo within the slave trade, and provided an additional link between Africa and the slave trade in general.

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APPENDIX: *QUEEN ANNE'S REVENGE* BEAD CATALOG

Beads organized numerically by QAR number and alphabetically by sub-letter. Each descriptive characteristic used to identify beads by the DAACS cataloging manual is displayed.

QAR# = QAR number as designated by the Queen Anne's Revenge Conservation Laboratory

Ct = Count of beads, complete and incomplete, per QAR number

SL = Sub-letter as designated by the author

MT = Manufacturing Technique

Structure

S = Simple, a single layer of glass

Comp = Compound, two or more layers of glass

Form

SC = Straight Curvilinear, beads with a round or oblate cross section

SP= Straight Polyhedral, beads with a polyhedral cross section and straight body

TC= Twisted Curvilinear, beads with a round or oblate cross-section and twisted body

Kidd Type = Kidd and Kidd Typology (1983)

Diaphaneity, the amount of light that can pass through the body of a bead

Tp = Transparent, very clear, objects can be seen through bead

Trans = Translucent, light easily passes through the body but the glass is not clear

Op = Opaque, light does not pass through the body of the bead

End Treatment

Cut = Cutting produces flat ends and sharp corners

Rounded = Rounded edge, usually from heat treatment

Unfinished = Rough edges

Heat Treatment = used to smooth edges, can be seen microscopically

Décor = Decoration

Mend = if the bead has been repaired during conservation

Cond = Condition of the beads

E/W= Eroded/Weathered

PMT = Post Manufacturing Technique, bead has been physically modified in order to change its original function

Cons = Conservation, if a bead has been conserved after archaeological recovery

Casing = outer layer of glass, commonly clear glass used to increase a beads brilliance

L = Length (mm)

W = Width (mm)

Wt = Weight (g)

QAR#	Ct	SL	Completeness	Material	MT	Structure	Form	Shape	Complex Shape	Kidd Type	End Treatment	Heat Treatment	Diaphaneity
286.005	1	a	Complete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Round	Yes	Trans
345.024	3	a	Incomplete	Glass	Drawn	S	SC	Spherical	N/A	Ila6	Round	Yes	Trans
		b	Incomplete	Glass	Drawn	S	SC	Spherical	N/A	Ila6	Round	Yes	Trans
		c	Incomplete	Glass	Drawn	S	SC	Spherical	N/A	Ila6	Round	Yes	Trans
347.002	1	a	Complete	Glass	Drawn	Comp	SC	Barrel	N/A	IVa13	Round	Yes	Op
387.011	1	a	Complete	Glass	Powdered	S	SC	Sub-spherical	N/A	Ila19	Round	Yes	Op
904.001	1	a	Complete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila51	Round	Yes	Op
1021.003	1	a	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
1111.036	5	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		c	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		d	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		e	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
1159.024	2	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
1179.024	5	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		c	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		d	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		e	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
1184.002	3	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		c	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
1205.011	19	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		c	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		d	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		e	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		f	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		g	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		h	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		i	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		j	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		k	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		l	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		m	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		n	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		o	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		p	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		q	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		r	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		s	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
1260.008	3	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ila19	Ground	No	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentified	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans

		d	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		e	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
3335.022	2	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ia19	Round	Yes	Trans
		b	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ia19	Round	Yes	Trans
3400.021	1	a	Complete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ia19	Round	Yes	Trans
3400.022	3	a	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		c	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
3876.012	3	a	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		b	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
		c	Incomplete	Glass	Drawn	S	SC	Unidentifiable	N/A	Unidentifiable	Unidentifiable	Unidentifiable	Trans
4005.009	1	a	Incomplete	Glass	Drawn	S	SC	Sub-spherical	N/A	Ia19	Ground	No	Trans

QAR#	SL	Mend	Décor	Facets	Cond	PMT	Cons	Casing	L	W	Wt	Munsell Color	Munsell Name	Notes
286.005	a	No	None	None	E/W	No	Yes	No	5.14	3.37	0.2535	5Y 7/8	Yellow	Concreated
345.024	a	No	None	None	E/W	No	Yes	No	3.64	6.16	0.1182	2.5Y 2.5/1	Black	Color more amber, all three pieces are of same bead
	b	No	None	None	E/W	No	Yes	No	0.96	4.90	0.0190	2.5Y 2.5/1	Black	Color more amber, all three pieces are of same bead
	c	No	None	None	E/W	No	Yes	No	0.90	3.69	0.0125	2.5Y 2.5/1	Black	Color more amber, all three pieces are of same bead
347.002	a	No	None	None	E/W	No	Yes	No	5.08	4.32	0.1859	5Y 8/2; Gley 1 7/N (core)	White/Light Grey	Grey core, white surface, collard
387.011	a	No	None	None	E/W	No	Yes	No	3.23	5.79	<.1	Unidentified	Unidentified	Data gathered through QAR Database and 2007 report. Brown
904.001	a	No	None	None	E/W	No	Yes	No	2.85	5.20	0.1406	Unidentified	Unidentified	Data gathered through QAR Database and 2007 report. Metallic Grey
1021.003	a	No	None	None	E/W	No	Yes	No	1.53	0.40	0.0020	5Y 7/8	Yellow	
1111.036	a	No	None	None	E/W	No	Yes	No	1.99	1.29	0.0060	5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.23	1.54	0.0070	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.08	1.14	0.0050	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	0.92	1.05	0.0040	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	0.97	0.89	0.0040	5Y 7/8	Yellow	
1159.024	a	No	None	None	E/W	No	Yes	No	1.79	1.17	0.0031	5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	1.23	1.05	0.0064	5Y 6/8	Olive Yellow	
1179.024	a	No	None	None	E/W	No	Yes	No	3.70	2.38	0.0520	5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	2.32	2.82	0.0351	5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	1.85	2.24	0.0306	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	1.17	1.55	0.0080	5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.48	1.85	0.0332	5Y 6/8	Olive Yellow	
1184.002	a	No	None	None	E/W	No	Yes	No	3.01	4.46	0.0640	5Y 7/8	Yellow	Complete diameter, incomplete length
	b	No	None	None	E/W	No	Yes	No	2.16	1.91	0.0222	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.79	1.52	0.0086	5Y 7/8	Yellow	
1205.011	a	No	None	None	E/W	No	Yes	No	2.39	2.79	0.0282	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	2.06	1.84	0.0195	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	3.31	2.91	0.0415	5Y 6/8	Olive Yellow	

	d	No	None	None	E/W	No	Yes	No	1.14	1.78	0.0058	5Y 6/8	Olive Yellow
	e	No	None	None	E/W	No	Yes	No	2.68	2.01	0.0249	5Y 6/8	Olive Yellow
	f	No	None	None	E/W	No	Yes	No	1.98	1.53	0.0150	5Y 6/8	Olive Yellow
	g	No	None	None	E/W	No	Yes	No	2.62	2.51	0.0214	2.5Y 7/8	Yellow
	h	No	None	None	E/W	No	Yes	No	0.87	1.04	0.0041	5Y 6/8	Olive Yellow
	i	No	None	None	E/W	No	Yes	No	1.94	1.87	0.0136	5Y 6/8	Olive Yellow
	j	No	None	None	E/W	No	Yes	No	2.14	2.54	0.0203	2.5Y 7/8	Yellow
	k	No	None	None	E/W	No	Yes	No	1.62	1.94	0.0141	5Y 6/8	Olive Yellow
	l	No	None	None	E/W	No	Yes	No	2.82	2.63	0.0324	5Y 6/8	Olive Yellow
	m	No	None	None	E/W	No	Yes	No	1.02	1.27	0.0094	2.5Y 7/8	Yellow
	n	No	None	None	E/W	No	Yes	No	0.99	1.17	0.0028	2.5Y 7/8	Yellow
	o	No	None	None	E/W	No	Yes	No	2.24	2.76	0.0292	2.5Y 7/8	Yellow
	p	No	None	None	E/W	No	Yes	No	2.05	2.65	0.0218	2.5Y 7/8	Yellow
	q	No	None	None	E/W	No	Yes	No	1.94	1.59	0.0161	5Y 6/8	Olive Yellow
	r	No	None	None	E/W	No	Yes	No	1.32	1.67	0.0128	5Y 6/8	Olive Yellow
	s	No	None	None	E/W	No	Yes	No	0.98	0.86	0.0031	5Y 6/8	Olive Yellow
1260.008	a	No	None	None	E/W	No	Yes	No	2.24	2.64	0.0282	2.5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	1.36	2.06	0.0060	2.5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	1.83	1.88	0.0116	2.5Y 6/8	Olive Yellow
1278.025	a	No	None	None	E/W	No	Yes	No	0.55	1.20	0.0005	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	1.79	0.84	0.0028	5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.86	1.02	0.0050	5Y 7/8	Yellow
	d	No	None	None	E/W	No	Yes	No	1.79	0.47	0.0025	5Y 7/8	Yellow
1278.030	a	No	None	None	E/W	No	Yes	No	2.73	2.74	0.0153	5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	1.25	1.36	0.0067	5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	2.64	2.82	0.0235	5Y 6/8	Olive Yellow
1315.009	a	No	None	None	E/W	No	Yes	No	3.40	1.94	0.0350	5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	2.42	1.79	0.0222	5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	2.93	2.02	0.0185	5Y 6/8	Olive Yellow
	d	No	None	None	E/W	No	Yes	No	2.77	0.99	0.0112	5Y 6/8	Olive Yellow
1363.017	a	No	None	None	E/W	No	Yes	No	1.89	3.44	0.0349	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	1.35	1.94	0.0078	5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	0.96	1.02	0.0021	5Y 7/8	Yellow
	d	No	None	None	E/W	No	Yes	No	1.88	2.51	0.0120	5Y 7/8	Yellow
	e	No	None	None	E/W	No	Yes	No	0.98	1.23	0.0024	5Y 7/8	Yellow
	f	No	None	None	E/W	No	Yes	No	1.87	1.23	0.0108	5Y 7/8	Yellow
	g	No	None	None	E/W	No	Yes	No	1.10	1.39	0.0067	5Y 7/8	Yellow
	h	No	None	None	E/W	No	Yes	No	2.06	1.89	0.0154	5Y 7/8	Yellow
1390.015	a	No	None	None	E/W	No	Yes	No	2.82	3.12	0.0723	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	1.47	0.88	0.0046	5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.02	0.76	0.0025	5Y 7/8	Yellow
1439.015	a	No	None	None	E/W	No	Yes	No	3.57	2.67	0.0450	5Y 6/8	Olive Yellow
1440.004	a	No	None	None	E/W	No	Yes	No	2.75	4.89	0.1575	2.5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	2.78	2.81	0.0417	2.5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.55	1.13	0.0042	2.5Y 8/8	Yellow
	d	No	None	None	E/W	No	Yes	No	1.25	0.73	0.0013	2.5Y 7/8	Yellow

