

**ANOTHER KIND OF BEADS:
A FORGOTTEN INDUSTRY OF THE NORTH AMERICAN COLONIAL PERIOD**

by
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ABSTRACT

DUANE EUGENE ESAREY: Another Kind of Beads: A Forgotten Industry of the
North American Colonial Period
(under the direction of C. Margaret Scarry).

This dissertation bears on a minor chapter in the colonial history of northeastern North America. My identification of 39 forms of marine shell ornaments as a unified industry foregrounds the presence of these products across 127 Historic Period archaeological sites in 18 states. I have designated this industry “Standardized Marine Shell” (hereafter SMS). Known almost entirely from archaeological specimens, the significance of these ornaments has proved approachable only through amassing a large analyzable inventory. When SMS is seen as a distinct product from both wampum and Native-modified marine shell ornaments, it can be perceived as a previously undefined industry spanning circa 1635–1710 A.D. The robust and varied SMS industry subsequently gives way to smaller and simpler shell ornament industries continuing into the late 19th century.

After an initial assessment of the colonial setting and characteristics of SMS production, I explore an inventory of 4845 ornaments, verifying this as a bounded industry and clarifying that the primary recipients of these standardized ornaments are the central figures in the 17th century Dutch fur trade network, as represented by 127 archaeological sites. I develop a statistical representation of SMS chronological affiliations that I term “span factored annual percentages” (SFAP) which graph each form’s history, cumulatively illustrating SMS as a commodity. The image that emerges is of a small-scale production and distribution strategy initiated by early settlers in the nascent New Netherland colony.

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The specific idea for this thesis dates to over a decade ago, when Dale Henning showed me a disk runtee from the Blood Run site in western Iowa. Appreciating immediately how out of place this seventeenth century ornament from the Northeast was on the edge of the Great Plains, I was frustrated to learn how little was known of these distinctive products.

I can only list those who contributed specific material aids to this project, some at one point and others in many repetitions over the last decade as I gathered data and perspective: Mary Bade (U. Alabama), Michael Barber (VA-DHR), Timothy Baugh (Chickasaw PHC), Marshall Becker (WCUPA), William Billeck (NMNH-SI), James W. Bradley (ArchLink), Elizabeth Bursick (Franklin and Marshall), Lawrence Conrad (WIU), R. Dustin Cushman (Rowan), R. P. Steven Davis, Jr. (UNC-CH), Dee DeRoche (VA-DHR), Penny Drooker (NYSM), Kathleen Ehrhardt (ISM), Thomas E. Emerson (ISAS), Tom Evans (NMAI), Charles Ewen (ECU), William Fox (Trent U.), William Green (Beloit), George Hamell

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DEDICATION

To Lynn Ceci (1931–1989), who straightened and smoothed this path.
And to my wife Janet, who made it possible for me to walk on it.

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CHAPTER 1

INTRODUCTION

In December 1659 the directors of one of the world's major corporations, the Dutch West India Company, communicated a passing sense of doubt about the economic security of one of their lesser colonies—New Netherland in northeastern North America (NYCD 1853–1887:14:450). Their concern was motivated by reports that the Natives of New Netherland might possibly change their mind about what kind of shell bead they most valued.

These master capitalists administered the business of what was then “*the greatest trading nation in the world.*” In doing so they controlled many of the most lucrative products of the vigorous Atlantic trade, such as the gold and slaves flowing from modern day Ghana (Boxer 1965; Klooster 2009; Postma 1990). Normally their thoughts would have been far removed from a detail as miniscule as a shift in Native preferences from one bead type to another. Yet, in examining the matter of New Netherland's economy at the urging of Pieter Stuyvesant (their local administrator) they found themselves considering exactly that.

Stuyvesant urgently desired that the company put the colony's internal economic dealings on a more secure footing by injecting currency to offset an overt dependence on wampum—tiny marine shell beads then in circulation as the foremost exchange medium among New Netherland colonists. The value of wampum ultimately rested its acceptability in barter to Native groups who provided the furs—a core export of New Netherland.

By refusing Stuyvesant's request, the Directors forced him to further devalue the exchange rate of wampum—the only way to deal with a vast oversupply. If there was too much wampum being made, then let it be devalued. The colonists would have to adjust. But the directors' response also acknowledged a much deeper fear—that wampum's valuation was inherently subject to capricious factors that should be watched closely. They finished their communication saying *“Some merchants here, with whom we have consulted . . . state that the tribes begin to incline towards another kind of beads which they mix with the wampum for the sake of ornament.”*

The directors did not explain their comment. Nor did they describe this new kind of bead or note where it came from. But one can easily imagine the logic of these distant lords of world trade. Since New Netherland's entire exchange system depended on something as subjective as the North American Natives' avid desire for a product very cheaply produced in the colony itself (and for which the value might easily change), then what might keep the colony's entire economy from being subject to renegotiation? And were there not too many furs available at the moment anyway? This colony had already cost them a great deal of money to keep afloat. Might it just be better to let the entire “shell game” play out rather than invest hard cash trying to keep such an inherently unstable enterprise afloat?

Wampum eventually regained its stability. The Native desire for these tiny mass-produced beads persisted another two centuries. In contrast, New Netherland passed to English rule in five more years. The West India Company directors' obscure and distant observation became one of the few documentary records that these once popular beads even existed, much less that it had once been feared they might undermine or complicate

the economic base of an entire colonial enterprise. My study is about this same obscure subject—the now largely forgotten industry that produced “another kind of beads.”

In contrast to their fleeting documentary record, the beads that were becoming increasingly popular by 1659 have been found in a large number of 17th century archaeological sites. But in spite of their ubiquity, archaeologists have developed very little evidence regarding their manufacture, distribution, and meanings. Unlocking the riddle of these ornaments will expose and highlight hidden aspects of regional trade economies and characterize northeastern colonial power relationships in the period before European hegemonies were established. In this sense, my study will illustrate changing power dynamics of the Northeast, bringing intercultural relations of the early colonial period into a new focus via the lens of a little-known, yet powerfully visual material category.

Standardized Marine Shell (hereafter SMS) was a modest scale 17th century shell ornament industry. Dimensional carvings and flattened outline forms of SMS appear in both effigy and geometric shapes and sometimes constitute elaborate composite necklaces (Figures 1.1–1.3; Table 1.1). These ornaments are found at many aboriginal sites in New York, Pennsylvania, New Jersey, and Southern Ontario starting during the second quarter of the 17th century. The simultaneous appearance of distinctive standardized ornaments at numerous archeological sites attributable to a variety of ethnicities begs an explanation couched in the rapid political and economic changes taking place in the earliest decades of the Northeast’s colonial period. Yet even their authorship has not been previously agreed upon or supported by evidence.

Manufacture of these unique ornaments required use of metal drills. This new production technology was accompanied by the appearance of new designs. Not only European



Figure 1.1.

Examples of Standardized Marine Shell ornament forms

- a) Birdman; b) Mask; c-d) Birds; e) Owl; f) Large Goose; g) Goose/Loon;
h) Otter; i) Beaver; j-l) Pelt Types A, B, and C; m) Fish; n) Large Tube; o) Pipe Bead;
p) SMS Gorget; q) Medallion; r-t) Disk Runtees

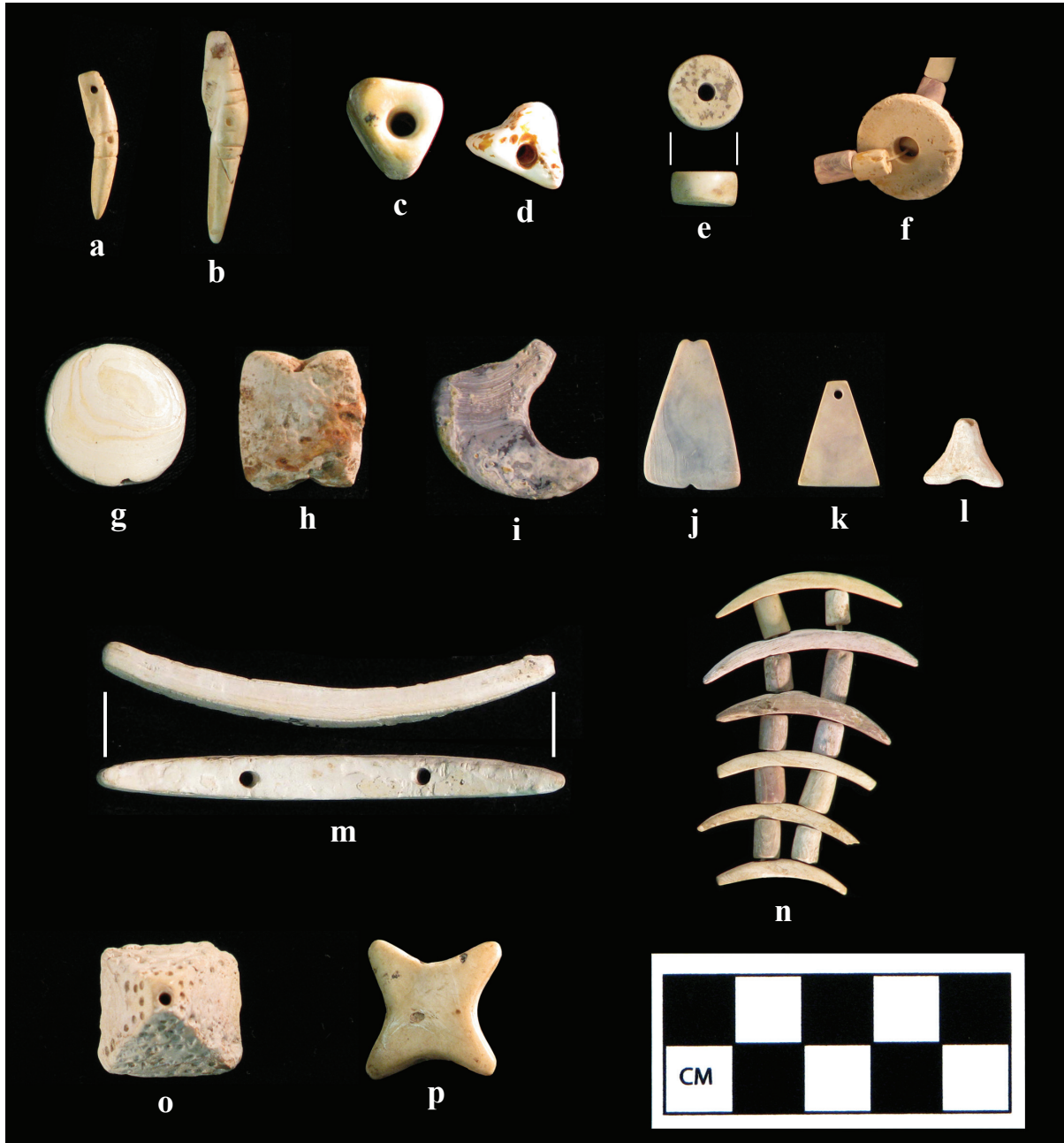


Figure 1.2.

Examples of Standardized Marine Shell ornament forms

- a–b) Bird Head; c–d) Irregular Massive; e) Thick Discoidal;
 f) Flat Discoidal (with wampum); g) Circuloid Runtie; h) Rectanguloid Runtie;
 i) Claw; j) Vertical Drilled Triangle; k) Apical Drilled Triangle; l) Triconcave;
 m) Large Crescent; n) Standard Crescents (with wampum); o) Pyramid; p) Cross/Star



Figure 1.3.
Matched set of disk runtees from Galligan 2 site, Montgomery Co., NY
(Photo courtesy of Wayne Lenig with cooperation of Fort Plain Museum, Fort Plain, NY)

Table 1.1. List of Standardized Marine Shell (SMS) forms

Anthropomorphic Forms	Birdman Human face
Zoomorphic Forms	Generic bird Owl Goose/Loon Large Goose Bird Head Fish Beaver Otter Pelt form A Pelt form B Pelt form C Generic quadruped Turtle Other effigy Snake/Lizard Unidentified effigy
Gorget/Medallion	SMS gorget SMS medallion
Pipes/Tubes	Large tube Standard pipe bead
Runtree Forms	Disk runtee Circuloid runtee Rectanguloid runtee
Triangle Forms	Isosceles—Apical Drilled Isosceles—Vertical Drill Triconcave (aka “Arrowhead”)
Two Hole Crescents	Large Crescent Standard crescent
Other Forms	Claw Star/Cross Geometric Unique Cone/Pyramid
Bead Forms	Flat discoidal Irregular (“massive”) Thick discoidal Ovoid Barrel bead Funnel/tube bead

technology, but European production mentalities and market strategies characterize the organization of SMS manufacture. I will show that SMS ornaments are, in essence, component parts within a persistent centralized production scheme. And yet, the entire industry is closely related to Native senses of value and meaning. Significantly, SMS ornaments appear soon after the first European settlers take residence in New Netherland.

SMS ornaments clearly represent some variety of early cross-cultural colonial interaction—one that necessarily provides an interesting view into early relations between the colonists and Native peoples. Although thousands of SMS ornaments have been collected by antiquarians and in modern archaeological excavations, their poorly recorded contexts and scattered distributions have made them difficult to understand. Without the most basic facts about SMS, there has been no way to choose between possible interpretations. The primary emphasis of my study is thus to assemble and analyze these materials in order to frame the first comprehensive overview of the SMS industry and detail its place in the history of the colonial Northeast.

Why Tell the Story of SMS?

Narratives of colonialism are inescapably told from a particular vantage point. Perspective matters tremendously. Northeastern North America has had no shortage of narratives about its colonial past. Earlier tellings generally attempted a unified story, tending towards archetype and representing a Western cultural perspective. These were efforts to tell *the* story, whether it be a narrative of triumphant conquest or indigenous tragedy, cross-cultural cooperation or conflict, heroic resistance and defense of identity, or progressive acculturative hegemony (e.g., Faragher 1994; Klein 1997; Martin 1987).

More recently, narratives with multiple threads and an abundance of diverse cultural agents populate more local, more ambiguous and, ultimately more enlightening vignettes of social processes. Studies in colonial settings inherently involve cultural interactions, and, if the setting is truly colonialism, must foreground power relations and processes of cultural domination (Alexander 1998; Reinhard 2001). SMS ornaments reside in a set of social relations sometimes seen as foundational to eventual power asymmetries. But over-emphasis on subsequent power relations can drive undue efforts to identify antecedents. This is not a goal here. In fact, production and distribution of SMS ornaments can be taken as evidence of very different, albeit rapidly changing, power asymmetries, in as much as they represent social relations during a time when Native viewpoints and desires were of paramount interest.

The Setting: New Netherland Meets Greater Iroquoia

The emergence of SMS ornaments came quite early in the colonial period of the Northeast. The ornaments that momentarily caught the attention of far off Dutch administrators in 1659 were indeed distinctive. Their story seems to be one of a specific economic opportunity—a production strategy and market niche created by intertwining Native and European settler economies in the early years of the New Netherland colony. Limited production scale and a shared mental template resistant to idiosyncratic executions are characteristics of this industry, which evolved in distinct stages and persisted for generations.

The first decades of the 17th century saw establishment of the earliest viable European settlements at several locations on the continent (Kelly and Smith 2007; Rothschild 2003). Colonization of the Northeast follows close on the heels of these beginnings. The emergence

and much of the tenure of Standardized Marine Shell take place well before the trickle of European settlers became a flood. These early beginnings help us avoid mistaking the creation of a colony (which merely implies interaction) for the subsequent enactment of hegemonic colonial power relations (Stein 2002).

Giving voice to an account of colonial interactions of the Northeast in which Native populations manifest early evidence of subaltern status would be inaccurate, regardless of later power differentials. Kurt Jorden (2009:32) drives this critical point home here in the Northeast. Colonization is the planting of a colony. Colonialism is intercultural domination and it is only one of many possible outcomes of colonization. The Dutch and subsequent English presence in the Northeast certainly moved towards the latter condition, but the social and economic milieu of the former condition still held sway in the mid-17th century. The story of SMS reveals far more than the earliest evidence of a later condition.

Using DuVal's (2006:5) terminology, the story of SMS ornaments unfolds on what was predominately a "native ground"—a cultural landscape where Native peoples possessed much political and economic power and would have seen little reason to accommodate Europeans beyond what directly served their own interests. In such a setting the relatively low numbers of newcomers were politically and economically vulnerable and far more incentivized to develop useful and interactive knowledge about their Native neighbors than their descendants eventually came to be.

This is an important distinction. If the beginnings of a colonial story are told in a way that only illustrates seminal formations of eventual social asymmetries, then archaeologists and historians become mere cataloguers of prologue. As such we might tend to ignore the wide varieties of incentives held by diverse groups and individuals. Seeing history

as emergent and contingent, with disparate events containing the seeds for a multitude of possibilities that did and did not come to fruition, best serves our desire to account for the maximum numbers of actors and incentives. This is the relevance of localized histories. SMS is just this kind of local story.

New Netherland as Part of the Dutch Atlantic World

The story of SMS is situated in approximately eight decades between the 1630s through 1710s, a period when the Dutch and their English successors conducted a brisk trade with the native nations of the Hudson River Valley, the Susquehanna River Valley and the lower Great Lakes region. This interaction was part of a much larger pattern of trade being enacted from numerous European colonial nodes throughout the world.

Dutch colonial power rapidly expanded on a world-wide scale at the end of the 16th century. Entry into the East Indies spice trade (at the expense of the Portuguese) initially commanded much of the Dutch commercial and military/privateering interest. Dutch colonial interests came only on the heels of the period when four other European maritime powers (Spain, Portugal, France, and England) had already consolidated initial toe-holds in the Atlantic World. Emulating the successful format of Portuguese and English colonial endeavors, the Dutch established a rapidly growing and vigorous trade in textiles and metals (copper, iron, gold) in the Atlantic by establishing and conquering posts sequentially in West Africa, then the Caribbean and northern South America, and then in Brazil, by the turn of the 17th century. The Dutch slave trade burgeoned several decades later, supplying the brutal labor demands of the rapidly expanding Atlantic plantations. Early Dutch power in the Atlantic emphasized combined commercial engagement with profitable military actions aligned with ongoing European wars. During this time Dutch fleets captured foreign

merchant ships and took their competitors' colonial installations by force. In the 17th century, the Dutch became the premier transporters and financial backers of the Atlantic trade, rather than simply servicing their own colonies' shipping needs. The hundreds of ships, thousands of soldiers/sailors, and tens of thousands of traders, colonists, and company employees in the Dutch corporate world colonial system help put the West India Company's concerns with the nascent colony of New Netherland in North America in perspective (Jacobs 2009a:20, 27–31; Klooster 2005, 2009). The tiny New Netherland colony was decidedly peripheral to Dutch colonial and financial interests.

New Netherland's history spans the 1620s through the middle 1660s, after which the colony fell to English administration, albeit with notable cultural continuity from the Dutch period. The history of colonial New Netherland has been told many times from many perspectives, with the tone and focus of accounts largely driven by the available documents. Some aspects of colonial New Netherland are well documented. Others remain virtually unknown. Although many early Dutch West India Company records were subsequently destroyed or lost, large portions of this particular colony's internal administrative records did survive. Thousands of pages of original papers were published as the New York Colonial Documents during the 19th century, supporting many early synthetic treatments. New translations and the discovery of new documents in recent decades have fueled a number of modern historiographies and topical treatments for New Netherland (e.g., Bradley 2007; Gehring 2005; Goodfriend 2005; Jacobs 2009a, 2009b; Merwick 1999; Shorto 2004; Venema 2003).

Natives

The Natives of northeastern North America, and their contact with the various colonial endeavors, have also been extensively documented. Tribes occupying the regions close to

colonial New Netherland can be divided into two main groups. Algonquians (especially the Munsee and related groups) were centered in modern-day New Jersey and the along the Hudson River, with the Mahicans living in the middle reaches of the Hudson where Fort Orange (Albany) was established. Far more numerous and economically powerful were various Iroquoian-speaking peoples of upstate New York (the Five Nations) and the Susquehannock who lived along the lower Susquehanna River (Bradley 2007; Grumet 2009; Kent 1989; Otto 2009; Richter 1992, 2001; Trelease 1971; Williams 1995).

North and west beyond modern day New York and eastern Pennsylvania the vigorous trade relations of the Susquehannock brought other Iroquoian-speakers (Huron, Petun/Tionnonate, Neutral, Wenro, and Erie) into the early Dutch trade sphere as well. Although the Huron and Tionnonate are better known for their trade connections to New France, SMS ornaments also firmly link them to Dutch trade. These more westerly Iroquoian polities were progressively broken up by attacks from the Five Nations collectively referred to as “dispersals” in the late 1640s and early 1650s. Many members of these groups were alternately absorbed by their attackers (Five Nations) or their allies (primarily the Susquehannock). Others survived by taking refuge with the French or embarking on western diaspora. Collectively (and rather imprecisely in the case of the Wenro and Erie, who contribute very few sites to this study) these western Iroquoians will be referred to here as pre-dispersal and post-dispersal Ontario groups (Garrad and Heidenreich 1978; Heidenreich 1978, 1990; Lennox and Fitzgerald 1990; Ramsden 1990; Trigger 1976; White 1978a, 1978b).

The Five Nations Iroquois (Mohawk, Oneida, Onondaga, Cayuga, and Seneca) formed the enduring core of New Netherland’s native peoples, remaining strong throughout the Dutch and English colonial period and persisting to the present. To the east of New

Netherland on Eastern Long Island and in Connecticut, Rhode Island, and Massachusetts were other coastal Algonquians who will be seen below to have had only minimal acquaintance with SMS ornaments. The same holds true for the Algonquians of the Chesapeake, south of New Netherland's boundaries, illustrating quite clearly that the story of SMS is intimately connected to the history of New Netherland.

The Dutch Fur Trade

European trade with these native groups began well in advance of the founding of the Dutch colony. Without doubt, trade in fur-bearing pelts, especially beaver, was the *raison d'être* for the colony. Although some factions of West India Company administration favored settlement, the fur trade both started and sustained New Netherland. Trade was the exclusive interest of most of those who came with the hope of quick profit, and trade seduced many others who ostensibly came with more domestic intents. Organized coastal trade by the Dutch began in the first decade of the 17th century, predating actual settlement by some 15 years. The fur trade was primarily enacted at three locations in New Netherland (modern day Albany, Manhattan, and Delaware Bay) but a great deal of economic activity took place “in the woods,” to the persistent consternation of the colony's administrators. Especially in the early decades, openly or covertly engaging in the fur trade was perennially foremost in many inhabitants' minds (e.g., Bradley 2007).

The Dutch trade extended to a subset of the Northeast's tribes. New Netherland was ideally situated to tap those groups best positioned to obtain furs. Furs were exchanged not just for “European trade goods” but many other materials—in fact furs were avidly traded for almost anything that the traders or settlers could put their hands on to “earn a beaver.” A bewildering array of ever changing incentives, regulations, and circumventions frame the

early and middle 17th century interface between European traders, settlers, and Natives.

Although the colony began as a trade monopoly, sluggish growth and other factors caused the company to open up aspects of the fur trade after 1639, encouraging growth (Bradley 2007; Jacobs 2009a; Middleton 2005).

Settlement

New Netherland settlement began in the mid-1620s and increased only slowly until circa 1640. Many in the early population in the colony were company employees, but employees had no right to engage in fur trade, manufacture, or follow any other incentive until the terms of their contract expired, when they might return home or stay as free settlers. Those who came as free settlers could trade and even manufacture certain kinds of goods. But numbers of these settlers (mostly farmers) remained small because of restrictions on land ownership. Population in New Netherland began to rise circa 1640. Rapid increase of the population took place after 1649. Although the company very much desired to plant large colonies of free settlers, Dutch citizens showed little inclination to migrate and many settlers in the early period population were from other nations. Overall the colony persisted as descendants of a wide variety of Europeans as well as a minority of mostly enslaved Africans (Gehring 2009; Heywood and Thornton 2009; Jacobs 2009a:32–61, 2009b).

Artisanship and Manufacture

During the company's trade monopoly period (pre-1639), local production of goods that might otherwise be imported from Europe for trade to the Natives was tightly regulated, inhibiting not only the ability of free settlers to trade but the development of local industries and settlement in general. Emigration of significant numbers of artisans came only as

increasing populations created sufficient markets for local goods and services. Even so, many of the skilled artisans who arrived also entered the fur trade, which was especially lucrative from the 1620s through the 1650s. Matson (2009:100) notes that by the late 1640s, ships going from New Netherland to Virginia and the Caribbean carried local beer and grain, but exports remained focused on furs for a number of decades. Further expansions of craft guidelines and settlers' rights took place in 1653 and 1657 (Maika 2005; Middleton 2005:136–140) finally establishing the vigorous internal crafts and domestic merchants that had been notably absent in the early decades of the colony.

New Netherland and Wampum

Use of shell, especially marine shell, for ornaments is an ancient tradition throughout the Americas and the world. In the colonial Northeast the introduction of metal tools provided impetus for a florescence of marine shell bead-making by coastal Algonquian groups in the Long Island region. Natives in that region made large quantities of wampum starting circa 1605–1610 (Bradley 2011a). These tiny, relatively uniform shell beads very rapidly became extremely popular among the tribes of the interior Northeast and eventually came to be widely desired and employed by many other North American Native peoples throughout the 17th, 18th, and early 19th centuries. The earliest wampum was produced by the coastal Algonquians using tapered metal awls (muxes) received as trade items.

This unprecedented popularity was based on social practices far more substantial than the mere inclinations that the Dutch West India Company directors perceived might change according to the Native people's sense of style. Value of marine shell in North America had for millennia been conditioned by near universal acceptance of the premise that it represented

cultural superlatives—goodness, truth, light, and order (e.g., Brain and Phillips 1990; Hamell 1996a; Penny 1985; Phillips and Brown 1978). Marine shell was taken to be the proper medium for expressing these themes, not just in the 17th century form of wampum beads, but in a myriad of forms across many centuries and many cultures.

For Native peoples, wampum beads became highly valued not only for ornamentation, or their convertibility in economic matters, but for their core symbolic associations. Because they embodied nearly timeless qualities that could be extensively and elaborately conditioned and nuanced, they very rapidly became the *sine qua non* for all formal expressions of personal and corporate communication in the Iroquoian Northeast. Wampum beads testified to good intent and truth relating to all social states of being. It was the persistent and widespread Native use of wampum for enacting social relations that allowed its valuation for other functions. Wampum took a place alongside beaver pelts as a primary medium of exchange only because there was always great demand for these beads. This demand was powered by elaborate social creativity energized by political and economic expansions.

Buoyed by the dependable accessibility and convertibility of wampum beads in trade with the Native peoples, but lacking any other suitable exchange medium, fur traders, administrators, and settlers in both New Netherland and New England adopted wampum beads as a currency substitute, further enhancing its valuation and providing a cross-cultural platform for exchange and communication. Wampum valuation and use persisted among Native people throughout the 17th and 18th centuries, with its use for political speech and as body decoration spreading as far as the western Plains in the early 19th century (Becker 2010; Bradley 2011a; Ceci 1977, 1980, 1982, 1986, 1990; Hamell 1996a, 1996c). At some point in the 17th century—and the time frame has remained quite fuzzy on this—wampum

production has been suggested to shift from Native manufacture to a Colonial European cottage industry. The manufacture of SMS ornaments originates somewhere within this cross-cultural political and economic materiality and is intimately intertwined with wampum production from the earliest days of the colony.

What is Standardized Marine Shell?

Standardized Marine Shell is a suite of North American marine shell ornaments most commonly found in archaeological sites of the 17th century Northeast. To begin with, it should be understood that the story of SMS that unfolds here is about an analytical category generated entirely from archaeological contexts.

Colonial-era references to SMS ornaments are uniformly vague and vanishingly rare. SMS has been repeatedly noted as distinctive, but these ornaments have nonetheless frequently been considered part and parcel of the broader phenomenon of 17th century marine shell trade and manufacture.

In this study, for the first time, SMS is defined as a restricted set of produced and circulated ornaments (that is, its own industry). Also for the first time, this study amasses a sufficient body of ornaments to make reliable comparisons across the geographic and temporal range of the artifact type. As a body then, SMS ornaments are a largely unstudied artifact class. Here we have a ubiquitous, but unexplained, ornament. The cultural contexts where SMS ornaments are found tend to be discrete, short term occupations. These associations will aid close examination of the industry's history. As will be seen below, the contours of SMS history closely mirror changing relations in the colonial Northeast.

Technical and stylistic attributes unite the various forms of SMS. Although individually crafted, SMS ornaments are characterized by stylistic uniformity through time and space, as well as by the presence of cylindrical drilling by metal drills. Although my survey amasses 4,845 SMS ornaments, it divides them into a few dozen easily recognized forms.

These initial observations generate questions. When and why did SMS emerge and what were its antecedents? Is SMS an entrepreneurial venture conceived of and initiated by European settlers? How was its conception in the minds of its producers shaped and moderated by existing mental templates of meaning in the minds of its consumers? How did this interplay between producers and consumers unfold? Is SMS the result of an emergent form of cultural hybridity—an early example of something entirely new made by people who do not easily fit into pre-defined categories—ornaments created by people inhabiting innovative cross-cultural contexts? Or is hegemonic effect or intent involved in the way SMS taps into the cultural preferences of consumers? Does feedback from consumers play a part in the evolution of the industry? Resolving these speculative questions hinges on observations not previously organized and analyses of data not previously marshaled.

Marine shell ornaments have been produced and circulated among North Americans for thousands of years, and their manufacture, possession, use, and ultimate disposal in traditional contexts is enmeshed in ancient patterns with persistent symbolic referents (Brain and Phillips 1996; Ceci 1989, Hamell 1992, 1996a; Holmes 1883; Reilly and Garber 2007; Trubitt 2003). The clearest difference between SMS ornaments and older marine shell forms is the appearance of standardization. SMS is typified by matched sets of ornaments (Figure 1.3). During previous centuries “horizon styles” and thematic similarities in marine shell can certainly be distinguished (Brain and Phillips 1996; Kneberg 1959; Muller 1966; Sullivan

2007). And matched sets of elaborate prehistoric marine shell ornaments were occasionally produced (e.g., Polhemus 1987:2:Figure 11:11, Brain and Phillips 1996:217). But with the advent of SMS we suddenly and routinely see matched ornament sets on necklaces, some of which include scores of like items, sometimes produced and displayed in graduated sizes, and showing no significant variation regardless of the ethnicity or geographic location of their owner.

The employments and cultural contexts of SMS during the early colonial period give us every reason to think that the deepest and most consistent past meanings of such ornaments continued to hold sway. But SMS ornaments have a production-related sameness of both theme and form, not seen in Native material culture. Early in the 17th century, and only among specific sets of the Northeast's Native peoples, marine shell ornaments suddenly show a radical shift most easily indexed by standardization. It is from this simple observation that this study proceeds.

SMS Distribution

SMS ornaments are distributed in 17th and early 18th century archaeological sites in a broad pattern encompassing the Northeast, the mid-Atlantic, and the upper Midwest (Figure 1.4). This far flung pattern includes notable outliers in the Plains and Mississippi Valley. But the vast majority of SMS ornaments have been found in 17th century sites in New Jersey, Pennsylvania, New York, and Southern Ontario. A focus on the chronology and location of SMS sites will provide the main evidence of the SMS industry and frame conditions for a consideration of the outliers.



Figure 1.4.
Distribution of sites with Standardized Marine Shell ornaments

Following a review of previous research, I outline an extensive series of observations relating to archaeological contexts and formal attributes of SMS. Since SMS has a long history of being considered as much the same as wampum, I make special effort to extricate these two shell industries into separate research problems. Notes on methodology and the process of generating this large SMS inventory set the stage for an initial exploration of the spatial and temporal attributes of SMS assemblages. The results of my exploratory analyses will show that understanding SMS production is essentially a chronological problem. Many questions about the place of SMS can be easily answered when the production history of these ornaments is clarified. In turn, a detailed reconstruction of that history allows fresh consideration of several of the Northeast's larger colonial period research questions.

CHAPTER 2

EVIDENCE FOR A FORGOTTEN INDUSTRY

Production and distribution of Standardized Marine Shell (SMS) is a forgotten industry. There are very few historical records indicating the manufacture of shell ornaments that arguably describe SMS forms, and only scant prior observations on the spatial-temporal distribution and frequency of the archaeological examples of these ornaments. Similarly, unlike wampum and other trade materials that repeatedly find voice in the descriptions of colonial interactions of the Northeast, few specific contemporary records of SMS social deployment can be found.

This hardly sets SMS apart from many other 17th century archaeological manifestations. Despite copious records for some realms of the colonial Northeast's record (Bradley 2007:3), many aspects of early colonial history are handicapped by inadequate documentary and archaeological records. An in-depth understanding of the parameters and meanings of SMS can only be derived from inference, analogy, and analysis of the archaeological materials themselves. These data consist largely of site attributions, excavation contexts, comments, assumptions, and conclusions of excavators.

Archaeological Perspectives On SMS Origins

No real evidence has been marshaled addressing who made SMS ornaments. These forms were noted along with the earliest considerations of Native people's shell ornaments

(Schoolcraft 1846:134–135, 1853:79, Plate 25; Shepard 1893). Holmes (1883:230) was the first to note that they dated to the historic era, and typically, the earliest researchers merely noted that historic period shell ornaments possessed signs that metal tools were used in drilling and decoration. An intimate link to wampum production has been repeatedly implied, but in no way demonstrated.

Investigations and Interpretations

Lynn Ceci's dissertation (1977) and her subsequent studies (well-cited below) fleshed out much of what is currently known about the history of wampum manufacture, bringing a welcome sense of evidence to shell ornament study in the Northeast. A number of early researchers implicated Europeans in the manufacture of the shell ornaments made with metal tools (e.g., Beauchamp 1901; Holmes 1883:228, 260). Others just as confidently assigned these same ornaments to the hands of Native peoples (Heye and Pepper 1915:14). Although Kraft (1978:38) crisply noted that "*such shell ornaments, runtees, hair pipes, and wampum . . . were manufactured by the white settlers and traded to the Indians,*" others have just as confidently implied Native manufacture by sorting artifacts into "Native" and "European" categories with SMS ornaments assigned to the former (e.g., Pietak 1996). Bradley, too (2007:128) notes that the ornaments I have since designated SMS were probably made by Europeans. Overall, SMS attributions are characterized by an absence of any systematic overview of these unique ornaments and open admission that no evidence exists to inform our suggestions.

Other researchers have merely pointed to the uniformity of historic period shell ornaments and not presumed to assign origin. For instance, Parker (1920:436) noted that

the drilling of these items indicates that they were made “*after the coming of the whites.*”

Yet Arthur Parker was apparently the first to suggest the possibility that “*commercial manufacturers of wampum made some runtees and shell pendants, for there is a remarkable similarity and almost mechanical likeness of certain patterns.*”

Charles Wray (1973:16; also see Wray and Schoff 1953:58) listed many SMS forms as traits and provided estimates of their placement in the Seneca sequence. Lynn Ceci (1986) was beginning to focus on the central problems of marine shell ornament production, including what I have termed SMS, at the end of her career.

Jim Bradley (1987:129) noted that some marine shell ornaments that emerged mid-17th century were “*highly stylized and probably mass-produced.*” He suggested that many of the Onondaga shell ornaments in 17th century sites were brought there in finished form, but focused more attention on the significant fluctuations in amounts of marine shell flowing into the Northeast during the Historic Period. Martha Sempowski (1989:90) quantified these same shifts in the Seneca sequence and noted dramatic increases in marine shell alongside “*new types of more or less standardized artifacts.*” This pointed to “*a new and abundant source of marine shell ornaments that were made elsewhere and traded as finished products.*” Sempowski’s observations (personal communication, 10 February 2010) prompted me to term this ornament complex “standardized marine shell.” Standardization refers to the fact that each SMS item is a free-hand execution of a mental template.

Recurring observations that SMS ornaments found on Iroquoian sites must have been made “elsewhere” are echoed outside of upstate New York. Lynn Pietak (1996:150) commented that the shell ornaments in Munsee sites were similar to those found in Iroquoia and southern New England and could be taken as testimony of a trade network between these

groups. Kevin McBride (1993:70) noted that items “*extremely similar if not identical*” to the shell effigies in a Pequot site (Long Pond) were found throughout the Northeast, particularly in Seneca and Susquehannock sites. Barry Kent (1989:174) commented that marine shell effigies in mid-17th century Susquehannock sites “*have a decided European flavor, suggesting that they were made by the colonial wampum manufacturers.*”

To date, most speculations about SMS ornament origins end with this level of observation. This is simply because no comparative data have been developed. Much of the problem is due to scale and geographic scope. Sites with large SMS inventories extend as horizon markers across geopolitical and ethnic affiliations. Like other goods distributed through the fur trade, SMS data runs “across” rather than along the geographic expertise of most archaeologists. Without a previous definition of SMS as a delimited topic, and without taking a broad geographic and temporal overview, the question of SMS origins has remained in limbo.

SMS Data and the Antiquarian Legacy

My study represents the first attempt at a comprehensive inventory of SMS. Few SMS ornaments have been recovered from scientific or well-controlled archaeological excavations, and there have been even fewer formal site reports of the kind that include detailed comparison. Instead, most of the SMS sample comes from poorly controlled excavations—the kinds of site destruction typical of late 19th and early 20th century antiquarian pursuits. Many such items subsequently found their way into current repositories decades after being excavated by collectors with little or no regard for either Native sensibilities or the preservation of associated cultural information. The majority of specimens encountered in my

survey are of this vintage and apparently these sources. Many are accompanied by relatively little information beyond collector name and archaeological site attribution.

The absence of a detailed understanding about SMS can be partly accounted for by these limitations. Beauchamp's "*Wampum and Shell Articles Used by the New York Indians*" and his unpublished "*Antiquities of Onondaga*" (compiled between 1876 and 1925) illustrate by far the most extensive compendium of SMS ornaments prior to this inventory, in spite of the intervening century (Beauchamp 1901, 1876–1925).

Significantly, the majority of SMS ornaments documented by Beauchamp were relocated during my repository visits. Many of these ornaments are now housed at the New York State Museum, the National Museum of the American Indian, and the Rochester Museum and Science Center, where they came to rest after their original collectors parted with them.

Beauchamp's notes clearly relate that the great majority of specimens he documented were being amassed by private collectors destroying Native archaeological sites, especially cemeteries. It is at least known that most of the mortuary ornaments were associated with individuals as necklaces. My analyses are tailored to accommodate these deficits and thus extract much of their information at the site and ethnic level of association. In sum, it must be understood that not only do many of the existing examples of SMS have serious contextual limitations, but that very little new or improved data to address this topic can be expected in the future.

CHAPTER 3

TAKING DIRECTION FROM SMS ATTRIBUTES

This inventory of SMS ornaments is accompanied by approximately a decade of observations. My attention was originally drawn to these ornaments when I was called upon to identify and explain the presence of examples far outside normal distributions in early contact period sites of the Midwest and West. Applying to what was known of the context of these distinctive ornaments in their “home” area showed me that there was little speculation and no consensus as to the origins or unitary identity of what I have come to define as SMS. My initial hope to elucidate down-the-line trade in European goods, track the Northeast’s migrants and refugees, or emphasize cultural integration across North American contact period cultures (Esarey 2007, 2009) gave way to more pragmatic concerns.

Over the course of the study I have accumulated qualitative observations about SMS that frame an initial understanding of the industry. These observations condition the range of possible interpretations and broadly dictate the analytical approach I take in this study.

Spatial and Temporal Distribution

A series of observations clarify that SMS is a uniquely American manifestation that appears quite early in the Dutch colonial sphere and is largely limited to the Northeast’s Native archaeological sites.

SMS Ornaments Are Restricted to Colonial North America

Examination of ship manifests, lists of trade goods, inventories of artifacts in 17th century archaeological sites outside North America (and extensive web text and image searches) yield no evidence of SMS ornaments outside North America. In addition archaeological sites with SMS ornaments are highly concentrated in the Northeast (Figure 1.4), indicating a very specific core area.

SMS Is Strongly Associated with the Primary Clients of the Dutch Fur Trade

Most SMS ornaments are found in the archaeological sites of the participants of the 17th century Dutch economic networks articulating with New Netherland (and it's immediately succeeding English administration). Specifically, SMS ornaments are most frequently found on sites identified as pre-dispersal Huron, Tionnonate, and Neutral sites in southern Ontario as well as Five Nations Iroquois, Susquehannock, and Munsee sites in New York, Pennsylvania, and New Jersey. This constitutes the core area of SMS distributions (Figure 3.1).

It is notable that, with the exception of the Munsee, these groups are all Iroquoian speakers. The Munsee were closest to New Amsterdam, but all these groups had at least down-the-line economic intercourse with the Dutch colony from its earliest years (Bradley 2007; Grumet 2009; Otto 2006, 2009).

SMS Appears Relatively Early in New Netherland's History

Certain forms of SMS ornaments are present in southern Ontario sites that terminated with the diasporas of the Neutral, Huron, and Tionnonate (Petun) nations from the late 1640s to 1653, indicating an early stage of the SMS industry was extant prior to the late

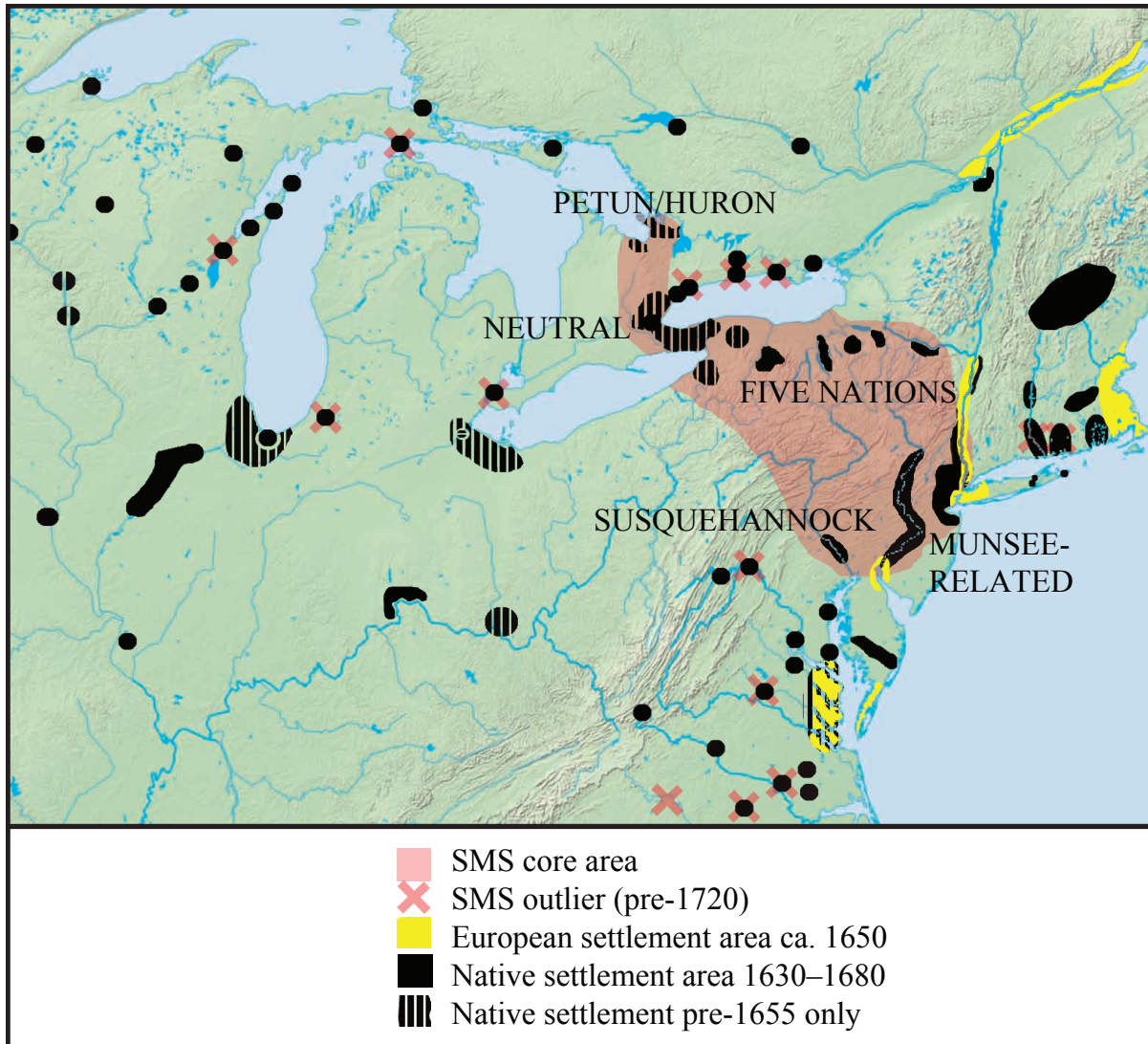


Figure 3.1.

Northeastern settlement locales (1630–1680) and SMS distribution
 (after Bradley 2001; Brown and Sasso 2001; Grumet 1995; Heidenreich 1971, 1990;
 Lennox and Fitzgerald 1990; Milner, et al. 2001; Snow 2001a, 2001b; Tanner 1986;
 Trigger 1976; and Ward and Davis 1993)

1640s. The emergence and growth of the SMS industry must be framed quite early in the Dutch colonial period.

Contemporary Documentation

One of the reasons so little attention has been given to SMS is that there is a marked lack of contemporary documentation that would have put its production into known social context. SMS was very common for several decades in the mid-17th century, but this was sufficiently early that the artifact complex largely escaped ethnographic notice. SMS ornaments appear to have been rapidly removed from circulation via attrition and placement in mortuary contexts. Only a vanishing trace of it can be found as ethnographically curated objects.

Little Contemporary Evidence Documents SMS Ornaments

In contrast to thousands of contemporary references to wampum and the wide range of physical forms and social formats in which it appears, there are very few unambiguous notices relating to SMS ornaments (Table 3.1). Although fascinating in its implications the December 1659 letter from the Directors of the West India Company to Stuyvesant stops short of a clear identification of SMS as its subject matter. This ambiguity is repeatedly the pattern with the few historical documents that seem to mention SMS. Another case in point is a 1684 proclamation (and subsequent 1686 ordinance) restricting movements of “*wampum, wampum pipes, Indian jewells*” from Albany. In all probability this refers inclusively to SMS but certainty is lacking.

Other than these kinds of vague clues, I have found little documentary trace of the SMS industry. Throughout the 17th century these distinctive ornaments are entirely absent as

Table 3.1. 17th century images/text possibly relating to SMS ornaments

Date	Content	References
1634	New England Indians described as having <i>“longing desire after many kinds of ornaments, wearing pendants in their ears, as forms of birds, beasts, and fishes, carved out of bone, shells, and stone, with long bracelets of their curious wrought wampompeage and mowhakees, which they put around their necks and loynes; these they count a rare kind of decking.”</i>	Wood 1634 [1865]:74
1645	W. Hollar portrait Unus Americanus de Virginia appears to include claw effigy headband on Munsee warrior captured in Gov. Kieft’s war in 1643/1644.	Hamell 1996b. Also see Otto 2006, 2009:187; Vaughan 2006:102–104.
1653	<i>“sticks of shell worn in ears”</i>	Thwaites 1900:40:202–207, fn. 243
1654–1656	Pietra Lindeström engraving showing a Munsee family wearing beaded sashes, belts, coronets, and runtee-like ornaments.	Lindström 1979:194
1659	December 1659 WIC director’s letter describe wampum as <i>“a medium of trade current only among the savages of New Netherland”</i> and say <i>“Some merchants here, with whom we have consulted, fear that the natives may change their minds in this respect, and state that the tribes begin to incline towards another kind of beads which they mix with the wampum for the sake of ornament.”</i>	NYCD 1853–1887:14:450
1679–1692	John Banister (southern Virginia at 1679–1692) describes wampum, runtee, and pipe beads. Wampum is made <i>“by the Indians to the Northward.”</i> Bracelets are made of <i>“great bulging beads made of the same shell, which the Southern Indians call Rantees.”</i> <i>“In their ears they hang a pipe about the bigness of the stem of a tobacco pipe smoothly worked out of the string or middle part of a Cunk drilled from end to end . . .”</i>	Ewan and Ewan 1970:373
1684	1684 proclamation and 1686 administrative order relating to the Indian trade at Albany <i>“That no person or persons whatsoever shall transport or cause to be transported any wampum, wampum pipes, Indian jewells, or money out of this citty and county . . .”</i>	Pearson and others 1883:415–416; Munsell 1857; L. Jordan 1997
1690	Ottawa Indians visiting the Onondaga desired to <i>“go quite to Albany to see Corlaer the Govr & see where the Wampum pipes are made.”</i>	Richter 1982:72

Table 3.1, continued. 17th century images/text possibly relating to SMS ornaments		
Date	Content	References
1650-1700	1837 portrait by Charles Osgood appears to show a late 17th century Pequot or Narragansett leader with double threaded disk runtees spaced with shell and glass beads and accompanied by shell effigy. Original source of details unknown.	Denison 1878:22; Hewes 2004:395–396
1702	Gifts sent to the “Farr Indians” called the Twightwighs and Tionondadees (i.e., the Miami and Tionnontate Huron at Detroit) include “ <i>Indian Jewells which I hear are most in request with you, Vizt. 110 wampum pipes, 9 shells, 117 round small shells, 32 Jewells that they wear in their eares . . .</i> ” ¹	NYCD 1853-1887:4:979–981
pre-1705	Robert Beverley, Jr. describes and illustrates a boy wearing a necklace of runtees. “ <i>Runtees are made of the conch shell as the peak is only the shape is flat and round like a cheese, and drilled edge-ways.</i> ” ²	Beverley 1722 [1855]:132. See Ewan and Ewan 1960:121 on Beverly’s plagiarism of Banister.
1717	The watercolor Sauvage Nepisingue en Canada 1717 shows a necklace of triconcave shell beads.	Muller 2008:46

¹Taken to possibly mean pipe beads, gorgets, disk runtees, and one other form.

²Significant amounts of Beverley’s material is verbatim or only slightly altered from Banister (Ewan and Ewan 1970:121).

a regulated product, taxed good, inventoried store, requested or provided trade good, or probated possession. This strongly conditions possible explanations of the industry’s origins.

Natives are apparently depicted with SMS ornaments in three portraits set in the 17th century and two more in the 18th century (Table 3.1). Once again, the 17th century cases remain ambiguous. In two portraits (by Hollar in 1645 and Lindstroom in 1654–1656) Munsee subjects wear ornaments clearly reminiscent of SMS forms (claws and disk runtees, respectively). In both instances these forms are entirely appropriate in time and place, and congruent with the archaeological record.

The most clear and convincing image of SMS ornaments in a portrait (very clearly depicting a two-strand mounting of two disk runtees and a vertically-drilled effigy) was long thought to be a contemporary painting of the 17th century Narragansett leader Ninigret (e.g., Anonymous 1925:99–100; Denison 1878:22; Williams and Flinn 1990:10). However, this portrait is now identified as the work of Charles Osgood and known to have been painted in 1837 from an unknown source. Speculation on the identity of the subject tends to focus on Pequot or Narragansett subjects (Hewes 2004:395–396). We have no idea of how the details of ornamentation came to be so accurate. It is noteworthy that no disk runtee has ever been found among these two groups, or in fact, east of the Hudson River Valley.

Late in the 17th century, Banister described two SMS forms in southern Virginia. Pipe beads were used as ear ornaments. "Rantees" were "great, bulging beads." These, he said, were "*made by the Indians to the Northward*" although Banister himself never ventured north of the Richmond, Virginia area. Slightly later, Beverley (1722), who plagiarized Banister (Ewan and Ewan 1970), unambiguously illustrated a boy wearing a necklace of small circuloid runtees in Virginia, but made no comments about their origin. Significantly, these circuloid runtees are found in southern Virginia, but only during Banister and Beverley's time.

Finally, a necklace of triconcave beads is very clearly represented in a 1717 French watercolor of a Nipissing man (a portrait stylistically reminiscent of the 1710 Verelst "Iroquois Kings" portraits, see Muller 2008:46). As noted by Timothy Kent (2001) necklaces of these "arrowhead" beads were being traded to the western Great Lakes in the early 18th century.

Ethnographic Specimens of SMS Are Exceedingly Rare

Only two known SMS specimens were collected directly from the people who used them. One of these ethnographic items is a two-hole disc runtee on a wampum necklace held for generations by the descendants of Okouandoron, a prominent 18th century Lorette Huron leader (Figure 3.2a). In 1923 this necklace was among a set of Okouandoron's possessions purchased by the Heye Foundation, which eventually became the National Museum of the American Indian (Orchard 1929:24, Plate IV; NMAI records for catalog 11-7512 through 11-7514).

A small wampum necklace (52 purple and white beads) and single unattached goose/loon pendant (Figure 3.2b) have been held in the collections of the Danish Royal Cabinet (catalog #Ehc21) and its predecessors for over 300 years. These probable mid-17th century ornaments are without specific provenance and only broadly attributed to New Sweden (Delaware Bay) or New Netherland (personal communication and image from George Hamell 19 May and 24 June 2011. For general information see Jacobaeus 1710).

Lack of Antecedents

For the most part SMS forms show little connection to the earlier Native shell ornament forms. The attributes of SMS shell ornament decorations and form that do connect back to earlier times appear come after the SMS industry begins and are presumed to arise out of feedback from the Native consumers of the ornaments.

Native Antecedents to SMS Ornament Forms Are Generally Lacking

I have defined 39 formal categories of SMS ornaments. Few SMS ornament forms have possible antecedents in Native manufacture, and there is no indication that the SMS industry

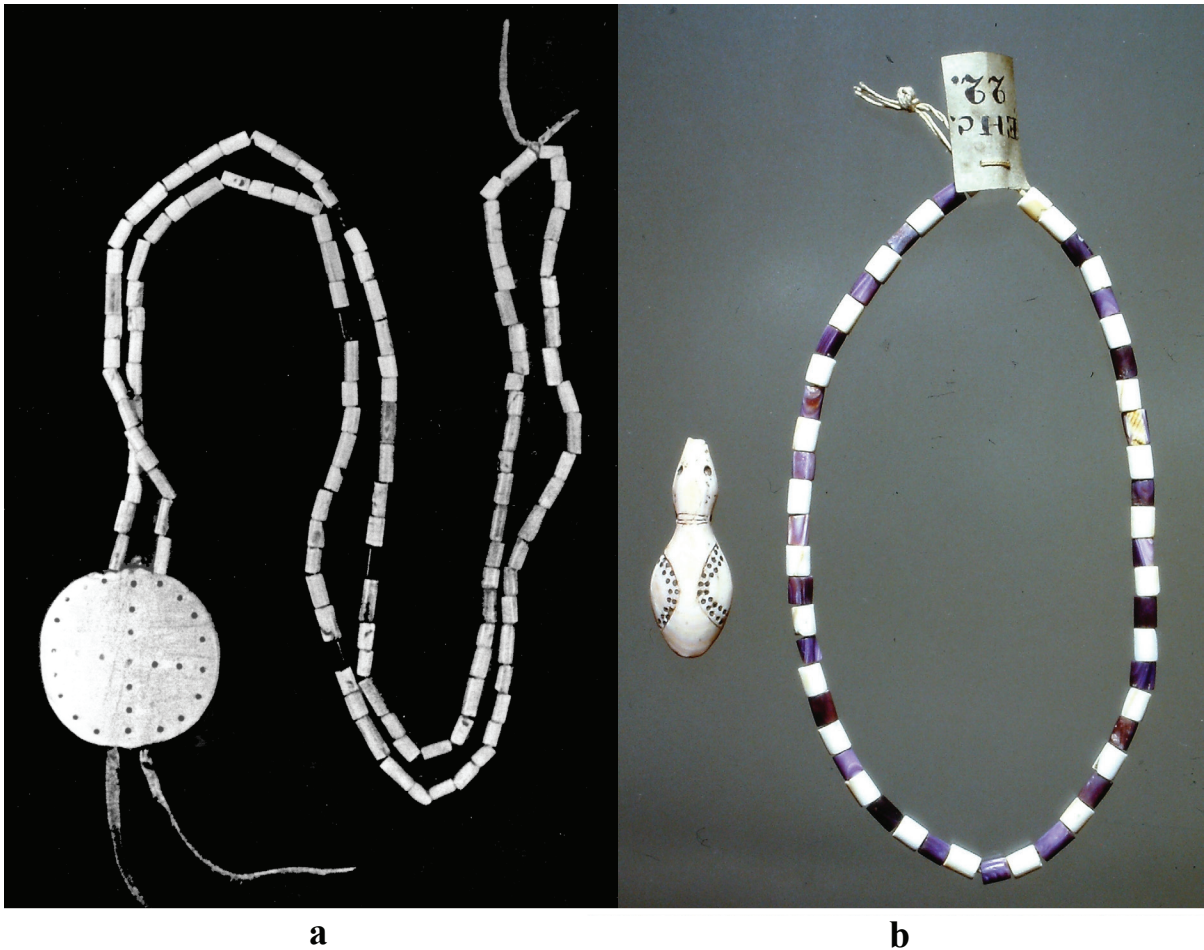


Figure 3.2.

The only known non-archaeological examples of SMS ornaments.

a: Runttee and wampum necklace once owned by Okouandoron, prominent 18th century Lorette Huron leader (NMAI #11-7513; image after Orchard 1929: Plate IV).

b: Small wampum necklace and single unattached goose/loon pendant. Collection of the Danish Royal Cabinet (catalog EHc21; image and information, personal communication, George Hamell May 19 and June 24, 2011).

emerges out of specific Native tradition shell ornament forms. The following examples of possible continuity illustrate the few possible exceptions to these general observations.

Pipe beads: Long tubular beads made from conch/whelk columella have a long history in North America. Forms that closely resemble SMS pipe beads are well documented prior to the 17th century. In contrast to SMS pipe beads, these earlier tubular beads generally retain evidence of the whorled groove (i.e., the the columellar folds—see Price 2003) of the central column of the whelk. Earlier pipe beads are shorter, but of similar diameter to SMS pipe beads (that is 4–6 mm). All of the earlier pipe beads have tapering “stone-tool-drilled” bore holes, presumably the factor that limits their overall length. Early pipe beads are known from sites that pre-date European trade goods, such as the Phillips site in southwest Pennsylvania, where they are said to be associated with “early wampum” (Gage 2008), or the 16th century Shannon site in western Virginia (Benthall 1969).

Crescents: Two-hole SMS crescents initially appear in a rare large form that is replaced by a very common “standard” form. The only possible antecedent is a thick, hollowed, “canoe-shaped” form. Seven examples of this early non-standardized crescent have been found in five locations in New York, Pennsylvania, and New Jersey (Schultz, Minisink Island, Cameron, Adams, and Kienuka sites). They are firmly dated to the last quarter of the 16th century in the Cameron, Adams, and Schultz sites (Wray et al. 1987:144; Wray et al. 1991:350).

Claws: Beads made of animal teeth and claws are common throughout time and space. Imitation animal claws in bone or copper are also known from various times and places in North America dating back several thousand years. Flat SMS marine shell effigies interpreted as claws do not seem to have any specific antecedent, however. Three claws erroneously attributed to Dutch Hollow site are from the post-1640 Steele site). These have also been

referred to as “brooding bird” or “duck” pendants by Beauchamp (1901:361) and Wray (1973:16).

Gorgetts: Circular marine shell gorgets have been made in North America for at least two thousand years (Phillips and Brown 1978:157–163). Ornate Mississippian period marine shell gorgets are especially typical of the greater Southeast in North America. In late prehistoric times, distributions of circular marine shell gorgets include parts of the Northeast (Brain and Phillips 1996; Drooker 1997:Figure 8-16–8-17; Glanville 2010; Hoffman 1997). Although SMS gorgets can thus be said to have antecedents, this form appears in standardized form only significantly after the SMS industry takes hold—suggesting that SMS gorget production was informed by native consumers rather than derived from native antecedents. Non-SMS gorgets continue to be found in 17th century sites in the Northeast even during the tenure of SMS ornaments.

Stylistic Links to Native Symbolism Appear After the SMS Industry Emerges

SMS referents to native symbology apparently developed well after the inception of the industry. Birdman themed art was a mainstay of late prehistoric symbolism (e.g., Phillips and Brown 1978; Strong 1989). This uniquely Native symbol, as well as other SMS effigy forms (anthropomorphic raptors, owls, fish) are certainly typical of prehistoric themes (Penny 1985; Townsend, ed. 2004), but these are not the earliest forms of SMS. Rather all these forms appear after the industry begins and are increasingly typical of later 17th century ornaments.

This is an important observation. Overall, SMS forms progress toward familiar themes of Native symbolism. Like the SMS gorgets, most effigy forms seem to be introduced after the simpler and earlier forms. Later forms converge upon, rather than descend from, Native

symbolic antecedents. The makers of early SMS forms were either less familiar with or less interested in emulating Native symbolic forms than they were later.

Observations on Imported Shell

All wampum and many SMS ornaments are made out of either local purple (*Mercenaria*) and white whelk shell. Earlier SMS production seems to make more use of the attractive purple *Mercenaria* than later. In producing millions of wampum beads over the decades, the wampum industry would have used tremendous amounts of local marine shell. Lynn Ceci went to considerable lengths to describe the Long Island shell middens as related to 17th century wampum manufacture and considered the possibility of localized raw material exhaustion. She noted that “*medium-sized and lightweight univalves [Busycon] were particularly suitable for [wampum] bead manufacture, and their natural abundance in the coastal waters surrounding New York made this region especially favorable for wampum production by local Algonquian Natives.*” (Ceci 1977:Appendix A, 262–263, 1980:840).

SMS ornaments require larger pieces of raw marine shell than wampum manufacture. A few of the SMS forms (for instance, pipe beads, gorgets, disk runtees, large effigies, irregular/massive beads) require such large pieces of raw shell that assigning all raw material for the forms as local is problematic. As Beauchamp (1901:329) noted “*no New York shell was large enough for some beads found here.*” Although a subsequent understanding of 16th century trade as coming from Chesapeake Bay sources has led to the general assumption that SMS forms can be made from Atlantic coast marine shells, this is not be the case with at least one SMS form.

Pipe beads are the most common and persistent SMS ornament. These long perfect cylinders require significant numbers of large marine gastropods as raw material. Often between 10–15 cm long, pipe beads have generally been conceived of as having been made from central whorls of large *Busycon* ssp. (e.g., Peña 1990:Figure 4). If this were the case, only one pipe bead per whelk would be possible. In fact, unless the source whelks were extremely large (i.e., **not** mid-Atlantic shells) it may not have been possible to produce cylindrical pipe beads from Atlantic whelk columnella in which the whorled columellar folds could be completely obliterated by grinding and polishing. Regardless, only a few beads could possibly be made from each shell, even the largest imported warm-water (i.e., West Indian) shells.

Busycon carica, the largest marine gastropods along the North American mid-Atlantic coast, attain an overall maximum size of about 30 cm at the latitude of North Carolina (Magalhaes 1948). I doubt the suitability of the *B. carica* for making SMS pipe beads. This does not necessarily mean that mid-Atlantic shell was not finding its way into the Northeast's Native sites. But most mid-Atlantic whelks, such as those earlier derived from the Chesapeake region and supplied to the interior (Pendergast 1989:107) probably did not attain sufficient size for making long perfectly cylindrical SMS pipe beads. In fact, Hammett and Sizemore (1989:128) assert that traces of the columellar folds would remain on a pipe bead made of a columella regardless of the size shell used. A more likely raw material source for 17th century pipe beads would have been blocks cut from the thickened outer lip of large West Indian conchs (*Strombus* ssp.). Significantly, this is the same raw material used to manufacture 19th century Plains hair pipes (Chesebro 1872; Ewers 1957; Westervelt 1916).

If European import of large (West Indian) shells was necessary for production of the most common SMS form (pipe beads), then access to that raw material is implied to be a central characteristic of the SMS industry. Once the amount of West Indian marine shell required to produce the thousands of pipe beads was in hand, however, the remainders of the large shells would be capable of supplying many of the industry's other products.

As various researchers (Bradley 2011a; Huey 1991:339; Louis Jordan 1997; Williams and Flinn 1990:29) have noted, there are surviving records of West Indian marine shell imported to New Netherland (Table 3.2), although the scale of import is difficult to assess. The main accounts of imported shell are found in the fragmentary remaining shipping records from Curaçao. Stuyvesant's other Curaçao records, and much of the West India Company administrative papers in general, were otherwise destroyed (Gehring 1987:xvi–xxi).

Extant records document three shipments of marine shell from Curaçao to New Netherland between 1659 and 1665. There is also a slightly later court record of legal action including marine shells imported from Bermuda during the British administrative period. For Curaçao, the representativeness of these records might be gauged by noting that this shell is shown on about a third of the preserved manifests and inventories of goods bound for New Netherland (that is, excluding bills of lading specific to a single category such as horses, slaves, salt, etc.).

The individuals listed in Table 3.2 as receiving shipments of conch from Curaçao were among New Netherland's prominent business and administrative leaders. Johannes Verbrugge, in particular, represented major business interests within the colony. Although it is not impossible that some of the conch might be a luxury food item, the difficulty of shipping such large numbers alive seems to preclude this as a general practice.

Table 3.2. 17th century records of marine shell imports to New Netherland

Description/Amount ¹	Est. # Conch	References
1659 manifest: Galiot <i>Nieuwer Amstel</i> to Nieu Nederland. <ul style="list-style-type: none"> • Lourens van Ruyven to C. van Ruyven—1 barrel conch • Mr. Vaendr to Daniel Litsco—1 barrel conch • Franck Bruyn to Dr. Hans Kiersteede—1 barrel conch • Item to Johannes Verbrugge—1 barrel conch • (other items include sugar, cotton, lemon juice, dyewood, and salt) 	96 96 96 96	Gehring 1987:138–139
1660 manifest: Galiot <i>Nieuwer Amstel</i> to Nieu Nederland. <ul style="list-style-type: none"> • Franck Bruyn to Petrus Stuyvesant—½ aem conch • To Johannes Verbrugge and Dr. Hans Kiersteede—1 barrel conch • (other items include sugar, lemon juice, cheese, castrated goats, and mares) 	some 96	Gehring 1987:168–169.
1665 letter: M. Beck to Peterus Stuyvesant, the Mannhatans in Nieu Nederland. Sent on the galiot <i>De Hoop</i> , Skipper Poppen. <ul style="list-style-type: none"> • 434 conch shells (same as 2 barrels conch listed below) • (other items include sugar, fine salt, preserved lemons, pots of sweets and a hammock) 	duplicate	Gehring 1987:201, 213–214
1665 register of goods loaded at Curacao (apparently the same sailing of <i>De Hoop</i> under Skipper Jan Poppen) <ul style="list-style-type: none"> • Jacobus Backer—1 barrel conch (4 guilders) • For Peterus Stuyvesant—2 barrels conch (9 guilders ea.) • Commissary Van Ruyven—1 barrel conch (9 guilders) • Distributed among the crew—“Some conch” • Under “Skipper’s goods”—350 conch listed (along with syrup, sugar, plums cloth, and salt) 	96 434 217 some 350	Gehring 1987:217–218
1668 court record: Mr. Young of Bermuda sold Mr. Isaac Bedloo 400 conch shells for the same amount as Young could sell them for to any other man. The court ordered Young to deliver the 400 shells to Bedloo at the same price he sold conch to Fredrick Phillips. ²	400	NYCD 1853–1887:14:450

¹Equivalencies (Gehring 1987:xxxi): aem = ~ 38-40 gallons (oil/wine); “vat” barrel = ~227–243 gallons (oil/wine); “tun” or “barrel” = 41 gallons (beer). The conversion used for deriving an estimated 2000 West Indian conchs from these records rests heavily upon the two barrels of conch shipped to Stuyvesant in April 1665. These also appear in Beck’s letter as 434 conch (i.e., providing a conversion rate of 217 conch per barrel) indicating that these may be “vat barrels.” Barrels evaluated at 4 guilders are then converted to 96 conchs, proportionate in value to the 9 guilder barrels. All unspecified barrels are given this same minimum value.

²Bedloo was a customs officer and prominent New Amsterdam citizen, alderman, militia captain, involved in real estate and affairs of the courts (Pelletreau 1907:2:111–114). Phillips served on juries, purchased land, and moved toward a status later described as “landed magnate.”

Another clue can be gleaned from the conchs' value. In the 1665 shipment it is mentioned that "some conch" were distributed among the crew. I take this to imply that loose conch shells had a value that could be realized by the crew, most likely implying that they were vendible at their destination. If so, this valuation was known by the 1660s which, as we shall see, corresponds exactly with peak SMS manufacture.

In Table 3.2 I estimate that these few scattered records represent import of at least 2000 West Indian conch. This estimate rests on the fact that, in 1665, one shipment of conchs is conveniently cross-referenced—being listed as 434 conches in an accompanying letter to Stuyvesant as well as being described on the ship's manifest as two barrels of conch valued at 9 guilders each. As noted (in the Table's footnote) these would have to be "vat" barrels to hold 217 conch each. This combined count and valuation of the same shipment provides a rough scale for the other conch shipped. In the same sailing other barrels are assigned proportionate counts according to their valuation and I use the minimum figure (96 conch per valued barrel) as the contents for all barrels of conch from Curaçao where no value is listed. I consider "*some conch distributed among the crew*" and "*½ aem of conch*" as minimal values.

We also have a 1668 record for the sale of 400 conch shells from Bermuda in Manhattan, which was recorded because of a legal dispute. The settlement of this claim (taking its precedent and price from another such sale) shows this transaction was not an isolated event. Although we have little indication of what portion of the actual shipping is preserved in the fragmentary Curaçao records, we know that trade between Curaçao and New Netherland was vigorous (Maika 1995:128).

It seems inescapable that there were other such shipments and thus many more thousand West Indian conchs entering New Netherland by mid-17th century. This pattern accords well

with later accounts by 19th century shell ornament producers in New Jersey who purchased West Indian conch imported as ships' ballast (Chesebro 1872; Ewers 1957; Westervelt 1916). Therefore I conclude that, by the 1650s at least, West Indian conch shells were a commodity in the Dutch colony. Many thousands were imported.

Attributes of Production

There can be little doubt that the standardization which distinguished SMS from other marine shell ornament production conveys implications about both its producers' and consumers' intents and interests. SMS ornaments appear simultaneously and without significant differences in execution in a number of ethnic groups. SMS ornament forms derive their appearance as standardized from a pointed lack of intermediate and idiosyncratic executions. Links to European technologies go well beyond cylindrical drilling, extending into both decorative and conceptual (mass production) realms. Putting all these clues together provides a unified sense of SMS as a production format quite specifically aimed at producing component parts for a necklace industry.

SMS Ornaments Exhibit Identical Forms Regardless of Ethnic Context

Researchers have repeatedly noted the overall standardization of SMS ornament forms regardless of the ethnicity of their owners (e.g., McBride 1993 ; Sempowski 1989). This observation alone sets off SMS ornaments as an anomaly and necessitates a unified explanation of the production and distribution of the various forms.

SMS Styles Indicate Persisting Production Strongly Linked to Crisp Mental Templates

Although each SMS ornament is individually crafted, examples of each distinct form are easily identified. Idiosyncratic themes and unrecognizable forms exist but are rare. The mere fact that over 4,800 hand-shaped ornaments can be categorized into a few dozen homogenous forms reflects the degree of standardization present. In part this may be typical of market-driven modes of production, but there is also the matter of SMS forms being designed as matched sets. Coherence among SMS forms and lack of progressive, intermediate, or innovative forms implies design and production by a small number of manufacturers who repetitiously produced large numbers of the forms. While there are multiple possibilities of what the “market” for SMS might be it seems clear these ornaments were not made by the people who used them.

SMS Production Includes European Decorative Attributes

The case for European production of SMS ornaments is bolstered by incorporation of Euro-centric or European-derived design elements executed with European technology, even as the industry in general exhibits a progressive focus on decorations sensible of Native symbolic systems.

Six-petal rosettes and precise arcs/circles:

Compass (aka divider) drawn arc and circle designs are common on SMS, especially the later, more elaborate forms. Six-petal rosettes and nested six-petal rosettes are the second most common decoration on disk runtees (after barred crosses), as well as being the single most common central design on SMS gorgets, where alternate designs include other divider-created multi-point stars and curved saw tooth designs (Figure 3.3).



Figure 3.3.
Compass inscribed SMS decorations

Top: RMSC 11534-237 Pen; RMSC 2367-103 Boughton Hill

Center: PHMC La40-37 Conoy; NMAI 37054 Bell (after Heye & Pepper 1915)

Bottom: NMAI 216306 Warwarsing; NMAI 094831_Ledyard;
RMSC _-132 Snyders McClure

Perfectly inscribed arcs and nested sets of perfect circles are commonly found on SMS gorgets and some zoomorphic effigies, especially what I term “Pelt Type A” (e.g., Houghton 1922:Plate XI:top; Kent 1970:Figure 3d, f) and some flat cut-out forms (e.g., Houghton 1922:Plate XI:middle; Kent 1970:Figure 3:c, f). Controlled arc designs are rare in previous Native technologies and symbolic executions. SMS compass designs always contain evidence of the fixed anchor point where one compass leg was set.

Excised fields enhance zonation in some SMS decorations. This is seen on disk runtee rosette petals or interline patterns such as bird wings, but reach their most elaborate use on SMS gorgets where complex star designs are elaborated by rouletted excisions and closely spaced concentric circles broken by rectangular excisions to created “beaded brickwork” bands (Figures 1.1 and 3.3).

Many SMS designs exhibit stylistic similarity to 17th and 18th century European chip carved wood-working decorations. Interestingly, Beauchamp (1876–1925:4:Figure 466–467) describes compass-drawn four-petal rosettes adorning a cradleboard from the Cayuga Reservation executed in wood chip technique. He noted:

this cradleboard belonged to Tom Jack's wife, on the reservation and was in use when I first saw it. The boards are planed. The bow and its supports are simply but ornamentally carved and the bow was inlaid with lead ornaments, some still remaining. The figure [Beauchamp's Figure 467] shows the bed and covering. She thought it about fifty years old, which seems merely to mean quite old. This seems to have been done mostly with a knife or chisel much of it being simply angles and diamonds.

In the Old World, rosettes (especially six-petal rosettes) are a ubiquitous symbol with considerable antiquity found throughout Europe and the Near East, being particularly common during the last two millennia (Goodenough 1965; Piercy and Bass 2004:405, 426). The most recognized North American venue for the six-petal rosette is as the simplest of

the “schtanne” [star] designs on 19th century Pennsylvania “Dutch” (actually German) farm buildings, where this design became particularly common in the 1850s.

In the colonial Northeast, six-petal rosettes inscribed as compass arcs on SMS ornaments link directly to 17th and 18th century Dutch chip carved designs on contemporary spoon holders and wooden boxes in northern New Jersey and New York (Blackburn and Piwonka 1988:160–161, 165, 205; Kenney 1991:71). Multiple examples of this Low Country-derived woodworking tradition have 17th and early 18th century Bergen County, New Jersey provenances. Likewise, Bergen County hosted a vigorous middle to late 17th century influx of Dutch, Walloon, and French Huguenot turners who produced chairs and other furniture (Groft and Mackay 1998:208). Barber and Howe’s (1846:72) claim that the housewives of Bergen County were involved in wampum manufacture “from very early times” has a very credible 17th century craft history as a backdrop. Interestingly, at the same time this symbol appears on SMS disk runtees in the Northeast, it is seen half a continent away carved in a painted lintel at the Pecos Mission, which was destroyed in the 1680 Pueblo Revolt (Weber 2007:159).

Other Design Forms:

SMS decorations also have notable connections to Native themes. Drilled holes, crosses, lines, and bands are deployed in ways that show connection to both abstract symbols and literal body decorations. The most common disk runtee designs are cross bars (and occasionally radial bars) filled with drilled dots. Although these cross designs are fully abstract and their meaning opaque, decorative bands on most effigy SMS forms constitute clear reference to beaded bracelets and necklaces. These anthropomorphizing forms of body ornamentation have deep roots in North American shell art, where literal necklaces, bracelets, anklets, and pendants are extremely common adornments on cosmic figures in both

human and animal form (Brain and Philips 1996; Brown 2007; Philips and Brown 1978). Representations of body decorations using combinations of lines with drilled dots or excised sections are especially clear in the case of birdman pendants, as well as most SMS effigy forms and “dressed pelts.” Again, it is suspected that these more literal references to Native symbolism emerge progressively through time.

Beyond the use of a compass divider, most decorative patterns are typically executed in roughly “freehand” modes, with minor misalignments of dots being frequent. Close examination of the drilled holes shows they are perfectly cylindrical and, in many cases, filled with black, red, or green pigment compounds. Surviving pigments have a gritty, greasy, occasionally crystalline appearance and set off the elaborate SMS designs sharply against the white shell (Figure 3.4). Pigments currently registering as green may reflect oxidized copper content of brownish/reddish color additives. A few rolled brass insets in SMS drilled decorations are also known. The significance of these particular colors is hardly accidental (Hamell 1988, 1992, 1996a:47–50) since colors strongly conditioned the various meanings of these ornaments for the Native people who wore them.

SMS Is a Necklace Industry

Far more than can be appreciated by an inventory of loose archaeological ornaments, my inventory of SMS has made it abundantly clear that production is focused on finished necklaces as well as their component parts. Although my unit of analysis is necessarily individual ornaments, repository visits quickly made me aware that, not only were forms of ornaments remarkably uniform, but I was frequently “seeing the same necklaces” in different locations. Several observations in this vein testify to a unified production mentality and market strategy for SMS.



Figure 3.4.
SMS decorations retaining pigments

Top: Top: Zoomorphic effigy, Dann site (RMSC 12961_28)

Center: Cross-shaped pendant, Beal site (RMSC 5002_98);
Disc runtee, Penn site (RMSC 11668_237)

Bottom: Goose/loon pendant, Snyders McClure site (RMSC 6040_132)



Figure 3.5.

Matched, graduated, and socketed SMS ornaments

Top: Matched set goose/loon pendants (Raymond Dann 1913 NYSM A21083)

Center: Graduated matched set two-hole crescent beads (Dann, NYSM A21070)

Bottom: Socketed goose/loon pendants (NYSM A21619, NMAI 220273, 103711, 104240)

Standardization in this ornament industry is quite literally a result of an initial desire to create sets of like items that can be arranged in individual arrays as well as the capability to actually create some of these same necklaces. Matched sets of various birds (generic birds, owls, goose/loons, and bird-head beads), claws, circuloid and disk runtees, fish, pelt forms, and pipe beads are extremely common (Figures 1.3, 3.5 top). Although it is clear that SMS ornaments were frequently restrung and recycled throughout their use-life, matched sets in a variety of contemporary sites testify to a production mentality also focused on the assembly of necklaces as a final product. Finished necklaces were a part of the SMS market strategy.

A related pattern is the production of graduated size sets. A significant number of matched set necklaces are arranged in graduated sizes. This is particularly true of standard two-hole crescents and disk runtee sets (Figure 3.5, center). Even more so than matched sets, graduated sizes imply customized and component part production sensibilities.

This design emphasis on presentation extends to spacing and suspension attributes of SMS ornaments. Many SMS forms are shaped and drilled with attention specifically to lying flat, whether in necklaces or attached to clothing. Transversely perforated SMS ornaments (disk runtees, circuloid runtees, vertically drilled triangles, fish pendants, claws, and horizontally drilled crosses) and various effigy forms suspended by lateral holes through their necks are all clearly manufactured in technological formats emphasizing unified and flat modes of presentation. Of course, this extra attention to detail is enabled by technology, but maximizing spectacular presentation over ease of production is an important attribute of SMS design intent.

Attractive spacing is significant part of this design sensibility. Not only do necklaces routinely use wampum or glass spacer beads, but some forms, notably goose/loon pendants, are manufactured with socketed necks fitted for spacer beads (Figure 3.5, bottom).

There are no documents regarding the distribution of 17th century SMS materials, but when documents appear during the 18th century phases of shell ornament production, there is plenty of evidence that production and distribution were still about component parts and complete necklaces. Mid-18th century trade documents in the western Great Lakes routinely refer to the distribution of triconcave (aka, “arrowhead”) beads as quantified by number of necklaces. As discussed below, the mid-18th century shell ornament industry apparently descended from the SMS industry.

Given all this, SMS as a whole reflects the production/distribution of complete necklaces, as well as a “mix and match” mental template. Four structural components can be noted: primary/central pendants, matched set items, spacers, and occasionally end units (e.g., pipe beads bracketing the central display components). This does not imply that consumers of these component parts and composite necklaces were in any way averse to customizing, recycling, and re-purposing SMS ornaments (in both physical and social formats). But it does mean that making spectacular necklaces for initial consumption was a primary goal of SMS production strategy. To summarize, SMS can be characterized as a modest scale, component part, necklace industry.

CHAPTER 4

UNTANGLING WAMPUM AND SMS

The most obvious unifying attribute of SMS ornaments is their cylindrical drilling which is produced by metal drills. This trait unmistakably ties SMS to the wampum industry. At the same time, the conceptual association of SMS ornaments with wampum's overall history has led to the assumption that the two are closely linked, or the same, in production history and social employments. My perspective is that these products probably do share intricately related histories. But the problem of SMS origins requires differences between wampum and SMS be emphasized rather than minimized in order to tease out their tangled histories.

Wampum refers to the tiny, increasingly standardized marine shell beads that appeared among coastal Algonquian groups at the turn of the 17th century (Bradley 2011a; Ceci 1980). The makers of these beads soon found their products to be in extreme demand, to the extent that, without wampum, little trade could be carried out between the Europeans and the other Native groups supplying the furs. In relatively short order, the colonists subjugated many of the wampum producing groups and began extracting the beads as tribute (Ceci 1977, 1980:845, 1982:98; Graeber 2001; Hamell 1996a, 1996c).

There are many historical and anthropological studies of wampum. These are based on a myriad of ethnographically curated specimens, contemporary descriptions and images, and archaeological examples (e.g., Becker 2010; Bradley 2011a; Ceci 1977, 1980, 1982, 1986, 1989, 1990; Graeber 2001; Hamell 1988, 1996c; Jacobs 1949; K. Jordan 2008b; L.

Jordan 1997; Peña 1990, 2001, 2003; Speck 1915, 1919; Williams and Flinn 1990). Lynn Ceci (1980:840) notes that straight, finely drilled bores “*first led early investigators to suspect that wampum was an artifact tied to the historic period. The primitive crude stone drills available to prehistoric natives do not produce such bores. Thus the manufacture of true wampum was necessarily dependent upon the metal drills introduced by Europeans.*” At some time in the 17th century Native production shifts from “early” wampum to “true” wampum. This distinction is based on the cylindrical drilling that first appeared on the earlier form of wampum (which was larger and more variable), and then became a finer and universal attribute of wampum beads in mid-17th century sites.

Ceci describes true wampum as “*quite small, and in size and shape . . . almost standardized.*” The purple and white beads range between 6.4–9.5 mm in length and average 3.2 millimeters in diameter; the drilled bore diameters average less than one millimeter (slightly different metrics are later presented by Ceci 1989:63.) Manufacture of early forms of wampum by Native people had also depended on access to metal tools (Ceci 1980, 1989:72), so the meaning of the shift to “almost standardized” true wampum is somewhat unclear. Although no exact study has been done, the advent of standardization in wampum may well be approximately coincident with the origins of SMS ornaments. It is tempting to read the shift towards “almost standardized” wampum with uniform drilling and the emergence of SMS standardization itself as indications that Europeans had entered production of shell ornaments.

Muxes are bipointed metal awls provided to Natives during the fur trade and are found by archaeologists on early and middle 17th century Native sites (Ceci 1977:246, 255; Orchard 1929:80; Williams 1973:244, 251–257; Williams and Flinn 1990:7). It is often suggested

that muxes were the standard tool for manufacture of all wampum. But, being square in cross-section and tapered to fine points at each end, these tools cannot make the cylindrical bore holes of “true wampum” and thus were only used to make “early wampum.” Whenever the manufacture of small diameter wampum with perfectly bored holes began, it was not accomplished with muxes, but cylindrical drill bits.

An Instructive Contrast: SMS and the Wampum Industry

Ceci (1989:63, 72–74, 1990:63) subsequently made several comments about the introduction of colonial lathes and drills in shell bead manufacture, specifically in the manufacture of “*cylindrical . . . beads, full length columellas from warm-water gastropods ground smooth*” (i.e., SMS pipe beads). Although it is not clear exactly when between 1660 and 1700 she thinks this transition took place, she credits the introduction of the lathe with the collapse of political authority based on bead production among coastal Algonquians. Regardless of the tool technology used, Ceci implicitly opens the possibility for defining a stage of wampum manufacture after the tenure of the coastal Algonquian wampum-makers. Almost certainly, this stage was characterized by colonist’s manufacture of wampum.

By the mid-18th century wampum manufacture at Albany was a vigorous colonial cottage industry that produced beads as a commodity for the expanding western trade (Lesniak 2003; Peña 1990, 2003). More to the point, and critical for the purpose of this study, the period intermediate between the documented wampum production by coastal Native groups (that is prior to 1660) and the establishment of large scale 18th century wampum manufacture at Albany (circa 1730) remains especially murky. As we shall see, peak production of SMS ornaments coincides with this interval.

Louis Jordan (1997) emphasized that, during the 1650s, Native wampum producers centered to the east in what had now become English territory were “dumping” their product into the Dutch economy, resulting in severe depreciation of wampum. Although the role of coastal Native producers is relatively well-documented up to this time, the strength of their contribution to overall wampum supplies is far less clear after the 1650s wampum valuation crisis. More typical of the second half of the 17th century is evidence that many people in many places were making moderate amounts of wampum. Earlier reports of wampum making at Fort Orange and in Albany (Huey 1991; Peña 1990, 2001) have been discounted by subsequent analyses that show that wampum production debris there is limited to mid-18th century contexts (Lesniak 2003; Peña 2003). This is not to say that there is no evidence that Natives continued to labor making wampum in later decades of the 17th century, but these references are less than clear in terms of social and technological context.

One of the most cited examples of Native wampum manufacture after the 1650s is set in 1679/1680 and related by Jasper Danckaerts (1913:172–180). Danckaerts related the concerns of a Munsee man named Hans whom his party hires as a guide. Hans bargained for compensation by citing his fear of losing time away from wampum production. Hans had “*long frequented among the Dutch*” and spoke their language. He guided Danckaerts’ party from the New Jersey shore near lower Manhattan (starting at modern-day Bayonne) up the Passaic Valley beyond Paterson, New Jersey (that is, past the Hackensack Valley where the 19th century shell ornament industry was later centered). By 1680 the lower courses of these rivers were already populated with immigrants and Danckaerts notes that the lands along the upper course of the valley were now “all taken up.”

To summarize the attributes of this oft-cited case of later 17th century Native wampum manufacture, Hans was a Munsee man who spoke Dutch and had long association with the settlers (who had been present in this region some 50 years). His geographic expertise in modern-day Essex and Bergen counties made him useful as a guide to visitors. His concerns about lost time making wampum could as easily be the concerns of a wage or piece-worker as a man self-employed in traditional production. We do not know if Hans produced wampum for himself or for wages, and if the latter, where he was employed and with whom. The coincidence of this account with the geographic locus (already partially converted to European colonist habitation) where the shell ornament industry was subsequently documented is also worthy of note.

Prior to 1660, it can safely be repeated that the “*greatest part of the Wampum, for which the furs are traded*” was manufactured by Natives on Eastern Long Island (Ceci 1977:78–79, 192, 242–244, 291–302; NYCD 1853–1887:1:360) and among Southern New England groups. As noted in Chapter 3, SMS ornaments were certainly already in production while these Native groups were making the greatest part of the wampum but SMS production lasted long after wampum tribute from these groups ended. Yet not one single 17th century SMS ornament has ever been found on Long Island. In fact SMS ornaments are rare east of the Hudson River Valley (a single late 17th century Pequot site with SMS ornaments notwithstanding). SMS ornaments quite clearly could not have been made side by side with the Native wampum industry. My reconstruction of the earliest history of SMS (below) will further clarify the question of authorship.

More typical of the post-1660 period are numerous references to large quantities of “*loose wampum*” which was strung by colonists, especially women, for pay (e.g., Peña

1990:29–30). Consistently, this loose wampum was received from unspecified sources. Post 1660 it appears wampum was the product of a diffuse production scheme rather than the output of groups of specialist producers.

Otto (2006:139) suggests that by the 1650s wampum was being made in large quantities by both the Munsee and Europeans, although he cites no supporting evidence. We lack significant details about shell ornament production from 1660 until well after 1700. What can the SMS industry tell about the shift away from marine shell production by Algonquian groups east of Manhattan? When, how, and where did the wampum industry change hands?

European Entry into Shell Production

I do not separate SMS from wampum because I insist the people making SMS ornaments did not also made wampum. Rather, I suggest that before circa 1640, the long-suspected bifurcation of wampum production took place, with some colonists near Manhattan joining in wampum production. I suspect these 1630s bead makers added the SMS forms as an increasingly popular specialty item (and thus “another kind of bead”). At the same time we know that Native wampum manufacture persisted vigorously until at least 1660, especially on Long Island and in Southern New England. This competitive production scenario would account for the well documented glut of wampum that culminated in the 1650s valuation crisis (Ceci 1980:846). I suggest that by considering SMS and wampum separately can this history be untangled.

Rau (1873:33) reports that Loskiel, writing in 1789, asserted that “*soon after their arrival in America, the Europeans began to manufacture wampum from shells, very neatly and in*

abundance” but notes that Loskiel had never visited America. Ceci’s (1989) comments about the introduction of European lathes affecting production of shell ornaments and the political and economic well-being of coastal Natives came a bit over a century after a very similar assertion by Ruttenber (1872:26), who credited the lathe as the mechanism by which the Europeans “*soon had the monopoly of the [wampum] trade.*”

Simple lathes would seem to be a reasonable explanation for the specialized drilling evident on SMS products, especially pipe beads, disk runtees, circuloid runtees, vertical-drilled isosceles triangles, fish effigies, or any other effigy or geometric form where finely drilled holes pass considerable distances through shell hardly twice as thick as the drill bore. But the exact methods behind SMS manufacture have never been analyzed.

Detailed contemporary descriptions of mid-19th century shell manufacture provided by Barber and Howe (1846:72–73) and Chesebro (1872) offer useful insights into 17th century SMS production. Although the 19th century manufactured ornaments were Plains hair pipes and shell “moon” gorgets, Barber and Howe (1846:72) mention that wampum production had been carried out by the females of the Bergen County, New Jersey region “*from very early times.*”

These and other early descriptions of 19th century shell ornament production depict a cottage industry where a group of men specialized in making formal ornaments (Williams and Flinn 1990). Properly speaking, neither wampum nor the shell ornament industry was ever truly “industrialized.” The 19th century ornament producers indicated that they paid people to open Mercenaria clams and make blanks. These goods and services were obtained from surrounding households of the northern New Jersey countryside. Diffuse surrounding locations were where others (apparently predominantly women) produced wampum beads. Even in the 19th century the slow steady produce of many households generated tens of

thousands of wampum beads. These were purchased along with the ornaments and funneled to jobbers supplying the western trade.

Judging by advertisements spanning the 1770 to 1800 era in New York newspapers, the early stage of the documented 19th century shell ornament industry was reflected in a vigorous trade in “black and white wampum, hair pipes and moons” carried out in the vicinity of New York City (Ewers 1957; Williams and Flinn 1990:28) from at least the Revolutionary War era.

Erminnie Smith (1885) documented that the Campbell family, the last remaining producers and the source of the most detailed the 19th century descriptions of this industry, had relocated their business from Edgewater (also in Bergen County but on the west bank of the Hudson River opposite Manhattan) to Hackensack two generations before (thus about 1800?). The question of how many other cottage industries producing wampum were formerly operating in Bergen County, New Jersey and elsewhere is open, but according to Chesebro (1872) there is little doubt many such establishments existed during post-Revolutionary times.

In the days of John Jacob Astor . . . and in the days of the Hudson Bay Company, ...from Hackensack up the valley of the Hudson River for a distance of fifteen or twenty miles, all the way you would have found . . . establishments resembling this [the Campbell Factory].

Wampum aside, Williams and Flinn (1990) provide the most comprehensive account of 19th century Bergen County shell ornament production and explore the available evidence of how middle 18th century cottage industries making ornaments might be antecedent. But these historical accounts have had essentially nothing to tell us about the emergence and continuity of the mid-17th century SMS industry. To what degree did the northern New

Jersey region produce these products “from very early times?” For a partial answer, I turn to a comparison of 17th and 19th century shell ornament technologies.

Comparing SMS and the Nineteenth Century Shell Industry

If even the 19th century shell ornament industry was never industrialized, then the technological modes of that shell ornament production should be examined to help illuminate the question of SMS authorship. Lynn Ceci began an approach to this question very near the end of her career. Part of her extensive June 1986 “Technical Report: The Origins of Wampum among the Seneca Iroquois” included x-ray images “*to better examine technological aspects of their manufacture*” (Ceci 1986:iv and Appendix E). The Research Division at Rochester Museum and Science Center retains a series of 13 of Ceci’s radiographs of shell beads associated with her 1986 report. Part of one of these is presented here as Figure 4.1.

Ceci’s image contains a string of disk runtees dated 1655–1670 (#534-28, Dann site) and pipe beads dated 1670–1687 (#248-29, Rochester Junction site). Another radiograph includes rectanguloid runtees dated 1640–1655 (#669-24, Power House) and a necklace of claw shaped SMS beads dated 1655–1670 (#6021-28, Dann site). Thus a small but comprehensive array of SMS ornaments dated 1640–1687 is represented.