1520.001	a	No	None	None	E/W	No	Yes	No	3.50	4.90	0.1843	5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	2.38	3.16	0.0257	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.08	0.44	0.0014	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	2.33	2.22	0.0175	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.54	0.67	0.0038	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	2.57	1.44	0.0140	2.5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	1.91	2.48	0.0141	2.5Y 7/8	Yellow	
1539.006	a	No	None	None	E/W	No	Yes	No	3.54	4.10	0.1851	5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	2.89	4.13	0.1315	5Y 6/8	Olive Yellow	Concreted
	c	No	None	None	E/W	No	Yes	No	2.10	3.96	0.0948	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	2.95	4.62	0.1680	5Y 6/8	Olive Yellow	Patinated
	e	No	None	None	E/W	No	Yes	No	1.54	1.98	0.0102	5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	1.96	1.58	0.0101	5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	1.26	1.03	0.0062	5Y 6/8	Olive Yellow	
	h	No	None	None	E/W	No	Yes	No	1.86	1.32	0.0108	5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	1.95	2.46	0.0179	5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	1.59	2.85	0.0202	5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	1.69	1.02	0.0094	5Y 6/8	Olive Yellow	
	l	No	None	None	E/W	No	Yes	No	1.36	1.81	0.0112	5Y 6/8	Olive Yellow	
	m	No	None	None	E/W	No	Yes	No	1.94	1.47	0.0096	5Y 6/8	Olive Yellow	
	n	No	None	None	E/W	No	Yes	No	1.78	1.09	0.0109	5Y 6/8	Olive Yellow	
	o	No	None	None	E/W	No	Yes	No	0.97	1.06	0.0058	5Y 6/8	Olive Yellow	
	p	No	None	None	E/W	No	Yes	No	2.38	2.26	0.0184	5Y 6/8	Olive Yellow	
	q	No	None	None	E/W	No	Yes	No	1.05	1.64	0.0121	5Y 6/8	Olive Yellow	
	r	No	None	None	E/W	No	Yes	No	2.13	1.98	0.0164	5Y 6/8	Olive Yellow	
1539.012	a	No	None	None	E/W	No	Yes	No	2.88	3.04	0.0661	5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	3.21	3.38	0.1872	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	2.94	1.82	0.0767	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	2.46	3.12	0.0616	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.76	1.15	0.0162	5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.72	2.11	0.0179	5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	2.42	3.01	0.0298	5Y 7/8	Yellow	
	h	No	None	None	E/W	No	Yes	No	1.22	1.31	0.0101	5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	1.14	1.26	0.0098	5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	1.84	1.59	0.0134	5Y 7/8	Yellow	
	k	No	None	None	E/W	No	Yes	No	2.37	3.22	0.0267	5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	1.42	1.87	0.0164	5Y 7/8	Yellow	
	m	No	None	None	E/W	No	Yes	No	1.83	2.24	0.0194	5Y 7/8	Yellow	
	n	No	None	None	E/W	No	Yes	No	2.34	3.25	0.0281	5Y 7/8	Yellow	
	o	No	None	None	E/W	No	Yes	No	1.52	1.36	0.0078	5Y 7/8	Yellow	
	p	No	None	None	E/W	No	Yes	No	1.32	1.02	0.0066	5Y 7/8	Yellow	
	q	No	None	None	E/W	No	Yes	No	1.87	1.99	0.0158	5Y 7/8	Yellow	
	r	No	None	None	E/W	No	Yes	No	2.14	2.83	0.0264	5Y 7/8	Yellow	
	s	No	None	None	E/W	No	Yes	No	1.09	1.07	0.0061	5Y 7/8	Yellow	
	t	No	None	None	E/W	No	Yes	No	1.86	1.48	0.0046	5Y 7/8	Yellow	
	u	No	None	None	E/W	No	Yes	No	2.26	1.37	0.0134	5Y 7/8	Yellow	

	v	No	None	None	E/W	No	Yes	No	0.98	1.63	0.0072	5Y 7/8	Yellow	
	w	No	None	None	E/W	No	Yes	No	1.96	1.35	0.0182	5Y 7/8	Yellow	
	x	No	None	None	E/W	No	Yes	No	2.78	1.32	0.0156	5Y 7/8	Yellow	
	y	No	None	None	E/W	No	Yes	No	1.98	1.46	0.0098	5Y 7/8	Yellow	
1540.003	a	No	None	None	E/W	No	Yes	No	3.07	4.31	0.1458	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	2.63	5.50	0.1551	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	3.15	4.67	0.1728	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	3.60	4.87	0.2057	2.5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.91	4.47	0.0763	2.5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	3.23	3.24	0.0396	2.5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	3.34	2.30	0.0321	2.5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	2.11	2.18	0.0183	2.5Y 6/8	Olive Yellow	
	l	No	None	None	E/W	No	Yes	No	2.89	2.14	0.0534	2.5Y 6/8	Olive Yellow	
	m	No	None	None	E/W	No	Yes	No	2.18	1.90	0.0154	2.5Y 6/8	Olive Yellow	
	n	No	None	None	E/W	No	Yes	No	1.82	2.27	0.0115	2.5Y 6/8	Olive Yellow	
	o	No	None	None	E/W	No	Yes	No	1.30	2.45	0.0109	2.5Y 6/8	Olive Yellow	
1577.004	a	No	None	None	E/W	No	Yes	No	3.62	2.28	0.0334	5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.33	1.47	0.0128	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	0.98	0.96	0.0034	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	2.65	1.94	0.0139	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	2.06	2.24	0.0280	5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.19	1.24	0.0116	5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	1.12	1.36	0.0088	5Y 7/8	Yellow	
1578.006	a	No	None	None	E/W	No	Yes	No	3.52	4.02	0.0811	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	3.24	2.85	0.0440	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	2.77	4.14	0.1329	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	3.88	2.65	0.0406	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.06	0.92	0.0016	5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.60	0.73	0.0060	5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	2.62	1.37	0.0132	5Y 7/8	Yellow	
	h	No	None	None	E/W	No	Yes	No	2.26	1.76	0.0122	5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	1.93	1.85	0.0143	5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	1.95	3.46	0.0265	5Y 7/8	Yellow	
	k	No	None	None	E/W	No	Yes	No	2.33	2.42	0.0197	5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	2.99	1.19	0.0124	5Y 7/8	Yellow	
	m	No	None	None	E/W	No	Yes	No	2.05	2.35	0.0278	5Y 7/8	Yellow	
	n	No	None	None	E/W	No	Yes	No	1.87	1.95	0.0165	5Y 7/8	Yellow	
1632.009	a	No	None	None	E/W	No	Yes	No	2.05	3.79	0.0658	5Y 7/8	Yellow	Patinated
	b	No	None	None	E/W	No	Yes	No	3.51	4.64	0.1894	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	3.93	1.91	0.0778	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	1.91	3.74	0.0352	2.5Y 7/8	Yellow	Very concreted, color barely visable
	e	No	None	None	E/W	No	Yes	No	2.72	3.93	0.0442	2.5Y 7/8	Yellow	Very concreted.
1633.005	a	No	None	None	E/W	No	Yes	No	3.18	2.94	0.1176	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	2.70	4.29	0.0572	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	2.73	3.61	0.0667	2.5Y 6/8	Olive Yellow	

	d	No	None	None	E/W	No	Yes	No	2.68	4.23	0.1198	2.5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.94	2.26	0.0153	2.5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	1.92	1.93	0.0119	2.5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	1.08	1.14	0.0027	2.5Y 6/8	Olive Yellow	
	h	No	None	None	E/W	No	Yes	No	1.90	1.48	0.0059	2.5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	2.79	1.09	0.0089	2.5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	1.66	0.64	0.0030	2.5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	1.69	3.36	0.0218	2.5Y 6/8	Olive Yellow	
	l	No	None	None	E/W	No	Yes	No	2.35	2.25	0.0158	2.5Y 6/8	Olive Yellow	
	m	No	None	None	E/W	No	Yes	No	2.49	1.33	0.0123	2.5Y 6/8	Olive Yellow	
	n	No	None	None	E/W	No	Yes	No	3.10	1.33	0.0098	2.5Y 6/8	Olive Yellow	
	o	No	None	None	E/W	No	Yes	No	3.44	3.61	0.0667	2.5Y 6/8	Olive Yellow	
	p	No	None	None	E/W	No	Yes	No	3.57	3.16	0.0500	5Y 4/1	Dark Grey	
	q	No	None	None	E/W	No	Yes	No	2.42	3.97	0.0395	2.5Y 6/8	Olive Yellow	
	r	No	None	None	E/W	No	Yes	No	2.57	2.69	0.0344	2.5Y 6/8	Olive Yellow	
	s	No	None	None	E/W	No	Yes	No	3.01	2.99	0.0293	2.5Y 6/8	Olive Yellow	
	t	No	None	None	E/W	No	Yes	No	2.14	3.32	0.0194	2.5Y 6/8	Olive Yellow	
	u	No	None	None	E/W	No	Yes	No	2.67	2.71	0.0251	5Y 4/1	Dark Grey	
	v	No	None	None	E/W	No	Yes	No	3.56	1.65	0.0211	2.5Y 6/8	Olive Yellow	
1649.002	a	No	None	None	E/W	No	Yes	No	2.42	4.33	0.1243	5Y 7/8	Yellow	Very patinated
	b	No	None	None	E/W	No	Yes	No	2.10	3.80	0.0360	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	0.91	2.20	0.0087	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	1.79	1.34	0.0044	5Y 7/8	Yellow	
1672.008	a	No	None	None	E/W	No	Yes	No	2.06	3.57	0.0390	5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	2.29	2.50	0.0270	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.94	3.91	0.0390	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	2.91	2.44	0.0350	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.23	1.74	0.0161	5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.86	1.27	0.0192	5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	1.94	1.17	0.0104	5Y 7/8	Yellow	
	h	No	None	None	E/W	No	Yes	No	1.36	2.04	0.0159	5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	2.23	2.16	0.0258	5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	1.76	2.14	0.0206	5Y 7/8	Yellow	
	k	No	None	None	E/W	No	Yes	No	1.22	1.58	0.0078	5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	1.79	2.24	0.0133	5Y 7/8	Yellow	
1691.003	a	No	None	None	E/W	No	Yes	No	2.51	1.35	0.0180	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.99	4.33	0.0640	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.94	2.34	0.0210	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	2.53	2.70	0.0360	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	2.05	3.89	0.0370	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	2.65	3.61	0.0420	2.5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	2.68	1.96	0.0220	2.5Y 7/8	Yellow	
	h	No	None	None	E/W	No	Yes	No	1.59	3.14	0.0200	2.5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	2.33	3.31	0.0350	2.5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	1.45	1.68	0.0184	2.5Y 7/8	Yellow	
	k	No	None	None	E/W	No	Yes	No	1.94	2.06	0.0163	2.5Y 7/8	Yellow	