We can compare the steps of 19th century shell ornament manufacture (as recorded from direct observation by Barber and Howe 1846 and Chesebro 1872) against Lynn Ceci’s radiographs (Note: these 11 steps are from Barber and Howe’s account, but I have taken editorial license, closely paraphrasing their text to distill procedures and apply them to products above and beyond wampum beads).



Figure 4.1.
Radiograph by Lynn Cici

Pipe beads: (248-29) Rochester Junction, 1670–1687 A.D.

Runtree necklace: (#534-28) Dann site, 1655–1670 A.D.

(Images courtesy of the Rochester Museum and Science Center)

1. A blank is created from raw shell with a light sharp hammer.
2. It is clamped in the sawed crevice of a slender stick.
3. While being held in both hands, the blank is ground smooth on a [water or foot-powered] grindstone until ready for boring.
4. The blank is inserted into a similar piece of wood fastened firmly to a bench. Part of this wood projects over the end of the bench, where a weight causes a sawed orifice to clamp down on the blank, making it ready to drill.
5. The iron drill [bit] is made, ground to a proper shape and tempered over a candle.
6. A rude ring, with a groove on its circumference, is put on the drill [bit], around which the operator curls the string of a common hand bow.
7. The other end is braced against a steel plate on the breast of the operator and boring commences.
8. About every other sweep of the bow the drill (still turning) is drawn out, cleaned and cooled by drops of water, in order to clear debris and reduce the buildup of heat.
9. When bored halfway, the bead is reversed and the operation repeated.
10. Finishing is accomplished with a wire fastened at one end of a bench. Under and parallel to the wire is a grindstone, fluted on its circumference, hung a little out of the center so as to be turned by a foot-powered treadle.
11. The wire-strung beads are applied to the fluted surface of the revolving grindstone and spun by a flat piece of wood until they are round and smooth. [End of paraphrasing].

The mid-17th century technological attributes revealed in Ceci's radiographs, along with my personal inspections of thousands of SMS ornaments, indicate that SMS technology compares extremely well to mid-19th century descriptions of shell ornament manufacture. In essence, no technological difference can be noted.

For instance, well-preserved 17th century disk runtees are typically ground perfectly flat in cross-section and generally quite round in circumference, implying that flattening by extensive grinding was not a major impediment. This may reflect that foot or water power drove the grinding process rather than simple hand grinding. Disk diameters vary widely, but thicknesses are more uniform. Typical thicknesses run about 4 mm, approximately twice the diameter of their transverse drilled suspension holes, although some disk runtees are as thick as 6 mm.

Grinding

Shaping of 17th century pipe beads is also essentially the same as the 19th century hair pipes, although the latter have a characteristic taper at each end rather than being perfectly cylindrical. As Ceci notes, SMS pipe beads give the impression that they are made on a lathe. Indeed, the 17th century pipe beads are uniform, near perfect cylinders ground smooth. These pipe beads were likely manufactured from sawed rectangular blocks cut from the thickened lips of large warm water conchs, just as the 19th century Plains hair pipes were. It may be that the approximate 15 cm maximum length of the 17th century pipe beads is a natural limit imposed by raw material.

Drilling

Both 19th and 17th century ornaments were drilled halfway from each direction. Ceci's radiographs reveal that ornament drillings seldom align perfectly and misalignments appear to become more frequent with the length of bore holes. Whatever jig or crude lathe was used to guide the drill alignments for 17th century disk runtees and pipe beads was clearly subject to personal skill and individual judgment and was unlikely to have been substantially different than the 19th century descriptions. Some of the 17th century drill holes also show clear evidence of the incremental hole clearing procedures when the bit was periodically slightly realigned when reset.

To summarize, I perceive no difference between the technology of mid-17th century SMS production and the mid-19th century descriptions of the Plains marine shell ornament industry. These two industries reflect technological continuity for approximately 200 years, with the first major technological "leap forward" being the circa 1842 invention of the hair pipe drilling machine by the Campbell brothers (Williams and Flinn 1990:53).

Pre-Analyses Overview

The observations in this and the previous chapter represent an effort to frame my questions regarding SMS. These questions are necessarily rudimentary. Firstly, within this cultural and economic network, who are the producers of SMS? Many different pieces of evidence point in the same direction. The best explanation is that SMS is a result of an entrepreneurial European mentality that perceived a potential mode of production linked to a body of consumers and moved to take advantage of that opportunity. Certainly this does not mean that an entire industry was conceived of *in toto*. More likely a series of stepwise successes lead to incremental changes and revisions.

This feedback, if it can be shown, becomes one of the more interesting intercultural aspects of the SMS industry. The emergence of standardization and use of component parts as a production strategy, the use of European derived decorative technologies, and import of West Indian conch shells, all make it likely European settlers discerned a market for SMS ornaments and created a specialized cottage industry to supply it.

This does not mean that Native groups were not capable of SMS production as a cottage industry, but such behavior was unlikely in the early and middle 17th century native cultural context. Engagement in the modes of SMS production seen here, which implies an multi-staged entrepreneurial endeavor, would have involved very differently perceived fields of social obligation and opportunity than those in which 17th century Natives of the Northeast tended to participate. The early beginnings of SMS mitigate against such a radical departure.

Richter (2001:51) comments:

there is little evidence from the early to mid-17th century that anything resembling the acquisitive, individualistic, profit-seeking values of Western European capitalism became widely sanctioned in eastern North America, where traditional economic patterns

remained strong. Individuals who engaged in openly acquisitive behavior encountered social disapproval rooted in almost universal Native attitudes towards property rights, which emphasized need and use rather than possession and accumulations.

From the discussion above, SMS products are too uniform to have disparate producers, and the earlier forms seem disconnected from previous forms of Native expression. Even the apparent convergence with Native symbolism seems to indicate intentionality progressively conditioned into the product by its consumers. Chronology and distribution will provide added perspective, but it seems clear that SMS is made by someone thinking of the consumers as some semblance of a market, and of their own labor as regulated by production-based sensibilities.

Such a distinctive industry would leave a notable signature, if not in documented observations, then in finished examples, shell waste and other byproducts (e.g., grind stones, discarded drills), as well as “wasters.” Williams and Flinn (1990:29) have documented post-1770 examples of such workshops in Bergen County, New Jersey, but no SMS ornaments and/or 17th century workshops have been found. Because the Hackensack Valley was not settled until somewhat after the beginning of the SMS industry, these workshops might be expected further east, along the New Jersey shore opposite Manhattan, or in Manhattan proper. Enough excavation has been done in Native villages that we have reasonable expectation that manufacturing evidence there would have been recognized. But if SMS manufacture is centralized and debris located in areas covered by subsequent 18th, 19th, and 20th century development it is quite conceivable that we would have no evidence.

The observations in these two chapters have taken us as far as we can go without a quantitative exploration of SMS. Probabilities seem to be indicated but only circumstantial evidence has been brought to bear on them. A data-driven approach to SMS will firmly

frame the historical parameters of the SMS industry and allow us to make a more exact approach to some of the basic questions about Standardized Marine Shell ornaments.

CHAPTER 5

MATERIALS AND METHODS

As indicated, this study is the first to consider Standardized Marine Shell ornaments as a delimited analytic construct. Because no comprehensive perspective on SMS exists, and because so much of the extant sample of SMS has limited records of contextual associations beyond the site level, the major goal has to be to assemble ornaments attributes which allow examination of distributions and associations. Time, space, and site level associations are the stuff of this analysis.

Prior research perspectives have focused on SMS as part and parcel of a major resurgence of imported shell after 1630, which also includes raw marine shell, increasingly massive amounts of wampum, and some forms of clearly Native manufactured marine shell ornaments. Frequent note has been made of some of the ornaments' standardization, and recent researchers have tended to express the opinion that SMS ornaments were "made elsewhere" rather than the sites where they have been found. Focus on changing marine shell use and shell importation patterns has framed the questions that understanding SMS may address, but has not brought resolution to the question of origins of the standardized shell ornaments.

This is why my focus (and my definition of SMS) has been restricted to those forms that both employ these extensive grinding and shaping technologies in conjunction with cylindrical metal drill perforations and simultaneously appear as "standardized" forms across a variety of ethnic groups. Many of the forms thus set off also have decorative modes exclusive to SMS,

enhancing the interpretation of these forms as a distinct industry and making assembly of an analyzable inventory a relatively straight-forward, if broad-based, enterprise.

SMS Standardization and Formal Categories

I list 39 known SMS forms in Table 1.1 (although a few are generic consolidations). These are the categories under which the inventory was assembled. I subsequently amalgamated these “Level 2” forms into nine composite categories (Level 1), which I use for several initial examinations of SMS distributions and associations, but the Level 2 categories have rather easily proved themselves the most productive of insights into the SMS industry.

The Level 2 forms represent what I take to be production-based mental templates. Specifically, I suggest these roughly approximate “emic types” in the sense that these forms generally existed in the minds of their makers as bounded categories. As evidence for this I note that the sample of SMS ornaments was quite easily (unambiguously and without significant boundary issues) catalogued into my subjectively defined modalities without generating any questions of gradation. I suspect that the reason for such clarity (bounded types) refers back to my initial observations that SMS seems to be a necklace industry, one whose objects’ degree of sameness is the result of intent to create displayed sets of like items. This alone would engender relatively rigidly conceived production templates. Even so, a widespread craft industry with many producers and dedicated to explicitly standardized forms would still tend to generate significant variations in style that would automatically distort type attribute modalities. Thus the clarity of these types themselves necessarily provides insight into either the rate or scale of SMS production (Roux 2003).

Having made the claim that the SMS forms I use approximate emic types, I am not suggesting that my taxonomy draws any particular analytic significance from being closer to a “discovered” type. The difference between sharply bounded typological sets and “real” or natural types is fraught with confusion (Tomášková 2005:82–85). There are certainly other potentially useful ways in which one might categorize these ornaments. I chose to emphasize form over drilling/display technologies. But a focus on suspension technology would combine various forms together under runtee-like, neck suspended, gorget, and various bead forms that might give additional insights into production. Resolution of the old typological arguments in archaeology has largely been achieved by the understanding that the only measure of archaeological types, regardless of how they are generated, is the analytical purposes they can serve and whether or not they provide replicable categorizations (Adams and Adams 1991:278–284). Given the lack of ambiguity in my sorting of SMS ornaments and the clear temporal ordering of those types within the industry’s history that I demonstrate below, I am satisfied that my types are both replicable and useful.

A few more comments about standardization are in order. I have observed that, although each SMS ornament is individually crafted, the standardization of forms is unmistakable. Archaeologists are interested in standardization for several reasons. For several decades archaeologists have noted standardization related to craft specialization is an often useful proxy for diagnosing the emergence of increased complexity in middle range societies (e.g., Costin 1991; Costin and Hagstrum 1995; Eerkens 2000; Longacre 1999; Rice 1991). Standardization is closely linked to routines and often emerges from choices in production pathways. In particular, high rates of production have been linked to levels of standardization that exceed individual producer induced variation (Roux 2003). Further considerations of the

“standardization hypothesis” have come to the conclusion that standardization can also relate to a variety of social messages signaling status, group identity, or ideological affiliations (e.g., Blackman, et al. 1993; Wattenmaker 1990). Thus standardization within production can be closely linked to socio-political factors (Berg 2004). For instance, Thomas (2011) examined a pertinent case where standardization of rare, exotic, or otherwise highly valued materials employed in lapidary production may have been instrumental in construction of social identities.

Regardless of the authorship of SMS negotiation of social identities is probably foremost among potential hypotheses exploring Native acceptance and social deployment of standardized SMS ornamentation. Individuals’ status, ornaments’ distinctiveness, and association with the rapidly emerging Dutch/Native economic networks are some of the meanings with possible explanatory value that come to mind. But the basic facts of SMS production first need to be ascertained.

Not surprisingly, variations within SMS form and decoration do exist. These might relate to temporal style drift or variation in contemporary executions by individual producers. In Appendix E, I delineate several of the more obvious temporal style progressions, such as within beaver pendants and the sequence of “pelt type” forms. But overall, the fact that further systematic style divisions based on minor features would generate subdivisions beyond the robustness of the available sample provides a defense that my form categories are proper analytic sets.

Untracked Forms

Several Level 2 forms were not selected for tracking in my final inventory. As I explain in Appendix E, I regret this decision and make some effort in the descriptions for those forms to correct for the loss of information. This decision was made on the basis of two considerations. Early on in my literature survey I made a judgment whether examples of any given form could be reliably identified without personal inspection. At the time I had no idea I would be able to personally inspect over 70 percent of the final inventory.

Flat, perfectly round disk beads with cylindrically-drilled perforations were part and parcel of the SMS production format, but could not be reliably identified in literature search and would necessarily be greatly under-represented (or worse, conflated with non-SMS flat discoidals). “False positives” would be damaging to my analysis. Two distinct SMS varieties of discoidal beads (thick narrow diameter versus thin wide diameter) exist (Figure 1.2:c–d). I also extended the same regrettable criterion to the irregular (also called “massive”) beads (Figure 1.2:b) made of smoothed chunks of large columella perforated by metal-drilled holes, and for heavy barrel-shaped beads (not illustrated). Two other SMS forms (funnel-shaped tubes and human faces) were both rare and lacked easily examined attributes, so by the time they were identified some examples had been bypassed. Of these six untracked forms, only flat discoidals and irregular/massive beads are common.

The final SMS inventory thus tracked 33 forms. The resulting inventory captured 4,845 ornaments (Table 5.1) and was carried out in four distinct stages.

Table 5.1. Inventory of Standardized Marine Shell ornaments by form

Level 1 Taxa		Level 2 Taxa	
Anthropomorphic	9	Birdman	9
		Human face *	rare
Zoomorphic	676	Generic bird	25
		Owl	38
		Goose/Loon	414
		Large Goose	8
		Bird Head	52
		Fish	41
		Beaver	24
		Otter	7
		Pelt form A (elaborate beaded)	18
		Pelt form B (dressed)	13
		Pelt form C (bipointed)	11
		Generic quadruped	4
		Turtle	1
		Other effigy	3
		Snake/“Lizard”	2
		Unidentified effigy	15
Gorget/Medallion	16	SMS gorget	14
		SMS medallion	2
Pipes/Tubes	1,597	Large tube	3
		Standard pipe bead	1,594
Runtree forms	933	Disk runtee	536
		Circuloid runtee	190
		Rectanguloid runtee	197
		Reworked disk runtee	4
		Runtee, unknown form	6
Triangle forms	427	Isosceles—Apical Drilled	65
		Isosceles—Vertical Drill	26
		Isosceles—Indeterminate drilled	13
		Triconcave (aka “arrowhead”)	323
Two hole crescents	962	Large Crescent	15
		Standard crescent	947
Claw	200	Claw	200
Other forms	25	Star/Cross	9
		Geometric Unique	13
		Cone/Pyramid	3
Bead forms	n/a	Flat discoidal *	common
		Irregular (“massive”) *	common
		Thick discoidal *	rare
		Ovoid Barrel bead *	rare
		Funnel/tube bead *	rare
Total	4,845		4,845

*This SMS form not tracked. See discussion in Appendix E.

Executing the Inventory

An earlier exploratory survey (Esarey 2007, 2009) focused on a single SMS form (disk runtees) and provided me both geographic and temporal exposure to the scope of the SMS problem. Initiating the full scale study, I attempted to locate all published examples of SMS. To do this my literature survey attempted to examine all relevant archaeological literature for all historic period Native sites between approximately 1620 and 1720 A.D. between the Mississippi River and Atlantic Ocean and from just south of the 35th degree latitude (approximately the southern border of Tennessee) northward to southern Ontario. On the south edge this was an attempt to execute full searches inclusive of the furthest south examples I had been able to find using other means (thus including Tupelo, Mississippi, and the entire Tennessee River drainage). Although I knew SMS ornaments were found in the far western Arikara sites, I also knew the marine shell forms of the Midwest and eastern Plains well. and a number of well-versed informants provided me with added assurance that the cases of SMS I was aware of west of the Mississippi were the only ones they had ever encountered (e.g., Billeck, personal communication May 2011; Henning 2005; Lippincott 1997–2000). The northern boundary is effectively the narrow band north of the Great Lakes where large populations were active in the trade during the 17th century.

The comprehensiveness of this survey was particularly aided by Robert Grumet's (1995) encyclopedic volume which provides references and summary tables for historic sites in various regions of the Northeast.

At the end of the literature search my SMS inventory totaled approximately 1,300 ornaments from 120 locations. Additionally, the comprehensive literature search identified

curatorial facilities where the largest and most important collections of SMS are curated, and identified nearly all SMS forms that could be tracked by both literature and repository visits.

Repositories

The third and final data-gathering stage was selection of repositories and direct examination of SMS ornaments. The eventual inventory of 4,845 SMS ornaments is distributed in at least 37 repositories. Slightly over 15 percent of these ornaments either have unknown curation or are in private hands.

Table 5.2 provides an overview of SMS curation and indicates collections personally inspected (11 public institutions). Four major museums (National Museum of the American Indian, New York State Museum, Pennsylvania Historical and Museum Commission, and Rochester Museum and Science Center) were selected because of the size of their SMS collections, while SMS ornaments at seven other institutions were targeted either because these materials represented SMS outliers or were easily accessible.

A total of 3,721 SMS ornaments were located in these 11 institutions, representing nearly 77 percent of my sample. Notes and photos from several other collections were provided by colleagues.

Repository Methods

At each repository every effort was made to comprehensively search for each SMS ornament in the institution. Collections of archaeological marine shell ornaments were organized in slightly different ways and access to the collections ranges varied slightly, but

Table 5.2. SMS ornament curation (includes probable collection locations and prior holdings now repatriated)

Visited	Curation	# SMS
	Buffalo and Erie Co. Historical Society and Buffalo Museum Science	1
	Carnegie Museum of Natural History, Pittsburg, PA	13
	Cayuga Museum of History and Art, Auburn, NY	32
	Chickasaw Nation History Research Center, Sulpher, OK	9
	Cornell University, Ithaca, NY	7
	The Danish Royal Cabinet, Copenhagen, Denmark	1
	Delaware Water Gap NRA, National Park Service	49
*	East Carolina State University, Greenville, NC	58
	Fort Plain Museum, Fort Plain, NY	10
	Geneva Historical Society, Geneva, NY	10
	Hershey Museum, Hershey, PA	5
*	Illinois State Museum, Springfield, IL	28
	Lorenzo State Historic Site, Cazenovia, NY	1
	Montgomery County Historical Society, Fort Johnson, NY	1
	Mohawk-Caughnawaga Museum, Fonda, NY	1
	McMaster University, Hamilton, ON	2
	Mashantucket Pequot Museum and Research Center	53
	Michigan State University Museum, East Lansing, MI	81
	New Jersey State Museum, Trenton, NJ	7
*	National Museum American Indian, Washington, DC	460
	National Museum of Natural History, Washington, DC	15
*	North Museum of Science and Natural History, Lancaster, PA	32
*	New York State Museum, Albany, NY	632
	“Ontario Provincial Collections” (now ROM, Toronto, ON)	9
*	Pennsylvania Historical & Museum Commission, Harrisburg, PA	296
	Peabody Museum of Archaeology and Ethnology, Cambridge, MA	6
*	Rochester Museum and Science Center, Rochester, NY	2,030
	Royal Ontario Museum, Toronto, ON	34
	South Dakota Archaeological Research Center, Rapid City, SD	6
	Susquehanna Heritage Park, York County, PA	30
*	Research Laboratories Archaeology, UNC–Chapel Hill, NC	29
	University Pennsylvania Museum, Philadelphia, PA	1
*	University of Tennessee–Knoxville	57
*	University of Wisconsin–Oshkosh	4
*	Virginia Department of Historic Resources, Richmond, VA	56
	Victoria Mem. Museum (prob. now National Museum), Ottawa, CA	5
	Wisconsin Historical Collections, Madison, WI	12
	Last known curation = private collection	251
	Curation unknown	509
	Field recorded, but reburied	2
Total		4,845

full visual inspection and photography of all marine shell artifacts from all Historic era sites (including items on display) was effectively achieved in each case.

I arrived at each repository with a list of SMS ornaments that my literature search had indicated would be housed there. This list was not a guide to the search as much as a cross-check whether the search (which turned up many additional ornaments) had been comprehensive enough to locate these known specimens. At National Museum of the American Indian (NMAI) and Rochester Museum and Science Center (RMSC) I was able to directly access each pertinent collection drawer. At NMAI all contents of all drawers from the same geographic parameters of the literature search were visually inspected for shell ornaments. At New York State Museum (NYSM) and Pennsylvania Historical and Museum Commission (PMHC) curators intimately acquainted with the archaeological collections attempted to find any and all shell ornaments from all historic era Native sites, typically pulling all marine shell encountered for my inspection. At NYSM I subsequently entered the collection ranges and systematically searched county drawers for additional examples, satisfying myself that very few marine shell ornaments could have been missed.

A total of 19 work days were spent in various repositories recording SMS ornaments. Allowing for examples already in my inventory, repository visits added roughly 3,500 SMS ornaments. Thus more than 70 percent of my total inventory is previously unpublished.

Documentation Procedures

The goal of repository visits was to create a comprehensive inventory of SMS ornaments with observations organized by the formal categories substantiated by my literature survey. SMS

ornaments and ornament sets were recorded in such a way that they would either add unique entries to the SMS inventory, or supplement entries already generated by the literature search.

The primary record for each ornament was high resolution (3264 x 2448 pixels) photographs accompanied by detailed photo logs. Easily available contextual and metric information was also captured in the photo logs. When I encountered very large sets of ornaments I focused on recording thicknesses and bore diameters (attributes not observable in record photos). Other metrics on many items could still be assembled from the scaled photographs if desired for future research. Approximately 3,950 images were recorded on repository visits dating April 2011 to January 2012. A full set of the digital images and data files is on file at the Research Laboratories of Anthropology at the University of North Carolina and the Illinois State Archaeological Survey at the University of Illinois.

The Master Inventory

The final stage of generating an inventory for analyses required organizing available information on each item, or set of like items, into a relational database, with extensive cross-checking to combine duplicate entries generating by encountering some ornaments in both literature and repository search.

The master inventory enumerates 4,845 individual SMS ornaments from 158 locations and includes attributes of archaeological context, curation, ethnic affiliation, assigned site dates, artifacts' decorative, technical and metric attributes, citations to publications, and cross-references to my photo log designation and any other published images. The various analyses in this study proceed from the subset of fields represented in Appendices A and B.

Exact latitude/longitude for each location at or near archaeological site level was recorded in the data base to support distributional mapping (Appendix G), but exact locations are not presented in the appendices.

The 4,845 ornaments in the inventory are divided into a total of 42 SMS categories. In addition to the 39 formal categories three generic categories (reworked disk runtees, runtees of unknown form, and isosceles triangle pendants with unknown drilling) were defined in order to record the relatively few cases where fragmentary items rendered more specific identification impossible. Figure 5.1 gives a first quantitative overview of the industry, graphing the tabulated Level 1 form categories. As described above six of the 39 Level 2 forms were not tracked. Either their rarity did not allow them to be identified until well into the study or it was not possible to identify the form consistently in archaeological literature (see Appendix E).

Conditioning the Inventory for Analyses

The 158 locations for SMS ornaments listed in Appendix A and B are located in 18 states or provinces (Figure 1.4 and 3.1). At this most general level no attempt was made to differentiate between archaeological sites and more general designations. Rather, the closest specific locator to archaeological site level (town, township, county, or state) was used.

Some artifacts not assigned to specific sites have nonetheless been assigned ethnicity when their location is so specific as to preclude all but a specific affiliation. For instance, an ornament said to be from Cayuga County, NY can be assigned a Cayuga affiliation because of the persistent Cayuga tenure in the region during the entire period in question. Likewise,

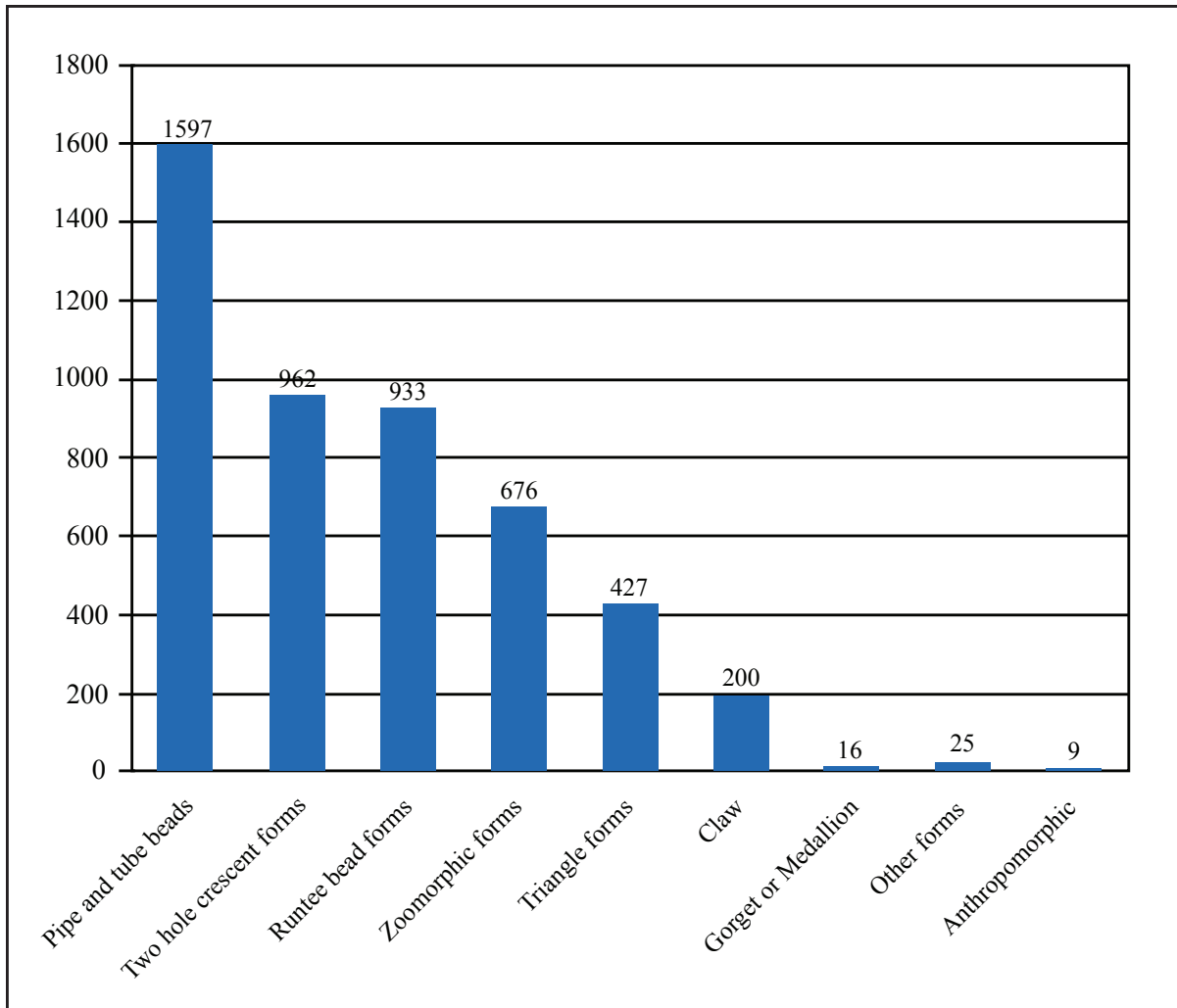


Figure 5.1.
Numbers of SMS ornaments in Level 1 form categories

artifacts listed as “Pompey” are unhesitatingly designated Onondaga, even though several specific sites are included in this original designation by Beauchamp.

A total of 36 ethnic identifiers (Table 5.3) were used to list ornament affiliations, although some sites were recorded as conjoined ethnic categories from this list. Appendix B provides the ethnic affiliation of locations in Appendix A. Cases listed in Appendix A not present in Appendix B are those in which geographic attributes are unknown, or nearly so (e.g., state level).

Table 5.3. Ethnic affiliations and corresponding geographic/ethnic general affiliation categories¹

Arikara	(PLNS)	Occaneechi	(NCVA)
Arikara/Pawnee	(PLNS)	Omaha (and others)	(PLNS)
Cayuga	(CYUGA)	Oneida	(ONEID)
Chickasaw	(CSAW)	Onondaga	(ONDGA)
Erie	(PREONT)	Ottawa	(POSTONT)
French (military)	(OTHR)	Pamunkey	(NCVA)
General Iroquoian*		Peoria	(18WGL)
Huron	(PREONT)	Pequot	(LISNE)
Ioway/Oto	(PLNS)	Sara	(NCVA)
Lorette Huron*		Seneca	(SENCA)
Meherrin/Weyanoke	(NCVA)	Susquehannock	(SUSQ)
Mesquakie	(18WGL)	Tionnontate Huron	(PREONT/POSTONT)
Mixed groups	(OTHR)	Tunxis?	(LISNE)
Mohawk	(MOHK)	Tuscarora	(NCVA)
Montauk	(LISNE)	Unknown**	
Munsee	(MUNSE)	Wampanoag	(LISNE)
Esopus (Munsee)	(MUNSE)	Wenro/Neutral	(PREONT)
Neutral	(PREONT)	Wyandot	(POSTONT)

¹General affiliation aggregates in this list consist of: 18th-century Western Great Lakes (18WGL); Cayuga (CYUGA); Chickasaw (CSAW); Long Island and Southern New England (LISNE); Mohawk (MOHK); Munsee (MUNSE); North Carolina and Virginia (NCVA); Oneida (ONEID); Onondaga (ONDGA); Plains (PLNS); Pre-dispersal “Ontario” (PREONT—includes pre-1650 Niagara Frontier sites); Post-Dispersal “Ontario” (POSTONT); Seneca (SENCA); Susquehannock and related groups (SUSQ). Appendix B gives sites and locations and Appendix C lists sites per category.

*Records eliminated from analyses due to inadequate chronological/ethnic specificity.

To provide another level of analytic comparisons ethnic identifiers were aggregated into general affiliation categories (Table 5.3 footnote). These aggregate categories provide a way of sorting sites along lines that respect both spatial and cultural factors. In the SMS core area (Figure 3.1) general affiliation categories align strongly with limited ethnic divisions, although the temporal distinction has been maintained between pre-dispersal and post-dispersal groups in the southern Ontario region and Niagara Frontier.

Among the spatial outliers in SMS sites (18th century Great Lakes, Chickasaw, Long Island and Southern New England, North Carolina and Virginia, and Plains) multiple ethnic groups tend to be lumped together to emphasize spatial and temporal affinities.

Site beginning and ending dates take on a central analytical role in reconstructing the SMS industry's stages and tenure. The colonial period in the Northeast is blessed with wonderfully accurate (exact or closely estimated) site occupation dates. These are the result of decades of extensive document research and cross-indexing sequences of site relocations and artifact type sequences (Bradley 1987; Ellis and Ferris 1990; Fitzgerald 1990; Grumet 1995; Kent 1989; Sempowski 1989; Wray 1973; Wray and Schoff 1953; Wray, et al. 1987). The central pillar of these chronological controls, both spatially and in terms of the quality and sample-driven robustness of data available to support it, is the Seneca sequence pioneered by Charles F. Wray. Because marine shell ornaments have played no significant role in assigning specific site dates, there is no circularity in using these dates to ascertain the record of availability of SMS ornaments for circulation and entry into the archaeological record.

Appendix B includes site occupation spans used in this study. Although these site spans are necessarily listed as specific years in order to date the individual forms (see Appendix E), it should be understood that these dates are best guesses. Only in some cases is it definitively known that this or that exact year is the beginning or ending of the occupation.

In the analyses that follow, assigned site occupation spans allow extraction of the chronological affiliation of each SMS form using a replicable metric (Span Factored Annual Percentage—see Chapter 7) that collates temporal assignments for each form across a large number of sites. Readers should understand that the effect of any small errors or differences of opinion about the beginning and ending dates for any particular site are minimized because the method takes equal account of each year within the date span. This minimizes the effect of assigning one particular year versus another as a site's beginning or ending occupation date. Specifically, the annual percentage method gives a progressively heightened profile to any year

that is recurrently documented by all of each form's various entries. More importantly, the method automatically minimizes the effect of any outliers generated by expansive or overly general estimated site occupation spans. This is explained in detail below.

Questions Addressed by the Analyses

This is an exploration of a previously undefined and largely forgotten industry. The questions I focus on are necessarily general. Where are SMS ornaments found? What is the meaning of SMS distribution in terms of production and circulation? In what ways does SMS distribution reflect the economic networks of the time in the colonial Northeast? What can the variable distribution of SMS forms between sites, regions, ethnicities tell us? Do patterns of the SMS distribution illustrate or tell us more about the dynamic connections between different groups during the mid-17th century? Does SMS illustrate patterns of down-the-line trade or is its exchange conditioned by other factors?

Do SMS forms differentially sort to specific groups and/or times? How much variety is found in site assemblages of SMS and which groups have or do not have these assemblages at what times? Is lower assemblage diversity present in geographic outliers and, if so, is that a reflection of cultural or temporal processes. With reference to ethnic affiliations, variations in the forms possessed almost certainly would reflect relations with SMS producers, time, economy, marketing strategy, and thus possibly provide vital clues to production.

Only archaeology can place SMS in historical context. Because northeastern colonial period sites offer fine-grained temporal controls, even an initial rough ordering by mean occupation dates showed that the industry was temporally staged (Esarey 2011). In developing a more sophisticated manipulation of the site dates I had every reason to hope

to discover the discreet evolution of the industry, including introduction, popularity and discontinuance of various forms. My analyses below provide this information.

CHAPTER 6

AN INITIAL EXPLORATION OF THE SMS INDUSTRY

An initial understanding of SMS can be obtained by a quick reference to distribution of the major samples of SMS ornaments. Figure 6.1 presents raw counts for the 46 largest assemblages (sites containing 20 or more ornaments) with a total of 4,412 ornaments (91 percent of all SMS) represented. These 46 sites represent only 29 percent of the 158 total sites/locations for SMS. A majority of locations contain only a few SMS ornaments each.

SMS Distribution—Where and When

Large assemblages of SMS ornaments are widely distributed. Figure 6.1 presents all the major regions where SMS has been found. For instance, sites in the Plains (Larson), Midwest (Lasanen, Fletcher, River L'Abbe), Virginia/North Carolina (John Green), and pre-dispersal Ontario area (Grimsby, Lake Medad) are present. Core area sites are liberally represented as well. The top ten site assemblages by raw counts are Seneca (5 sites), Cayuga (1 site), Onondaga (1 site), Susquehannock (2 sites), and Munsee (1 site).

That said an extraordinary proportion (34.7 percent) of all SMS ornaments are in two sequential Seneca sites (Dann and Rochester Junction). In fact, 21 percent of all SMS ornaments (937 items) are at the Dann site alone. These two sites adequately illustrate the degree to which certain Seneca sites contain most SMS ornaments. They also show the peak

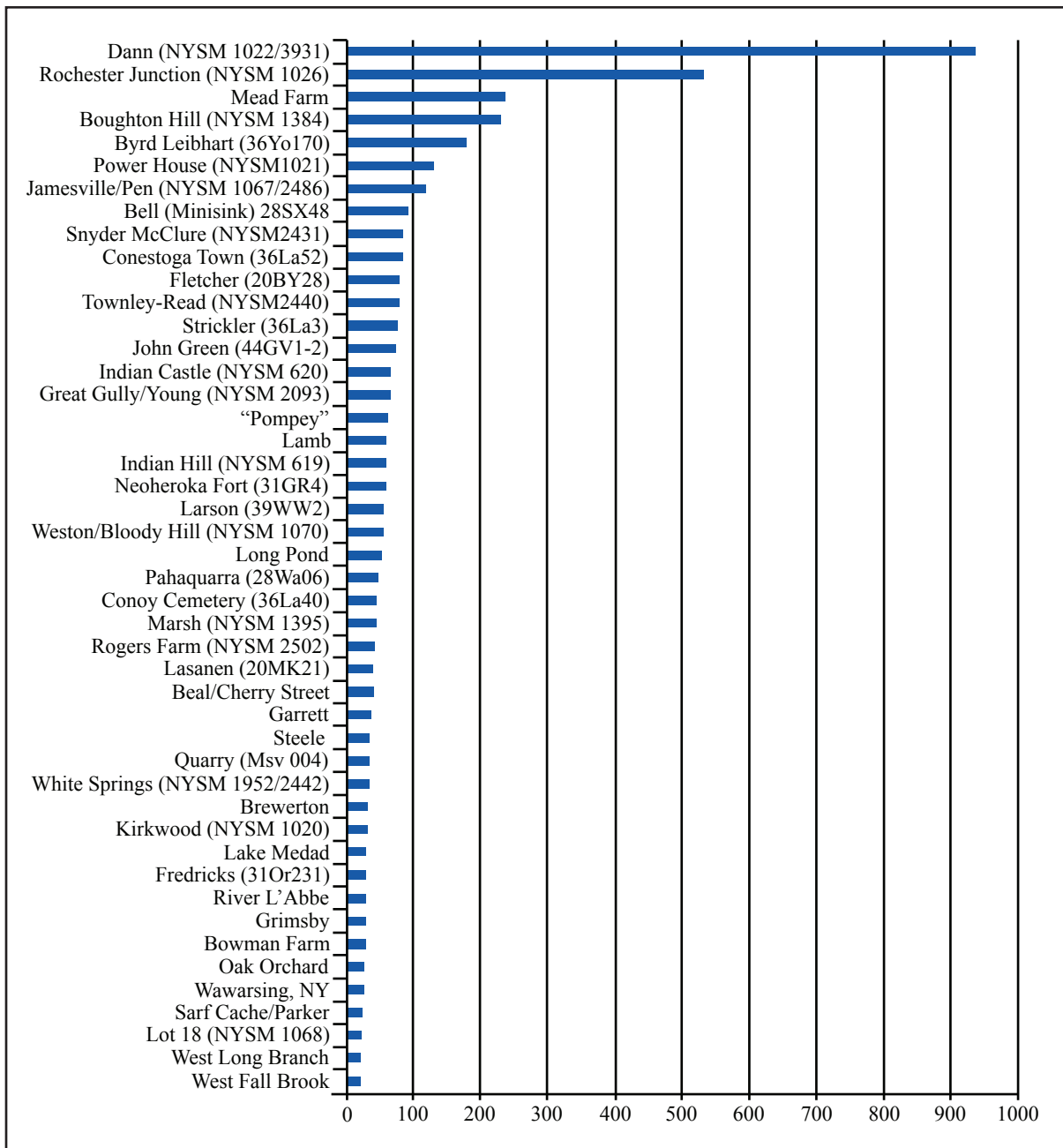


Figure 6.1.
Sites with 20 or more SMS ornaments (N = 46 sites and 4,412 ornaments)

time period for SMS material (spanning as they do the 1655–1687 period). As noted long ago (Wray 1973) these decades are typified by these SMS ornament forms on many sites.

The site with the 11th largest assemblage illustrates the problem with putting any further emphasis on this particular mode of representing SMS assemblages. A total of 81 SMS ornaments were found at the mid-18th century Fletcher site in Michigan. Not only is this site noticeably later and far from the SMS core area, but only a single form (triconcave beads) was present. All the beads derived from a few necklaces. This “necklace effect” emerges as a recurring limitation below.

Geographic and Ethnic Distribution: An Initial Exploration

The ethnic affiliations of those holding SMS outside the core area quickly splinter into many groups with small numbers of SMS ornaments. These are too many groups with too few ornaments to represent without aggregation. The general affiliation categories (presented in Table 5.3 and detailed in Appendix C) provide a useful way to aggregate these data. Figure 6.2 presents a distribution of raw counts of SMS ornaments by general ethnic and geographic affiliations. This data set retains almost 93 percent of all SMS ornaments (127 sites/locations with 4,501 SMS ornaments). This graph has been arranged in such a way as to put the SMS core area in the middle bracketed by peripheral groups in an attempt to make the frequency distribution more spatially coherent.

Following upon observations from Figure 6.1, it is notable that 50.2 percent of all SMS ornaments are found on Seneca sites. This apparently massive disproportion requires explanation. Equally compelling is the related observation that there seems to be a west to east clinal distribution in Five Nations SMS use. Not only are 70.9 percent of all Five Nations SMS

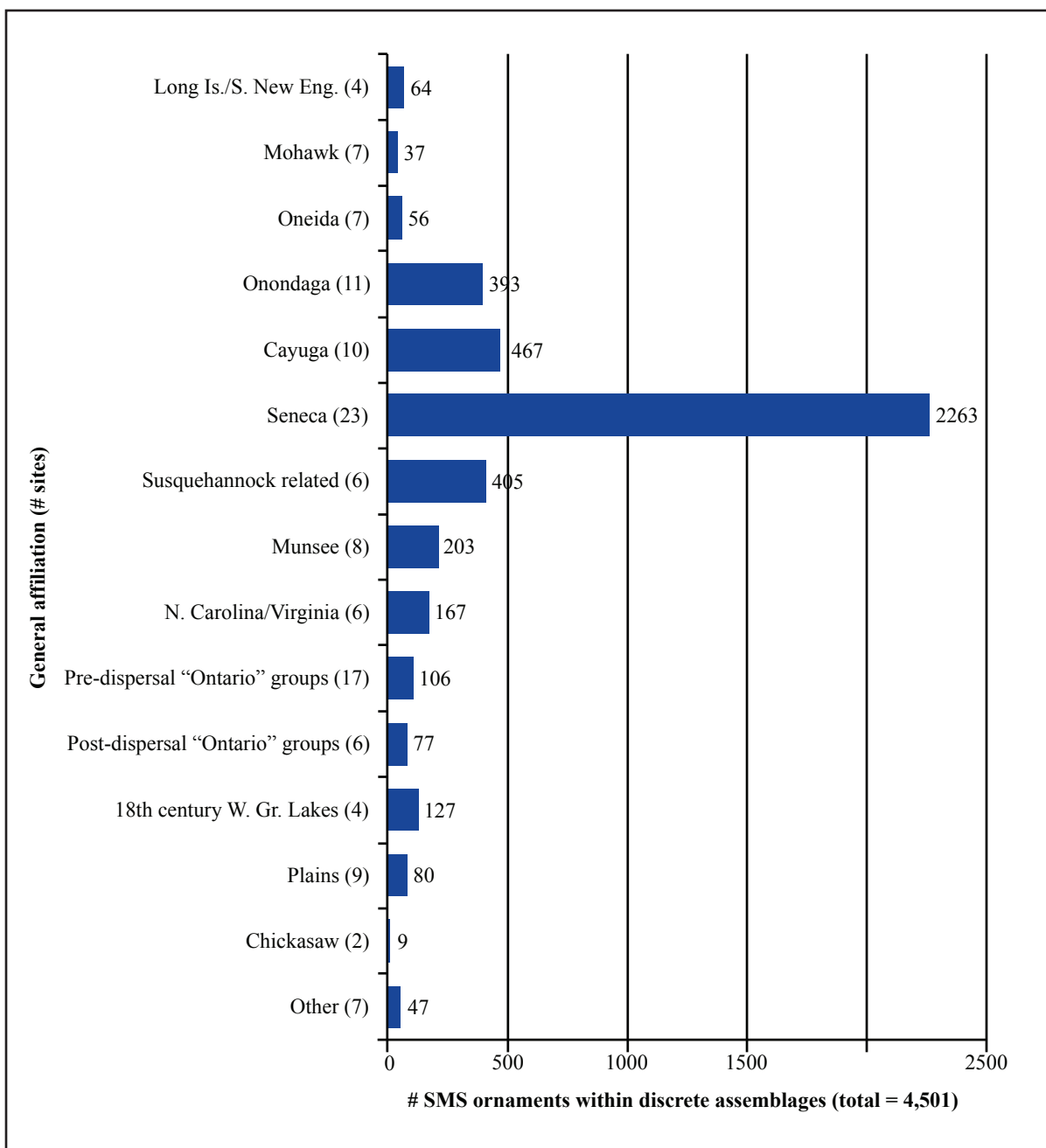


Figure 6.2.
Distribution of SMS ornaments by general affiliation

ornaments in Seneca sites, but there are progressively increasing numbers of SMS ornaments found from Mohawk sites in the east to Seneca sites on the west. This pattern is so marked that it will be best to examine it immediately before returning to Figure 6.2.

Population figures partially temper the apparent disproportion of Seneca SMS holdings. Although the history of Iroquois population studies is fraught with difficulties and qualifications, the only interest of comparison here is the relative proportion of Five Nations populations to each other. Thus a very general comparison can be obtained by picking a relatively stable and well documented decade when there was a great deal of SMS in circulation (the 1670s, primarily drawn from the 1677 Greenhalgh data). Reducing the population figures at that time to proportional ratios (Brandão 1997:Appendix C1, C5; Jones 2008:Chapter 3) provides raw data for these comparisons, with qualifications offered as a footnote (Table 6.1). Viewed this way the SMS distributions among the Five Nations is not as disproportionate as it seems at first glance. Figure 6.3 graphs the relative proportion of Five Nations populations at this single well-documented point in time. This simple device considerably eases the appearance of disproportion in Seneca possession of SMS ornaments based on raw counts. But even with this correction there is still some indication of disproportionately increasing SMS ornament numbers east to west in Figure 6.3. If real, this trend is notable because it belies the basic rule of down-the-line distribution.

Regardless of who was producing SMS ornaments, if the distribution of these ornaments came to the westernmost Five Nations groups through the main Hudson River trade route, more SMS should have been in the east. All things being equal, a progressive fall-off curve should be observable in the western frequencies. A second possible explanation is that much or all of the disproportion remaining after correcting for population size can be attributed to the highly

Table 6.1. Five Nations SMS distribution compared to Five Nations 1670s population¹

	SMS #	SMS %	Greenhalgh 1677 # Houses	Greenhalgh 1677 % Houses	Five Nations Estimated Population #	Five Nations Estimated Population %
Mohawk	37	1.1	96	12.2	1,500	16.8
Oneida	56	1.7	100	12.7	750	8.4
Onondaga	393	12.2	164	20.9	1,250	14.0
Cayuga	467	14.5	100	12.7	1,200	13.4
Seneca	2,263	70.3	324	41.3	4,250	47.5
Total	3,216	99.8	784	99.8	8,950	100.1

¹Sources: Figure 6.2 in this thesis, Brandão 1997:Appendix C1 houses, and Jones 2008:Chapter 3 populations. These figures are not an endorsement of either Brandão's or Jones' overall population figures, which are in fact wildly disparate. The only concern here is the proportionate size of various Five Nations populations, not the accuracy of scaled population estimates. Most of Jones 2008 populations as represented here are merely estimated from the mid-1670s along trend lines provided in his Chapter 3 population graphs. Jones does not provide a population history for Cayuga sites but notes that the population in 1677 is known to have been 1200 (Jones 2008:82).