	l	No	None	None	E/W	No	Yes	No	2.09	1.86	0.0142	2.5Y 7/8	Yellow
	m	No	None	None	E/W	No	Yes	No	1.97	2.24	0.0161	2.5Y 7/8	Yellow
	n	No	None	None	E/W	No	Yes	No	2.14	2.38	0.0304	2.5Y 7/8	Yellow
	o	No	None	None	E/W	No	Yes	No	2.35	1.98	0.0212	2.5Y 7/8	Yellow
	p	No	None	None	E/W	No	Yes	No	1.79	2.04	0.0138	2.5Y 7/8	Yellow
	q	No	None	None	E/W	No	Yes	No	1.89	1.66	0.0089	2.5Y 7/8	Yellow
	r	No	None	None	E/W	No	Yes	No	1.88	2.51	0.0235	2.5Y 7/8	Yellow
	s	No	None	None	E/W	No	Yes	No	0.96	1.14	0.0082	2.5Y 7/8	Yellow
1720.010	a	No	None	None	E/W	No	Yes	No	3.61	1.88	0.0080	5Y 7/8	Yellow
1721.007	a	No	None	None	E/W	No	Yes	No	2.84	4.27	0.0825	2.5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	2.04	4.01	0.0454	2.5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	2.21	1.11	0.0048	2.5Y 6/8	Olive Yellow
	d	No	None	None	E/W	No	Yes	No	1.57	0.72	0.0032	2.5Y 6/8	Olive Yellow
1722.006	a	No	None	None	E/W	No	Yes	No	1.56	1.85	0.0087	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	1.87	1.94	0.0106	5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	2.76	2.68	0.0358	5Y 7/8	Yellow
	d	No	None	None	E/W	No	Yes	No	0.89	0.93	0.0041	5Y 7/8	Yellow
1879.010	a	No	None	None	E/W	No	Yes	No	1.30	1.41	0.0077	2.5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	2.24	2.75	0.0231	2.5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.02	0.99	0.0049	2.5Y 7/8	Yellow
	d	No	None	None	E/W	No	Yes	No	1.79	1.17	0.0102	2.5Y 7/8	Yellow
1903.010	a	No	None	None	E/W	No	Yes	No	1.94	2.51	0.0198	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	2.36	2.01	0.0211	5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.12	3.04	0.0142	5Y 7/8	Yellow
	d	No	None	None	E/W	No	Yes	No	2.74	1.69	0.0212	5Y 7/8	Yellow
	e	No	None	None	E/W	No	Yes	No	2.06	1.52	0.0113	5Y 7/8	Yellow
	f	No	None	None	E/W	No	Yes	No	2.41	2.72	0.0226	5Y 7/8	Yellow
	g	No	None	None	E/W	No	Yes	No	2.09	2.59	0.0128	5Y 7/8	Yellow
	h	No	None	None	E/W	No	Yes	No	1.64	1.99	0.0124	5Y 7/8	Yellow
	i	No	None	None	E/W	No	Yes	No	2.43	2.06	0.0143	5Y 7/8	Yellow
	j	No	None	None	E/W	No	Yes	No	1.16	1.45	0.0078	5Y 7/8	Yellow
	k	No	None	None	E/W	No	Yes	No	1.54	1.63	0.0114	5Y 7/8	Yellow
	l	No	None	None	E/W	No	Yes	No	1.82	1.43	0.0109	5Y 7/8	Yellow
	m	No	None	None	E/W	No	Yes	No	1.87	0.84	0.0032	5Y 7/8	Yellow
	n	No	None	None	E/W	No	Yes	No	1.12	1.54	0.0240	5Y 7/8	Yellow
	o	No	None	None	E/W	No	Yes	No	1.53	0.88	0.0031	5Y 7/8	Yellow
	p	No	None	None	E/W	No	Yes	No	1.39	1.15	0.0164	5Y 7/8	Yellow
	q	No	None	None	E/W	No	Yes	No	1.82	1.13	0.0105	5Y 7/8	Yellow
	r	No	None	None	E/W	No	Yes	No	1.36	1.19	0.0029	5Y 7/8	Yellow
	s	No	None	None	E/W	No	Yes	No	1.69	1.05	0.0108	5Y 7/8	Yellow
2003.005	a	No	None	None	E/W	No	Yes	No	1.53	1.23	0.0068	2.5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	2.19	2.48	0.0215	2.5Y 7/8	Yellow
	c	No	None	None	E/W	No	Yes	No	1.46	1.74	0.0121	2.5Y 7/8	Yellow
2003.027	a	No	None	None	E/W	No	Yes	No	2.46	2.57	0.0370	5Y 6/8	Olive Yellow
2103.009	a	No	None	None	E/W	No	Yes	No	3.77	2.32	0.0330	5Y 7/8	Yellow
	b	No	None	None	E/W	No	Yes	No	1.97	1.75	0.0116	5Y 7/8	Yellow

2104.003	a	No	None	None	E/W	No	Yes	No	2.47	3.11	0.0370	2.5Y 7/8	Yellow	
2105.003	a	No	None	None	E/W	No	Yes	No	2.64	1.14	0.0120	5Y 7/8	Yellow	
2106.006	a	No	None	None	E/W	No	Yes	No	3.48	1.89	0.0191	5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	3.15	3.07	0.0370	5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	1.33	1.85	0.0101	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	1.84	1.74	0.0143	5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.40	2.65	0.0421	5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	3.16	1.78	0.0310	5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	2.14	2.06	0.0252	5Y 6/8	Olive Yellow	
	h	No	None	None	E/W	No	Yes	No	1.58	1.66	0.0144	5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	1.39	1.94	0.0128	5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	1.36	1.14	0.0116	5Y 6/8	Olive Yellow	
2107.002	a	No	None	None	E/W	No	Yes	No	3.27	3.08	0.0380	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.66	1.74	0.0122	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	2.82	2.19	0.0259	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	1.87	1.23	0.0168	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	2.48	2.76	0.0295	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.17	1.55	0.0158	2.5Y 7/8	Yellow	
2116.009	a	No	None	None	E/W	No	Yes	No	0.99	0.64	0.0030	5Y 7/8	Yellow	
2120.006	a	No	None	None	E/W	No	Yes	No	2.12	2.34	0.0250	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.84	2.40	0.0197	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.79	2.24	0.0151	2.5Y 7/8	Yellow	
2121.006	a	No	None	None	E/W	No	Yes	No	1.88	2.51	0.0268	5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	2.11	3.18	0.0282	5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	2.06	1.42	0.0130	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	3.35	2.06	0.0191	5Y 6/8	Olive Yellow	
2156.004	a	No	None	None	E/W	No	Yes	No	1.66	3.88	0.0653	2.5Y 6/8	Olive Yellow	Devitrified
	b	No	None	None	E/W	No	Yes	No	0.98	1.02	0.0080	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	1.22	1.04	0.0160	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	2.75	2.95	0.0377	2.5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.34	2.39	0.0185	2.5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	2.36	2.17	0.0198	2.5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	2.97	2.47	0.0240	2.5Y 6/8	Olive Yellow	
	h	No	None	None	E/W	No	Yes	No	1.08	3.61	0.0217	2.5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	2.45	2.42	0.0192	2.5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	2.44	2.11	0.0170	2.5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	2.34	2.66	0.0217	2.5Y 6/8	Olive Yellow	
	l	No	None	None	E/W	No	Yes	No	2.68	0.82	0.0067	2.5Y 6/8	Olive Yellow	
	m	No	None	None	E/W	No	Yes	No	0.74	0.85	0.0028	2.5Y 6/8	Olive Yellow	
	n	No	None	None	E/W	No	Yes	No	1.44	1.31	0.0053	2.5Y 6/8	Olive Yellow	
	o	No	None	None	E/W	No	Yes	No	1.03	0.95	0.0078	2.5Y 6/8	Olive Yellow	
	p	No	None	None	E/W	No	Yes	No	0.84	0.96	0.0065	2.5Y 6/8	Olive Yellow	
	q	No	None	None	E/W	No	Yes	No	2.59	1.92	0.0180	2.5Y 6/8	Olive Yellow	
	r	No	None	None	E/W	No	Yes	No	1.31	2.36	0.0175	2.5Y 6/8	Olive Yellow	
	s	No	None	None	E/W	No	Yes	No	2.54	2.09	0.0154	2.5Y 6/8	Olive Yellow	
2156.018	a	No	None	None	E/W	No	Yes	No	3.20	2.16	0.0320	5Y 6/8	Olive Yellow	