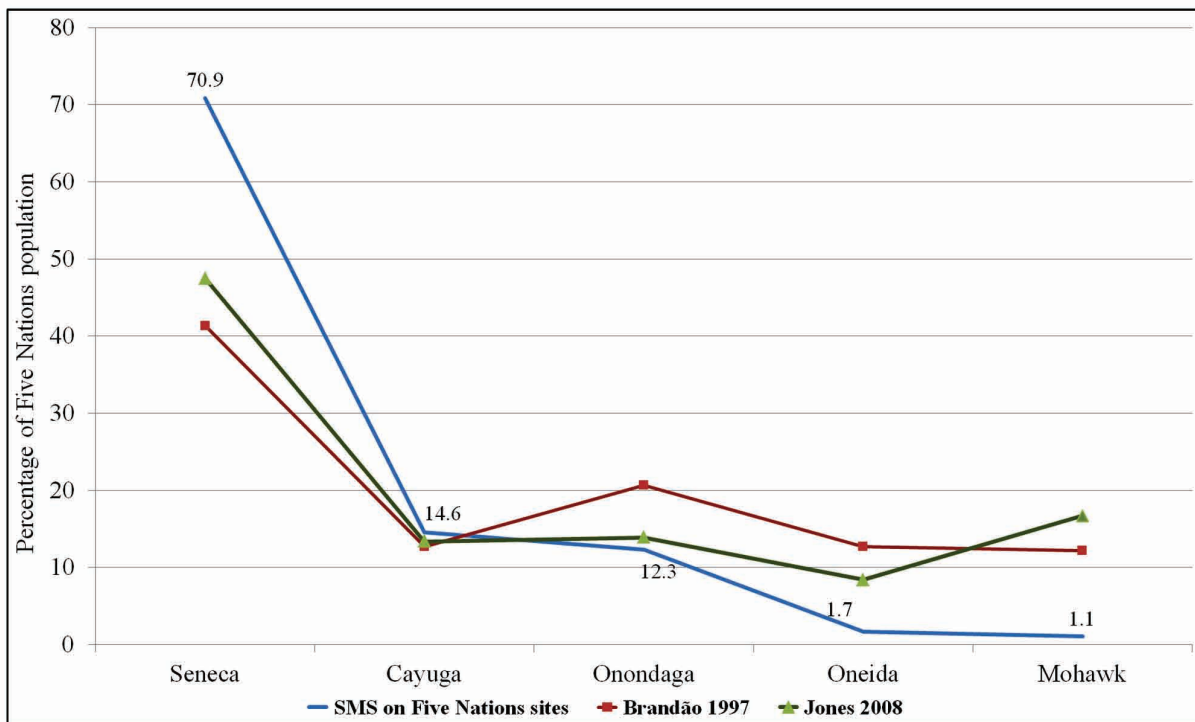


Figure 6.3.

SMS distribution among Five Nations Iroquois compared to relative proportion of 1670s populations (percentage comparisons drawn from Table 6.1)

variable history of these data. There are progressively much larger samples from western than eastern Five Nations sites (especially cemeteries), although it is very difficult to even estimate this factor. Given all these vagaries disparities are to be expected. The explanation favored here is that, allowing for Iroquois population disparities and sample size problems, SMS ornament availability was probably roughly equitable throughout the Five Nations.

Returning to the data presented in Figure 6.2, the core area for SMS is also strongly represented by Munsee and Susquehannock-related sites (with the latter designation meaning this aggregate includes the multiple ethnic groups that joined the Susquehannock in the Lancaster, Pennsylvania area (Conoy, Conestoga, etc.) after 1690.

It is no easy matter to assess what level of SMS ornaments among the Susquehannock and Munsee might be considered proportionate relative to Five Nations distributions, and thus indicative of uniform access to this industry, but a few figures are instructive. The Susquehannock population probably never numbered more than 10–15 percent of the Five Nations numbers (Kent 1989:364). The strong representation of SMS in these sites seems to indicate an at least generally proportionate use compared to the Five Nations.

Munsee affiliated sites clearly figure as part of the SMS core area. The Munsee population during the study period was much larger than the Susquehannock, although Munsee numbers declined from about 4,000 to 2,800 individuals from the 1640s to 1680s (Grumet 1989; 2009:xxii–xxvi). This would seem to imply a somewhat lesser participation in SMS ornamentation among the Munsee, whose subgroups had variable access to furs and many of whom were intermingled among a larger and rapidly growing colonial population. Indeed the distribution of the Munsee sites with SMS seems pointedly at the peripheries of their mid-17th

century distribution. Further complicating the matter, there has been an increased level of Munsee archaeological site destruction by subsequent settlement (Grumet 2009:36).

The pre-dispersal and post-dispersal Ontario groups bracket the western edge of the core area with a more complex occupational history. As previously noted, SMS ornaments in 17 pre-dispersal Ontario sites provide a clear indication that the roots of the SMS industry predate the ca. 1650 dispersals of these populations. Post-dispersal occupations of surviving non-absorbed descendants (notably the Tionnoate Huron) indicate continued access to newly made SMS ornaments after 1650. At the same time, a few SMS outliers, especially along the North Shore of Lake Ontario (see Figure 3.1), probably testify to the expansion of Five Nations citizens into areas that had been emptied some decades before by the mid-17th century dispersals (e.g., Snow 2001a:Map 17.12).

On the other hand, the relatively high SMS ornament totals on a few sites in the North Carolina/Virginia and the 18th century Western Great Lakes groupings assuredly include a signature of the aforementioned “necklace effect.” Here a single form in just a few necklaces inflates not only the raw SMS numbers but enhances the appearance of persistence of the SMS industry into the middle of the 18th century. This problem is resolved below by discrete dating of the specific SMS forms.

Among Plains groups, a relatively high number of sites ($N = 9$) have SMS ornaments ($N = 80$) at a distance of over 2,200 kilometers west of the SMS core area. In fact, these Plains sites have numerous disk runtees over 1,400 kilometers from the nearest like item! This too begs an explanation that cannot even be attempted without a better chronological framework for all SMS production.

In sum, the Figure 6.2 distribution shows a “temporally collapsed” map of the exchange networks through which SMS ornaments moved. Minimally, this shows that most of the groups in the core area can be assumed to have approximately equal access to the source of SMS ornaments.

What do these groups share above and beyond SMS ornaments? In population as well as site numbers, the majority of those holding SMS ornaments are Iroquoian speakers. All told, 89 (70 percent) of the 127 sites in Figure 6.2 are of Iroquoian speakers, and these sites contain 3,935 (87.4 percent) of known SMS ornaments. Two of the six North Carolina sites are also Iroquoian speakers—John Green (Meherrin) and Neoheroke Fort (pre-migration Tuscarora). When temporal discrimination puts the lateness of western and southern sites into perspective (below), the predominantly Iroquoian identity of SMS users takes on a new clarity.

The Munsee, and a single Pequot site (Long Pond), provide the only important exceptions to this general pattern. For the Munsee, this highlights the observation above that they show less use of SMS for their population size than the Iroquois speakers of the core area. No doubt this is related to the highly differentiated but generally severe effects of the Dutch on their local Algonquin neighbors (Ceci 1990; Grumet 1989, 1994, 2009; Trelease 1971).

To a large degree, it is easily observable that SMS distribution models the economic and political power differentials of the middle and late 17th century in the Northeast. This helps explain the sharp boundaries of SMS distribution. Otto (2006:110) comments that most of those who came to trade at Manhattan in the 1640s (when SMS was becoming increasingly available) “*were not Munsees, however, but those ‘who come more than ten and twenty days’ journey from the interior.*” The Mohawk initially controlled some measure of western access to Europeans goods at Beverwijck, at least in earlier decades of the mid-17th century, but

during the 1640s the amounts of material flowing into Native hands increased sharply and the western Five Nations allies established direct trade with Europeans (Bradley 2007:38, 79, 107, 135; Brandão 1997:106). At the same time, during the 1650s and 1660s the fur trade was experiencing contractions (Brandão 1997; Jacobs 2009a:117). In short, SMS ornaments map the contours of “purchasing power” and political influence among the Northeast’s Native groups. Groups with suitable proximity and integration to the Dutch economic network have SMS ornaments.

The edges of SMS distributions are sharp. There are few or no ornaments among groups immediately east, northeast, west, and south of the core area. In the Northeast, no SMS ornaments have been found among the Mahicans, who were in sustained and intimate contact with the Dutch at Beverwijck (although this may well be a sample size problem, see Bradley 2007:9). Eastward, with the exception of SMS necklaces among the Pequot at Long Pond site, and ornaments at a single undated site near Hartford, Connecticut, 17th century groups in Southern New England and all of Long Island had little or no access to (or desire for?) SMS ornaments. The sole SMS site on Long Island (Lilly Hill, aka Pantigo site) dates well into the 18th century. In southernmost New Jersey and all of Maryland (the areas to the southeast, south, and west of the Susquehannock) there are almost no SMS ornaments, including among those groups who eventually folded into the later Susquehanna River occupations and thus did come to have SMS ornaments after 1690.

Having delineated the numbers and general location of most SMS ornaments, I turn to an exploration of the various assemblages, with particular reference to spatial and temporal variation, in an attempt to better determine the factors affecting the evolution of the industry.

Exploring SMS Ornament Assemblages

As noted, 39 categories of form have been defined. Six categories were not tracked, although what is known of them is presented in Appendix E. The remaining 33 forms (designated the Level 2 forms) were amalgamated into Level 1 form sets (Figure 5.1). This grouping provided a useful quantitative first glance at the SMS industry (for instance showing the absolute predominance of the pipe bead form) but can be dispensed with as far as being otherwise analytically useful.

Appendix A provides an index of counts for each form within each site/location. Perusing this inventory and Table 5.1 concurrently supports the impression that, although some SMS forms are widespread across many sites, many sites have small assemblages and a dearth of diversity. Of course, small assemblages are necessarily linked to a lack of diversity in and of themselves, but this difficulty is accentuated by the already introduced “necklace effect” which inflates counts of SMS ornaments without expanding diversity. It will be important keep these underlying limitations in mind while viewing exploratory data.

Because many of the sites are not only well dated but have relatively short occupation spans (see Appendix B), if there is variation in the types of SMS produced through time this will automatically manifest as ubiquitous non-diverse assemblages. Other possible explanations of non-diverse assemblages might be lack of spatial or economic access or differential cultural assessments of desirability). In spite of these multiple potential explanations, a closer look at diversity of SMS assemblages is critical in framing the probable structure and history of the SMS industry.

Assemblage Richness by Site

Unmodified counts (or in one case below, log-scaled counts) of SMS forms provide a first look at SMS site assemblages. This form of diversity is known as “richness” (Kintigh 1989). Figure 6.4 represents a very simple visualization of the richest SMS site assemblages. Two important points are immediately clear.

Very few of the 127 study sites contain any significant portion of the diversity of the defined range of SMS forms. Only one site assemblage (the Seneca Dann site) includes more than half of the known forms. Dann has 70 percent of the known forms, while two other sites (the Susquehannock Strickler site and the Seneca Snyders-McClure site) have slightly less than half the known forms. At the other end of the spectrum, (not shown) 44 percent of study sites’ assemblages include a single SMS form, in many cases represented by a single ornament. Sixty percent of the study sites include only one or two ornament forms. The 21 site assemblages (17 percent of the study cases) that contain seven or more distinct (Level 2) SMS forms are affiliated with Five Nations, Susquehannock and Munsee archaeological components that constitute the SMS “core area.” Only two sites outside the core area, Long Pond (a Pequot site in Connecticut) and Gros Cap (a Tionnonate Huron and Ottawa site in Michigan) exhibit as many as six forms each.

Diversity by General Affiliation Aggregates

Variation in assemblage richness may simply be a function of the temporal distribution of the study assemblages. If so, sharp increases in the numbers of forms will be evident when temporally discrete assemblages are combined into aggregate regional groupings (especially if those aggregates represent temporal sequences of sites). Figure 6.5 presents ornament form diversity within the general affiliation categories used in Figure 6.2 (see Table 5.3

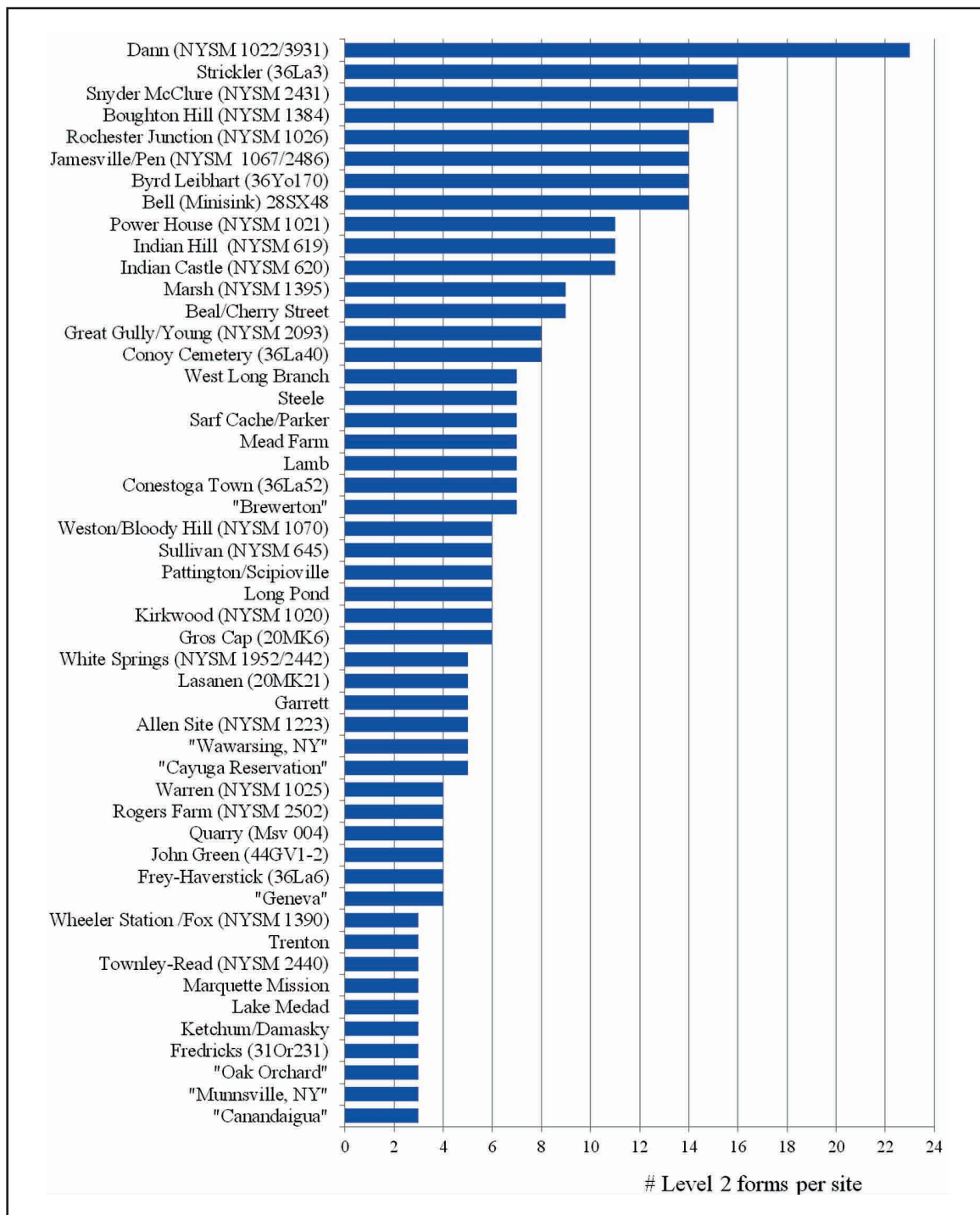


Figure 6.4.
Sites with three or more Level 2 SMS forms (N = 50)

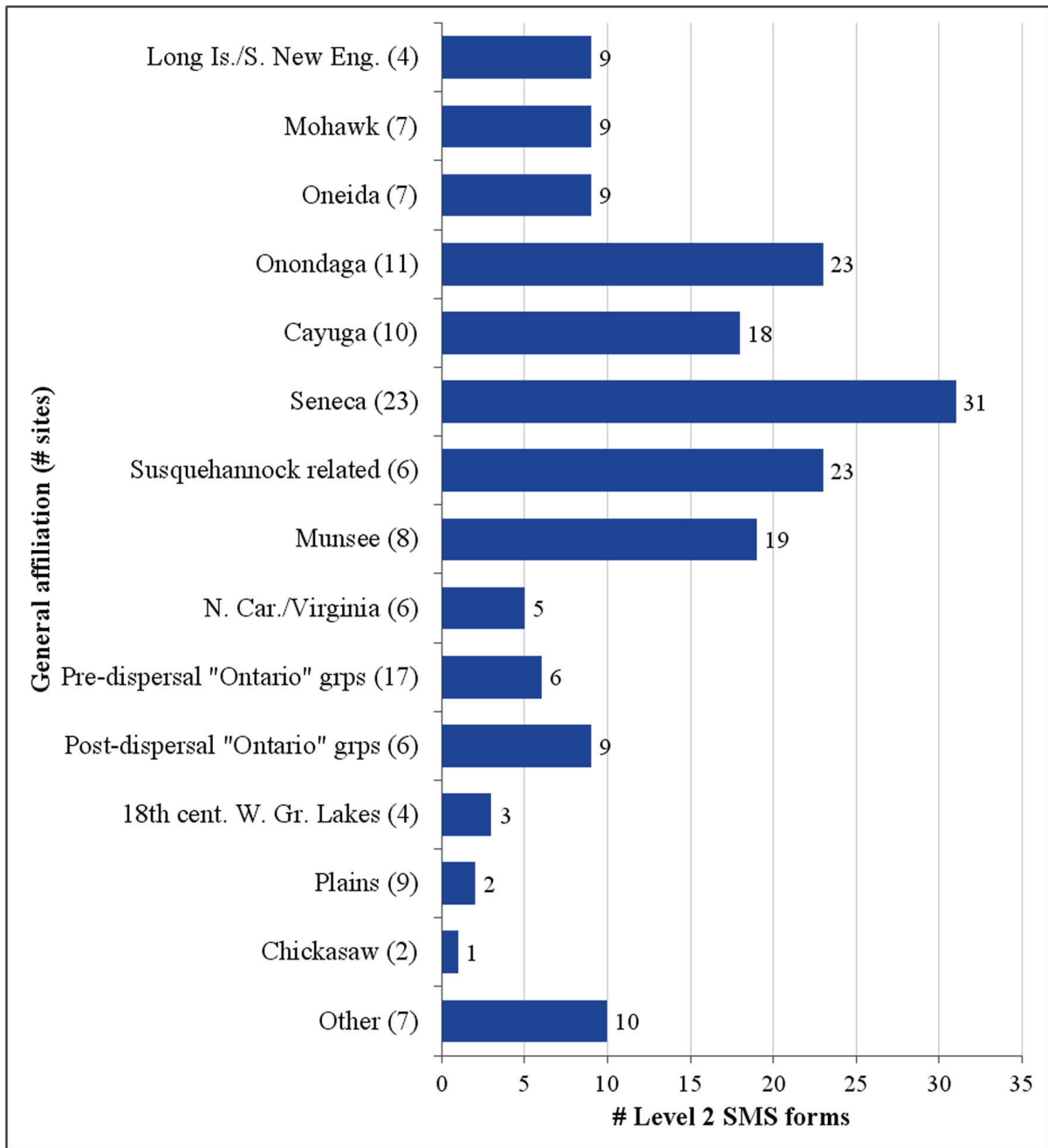


Figure 6.5.
SMS Level 2 form diversity by general affiliation

and Appendix C). The richness of the combined regional and ethnic affiliation categories is notably increased. For instance, almost all SMS forms are found among the combined Seneca samples. Rich site assemblages are also present among the Onondaga, and Cayuga, making it relatively clear that sample size (making reference to Figure 6.2) probably explains the notably lower assemblage richness among the Mohawk and Oneida.

Susquehannock and Munsee groups also show relatively high assemblage richness in aggregate. However, other main group of sites in the core area (pre-dispersal Ontario) continues to show low diversity. Assuming that different forms are available at different times, this is perfectly in keeping with this region's truncated temporal sequence. The post-dispersal populations linked to these same people show a bit more raw diversity, which might indicate that the period after the dispersal is the time of maximum diversity, assuming that continuing access was available.

Aggregates of distant outlier sites persist in showing depauperate assemblage diversity. These outliers may represent short term patterns of interaction or even single episodes/events of ornament acquisition. For example, in spite of the relatively numerous SMS counts far to the west in the Arikara sites of the Great Plains, only pipe beads and disk runtees (and one untracked form—large even barrel-shaped beads) are found there. The two Chickasaw sites with only disk runtees might well find their explanation in a single event.

A different way of measuring the effect of sample sizes on raw diversity is shown in Figure 6.6. Using these same general affiliation categories and plotting logged totals for each of three values (the number of SMS ornaments, number of sites in that category and the number of Level 2 forms in the category) generates a simple representation of sample size relationships for the general affiliation categories. Only contrasts between the relative position

Table 6.2. Level 2 ornament forms by general affiliation category

	PREONT	POSTONT	18WGL	CYUGA	CSAW	LISNE	MOHK	Munsee
Birdman	—	—	—	—	—	—	1	—
Bird	—	1	—	5	—	—	1	6
Owl	—	—	—	—	—	—	1	11
Goose/Loon	1	—	1	69	—	9	5	17
Large Goose	—	—	—	1	—	—	—	—
Bird Head bead	—	—	—	—	—	—	—	8
Fish	—	6	—	6	—	—	—	7
Beaver	—	—	—	2	—	—	—	1
Otter	—	—	—	—	—	1	—	1
Pelt Type A	—	—	—	1	—	—	—	4
Pelt Type B	—	—	—	—	—	—	1	—
Pelt Type C	—	—	—	—	—	—	—	2
Quadruped	—	—	—	1	—	—	—	—
Turtle	—	—	—	—	—	—	—	—
Effigy Unique	—	—	—	—	—	—	—	1
“Lizard”/Serpent	—	—	—	—	—	—	—	—
Effigy Unident.	—	—	—	2	—	1	—	—
SMS Gorget	—	—	—	—	—	—	—	1
Medallion	—	—	—	—	—	—	—	—
Large Tube	1	—	—	—	—	—	—	—
Pipe Bead	—	41	3	87	—	17	8	85
Runtie Disk	4	16	—	74	9	2	15	30
Runtie Circuloid	—	—	—	1	—	—	—	5
Runtie Rectanguloid	85	1	—	—	—	—	—	—
Triangle Apical	—	1	—	2	—	—	—	1
Triangle Vertical	—	3	—	1	—	1	—	10
Triconcave	—	7	123	2	—	—	—	—
Large Crescent	14	—	—	—	—	—	—	—
Crescent	1	—	—	200	—	14	3	—
Claw	—	—	—	5	—	18	2	10
Star/Cross	—	—	—	4	—	—	—	—
Cone/Pyramid	—	—	—	—	—	1	—	1
Geom. Unique	—	1	—	1	—	—	—	2
Total = 4,501	106	77	127	467	9	64	37	203

of the lines matter in this graph. The uppermost line (total SMS sample size per affiliation category) generates a rough sense of expected diversity, all other factors being equal. Several observations can be made, although it is important not to “over-read” this chart.

Table 6.2, continued. Level 2 ornament forms by general affiliation category

	NCVA	ONEID	ONDGA	OTHR	PLNS	SENCA	SUSQ
	—	—	1	2	—	5	—
Bird	—	1	1	—	—	8	2
Owl	—	2	1	—	—	6	14
Goose/Loon	—	15	40	10	—	166	48
Large Goose	—	—	—	—	—	5	1
Bird Head bead	—	—	4	—	—	31	2
Fish	—	—	13	2	—	4	2
Beaver	—	1	3	1	—	6	7
Otter	—	—	1	—	—	3	—
Pelt Type A	—	—	4	2	—	3	2
Pelt Type B	—	—	4	—	—	2	4
Pelt Type C	—	—	2	—	—	5	1
Quadruped	—	—	—	—	—	2	—
Turtle	—	—	—	—	—	1	—
Effigy Unique	—	—	1	—	—	—	—
“Lizard”/Serpent	—	—	—	—	—	2	—
Effigy Unident.	—	—	2	—	—	2	6
SMS Gorget	—	—	5	—	—	4	3
Medallion	—	—	—	—	—	1	1
Large Tube	—	—	—	—	—	2	—
Pipe Bead	15	22	141	2	52	871	141
Runtie Disk	13	4	43	13	25	189	54
Runtie Circuloid	128	1	3	—	—	11	41
Runtie Rectanguloid	—	—	5	11	—	76	8
Triangle Apical	—	—	1	—	—	55	1
Triangle Vertical	—	—	—	—	—	8	1
Triconcave	3	—	41	1	—	114	16
Large Crescent	—	—	1	—	—	—	—
Crescent	—	7	58	3	—	558	36
Claw	8	3	16	—	—	104	5
Star/Cross	—	—	1	—	—	2	—
Cone/Pyramid	—	—	—	—	—	1	—
Geom. Unique	—	—	—	—	—	7	2
Total = 4,501	167	56	393	47	80	2,263	405

SMS core area groups are at the right and left side of this graph. Level 2 form variation plots above the number of sites in each category. This can be read as some kind of recurring or “normal” sample size relationship to richness of forms in the core area. The larger assemblages have the most abundant diversity of forms (see Figure 6.5), whereas groups

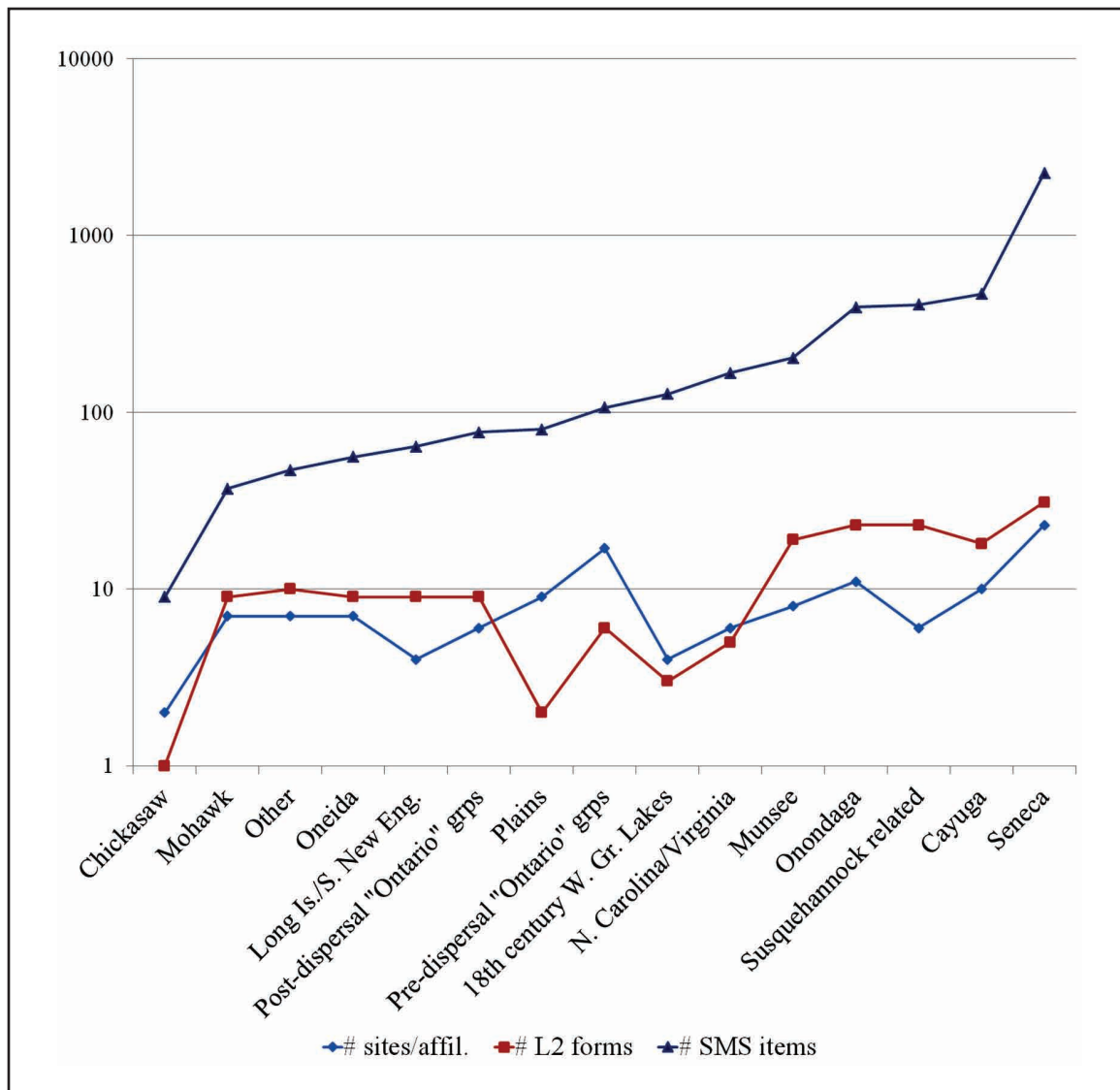


Figure 6.6.
Logged SMS ornament count, Level 2 forms, and sites per general affiliation

where there is any concern about sample size (left side) show only a moderate departure from the relationship of other core area groups (far to the right). The “Other” category has no meaningful cultural affiliations but has a normal sample size relation nonetheless.

Areas where form diversity line falls below the logged number of sites in the center are also the spatially outlying affiliation categories. Especially interesting here are the cases in which the

number of sites in a given category departs notably from logged form variation. Both the Plains and pre-dispersal Ontario group have site numbers notably **high** in relation to the number of SMS forms present. Conversely, the Susquehannock-related sites grouping has lower site numbers yet more diverse assemblages. The 18th century Western Great Lakes and North Carolina/Virginia categories exhibit both relatively lower site numbers and lower diversity.

The low site numbers and high diversity of the Susquehannock-related sites means that they do not suffer relative impoverishment of SMS forms even though the number of sites in this group is significantly lower than other core area groupings. In other words, Susquehannock communities were “plugged in” to the distribution system of SMS ornaments. Having far fewer sites than their neighbors in the core area did not hinder access to available diversity. In the case of the Plains and pre-dispersal Ontario group relatively high site numbers did not translate into more numerous SMS forms. This is not surprising for the temporally truncated pre-dispersal grouping, and the normal performance of the post-dispersal group validates the reasoning behind keeping these categories separate. Apparently the temporal cut-off dates (ca. 1650) create a watershed in terms of later SMS forms available to these western Iroquoians, whose assemblages became richer in spite of their diaspora. The Plains grouping has a relatively high number of sites for such an extreme spatial outlier, but very low diversity. Time and/or distance will unquestionably be required to explicate this relationship.

A final interesting pattern in Figure 6.6 is that the sharp spike in overall ornament numbers among the Seneca still results in mere accordance between site numbers and Level 2 forms present. In all probability, any further increase in sample size would not significantly change numbers of forms present.

These glimpses into the relative richness of SMS site assemblages and their geographic/ethnic aggregates greatly clarify the dimensions of assemblage diversity. It has already been made clear that a number of the units of comparison here have sample size issues. Far more importantly, variations in assemblage diversity are almost certainly due to temporal variations in the availability of SMS forms at any given time. Many of the aggregated site assemblages, as well as all individual sites with SMS, cannot possibly access the full population of SMS forms, and thus we have no need of more formal measures of diversity (Kintigh 1989).

Regional Temporal Sequences

The marked lack of diversity on SMS-bearing sites implies strong temporal conditioning of the ornament assemblages. This gives us every reason to suspect that individual ornament forms were available in abundance only at certain times. An examination of individual site chronologies and site general affiliation category sequences will help understand the availability of SMS forms and thus clarify SMS production and distribution. To illustrate those site sequences I draw upon Appendix C (sites by general affiliation category) and Appendix B (site spans for the 100 dated sites) to generate a list of dated contexts (Appendix D) with sites arranged in chronological order (sorted by their beginning date). A Gantt chart (Figure 6.7) based on Appendix D data illustrates the regional temporal sequences for groups of sites.

The span of sites depicted in Figure 6.7 provides a very rough gauge of the temporal span of SMS presence in archaeological sites, but exhibits a marked bias towards later site dates. This is so because, with no mechanism to differentiate the qualitative signature of ornament

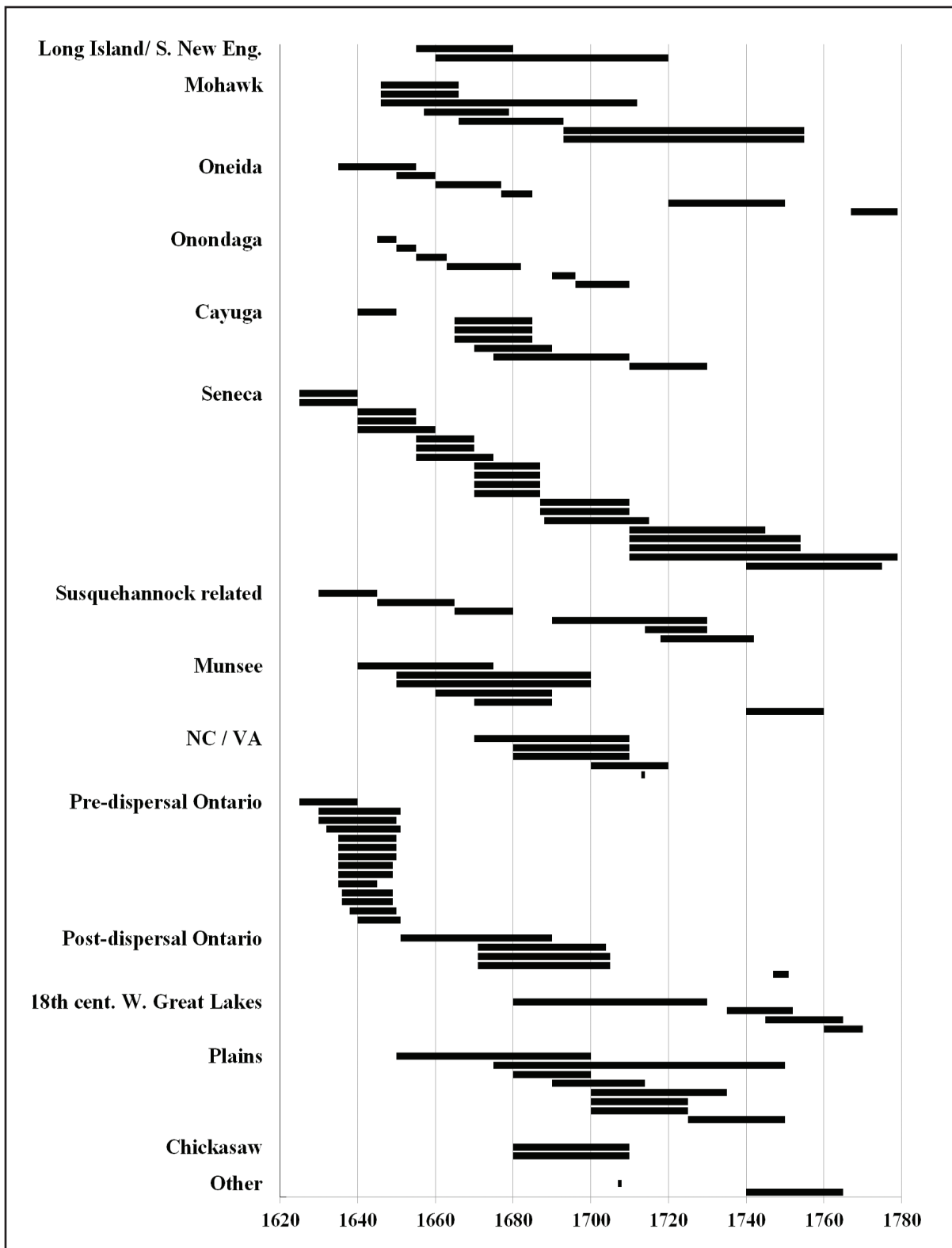


Figure 6.7.
Spans of dated sites with SMS ornaments (drawn from Appendix D)

frequency, including curated items, the late part of the chart's span assumes far too much importance. Each bar simply represents a site with at least a single SMS ornament.

To the trained eye Figure 6.7 also exhibits certain notable specific historical patterns. Note, for instance, the dispersal of Ontario Iroquoians, where that sequence is truncated soon after 1650. The westward removal of Munsee at the start in the 18th century is also visible. The discontinuity between the Susquehannock occupations proper and the multi-ethnic occupations of the same locale is seen as a hiatus before 1690. Note also the later penetration of SMS ornaments into four peripheral regions, (Western Great Lakes, North Carolina/Virginia, Chickasaw, and Plains). If certain SMS forms are typical of only certain times, but some general affiliation category groups had access to the full temporal sequence, then a correspondence analysis will reflect the degree of these associations quite neatly.

Correspondence Analysis

Correspondence analysis explores associated components within matrices of categorical data sets. In this case the relationship between form categories and sets of sites aggregated into larger spatial/ethnic categories will provide a measure of association and representativeness of the forms, correcting for sample sizes by converting counts to percentages (Shennan 1997:308–309). In this correspondence analysis, deviations from expected levels drive the scores of forms and general affiliation assemblages away from axes generated as an expression of average profiles, producing clusters of similar assemblages on a biplot. The resulting clustered spatial arrangements can be read as indicative of repeated association.

Because we have seen that all site assemblages contain low percentages of the universe of SMS forms, any view of correspondence between individual site assemblages and SMS

forms would be useless. As we saw in Figures 6.5 and 6.6, the aggregated general affiliation categories (which are, after all, for the most part regional site sequences) provide much more diverse cumulative sets of forms.

Figure 6.8 is a JMP (version 5.0.1a) correspondence biplot for Level 2 form divisions by aggregated general affiliation categories. This graph gives voice to several clearly meaningful aspects of the structure and history of SMS industry. Figure 6.9 provides a magnified view of the central cluster of correspondence (relabelled for clarity). This correspondence analysis indicates that some general affiliation categories have significantly different SMS form associations. Several SMS Level 2 forms separate from the main cluster of strongly (i.e., repetitively) associated general affiliations and forms (i.e., core area patterns). Five groupings of sites (pre-dispersal Ontario, Plains, Chickasaw, North Carolina/Virginia, and 18th century Western Great Lakes) and three Level 2 forms (rectanguloid runtees, large tubes, and large crescents) appear as outliers. Other affiliations and form categories provide sufficient recurring associations to distinctly correspond with each other.

All three outlying Level 2 forms are clearly related to the pre-dispersal Ontario group of sites (which has already been identified as a relatively large set of sites within a truncated chronological sequence. A few observations clarify this part of the biplot. One site (Lake Medad) accounts for 13 of 15 recorded large two-hole crescents. Other large crescents are from another Ontario site and an Onondaga site. There are only a very few (3) large tubes, but one of them is from Lake Medad. Rectanguloid runtees have a more median position because they are routinely found in core area sites, but they are the most common SMS ornament form found in pre-dispersal (i.e., pre-1653) Ontario sites. Thus, these three forms

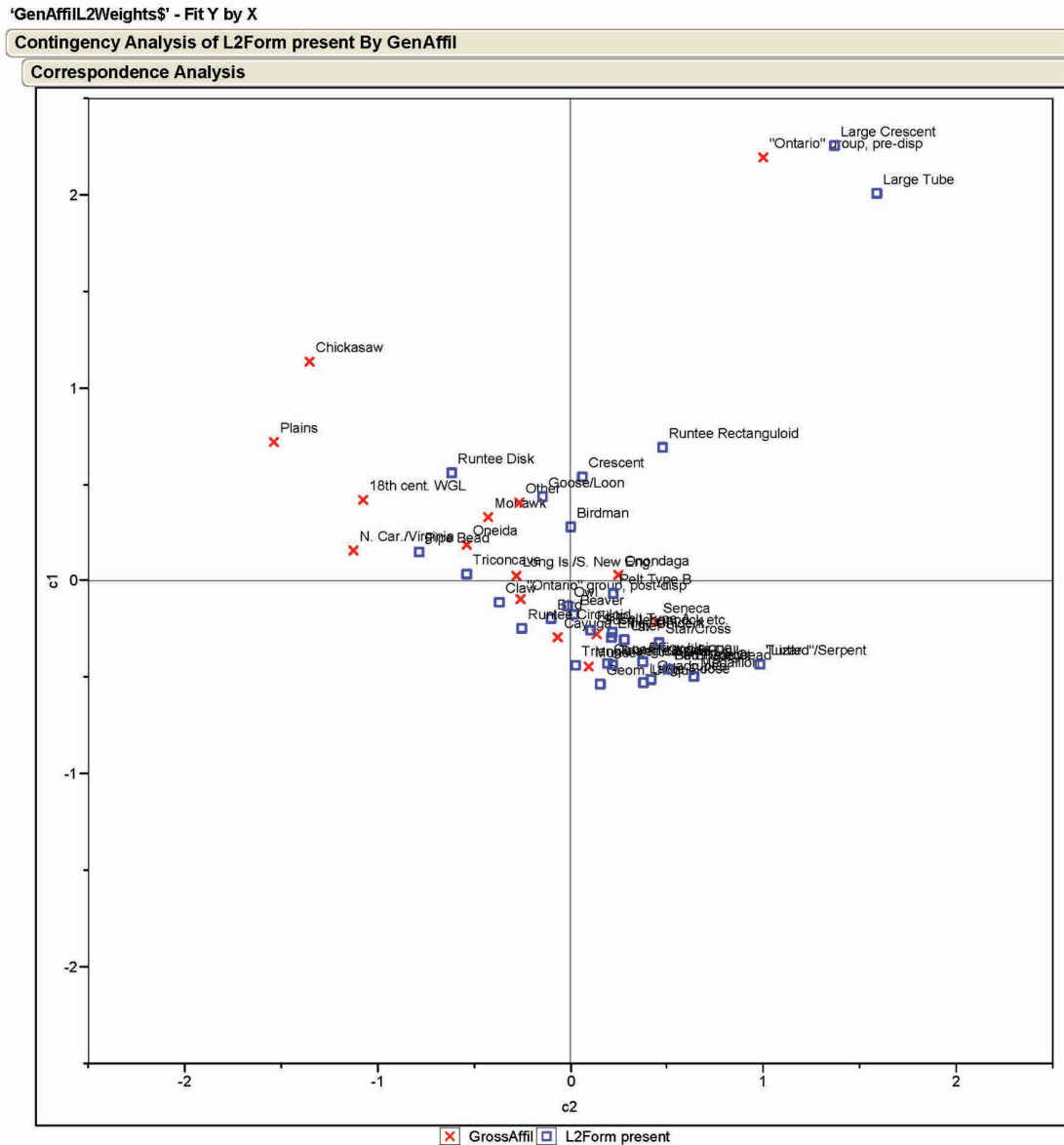


Figure 6.8.
Correspondence biplot SMS Level 2 forms by general affiliation

are firmly indicated as early (meaning pre-dispersal) SMS forms. Their strong association with the pre-dispersal Ontario sites is sufficient to make them outliers in this biplot.

Chickasaw sites include only disk runtees within severely constrained sample sizes (two sets in two sites) and Plains sites have only disk runtees and pipe beads, albeit in a larger

'GenAffLevel2Weights\$' - Fit Y by X

Contingency Analysis of GenAffil By L2Form present

Correspondence Analysis

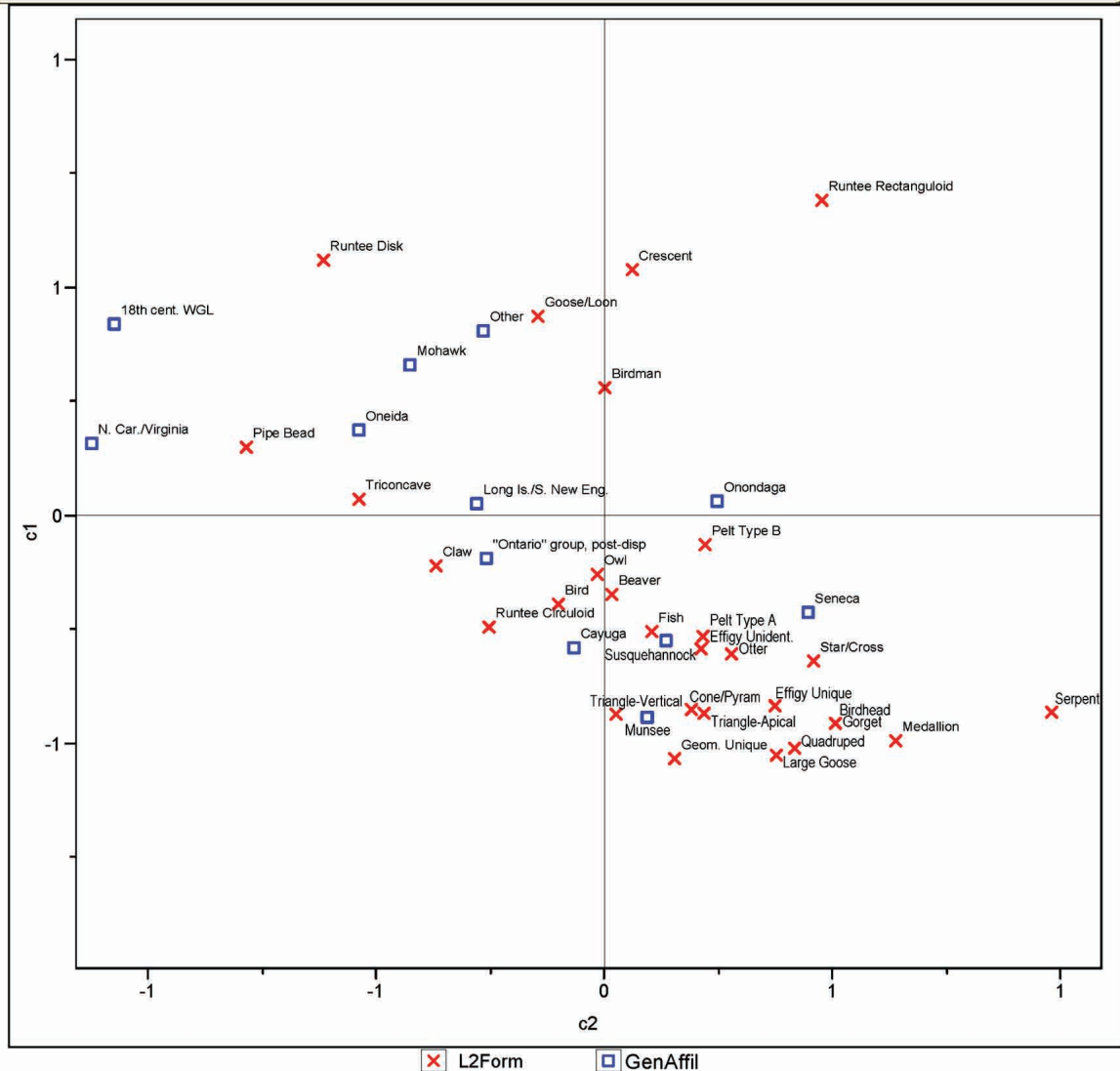


Figure 6.9.

Close-up of correspondence biplot SMS Level 2 forms by general affiliation

number of sites. Pipe beads and a few disk runtees are also found in some 18th century Western Great Lakes sites and North Carolina/Virginia sites, but it is the triconcave bead form in both cases plus the circuloid runtees and a claw necklace in the latter case that set these assemblage

sets apart in Figure 6.8. But all five forms with associations to these outliers (disk runtees, pipe beads, triconcave beads, claws, and circuloid runtees) are entirely typical of the core area as well. Thus the forms are pushed only to the margins of the central cluster.

This correspondence analysis reveals two primary patterns. First, with reference to Figure 6.7, the five general affiliation site groups classified as outliers in Figure 6.8 deviate **chronologically** from the more comprehensive core area site sequences (clustered at the center of the biplot) that experienced the SMS industry as a persistent and unified phenomenon.

Secondly, one temporally foreshortened geographic sequence of sites (post-dispersal Ontario sites) does **not** display a significant lack of correspondence, nor was any significant variation in assemblage richness evident. This difference becomes coherent when it is understood that most of the sites in this category (see Appendix C) are descendant polities of the pre-dispersal Ontario groups. During the 1650s through early 1670s after moving further west in the Great Lakes, they remained in close contact with their Susquehannock trading partners (who were themselves displaced in the 1670s). By 1700, they were once again receiving SMS goods from the core area (Table 3.1). Their SMS forms correspond with the core area groups, accordingly. If the pre-dispersal and post-dispersal “Ontario” groups had been a single combined taxonomic unit in these analyses, their summed assemblage would have appeared very much like the other core groups, but the temporal division of the industry (showing that the early stages of SMS production firmly predate the southern Ontario dispersals) would not have been in evidence.

Beyond these observations, the main message in this correspondence analysis is that the core cluster is very tightly grouped, reflecting the Standardized Marine Shell industry is a recurring set of closely associated forms across a number of geographically contiguous ethnic groups.

Summary of Exploratory Analyses

These analyses present a uniform and coherent representation of the SMS industry. We have seen that a great majority of SMS ornaments (91 percent) are found in a minority (29 percent) of the sites, but that the sites with robust samples are distributed across both ethnic groups and time. SMS is a widespread manifestation with persistent tenure, with the individualized aspects of the outlying assemblages being made coherent primarily by reference to chronological affiliations.

The core consumers of the industry consist of the Five Nations Iroquois, southern Ontario-related Iroquoian speakers (Huron, Tionnonate, Neutral, Wenro, and Erie), Susquehannock, and Munsee. These are represented by variously complete site sequences. SMS ornaments within the Five Nations are especially concentrated among the large populations of the Seneca. Much, if not all, of the disproportionate distributions in the core area groups can be explained as either chronological or sampling issues. Specifically, the abundance of SMS in Seneca sites is interpreted as relating to population size and excavation history. In particular, matched sets distributed as necklaces sometimes interfere with analytical methods of looking at these assemblages.

Aggregation of site assemblages into general affiliation categories provides useful comparative taxa, although a similar amalgamation of SMS form categories provided no useful analytic benefits. Examining diversity and correspondence between SMS forms and the general affiliation categories indicate that a chronological sequence of production for the various forms is very likely the explanation for the observed patterns. Finally, correspondence analysis shows that, as a body, SMS core area groups provide a set of

strongly recurring associations. The SMS industry holds together both as a spatial core and a persistent association of forms distributed throughout that core.

SMS is therefore an industry—a sequence of forms that achieved roughly equitable distribution among consumers throughout its core area. SMS ornaments are consistent with goods coming from a central source in an exchange market. The market illustrated by this distribution corresponds quite neatly to the middle 17th century Dutch/Swedish trade network and subsequent English administered New York and Pennsylvania (but not New England, Maryland, or Virginia). The story of the SMS industry can best be told by discovering a discrete chronology of ornament forms illustrating the initiation and evolution of this unique enterprise.

CHAPTER 7

RECONSTRUCTING THE SMS INDUSTRY

Archaeologists seldom find themselves in the position of using firmly dated archaeological sites to determine the production and distribution dates of an artifact form. There are established methodologies to put sites in proper relative order in the absence of absolute dates (Ford 1962; Marquardt 1978) or to use firmly dated artifact types to assign occupation spans to sites (Bartovics 1981; Carlson 1983; Steponaitis and Kintigh 1993). I have found no established (much less quantifiably replicable) method for using dated sites to establish the age of an artifact type. Given the goal of establishing discrete production/circulation estimates for each SMS form, what evidence is can be brought to bear and what are the methodological challenges involved?

SMS Sites and Chronology

As previously noted (Chapter 5) the total study sample of SMS ornaments includes 4845 individual items from 158 locations (Appendix A). Attributes of these locations are tallied in Appendix B. It can be observed that almost 30 of these records are specific only to state, county, or an otherwise poorly specified and undated location. Conversely, approximately 80 percent of the 158 locations are sufficient to be useful in assigning their assemblages to general affiliation categories. That subset (127 sites, see Appendix C) was used to examine diversity and correspondence of the various assemblages.

In the previous chapter, Appendix D was introduced as a subset of Appendix C, listing 100 sites with beginning and ending dates (dates being compiled from the literature cited in Appendix B). This dated set of SMS ornaments still includes the great majority (89.5 percent or 4,339 items) of the known SMS sample. Figure 6.7 displays the occupation spans from this listing, showing the sites and sequences that comprise solid chronological controls available for determining the temporal affiliations for SMS ornament form categories. But there are several methodological hurdles to pass in order to systematize use of the sites' occupation spans in generating representations of ornament circulation.

The date ranges assigned to 17th century northeastern site components tend to be discrete when compared to many other time periods and regions. Site sequences have been generated and refined by reference to historic documents, trade good assemblages, and indications that specific ethnic groups are moving from site to sequential site within their respective territories. In some cases, specific years assigned as site spans are absolutely documented, while in other cases, these years are assigned as idealized estimates of the transition date from an antecedent site to that population's subsequent iteration (e.g., Grumet 1995; Kent 1989; Sempowski 1989: 81–84; Wray, et al. 1987). Fortunately, SMS ornament forms have not played any significant part in assigning these occupation spans. The use/deposition dates for these ornaments can be generated from established site dates without circular reasoning.

Although Figure 6.7 is a correct list of sites with SMS ornaments, it has obvious shortcomings as a literal representation of the SMS industry. For example, a single curated item in a very late site (such as the single goose/loon pendant that somehow made its way to the Mesquakie Bell site in Wisconsin [1680–1730] notably skews the graph [i.e., the 18th century Western Great Lakes category without that site is limited to much later sites]).

Another confounding effect can be seen in the fact that SMS items are quite uncommon in mid-18th century Seneca sites compared to their mid-17th century antecedents, but the combination of longer site spans for 18th century sites and curation of a few examples makes the post-1720 representation of SMS in Figure 6.7 look as robust as the mid-17th century.

Some sites have long spans that are little better than best guesses about the represented decades, while others offer relatively exact data on when an ornament was deposited. Further, these are site occupation **spans**—the deposition of SMS items in a site can date to any year within the site span (this principle will become especially important when it comes to reading my chronological graphs for each form).

And of course, there are also holes in the data from any given sequence of sites. The cumulative SMS assemblages for most sites have been stitched together from multiple repository collections. Gaps in the local sequences arise from a variety of factors, including missing, poorly represented, or unexcavated site assemblages. Sites within sequences but not excavated, published, or in available curation show up here as interstitial blanks. A methodology capable of generating a replicable synthesis of these data will be a valuable comparative tool.

Span Factored Annual Percentage (SFAP) Graphs

How can we combine and compare ornament forms' association with discrete site spans to generate a history of SMS forms and, in aggregate, the entire industry? I have discovered no explicitly codified methodology previously developed to deal with this exact problem, but guidance is available from methodology pioneered to achieve the exact opposite effect—using dated artifacts to create site occupation spans.

Steponaitis and Kintigh (1993) reviewed methods used by Bartovics (1981) and Carlson (1983) to generate beginning and ending dates for the occupations of sites using known ranges of ceramic types' manufacture or use. Steponaitis and Kintigh refine this methodology by introducing additional methods entailing *“both an explicit theoretical framework and explicit rules for estimation of the span of occupation from curves generated by cumulative distributions of the known types within each site's assemblage.”* Because I already have site occupation spans and want to generate a replicable representation of them as a composite measure for each artifact form, I have crafted a mirrored version of the same process, adding another step in consideration of the specific problem of the lesser confidence available in longer occupation spans.

Site Occupation Spans and Span Factoring

One easily perceived potential limitation in employing site occupation spans to create a representation for artifact style across a number of sites is that assigned occupation spans tend to be more specific (shorter) when they are exactly known and more expansive when estimated. This is only natural since a conservative approach to assigning site occupation span translates any lack of confidence or secure data to a more generous time estimate. But any statistical manipulation of these dates stands to convert this conservative caution into surety—giving less precise expansive estimates comparable weight to exactly known spans of better dated sites. This would quite understandably incentivize researchers toward subjective “cherry picking” which entails selecting those occupations spans thought to provide the best data. Such subjectivity, of course, is not replicable even if it yields more accurate results.

When it comes to the deposition of a specific artifact, a site occupation span is, in essence, a probability statement. The artifact entered the archaeological record at some moment within the site's span. All things being equal, we can assume the depositional event occurs at random within the occupation span. Accordingly, any given artifact form's presence across many sites can be evenly partitioned and reassembled as annual frequencies.

A short occupation span offers stronger evidence of an ornament's temporal placement than available from a site of longer duration. This is so whether occupation spans are exact or estimated (although, in practice, short occupation spans are assigned only when there is a good deal of certainty). We can take advantage of that strength of evidence by scaling the artifact form's representation by occupation span. Factoring the annual representation of the artifact form by the span of the site takes advantage of whatever precision is available to place the artifact in time. This is so because, for the purposes at hand, the power of knowing an ornament is present in a five year span is proportionately more important than a 20 year span, because the only thing of interest is the relative probability of what year deposition took place. Accordingly, a reasonable and replicable way to accumulate and represent the history of an artifact form's deposition process over time on a number of dated sites is a procedure I have dubbed span factored annual percentages (SFAP).

Method

The primary assumptions underlying my span factored annual percentage method are the same as outlined in Steponaitis and Kintigh (1993). In order to progress with a statistical model creating composite representations of the artifact/site temporal relationship, we have to assume that the artifacts at any given site are deposited continuously/randomly throughout its occupation. Steponaitis and Kintigh's methods operationalized this and other assumptions

into explicit rules for achieving the mirror goal from mine. Reversing the process is relatively mechanical, requiring only interpretive guidelines for the resulting graphs to harvest artifact circulation dates representing cumulative annual presence of the artifact forms.

Along with the descriptions of each SMS form in Appendix E is an inventory detailing the total number of examples of the form for each site. The sites having assigned beginning and ending dates provide the raw material for a statistical representation of each SMS form's depositional history. My span factored annual percentage method combines these disparate sets of occupation spans (short and long, exact and estimated) in such a way as to create a graphic representation of each form's cumulative frequencies per year.

Because I have not located any other examples statistically representing cumulative temporal associations of an artifact type spread across multiple sites of known occupation spans, I provide an explicit account of the manipulations in Appendix F. SFAP graphs for each form with adequate samples are also presented there. Obviously, this method can be applied to any artifact type present in any large series of well dated sites. Interpreting the resulting graphs provides the basis for delineating the production history of SMS.

Reading SFAP Graphs: Beginning Dates

Estimating the beginning of production of an SMS ornament form entails several embedded principles. First, the method models only the date of deposition—use lives are inscrutable in this kind of data. Second, it assumes items in a site could have been interred at any time during the occupation span. Applying site spans in this way distributes the probability of deposition. This causes little problem within the body of the bar graph, but means that SFAP graphs necessarily generate what may be characterized as a "false lead"—a period within the earliest represented site span(s) when the forms may or may not actually be present.

A simplified hypothetical ornament's data field is provided to illustrate this process (Table F.1, Appendix F). Looking at the simulated ornament data we can see that a false lead for the hypothetical form is created by a single artifact at the Strickler site dating between 1645 and 1665. The actual earliest date that the hypothetical ornament form in Table F.1 was available for interment may well trail the 1645 beginning of Strickler sites occupation span by several years. Determining how many years after 1645 form production began must take into account one subjective consideration and one objective piece of data, and thus is a bit of an art, yet is constrained by real limits.

Subjective increased confidence that an artifact is in production can be taken from the point at which several overlapping site spans (in the raw data) are contributing (1655 in Table F.1). Only the **earliest terminal date** of any one of the site spans provides a concrete point of reference guaranteeing the form was certainly in production by that year. In Table F.1 that date is 1662—the last year of the Indian Castle occupation span. For this reason the estimated production dates I generate for each ornament form routinely include reference to the earliest terminal date for any one of the occupations (Table E.1).

As a rule of thumb the estimated beginning date for an ornament form should be set no earlier than the point at which two or more site spans are contributing to an annual percentage, unless over-ruled by an earliest terminal date. Overall, this will provide a reasonable estimate of the onset of the artifact's general availability for interment. But this assessment of course remains subjective. For instance, if all the contributing site spans on the early end are relatively long (perhaps 20 years) and aligned in a way that no occupations' terminal date gives a clear indication that some examples of the form were necessarily available before nearing the end of those spans, then additional caution is in order.

A primary factor that would affect the ability of SFAP graphs to model production history of SMS ornaments would be cultural and historical patterns controlling the rate of the ornaments' ultimate deposition, specifically how soon significant numbers of ornaments enter archaeological context after arriving on a site. This would moderate the artifact's beginning date, mitigating more or less of the false lead of a SFAP graph. When many site spans are relatively short the margin of error in this method would be no more than about half the duration of the "false lead" on the SFAP graph. For example, in the hypothetical case offered in Table F.1 this would be roughly 5 years. All considered the estimated beginning of production date for the Table F.1 hypothetical ornament form can be confidently given as circa 1655 because contributions from multiple site spans greatly increase the likelihood that the Strickler site ornament also falls into the latter half of that site's span.

Assigning End Dates

Determining the end of production is similarly subjective. Of course, there is also a "false end" generated by the same contributing factors, but artifact curation further compounds the challenge of discerning an end date for artifact production. Artifact cycling, use life, and deposition are often debated in the context of lithic tool contributions to site formation processes (e.g., Binford 1978; Hayden 1976). Curation of ornaments (that is, the propensity of ornaments to enter the archaeological record at rates differentially moderated by retentive behavior) has been less examined. It is easy to see why, since ornaments can present simultaneously strong cases for opposing behavioral extremes.

Ornaments frequently come to carry overt forms of social information that become so closely associated with individuals that they tend to not be transferred (Babić 2005:82–84; Thomas 1991:72–75). In this case ornaments would be relatively quickly cycled into

burials (and thus be primarily moderated by mortality profiles). But if ornaments are seen as transferrable they might also be prone to generous “generation to generation” curation patterns. Knowing that SMS ornaments were indeed very frequent inclusions in northeastern mortuary contexts, I take some statistical comfort in using occupation spans as a measure of their production and employment.

Nonetheless, we can expect low frequencies of these ornaments to present an attenuated sense of artifact availability on archaeological sites subsequent to the time of their manufacture and peak use. If, statistically speaking, these are exceptions rather than the rule, span factored annual percentages will minimize their effect on a given form’s temporal estimates. It is only important to keep in mind that attenuated signatures are to be treated like the early false leads if we are estimating production. The fall off of a form’s entry into archaeological context is a probable signal of cessation of its manufacture. Any measure gleaned from its data from many different sites and a variety of site sequences is further insulated against extraneous factors affecting this fall off curve.

It is notable that by the time that ethnographic collecting was underway in the 19th century there were essentially **no** SMS forms in circulation or curation. Beyond the contemporary “ethnographic” collection of one SMS ornament held by the Danish Royal Museum and its predecessors for over 300 years, there is only one single known case where Native curation of an SMS ornament clearly persisted well beyond an individual life span (the runtee and necklace curated by Lorette Huron descendants for perhaps 200 years and the Heye/NMAI for another 90 years)

Archaeological examples of non-generational curation are seen in the cases of two 18th century caches—Sarf and Pahaquarra (Kent 1970 and Kraft 1986, respectively). Both cases

seem to represent something on the order of “jewelry boxes” with large numbers of SMS ornaments that date four or five decades earlier than associated materials (i.e., mid-18th century glass beads, gun, etc.). The most plausible explanation of these caches is that they represent personal possessions maintained over a single lifespan. Even this “first person” curation took these SMS ornaments the 30 or 40 years “out of their time” sufficiently to stand out compared to the period of interment for most examples of these forms. Overall, the entire pattern of SMS ornament appropriation, cycling, and deposition, as well as much of what we know about contemporary funerary customs, indicate that these ornaments, like glass beads, very rapidly entered archaeological contexts via inclusion in or contribution to burials, as well as loss and breakage. For glass beads, Sempowski, et al. (2001:513) have estimated the general temporal range of circulation before interment as approximately 10–40 years.

Our specific interest here is an end date of production for any given form rather than an understanding of ornament use life. We have no particular reason to conclude (in what might be termed a standard seriation assumption) that these ornament forms slowly gained and then slowly waned in popularity while being uniformly available. Because our interest is determining the end of production, we are looking for evidence of the point in time at which (all other factors being equal) a notable fall off in the frequency of a form provides reasonable suggestion that the form has become less available to enter the archaeological record. Of course, this should show in the record slightly later than the actual reduction or cessation of production, but allowing for that factor would probably be overly subjective. SFAP graphs thus seem to provide useful measure of SMS form production and use.

CHAPTER 8

A PROFILE OF THE NORTHEASTERN SHELL ORNAMENT INDUSTRIES

Using the SFAP method and the interpretive modes described in Chapter 7 it is possible to construct a graph for each Level 2 SMS form as the initial step toward reconstructing the history of the SMS industry. Appendix E presents discussion and tabular site data for each form, including untracked forms.. Span factored annual percentage graphs and distribution maps for each SMS form are presented in Appendices F and G, respectively. These provide detailed spatial and aggregated temporal distributional data that can be used to reconstruct the history of the entire industry.

Overall, SFAP graphs for most forms show false leads followed by relatively rapid increases, modeling the onset of that ornament's availability for deposition. Distinct fall off points indicate the onset of increasing rarity as the form become less available, indicating the individual forms had distinct tenures. Moreover, the beginning and end dates for a number of forms tend to line up, implying that the industry had distinct stages.

All forms with sufficient sample sizes (in general 7 or more items) have SFAP graphs plotted, but only a verbal assessment is presented (see Appendix E) for forms with lower samples sizes or extremely limited distribution (less than 4 sites), or which have both low numbers and a generic or expansive categorical characterizations (e.g., "unidentified effigies" or "runtie unknown form").

Table 8.1. Summary of sample data and chronological assignments for SMS forms

	Total	Locations	Dated Items	Dated Sites	Earliest Terminal Date	Assigned Beginning	Assigned End
Thick Discoidal	—	—	—	—	1640	1635	~1640
Large Tube	3	3	3	3	1640	1635	1655
Flat Discoidal	—	—	—	—	1655	~1640	1655
Large Crescent	14	3	13	2	1650	1635	1660
Irregular Massive	—	—	—	—	1640	1635	1670
Runtee Rectanguloid	197	31	174	27	1640	1635	1670
Pipe Bead	1,594	64	1,451	51	1640	1635	1720+
Crescent	947	37	857	26	1640	1645	1680
Geom. Unique	13	8	13	8	1650	1645	1690
Claw	200	32	158	22	1655	1645	1690
Effigy Unident.	15	12	12	9	1645	1645	1710
Runtee Disk	536	77	476	55	1649	1645	1710
Goose/Loon	414	52	348	32	1655	1650	1685
Owl	38	15	34	11	1650	1650	1690
Beaver	24	18	21	16	1655	1650	1710
Triangle Apical Drill	65	12	59	9	1655	1650	1690
Otter	7	7	6	6	1660	1650	1690
Bird	25	17	25	17	1650	1650	1710
Runtee Circuloid	190	16	184	14	1655	1650	1710
Serpent	2	1	2	1	1670	1655	1670
Pelt Type B	13	7	7	4	1665	1655	1680
Triangle Vert. Drill	26	11	23	8	1650	1655	1690
Pelt Type C	11	7	10	6	1663	1655	1690
Large Goose	8	5	7	4	1665	1660	1690
Quadruped	4	4	3	3	1670	1660	1690
Fish	41	20	37	17	1663	1660	1710
Medallion	2	2	2	2	1670	1660	1710
Cone/Pyramid	3	3	2	2	1670	1660	1710
Birdman	9	5	9	5	1670	1665	1710
Bird Head bead	52	16	44	12	1670	1665	1690
SMS Gorget	14	11	13	10	1682	1670	1710
Effigy Unique	3	3	2	2	1690	1670	1710
Star/Cross	9	6	2	2	1687	1675	1700
Pelt Type A	18	8	12	5	1710	1690	1710
Turtle	1	1	1	1	1710	1690	1710
Triconcave	323	21	305	16	1710	1695	1765

Drawing data from the form graphs in Appendix F, an overview of the SFAP results is presented as Table 8.1. The earliest terminal date for each form (the year which guarantees that a form was available) is also noted. Using this and the principles outlined, my interpretation of each SFAP graph provides the column of beginning and ending dates for each form. Figure 8.1 displays a cumulative SFAP graph for the entire SMS industry. This graph presents a cumulative history of SMS ornaments by simple numerical popularity per annum.

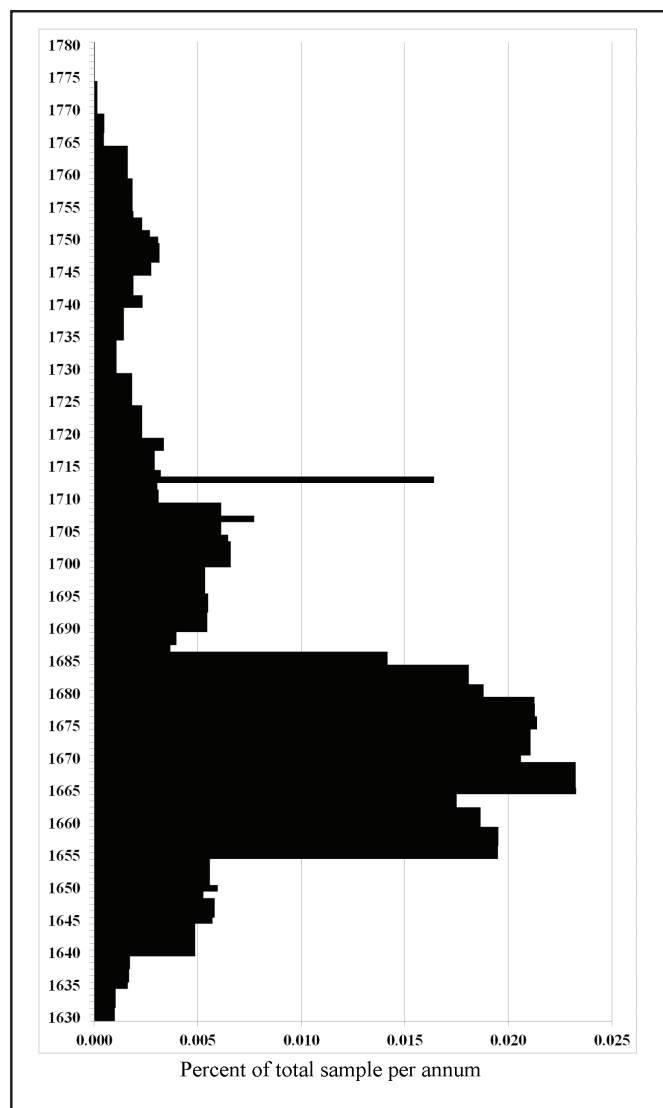


Figure 8.1.
SFAP graph of all dated SMS ornaments

Figure 8.2 provides a Gantt chart representing the forms' beginning and ending dates and creating a cumulative representation of the SMS industry's history. I have broken the 75 year production record into three parts, emphasizing continuity of some forms even in the midst of major shifts at circa 1650 (rapidly increasing quantities and forms with many necklaces made of large matched sets) and the 1680s (elaboration of both forms and decorations, but a notable waning of the numerically large matched set forms).

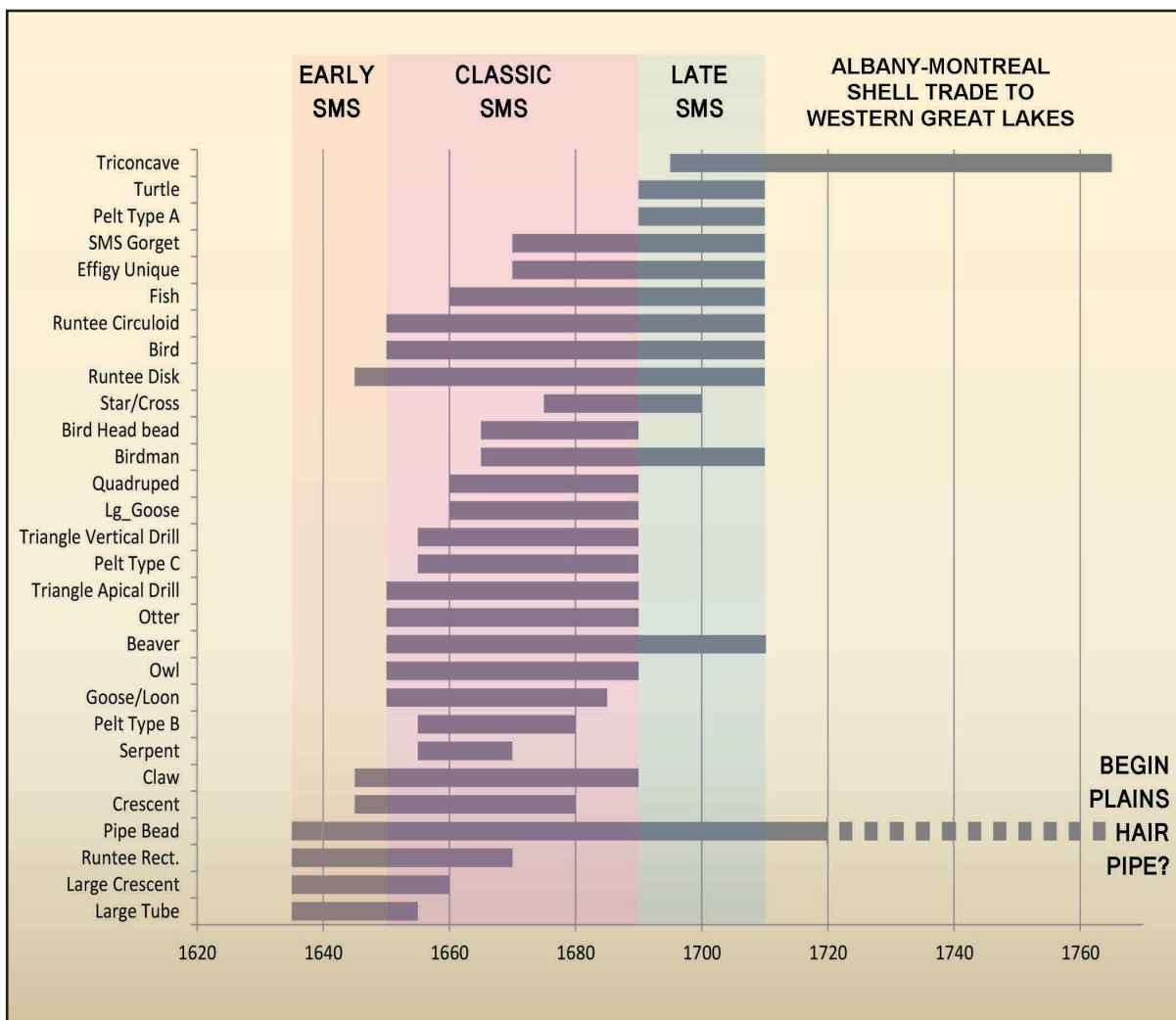


Figure 8.2.
Suggested Standardized Marine Shell ornament production history

Early SMS (circa 1635–1655)

Establishing a date for the beginning of the SMS industry is fairly straightforward. Four forms in Table 8.1 have earliest terminal dates of 1640. The large crescent form (most of which come from Lake Medad site) almost certainly dates to this incipient stage of the industry as well but the dating of that site is very general. These terminal dates provide firm evidence that the onset of SMS manufacture must predate 1640—approximately being the point in time (ca. 1635) that multiple sites begin contributing data.

The beginning of the SMS industry thus consists of five or six forms sharing a number of specific characteristics. Three earliest forms are large tubes, large crescents, and rectanguloid runtees. Two SMS forms that were not tracked can be added to these (the so-called irregular/massive beads and thick discoidal beads). Examples of each of these types were seen in Figures 1.1 and 1.2. The latter two are dated by association with the other three forms at Lake Medad site. In terms of the Northeastern glass bead sequence dating scheme, Lake Medad site is a GBP 2 and GBP 3 Neutral site in Ontario. It effectively serves as type site for the earliest known stage of SMS because all five of these bead types are found there. Lake Medad site also has large numbers of 1.5–2.5 cm “short pipe beads” that are about 5 mm in diameter with circa 3 mm bore holes.

At this point we can see that the SMS ornament industry sprang up very early in the settlement period of New Netherland and New Sweden when the fur trade was rapidly expanding. The earliest forms are very much what one might expect of a brand new industry. They are simple, thick, roughly shaped marine shell objects drilled with larger, but still perfectly cylindrical holes. The irregular/massive bead form especially makes sense as an

earliest type. These are simply chunks of columella from large conch, moderately smoothed and drilled.

The medium is especially the message for these earliest forms. The large chunks of columella transformed into the irregular/massive beads inherently state access to a symbolic superlative (large pieces of marines shell). Although quite rare, large tubes also match this conceptual field—very probably simply the largest possible piece of marine shell that can be made into a thick, relatively straight rod. Very likely, no raw material other than the outer lip of a large West Indian conch would suffice to produce the large tube form of SMS. Significantly, although large tubes are very thick, their length does not appreciably exceed the longest examples of the later pipe bead form. The early placement of this form says something rather definitive about access to at least some imported West Indian shell from the beginning of SMS production.

Rectanguloid runtees, at Lake Medad and throughout Ontario and the rest of the SMS core area, are simply a slightly refined variety of the irregular/massive beads. They are thick, very often not flat, and generally bored with a thick (circa 3 mm) hole. The earliest form of standardized discoidal beads has a relatively narrow diameter (approximately 10–15 mm) and are generally 5 or 6 mm thick (much thicker than discoidal beads 20 years later). The large two-hole crescents at Lake Medad are significantly thicker than the standardized type descended from them. At the same time there can be no mistake, the concept of standardization is present in SMS from the beginning. Large crescents, thick discoidals, and the “short pipe beads” are all found in sets at Lake Medad site.

Initiation of the SMS industry was characterized by a vigorous flow of SMS ornaments to Huronia and Neutralia during the 1635–1655 period, probably via the Susquehannock,

as well to the Five Nations. Early SMS is characterized by noticeably more simple (but still standardized) forms, progressive introduction of subsequent new forms, and a moderate level of production compared to the ensuing period.

Starting Classic SMS (circa 1655)

I conceive of Classic SMS as the time of peak production in both quantity of ornaments and variety of forms. Figure 8.1 shows that a major increase in production takes place circa 1655. This implies that this was a point of transition at which the already well-established and steadily expanding ornament industry “took off.” Because SFAP graphs literally represent frequencies of artifacts, the peak production and popularity of SMS ornaments (i.e., Classic SMS) stands out quite clearly as 1655–1687.

Blaming the Victim: SMS Becomes a “Least Costly Ware”

The sharp increase in SMS production at circa 1655 is almost certainly intimately linked in some way to the well-documented massive deflation in the value of wampum that took place in the mid-1650s (Bradley 2011a). The most reasonable explanation of the expansion and diversification of SMS manufacture is that it was driven by changing incentives of those already making marine shell products. The value of wampum among colonists declined and then plummeted in the late 1650s. Changes in production are often implicated in such a scenario.

On the consumer (Native) side of the equation, wampum and shell ornaments were both still strongly desired (Richter 2001:46). As Graeber (2001) makes clear, elaboration of innovative social practices insured that there was no practical limit to how much wampum

was desired. But devaluation of wampum in the colony meant Natives quickly came to expect far more of the beads in trade for their products. Accelerating the effect of the pressure to devalue, this was also the time of the first constriction of the fur trade after several decades of steady expansion. Demand for beaver was dropping rapidly at the same time as wampum supplies increased. The inescapable effect was devaluation of wampum (Ceci 1980; Jacobs 2009a:107–111; Louis Jordan 1997). This stagnating market and plummeting product value would have put immense pressure on wampum makers.

By 1650 SMS production had been ongoing for perhaps 15 years. New forms rapidly morphed into more sophisticated and numerous products. This probably indicates that the initial forms of the 1630s had met with huge success. Given my discussion of raw material imports above, the rapid expansion we see in the 1650s may well be linked to rapidly expanding supplies of marine shell. This sudden access to far more marine shell would also have had an effect on wampum production. Given the devaluation of wampum, those already making SMS ornaments would quite naturally have further shifted their efforts toward SMS ornament production as long as that product continued to be met with strong demand among native consumers. But there may be even more to this story.

Recall Lynn Ceci's observations on the transition between early wampum and true wampum (Chapter 4). Many of the Coastal Algonquians making wampum had previously been more or less under the control of the Dutch and were subject to extraction of wampum as tribute. This essential material simply flowed into the colony's economy at very low cost. But by the 1650s it may be that competition between Native and settler wampum makers was fueling a glut and driving the progressive devaluations.

With the advent of wampum overproduction Colonial administrators are on record as pointing with alarm to the Native producers as the source of the problem. Rapidly increasing production of both SMS and wampum by colonists at exactly this time would show not only how devaluation of wampum might incentivize SMS production but explain why the Native producers were so suddenly the “problem.” This situation provides apt warning that we should “watch what colonial administrators did rather than listen to what they said.”

Because the Native wampum manufacturers of Long Island and southern New England had recently fallen under English control there was every incentive to identify them as the source of unwanted wampum flooding New Netherland’s economy. This especially makes perfect sense if the real problem was that there were now many wampum producers of diverse backgrounds cumulatively producing too many beads. Dutch administrators would automatically undercut the Native wampum makers (now in English territory) and protect both their economy and the wampum makers within the colony. By 1659 this situation had apparently progressed to the point that the West India Company directors were aware not only of the glut in wampum but of the SMS industry and were worried that “another type of beads” might capriciously shift the economic base of the colony.

Weak European demand for furs was also at least partially to blame for the decline in the furs traded (rather than being entirely a supply-side effect) but trade in any commodity or currency that could still garner those furs more effectively/cheaply than the rapidly devaluing wampum (or the fixed cost of manufactured goods from Europe) was highly incentivized. SMS ornaments thus fall under the rubric of a “least costly ware” in terms of effective exchange within the colony (see Ceci 1982:101). The strong upswing in SMS ornament production in the mid-1650s is very likely the outcome of these pointed economic pressures.

No SMS is found on 17th century Long Island. Nor is there any among the Narragansett. The Pequot have a single site with SMS. SMS was neither made nor significantly consumed east of Manhattan. These facts help identify ca. 1655–1665 as the turning point identified by Ceci (1989:63, 72–74) when these Native producers were forced out of mainstream production of the wampum that supplied the Dutch colony. By the late 1660s wampum was again scarce because of steady demand by the tribes and because there was “little or none brought in as formerly” from the Natives in English territory who had taken part in the glut of 1650s wampum production (NYCD 1853–1887:14:679).

To summarize, I speculate that some colonists had adopted wampum bead production as piece work alongside their other scheduled tasks in the earliest days of the colony. After all making wampum was quite literally minting money. I suggest that SMS ornament production emerged as a moderate scale specialty alongside wampum-making in this social context. Finished necklaces of like forms were a well-received market strategy in place from the beginning. By the 1650s there was pressure to either intensify or abandon production of wampum due to over-production. The beginning of Classic SMS coincides with an explosion of extraordinary numbers of shell ornaments being made in multiple innovative forms. This comes at exactly the same time as another shell product (wampum) was plummeting in value. This implies that SMS was the result of a successful choice to intensify production, perhaps driven by an inside track in terms of access to imported West Indian marine shell. Perhaps for this same reason, SMS subsequently stayed in the hands of a restricted set of specialists. The result is the coherent industry shown in Figure 8.2.

Ending Classic SMS (the 1680s)

Much lower numbers of SMS ornaments evident in archaeological contexts that postdate the mid-1680s indicate a precipitous decline in SMS production. This major shift in SMS entering the archaeological record is obvious by 1687 although a decline from peak numbers can be seen beginning circa 1680 (Figure 8.1).

The summer of 1687 is a horizon-marker well known to Iroquois scholars, since it marks the first invasion of the Seneca territory by Europeans, when Marquis de Denonville destroyed each of the four occupied Seneca sites. Since these same sites were especially rich in SMS ornaments, and given the way SFAP rates are generated by site spans, 1687 overtly stands out as a clear date after which subsequent settlements show a very different SMS industry. But this does not mean a decline in SMS happened **at** 1687. Given the way SFAP analysis treats these data, this only means the change in the industry came **during** the span of the sites which were terminated at 1687 (that is, between 1670 and 1687). Sites in other sequences further moderate this signature. The fact that these Seneca sites have so much SMS material in them implies the change was not early in that period.

An understanding of how this radical change in the character of the SMS industry probably unfolded is succinctly detailed by Bradley (2007:180–181). Looking at the frequencies in Figure 8.1, we see an initial decline in SMS numbers beginning about 1680. This change takes place at the same time as the successive Andros and Dongan administrations take hold of the Albany trade. These changes progressively impinged on traditional (Dutch) trading practices at Albany and excluded elements of the Manhattan trade (the latter being where I suspect SMS production was located). These administrative changes in the regulation of trade coincide with the end of Classic SMS. Perhaps the most significant

change for the SMS industry came as trade at Albany now became the prerogative of its “actual inhabitants.” This would insert a middleman position into the distribution of any product made at Manhattan.

Bradley concludes that much of this restriction was in place by 1679. In fact, Figure 8.1 shows the first signs of a decline in SMS annual frequencies starting at exactly this same time. Further restrictions during the 1680s set the stage for Albany to have “the sole and only management” of the Native trade. This process culminated in the “Albany Charter” in 1686 (coincidentally, the year before Denonville savaged the western Five Nations by eliminating Onondaga leadership and destroying the Seneca villages). The Iroquois recovered, and what Aquila (1997) styled as the Twenty Years War went on. But these combined economic and military hegemonic moves by English and French colonial powers serve to mark the beginnings of a major change in imperial power relations with the Iroquois.

This does not signify that no material “outside” the Albany trade made it to the Five Nations, but it seems especially significant that the mode of access to the Five Nations consumers and the character of the ornament industry both changed at this exact time. Between 1675 and 1680, prospects for the future must have looked uncertain to the producers of SMS ornaments. Not only was access to the Five Nations trade reconfiguring, but the main consumers of SMS ornaments in the south had recently disappeared as the Susquehannock were vanquished and fled southward. This southern market was re-established after 1690 and saw the import of many SMS ornaments, but it is not surprising that shifts in the SMS industry closely reflect changes in their consumer’s fortunes.

I previously suggested that the economic conditions of the 1650s were instrumental in the shift from Early to Classic SMS production modes. Now I suggest that the production shift

at the end of the Classic SMS period was also quite literally dictated by concurrent economic and political changes.

SMS frequencies as expressed in per annum measures line up with this history rather exactly. Ornament numbers being interred first decline in the early 1680s and then plummet to the level seen in post-1687 occupations. Given the way the SFAP method works this apparently precipitous decline is averaged over the last few years before the 1687 end of SMS-rich Seneca occupations (especially the Rochester Junction and Boughton Hill sites).

Late SMS (1687–circa 1710)

Many SMS forms, some of them having been in production up to 25 years, disappear at this juncture. The producers of SMS ornaments adjusted to 1680s changes in the trade by restricting the range of forms. While sheer numbers of ornaments in Late SMS never approach Classic SMS levels, the tone of the industry is not so much decline, but elaboration and specialization.

Most Late SMS forms were survivors from the heyday of SMS. These forms share specific traits. Gone are the large necklaces of sheer numerical repetition (e.g., claws, goose/loon). A restricted range of forms are produced, and in lower numbers. But these ornaments are noticeably more elaborate. Two loci of symbolic meanings are embodied in these generally later (Classic and Late SMS) forms—economic and spiritual.

A convergence with Native symbolism and progressive trend towards ornate decorations was present in the industry since the beginning of Classic SMS. This theme increases in the 1670s with the appearance of new forms such as SMS gorgets, birdman pendants, and “bird head” beads (a tiny effigy bird head with a long beak and eyes, known to some researchers as

“tooth” beads). Along with these symbols comes elaboration of forms already in existence – such as fish, birds/owls, and beavers. For instance, this shift is quite apparent in the sequence of beaver forms described in Appendix F.

One “new” form introduced during Late SMS is not new at all, being the final iteration of a persistent theme in SMS—the pelt-shaped effigy pendant. Starting with the proliferation of forms in the 1650s small flat zoomorphic effigy quadrupeds with heads, tails, and four appendages were common, sometimes occurring as small matched sets and being only occasionally decorated. I take these to be literal representations of not just fur-bearing animals, but the vendible form of that economic unit—the dressed pelt.

I have defined three distinct varieties of these—a literal flat pelt form with appendages intact (Pelt Type B), the dressed pelt in which upper legs, head and tail are represented by neatly trimmed edges (Pelt Type C), and the most elaborate (Pelt Type A). The well-known Type A form appears quite literally and repetitively (18 known examples) as an ornately decorated dressed beaver pelt. These forms are shown in Figure 1.1.

Archaeologists have long (and inscrutably) referred to my Pelt Type A form as a “turtle.” Although turtles were indeed important to Iroquoian speakers, there is only a single anatomically correct SMS turtle, from the Seneca Snyder McClure site. Because there has been so much confusion on this point I have left turtle as a type in spite of having only a single example. Returning to the pelt type forms, a chronological progression is observed from Pelt Type B to Pelt Type C to Pelt Type A. Appendix E contains further discussion on these forms.

The literal representations of various quadrupeds throughout Classic and Late SMS are also fur trade mammals. Not surprisingly, beaver and otter are chief among these. Adding

the economic implications of dressed pelts/skins to these various literal/dimensional effigy forms (beaver, otter, generic quadrupeds), as well as the also possibly economically relevant fish and fowl, brings about a powerful summative overview of the SMS industry. I will return to this point in Chapter 10.

The Albany-Montreal Shell Ornament Trade (circa 1710–1770)

With two notable exceptions, the end of production for the Late SMS forms is interpreted as circa 1710. At this time there is a notable drop off of cumulative annual signature for the industry. The SFAP graphs for most of the SMS forms are consistent with them ending circa 1710. Only two forms (triconcave beads and pipe beads) clearly persist and one new (untracked) form is introduced (“moon” gorgets). This new pattern of shell ornament production is documented by both archaeological sites and 18th century trade documents. These lines of evidence flesh out a notably different wampum and marine shell ornament industry during the interval between the SMS industry and the 19th century Plains Indian shell ornament industry (Table 8.2).

Table 8.2. Suggested stages of the North-east’s shell ornament industries

Standardized Marine Shell Industry		
Early	1635	1655
Classic	1655	1687
Late	1687	1710
Albany Montreal Marine Shell Industry		
	1710	~1770
Plains Indian Marine Shell Industry		
	~1770	1800s

I refer to this post-SMS shell ornament manufacture as the Albany-Montreal shell trade because the destinations of marine shell ornaments flowing through Albany came to include the French-controlled portion of the western Great Lakes early in the 18th century. This trade was alternately channeled through English interloper traders going west, smuggling of furs to Albany by Canadians, and by drawing the “Far Indians” in for trade. But there was also a vigorous trade supplying Albany goods to Montreal merchants. Interestingly, it is the trade channeled through Montreal that supplies the best information about the shell ornaments being manufactured at this time.

Albany’s connections to the western Great Lakes trade had been framed for expansion since the Albany Charter of 1686 (Bradley 2007:181; NYCD 1853–1887:9:171). Western trade grew steadily after 1715, with the 1724 establishment of a post at Oswego resulting in direct Great Lakes trade (Eccles 1983:135, 141–145; Kammen 1975:193). A sharply curtailed shell ornament industry descendant from SMS was in operation during this period. It is not unlikely Bergen County was the primary seat of marine shell ornament production from the 17th through 19th century, since the requirements of access to marine shell remained the same.

None of the Late SMS forms besides pipe beads and triconcave beads are found on sites in the western sites in the Great Lakes that are known to post-date 1710. This seems to confirm that these forms were no longer available and that the shell ornament trade had fundamentally changed..

A new marine shell ornament form is found alongside the pipe beads and subtriangular beads of the Great Lakes. Medium sized plain two-hole gorgets clearly linked to the well-documented “moons” of the later Plains Indian shell ornament trade appear at this time. To

all appearances only these three shell ornament forms (and wampum) were made during the mid-18th century. Although these forms are obviously standardized, and I see no reason to suspect that the locus on manufacture has shifted, the industry is neither robust nor innovative. Most importantly, the greatly restricted formats of the industry signal a very different relation between producers and consumers.

The mid-18th century also saw the development of a major new cottage industry making wampum at Albany. But as Williams and Flinn make abundantly clear, wampum was (and long had been) made in many locations in colonial New York and New Jersey (Lesniak 2003; Peña 2003; Williams and Flinn 1990). As described above, wampum's diffuse mode of production is part of the reason this study restricts its focus to non-wampum ornaments.

Triconcave Beads (AKA Arrowhead Beads)

I have interpreted the SFAP data to indicate that only curated examples of most SMS ornaments appear in the SMS core area after circa 1710. The SMS industry schedule (Figure 8.2) graphically highlights triconcave beads as one bead form that is introduced well after all the others. Popularity of this bead was expanding even while the SMS industry disappeared.