2161.001	a	No	None	None	E/W	No	Yes	No	2.75	4.92	0.0959	Gley 2 5/5B	Greyish Blue
2209.004	a	No	None	None	E/W	No	Yes	No	2.16	4.49	0.0582	2.5Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	2.14	2.97	0.0290	2.5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	2.14	2.77	0.0252	2.5Y 6/8	Olive Yellow
	d	No	None	None	E/W	No	Yes	No	2.95	2.79	0.0260	2.5Y 6/8	Olive Yellow
2210.006	a	No	None	None	E/W	No	Yes	No	3.18	3.43	0.0676	2.5Y 7/6	Yellow
	b	No	None	None	E/W	No	Yes	No	2.96	2.01	0.0245	2.5Y 7/6	Yellow
	c	No	None	None	E/W	No	Yes	No	3.01	2.99	0.0451	2.5Y 7/6	Yellow
	d	No	None	None	E/W	No	Yes	No	2.56	3.72	0.0453	2.5Y 7/6	Yellow
	e	No	None	None	E/W	No	Yes	No	1.69	3.86	0.0342	2.5Y 7/6	Yellow
	f	No	None	None	E/W	No	Yes	No	3.36	2.53	0.0450	2.5Y 7/6	Yellow
	g	No	None	None	E/W	No	Yes	No	2.53	3.77	0.0390	2.5Y 7/6	Yellow
2224.008	a	No	None	None	E/W	No	Yes	No	2.44	3.05	0.0371	2.5Y 7/6	Yellow
	b	No	None	None	E/W	No	Yes	No	1.61	2.62	0.0152	2.5Y 7/6	Yellow
	c	No	None	None	E/W	No	Yes	No	1.64	1.15	0.0121	2.5Y 7/6	Yellow
	d	No	None	None	E/W	No	Yes	No	1.46	1.87	0.0131	2.5Y 7/6	Yellow
	e	No	None	None	E/W	No	Yes	No	1.58	1.13	0.0138	2.5Y 7/6	Yellow
	f	No	None	None	E/W	No	Yes	No	1.69	2.14	0.0167	2.5Y 7/6	Yellow
2250.003	a	No	None	None	E/W	No	Yes	No	3.31	2.84	0.0377	2.5 Y 6/8	Olive Yellow
	b	No	None	None	E/W	No	Yes	No	2.92	3.44	0.0366	5Y 6/8	Olive Yellow
	c	No	None	None	E/W	No	Yes	No	4.09	3.54	0.0566	5Y 6/8	Olive Yellow
	d	No	None	None	E/W	No	Yes	No	2.66	3.43	0.0311	5Y 6/8	Olive Yellow
	e	No	None	None	E/W	No	Yes	No	3.12	2.84	0.0322	5Y 6/8	Olive Yellow
	f	No	None	None	E/W	No	Yes	No	3.45	3.03	0.0388	5Y 6/8	Olive Yellow
	g	No	None	None	E/W	No	Yes	No	3.64	2.70	0.0437	5Y 6/8	Olive Yellow
	h	No	None	None	E/W	No	Yes	No	2.90	2.26	0.0263	5Y 6/8	Olive Yellow
	i	No	None	None	E/W	No	Yes	No	2.63	2.13	0.0324	5Y 6/8	Olive Yellow
	j	No	None	None	E/W	No	Yes	No	2.75	2.90	0.0336	5Y 6/8	Olive Yellow
	k	No	None	None	E/W	No	Yes	No	2.84	2.52	0.0261	5Y 7/8	Yellow
	l	No	None	None	E/W	No	Yes	No	3.01	0.97	0.0120	5Y 7/8	Yellow
	m	No	None	None	E/W	No	Yes	No	1.24	1.42	0.0058	5Y 7/8	Yellow
	n	No	None	None	E/W	No	Yes	No	2.53	2.35	0.0285	5Y 6/8	Olive Yellow
	o	No	None	None	E/W	No	Yes	No	3.69	1.77	0.0143	5Y 6/8	Olive Yellow
	p	No	None	None	E/W	No	Yes	No	1.81	1.69	0.0127	5Y 6/8	Olive Yellow
	q	No	None	None	E/W	No	Yes	No	2.80	1.69	0.0175	5Y 6/8	Olive Yellow
	r	No	None	None	E/W	No	Yes	No	2.92	1.49	0.0146	5Y 6/8	Olive Yellow
	s	No	None	None	E/W	No	Yes	No	1.92	1.96	0.0139	5Y 6/8	Olive Yellow
	t	No	None	None	E/W	No	Yes	No	2.50	1.34	0.0101	5Y 6/8	Olive Yellow
	u	No	None	None	E/W	No	Yes	No	1.43	1.18	0.0047	5Y 6/8	Olive Yellow
	v	No	None	None	E/W	No	Yes	No	3.14	3.12	0.0227	5Y 6/8	Olive Yellow
	w	No	None	None	E/W	No	Yes	No	2.01	1.21	0.0119	5Y 6/8	Olive Yellow
	x	No	None	None	E/W	No	Yes	No	1.97	1.85	0.1260	5Y 6/8	Olive Yellow
	y	No	None	None	E/W	No	Yes	No	2.48	1.69	0.0123	5Y 6/8	Olive Yellow
	z	No	None	None	E/W	No	Yes	No	3.10	1.88	0.0192	5Y 6/8	Olive Yellow
	aa	No	None	None	E/W	No	Yes	No	2.96	1.89	0.0163	5Y 6/8	Olive Yellow
	ab	No	None	None	E/W	No	Yes	No	2.44	0.75	0.0056	5Y 6/8	Olive Yellow

	ac	No	None	None	E/W	No	Yes	No	2.42	2.10	0.0190	5Y 7/8	Yellow	
	ad	No	None	None	E/W	No	Yes	No	2.82	2.62	0.0268	5Y 7/8	Yellow	
	ae	No	None	None	E/W	No	Yes	No	3.64	1.87	0.0230	5Y 7/8	Yellow	
	af	No	None	None	E/W	No	Yes	No	2.98	1.57	0.0144	5Y 7/8	Yellow	
	ag	No	None	None	E/W	No	Yes	No	1.78	1.48	0.0072	5Y 7/8	Yellow	
	ah	No	None	None	E/W	No	Yes	No	2.51	1.80	0.0098	5Y 7/8	Yellow	
	ai	No	None	None	E/W	No	Yes	No	2.28	1.16	0.0061	5Y 7/8	Yellow	
	aj	No	None	None	E/W	No	Yes	No	2.75	0.97	0.0072	5Y 7/8	Yellow	
	ak	No	None	None	E/W	No	Yes	No	2.17	0.64	0.0037	5Y 7/8	Yellow	
	al	No	None	None	E/W	No	Yes	No	3.04	1.04	0.0119	5Y 7/8	Yellow	
	am	No	None	None	E/W	No	Yes	No	2.29	0.81	0.0082	5Y 7/8	Yellow	
	an	No	None	None	E/W	No	Yes	No	2.12	1.03	0.0098	5Y 7/8	Yellow	
	ao	No	None	None	E/W	No	Yes	No	1.97	1.06	0.0038	5Y 7/8	Yellow	
	ap	No	None	None	E/W	No	Yes	No	1.54	1.15	0.0047	5Y 7/8	Yellow	
	aq	No	None	None	E/W	No	Yes	No	1.33	0.98	0.0033	5Y 7/8	Yellow	
	ar	No	None	None	E/W	No	Yes	No	2.65	1.89	0.0112	5Y 7/8	Yellow	
	as	No	None	None	E/W	No	Yes	No	3.43	2.21	0.0211	2.5Y 6/8	Olive Yellow	
	at	No	None	None	E/W	No	Yes	No	1.88	1.38	0.0060	5Y 7/8	Yellow	
	au	No	None	None	E/W	No	Yes	No	2.28	1.64	0.0111	5Y 6/8	Yellow	
	av	No	None	None	E/W	No	Yes	No	2.59	1.10	0.0085	5Y 7/8	Yellow	
	aw	No	None	None	E/W	No	Yes	No	2.61	1.57	0.0150	5Y 7/8	Yellow	
	ax	No	None	None	E/W	No	Yes	No	1.57	0.87	0.0073	5Y 7/8	Yellow	
	ay	No	None	None	E/W	No	Yes	No	2.64	1.04	0.0102	5Y 6/8	Olive Yellow	
	az	No	None	None	E/W	No	Yes	No	2.18	1.67	0.0108	5Y 6/8	Olive Yellow	
	ba	No	None	None	E/W	No	Yes	No	1.80	1.64	0.0104	5Y 6/8	Olive Yellow	
	bb	No	None	None	E/W	No	Yes	No	2.02	1.54	0.0058	5Y 6/8	Olive Yellow	
	bc	No	None	None	E/W	No	Yes	No	2.17	1.45	0.0062	5Y 6/8	Olive Yellow	
	bd	No	None	None	E/W	No	Yes	No	1.83	0.85	0.0040	5Y 7/8	Yellow	
	be	No	None	None	E/W	No	Yes	No	1.37	0.72	0.0036	5Y 7/8	Yellow	
	bf	No	None	None	E/W	No	Yes	No	1.68	0.92	0.0013	5Y 6/8	Olive Yellow	
	bg	No	None	None	E/W	No	Yes	No	2.05	0.78	0.0020	5Y 6/8	Olive Yellow	
	bh	No	None	None	E/W	No	Yes	No	1.75	1.02	0.0040	5Y 6/8	Olive Yellow	
	bi	No	None	None	E/W	No	Yes	No	1.33	0.82	0.0044	5Y 6/8	Olive Yellow	
	bj	No	None	None	E/W	No	Yes	No	1.72	1.17	0.0020	5Y 6/8	Olive Yellow	
	bk	No	None	None	E/W	No	Yes	No	1.50	0.89	0.0018	5Y 6/8	Olive Yellow	
	bl	No	None	None	E/W	No	Yes	No	1.26	1.13	0.0050	5Y 6/8	Olive Yellow	
	bm	No	None	None	E/W	No	Yes	No	0.85	0.97	0.0027	5Y 7/8	Yellow	
	bn	No	None	None	E/W	No	Yes	No	0.50	0.42	0.0006	5Y 7/8	Yellow	
2251.006	a	No	None	None	E/W	No	Yes	No	3.85	4.01	0.1851	5Y 7/8	Yellow	Translucent, patinated, concretion
2251.007	a	No	None	None	E/W	No	Yes	No	1.46	2.82	0.0200	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.68	2.67	0.0190	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.67	3.34	0.0260	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	1.91	4.34	0.0550	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.87	3.32	0.0320	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	2.59	4.28	0.0530	2.5Y 7/8	Yellow	
	g	No	None	None	E/W	No	Yes	No	3.29	1.67	0.0310	2.5Y 7/8	Yellow	

	h	No	None	None	E/W	No	Yes	No	0.98	1.42	0.0096	2.5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	2.13	2.32	0.0244	2.5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	0.81	1.12	0.0064	2.5Y 7/8	Yellow	
	k	No	None	None	E/W	No	Yes	No	1.58	1.69	0.0139	2.5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	3.04	2.41	0.0466	2.5Y 7/8	Yellow	
	m	No	None	None	E/W	No	Yes	No	1.69	1.71	0.0153	2.5Y 7/8	Yellow	
	n	No	None	None	E/W	No	Yes	No	0.99	1.13	0.0051	2.5Y 7/8	Yellow	
	o	No	None	None	E/W	No	Yes	No	3.01	2.14	0.0354	2.5Y 7/8	Yellow	
	p	No	None	None	E/W	No	Yes	No	1.58	1.67	0.0128	2.5Y 7/8	Yellow	
	q	No	None	None	E/W	No	Yes	No	2.34	1.46	0.0274	2.5Y 7/8	Yellow	
	r	No	None	None	E/W	No	Yes	No	1.84	1.25	0.0141	2.5Y 7/8	Yellow	
	s	No	None	None	E/W	No	Yes	No	1.74	1.85	0.0172	2.5Y 7/8	Yellow	
	t	No	None	None	E/W	No	Yes	No	0.84	1.47	0.0053	2.5Y 7/8	Yellow	
	u	No	None	None	E/W	No	Yes	No	0.68	1.12	0.0078	2.5Y 7/8	Yellow	
	v	No	None	None	E/W	No	Yes	No	1.12	1.86	0.0127	2.5Y 7/8	Yellow	
	w	No	None	None	E/W	No	Yes	No	3.02	2.84	0.0353	2.5Y 7/8	Yellow	
	x	No	None	None	E/W	No	Yes	No	1.74	1.38	0.0147	2.5Y 7/8	Yellow	
	y	No	None	None	E/W	No	Yes	No	1.45	1.77	0.0108	2.5Y 7/8	Yellow	
	z	No	None	None	E/W	No	Yes	No	1.78	1.94	0.0154	2.5Y 7/8	Yellow	
	aa	No	None	None	E/W	No	Yes	No	1.44	1.35	0.0117	2.5Y 7/8	Yellow	
	ab	No	None	None	E/W	No	Yes	No	1.98	2.04	0.0198	2.5Y 7/8	Yellow	
	ac	No	None	None	E/W	No	Yes	No	1.38	1.66	0.0119	2.5Y 7/8	Yellow	
	ad	No	None	None	E/W	No	Yes	No	1.75	1.03	0.0128	2.5Y 7/8	Yellow	
	ae	No	None	None	E/W	No	Yes	No	1.68	1.70	0.0130	2.5Y 7/8	Yellow	
	af	No	None	None	E/W	No	Yes	No	2.54	1.87	0.0253	2.5Y 7/8	Yellow	
	ag	No	None	None	E/W	No	Yes	No	1.98	1.24	0.0087	2.5Y 7/8	Yellow	
	ah	No	None	None	E/W	No	Yes	No	1.74	2.03	0.0188	2.5Y 7/8	Yellow	
	ai	No	None	None	E/W	No	Yes	No	1.65	1.47	0.0053	2.5Y 7/8	Yellow	
	aj	No	None	None	E/W	No	Yes	No	2.54	2.01	0.0219	2.5Y 7/8	Yellow	
	ak	No	None	None	E/W	No	Yes	No	2.31	1.45	0.0198	2.5Y 7/8	Yellow	
	al	No	None	None	E/W	No	Yes	No	1.46	2.06	0.0153	2.5Y 7/8	Yellow	
	am	No	None	None	E/W	No	Yes	No	1.87	1.21	0.0084	2.5Y 7/8	Yellow	
	an	No	None	None	E/W	No	Yes	No	1.94	1.33	0.0099	2.5Y 7/8	Yellow	
	ao	No	None	None	E/W	No	Yes	No	2.20	1.84	0.0143	2.5Y 7/8	Yellow	
	ap	No	None	None	E/W	No	Yes	No	3.02	2.45	0.0384	2.5Y 7/8	Yellow	
	aq	No	None	None	E/W	No	Yes	No	1.88	2.04	0.0116	2.5Y 7/8	Yellow	
	ar	No	None	None	E/W	No	Yes	No	1.94	1.12	0.0097	2.5Y 7/8	Yellow	
	as	No	None	None	E/W	No	Yes	No	1.23	2.04	0.0146	2.5Y 7/8	Yellow	
	at	No	None	None	E/W	No	Yes	No	1.33	1.78	0.0103	2.5Y 7/8	Yellow	
	au	No	None	None	E/W	No	Yes	No	1.69	1.21	0.0057	2.5Y 7/8	Yellow	
2251.023	a	No	None	None	E/W	No	Yes	No	1.40	2.13	0.0187	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	3.04	2.54	0.0362	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	2.45	1.89	0.0310	2.5Y 7/8	Yellow	
2346.010	a	No	None	None	E/W	No	Yes	No	3.15	1.53	0.0402	5Y 7/8	Yellow	Devitrified, concreted, glass barely visible
	b	No	None	None	E/W	No	Yes	No	2.44	2.93	0.0289	2.5Y 6/8	Olive Yellow	

	c	No	None	None	E/W	No	Yes	No	2.57	3.20	0.0419	2.5Y 6/8	Olive Yellow
	d	No	None	None	E/W	No	Yes	No	1.80	1.65	0.0080	2.5Y 6/8	Olive Yellow
	e	No	None	None	E/W	No	Yes	No	2.96	3.07	0.0336	2.5Y 6/8	Olive Yellow
	f	No	None	None	E/W	No	Yes	No	1.22	1.80	0.0051	2.5Y 6/8	Olive Yellow
	g	No	None	None	E/W	No	Yes	No	1.46	1.16	0.0063	2.5Y 6/8	Olive Yellow
	h	No	None	None	E/W	No	Yes	No	2.57	3.12	0.0234	2.5Y 6/8	Olive Yellow
	i	No	None	None	E/W	No	Yes	No	1.95	2.81	0.0176	2.5Y 6/8	Olive Yellow
	j	No	None	None	E/W	No	Yes	No	1.42	2.83	0.0185	2.5Y 6/8	Olive Yellow
	k	No	None	None	E/W	No	Yes	No	1.13	2.67	0.0101	2.5Y 6/8	Olive Yellow
	l	No	None	None	E/W	No	Yes	No	2.73	2.03	0.0125	2.5Y 6/8	Olive Yellow
	m	No	None	None	E/W	No	Yes	No	2.92	1.99	0.0172	2.5Y 6/8	Olive Yellow
	n	No	None	None	E/W	No	Yes	No	1.85	1.92	0.0095	5Y 7/8	Yellow
	o	No	None	None	E/W	No	Yes	No	1.76	1.99	0.0102	2.5Y 6/8	Olive Yellow
	p	No	None	None	E/W	No	Yes	No	1.95	1.48	0.0061	5Y 7/8	Yellow
	q	No	None	None	E/W	No	Yes	No	2.34	1.98	0.0116	2.5Y 6/8	Olive Yellow
	r	No	None	None	E/W	No	Yes	No	1.11	2.35	0.0104	5Y 7/8	Yellow
	s	No	None	None	E/W	No	Yes	No	1.90	2.26	0.0180	2.5Y 6/8	Olive Yellow
	t	No	None	None	E/W	No	Yes	No	2.02	1.79	0.0093	2.5Y 6/8	Olive Yellow
	u	No	None	None	E/W	No	Yes	No	3.09	1.64	0.0314	5Y 6/8	Olive Yellow
	v	No	None	None	E/W	No	Yes	No	2.51	2.13	0.0245	5Y 6/8	Olive Yellow
	w	No	None	None	E/W	No	Yes	No	1.23	1.47	0.0198	5Y 6/8	Olive Yellow
	x	No	None	None	E/W	No	Yes	No	0.95	1.16	0.0067	5Y 6/8	Olive Yellow
	y	No	None	None	E/W	No	Yes	No	1.53	1.31	0.0082	5Y 6/8	Olive Yellow
2419.004	a	No	None	None	E/W	None	Yes	No	1.85	3.25	0.0135	5Y 7/8	Yellow
	b	No	None	None	E/W	None	Yes	No	2.54	3.04	0.0249	5Y 7/8	Yellow
	c	No	None	None	E/W	None	Yes	No	1.93	2.78	0.0113	5Y 7/8	Yellow
	d	No	None	None	E/W	None	Yes	No	3.62	2.64	0.0220	5Y 7/8	Yellow
	e	No	None	None	E/W	None	Yes	No	3.18	2.82	0.0304	5Y 7/8	Yellow
	f	No	None	None	E/W	None	Yes	No	2.24	1.94	0.0164	5Y 7/8	Yellow
	g	No	None	None	E/W	None	Yes	No	1.46	1.87	0.0102	5Y 7/8	Yellow
	h	No	None	None	E/W	None	Yes	No	2.37	2.05	0.0238	5Y 7/8	Yellow
2420.006	a	No	None	None	E/W	None	Yes	No	1.94	2.32	0.0113	5Y 7/8	Yellow
	b	No	None	None	E/W	None	Yes	No	1.17	1.84	0.0098	5Y 7/8	Yellow
	c	No	None	None	E/W	None	Yes	No	2.45	3.04	0.0240	5Y 7/8	Yellow
	d	No	None	None	E/W	None	Yes	No	1.93	2.31	0.0147	5Y 7/8	Yellow
	e	No	None	None	E/W	None	Yes	No	1.85	1.27	0.0130	5Y 7/8	Yellow
	f	No	None	None	E/W	None	Yes	No	2.31	1.70	0.0118	5Y 7/8	Yellow
	g	No	None	None	E/W	None	Yes	No	2.15	1.85	0.0192	5Y 7/8	Yellow
	h	No	None	None	E/W	None	Yes	No	1.40	2.63	0.0101	5Y 7/8	Yellow
2468.003	a	No	None	None	E/W	None	Yes	No	3.62	2.02	0.0441	5Y 7/8	Yellow
	b	No	None	None	E/W	None	Yes	No	2.44	1.95	0.0129	5Y 7/8	Yellow
	c	No	None	None	E/W	None	Yes	No	2.11	1.52	0.0122	5Y 7/8	Yellow
	d	No	None	None	E/W	None	Yes	No	1.72	2.11	0.0172	5Y 7/8	Yellow
2476.004	a	No	None	None	E/W	None	Yes	No	2.05	1.37	0.0080	5Y 7/8	Yellow
2477.005	a	No	None	None	E/W	None	Yes	No	1.57	1.93	0.0109	2.5Y 7/8	Yellow
2478.006	a	No	None	None	E/W	None	Yes	No	2.64	2.01	0.0210	5Y 7/8	Yellow