Triconcave beads are a horizon marker. I have seen no reason to conclude that they were made before 1695 and their SFAP graph (Figure F.23) and distribution map (Figure G.32) make it clear that this form is diagnostic of the 18th century. These beads persist in early 18th century SMS core area sites and are also part of the Late SMS expansion into Virginia and North Carolina. Because there are no triconcave beads in the Arikara assemblages in South Dakota, I conclude the movement of those SMS materials (disk runtees and pipe beads) to the Plains predates 1695.

Pipe Beads

Production and distribution of pipe beads clearly decline between 1710 and 1730. It is tempting to assume they suffer the same fate as the rest of the industry's forms. There are three strong indications to the contrary, however. First, pipe beads are the only logical antecedent to the Plains hair pipe form, which becomes popular only at the very end of the 18th century. Plains hair pipes probably support the continuation of pipe beads through the mid-18th century rather than suggesting resurrection of an abandoned form.

The second indication is more deeply buried in the data. Pipe beads are by far the single most common shell ornament form (N = 1,594 ornaments of which 1,451 are from 51 dated sites). Most of the large caches of pipe beads date between 1670 and 1710. Continuity of pipe beads after 1710, in contrast with other Late SMS forms, may simply be masked because they were the most common SMS form (Figure F.2). Later annual percentages seem minor in comparison to the earlier scale of production for this common form, but continuity of the pipe bead is supported by the fact that nine of the 51 dated sites with pipe beads begin after and thus fully post-date 1710. The third indication is documentary. "Finger-length porcelain cores" are among the shell ornaments known to have been traded west with the "arrowhead" beads during the mid-18th century. These "long cores" are presumed to be a form of pipe bead.

The best description of the three shell ornament forms trafficked in the Albany-Montreal shell trade is provided by Timothy Kent (2001:881). A series of ledger entries by a Montreal merchant outfitting traders to Green Bay and Rainy Lake repeatedly mention these same three ornament forms moving west alongside tens of thousands of wampum beads. Kent enumerates five shipments between 1725 and 1753 (the latest of which was received

from Albany via Montreal). These shipments alone include a total of 144 necklaces of “arrowhead” beads, 83 “finger-length cores” (pipe beads), 508 cut discs (moon gorgets), and thousands of wampum beads.

As an aside, it is especially interesting that in these mid-18th century inventories also document the degree to which finished wampum belts had become a commodity consumed by colonial administrators obligated to come up with new diplomatic belts not familiar to the Natives with whom they routinely negotiated.

All this verifies that the cylindrical pipe bead form persists, and was available to transform into the distinctive bi-tapered Plains Hair Pipe at the end of the century. This evolution took place long after the Iroquois ceased to have an interest in marine shell ornaments. A reasonable guess for the timing of the transformation from pipe beads to Plains hair pipes would be circa 1780–1790, but it certainly took place before 1800 (Williams and Flinn 1990:48). Only two Plains Hair Pipes are known anywhere in the SMS core area—one on the Seneca Canawaugus site (1775–1820) and one, inexplicably, at the Snyder’s McClure site (1687–1710).

Cut Disc Gorgets (Moon Gorgets)

Cut discs described in these trade documents are clearly much the same as what are later known as “moon” gorgets—simple concave discs of the Plains Indian trade. In fact, Timothy Kent uses this name interchangeably, although the contemporary references refer to these simply as “round cores” (*noyaux ronds de porcelaine*) of shell. This simple product was not recognized during my literature search nor observed among SMS assemblages in my repository search, except for several western examples at Fletcher site (Mainfort 1979:406).

Another may be present at Rock Island (Mason 1986:124–125) but is badly damaged. Both sites also have triconcave shell beads.

The Plains Indian Shell Ornament Industry (circa 1770–1880s)

The scale of the Albany-Montreal ornament trade is unknown, but almost certainly marks a numerical low point in the Northeast's shell ornament production. The advent of another stage of western shell ornament trade was marked by changes in ornament form and contemporary documentation, as well as the opening of a significantly larger market.

The end of the French regime in 1763 was formally coincident with New York's legal access to the western Great Lakes and Ohio Valley native markets, soon including the Illinois Country and beyond. However, the English trade had expanded west of its formal limits well before this. By the late 1740s Pennsylvania traders had captured the trade of the upper Ohio Valley and operated with impunity even further west. This trade is certainly reflected in the triconcave beads at the 1747–1751 West Pittsburg site, a Wyandot site in Lawrence County, Pennsylvania (Appendices A and B). Although English trade was momentarily pushed back eastward in the 1750s there was only a short interlude before the area came fully under English control (Eccles 1983:151, 157–165).

With formal cession from the French in 1673 the western trade expanded rapidly. English traders showed up significantly before imperial troops were able to occupy new territories. Eastern commercial trade firms sometimes played overtly large early roles in various schemes to expand the trade and colonize the vast northwest (Alvord and Carter 1916:xiv; McConnell 1992a:149, 1992b).

Demand for wampum and shell ornaments apparently grew rapidly when the western trade fully opened, judging by post-1770 advertisements in New York newspapers for wampum, hair pipes, and moon gorgets. The Montreal traders had already pushed the northern market west to the Rocky Mountains (Eccles 1983:187) and the southern market expanded to include the Missouri River trade by the 1790s (Nasatir 1952). In the shell ornament trade this pre-1770 change was marked by the disappearance of the “arrowhead” bead and, at some time after, the evolution of the pipe bead into the bi-tapered “Plains hair pipe” (Ewers 1957; Williams and Flinn 1990:50).

The fact that the manufacture of the 19th century Plains shell ornaments was located in Bergen County, New Jersey is taken as significant. In all probability this was the primary seat of marine shell ornament manufacture all along—from the 1630s to the 1880s. Bergen County and the greater Manhattan area offered persistent advantages—proximity to *Mercenaria* and local whelks and access to imported West Indian conch and whelk shell. In the absence of any indication to the contrary, the lower Hudson River (northern New Jersey and Manhattan itself) therefore must be considered by far the most likely location for 17th century SMS ornament manufacture. I see no reason to suppose that shell ornament manufacture there ever completely ceased between initial European settlement and the 19th century.

Williams and Flinn (1990:57) detail this best documented shell ornament industry, noting that peak years for ornaments of the Plains industry were circa 1830 to 1850s, with demand winding down by 1866. Most Bergen County competitors abandoned shell ornament manufacture by this date. The Campbell Family operation persisted because they alone pioneered a more efficient mechanized production of hair pipes, but finally closed their operation in the 1880s.

My conclusion is that the Campbell Family was the last of many generations of craft people who specialized in shell ornament fabrication between the 1630s and the 1880s. Although the manufacture of wampum beads continued apace alongside of the northern New Jersey craft specialists making shell ornaments, the two industries are in no way the same. Wampum was made in hundreds of households and small shops throughout New York and New Jersey—from Albany to Delaware Bay. Although many individuals made bit work wages making and/or stringing these beads, these activities produced a single simple product and these specialists were at the fringes of the economy—be they on farms in New Jersey or at the Alms House in Albany.

Conversely, there is every indication that marine shell ornament specialists persisted as a restricted set of craftsmen—a small scale cottage industry capable of a notable degree of uniformity within its products. During two and a half centuries the consumption of these products shifted considerably. In the 17th century the varied forms and ornately decorated matched set necklaces were consumed by the craft specialists' politically and economically powerful 17th century neighbors in the East. During the 18th century shell ornaments made their way west to Native fur trade specialists in the Great Lakes in cargo canoes by way of the Montreal fur trade. And in the middle 19th century simple sets of New Jersey marine shell ornaments were being delivered 2,500 kilometers west to Plains agriculturists on steamboats.

CHAPTER 9

AN OVERVIEW OF THE 17TH CENTURY MARINE SHELL TRADE

The SMS industry emerges in the context of early 17th century fur trade economies as a new kind of marine shell product. Although an understanding of the emergence of the standardized marine shell trade must be rooted in the timing of late prehistoric and early historic period marine shell use in the Northeast, the SMS industry was very unlike any previous production or consumption of marine shell in the region. My interpretation that the SMS industry and some significant portion of its raw material come under European control at such an early date in the history of New Netherland carries with it the necessity of reexamining other assumptions supporting current interpretations of the 17th century marine shell trade. If SMS is a colonial endeavor run even partly on imported marine shell this fact alone changes a great deal of the current model of 17th century Native marine shell use.

Setting the Stage: Previous Marine Shell Trade

Although marine shell use in the Northeast has antecedents dating back several millennia, the 16th century archaeological sites in southern Ontario, New York, and Pennsylvania suddenly begin to have greatly elevated amounts of marine shell over the prehistoric record. SMS emerges circa 1635, subsequent to the rise and fall of a vigorous 16th century marine shell trade. Two major geographic divisions of the Northeast show somewhat different histories of marine shell importation.

Eastern Groups

In the territory of the Susquehannock and Five Nations marine shell first becomes common in archaeological sites of the 16th century. This sharp increase over the amount of shell present in prehistoric sites in the region was noticed quite early. New York's plentiful shell objects were covered in depth in Holmes' (1883) massive "Art in Shell" compendium and provided the impetus for Beauchamp's 1901 opus "Wampum and Shell Articles Used by the New York Indians."

The Susquehannock, positioned as they were near the heads of both Chesapeake and Delaware bays, have traditionally been seen as handling a share of the early movement of marine shell into the interior, including the Five Nations (Bradley 1987; Sempowski 1994; Wray, et al. 1987). In part this construct is dependent on better 16th century relations between the Susquehannock and Five Nations than they had during the 17th century.

The best quantification of the widespread change in marine shell in the Northeast has been documented in the sites of the discretely calibrated Seneca sequence, where quantities of marine shell vary significantly during the mid-16th century through late 17th century. Martha Sempowski (1989) delineates sharp temporal variations in marine shell available to the Seneca during this span.

Sempowski shows that frequencies of shell beads and idiosyncratic forms of marine shell pendants (that is, idiosyncratic when compared to SMS) dramatically increase during Period I and II in the Seneca sequence (ca. A.D. 1560–1590). James Bradley (1987, 2011a:31) extends this 16th century sudden increase and sustained popularity for marine shell as a general pattern to the rest of the Five Nations and the Susquehannock.

Sempowski shows that during Period III of the Seneca sequence (about A.D. 1590–1615) amounts of marine shell decline sharply and remain low through Period IV (ca. 1610–1635). European trade goods show no parallel drop. In fact, access to Dutch trade is increasing during this period. The sparse marine shell ornaments during this time are discoidal and tubular beads and a few pendants. Bradley (2011a) suggests that a major contributor to this decline may be the beginning of the First Powhatan War in 1610, although that event comes somewhat after the midpoint of Period III. Bradley asserts that difficulties accessing Chesapeake Bay shell continued through circa 1632, the end of the second Powhatan War.

Bradley cogently observes that it was during this hiatus in shell imports that wampum production as a specialized manufacturing activity spread rapidly among coastal natives of the Northeast. These shell products very rapidly became established in all exchange networks of the region. Using a statement by William Bradford, Bradley (2011a:34) fixes the beginning of wampum production at at about 1605–1610.

Starting at the beginning of Seneca Period V (circa 1630/1635) after about 40 years during which trade in European goods increased but marine shell remained scarce, marine shell shows “a tremendous resurgence” in Seneca sites. Glass beads and metal goods from Dutch sources remain abundant. But now wampum belts, flat discoidal beads, very large tubes, and several different forms of beads and pendants are suddenly quite common (Sempowski 1989). In accordance with the analyses presented above, it is not surprising that some (but by no means all) of the shell flooding into Five Nations sites at this time is in the form of Standardized Marine Shell ornaments.

Chapter 8 has shown that the introduction of SMS forms into Susquehannock, Five Nations, and Munsee sites at this time is entirely coincident with the ca. 1630–1635

resurgence of marine shell among the Seneca. These ethnic groups form the core area of SMS distributions through the rest of the 17th century. Any investigation into the re-emergence of the marine shell trade in the Northeast must take the new raw material parameters, production, and distribution modes of SMS into account.

Along with the rest of the Northeast, southern New England and Long Island Natives also “fell into” use of marine shell, including wampum manufacture, but with notable differences. According to William Bradford (as cited by Bradley 2011a:34), these groups began wampum production as a response its wampum’s skyrocketing valuation among others. But their own use of wampum showed persistent cultural differences. Becker (2010) has suggested that these differences stemmed more from these groups’ egalitarian social structure than their marginality to the trade in pelts. The general lack of penetration of SMS beyond the Pequots (south and east onto Long Island and east along the coast) invokes this same difference, whatever its root cause may be.

Western Groups

Early in the historic period, marine shell also becomes notably abundant beyond the Niagara Escarpment in the Iroquoian sites of southern Ontario. Numerous reports by David Boyle (dating from 1888 through 1907) and William J. Witemberg (dated 1908–1931) make note of copious amounts of marine shell that made its way to late 16th and 17th century Ontario sites.

In this more westerly region, the sharp upswing in marine shell came after this raw material became common in the Five Nations, taking place only very late in the 16th century. Slightly before A.D. 1600, large amounts of marine shell are found far into the interior on Neutral, Huron, and Petun sites (Fitzgerald 1982:212; 1990:389, 559–560; Fox 2008:11;

Pendergast 1989; White 1968). This Ontario trade was typified by notable amounts of raw material, including intact whelk shells.

Early SMS ornaments appeared in this western area on the same schedule as further east (circa 1635), again being found alongside large amounts of raw marine shell (Fitzgerald 1990:569). Of course, these occupations continued only until 1649–1653 (the destruction of Huronia and Neutralia).

It has been argued that middlemen, notably the “Massawomeck” (which Johnson has archaeologically identified as the Foley Farm phase of the Monongahela) provided Neutralia with shell from Chesapeake area sources (Johnson 2001; Pendergast 1989, 1994; Sempowski 1994). Lapham and Johnson (2002) make the case that Monongahela participation in the trade began slightly before A.D. 1600, coinciding with the major upswing in marine shell in Neutral sites. Concordantly, Fitzgerald (1990:590) notes that the Neutral sites of this time have far more marine shell than contemporary Susquehannock sites.

Meanwhile, the Neutral glass trade bead sequence shows that Dutch (in contrast to pre-existing access to French) trade materials became easily accessible to the Neutral at circa 1610 (Fitzgerald 1990; Lapham and Johnson 2002:102). The end of the Monongahela occupations thought responsible for the Neutral whelk shell trade came in the 1630s (at the hands of the Seneca?) and marked the point at which the shell trade coming to the Neutral, Petun, and Huron would have then become more strongly conditioned by the Susquehannock. This is exactly the time when SMS was becoming available. This suggests that the 1590s decline in Seneca marine shell is related to their exclusion from the Neutral-Massawomeck-Chesapeake Bay shell trade, and that the resumption of Western Five Nations marine shell supplies may be linked to the 1630s dissolution of that network (Johnson 2001:801; Johnson and Means 2009; Lapham and Johnson 2002).

Alternately, Wray, et al. (1991) and Sempowski (1994:52) have made the case that the Susquehannock were continuously in connection with the Ontario Iroquois through the early contact period, as well as suggesting that the social distance later characteristic of the Seneca and Susquehannock was not present in the last years of the 16th and earliest years of the 17th century. Central to the issue of the more westerly marine shell trade is the role of Monongahela traders up to the 1630s. But, for our purposes, distribution of SMS ornaments begins immediately on the heels of these changes. Post-1635 Susquehannock trade associations would be implicated in SMS distributions to the western Iroquoians (Neutral, Huron, Tionnonate) in either case.

The Northeast's Shell Trade in the Middle and Late 17th century.

Framing the post-1630 re-emergence of marine shell trade in the Northeast entirely in terms of the history of the Chesapeake shell trade previously appeared reasonable given the available facts. After all, non-SMS marine shell continues to be imported into the SMS core area sites throughout the 17th century. It has been only logical to assume that this traditionally manipulated shell flowed from its traditional source. In this scenario the evolution of the SMS industry would be a partial reflection, not the entire embodiment, of persisting valuation of this substance and the economic wherewithal to pay for it. But with the identification of the SMS industry as a colonial enterprise, one that may well include large imports of marine shell, this picture changes. One must also wonder about the sources of the non-SMS raw marine shell.

Models that posit a resurgence of marine shell availability from the Chesapeake region now have to compete with the possibility that raw marine shell, as well as wampum and

manufactured SMS ornaments, became a commodity flowing to the Iroquoians through the Dutch colony. Information about marine shell sources in the critical decades just prior to and during the emergence of SMS (i.e., 1610s through 1640s) are lacking. By the mid-1650s we have fragmentary records of imports from Curaçao showing at least some thousands of conchs were imported to New Netherland. In particular, the 1665 distribution of “some conch” among the crew of a vessel bound for there (Table 3.2) implies widespread knowledge that these things had value there. Some of the non-SMS gorgets at even very late 17th century Iroquois sites such as Weston (e.g., Beauchamp 1901:Plate 17:208) are huge by any prehistoric standard. If there were large imports of West Indian shell into Manhattan by the 1650s, would imported raw marine shell not be available at some price alongside of SMS ornaments? There is no particular reason to dismiss these shells as a colonial commodity in their own right.

Kurt Jordan (2008b) has examined marine shell use in Seneca contexts dating 1688–1754. Although SMS ornaments accounted for most of the crafted ornaments in these sites, limited marine shell manufacturing debris documented continuing interest in Native manipulation of raw marine shell at least through 1710. More to the point, the coincidence of the decline of the SMS industry and the notable constriction of overall marine shell seen in Seneca sites after 1710 supports the idea that Five Nations access to shell at this time flowed through a single source because non-SMS shell declined along with SMS ornaments.

Consequently, I suggest that evidence that the Chesapeake Bay shell trade rebounded after its decline must be critically re-evaluated. The 1630s expansion of marine shell use throughout what became the SMS core area is much more likely to be a proxy for the emergence of European colonial imports of warm water (West Indian) marine shell that became increasingly available at the same time the SMS industry was emerging.

CHAPTER 10

WHAT DOES SMS MEAN?

This study is an initial exploration of a long-forgotten industry. Many aspects of Standardized Marine Shell and northeastern marine shell use remain to be examined. I have defined SMS as a series of ornament forms with a shared technological, temporal, and geographic range. I have characterized it as an industry without possessing any direct documentation of its manufacture, relying instead on technological attributes and archaeological affiliations. I suggest that these ornaments were produced in cottage industry format by a relatively limited circle of producers and assume that their format reflects a producer's interpretation of the interests and desires of the consumers for whom they were designed. I have determined that this industry starts in the early decades of the Dutch colonial enterprise when numbers of European colonists were quite low. This also implies the entrance of settlers into the manufacture of some small portion of the wampum beads at an early schedule.

There is little or no evidence that the standardized ornament forms emerged as a transition from a pre-existing tradition. In fact, standardization is evident in the earliest identifiable stage. SMS emerges as something entirely new in Native ornamentation. The best explanation of its origin is that someone conceived of this as a marketable product that met strong demand and thus developed an appropriately scaled production and distribution format. Correspondence analysis and assessments of assemblage diversity indicate that

this industry has geographic and temporal coherence, holding together as a persisting and unified phenomenon. Industry developments take the form of stages easily correlated to historical developments within the young colony. The market illustrated by SMS distribution corresponds quite neatly to most of the economically important Dutch/Swedish trade network partners up through the 1660s. SMS then persists through the rest of the 17th century in the English administered New York and Pennsylvania trade (but does not extend significantly into New England, Maryland, or Virginia). The few outliers to the south in Virginia and North Carolina date between 1690 and 1720.

Concordance of SMS production with 1640s–1660s changes in the wampum industry is also suggested and I have indicated that the young SMS industry probably takes some impetus from mid-17th century wampum overproduction, with that competition being resolved to the detriment of the Native wampum producers of southern New England and Long Island. Chronological and distributional analyses of wampum's physical attributes will be required to examine this question. I have also suggested SMS has some connection to the overall changes in raw marine shell distribution during the 17th century. Research will have to be designed to investigate that hypothesis.

Developments in the SMS industry take the form of increasingly sophisticated technical presentation and symbolic content presumably amenable to the intended consumers. Yet the Natives' tastes and interests were almost certainly on the minds of SMS producers from the beginning. Technological and symbolic choices made by the authors of SMS are worthy of a closer look in an attempt to determine what SMS means in terms of intercultural relations and colonial history.

Who Made SMS?

I have established that SMS is restricted to the Dutch/Swedish trade sphere. I have not seen evidence that it was imported, taxed, nor regulated. The beginning date of the SMS industry is the middle years of the 1630s (because the earliest ending dates for sites with SMS are circa 1640). Given this early date in the colonial history of the Northeast in general and New Netherland in particular, and given that the core concept of the industry includes standardization from the very beginning, there are realistically no producers more probable than the New Netherland colonists of that decade.

The problem then becomes how little is known of the activities of these people. Settlement in New Netherland began in the mid-1620s as the first settlers and company employees arrived at trading locations (Albany, Manhattan, and the Connecticut River). Very few settlers were added during 1630s. Not only were there few incentives for settlers to immigrate to this particular colony, but this was a decade of economic stagnation, with much smuggling and theft from the West India Company. Population began to rise quickly only after 1639 when incentives were restructured regarding land ownership and trade with the Natives (Jacobs 2009a:45–49; Kammen 1975:34–38). Those initiating the SMS industry were almost certainly among the pre-1639 population.

Between 1630 and 1640 the colony's population only grew from 300 to about 500 individuals. These colonists were of quite varied European national origins. Inhabitants were either company employees (most of whom are described by Kammen as "*traders, clerks, soldiers, craftsmen, and what were called hired farmers*") or free settlers. Company employees were not allowed to engage in private trade or labor during their first six years under contract. Free settlers were not company employees and mostly subsisted as farmers,

but they could also legally engage in the fur trade. Enslaved Africans (less than 100) were also present in this decade (Heywood and Thornton 2009:196).

Whoever began the SMS industry necessarily dwelt near the shore, and thus in this decade were located quite close to Manhattan. The industry could hardly have begun, much less persisted, anywhere other than a location with general access to water transportation allowing bulk movement of marine shell raw material. Free settlers at Manhattan farmed, raised stock, traded, and smuggled furs, but there are very few accounts of their specific activities. Many of these were Walloons, French-speaking Calvinists who formed the core of pre-1640 free settlers in the colony, having come as a family-based migration in the 1620s.

Most farms at Manhattan were initially located just outside the company's compound. According to Green (1924) many of the Walloons who emigrated to Holland, England, and North America were skilled artisans. Importantly, in New Netherland they had the right to trade directly with the Natives. Many Walloons grew disillusioned and chose to migrate elsewhere as their ethnic community was increasingly marginalized by "company people" during the 1630s and they were unduly burdened by heavy handed administration during New Netherland's early years. But others established themselves and became ancestors of some of the colony's "families of singular importance" (Jacobs 2009a:64; Klooster 2009:69; Rink 1986:92, 133–134, 143).

The free settlers of the 1630s were not numerous but their manufactures were restricted only in as much as they could not legally craft goods that competed directly with produce made in the Dutch Republic. Jacobs (2009a:128) notes that "*in the Provisional Regulations of 1624, the colonists were forbidden to carry out any handicraft to which the trade is attached.*" Arguably, though, making wampum and shell ornaments, even in the 1630s

before free trade was generally allowed to others, could have been carried out openly by these free settlers.

This information still only circumstantially frames the question of who made SMS. The answer will have to wait on archaeological discovery of evidence of manufacture or perhaps upon recognition of some long neglected documentary passage whose significance can now be discerned with the existence and timing of the SMS industry outlined.

SMS in the Colonial World

SMS emerged in a very different colonial world than was the case 75 years later when it ended. As Richter (2001:174) has pointed out, the difference between “back-country” North American Indian groups purchasing “trade goods” and those producing these goods in Europe and elsewhere was not so great as one might presume. In fact Richter says “*in many respects Native Americans experienced the full effects of the eighteenth-century consumer revolution even before most British Americans did.*” Axtell emphasizes that it was only between 1690 and 1740, well after the onset of a burgeoning Atlantic trade with Natives of the colonial Northeast, that middle class English and Scotch consumers began to purchase large amounts of manufactured goods. Further, the mechanisms of advancing credit for manufactured goods were worked out quite early in the North American trade (Axtell 1992:126–146) largely because imported equipment was instrumental in procuring the resources that drove the economy. More recent review of the over-arching changes in consumer behavior in world markets emphasizes this broad view, with onset of major changes in consumer behavior in Europe originating circa 1650 (De Vries 2008).

If we were looking for first signs of North American Native dependency we might assign untoward significance to these credit arrangements and early Native consumption of manufactured goods. Such interactions have been argued to foreshadow less than favorable balances of economic power. Power asymmetries were undeniably instrumental in foreshadowing conquest and land cessions. But disadvantages accruing to some Native economies were hardly inescapable results of determinate choices made decades before. For instance, Ray (1974:137–165) examined use of extended credit and varying levels of consumption of trade goods in relation to long term economic and cultural changes in the Northern fur trade, finding highly variable outcomes dependent on other factors, including mobility, sustainability, and availability of alternate resources. In some cases the competition for products of Native-provided resources can drive considerable competition among various suppliers and exporters. Consumed goods do not automatically drive dependency (DuVal 2006:251; Richter 2001).

This is another lesson of the consumer revolution. Although 17th century northeastern Natives had very different incentives for consuming manufactured goods than the exclusivity craved by class conscious consumers in Europe, they still possessed and exercised consumer power. Examples of consumer feedback help create a more accurate sense of contemporary local balances of power between actors in the colonial setting than the eventual asymmetric outcomes. Of course, this is not to say that colonists did not desire or intend to institute ideological and economic asymmetries, but it does remind us that those desires are only peripherally relevant to examining *how* the eventual asymmetries came about. Examples of consumer power are to be found everywhere in Native North American consumption of manufactured goods. Richter (2001:174–176) describes numerous examples of how

feedback from Natives shaped production of goods coming to North America. Eccles (1983:145) describes the extraordinary accommodations of French administrators forced to compete with higher quality woven goods provided by the British. In fact, given the early onset of trade in the products of industrial and proto-industrial European manufacture and the strong role of consumer feedback shaping that production, Richter concludes that it would be far more accurate to refer to these objects as “*Indian goods made in Europe to suit Native tastes*” than merely European trade goods.

Very much in this same vein, SMS shows that, from the earliest days of the trade, Natives of the Northeast were in possession of the power of consumer choice. Through consumption, and as a proxy measure of larger power dynamics of the colonial economic interface, Native people had the power to incentivize colonists to offer them richly diverse and beautiful products synchronized to their tastes and increasingly reflective of their beliefs. To explain the emergence and stages of SMS will require that we combine *this* insight with a Native view of the desired employment of that economic power.

A Note on Consumption and Appropriation

In an attempt to explore the supposedly different meanings of commodities in various “types” of societies, Douglas and Isherwood (1996:36–41) have defined consumption as beginning where the market ends, with the essential function of consumption being “drawing the lines of social relationships.” More explicitly, they assert that (regardless of the encompassing economic system) consumed goods are particularly “good for thinking” in as much as they are “a nonverbal medium for the human creative faculty.”

Human employment of artifacts to express and negotiate social creativity implies much the opposite of artifacts having fixed or essential meanings. The location of a material sensibility is its social use, or more exactly, the “recursive dynamic” between materials and human relations (Meskell 2005). The goal of Douglas and Isherwood’s thesis was to unify theoretical approaches to consumption by extending an anthropological perspective into economists’ view about consumer “rationality” via an acknowledgement that meaning equals meanings (and thus rationality) are mediated by *“an active process in which all the social categories are being continually redefined”* (Douglas and Isherwood 1996:45).

Meskell (2005:5) describes how even local manufacture is easily stripped of authorship in service of ideological substantiations (e.g., production of sacred objects or creation of actual physical divinities). Artifacts transferred across cultural borders would be far more important if the separation between the semiotic ideologies that shape their meanings was total (Keane 2005). But because meanings are pliable and indexed for interpretation by incompletely shared sets of historical/contingent assumptions, it is easy to make too much of the borders between production origins. Disabling a rigid division between modes of production in capitalistic and reciprocal economies allows us to see the processes of differentiation and contingency that condition meanings of objects moving between these overly dichotomized and supposedly evolutionary systems (Thomas 1991:18).

All that said, the alignment of production with understood meanings within a system of knowledge is still no small thing. Nor are the potentialities brought about by the introduction of something new. Newness itself can be a commodity—a template not requiring erasure before inscription with new meanings. This leads us to an acknowledgment that “new” cultural objects have a particularly potent ability to be involved in social creativity, and

that the social purposes to which they are put are often a clear expression of sophisticated political agendas.

Wampum provides a particularly relevant illustration. The wampum valuation crisis as experienced by Dutch colonists and administrators was quite different than the Native experience of this change. Both colonists and major Native players in the fur trade received increasingly large amounts of beads worth progressively less and less in terms of their “purchasing power” against other commodities. But the effects on Native peoples were mediated by holding the resources these devaluing beads were measured against. In New England the devaluation and removal of wampum as a cornerstone of the economic system was devastating to its producers, the coastal Algonquians (Ceci 1980, 1990; Richter 2001:100–101). The laws of supply and demand inexorably pushed these producers to an economically marginal position resulting in loss of land and power.

But for the Five Nations, the lower value and increased production of millions of wampum beads did not result in lower demand or lower internal valuation. Something quite the opposite developed, recalling Douglas and Isherwood’s assertion that consumed goods can be “good for thinking” and “a nonverbal medium for the human creative faculty.” George Hamell (1996a) describes the ways the semantic domain of wampum products and practices were conditioned to foreground a wide variety of “social states of being,” illustrating his claim that wampum was a material expression of an ethos in which “light, white, and bright things are good to think.” This is a good example of “material thought” constituting the social valuation of goods.

David Graeber (2001) expands on this, noting that the social contexts of wampum use were far more political than economic, thus positing a very different regime of value.

According to Graeber, wampum's external origin was constitutive of its perceived power of social creativity. He explains this as one possible solution to a cosmological dilemma, rhetorically stated as "*how can that which has the power to constitute a certain order itself partake of that order?*" Once endowed with exotic power wampum was valued according to its ability to effect two forms of political action. Wampum created superior modes of communication by purifying social context and testifying to the veracity/formality of what was being said. This was wampum in its circulating free-form state. Alternately, in curated belt form, wampum was a formal record of understandings achieved under that open communication. In terms of social creativity, larger and larger quantities of wampum only affected what might be called the metrics of display, without eroding the underlying esteem for wampum's essential function. The result was a fabulous elaboration of material practice rather than a cross-cultural consensus that this was now a devalued commodity.

In contrast, this discussion frames how much more there is to do in determining what SMS means to those who employed it socially. It has long been assumed that the attributes of wampum automatically extend to the other shell ornaments found alongside it. But there are cautions for those who would take this too much for granted. There are significant differences between SMS and wampum. For instance, there is no indication that SMS was involved in representations of political speech. This implies SMS lacked the transferable sacred meanings of wampum. Perhaps not surprisingly, SMS tends more towards identity-related social functions, since both wampum and SMS were liberally associated with socially creative use as identity-related body adornment during the 17th century (Pietak 1996). Addressing the place of SMS in Native society will require theorizing identity-related materiality within a contextually based investigation. Although I have not gathered what

remains of this particular information, my inventory and interpretations now make this chore now much more possible.

SMS certainly also had meaning to those who created it. Products reflect choices made by their producers (Hegmon 1992). In the case of SMS ornaments, which are apparently made for someone else by a restricted set of producers in a persistent cottage industry setting, this sense of meaning can be approached in terms of two active interfaces, information iconologically communicated and technical choices that may or may not transmit social information.

A Note on Meaning

Archaeologists have often approached style through technology (i.e., isochrestic variation) and symbol (iconological representation). Choices made between equivalent technical alternatives, and the social logic behind those choices, have been identified as particularly relevant reflections of social interaction and historical context (Hegmon 1992; Miller 2007:191–195; Sackett 1982, 1985). Since SMS brings new technological styles (notably standardization) to bear on the traditional product of another culture, one important question here becomes whether consuming this standardized product was seen as a neutral choice or selected as a politically appropriate or desirable and thus reflects innovative cultural interaction. For instance, does newness or otherness play into the consumption of this product?

Standardization might prove no impediment to marketing this product if the consumers of SMS ornaments had only minor political boundaries among themselves. But it would be an understatement to observe that there was no solidarity among the pre-1675 Susquehannock and the Seneca, or the Tionnonate Huron and the Five Nations, for instance. Yet all wore the same standardized shell ornaments. On the whole, the choice of SMS producers to

manufacture a standardized product required standardization to be at least passive or “tolerated”—a mode of production having either no particular significance to the consumers or perhaps even being perceived as a positive attribute.

All things being equal, entrepreneurial desire to produce a commodity might be assumed guided more by effective modes of production than any desire to encode social information, but this too is mediated by the politics of difference. In the 1630s the colony’s success and failure, not to mention the matter of colonists’ life and death, lay squarely with the good will of Native peoples. Early settlers had a great deal indeed to communicate to their Native neighbors.

Such information might typically be transmitted by encoded symbol, but there are situations where functional variation takes on immense social significance in its own right (Sackett 1985:157). As a class, body ornaments are never intended to convey functionality, in fact the impetus to display meaning is often strongly channeled by rarity and/or distinctiveness (Miller 2007:206). But desire for message differentiation (meaning a material’s amenability for syntactical content) easily converts functional attributes to decorative. For example, early functional trade items were often converted to decorative use in North America and elsewhere (e.g., Otto 2006:57). Such ornaments obviously spoke more about the fact that their bearers had access to these significant items than what the material displayed represented in function. It is not at all unlikely that part of the acceptability of these standardized ornament forms derives not simply from a predisposition to value this raw material according to traditional perspectives, but from the fact that European production within the context of roughly appropriate Native form came to represent social information regarding political and economic alignments (with the Europeans) and reflected an involvement in emerging networks of meaning beyond the Native world. In spite of sharing

the same powerful raw material, the same cannot be said for wampum. Wampum's symbolic meanings erased its origins.

Scale, labor, and status are industry attributes with social historical overtones. The 18th and 19th century descriptions of northeastern shell ornament production documented both family-based and piece-work labor situations and generally, but not exclusively, gendered divisions of labor (Williams and Flinn 1990). Specialized tasks such as raw material manipulation were "farmed out." Women, children, and indigent persons made wampum in the middle 18th century Albany industry, while in Bergen County, New Jersey women made wampum beads "from the earliest days of the colony." In the case of the middle 19th century Campbell Factory, all crafting of finished ornaments was done by men who specialized in this trade, spending most of the year at the task. However, reduction of raw shells to suitable rough blanks was completed by others in large lots. At the same time, the Campbells maintained control of capital functions (purchasing bulk *Mercenaria* shell from local shell fishermen and receiving imported West Indian shell brought in as ships' ballast).

Social status of the shell ornament producers also varied. As noted by Ceci (1977), much of the earliest colonial supplies of wampum were made by Native groups. Very early on, these groups derived power and independence from their production, experiencing what Richter (2001:99) refers to as a golden age where their leaders moved confidently in two economic and political worlds. But as wampum producers were subjugated and production became a matter of forced tribute the status of wampum production must have also dropped.

Peña (1900, 2003) shows that wampum production in 18th century Albany typically was done by low status individuals. Only in the 19th century Bergen County industry was there any degree of economic self-sufficiency and status in shell work, and that was very

probability limited to only the self-employed specialists producing the top tier—the formal ornaments. These ornaments were the latter day equivalent in form and function of the SMS ornaments. We can only guess who was producing the 17th century SMS ornaments, but we can assume from these analogies and the relative invisibility of their trade in contemporary documents that no great wealth was attained by this craft.

Finally, there is the question of symbol and meaning. A contextual analysis would be required to examine the social context of SMS ornaments following their appropriation into Native social employments. Any iconological style (Hegmon 1992; Wiessner 1985; Wobst 1977) engendered by SMS producers would necessarily pass through cultural appropriative modes (negotiations and construction of shared meaning). But that does not mean the producers of SMS had no social message for their consumers.

Pelt-shaped forms are persistent images in the SMS industry. These are found alongside literal representations of various fur trade mammals. The economic implication of these referents is added to by possibly economically relevant fish and fowl forms. After all, a necklace of goose/loon pendants closely resembles a brace of captured waterfowl. These symbols may express a summative unity from the perspective of the minds of the SMS makers—a creative misunderstanding as to what the meaning of the ornaments might be to Native peoples.

Certainly, pelt-shaped forms of the SMS industry are material testimony to the animal pelts/skins that constituted the core product of Native economic relations with Europeans. This gives voice to Kurt Jordan's (2008a:290–292) charge that the persistent breath of commerce in these natural products and their concomitant procurement practices have been vastly under-recognized among the Iroquois. Thus it may be that representing the economic

relationship between Natives and Europeans is one of the major themes of SMS, at least initially and from the perspective of the producers. This symbolic acknowledgement of the economic underpinnings of the relationship between Natives and European settlers brings to mind the 1634 Native joke reported by Father Le Jeune “*The Beaver does everything perfectly well, it makes kettles, hatchets, swords, knives, bread; and, in short, it makes everything*” (Thwaites 1900:6:295).

Like most successful jokes, this statement frames a juxtaposition of meanings. And this is where the progressive incorporation of native symbol in SMS forms comes to the foreground. The power of the beaver to “fabricate” all these things rests in two realms—economic and cosmological. Behind the joke is the widespread Native acknowledgement that the natural world was populated by cosmological powers that held sway over human affairs. It may be that, for Native peoples, SMS represented and mediated the cosmological well-being of the fur trade in much the same way as this “joke,” by acknowledging there was more to this endeavor than its economic frame.

Conclusion

George Lankford (2004), in a review of Southeastern Mississippian period art, suggests that Native art forms with cosmological themes consist of microcosmic abstractions of the world as “fundamentally one that humans did not create.” He suggests that “sense-making” operations were a refusal to live in chaos, and thus resulted in attempts to represent the order of things with symbolic media. In the Mississippian period of North America, the formats of those attempts span many different media, with art in shell taking its place (along with copper, stone, and ceramic art) among the most prominent iconographic media. With specific

reference to marine shell gorgets, Lankford encapsulates the over-arching drive to represent order as displaying “the world on a string.” This broad sense of appropriate format and content for sense-making messages is the traditional system of meanings within which SMS ornaments emerged in the 1630s colonial interface of New Netherland.

SMS began as a series of crudely crafted abstract forms. Even the simple earliest beads were repetitive iterations—testimony to the standardizing effect of specialized production for others and aligned and fine-tuned with received intelligence regarding material and shapes of crafted products acceptable to consumers. The earliest literally symbolic forms started circa 1645–1650, perhaps ten years after the industry first took form, and were a consistent theme thereafter. The forms and format of SMS beads and their production were recursively shaped by feedback from the consumers (as successful commodities often are) and the production of forms and formats changed. Part of that intimacy was increasing sophistication in matching the consumer’s desire for cosmological content.

Many of the zoomorphic forms are shown as beaded entities, a traditional depiction of celestial or mythical figures dating far back in time. In this case I interpret these creatures’ beaded adornments as testifying to the cosmological powers that mediate human relationships with the natural world. Not only does this appear to be a direct reference to the role of these creatures in the political and spiritual economies that sustain the colonial relationship, but appearing as it does in these standardized forms, it clearly represents a growing sophisticated understanding of Native views on these matters and a literal acknowledgement of the entangled and interdependent Native and settler worlds. In this sense one might characterize the iconological imagery of SMS as a progressively sophisticated etic characterization of the Native world view as perceived by early European

settlers and carried on by ensuing generations of their descendants. The power dynamic that led to the producers' desire to attempt to represent this Native world view is the vital key to interpreting the meaning of SMS ornaments.

An exchange interface generating a concrete iconographic representation of itself is perhaps not so unusual. Icons in the modern world commercial market represent local as well as global meanings, one of which is the unmistakable reach of commerce and its concomitant creation and re-crafting of social inter-connections. Identity negotiations are always characterized by this kind of two-way street, where the social employment of a specific material seizes on a discrete attribute which can be converted to significance—conveying recursively selected specific and exclusive points. Identities are assertions necessarily defined against an alternate possibility, and then only at the point when that opposition is seen as significant to transmit (Lucy 2005:95).

This point insists that the acceptability of standardized ornaments to widely disparate groups (even those who regarded each other as enemies) must be born of shared acknowledged dichotomy. The settlers expressed one aspect of this “difference” in production, and the Natives express a form of negotiated concurrence in their adoption, regardless of what other information was assigned in the consumer's social systems through the cultural appropriation of these ornaments.

The fact that the producers of SMS became increasingly schooled in Native meanings and the modes of signifying them is strongly indicative of the power dynamic between the two groups. The reflection of power within a custom defined and increasingly elaborate ornamental product marks SMS as a relatively straightforward measure of mutual dependencies and benefits of interaction. In this sense, we can see the fluorescence and

elaboration of Standardize Marine Shell ornament forms from the late 1630s through the end of the 17th century as a product of robust economic interactions and viable political options in the midst of major cultural changes for both the colonists and those beginning to be colonized. In this light, the later progression towards constricted choices of shell ornament forms after 1680 and especially after 1710 reflects power relations between the now well-established colonizers and Native peoples. Colonial power relations were shifting.

This movement towards unbalance was not inexorable or inescapable, but economic and political stability were difficult for Native polities to maintain. All through the century various polities winked out as individually identifiable groups lost ground in terms of economic viability and made land cessions, or reinvented themselves while seeking new stability. The southern Ontario dispersals of the ca. 1650 horizon were followed in short order by the coastal Algonquian's economic marginalization and the rapidly increasing cessions of land by Munsee and others close to the European centers (Grumet 1989, 1994). By 1675, many of the smaller and more vulnerable Native groups were subdued or economically cut off, including the recently powerful Susquehannock, who were then reconstituted as a multi-ethnic population under Seneca influence 15 years later. Of the wide range of groups sporting SMS ornaments in the 800 kilometer span between Manhattan and the shore of Georgian Bay in the middle 1640s, only the upstate New York Iroquois retained a (much changed but still viable) political and economic presence after 1710 (Jordan 2008a). Viable options for self-determination and economic sustainability still remained for the Native peoples in the American Northeast, but not so many options as a century before. In this sense the elaborate SMS ornaments send as much of a message about power relations in their absence as they had with their vibrant presence. This forgotten industry represents a forgotten balance of power.