	b	No	None	None	E/W	None	Yes	No	1.23	1.05	0.0063	5Y 7/8	Yellow
	c	No	None	None	E/W	None	Yes	No	2.20	2.50	0.0108	5Y 7/8	Yellow
	d	No	None	None	E/W	None	Yes	No	3.02	3.28	0.0339	5Y 7/8	Yellow
2479.013	a	No	None	None	E/W	None	Yes	No	4.23	2.69	0.0429	5Y 6/8	Olive Yellow
	b	No	None	None	E/W	None	Yes	No	3.32	2.05	0.0210	5Y 6/8	Olive Yellow
	c	No	None	None	E/W	None	Yes	No	3.15	2.97	0.0298	5Y 6/8	Olive Yellow
	d	No	None	None	E/W	None	Yes	No	2.99	2.29	0.0215	5Y 6/8	Olive Yellow
	e	No	None	None	E/W	None	Yes	No	1.23	1.08	0.0013	5Y 6/8	Olive Yellow
	f	No	None	None	E/W	None	Yes	No	1.72	2.32	0.0124	5Y 6/8	Olive Yellow
	g	No	None	None	E/W	None	Yes	No	1.98	1.79	0.0150	5Y 6/8	Olive Yellow
	h	No	None	None	E/W	None	Yes	No	2.05	2.41	0.0134	5Y 6/8	Olive Yellow
	i	No	None	None	E/W	None	Yes	No	1.74	2.50	0.0210	5Y 6/8	Olive Yellow
	j	No	None	None	E/W	None	Yes	No	1.42	1.68	0.0118	5Y 6/8	Olive Yellow
	k	No	None	None	E/W	None	Yes	No	2.24	2.08	0.0243	5Y 6/8	Olive Yellow
	l	No	None	None	E/W	None	Yes	No	2.32	2.15	0.0192	5Y 6/8	Olive Yellow
	m	No	None	None	E/W	None	Yes	No	1.79	1.21	0.0072	5Y 6/8	Olive Yellow
	n	No	None	None	E/W	None	Yes	No	2.64	1.14	0.0102	5Y 6/8	Olive Yellow
	o	No	None	None	E/W	None	Yes	No	3.48	1.89	0.0319	5Y 6/8	Olive Yellow
	p	No	None	None	E/W	None	Yes	No	3.01	2.76	0.0298	5Y 6/8	Olive Yellow
	q	No	None	None	E/W	None	Yes	No	2.57	2.24	0.0270	5Y 6/8	Olive Yellow
	r	No	None	None	E/W	None	Yes	No	2.05	1.84	0.0092	5Y 6/8	Olive Yellow
2480.008	a	No	None	None	E/W	None	Yes	No	2.31	2.26	0.0320	5Y 7/8	Yellow
	b	No	None	None	E/W	None	Yes	No	2.33	3.75	0.0238	5Y 7/8	Yellow
	c	No	None	None	E/W	None	Yes	No	2.05	2.78	0.0320	5Y 7/8	Yellow
	d	No	None	None	E/W	None	Yes	No	2.15	2.31	0.0125	5Y 7/8	Yellow
	e	No	None	None	E/W	None	Yes	No	2.01	1.70	0.0150	5Y 7/8	Yellow
	f	No	None	None	E/W	None	Yes	No	2.30	4.10	0.0460	5Y 7/8	Yellow
	g	No	None	None	E/W	None	Yes	No	2.08	3.96	0.032	5Y 7/8	Yellow
	h	No	None	None	E/W	None	Yes	No	1.85	1.27	0.0040	5Y 7/8	Yellow
	i	No	None	None	E/W	None	Yes	No	2.33	2.18	0.0121	5Y 7/8	Yellow
	j	No	None	None	E/W	None	Yes	No	1.23	1.79	0.0099	5Y 7/8	Yellow
	k	No	None	None	E/W	None	Yes	No	1.39	1.84	0.0013	5Y 7/8	Yellow
	l	No	None	None	E/W	None	Yes	No	2.24	1.87	0.0120	5Y 7/8	Yellow
	m	No	None	None	E/W	None	Yes	No	1.53	1.79	0.0040	5Y 7/8	Yellow
	n	No	None	None	E/W	None	Yes	No	2.31	1.70	0.0044	5Y 7/8	Yellow
	o	No	None	None	E/W	None	Yes	No	2.68	2.92	0.0220	5Y 7/8	Yellow
	p	No	None	None	E/W	None	Yes	No	2.88	3.18	0.0318	5Y 7/8	Yellow
	q	No	None	None	E/W	None	Yes	No	1.54	1.22	0.0113	5Y 7/8	Yellow
	r	No	None	None	E/W	None	Yes	No	1.84	1.45	0.0020	5Y 7/8	Yellow
	s	No	None	None	E/W	None	Yes	No	1.74	2.03	0.0240	5Y 7/8	Yellow
	t	No	None	None	E/W	None	Yes	No	1.52	1.32	0.0044	5Y 7/8	Yellow
	u	No	None	None	E/W	None	Yes	No	1.77	1.18	0.0020	5Y 7/8	Yellow
	v	No	None	None	E/W	None	Yes	No	1.89	1.42	0.0109	5Y 7/8	Yellow
	w	No	None	None	E/W	None	Yes	No	1.23	2.10	0.0198	5Y 7/8	Yellow
	x	No	None	None	E/W	None	Yes	No	3.02	2.98	0.0318	5Y 7/8	Yellow
	y	No	None	None	E/W	None	Yes	No	2.51	2.13	0.0185	5Y 7/8	Yellow

	z	No	None	None	E/W	None	Yes	No	1.46	1.79	0.0147	5Y 7/8	Yellow	
	aa	No	None	None	E/W	None	Yes	No	2.51	1.48	0.0130	5Y 7/8	Yellow	
	ab	No	None	None	E/W	None	Yes	No	1.26	1.78	0.0118	5Y 7/8	Yellow	
	ac	No	None	None	E/W	None	Yes	No	3.20	2.87	0.0216	5Y 7/8	Yellow	
	ad	No	None	None	E/W	None	Yes	No	1.65	1.21	0.0101	5Y 7/8	Yellow	
	ae	No	None	None	E/W	None	Yes	No	1.85	1.42	0.0102	5Y 7/8	Yellow	
	af	No	None	None	E/W	None	Yes	No	1.74	2.53	0.0239	5Y 7/8	Yellow	
	ag	No	None	None	E/W	None	Yes	No	1.92	1.79	0.0122	5Y 7/8	Yellow	
	ah	No	None	None	E/W	None	Yes	No	1.88	2.24	0.0172	5Y 7/8	Yellow	
	ai	No	None	None	E/W	None	Yes	No	1.79	2.51	0.0080	5Y 7/8	Yellow	
	aj	No	None	None	E/W	None	Yes	No	2.76	3.18	0.0109	5Y 7/8	Yellow	
2570.01	a	No	None	None	E/W	None	Yes	No	1.78	3.93	0.045	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	3.69	2.45	0.045	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	3.18	3.25	0.034	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.59	3.65	0.045	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	3.81	2.63	0.04	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	2.99	2.62	0.037	2.5Y 7/8	Yellow	
2571.009	a	No	None	None	E/W	None	Yes	No	2.71	4.20	0.047	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	3.36	1.66	0.032	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.24	1.74	0.0152	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.65	2.06	0.0210	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	1.94	2.24	0.0191	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	2.24	1.87	0.0121	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	0.95	1.02	0.0068	5Y 7/8	Yellow	
2591.003	a	No	None	None	E/W	None	Yes	No	3.36	1.86	0.032	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.97	1.89	0.022	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.37	1.84	0.021	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.99	1.79	0.0116	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	1.21	1.03	0.0098	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	1.94	2.18	0.0811	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	1.46	1.33	0.0116	5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	1.24	1.13	0.0143	5Y 7/8	Yellow	
	i	No	None	None	E/W	None	Yes	No	2.53	2.76	0.0274	5Y 7/8	Yellow	
	j	No	None	None	E/W	None	Yes	No	2.45	2.14	0.0216	5Y 7/8	Yellow	
	k	No	None	None	E/W	None	Yes	No	1.23	1.54	0.0097	5Y 7/8	Yellow	
	l	No	None	None	E/W	None	Yes	No	1.11	1.36	0.0146	5Y 7/8	Yellow	
	m	No	None	None	E/W	None	Yes	No	1.54	1.88	0.0099	5Y 7/8	Yellow	
	n	No	None	None	E/W	None	Yes	No	2.68	2.45	0.0235	5Y 7/8	Yellow	
	o	No	None	None	E/W	None	Yes	No	1.24	1.56	0.0214	5Y 7/8	Yellow	
2592.003	a	No	None	None	E/W	No	Yes	No	3.55	4.43	0.0602	5Y 6/8	Olive Yellow	Very concreted and patinated
	b	No	None	None	E/W	No	Yes	No	1.74	3.68	0.1553	5Y 6/8	Olive Yellow	Mended during conservation
	c	No	None	None	E/W	No	Yes	No	2.90	2.54	0.0211	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	2.13	3.19	0.0261	5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.01	2.74	0.0168	5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	2.14	1.94	0.0145	5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	2.23	2.20	0.0178	5Y 6/8	Olive Yellow	

	h	No	None	None	E/W	No	Yes	No	2.05	2.39	0.0177	5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	1.47	2.12	0.0125	5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	1.70	1.51	0.0075	5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	1.30	2.03	0.0087	5Y 6/8	Olive Yellow	
	l	No	None	None	E/W	No	Yes	No	1.24	1.96	0.0062	5Y 6/8	Olive Yellow	
	m	No	None	None	E/W	No	Yes	No	1.52	1.17	0.0040	5Y 6/8	Olive Yellow	
	n	No	None	None	E/W	No	Yes	No	1.15	1.72	0.0031	5Y 6/8	Olive Yellow	
	o	No	None	None	E/W	No	Yes	No	1.25	2.29	0.0053	5Y 6/8	Olive Yellow	
	p	No	None	None	E/W	No	Yes	No	1.47	1.74	0.0061	5Y 6/8	Olive Yellow	
	q	No	None	None	E/W	No	Yes	No	1.23	1.40	0.0047	5Y 6/8	Olive Yellow	
	r	No	None	None	E/W	No	Yes	No	1.09	0.63	0.0018	5Y 6/8	Olive Yellow	
	s	No	None	None	E/W	No	Yes	No	1.33	2.21	0.0068	5Y 6/8	Olive Yellow	
	t	No	None	None	E/W	No	Yes	No	0.90	0.92	0.0014	5Y 6/8	Olive Yellow	
2650.004	a	No	None	None	E/W	None	Yes	No	2.95	2.15	0.0124	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	3.42	2.93	0.0319	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.16	1.91	0.0084	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.50	2.18	0.0192	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	2.63	2.24	0.0185	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	3.18	2.99	0.0319	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	1.79	2.82	0.0107	5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	1.14	1.46	0.0112	5Y 7/8	Yellow	
2651.006	a	No	None	None	E/W	None	Yes	No	2.07	1.97	0.015	5Y 6/8	Olive Yellow	
2693.003	a	No	None	None	E/W	None	Yes	No	2.68	2.05	0.028	2.5Y 7/8	Yellow	
2694.002	a	No	None	None	E/W	None	Yes	No	2.26	1.17	0.006	5Y 7/8	Yellow	
2701.003	a	No	None	None	E/W	None	Yes	No	2.44	1.34	0.008	2.5Y 6/1	Gray	Graying is due to concretion and patina, actual color of bead is yellow
2705.005	a	No	None	None	E/W	No	Yes	No	3.56	4.36	0.1668	5Y 7/8	Yellow	broken, some concretion patination
	b	No	None	None	E/W	No	Yes	No	3.23	3.33	0.0448	5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	2.24	4.67	0.0695	5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	1.73	3.22	0.0289	5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	3.32	3.86	0.0469	5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	2.57	3.96	0.0471	5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	3.21	0.90	0.0188	5Y 7/8	Yellow	
	h	No	None	None	E/W	No	Yes	No	2.74	2.77	0.0242	5Y 7/8	Yellow	
	i	No	None	None	E/W	No	Yes	No	2.54	1.93	0.0179	5Y 7/8	Yellow	
	j	No	None	None	E/W	No	Yes	No	2.63	2.17	0.0203	5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	2.21	2.19	0.0136	5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	2.64	2.42	0.0211	5Y 7/8	Yellow	
	m	No	None	None	E/W	No	Yes	No	2.61	2.54	0.0182	5Y 7/8	Yellow	
	n	No	None	None	E/W	No	Yes	No	2.78	2.95	0.0298	5Y 7/6	Yellow	
	o	No	None	None	E/W	No	Yes	No	1.88	3.02	0.0148	5Y 7/8	Yellow	
	p	No	None	None	E/W	No	Yes	No	2.19	2.80	0.0215	5Y 6/8	Olive Yellow	
	q	No	None	None	E/W	No	Yes	No	3.03	1.39	0.0229	5Y 7/8	Yellow	
	r	No	None	None	E/W	No	Yes	No	2.25	2.22	0.0147	5Y 6/8	Olive Yellow	
	s	No	None	None	E/W	No	Yes	No	2.07	1.83	0.0101	5Y 7/8	Yellow	
	t	No	None	None	E/W	No	Yes	No	1.75	1.89	0.0123	5Y 7/8	Yellow	

	u	No	None	None	E/W	No	Yes	No	2.31	1.31	0.0116	5Y 7/8	Yellow	
	v	No	None	None	E/W	No	Yes	No	1.81	1.74	0.0055	5Y 7/8	Yellow	
	w	No	None	None	E/W	No	Yes	No	2.37	1.55	0.0079	5Y 7/8	Yellow	
	x	No	None	None	E/W	No	Yes	No	1.61	1.41	0.0059	5Y 7/8	Yellow	
	y	No	None	None	E/W	No	Yes	No	2.10	0.46	0.0024	5Y 7/8	Yellow	
	z	No	None	None	E/W	No	Yes	No	1.23	0.97	0.0044	5Y 7/8	Yellow	
	aa	No	None	None	E/W	No	Yes	No	1.42	0.80	0.0023	5Y 7/8	Yellow	
	ab	No	None	None	E/W	No	Yes	No	1.57	1.30	0.0055	5Y 7/8	Yellow	
	ac	No	None	None	E/W	No	Yes	No	0.76	1.22	0.0012	5Y 7/8	Yellow	
	ad	No	None	None	E/W	No	Yes	No	1.14	0.66	0.0015	5Y 7/8	Yellow	
	ae	No	None	None	E/W	No	Yes	No	1.20	0.45	0.0019	5Y 7/8	Yellow	
	af	No	None	None	E/W	No	Yes	No	1.11	1.22	0.0033	5Y 7/8	Yellow	
	ag	No	None	None	E/W	No	Yes	No	1.55	0.70	0.0024	5Y 7/8	Yellow	
	ah	No	None	None	E/W	None	Yes	No	3.96	3.41	0.0329	5Y 7/8	Yellow	
2722.017	a	No	None	None	E/W	None	Yes	No	2.13	1.59	0.0113	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.67	1.94	0.0162	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.24	1.98	0.0193	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	1.84	2.20	0.0164	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	2.94	3.25	0.0301	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	2.85	2.50	0.0283	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	1.87	1.48	0.0190	5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	2.24	2.02	0.0270	5Y 7/8	Yellow	
	i	No	None	None	E/W	None	Yes	No	1.69	1.54	0.0111	5Y 7/8	Yellow	
	j	No	None	None	E/W	None	Yes	No	2.76	2.33	0.0249	5Y 7/8	Yellow	
	k	No	None	None	E/W	None	Yes	No	1.88	1.79	0.0160	5Y 7/8	Yellow	
	l	No	None	None	E/W	None	Yes	No	2.24	2.31	0.0237	5Y 7/8	Yellow	
	m	No	None	None	E/W	None	Yes	No	1.46	2.06	0.0164	5Y 7/8	Yellow	
	n	No	None	None	E/W	None	Yes	No	1.87	1.21	0.0120	5Y 7/8	Yellow	
	o	No	None	None	E/W	None	Yes	No	1.94	1.33	0.0094	5Y 7/8	Yellow	
	p	No	None	None	E/W	None	Yes	No	2.20	1.84	0.0102	5Y 7/8	Yellow	
2723.009	a	No	None	None	E/W	None	Yes	No	3.02	2.45	0.0238	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.88	2.04	0.0141	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.74	1.26	0.0082	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.51	2.03	0.0192	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	3.18	2.87	0.0311	5Y 7/8	Yellow	
2756.006	a	No	None	None	E/W	No	Yes	No	2.70	4.77	0.0919	5Y 2.5/1	Black	Very broken and patinated, color may be off due to patination
	b	No	None	None	E/W	No	Yes	No	0.91	3.41	0.0254	5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	1.25	1.80	0.0060	5Y 7/8	Yellow	
	d	No	None	None	E/W	No	Yes	No	3.44	1.80	0.0146	5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.90	2.30	0.0143	5Y 7/8	Yellow	
	f	No	None	None	E/W	No	Yes	No	1.81	2.97	0.0119	5Y 6/8	Olive Yellow	
2757.021	a	No	None	None	E/W	None	Yes	No	1.17	1.55	0.0166	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	0.86	1.26	0.0106	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.25	2.50	0.0178	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.10	2.36	0.0152	5Y 7/8	Yellow	