Appendix A. Master inventory of Standardized Marine Shell ornaments

Location	State/Prov.	SMS #/site	Birdman	Bird	Owl	Goose/Loon	Large Goose	Bird Head bead	Fish	Beaver	Otter	Pelt Type A	Pelt Type B	Pelt Type C	Quadruped	Turtle	Effigy Unique
Farmington	CT	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Pond	CT	53	0	0	0	9	0	0	0	0	1	0	0	0	0	0	0
Milford	IA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blood Run	IA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River L'Abbe	IL	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake Freeman	IN	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam 4, Potomac R.	MD	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fletcher	MI	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area of Fort St. Joseph	MI	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gros Cap	MI	10	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0
Lasanen	MI	41	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Richardson	MI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marquette Mission	MI	17	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ft. Pontchartrain	MI	7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Cadillac, MI	MI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Town	MS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silo Ridge	MS	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neoheroka Ft.	NC	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fredricks	NC	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jenrette	NC	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Saratown	NC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trenton	NJ	6	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0
W. Long Branch	NJ	21	0	1	4	0	0	8	0	0	1	0	0	0	0	0	0
Bell	NJ	92	0	5	6	4	0	0	5	1	0	0	0	2	0	0	1
Minisink area	NJ	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calno School	NJ	7	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
Pahaquarra	NJ	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Burlington Co.	NY	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cayuga Co.	NY	54	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0
Cayuga Reservation	NY	13	0	0	0	3	0	0	2	0	0	0	0	0	0	0	0
Cayuga Castle	NY	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Garrett	NY	38	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Gr. Gully/ Young	NY	65	0	1	0	8	1	0	4	0	0	1	0	0	0	0	0
Lamb	NY	60	0	0	0	8	0	0	0	1	0	0	0	0	0	0	0
Mead Farm	NY	236	0	1	0	43	0	0	0	1	0	0	0	0	1	0	0
Pattington/ Scipioville	NY	8	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Rene Menard Bridge	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sibley Farm	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Van Son	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Snyders or Huntoon	NY	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Snyder McClure	NY	85	0	2	0	6	0	2	1	0	0	3	0	0	0	1	0
Kirkwood	NY	31	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Menzis	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Power House	NY	131	0	2	0	7	0	0	0	1	0	0	0	0	0	0	0
West Fall Brook	NY	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Munnsville	NY	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Quarry	NY	35	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
Sullivan	NY	11	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0
Thurston	NY	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Honeoye Falls	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

Appendix A, continued. Master inventory of Standardized Marine Shell ornaments

Location	“Lizard”/Serpent Effigy Unident.	SMS Gorget Medallion Large Tube	Pipe Bead	Runtee Disk	Runtee Circuoid	Runtee Rect.	Runtee reworked	Runtee, unknown	Triangle Apical Drill	Triangle Vertical Drill	Triangle—Indeterm.	Triconcave	Large Crescent	Crescent	Claw	Star/Cross	Cone/Pyramid	Geom. Unique
Farmington	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0
Long Pond	0	1	0	0	10	0	0	0	0	0	0	0	0	14	18	0	0	0
Milford	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Blood Run	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
River L’Abbe	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0
Lake Freeman	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Dam 4, Potomac R.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Fletcher	0	0	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0
Area of Fort St. Joseph	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Gros Cap	0	0	0	0	2	3	0	1	0	0	0	0	0	0	0	0	0	1
Lasanen	0	0	0	0	24	10	0	0	0	1	3	0	0	0	0	0	0	0
Richardson	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Marquette Mission	0	0	0	0	15	1	0	0	0	0	0	0	0	0	0	0	0	0
Ft. Pontchartrain	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
Cadillac, MI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Long Town	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Silo Ridge	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
Neoheroka Ft.	0	0	0	0	0	0	58	0	0	0	0	0	0	0	0	0	0	0
Fredricks	0	0	0	0	11	10	8	0	0	0	0	0	0	0	0	0	0	0
Jenrette	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Upper Saratown	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Trenton	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
W. Long Branch	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	1	0
Bell	0	0	1	0	31	15	0	0	0	1	10	0	0	0	8	0	0	2
Minisink area	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calno School	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pahaquarra	0	0	0	0	40	8	0	0	0	0	0	0	0	0	0	0	0	0
Burlington Co.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cayuga Co.	0	1	0	0	11	3	0	0	0	0	0	0	0	33	1	0	0	0
Cayuga Reservation	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	4	0	0
Cayuga Castle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Garrett	0	0	0	0	0	6	0	0	0	0	1	0	0	28	0	0	0	1
Gr. Gully/ Young	0	1	0	0	42	7	0	0	0	0	0	0	0	0	0	0	0	0
Lamb	0	1	0	0	16	10	0	0	0	0	0	0	0	20	4	0	0	0
Mead Farm	0	0	0	0	16	42	0	0	0	0	0	0	0	132	0	0	0	0
Pattington/ Scipioville	0	0	0	0	2	0	1	0	0	0	0	2	0	0	1	0	0	0
Rene Menard Bridge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sibley Farm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Van Son	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Snyders or Huntoon	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
Snyder McClure	0	1	0	0	18	20	2	7	0	0	1	2	0	15	3	0	0	1
Kirkwood	0	0	0	0	17	9	0	0	0	2	0	0	0	1	1	0	0	0
Menzis	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Power House	0	0	0	0	1	44	1	0	28	0	0	0	0	30	11	0	0	4
West Fall Brook	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0
Munnsville	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Quarry	0	0	0	0	22	0	1	0	0	0	0	0	0	0	1	0	0	0
Sullivan	0	0	0	0	0	2	0	0	0	0	0	0	0	3	1	0	0	0
Thurston	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Honeoye Falls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, continued. Master inventory of Standardized Marine Shell ornaments

Location	State/Prov.	SMS #/site	Birdman	Bird	Owl	Goose/Loon	Large Goose	Bird Head bead	Fish	Beaver	Otter	Pelt Type A	Pelt Type B	Pelt Type C	Quadruped	Turtle	Effigy Unique
Monroe Co.	NY	50	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Dann	NY	937	1	1	3	118	4	14	1	3	1	0	2	3	1	0	0
Rochester Junction	NY	533	4	0	2	4	0	1	1	0	0	0	0	1	0	0	0
Allen Site	NY	19	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0
Brown	NY	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Galligan 2	NY	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horatio Nellis	NY	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson-Everson	NY	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lipe II or White Orchard	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prospect Hill	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Oneida Valley	NY	18	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Hogan	NY	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Lanz-Hogan	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oneida Castle	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brewerton	NY	34	0	0	1	2	0	0	0	0	0	0	4	0	0	0	0
Christopher Site, Pompey	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lafayette	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near Pompey	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oak Orchard	NY	27	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0
Pompey	NY	62	0	0	0	4	0	0	0	0	0	1	1	0	0	0	0
Armand	NY	7	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Carley	NY	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Indian Castle	NY	65	0	0	0	4	0	1	1	0	0	0	0	2	0	0	0
Indian Hill	NY	59	1	0	0	14	0	2	0	1	0	0	0	0	0	0	0
Jamesville/ Pen	NY	120	0	1	0	2	0	1	10	1	1	4	0	0	0	0	1
Lot 18	NY	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weston/Bloody Hill	NY	55	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Canandaigua	NY	10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
East Bloomfield	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Near East Bloomfield	NY	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Ontario Co.	NY	20	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
W. Bloomfield	NY	8	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Beal/Cherry Street	NY	41	0	0	1	4	0	9	0	0	0	0	0	0	0	0	0
Boughton Hill	NY	234	0	2	0	5	1	2	0	1	1	0	0	0	0	0	0
Cornish	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Huntoon	NY	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ketchum/Damasky	NY	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Marsh	NY	45	0	1	0	11	0	2	0	0	0	0	0	1	0	0	0
New Ganestage complex	NY	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steele	NY	36	0	0	0	6	0	0	0	0	1	0	0	0	0	0	0
Townley-Read	NY	80	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Warren	NY	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheeler Station /Fox	NY	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
White Springs	NY	34	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Geneva	NY	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Seneca Co.	NY	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Kendaia	NY	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lilly Hill	NY	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wawarsing	NY	25	0	0	0	3	0	0	1	0	0	4	0	0	0	0	0
Reed & Sanach	NY	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seneca sites	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near Rochester	NY	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naples area	NY	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	NY	77	0	0	1	20	1	3	0	2	1	1	0	0	1	0	1

Appendix A, continued. Master inventory of Standardized Marine Shell ornaments

Location	“Lizard”/Serpent Effigy Unident.	SMS Gorget	Medallion	Large Tube	Pipe Bead	Runtee Disk	Runtee Circuoid	Runtee Rect.	Runtee reworked	Runtee, unknown	Triangle Apical Drill	Triangle Vertical Drill	Triangle—Indeterm.	Triconcave	Large Crescent	Crescent	Claw	Star/Cross	Cone/Pyramid	Geom. Unique
Monroe Co.	0	0	0	0	32	1	0	0	0	0	0	0	0	0	0	0	16	0	0	0
Dann	2	0	0	1	0	154	48	6	22	0	1	23	2	0	0	462	63	0	0	1
Rochester Junction	0	1	0	0	0	424	67	1	2	0	1	17	4	0	0	0	3	0	0	0
Allen Site	0	0	0	0	0	8	3	0	0	0	0	0	0	0	0	3	0	0	0	0
Brown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Galligan 2	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
Horatio Nellis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson-Everson	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Lipe II or White Orchard	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Prospect Hill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oneida Valley	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	1	0	0
Hogan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lanz-Hogan	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Oneida Castle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Brewerton	0	0	0	0	0	11	0	3	0	0	0	0	0	0	0	3	10	0	0	0
Christopher Site, Pompey	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lafayette	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Near Pompey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Oak Orchard	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	7	0	0	0	0
Pompey	0	0	0	0	0	30	9	1	8	0	0	0	0	0	0	7	1	0	0	0
Armand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
Carley	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indian Castle	0	0	0	0	0	35	2	0	1	0	0	0	0	6	1	11	1	0	0	0
Indian Hill	0	0	1	0	0	15	5	0	4	0	1	1	0	0	0	9	5	0	0	0
Jamesville/ Pen	0	1	2	0	0	47	18	0	0	0	0	0	0	30	0	1	0	0	0	0
Lot 18	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	21	0	0	0	0
Weston/Bloody Hill	0	0	2	0	0	33	12	0	0	0	0	0	0	5	0	0	0	1	0	0
Canandaigua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	2	0	0	0
East Bloomfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near East Bloomfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ontario Co.	0	0	0	0	0	0	16	0	0	0	0	2	0	0	0	1	0	0	0	0
W. Bloomfield	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	1	0	0
Beal/Cherry Street	0	0	0	0	0	17	2	0	5	0	0	0	0	0	0	1	1	1	0	0
Boughton Hill	0	0	1	0	0	145	36	0	1	0	3	11	1	4	0	16	3	0	0	1
Cornish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Huntoon	0	0	0	0	0	9	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Ketchum/Damasky	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Marsh	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	19	6	0	1	0
New Ganechstage complex	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Steele	0	0	0	0	0	4	0	1	7	0	0	0	0	0	0	6	11	0	0	0
Townley-Read	0	0	0	0	0	2	0	0	0	0	0	0	0	77	0	0	0	0	0	0
Warren	0	0	0	0	1	11	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Wheeler Station /Fox	0	0	0	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0
White Springs	0	0	1	0	0	19	1	0	0	0	0	0	0	11	0	0	0	0	0	0
Geneva	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Seneca Co.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0
Kendaia	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lilly Hill	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Wawarsing	0	0	0	0	0	11	6	0	0	0	0	0	0	0	0	0	0	0	0	0
Reed & Sanach	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0
Seneca sites	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
near Rochester	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
Naples area	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	0	0	0	0	0	35	1	0	0	0	0	0	0	0	0	7	3	0	0	0

Appendix A, continued. Master inventory of Standardized Marine Shell ornaments

Location	State/Prov.	SMS #/site	Birdman	Bird	Owl	Goose/Loon	Large Goose	Bird Head bead	Fish	Beaver	Otter	Pelt Type A	Pelt Type B	Pelt Type C	Quadruped	Turtle	Effigy Unique
Rogers Farm	NY	43	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Croton Aqueduct	NY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Sandusky	OH	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brantford Twp	ON	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walker Ossuary	ON	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brantford	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near Craigleith	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake Medad	ON	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lot 19, Con. 3	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grimsby	ON	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Colborne	ON	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smokes Point	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near Penetanguishene	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angoutenc	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bowman Farm	ON	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ossosone	ON	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nottawasaga Twp	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lot 11, Conc. 8	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lot 24, Conc. 7	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ontario	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterloo Co.	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Beverly Twp	ON	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Hamilton	ON	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barton Twp	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lambton Mills	ON	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Near Lambton	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Garrow Farm	ON	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28th Street	PA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conoy Cemetery	PA	46	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
Lancaster Co.	PA	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Frey-Haverstick	PA	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Strickler	PA	78	0	1	9	9	1	1	0	1	0	0	3	1	0	0	0
Conestoga Town	PA	83	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0
Lancaster Co. Park	PA	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Pittsburg	PA	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarf Cache	PA	24	2	0	0	10	0	0	1	1	0	2	0	0	0	0	0
Zimmerman	PA	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Pennsylvania	PA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Byrd Leibhart	PA	180	0	0	4	39	0	1	0	4	0	0	1	0	0	0	0
Lorette	QC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Burr's Hill	RI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leavenworth	SD	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Four Bear	SD	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosa	SD	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fort George	SD	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sully	SD	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Larson	SD	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mobridge	SD	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Sweden/New Amsterdam	Unk	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
John Green	VA	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Raymond Bush	VA	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock Island II	WI	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hanson Site	WI	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bell	WI	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Totals		4,845	9	25	38	414	8	52	41	24	7	18	13	11	4	1	3

Appendix A, continued. Master inventory of Standardized Marine Shell ornaments

Location	“Lizard”/Serpent Effigy Unident.	SMS Gorget Medallion Large Tube	Pipe Bead	Runtee Disk	Runtee Circuoid	Runtee Rect.	Runtee reworked	Runtee, unknown	Triangle Apical Drill	Triangle Vertical Drill	Triangle—Indeterm.	Triconcave	Large Crescent	Crescent	Claw	Star/Cross	Cone/Pyramid	Geom. Unique			
Rogers Farm	0	0	0	0	9	9	0	0	0	0	3	0	0	20	0	0	0	0			
Croton Aqueduct	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Upper Sandusky	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Brantford Twp	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0			
Walker Ossuary	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0			
Brantford near Craigleith	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0			
Lake Medad	0	0	0	0	1	0	0	15	0	0	0	0	13	0	0	0	0	0			
Lot 19, Con. 3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0			
Grimsby	0	0	0	0	0	1	0	27	0	0	0	0	0	0	0	0	0	0			
Port Colborne	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0			
Smokes Point	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
near Penetanguishene	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Angoutenc	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
Bowman Farm	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0			
Ossosone	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0			
Nottawasaga Twp	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Lot 11, Conc. 8	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
Lot 24, Conc. 7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0			
Ontario	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Waterloo Co.	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
Beverly Twp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Hamilton	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0			
Barton Twp	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Lambton Mills	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
near Lambton	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0			
Garrow Farm	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
28th Street	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0			
Conoy Cemetery	0	0	2	0	22	1	2	0	0	0	0	16	0	0	0	0	0	0			
Lancaster Co.	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0			
Frey-Haverstick	0	1	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0			
Strickler	0	3	0	0	2	6	16	4	0	0	1	0	0	15	4	0	0	0			
Conestoga Town	0	0	1	1	67	10	0	0	0	0	0	0	0	0	0	0	0	0			
Lancaster Co. Park	0	0	0	0	7	0	0	0	0	0	0	5	0	0	0	0	0	0			
West Pittsburg	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0			
Sarf Cache	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	0			
Zimmerman	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0			
Pennsylvania	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0			
Byrd Leibhart	0	2	0	0	40	37	23	3	1	0	1	0	0	21	1	0	0	2			
Lorette	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Burr’s Hill	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0			
Leavenworth	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0			
Four Bear	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0			
Rosa	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Fort George	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Sully	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0			
Larson	0	0	0	0	34	20	0	0	3	0	0	0	0	0	0	0	0	0			
Mobridge	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0			
New Sweden/New Amsterdam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
John Green	0	0	0	0	3	0	59	0	0	0	0	3	0	0	8	0	0	0			
Raymond Bush	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0			
Rock Island II	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0			
Hanson Site	0	0	0	0	1	0	0	11	0	0	0	0	0	0	0	0	0	0			
Bell	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0			
Totals	2	15	14	2	3	1,594	536	190	197	4	6	65	26	13	323	15	947	200	9	3	13

Appendix B. Inventory of sites with Standardized Marine Shell ornaments

Location	Ethnic Affiliation	County	ST	Est. Begin	Est. End	Comments and Discussion of Site Occupation Span
CONNECTICUT						
“Farmington”	Tunxis?	Hartford	CT			Shepard says 1824 “at Farmington.” His daughter (to Beauchamp) as “near New Britain.” Dutch post Good Hope occupied 1631–1653. Local Dutch relations continued strong in the 1660s (Grunet 1995:176; Shorto 2004).
Long Pond	Pequot	New London	CT	1660	1720	Bradley 2012b; McBride publications (e.g., Curry and McBride 2001; Jones and McBride; McBride and Grunet 1996) list 1670 as start because of documented occupation, but area was already occupied prior to establishment of reservation. Grunet 1995 lists as 1660–1720.
IOWA						
Milford (13DK1)	Ioway/Oto	Dickinson	IA	1680	1700	Tiffany and Anderson 1993; Henning 2005 says Milford is the latest Okoboji Phase Oneota village and goods there indicate direct contact with French traders.
Blood Run (13LO2)	Omaha (and many others)	Lyon	IA	1690	1714	Henning 2003, 2005; Henning and Schermer 2004. This span is the major Omaha occupation.
ILLINOIS						
River L’Abbe	Peoria	Madison	IL	1735	1752	Walthall and Benchley 1987.
INDIANA						
“Lake Freeman”	Unknown	White	IN			Unspecified site.
MARYLAND						
“Dam 4, Potomac River”	Unknown	Washington	MD			Unspecified site.
MASSACHUSETTS						
Deerfield PVMA	Unknown	Unknown	MA			Site unknown. Added after analysis. http://1704.deerfield.history.museum/list/artifacts/personal.do
MICHIGAN						
Fletcher (20BY28)	Ottawa	Bay	MI	1745	1765	Beginning date based on assumptions about rates of burial (Mainfort 1979).

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

“Area of Fort St. Joseph” (20BE23).	Unknown	Berrien	MI			Quimby 1939. The fort site itself was occupied 1691–1781. But Grumet 2009:155 notes that in 1681 a group of 90–150 people, including some Minisinks were encountered at St. Joseph by LaSalle. This group was at this locale at least 1679–1682.
Gros Cap (20MK6)	Ottawa	Mackinac	MI	1671	1705	Cleland 1999:280–282; Nem and Cleland 1974.
Lasanen (20MK21)	Ottawa/Tionnontate Huron	Mackinac	MI	1671	1705	Buckmaster and Canouts 1971; Cleland (ed.) 1971; Cleland 1999:280–282.
Marquette Mission	Tionnontate Huron	Mackinac	MI	1671	1704	Lyle Stone 1972; Fitting 1975:101 uses a terminal date of 1701 for the Tionnontate village and 1705 for the Mission. Branstner 1991:23 uses effective terminal date of 1704.
Richardson	Ottawa/Tionnontate Huron	Mackinac	MI	1651	1690	Greenman (1958) notes this was a Ottawa village from 1679–1690, but the location was also Ottawa/Tionnontate Huron 1651 and after.
Fort Pontchartrain	French	Wayne	MI	1707	1707	This description of 6 apparent runtees and an effigy fish is included in the 1707 inventory of a Fort Pontchartrain soldier’s household effects (T. Kent 2001).
“Cadillac, MI”	Ottawa?	Wexford	MI			Hinsdale 1925. This is generally an Ottawa occupation area.
MISSISSIPPI						
Long Town (Tcuka Falaa)	Chickasaw	Pontotoc	MS	1680	1710	Pers. Comm. Timothy Baugh 19 Nov 2008; Ethridge 2010:223.
Silo Ridge (Yaneka)	Chickasaw	Pontotoc	MS	1680	1710	Pers. Comm. Timothy Baugh 19 Nov 2008; Ethridge 2010:223.
NEW JERSEY						
Trenton	Munsee	Mercer	NJ	1640	1675	AKA “Trenton Burying Ground.” Skinner and Schrabisch 1913:29. Date by Veit and Bello 2001:53 based on assemblage as a whole.
West Long Branch	Munsee	Monmouth	NJ	1650	1700	Pre-1700 date based on glass beads (Pietak 1995:195). Grumet (2009:178) shows this land sold 1674–1688.
Bell (Minisink) 28SX48	Munsee	Sussex	NJ	1670	1690	Heye and Pepper 1915. Puniello and Williams (1978:139) date the site 1650–1700. Pietak 1995:208 notes that an earlier type is present but most of the bead assemblage matches the 1670–1690 period.
Calno School	Munsee	Warren	NJ	1650	1700	Cushman 2007, 2011; Grumet 1995:214; Puniello and Williams 1978. AKA Wakefield site.
Pahaquarra (28Wa06)	Munsee	Warren	NJ	1740	1760	Kraft 1986, 1996; NPS 2008. Date range centers on Kraft 2001:397 assigned date of ca. 1750. Gun made post 1730 and crucifix made post 1727. One of three intrusive graves to earlier cemetery.

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

"Minisink area"	Munsee			NJ		A caption (Kraft 2001, Figure 9.27h) designates it as "from the Minisink area." That means anywhere between the Water Gap and the NY state line.
NEW YORK						
"Burlington Co."	Munsee	Burlington		NY		Unspecified site.
"Cayuga County"	Cayuga	Cayuga		NY		Unspecified site.
"Cayuga Reservation"	Cayuga	Cayuga		NY		Unspecified site. Cowin 2000.
Cayuga Castle	Cayuga	Cayuga		NY		A single SMS item at a Cayuga site occupied much of the second half of the 18th century. Beginning and end dates both fuzzy.
Garrett	Cayuga	Cayuga		NY	1640 1650	Grumet 1995:399; Jones 2008; Niemczycki 1984. AKA Culleys, Tile Kiln, Venice Center.
Great Gully/Young (NYSM 2093)	Cayuga	Cayuga		NY	1675 1710	Skinner 1921; Dubin 1999:Plate 292; Mandzy 1992, Orchard 1929. Grumet 1995:399 lists a starting date of 1690, citing Mandzy (1992) and Niemczycki (1984). Jones (2008:332) uses an occupation span of 1670–1710, suggesting the site was occupied for visits in 1677 and 1688.
Lamb	Cayuga	Cayuga		NY	1665 1685	Niemczycki 1984, Mandzy 1992. Date from Grumet 1995:399. Some confusion between Lamb and Mead but both sites have same dates. AKA "Fleming" or "East Cayuga."
Mead Farm	Cayuga	Cayuga		NY	1665 1685	Grumet 1995:399; Mandzy 1992.
Pattington—Scipioville	Cayuga	Cayuga		NY	1710 1730	Beauchamp 1902:272; Grumet 1995:399; Mandzy 1992; Niemczycki 1984. Beauchamp 1876–1925 3:298 locates at SW portion of modern Scipioville.
Rene Menard Bridge Hilltop (NYSM 2085)	Cayuga	Cayuga		NY	1670 1690	Grumet 1995:399; Mandzy 1992.
Sibley Farm	Cayuga	Cayuga		NY		"Sibley Farm, Fox Ridge." The community of Fox Ridge is about one kilometer southeast of Rogers Farm site, across county line.
Van Son	Wenro/Neutral	Erie		NY	1635 1645	Grumet 1995:419; White 1968.
"Snyders or Hunttoon"	Seneca	Genesee		NY	1687 1745	Combined span of two sites. Grumet 1995:407; Jordan 2008a:166; Sempowski and Saunders 2001:6; Wray 1983.
Snyder McClure (NYSM 2431)	Seneca	Genesee		NY	1687 1710	Jordan 2008a:166; Sempowski and Saunders 2001:6; Wray 1983.
Kirkwood (Hne 013—NYSM 1020)	Seneca	Livingston		NY	1670 1687	NPS 2000a; Sempowski and Saunders 2001:6; Wray and Schoff 1953.

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

Menzis	Seneca	Livingston	NY	1640	1655	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Power House (NYSM 1021)	Seneca	Livingston	NY	1640	1655	Sempowski 1988:92–1989; Sempowski and Saunders 2001:6; Wray and Schoff 1953.
West Fall Brook	Seneca	Livingston	NY	1740	1775	Wray 1983. Jordan 2008:166, 184 suggests site begins 1740–1745. Fall Brook was a dispersed community.
“Munnsville, NY”	Oneida	Madison	NY			
Quarry (Msv 004)	Oneida	Madison	NY	1650	1660	Bennett 1983; Grumet 1995:380 uses date of 1640–1650. Jones 2008:286 makes a detailed case for a 1650–1660 span. NPS 2000b.
Sullivan (NYSM 645 and OND 3–4)	Oneida	Madison	NY	1660	1677	Bennett 1983; Grumet 1995:380; Jones 2008:290–291.
Thurston (NYSM 670)	Oneida	Madison	NY	1635	1655	Bennett 1983; Grumet 1995:380 uses date of 1625–1637. Jones 2008:282 makes a detailed case for a 1635–1655 span. Pratt 1976.
“Honeoye Falls”	Seneca	Monroe	NY			Unspecified site.
“Monroe County, NY”	Seneca	Monroe	NY			Unspecified site.
Dann (NYSM 1022 and 3931)	Seneca	Monroe	NY	1655	1670	Ryan and Dewbury 2001; Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Rochester Junction (NYSM 1026)	Seneca	Monroe	NY	1670	1687	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Allen Site (NYSM 1223)	Mohawk	Montgomery	NY	1646	1712	Lenig 2011. Snow (and Jones 2008) use 1646–1666 for main occupation. Snow (1995b:390) and Rumrill (1985) document a minor later occupation (1693–1710). Grumet 1995:357 for entire span.
Brown (NYSM 1204)	Mohawk	Montgomery	NY	1646	1666	Lenig 2011. Snow 1995b:289 has concluded this is the only candidate for Schanidisse (1626–1635), although he notes that Rumrill (1985) “guess” dated this site to 1646–1666. SMS here cannot date to 1635.
Galligan 2 (NYSM 1193)	Mohawk	Montgomery	NY	1693	1755	Lenig 2002, 2011; Snow 1995a:25. Snow 1995b:469 cites D. Lenig 1972 as 1693–1755. Grumet 1995:357 uses 1712–1755.
Horatio Nellis (NYSM 1229)	Mohawk	Montgomery	NY	1646	1666	Rumrill 1985; Snow 1995b:384.
Jackson-Everson (NYSM 1213)	Mohawk	Montgomery	NY	1657	1679	Grumet 1995:358; Lenig 2002; Rumrill 1985. Jones 2008 (citing Snow 1995b) accepts a beginning date of 1657 as the date Huron settlement began.
Lipe II or White Orchard	Mohawk	Montgomery	NY	1666	1693	Rumrill 1985. Combined span for both sites—Lipe II (1679–1693) or White Orchard (1666–1693). Also see Grumet (1995:358).

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

Prospect Hill (NYSM 1207 & 1193)	Mohawk	Montgomery	NY	1693	1755	Grumet 1995:357 uses 1712–1755. Snow 1995b:469 cites D. Lenig 1972 as 1693–1755.
“Oneida Valley”	Oneida	Oneida	NY			Apparently near Sterling site (Beauchamp 1901:362).
Hogan	Oneida	Oneida	NY	1677	1685	Bennett 1983; Grumet 1995:380.
Lanz-Hogan (NYSM 646)	Oneida	Oneida	NY	1720	1750	Bennett 1982, 1983; Grumet 1995:380.
Oneida Castle	Oneida	Oneida	NY	1767	1779	Grumet 1995:380.
“Brewerton”	Onondaga	Onondaga	NY			Only a 16th century Onondaga site is known at Brewerton (Grumet 1995:390), but Beauchamp 1876–1925:8 and collections at RMSC also clearly document a middle to late 17th century mortuary component.
“Christopher Site, Pompey”	Onondaga	Onondaga	NY			Beauchamp 1901:364 did not specify site location.
“Lafayette”	Onondaga	Onondaga	NY			Beauchamp 1876–1925:3; Fig. 1494. Site location unclear.
“Near Pompey”	Onondaga	Onondaga	NY			Beauchamp’s generic designation for several Onondaga sites (pers. comm., James Bradley, June 21, 2011).
“Oak Orchard”	Onondaga	Onondaga	NY			An undocumented 17th century Onondaga site along the Oneida River in the town of Clay (Beauchamp 1876–1925:10; Bradley, pers. comm. Feb 16, 2012).
“Pompey”	Onondaga	Onondaga	NY			Various ornaments at many repositories. Beauchamp (1901, 1876–1925) used this as a conjoined designation for a number of Onondaga sites, especially Bigelow and Fitch collections (Bradley, pers. comm. June 21, 2011).
Armand	Onondaga	Onondaga	NY			Site 219 in the RMSC site lists.
Carley (NYSM 1974)	Onondaga	Onondaga	NY	1645	1650	Bradley 1979:255, 1987:116.
Indian Castle (NYSM 620)	Onondaga	Onondaga	NY	1655	1663	Site occupation span pers. comm. James Bradley, 20 Oct. 2011. Also see Bradley 1987:205, 2011b, 2011e; Jones 2008; Tuck 1971:186.
Indian Hill (NYSM 619)	Onondaga	Onondaga	NY	1663	1682	Site occupation span pers. comm. James Bradley, 20 Oct. 2011. Also see Bradley 1987:206.
Jamesville Pen (NYSM 1067/2486)	Onondaga	Onondaga	NY	1700	1710	Bradley 1987. Revised date from pers. comm., James Bradley, 12 June 2012, 20–21 June 2011, and 27 May 2011.
Lot 18 (NYSM 1068)	Onondaga	Onondaga	NY	1650	1655	Bradley 1979:274, 1987:116–117.
Weston/Bloody Hill (NYSM 1070)	Onondaga	Onondaga	NY	1690	1696	Bradley (1987:206). Revised date James Bradley, pers. comm. 20 June, 21 Nov., 8 Dec., 2011. AKA “Gates, Bloody Hill, and Doxator.”

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

“Canandaigua”	Seneca	Ontario	NY		Seneca site designation in NMAI collections. Also mentioned by Beauchamp 1876–1925:10. Very probably Snyder McClure or Huntoon.
“East Bloomfield”	Seneca	Ontario	NY		Might be Steele or Gandougarae.
“Near East Bloomfield”	Seneca	Ontario	NY		Might be Steele or Gandougarae.
“Ontario County”	Seneca	Ontario	NY		Unspecified site.
“West Bloomfield”	Seneca	Ontario	NY		West Bloomfield, but probably not Warren site.
Beal/Cherry Street	Seneca	Ontario	NY	1670 1687	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Boughton Hill (NYSM 1384)	Seneca	Ontario	NY	1670 1687	Gonyea and Johnson 1986; Sempowski and Saunders 2001:6; Wood 1964; Wray and Schoff 1953.
Cornish (NYSM 1024)	Seneca	Ontario	NY	1625 1640	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Huntoon	Seneca	Ontario	NY	1710 1745	Jordan 2008a:166; Wray 1983.
Ketchum/Damasky	Seneca	Ontario	NY	1687 1710	Grumet 1995:407; Jordan 2008a:166–170; Wray 1983.
Marsh (NYSM 1395)	Seneca	Ontario	NY	1655 1670	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
New Ganechstage site complex	Seneca	Ontario	NY	1710 1754	Wray 1983. Jordan 2008 suggests a start date of 1710–1715. Collector term of “Burrel Creek” implies entire site complex.
Steele	Seneca	Ontario	NY	1640 1660	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Townley-Read (NYSM 2440)	Seneca	Ontario	NY	1710 1754	Jordan 2008a:166; Wray 1983.
Warren (NYSM 1025)	Seneca	Ontario	NY	1625 1640	Sempowski and Saunders 2001:6; Wray and Schoff 1953.
Wheeler Station /Fox (NYSM 1390)	Seneca	Ontario	NY	1655 1675	Sempowski and Saunders 2001:6; Wray and Schoff 1953. Jones 2008:367 makes a case for a 1675 abandonment. AKA W.G. Rainey Farm.
White Springs (NYSM 1952 and 2442)	Seneca	Ontario	NY	1688 1715	Jordan 2008a:166; Sempowski and Saunders 2001:6; Wray 1983. Grumet 1995 lists 1687–1710.
“Geneva”	Seneca	Seneca	NY		Collector designation NMAI collections. Closest site is Kanadesaga, an 18th century site, but White Springs (1687–1710) is also very close.
“Seneca County”	Seneca	Seneca	NY		Unspecified site.
Kendaia	Seneca	Seneca	NY	1710 1779	Wray 1983. Grumet 1995:207 lists 1710–1779. Jordan 2008a:166 lists a start 1704–1720 and suggest continuous occupation.
Lilly Hill	Montauk	Suffolk	NY		Upper part of Pantigo Hill. Post-1728 by dated coins in cemetery (Saville 1920).

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

“Wawarsing, NY”	Munsee/Esopus	Ulster	NY			George Budke Collection at NMAI. Originally Alfred Rank Collection (Beauchamp 1876–1925:10; Fig. 263–268).
Rogers Farm (NYSM 2502)	Cayuga	Wayne	NY	1665	1685	Grunet 1995:399; Mandzy 1992, 1994; NPS 2000c.
Croton Aqueduct Site	Munsee	Westchester	NY	1645	1740	Grave discovered 1842 during construction of Croton Aqueduct. Veit and Bello 2001 date based on association with Jesuit L-Heart ring.
“Naples area”	Unknown		NY			SMS items from “Miss Lucy S. Wells” of Naples, NY (Clarke 1911:79).
“Near Rochester”	Seneca?		NY			Unspecified site in RMSC collections.
“New York”	Gen. Iroquoian		NY			Unspecified sites in various repositories.
“Reed & Sanach”	Gen. Iroquoian		NY			Ambiguous site designation in Anonymous 2005.
“Seneca sites”	Seneca		NY			Generic designation in Anonymous 2005.
NORTH CAROLINA						
Neoheroke Fort (31GR4)	Tuscarora	Greene	NC	1713	1713	Occupation span from Byrd and Heath 2004. Heath 2007; Heath and Phillips 1998; Lee 2004.
Fredricks (31Or231)	Occaneechi	Orange	NC	1680	1710	Occupation span from Davis, et al. 1998. Davis 2002:150–151 notes that the Occaneechies were taking in Susquehannock refugees after 1676. Hammett 1998.
Jenrette (31Or231a)	Occaneechi	Orange	NC	1680	1710	Ward and Davis 1999:242.
Upper Saratow (31Sk1)	Sara	Stokes	NC	1670	1710	Ward and Davis 1999:248.
OHIO						
“Upper Sandusky”	Wyandot	Wyandot	OH	1738	1843	Holmes 1883:228; Tooker 1978:400–402.
ONTARIO						
“Brantford Twp”	Neutral	Brant	ON			Generic Neutral and later occupations. Other Brantford material at NMAI shows later components than pre-dispersal Neutral.
“Brantford”	Unknown	Brant	ON			Generic Neutral and later occupations. Redstone arrowhead bead rules out pre-dispersal Neutral affiliation.
Walker Ossuary (AgHa-10)	Neutral	Brant	ON	1632	1651	Fitzgerald 1990:394. Lennox 1981:217 refers to Walker as 1625–1645; Ridley 1961.
“Near Craigleith, Collingwood Twp”	Tionmontate	Grey	ON	1635	1650	Warrick 2008:Fig. 7.7 and 7.15; Witemberg 1926.
Lake Medad	Neutral	Halston	ON	1630	1650	Lennox 1981:219; Noble 1984:13. Kearsley 1996:44 gives date of 1638–1640. Lake Medad is GBP 2 and 3 (William Fox, personal comm. October 2011; Smith 1897; Wilson 1876, 1892.

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

Lot 19, Con. 3		Middlesex	ON			Apparently a later Iroquois site in Lot 19, Concession 3, London Township (Witemberg 1908:68, Plate 9c).
Grimsby	Neutral	Niagara	ON	1630	1651	Ellis and Ferris 1900:453–1990; Jackes 2008; Kenyon 1982; Kenyon and Fox 1986. Grimsby is GBP 2 and 3.
Port Colborne	Neutral	Niagara	ON	1640	1651	Witemberg 1908. Ellis and Ferris (1990: 414) list as GBP 3. Apparently pre-dispersal Neutral, beginning date arbitrary.
Smokes Point	Gen. Iroquoian	Prince Edward	ON			Apparently a later North Shore Iroquois occupation (Witemberg 1926).
“Near Penetanguishene”	Huron	Simcoe	ON	1635	1649	A pre-dispersal Huron site (Trigger 1976).
“Nottawasaga Twp”	Tionnontate	Simcoe	ON	1630	1649	Witemberg 1908, 1926. Corresponds to location of Etharita, a pre-dispersal Tionnontate community.
Angoutenc	Huron	Simcoe	ON	1636	1649	A pre-dispersal Huron site. Location from Heidenreich 1971:37.
Bowman Farm	Huron	Simcoe	ON	1635	1649	Boyle 1896:42. Begin date approximate. Trigger 1976:727.
Lot 11, Conc. 8, Simcoe	Tionnontate	Simcoe	ON	1635	1650	Witemberg 1931. Begin date approximate. Garrad and Heidenreich 1978:394.
Lot 24, Conc. 7, Simcoe	Tionnontate	Simcoe	ON	1635	1650	Witemberg 1931. Begin date approximate.
Ossosone	Huron	Simcoe	ON	1636	1649	Kidd 1953.
“Waterloo County”	Neutral	Waterloo	ON	1640	1651	Witemberg 1908. Apparently pre-dispersal Neutral, begin date arbitrary.
“Barton Twp”	Neutral or Sencea	Wentworth	ON			Unspecified site (Witemberg 1926:46, Fig. 17).
“Beverly Twp”	Gen. Iroquoian	Wentworth	ON			Unspecified site (Witemberg 1908:77, Fig. 19g).
Hamilton	Neutral	Wentworth	ON	1638	1650	Lennox 1981. Lennox and Fitzgerald 1990:410, 413 merely place Hamilton into GBP 3 (1624/1630–1650).
“Lambton Mills”	Gen. Iroquoian	York	ON			Unspecified site (Witemberg 1908:77, Plate 19g).
“Near Lambton”	Gen. Iroquoian	York	ON			Unspecified site (Witemberg 1931:124, Plate XVII:14).
Garrow Farm	Gen. Iroquoian	York	ON			“Grave near the Humber River” and “farm of R. Garrow, King Twp, York County” (Boyle 1904:87–88, Fig. 54; Witemberg 1908:69).
“Ontario”			ON			Generic references, Neutral/Huron territory generally.
PENNSYLVANIA						
28th Street (36Er13)	Erie	Erie	PA	1625	1640	Date from Carpenter et al 1949; Grumet 1995:419.
“Lancaster County”	Susquehannock	Lancaster	PA			Unspecified sites in various private collections (Landis n.d., Fogelman 1989).

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

Conestoga Town (36La52)	Susquehannock & Seneca	Lancaster	PA	1690	1730	Terminal date 1730 is approximate. The 1730–1763 part of the site's occupation was not located at 36La52 (B. Kent 1989:18, 386).
Conoy Cemetery (36La40)	mixed groups	Lancaster	PA	1718	1742	Date from B. Kent 1989.
Frey-Haverstick (36La6)	Susquehannock	Lancaster	PA	1630	1645	B. Kent 1989:18. White 2001:190 says Roberts Phase is hypothesized to be transitional between Washington Boro and Strickler phases, but “presents a dilemma for analysts.”
Lancaster County Park (36La96)	Unknown	Lancaster	PA	1714	1730	B. Kent 1989. Kinsey and Custer 1982 document nearby village 1714–1722. Grumet 1995:304 gives date at 1720–1730; Custer 1989:338.
Strickler (36La3)	Susquehannock	Lancaster	PA	1645	1665	Bradley 2010; Cadzow 1936; Grumet 1995:304; B. Kent 1989:348; White 2001:164.
West Pittsburg (36Lr1)	Wyandot	Lawrence	PA	1747	1751	B. Kent 1989 cites Withoft as dating the site to 1748–1751. NPS 2000d dates at 1747–1651. AKA Wyandot Town. B. Kent 1970; Orlandini 1996.
Sarf Cache—Parker	multiple	Luzerne	PA	1740	1765	B. Kent 1989:101–106 says Delaware moved there by 1742 and gives terminal date of 1753 for another group. Grumet 1995:427–428 says “middle decades of 1700s.”
Zimmerman (36PI14)	Munsee	Pike	PA	1660	1690	Grumet 1995:214; Pietak 1995:197 says the burial may date to “around 1650,” Werner 1972.
Byrd Leibhart (36Yo170)	Susquehannock	York	PA	1665	1680	Date from B. Kent 1989:18. Biesaw 2008; White 2001.
“Pennsylvania” QUEBEC	Susquehannock		PA			Generic attribution in various repository collections.
“Lorette”	Lorette Huron	Quebec City	QC			Collected ca. 1923. Handed down since 18th century (Orchard 1929:24, Plate IV, NMAI accession records for 11-7512–11-7514).
RHODE ISLAND						
Burr's Hill	Wampanoag	Bristol	RI	1665	1680	Dates from Gibson 1980 and Grumet 1995.
SOUTH DAKOTA						
Leavenworth (39CO9)	Arikara	Corson	SD	1800	1832	Billeck, et al. 2005:48. Also see Johnson 2007.
Four Bear (39DW2)	Arikara	Dewey	SD	1700	1735	1700–1725 is the core date by Billeck 2000. Alternately, Johnson 2007:147 assigns Four Bear and Nordvold 10 to 30 years later. Hurt 1962.
Rosa (39PO3)	Arikara	Potter	SD	1700	1725	Both Johnson 2007:147 and Billeck 2000 date Rosa as 1700–1725.

Appendix B, continued. Inventory of sites with Standardized Marine Shell ornaments

Fort George (39ST17)	Arikara/Pawnee	Stanley	SD	1675	1750	Billeck 2000 (Johnson 2007:158) dated the site 1675–1700 based on trade beads. Johnson 2007:157 provides evidence for a 1700–1750 span. Hoffman 1972 dates the site at 1730. Rogers 1990:124 (citing Bass 1965) assigned it to 1726–1775. Billeck 2011a; Hoffman 1965.
Sully (39SL4)	Arikara	Sully	SD	1650	1700	1675–1700 is the core date assigned by Billeck 2000 on trade beads. Johnson 2007:148, 191 suggests 1650 and 1700. He sees the middle and late periods at Sully as contemporaneous with Larson (ceramic chronology). Another analysis (Johnson 2007:132) places the mid-point of occupation at Sully as 1650–1675. Owsley (1992:77) dates all three Sully cemeteries 1650–1733. Rogers (1990) assigns a date of 1681–1725.
Larson (39WW2)	Arikara	Walworth	SD	1700	1725	Bass and Rucker 1976; Lehmer 2001:253, Figure 7. Date of 1700–1725 from Billeck 2000. Billeck asserts (p.c. 5 May 2011) all runtees with glass beads at Larson have post-1700 bead types. Johnson 2007:147, 210 assigns an overall date of 1680–1700 for Larson.
Mobridge (39WW1)	Arikara	Walworth	SD	1725	1750	Johnson 2007:147; Owsley 1981. Revised Billeck 2000 (2008) agrees with this.
VIRGINIA						
John Green (44GV1-2)	Meherrin, Weyanoke	Greensville	VA	1700	1720	MacCord 1970; Painter 1963. Binford 1967:153, 166, 179 (as approx. location of Meherrin 1650–1681). Grunet 1995:276 assigns 1700–1720. Rhoades (2000:68) describes 1710s occupation of locale. Artifacts strongly favor later dates.
Raymond Bush (44KW29)	Pamunkey	King William	VA			Hodges 1993. Early 19th century context so either redeposited or curated (Norrisey 1980).
WISCONSIN						
Hanson Site (44BD71)	Unknown	Door	WI			Overstreet 1993 suggests as proto-Winnebago occupation. However, various evidence ties Hanson to 1640–1670 (pre-dispersal or immediately post-dispersal) Neutral, Tionnonate, Huron affiliations (Rosebrough 2012, n.d.). Date not used in this analysis because shell bead forms are a primary chronological indicator.
Rock Island II	Ottawa	Door	WI	1760	1770	Mason 1986. Burial 3 is in a Period 4 cemetery, isolated from other burials.
Bell (47Wn9)	Mesquakie	Winnebago	WI	1680	1730	Behm 2008.

Appendix C. Sites with Standardized Marine Shell ornaments by affiliation category

Affiliation Category	Site Designation
Long Is./S. New Eng.	Burr's Hill "Farmington" Lilly Hill Long Pond
Mohawk	Horatio Nellis (NYSM 1229) Jackson-Everson (NYSM 1213) Lipe II or White Orchard Prospect Hill (NYSM 1207/1193) Brown (NYSM 1204) Galligan 2 (NYSM 1193) Allen Site (NYSM 1223)
Oneida	Hogan Lanz-Hogan (NYSM 646) Oneida Castle Thurston (NYSM 670) "Munnsville, NY" Quarry (Msv 004) Sullivan (NYSM 645)
Onondaga	Carley (NYSM 1974) "Christopher Site, Pompey" "Lafayette" Lot 18 (NYSM 1068) Armand "Oak Orchard" Weston/Bloody Hill (NYSM 1070) "Brewerton" Indian Castle (NYSM 620) Indian Hill (NYSM 619) Jamesville/Pen (NYSM 1067/2486)
Cayuga	Rene Menard Bridge (NYSM 2085) Cayuga Castle Sibley Farm Rogers Farm (NYSM 2502) Garrett "Cayuga Reservation" Pattington/Scipioville Lamb Mead Farm Great Gully/Young (NYSM 2093)
Seneca	Cornish (NYSM 1024) Menzis West Fall Brook "Honeoye Falls" Huntoon New Ganestage site complex Kendaia Wheeler Station /Fox (NYSM 1390) Ketchum/Damasky

Appendix C, continued. Sites with Standardized Marine Shell ornaments by affiliation category

Affiliation Category	Site Designation
Seneca, continued	Townley-Read (NYSM 2440) “Canandaigua” Warren (NYSM 1025) “Geneva” White Springs (NYSM 1952/2442) Kirkwood (NYSM 1020) Steele Marsh (NYSM 1395) Beal/Cherry Street Power House (NYSM 1021) Rochester Junction (NYSM 1026) Boughton Hill (NYSM 1384) Snyder McClure (NYSM 2431) Dann (NYSM 1022/3931)
Susquehannock etc.	Lancaster County Park (36La96) Frey-Haverstick (36La6) Conestoga Town (36La52) Conoy Cemetery (36La40) Byrd Leibhart (36Yo170) Strickler (36La3)
Munsee	Croton Aqueduct Site Calno School Zimmerman (36PI14) Pahaquarra (28Wa06) Trenton “Wawarsing, NY” West Long Branch Bell (Minisink) 28SX48
N. Car./Virginia	Upper Saratown (31Sk1) Jenrette (31Or231a) Neoheroka Fort (31GR4) Raymond Bush (44KW29) Fredricks (31Or231) John Green (44GV1-2)
“Ontario” group—pre dispersal	28th Street (36Er13) Van Son Walker Ossuary (AgHa-10) “near Penetanguishene” Bowman Farm “near Craigleith, Collingwood Twp” Angoutenc Lot 11, Conc. 8, Simcoe Lot 24, Conc. 7, Simcoe Ossosone Hamilton “Lambton Mills” “near Lambton” Garrow Farm Grimsby

Appendix C, continued. Sites with Standardized Marine Shell ornaments by affiliation category

Affiliation Category	Site Designation
“Ontario” group—pre dispersal	Port Colborne Lake Medad
“Ontario” group—post	Richardson West Pittsburg (36Lr1) “Upper Sandusky” Marquette Mission Lasanen (20MK21) Gros Cap (20MK6)
18th century WGL	River L’Abbe Fletcher (20BY28) Rock Island II Bell (47Wn9)
Plains	Sully (39SL4) Milford (13DK1) Blood Run (13LO2) Fort George (39ST17) Rosa (39PO3) Mobridge (39WW1) Leavenworth (39CO9) Larson (39WW2) Four Bear (39DW2)
Chickasaw	Long Town (Tcuka Falaa) Silo Ridge (Yaneka)
Other	Smokes Point “Dam 4, Potomac River” “Lake Freeman” Lot 19, Con. 3, London Fort Pontchartrain Hanson Site (44BDr71) Sarf Cache/Parker

Appendix D. Dated sites and site occupation spans by affiliation category

Gross Affiliation	Site	Begin	Span	End
Long Island/ S. New Eng.	Burr's Hill	1655	25	1680
	Long Pond	1660	60	1720
Mohawk	Allen Site	1646	66	1712
	Brown (NYSM 1204)	1646	20	1666
	Horatio Nellis	1646	20	1666
	Jackson-Everson	1657	22	1679
	Lipe II or White Orchard	1666	27	1693
	Galligan 2	1693	62	1755
	Prospect Hill	1693	62	1755
Oneida	Thurston (NYSM 670)	1635	20	1655
	Quarry	1650	10	1660
	Sullivan	1660	17	1677
	Hogan	1677	8	1685
	Lanz-Hogan	1720	30	1750
	Oneida Castle	1767	12	1779
Onondaga	Carley	1645	5	1650
	Lot 18	1650	5	1655
	Indian Castle	1655	8	1663
	Indian Hill	1663	19	1682
	Weston/Bloody Hill	1690	6	1696
	Jamesville/Pen	1696	14	1710
Cayuga	Garrett	1640	10	1650
	Lamb	1665	20	1685
	Mead Farm	1665	20	1685
	Rogers Farm	1665	20	1685
	Rene Menard Bridge	1670	20	1690
	Great Gully/Young	1675	35	1710
	Pattington/Scipioville	1710	20	1730
Seneca	Cornish	1625	15	1640
	Warren	1625	15	1640
	Menzis	1640	15	1655
	Power House	1640	15	1655
	Steele	1640	20	1660
	Dann	1655	15	1670
	Marsh	1655	15	1670
	Wheeler Station /Fox	1655	20	1675
	Beal/Cherry Street	1670	17	1687
	Boughton Hill	1670	17	1687
	Kirkwood	1670	17	1687
	Rochester Junction	1670	17	1687
	Ketchum/Damasky	1687	23	1710
	Snyder McClure	1687	23	1710
	White Springs	1688	27	1715
	Huntoon	1710	35	1745
	Kendaia	1710	69	1779
	New Ganechstage	1710	44	1754
	Townley-Read	1710	44	1754
	West Fall Brook	1740	35	1775

Appendix D, continued. Dated sites and site occupation spans by affiliation category

Gross Affiliation	Site	Begin	Span	End
Susquehannock related	Frey-Haverstick	1630	15	1645
	Strickler	1645	20	1665
	Byrd Leibhart	1665	15	1680
	Conestoga Town	1690	40	1730
	Lancaster Co. Park	1714	16	1730
	Conoy Cemetery	1718	24	1742
Munsee	Trenton	1640	35	1675
	Calno School	1650	50	1700
	West Long Branch	1650	50	1700
	Zimmerman	1660	30	1690
	Bell (Minisink)	1670	20	1690
	Pahaquarra	1740	20	1760
NC / VA	Upper Saratown	1670	40	1710
	Fredricks	1680	30	1710
	Jenrette	1680	30	1710
	John Green	1700	20	1720
	Neoheroka Fort	1713	1	1714
Pre-dispersal Ontario	28th Street	1625	15	1640
	Grimsby	1630	21	1651
	Lake Medad	1630	20	1650
	Walker Ossuary	1632	19	1651
	“near Craigeleith”	1635	15	1650
	“near Penetanguishene”	1635	14	1649
	Bowman Farm	1635	14	1649
	Lot 11, Conc. 8, Simcoe	1635	15	1650
	Lot 24, Conc. 7, Simcoe	1635	15	1650
	Van Son	1635	10	1645
	Angoutenc	1636	13	1649
	Ossosone	1636	13	1649
	Hamilton	1638	12	1650
	Port Colborne	1640	11	1651
Post-dispersal Ontario	Richardson	1651	39	1690
	Gros Cap	1671	34	1705
	Lasanen	1671	34	1705
	Marquette Mission	1671	33	1704
	West Pittsburg	1747	4	1751
18th cent. W. Great Lakes	Bell	1680	50	1730
	River L'Abbe	1735	17	1752
	Fletcher	1745	20	1765
	Rock Island II	1760	10	1770
Plains	Sully	1650	50	1700
	Fort George	1675	75	1750
	Milford	1680	20	1700
	Blood Run	1690	24	1714
	Four Bear	1700	35	1735
	Larson	1700	25	1725
	Rosa	1700	25	1725

Appendix D, continued. Dated sites and site occupation spans by affiliation category

Gross Affiliation	Site	Begin	Span	End
Plains, continued	Mobridge	1725	25	1750
Chickasaw	Long Town	1680	30	1710
	Silo Ridge	1680	30	1710
Other	Fort Pontchartrain	1707	1	1701
	Sarf Cache	1740	25	1765

APPENDIX E
LEVEL 2 SMS FORMS:
DESCRIPTIONS, TALLIES, AND TEMPORAL ASSIGNMENTS

Following Table 5.1 this appendix provides descriptions, observations, and comments for each of the Level 2 forms, including those known but not tracked. Temporal assignments are generated by reference to the Span Factored Annual Percentage graphs (Appendix F) and refined in the context of observations made here. But, for clarity, these discussions are preceded with a summary tabulation of the forms ordered chronologically (Table E.1). Interpretation of production dates from SFAP graphs follows the format described in Chapter 7.