	e	No	None	None	E/W	None	Yes	No	1.84	1.79	0.0103	5Y 7/8	Yellow	
2852.003	a	No	None	None	E/W	No	Yes	No	3.18	4.81	0.0848	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	3.08	4.68	0.0682	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	No	Yes	No	2.51	2.76	0.0237	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	2.07	2.45	0.0127	2.5Y 6/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	1.72	1.79	0.0117	2.5Y 6/8	Olive Yellow	
	f	No	None	None	E/W	No	Yes	No	2.46	2.09	0.0144	2.5Y 6/8	Olive Yellow	
	g	No	None	None	E/W	No	Yes	No	2.49	1.80	0.0124	2.5Y 6/8	Olive Yellow	
	h	No	None	None	E/W	No	Yes	No	1.35	2.48	0.0080	2.5Y 6/8	Olive Yellow	
	i	No	None	None	E/W	No	Yes	No	2.44	1.47	0.0094	2.5Y 6/8	Olive Yellow	
	j	No	None	None	E/W	No	Yes	No	1.99	1.07	0.0065	2.5Y 6/8	Olive Yellow	
	k	No	None	None	E/W	No	Yes	No	1.95	1.34	0.0063	2.5Y 7/8	Yellow	
	l	No	None	None	E/W	No	Yes	No	1.21	1.06	0.0027	2.5Y 7/8	Yellow	
	m	No	None	None	E/W	No	Yes	No	2.29	0.55	0.0036	2.5Y 7/8	Yellow	
	n	No	None	None	E/W	No	Yes	No	1.43	1.09	0.0250	2.5Y 7/8	Yellow	
	o	No	None	None	E/W	No	Yes	No	1.66	1.01	0.0017	2.5Y 7/8	Yellow	
	p	No	None	None	E/W	No	Yes	No	0.80	0.53	0.0001	2.5Y 7/8	Yellow	
	q	No	None	None	E/W	No	Yes	No	1.96	0.75	0.0025	2.5Y 6/8	Olive Yellow	
	r	No	None	None	E/W	No	Yes	No	1.14	1.44	0.2400	2.5Y 6/8	Olive Yellow	
	s	No	None	None	E/W	No	Yes	No	1.53	0.88	0.0031	2.5Y 6/8	Olive Yellow	
	t	No	None	None	E/W	No	Yes	No	1.39	1.25	0.0074	2.5Y 6/8	Olive Yellow	
	u	No	None	None	E/W	No	Yes	No	1.81	1.62	0.0075	2.5Y 6/8	Olive Yellow	
	v	No	None	None	E/W	No	Yes	No	1.47	1.22	0.0024	2.5Y 6/8	Olive Yellow	
	w	No	None	None	E/W	No	Yes	No	1.58	1.80	0.0052	2.5Y 6/8	Olive Yellow	
	x	No	None	None	E/W	No	Yes	No	1.35	0.78	0.0035	2.5Y 6/8	Olive Yellow	
	y	No	None	None	E/W	No	Yes	No	1.61	1.15	0.0012	2.5Y 6/8	Olive Yellow	
	z	No	None	None	E/W	No	Yes	No	1.80	0.84	0.0038	2.5Y 6/8	Olive Yellow	
2853.006	a	No	None	None	E/W	None	Yes	No	2.69	2.45	0.0330	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.20	1.84	0.0219	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.42	1.79	0.0115	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	1.84	2.20	0.0205	2.5Y 7/8	Yellow	
2891.004	a	No	None	None	E/W	None	Yes	Yes	0.84	0.96	0.0032	2.5Y 8/1	White	Fragment a contains entire diameter of bead and half of length. Clear casing is present. All beads are of 1 bead
	b	No	None	None	E/W	None	Yes	Yes	1.98	2.24	0.0092	2.5Y 8/1	White	
	c	No	None	None	E/W	None	Yes	Yes	1.79	2.20	0.0116	2.5Y 8/1	White	
2897.005	a	No	None	None	E/W	None	Yes	No	0.98	1.21	0.006	5Y 7/8	Yellow	
2898.006	a	No	None	None	E/W	No	Yes	No	2.26	4.60	0.1321	2.5Y 6/8	Olive Yellow	concretion patination Mended during conservation
	b	No	None	None	E/W	No	Yes	No	4.14	5.49	0.3589	2.5Y 6/8	Olive Yellow	concretion, patination
	c	No	None	None	E/W	No	Yes	No	2.46	3.19	0.0297	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	1.77	1.60	0.0113	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	No	Yes	No	0.94	1.12	0.0027	2.5Y 7/8	Yellow	
2905.003	a	No	None	None	E/W	None	Yes	No	2.24	2.68	0.0212	5Y 7/8	Yellow	
2906.007	a	No	None	None	E/W	None	Yes	No	3.29	2.31	0.0310	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.54	2.40	0.0150	5Y 7/8	Yellow	

	c	No	None	None	E/W	None	Yes	No	1.87	2.14	0.011	5Y 7/8	Yellow	
2908.004	a	No	None	None	E/W	None	Yes	No	1.68	1.58	8E-04	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.89	2.97	0.022	5Y 7/8	Yellow	
2914.002	a	No	None	None	E/W	None	Yes	No	1.74	0.95	0.008	5Y 7/8	Yellow	
2916.005	a	No	None	None	E/W	None	Yes	No	1.92	1.79	0.0130	5Y 7/8	Yellow	
2917.004	a	No	None	None	E/W	No	Yes	No	4.24	2.04	0.0761	2.5Y 7/8	Yellow	Broken during examination, now two pieces, inside very degraded
2921.006	a	No	None	None	E/W	None	Yes	No	2.64	1.48	0.021	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.75	3.05	0.031	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.50	1.94	0.0142	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.63	2.26	0.0211	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	1.42	1.84	0.0143	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	2.45	2.24	0.0230	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	1.36	1.24	0.0097	5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	2.21	1.87	0.0114	5Y 7/8	Yellow	
	i	No	None	None	E/W	None	Yes	No	1.92	1.79	0.0190	5Y 7/8	Yellow	
	j	No	None	None	E/W	None	Yes	No	1.74	1.35	0.0131	5Y 7/8	Yellow	
	k	No	None	None	E/W	None	Yes	No	1.87	1.58	0.0096	5Y 7/8	Yellow	
	l	No	None	None	E/W	None	Yes	No	2.98	3.18	0.0293	5Y 7/8	Yellow	
2926.011	a	No	None	None	E/W	No	Yes	No	2.23	2.52	0.0189	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	No	Yes	No	1.12	3.05	0.0166	2.5Y 8/2	Pale Yellow	
2948.010	a	No	None	None	E/W	None	Yes	No	2.68	2.84	0.0236	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.31	1.79	0.0146	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.28	1.48	0.0132	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	1.42	1.72	0.0128	5Y 7/8	Yellow	
2953.007	a	No	None	None	E/W	None	Yes	No	1.25	1.36	0.0102	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	1.25	1.34	0.0091	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.84	2.37	0.0190	5Y 7/8	Yellow	
3019.014	a	No	None	None	E/W	No	Yes	No	2.56	4.13	0.0766	2.5Y 6/8	Olive Yellow	3 pieces from one bead
	b	No	None	None	E/W	No	Yes	No	2.04	1.97	0.0154	2.5Y 6/8	Olive Yellow	3 pieces from one bead
	c	No	None	None	E/W	No	Yes	No	1.96	1.12	0.0063	2.5Y 6/8	Olive Yellow	3 beads from one bead
	d	No	None	None	E/W	None	Yes	No	2.25	2.24	0.016	5Y 7/8	Yellow	
3020.013	a	No	None	None	E/W	No	Yes	No	2.47	4.18	0.1188	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	No	Yes	No	3.68	4.62	0.0928	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	No	Yes	No	3.79	4.10	0.0730	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	No	Yes	No	2.20	3.78	0.0530	2.5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	No	Yes	No	2.19	1.36	0.0087	2.5Y 6/8	Olive Yellow	
3083.008	a	No	None	None	E/W	None	Yes	No	3.39	1.84	0.0201	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	None	Yes	No	1.94	1.46	0.0079	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	None	Yes	No	0.98	1.17	0.0041	2.5Y 6/8	Olive Yellow	
3084.015	a	No	None	None	E/W	None	Yes	No	1.74	2.89	0.0149	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.19	2.60	0.0248	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.51	4.48	0.0580	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	1.84	1.63	0.0191	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	1.98	1.27	0.0129	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	1.79	1.54	0.0109	2.5Y 7/8	Yellow	

	g	No	None	None	E/W	None	Yes	No	1.85	1.42	0.0132	2.5Y 7/8	Yellow	
3178.018	a	No	None	None	E/W	None	Yes	No	3.00	1.59	0.0283	2.5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.56	1.86	0.0233	2.5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.24	1.87	0.0198	2.5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	1.24	1.63	0.0154	2.5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	2.62	2.12	0.0201	2.5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	2.14	1.95	0.0192	2.5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	2.11	1.92	0.0154	2.5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	2.50	2.13	0.0293	2.5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	2.24	1.92	0.0177	2.5Y 7/8	Yellow	
	i	No	None	None	E/W	None	Yes	No	1.49	1.96	0.0030	5Y 7/8	Yellow	
3233.020	a	No	None	None	E/W	None	Yes	No	0.96	1.02	0.0083	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.33	2.18	0.0121	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.94	1.33	0.0134	5Y 7/8	Yellow	
	d	No	None	None	E/W	None	Yes	No	2.20	1.84	0.0185	5Y 7/8	Yellow	
	e	No	None	None	E/W	None	Yes	No	1.35	1.48	0.0088	5Y 7/8	Yellow	
	f	No	None	None	E/W	None	Yes	No	1.79	1.49	0.0096	5Y 7/8	Yellow	
	g	No	None	None	E/W	None	Yes	No	1.63	1.45	0.0102	5Y 7/8	Yellow	
	h	No	None	None	E/W	None	Yes	No	2.41	2.65	0.0264	5Y 7/8	Yellow	
	i	No	None	None	E/W	None	Yes	No	1.95	1.43	0.0098	5Y 7/8	Yellow	
	j	No	None	None	E/W	None	Yes	No	3.98	2.56	0.0253	5Y 6/8	Olive Yellow	
3297.001	a	No	None	None	E/W	None	Yes	No	2.31	1.95	0.0131	2.5Y 3/2	Very dark grayish brown	Concreted, concretion may be skewing color
3306.006	a	No	None	None	E/W	None	Yes	No	1.45	1.67	0.0083	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	3.72	2.53	0.0295	2.5Y 6/8	Olive Yellow	
3323.012	a	No	None	None	E/W	No	Yes	No	1.86	3.78	0.0275	10YR 2/1	Black	Patinated
3323.013	a	No	None	None	E/W	None	Yes	No	2.50	2.45	0.0192	2.5Y 6/8	Olive Yellow	
	b	No	None	None	E/W	None	Yes	No	2.25	2.37	0.0204	2.5Y 6/8	Olive Yellow	
	c	No	None	None	E/W	None	Yes	No	1.26	1.37	0.0123	2.5Y 6/8	Olive Yellow	
	d	No	None	None	E/W	None	Yes	No	2.24	2.76	0.0198	2.5Y 6/8	Olive Yellow	
	e	No	None	None	E/W	None	Yes	No	1.46	1.82	0.0139	5Y 7/8	Yellow	
3335.022	a	No	None	None	E/W	No	Yes	No	1.78	3.02	0.0186	2.5Y 6/8	Olive Yellow	Two beads in this number make one whole bead
	b	No	None	None	E/W	No	Yes	No	1.78	2.62	0.0162	2.5Y 6/8	Olive Yellow	Two beads in this number make one whole bead
3400.021	a	No	None	None	E/W	No	Yes	No	2.17	1.49	0.0606	2.5Y 6/8	Olive Yellow	
3400.022	a	No	None	None	E/W	None	Yes	No	1.62	1.84	0.0320	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	2.14	1.87	0.0219	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	1.58	1.14	0.0076	5Y 7/8	Yellow	
3876.012	a	No	None	None	E/W	None	Yes	No	2.63	1.79	0.0119	5Y 7/8	Yellow	
	b	No	None	None	E/W	None	Yes	No	3.18	2.75	0.0134	5Y 7/8	Yellow	
	c	No	None	None	E/W	None	Yes	No	2.24	1.87	0.0182	5Y 7/8	Yellow	
4005.009	a	No	None	None	E/W	None	Yes	No	2.24	2.02	0.0199	5Y 7/8	Yellow	