Because the focus here is chronological and distributional tabulations of ornaments within these descriptions below are of the dated and/or roughly mappable examples. A full list of occurrences for each form is available in Appendix 1. Totals thus necessarily fall between the total number known and number within dated context (see Table E.1).

Although metrics, raw materials, and design analyses were not part of this study, these data would be, for the most part, retrievable from my records and photos. General observations offered on these attributes below are based on partial samples recorded.

Table E.1. Tally of tracked SMS Level 2 forms ordered by assigned beginning of production

	Total	Locations	Dated Items	Dated Sites	Earliest Terminal Date	Assigned Beginning	Assigned End
Thick Discoidal	—	—	—	—	1640	1635	~1640
Large Tube	3	3	3	3	1640	1635	1655
Flat Discoidal	—	—	—	—	1655	1640	1655
Large Crescent	14	3	13	2	1650	1635	1660
Irregular Massive	—	—	—	—	1640	1635	1670
Runtree Rectanguloid	197	31	174	27	1640	1635	1670
Pipe Bead	1,594	64	1,451	51	1640	1635	1720+
Crescent	947	37	857	26	1640	1645	1680
Geom. Unique	13	8	13	8	1650	1645	1690
Claw	200	32	158	22	1655	1645	1690
Effigy Unident.	15	12	12	9	1645	1645	1710
Runtree Disk	536	77	476	55	1649	1645	1710
Goose/Loon	414	52	348	32	1655	1650	1685
Owl	38	15	34	11	1650	1650	1690
Beaver	24	18	21	16	1655	1650	1710
Triangle Apical Drill	65	12	59	9	1655	1650	1690
Otter	7	7	6	6	1660	1650	1690
Bird	25	17	25	17	1650	1650	1710
Runtree Circuloid	190	16	184	14	1655	1650	1710
Serpent	2	1	2	1	1670	1655	1670
Pelt Type B	13	7	7	4	1665	1655	1680
Triangle Vert. Drill	26	11	23	8	1650	1655	1690
Pelt Type C	11	7	10	6	1663	1655	1690
Lg_Goose	8	5	7	4	1665	1660	1690
Quadruped	4	4	3	3	1670	1660	1690
Fish	41	20	37	17	1663	1660	1710
Medallion	2	2	2	2	1670	1660	1710
Cone/Pyramid	3	3	2	2	1670	1660	1710
Birdman	9	5	9	5	1670	1665	1710
Bird Head bead	52	16	44	12	1670	1665	1690
SMS Gorget	14	11	13	10	1682	1670	1710
Effigy Unique	3	3	2	2	1690	1670	1710
Star/Cross	9	6	2	2	1687	1675	1700
Pelt Type A	18	8	12	5	1710	1690	1710
Turtle	1	1	1	1	1710	1690	1710
Triconcave	323	21	305	16	1710	1695	1765

Irregular Massive (Assigned Production 1635–1670)

(not tracked) Figure 1.2c–d

The decision not to track this form is understandable based on the lack of regular dimensions and the great difficulty of determining whether any given example of irregular marine shell qualified as SMS when presented in archaeological literature. In essence,

Irregular Massive beads are simply large irregularly-shaped chunks of marine shell (typically sections of quite large conch/whelk columella) that have a perfectly cylindrical (metal-drilled) hole through them (typically oriented vertical to the axis of the columella).

At the same time, failing to track this particular form has been particularly unfortunate, given the probability that this constitutes one of the earliest SMS forms. Common throughout the core area of SMS, irregular beads might be seen as a straight forward expression of the cultural message of marine shell beads expressed in their simplest format—documenting possession of and access to large chunks of conch shell.

Rectanguloid runtees (see below) are a form of Irregular Massive beads that display a sufficiently rectanguloid outline shape to provide them a “flat” display format, but many of them remain somewhat irregular or triangular in cross-section. Because rectanguloid runtees are a subset of the Irregular Massive category, they presumably serve as an adequate proxy for the temporal affiliation of the encompassing form. Accordingly, I assign Irregular Massive beads a maximum production span of 1635–1670. As with Rectanguloid Runtees, I actually suspect production span was limited to only 1635–1655).

Thus, the earliest assemblages of SMS probably contained a number of forms that subsequently took on smaller and more refined attributes (e.g., rectanguloid runtees and larger/thicker versions of tubes, crescents, and discoidal beads). The Neutral Lake Medad collection of SMS is the most complete expression of this early SMS assemblage. Irregular Massive beads seem to represent a generic initial format that does not lead to a refined form.

Large Tube (Assigned Production 1635–1655)

Figures 1.1n and G.1; Table E.2

Large Tubes are a rare SMS form. This analysis included only three examples. Another example from the Dann site (on display at the Rochester Museum and Science Center) was overlooked until after the analysis. In accordance with the concept of Irregular Massive beads as exemplifying an underlying message of access to particularly large pieces of shell, the Large Tube form is a long thick piece of roughly cylindrical marine shell which would presumably have been obtainable only from the thickened outer lip of a very large (West Indian) conch. Metrics are not available for two of the four known examples but a typical diameter would slightly exceed one centimeter and lengths certainly exceed ten centimeters.

With the exception of the Dann site specimen, Large Tubes are found on pre-1655 sites in the SMS core area and have been assigned a production span of 1635–1655. Although not counted as Large Tubes a set of long tubular beads dating to 1640-1655 and intermediate in form and size between the Large Tube and Pipe Bead form were noted at RMSC from the Powerhouse site (#1176/74). This further reinforces the idea that Large Tubes are restricted to Early SMS and that the large thin Pipe Bead form emerges in the 1650s.

Table E.2. Distribution of dated/mappable Large Tubes

Location	General Affiliation	Ethnic Affiliation	Begin	End
Lake Medad	“Ontario” group–pre	Neutral	1630	1650
Power House	Seneca	Seneca	1640	1655
Warren	Seneca	Seneca	1625	1640
Dann (post-analysis)	Seneca	Seneca	1655	1670

Large Crescent (Assigned Production 1635–1660)

Figures 1.2m and G.2; Table E.3

A set of 13 large, graduated, bi-pointed two-hole crescents made of the outer wall of conch or whelk shell at Lake Medad site provide the earliest evidence of matched sets of SMS ornaments. These crescents are much larger, rougher, and thicker than the Standard Crescent form in production by 1645. Presumably the latter descends from the former, but I do not have the data that restricts them to only antecedence.

Large Crescents are all conch/whelk shell and are known from only three sites (all in the SMS core area). They range from 4–6 cm across, .5–.7 cm wide, and .3–.6 cm thick. Although the SFAP graph supports a continued presence until 1660, it is probable (based primarily on the set from Lake Medad and the form's antecedence to the Standard Crescent form) that they were made only between 1635 and 1645.

Large Crescents also provide one of the few examples of possible continuity from a previous marine shell ornament form. Hollowed out “boat-shaped” two hole crescent ornaments are known from five late 16th century Northeastern sites—Schultz, Kienuka, Cameron, Adams, and “Minisink Island” (B. Kent 1989; NMAI 2008:42; RMSC collections; Wray et al. 1987:144; Wray et al. 1991:350). This possible antecedent's known temporal assignments are between A.D. 1575 and 1605—only about a quarter century before the SMS Large Crescents. On the other hand these earlier boat-shaped are not made as sets nor are they apparently part of a unified industry with multiple forms. My opinion is that they cannot be regarded as true antecedents to the SMS forms.

Table E.3. Distribution of dated/mappable Large Crescents

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
“near Lambton”	“Ontario” group–pre	General Iroquoian	—	—	1
Lake Medad	“Ontario” group–pr	Neutral	1630	1650	13
Indian Castle	Onondaga	Onondaga	1655	1663	1

Runtree Rectanguloid (Assigned Production 1635–1670)

Figures 1.2h, F.1 and G.3; Table E.4

As noted under Irregular Massive beads, many of the vertically perforated SMS beads that have a roughly rectanguloid outline, are not flatted. These clearly grade into the irregular-shaped massive SMS beads. All are made of conch/whelk, rather than *Mercenaria* shell.

Size and proportion of these rectangles vary wildly but the average dimensions of 37 examples I have these data for averages 2.2 cm long, 1.88 cm tall, and .78 cm thick. In accordance with their early dating within the SMS sequence, bore holes are generally large, ranging between .2 and .3 cm and averaging .27 cm. The designation of these as a “runtree” form derives from Ontario descriptions, where they are by far the most common form of SMS bead.

A conservative interpretation of the SFAP graph for Rectanguloid Runtrees (Figure F.1) accounts for my assigned production dates of 1635–1670, but the precipitous drop in their frequencies after 1650 (and thus coincident with the destruction of the Huron, Petun, and Neutral occupations) suggests that this event curtailed the curation effect for this form supporting the idea that the form was out of production by 1650. Rectanguloid Runtrees are not typically found outside of the SMS core area, but one particularly interesting incidence of Irregular Massive beads and Rectanguloid Runtrees found in the absence of any later forms of SMS can be seen at the Hanson Site, in Door County, Wisconsin. Since the SMS beads are

one of the most convincing attributes supporting the site being a pre-dispersal Huron/Petun cemetery (Rosebrough et al. 2012), the site date and ethnicity was not used in my analysis.

Table E.4. Distribution of dated/mappable Rectanguloid Runtees

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Gros Cap	“Ontario” group-post	Ottawa	1671	1705	1
28th Street	“Ontario” group-pre	Erie	1625	1640	2
Bowman Farm	“Ontario” group-pre	Huron	1635	1649	28
Ossosone	“Ontario” group-pre	Huron	1636	1649	3
Angoutenc	“Ontario” group-pre	Huron	1636	1649	1
Grimsby	“Ontario” group-pre	Neutral	1630	1651	27
Lake Medad	“Ontario” group-pre	Neutral	1630	1650	15
Walker Ossuary	“Ontario” group-pre	Neutral	1632	1651	3
Hamilton	“Ontario” group-pre	Neutral	1638	1650	2
Port Colborne	“Ontario” group-pre	Neutral	1640	1651	1
“near Craigleith	“Ontario” group-pre	Tionnontate	1635	1650	1
Lot 11, Conc. 8	“Ontario” group-pre	Tionnontate	1635	1650	1
Van Son	“Ontario” group-pre	Wenro/Neutral	1635	1645	1
Indian Hill	Onondaga	Onondaga	1663	1682	4
Indian Castle	Onondaga	Onondaga	1655	1663	1
Hanson Site	Other	Unknown	—	—	11
Power House	Seneca	Seneca	1640	1655	28
Dann	Seneca	Seneca	1655	1670	22
Snyder McClure	Seneca	Seneca	1687	1710	7
Steele	Seneca	Seneca	1640	1660	7
Beal/Cherry Street	Seneca	Seneca	1670	1687	5
Rochester Junction	Seneca	Seneca	1670	1687	2
Wheeler Station /Fox	Seneca	Seneca	1655	1675	2
Warren	Seneca	Seneca	1625	1640	1
Boughton Hill	Seneca	Seneca	1670	1687	1
“Geneva”	Seneca	Seneca	—	—	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	4
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	3
Frey-Haverstick	Susquehannock etc.	Susquehannock	1630	1645	1

Thick Discoidal (Assigned Production 1635~1640)

(not tracked) Figure 1.2e

Discoidal beads are a timeless North American marine shell bead form. The understandable difficulty of identifying SMS forms of discoidal beads in the literature search led to them being eliminated as a tracked form. As with the irregular beads, this was an unfortunate choice, because two forms of discoidal forms are evident in SMS, a very early thicker bead with narrow diameter and a flatter, wider, and more standardized bead largely restricted to pre-1670 contexts.

Once again, the bead assemblage from Lake Medad site in Neutrialia provides the best examples of the earliest SMS assemblage. Here, along with Large Crescents, Rectanguloid Runtees, Irregular Massive beads, and over 100 relatively uniform short tubes (1–1.5 cm long), were 59 circa .6–.9 cm thick discoidals of highly variable diameters and perfectly cylindrical perforations. I suggest that these are the prototype for thinner and more standardized discoidals that were made immediately after this. Luckily, the chronological placement of both forms is relatively straight forward.

Flat Discoidal (Assigned Production 1640–1655)

(not tracked) Figure 1.2f

Flat Discoidal SMS beads become highly visible for a short time immediately after the earliest SMS forms give way to the more refined versions of themselves (i.e., Large Crescents to smaller and thinner Standard Crescents, Large Tubes to uniform Pipe Beads, and Thick Discoidals to thin, flat, uniform diameter Flat Discoidals). The timing of these

transitions is quite evident in the Seneca sequence at the Powerhouse and Steele sites (1640–1655). A number of necklaces at these sites have numerous standardized discoidal beads spaced by individual wampum beads. By the time the next sequential Seneca sites are occupied (1655–1670), uniform Flat Discoidal beads are already becoming less notably common. I presume they are curated by this time.

The rapid wane of the popularity of this time honored marine shell bead form provides an interesting window into the rapid evolution and short life-spans of the SMS forms, suggesting that Native desire for novel new forms of both shape and presentation format may have been driving the evolution of the SMS industry. Discoidal beads do not lend themselves to the flat display format made possible by both runtee style and transverse drilling though necks typical of most SMS form.

Pipe Bead (Assigned Production 1635–1720+)

Figures 1.1o, F.2, and G.4; Table E.5

Long tubular beads of marine shell, typically made of marine shell are not a new idea in 17th century North America. Lengths of columella had been converted into beads by various types of drilling for thousands of years. As recently as the 15th and 16th century, medium length, longitudinally drilled “early pipe heads” were being made at sites such as the Phillips Site in Southwestern Pennsylvania.(Gage 2008). These short (4–5 cm) marine shell tubes had with tapering drill holes, and traces of the columellar fold, but otherwise look somewhat like, 17th century pipe beads.

The SFAP graph for standardized Pipe Beads (Figure F.2) shows that even though some forms of Pipe Beads were being produced before 1640, they only became common after

Table E.5. Distribution of dated/mappable Pipe Beads

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Gros Cap	“Ontario” group–post	Ottawa	1671	1705	2
Lasanen	“Ontario” group–post	Ottawa/Tionnontate Huron	1671	1705	24
Marquette Mission	“Ontario” group–post	Tionnontate Huron	1671	1704	15
Bell (Wisconsin)	18th cent. WGL	Mesquakie	1680	1730	3
Great Gully/Young	Cayuga	Cayuga	1675	1710	42
Mead Farm	Cayuga	Cayuga	1665	1685	16
Lamb	Cayuga	Cayuga	1665	1685	16
Rogers Farm	Cayuga	Cayuga	1665	1685	9
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	2
“Cayuga Reservation”	Cayuga	Cayuga	—	—	2
Lilly Hill	Long Is./S. New Eng.	Montauk	—	—	6
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	10
Burr’s Hill	Long Is./S. New Eng.	Wampanoag	1655	1680	1
Allen Site	Mohawk	Mohawk	1646	1712	8
Pahaquarra	Munsee	Munsee	1740	1760	40
Bell (Minisink)	Munsee	Munsee	1670	1690	31
West Long Branch	Munsee	Munsee	1650	1700	1
Trenton	Munsee	Munsee	1640	1675	1
Calno School	Munsee	Munsee	1650	1700	1
“Wawarsing, NY”	Munsee	Munsee/Esopus	—	—	11
John Green	N. Car./Virginia	Meherrin, Weyanoke	1700	1720	3
Fredricks	N. Car./Virginia	Occaneechi	1680	1710	11
Raymond Bush	N. Car./Virginia	Pamunkey	—	—	1
Quarry	Oneida	Oneida	1650	1660	22
Jamesville/Pen	Onondaga	Onondaga	1696	1710	47
Indian Castle	Onondaga	Onondaga	1655	1663	35
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	33
Indian Hill	Onondaga	Onondaga	1663	1682	15
“Brewerton”	Onondaga	Onondaga	—	—	11
“Dam 4, Potomac R.”	Other	Unknown	—	—	1
Hanson Site (Wisc.)	Other	Unknown	—	—	1
Larson	Plains	Arikara	1700	1725	34
Sully	Plains	Arikara	1650	1700	8
Mobridge	Plains	Arikara	1725	1750	5
Four Bear	Plains	Arikara	1700	1735	2
Leavenworth	Plains	Arikara	1800	1832	2
Milford	Plains	Ioway/Oto	1680	1700	1
Rochester Junction	Seneca	Seneca	1670	1687	424
Dann	Seneca	Seneca	1655	1670	154
Boughton Hill	Seneca	Seneca	1670	1687	145
Power House	Seneca	Seneca	1640	1655	44
White Springs	Seneca	Seneca	1688	1715	19
Snyder McClure	Seneca	Seneca	1687	1710	18
Beal/Cherry Street	Seneca	Seneca	1670	1687	17
Kirkwood	Seneca	Seneca	1670	1687	17

Warren	Seneca	Seneca	1625	1640	11
Huntoon	Seneca	Seneca	1710	1745	9
Steele	Seneca	Seneca	1640	1660	4
Wheeler Sta./Fox	Seneca	Seneca	1655	1675	3
Marsh	Seneca	Seneca	1655	1670	2
Townley-Read	Seneca	Seneca	1710	1754	2
New Ganechstage complex	Seneca	Seneca	1710	1754	1
“Geneva”	Seneca	Seneca	—	—	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	22
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	40
Frey-Haverstick	Susquehannock etc.	Susquehannock	1630	1645	3
Strickler	Susquehannock etc.	Susquehannock	1645	1665	2
Conestoga Town	Susquehannock etc.	Susquehannock/Seneca	1690	1730	67
Lancaster County Park	Susquehannock etc.	Unknown	1714	1730	7

1650–1655. The uniform, short (less than 2 cm), cylindrical beads seen with the earliest SMS assemblage at Lake Medad site may represent an early stage of the production of standardized pipe beads, but the form itself has time depth. Based on the information presented in this thesis on the schedule and scale of importation of West Indian marine shell, I suggest that only exotic conchs (meaning not from the mid-Atlantic coast) were suitable for producing the extremely long (circa 10 cm), narrow (circa .5 or .6 cm) perfectly smooth Pipe Beads that become popular later in the 17th century. No Pipe Beads are made of Mercenaria shell.

These “classic” Pipe Beads became common around 1655. Matched sets of these long beads are typical of post-1670 sites throughout the core area (and beyond, as seen in sites such as Lasanen in Michigan, Fredricks in North Carolina, and Larson in South Dakota). Although their numbers diminish after 1720, it seems unlikely that Pipe Beads ever entirely ceased being made during the 18th century, in as much as they appear to be the predecessor to the Plains Hair Pipe form (Ewers 1957).

Standard Crescent (Assigned Production 1645/1650–1680)

Figures 1.2n, F.3, and G.5; Table E.6

Standard two-hole crescents seem to come into production early in the SMS sequence, with the earliest terminal date being 1640. Yet, in spite of the single record that supports this early terminal date (a single crescent from the Seneca Warren site) I have assigned the beginning of production for Standard Crescents as 1645/1650, in part because I assume their derivation from the Large Crescents. Another factor arguing that they may begin slightly later than 1645 is their near total absence from pre-dispersal Ontario sites (again, their presence in those sites hangs on a single item). At least 10 percent of Standard Crescents are made of *Mercenaria* versus conch shell.

Size graduation is a consistent feature of most sets of Standard Crescents (see Figure 3.6) with typical specimens ranging between 2 and 4 cm in length. Typical widths might range from .45–.7 cm and uniform thicknesses between .2 and .4 cm are the rule. From an economic point of view, graduated crescents provide a way to use highly variably sized pieces of marine shell. The numbers of crescents in sets vary wildly, presumably as a result of restringing from original large graduated sets (the largest known examples of which contain 60–100 beads).

As with many other forms the production of this form explodes at about 1655 and the most notable period of production is the 15 years between 1655 and 1670. I have suggested a 1680 end date for production of Standard Crescents because most large sets entered the archaeological record prior to 1685. As seen in Figure G.5, Standard Crescents are largely restricted to the SMS core area, further supporting their primary affiliation with the 1655–1670 period.

Table E.6. Distribution of dated/mappable Standard Crescents

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lot 24, Conc. 7, Simcoe	“Ontario” group–pre	Tionnontate	1635	1650	1
Mead Farm	Cayuga	Cayuga	1665	1685	132
Garrett	Cayuga	Cayuga	1640	1650	28
Lamb	Cayuga	Cayuga	1665	1685	20
Rogers Farm	Cayuga	Cayuga	1665	1685	20
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	14
Allen Site	Mohawk	Mohawk	1646	1712	3
Sullivan	Oneida	Oneida	1660	1677	3
Thurston	Oneida	Oneida	1635	1655	3
Oneida Castle	Oneida	Oneida	1767	1779	1
Lot 18	Onondaga	Onondaga	1650	1655	21
Indian Castle	Onondaga	Onondaga	1655	1663	11
Indian Hill	Onondaga	Onondaga	1663	1682	9
Oak Orchard	Onondaga	Onondaga	—	—	7
Armand	Onondaga	Onondaga	—	—	6
Brewerton	Onondaga	Onondaga	—	—	3
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
Sarf Cache/Parker	Other	Multiple	1740	1765	3
Dann	Seneca	Seneca	1655	1670	462
Power House	Seneca	Seneca	1640	1655	30
Marsh	Seneca	Seneca	1655	1670	19
Boughton Hill	Seneca	Seneca	1670	1687	16
Snyder McClure	Seneca	Seneca	1687	1710	15
Canandaigua	Seneca	Seneca	—	—	7
Steele	Seneca	Seneca	1640	1660	6
Warren	Seneca	Seneca	1625	1640	1
Beal/Cherry Street	Seneca	Seneca	1670	1687	1
Kirkwood	Seneca	Seneca	1670	1687	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	21
Strickler	Susquehannock etc.	Susquehannock	1645	1665	15

Geometric Unique (Assigned Production 1645–1690)

Figures F.4 and G.6; Table E.7

Geometric Unique is a facile way of grouping forms that may be unique or may be representative of low-frequency standardized forms. A parallel category is Effigy Unique. A total of 13 specimens from 8 sites have this classification and, as one might expect, there is little similarity between the examples.

Table E.7. Distribution of dated/mappable Geometric Unique ornaments

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Gros Cap	“Ontario” group–post	Ottawa	1671	1705	1
Garrett	Cayuga	Cayuga	1640	1650	1
Bell (Minisink)	Munsee	Munsee	1670	1690	2
Power House	Seneca	Seneca	1640	1655	4
Dann	Seneca	Seneca	1655	1670	1
Boughton Hill	Seneca	Seneca	1670	1687	1
Snyder McClure	Seneca	Seneca	1687	1710	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	2

A sample of descriptions best provides an understanding of how this category has been employed (e.g., “Cone shape indicated but with lateral cylindrical perforation.” “Quite flat, heart-shaped bead with transverse hole.” “Rectangular plaque with dot design.” “Remnant of a rectangular plaque with dot design.” “Diamond shaped bar with holes at each end. Row of dot decorations along center.” “Probable claw pendant reworked into ovate pendant.”). The fact that so few examples accumulated in this kind of generic category is testimony to the level of thematic standardization within the industry.

Claw (Assigned Production 1645–1690)

Figures 1.2i, F.5, and G.7; Table E.8

Formal variation between examples of Claw SMS beads is minor and usually is expressed in the shape of the appendage where the suspension hole is placed. This uniformly flat (typically .3–.5 cm) form requires suspension that orients the 2–3 cm pendants uniformly. Matched set necklaces are commonly indicated, many of which are all the more lovely when

Table E.8. Distribution of dated/mappable Claw pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lamb	Cayuga	Cayuga	1665	1685	4
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	1
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	18
Brown	Mohawk	Mohawk	1646	1666	2
Bell (Minisink)	Munsee	Munsee	1670	1690	8
Zimmerman	Munsee	Munsee	1660	1690	2
John Green	N. Car./Virginia	Meherrin, Weyanoke	1700	1720	8
Quarry	Oneida	Oneida	1650	1660	1
Sullivan	Oneida	Oneida	1660	1677	1
“Munnsville, NY”	Oneida	Oneida	—	—	1
“Brewerton”	Onondaga	Onondaga	—	—	10
Indian Hill	Onondaga	Onondaga	1663	1682	5
Indian Castle	Onondaga	Onondaga	1655	1663	1
Dann	Seneca	Seneca	1655	1670	63
Power House	Seneca	Seneca	1640	1655	11
Steele	Seneca	Seneca	1640	1660	11
Marsh	Seneca	Seneca	1655	1670	6
Boughton Hill	Seneca	Seneca	1670	1687	3
Snyder McClure	Seneca	Seneca	1687	1710	3
Rochester Junction	Seneca	Seneca	1670	1687	3
“Canandaigua”	Seneca	Seneca	—	—	2
Beal/Cherry Street	Seneca	Seneca	1670	1687	1
Kirkwood	Seneca	Seneca	1670	1687	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	4
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	1

executed in purple shell. Approximately 60 percent of the 200 known claw-shaped beads are made of purple *Mercenaria* shell.

If the identification of Hollar’s 1645 “Unus Americanus” as wearing a SMS “claw necklace” on his brow is correct, the SFAP graph is exactly correct in its indication that this form emerged in that decade. But the absence of this form in Ontario pre-dispersal sites gives some pause and argues for a beginning of manufacture closer to circa 1650. Claw necklaces are typical only of the SMS core area, although one necklace of them was found in a significantly later site in Virginia (John Green 1700–1720). Otherwise these necklaces are typical only of the 1655–1670 era, and continued production of the form after the 1670s

is open to question, since it is numerically dependent on outlier sets (Long Pond, John Green site) and loose examples in the SMS core area.

One source of discordant data on the chronological placement of claw pendants needs to be corrected. Sempowski (1989:86, Figure 10f) and Sempowski and Saunders (2001:267–268) list the first appearance of SMS claw effigy beads as being at the Period III Dutch Hollow site. Since those publications Martha Sempowski has located a catalog error and traced the three beads in question [items 15086–15088] to the Period V Steele site (personal communication during Esarey RMSC visit 17 May 2011).

Effigy Unidentified (Assigned Production 1645–1710)

Figure G.8; Table E.9

This category is merely a way of grouping fragmentary and unique effigy forms. One would not expect coherence in the chronology or distribution of dated/mappable examples of the category and there is none.

Table E.9. Distribution of dated/mappable Effigy Unidentified pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lamb	Cayuga	Cayuga	1665	1685	1
Great Gully/Young	Cayuga	Cayuga	1675	1710	1
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
“Christopher Site, Pompey”	Onondaga	Onondaga	—	—	1
Snyder McClure	Seneca	Seneca	1687	1710	1
Rochester Junction	Seneca	Seneca	1670	1687	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	3
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	2
Frey-Haverstick	Susquehannock etc.	Susquehannock	1630	1645	1

Disk Runtree (Assigned Production 1645–1710)

Figures 1.1r–t, 1.3, 3.2, 3.3, 3.4, 3.5, F.6, and G.9; Tables E.10, E.11

Along with Pipe Beads, Disk Runtrees are the most ubiquitous, persistent, and widespread SMS product. Diameters and thicknesses vary significantly. A sample of easily retrieved metrics (for about a quarter of the known examples of this form) show disk diameters typically ranging between 1.5 and 4.5 cm with an average diameter being 3.0 cm. Typical thicknesses range from .3–.6 cm with average thickness being .45 cm. Graduated diameter sets are known, but matched sets of similar size and design are more typical.

Most Disk Runtrees are drilled with two longitudinal holes. Of 343 Disk Runtrees where this attribute is recorded 86% have two holes while nearly all the remainder have a single hole (two examples with three holes are known). Bore holes typically range from .1–.25 diameter, averaging .18 cm (over 60% of Disk Runtrees have bore holes recorded as .2 cm).

The Span Factored Annual Percentage graph for Disk Runtrees shows several stages to their production. Because a few examples of this form are present in the pre-dispersal Ontario Iroquoians, we can be assured that the form was initiated in the 1640s. The major upswing in all SMS forms in the mid-1650s also is reflected among Disk Runtrees. But unlike many of

Table E.10. Recorded Disk Runtree decorations

Decorations	#	%
Cross bars/dots	199	69.0
Arc rosette	37	12.8
Concentric	30	10.4
Central dot	13	4.5
Other	5	1.7
Edge dots only	2	>1.0
Radial bars/lines	2	>1.0

Table E.11. Distribution of dated/mappable Disk Runtrees

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Gros Cap	“Ontario” group—post	Ottawa	1671	1705	3
Lasanen	“Ontario” group—post	Ottawa/Tionnontate Huron	1671	1705	10
Richardson	“Ontario” group—post	Ottawa/Tionnontate Huron	1651	1690	1
Marquette Mission	“Ontario” group—post	Tionnontate Huron	1671	1704	1
Upper Sandusky	“Ontario” group—post	Wyandot	1738	1843	1
Garrow Farm	“Ontario” group—pre	General Iroquoian	—	—	1
near Penetanguishene	“Ontario” group—pre	Huron	1635	1649	1
Grimsby	“Ontario” group—pre	Neutral	1630	1651	1
Port Colborne	“Ontario” group—pre	Neutral	1640	1651	1
Mead Farm	Cayuga	Cayuga	1665	1685	42
Lamb	Cayuga	Cayuga	1665	1685	10
Rogers Farm	Cayuga	Cayuga	1665	1685	9
Great Gully/Young	Cayuga	Cayuga	1675	1710	7
Garrett	Cayuga	Cayuga	1640	1650	6
Silo Ridge	Chickasaw	Chickasaw	1680	1710	7
Long Town	Chickasaw	Chickasaw	1680	1710	2
Farmington	Long Is./S. New Eng.	Tunxis	—	—	2
Galligan 2	Mohawk	Mohawk	1693	1755	9
Allen Site	Mohawk	Mohawk	1646	1712	3
Jackson-Everson	Mohawk	Mohawk	1657	1679	2
Lipe II or White Orchard	Mohawk	Mohawk	1666	1693	1
Bell	Munsee	Munsee	1670	1690	15
Pahaquarra	Munsee	Munsee	1740	1760	8
Croton Aqueduct Site	Munsee	Munsee	1645	1740	1
Wawarsing, NY	Munsee	Munsee/Esopus	—	—	6
Fredricks	N. Car./Virginia	Occaneechi	1680	1710	10
Jenrette	N. Car./Virginia	Occaneechi	1680	1710	2
Upper Saratown	N. Car./Virginia	Sara	1670	1710	1
Sullivan	Oneida	Oneida	1660	1677	2
Munnsville, NY	Oneida	Oneida	—	—	1
Lanz-Hogan	Oneida	Oneida	1720	1750	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	18
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	12
Indian Hill	Onondaga	Onondaga	1663	1682	5
Oak Orchard	Onondaga	Onondaga	—	—	3
Indian Castle	Onondaga	Onondaga	1655	1663	2
Lot 18	Onondaga	Onondaga	1650	1655	2
Lafayette	Onondaga	Onondaga	—	—	1
Fort Pontchartrain	Other	French	1707	1707	6
Smokes Point	Other	General Iroquoian	—	—	1
Sarf Cache/Parker	Other	Multiple	1740	1765	5
Lake Freeman	Other	Unknown	—	—	1
Larson	Plains	Arikara	1700	1725	20
Four Bear	Plains	Arikara	1700	1735	2
Rosa	Plains	Arikara	1700	1725	1

Fort George	Plains	Arikara/Pawnee	1675	1750	1
Blood Run	Plains	Omaha (and many others)	1690	1714	1
Rochester Junction	Seneca	Seneca	1670	1687	67
Dann	Seneca	Seneca	1655	1670	48
Boughton Hill	Seneca	Seneca	1670	1687	36
Snyder McClure	Seneca	Seneca	1687	1710	20
Kirkwood	Seneca	Seneca	1670	1687	9
Marsh	Seneca	Seneca	1655	1670	2
Beal/Cherry Street	Seneca	Seneca	1670	1687	2
Ketchum/Damasky	Seneca	Seneca	1687	1710	2
Power House	Seneca	Seneca	1640	1655	1
White Springs	Seneca	Seneca	1688	1715	1
Kendaia	Seneca	Seneca	1710	1779	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	37
Strickler	Susquehannock etc.	Susquehannock	1645	1665	6
Conestoga Town	Susquehannock etc.	Susquehannock and Seneca	1690	1730	10

the forms initially produced in the 1650s, Disk Runties become more rather than less popular in the 1670s. Nor are they at all rare during the 1687–1710 period.

I have chosen to interpret the end of production of Disk Runties as being circa 1710.

The span factored frequencies make a notable drop at this point, and I remain confident that the notable occurrence of a number of examples in caches such as Sarf and Paquaharra are curated examples made some three or four decades after their manufacture and buried at the end of the life of their personal owner. The large numbers of Disk Runties in far western Arikara sites would be more troubling to my assigned cessation of production except that none of the Triconcave “arrowhead” beads moving to the Western Great Lakes in large numbers after the first decade of the 18th century penetrated the far western groups with SMS ornaments. Consequently, I’m convinced the Disk Runties in the Great Plains moved there before 1720.

Nearly all Disk Runties are made of conch/whelk, although three of the 536 known examples are recorded as Mercenaria. Disk Runtie designs have not been analyzed, but have

been tabulated for 288 of the 536 known examples. The most common design (cross bar with dots) is present from the time Disk Runttees appear and remains popular until the end of production. The next most common design (arc rosette) is made with compass dividers, an attributed shared with the majority of SMS gorgets. This form does not appear until after 1670.

Goose/Loon (Assigned Production 1650–1685)

Figures 1.1g, 3.2, 3.5, 3.6, F.7, and G10; Table E.12

The unique and distinctive goose or loon-shaped pendants are a fascinating zoomorphic effigy, radically different from any antecedent image. A common SMS form, they appear to represent a brace of waterfowl suspended by their heads and evenly spaced. Like a number of the early SMS forms the Goose/Loon pendants are specifically designed as necklace components. The necks are often socketed to accept spacer beads of wampum of glass and size graduated sets are the rule. Pendants typically range from 2.5–4.0 cm long and .7–1.0 cm wide. They the ventral side is somewhat flattened and each bead is about .4–.6 cm thick. Bore holes tend to be .1–.15 cm diameter. Only about 6 percent of Goose/Loon pendants are made of *Mercenaria* shell. Beauchamp's (1901:362) comment that many of these pendants are made of bone as well as shell is to be largely disregarded but some few examples of bone do exist.

Most large sets have matched decorations. Although no categorization of tabulation of decorations has been made, most decorations involve dots bordering straight or arcing lines upon the back as well as the always present eye dots.

The SFAP graph for Goose/Loons shows that they were probably introduced circa 1650 and were most popular between 1655 and 1685. After 1680s they are rapidly reduced to

small sets and loose examples. This form only rarely is found outside the SMS core area, but one lonely example did somehow make it to the Grand Village of the Mesquakie in Wisconsin, who were known to be having dealings with the Five Nations during the first decades of the 18th century (Behm 2008).

Table E.12. Distribution of dated/mappable Goose/Loon pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lambton Mills	“Ontario” group—pre	General Iroquoian	—	—	1
Bell	18th cent. WGL	Mesquakie	1680	1730	1
Mead Farm	Cayuga	Cayuga	1665	1685	43
Lamb	Cayuga	Cayuga	1665	1685	8
Great Gully/Young	Cayuga	Cayuga	1675	1710	8
Cayuga Reservation	Cayuga	Cayuga	—	—	3
Rogers Farm	Cayuga	Cayuga	1665	1685	2
Cayuga Castle	Cayuga	Cayuga	—	—	2
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	1
Rene Menard Bridge	Cayuga	Cayuga	1670	1690	1
Sibley Farm	Cayuga	Cayuga	—	—	1
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	9
Allen Site	Mohawk	Mohawk	1646	1712	4
Prospect Hill	Mohawk	Mohawk	1693	1755	1
Calno School	Munsee	Munsee	1650	1700	6
Bell (Minisink)	Munsee	Munsee	1670	1690	4
Trenton	Munsee	Munsee	1640	1675	4
Wawarsing, NY	Munsee	Munsee/Esopus	—	—	3
Quarry	Oneida	Oneida	1650	1660	11
Sullivan	Oneida	Oneida	1660	1677	2
Thurston	Oneida	Oneida	1635	1655	1
Munnsville, NY	Oneida	Oneida	—	—	1
Oak Orchard	Onondaga	Onondaga	—	—	17
Indian Hill	Onondaga	Onondaga	1663	1682	14
Indian Castle	Onondaga	Onondaga	1655	1663	4
Brewerton	Onondaga	Onondaga	—	—	2
Jamesville/Pen	Onondaga	Onondaga	1696	1710	2
Armand	Onondaga	Onondaga	—	—	1
Sarf Cache/Parker	Other	Multiple	1740	1765	10
Dann	Seneca	Seneca	1655	1670	118
Marsh	Seneca	Seneca	1655	1670	11
Power House	Seneca	Seneca	1640	1655	7
Snyder McClure	Seneca	Seneca	1687	1710	6
Steele	Seneca	Seneca	1640	1660	6
Boughton Hill	Seneca	Seneca	1670	1687	5

Beal/Cherry Street	Seneca	Seneca	1670	1687	4
Rochester Junction	Seneca	Seneca	1670	1687	4
White Springs	Seneca	Seneca	1688	1715	2
Townley-Read	Seneca	Seneca	1710	1754	1
Geneva	Seneca	Seneca	—	—	1
Honeoye Falls	Seneca	Seneca	—	—	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	39
Strickler	Susquehannock etc.	Susquehannock	1645	1665	9

Owl (Assigned Production 1650–1690)

Figures 1.1e, F.8 and G11; Table E.13

Three dimensional owls with a somewhat flattened back are often free-standing effigies (meaning they are often found as individual pendants). Of the 38 examples known, 16 examples are from three sets (two sets of six and one set of four), but other examples are found individually. Most examples range between 2 and 4 cm tall, 1–2 cm wide, and .6–1.3 cm thick. Bore holes are typically .1–.15 in diameter.

Only one owl is known to be made of Mercenaria shell. Decoration is often eroded but typically includes modeling of the head to accentuate the eyes and vertical lines on the main

Table E.13. Distribution of dated/mappable Owl pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Allen Site	Mohawk	Mohawk	1646	1712	1
Bell	Munsee	Munsee	1670	1690	6
West Long Branch	Munsee	Munsee	1650	1700	4
Trenton	Munsee	Munsee	1640	1675	1
Sullivan	Oneida	Oneida	1660	1677	2
Brewerton	Onondaga	Onondaga	—	—	1
Dann	Seneca	Seneca	1655	1670	3
Rochester Junction	Seneca	Seneca	1670	1687	2
Beal/Cherry Street	Seneca	Seneca	1670	1687	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	9
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	4
Frey-Haverstick	Susquehannock etc.	Susquehannock	1630	1645	1

body (sometimes with bordering dots) to represent the wings. Interestingly, the talons are quite frequently represents in one manner or another and are recognizably in a “perching” position.

The SFAP graph for Owls shows a normal distribution of dated/mappable examples indicating that this form was in production by 1650 and persisted until perhaps 1690.

Beaver (Assigned Production 1650–1710)

Figures 1.1i, F.9 and G12; Tables E.14, E.15

Beaver effigies are a distinctive and persistent SMS form found as individual pendants rather than matched sets. Complete examples range between 4 and 11 cm long, 2–4 cm wide, and .3–.95 cm thick. Three rather easily sorted styles of beaver pendants are present and these styles are produced sequentially.

Type A beavers: The earlier series of beaver pendants securely dates between 1655 and ca. 1670/1675. These beavers are shorter and wider, and most are undecorated except for eye spots and occasional cross-hatching on the tail. Type A beavers have a diamond-shaped head and many examples have the tail snapped off. Examples are found at Dann (2), Powerhouse, Wheeler Station, Strickler, and Mead, as well as two unprovenienced beaver pendants from “New York” (Parker 1920:Plate 135:5a).

Type B beavers: A later style of beaver pendants begins around 1670. I suggest production of this form ends around 1690, but they may be made as late as 1710. These

Table E.14. Chronological assignment of SMS Beaver pendant types

Type A	1655–1670/1675
Type B	1670–1690
Type C	1690–1710

are longer, narrower, and more ornately decorated. Most Type B beaver pendants still have diamond-shaped heads but the trait is sometimes less pronounced or absent. Examples are found at Indian Hill, Hogan, Boughton Hill, Conestoga, Conoy, Bell (Minisink), Penn, and Dann. Decorations are generally longitudinal or laterally oriented lines and dots on the body.

Type C beavers: I've assigned a single flat outline shape of an ornately decorated beaver from the Sarf Cache to Type C. I assign this form to 1690–1710 because the perfectly hemispherical arcs and dots of this example are identical to the “beaded pelt” appearance of the Pelt Type A form pendants. I have no images of Beaver pendants from Bryd Liebhart and Carley sites and several flat outline pendants are not assigned to any type.

I find pointed significance in the fact that these roughly 20 year production periods document continuities as well as trends of production. They support continuity within a small cottage industry over an approximately 60 year period. Even more significant is the observation that the temporal resolution of these forms is rather startling proof of a rapid deposition rate. That is, much of the clarity that allows sorting of SMS ornaments' chronological affiliations apparently derives from a generally short “life-span” (production, distribution, and deposition of these personal possessions into graves). For example, none of the beaver pendants stylistically associated with pre-1670 sites seems to have been buried much later than the 1670s. Curation appears to be negligible. Put more pointedly, production spans of roughly 20 years can only be attested by site occupation spans if they are accompanied by very rapid deposition of the ornaments.

The distribution of beaver pendants is limited to that part of the SMS core area that does not include the Ontario pre-dispersal region.

Table E.15. Distribution of dated/mappable Beaver pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Mead Farm	Cayuga	Cayuga	1665	1685	1
Lamb	Cayuga	Cayuga	1665	1685	1
Bell (Minisink)	Munsee	Munsee	1670	1690	1
Hogan	Oneida	Oneida	1677	1685	1
Indian Hill	Onondaga	Onondaga	1663	1682	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
Carley	Onondaga	Onondaga	1645	1650	1
Sarf Cache/Parker	Other	Multiple	1740	1765	1
Dann	Seneca	Seneca	1655	1670	3
Power House	Seneca	Seneca	1640	1655	1
Boughton Hill	Seneca	Seneca	1670	1687	1
Wheeler Station /Fox	Seneca	Seneca	1655	1675	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	4
Strickler	Susquehannock etc.	Susquehannock	1645	1665	1
Conestoga Town	Susquehannock etc.	Susquehannock and Seneca	1690	1730	1

Triangle Apical Drilled (Assigned Production 1650–1690)

Figures 1.2k, F.10, G.13; Table E.16

Thin isosceles triangles with a tiny hole at the apex are an aberration among SMS forms on several points. Only one of these triangles is recorded as being made of *Mercenaria*, but approximately a third of them are made of mussel shell, with their perfectly cylindrical suspension hole being the main factor that identifies them as a SMS form.

Recorded lengths average 2.0 cm, ranging between 1.0 and 3.0 cm. Widths range from 1.0–2.1 cm, averaging 1.6 cm. These triangles are typically quite thin, averaging .21 cm thick, with bore holes averaging only .10 cm. Most apical drilled triangle pendants are undecorated—the three exceptions have various drilled dots (a single central dot, a line of dots along each side, or a line down the axis) as decoration.

This form was made from about 1650 to 1690 and is especially common 1655–1685.

Examples at Lasanen site in the western Great Lakes are the only known case outside the SMS core area.

Table E.16. Distribution of dated/mappable Triangle Apical Drilled pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Strickler	Susquehannock etc.	Susquehannock	1645	1665	1
Dann	Seneca	Seneca	1655	1670	23
Rochester Junction	Seneca	Seneca	1670	1687	17
Boughton Hill	Seneca	Seneca	1670	1687	11
Power House	Seneca	Seneca	1640	1655	2
Kirkwood	Seneca	Seneca	1670	1687	2
Indian Hill	Onondaga	Onondaga	1663	1682	1
Bell (Minisink)	Munsee	Munsee	1670	1690	1
Cayuga Reservation	Cayuga	Cayuga	—	—	2
Lasanen	“Ontario” group–post	Ottawa/Tionnontate Huron	1671	1705	1

Otter (Assigned Production 1650–1690)

Figures 1.1h, F.9, and G.14; Table E.17

A relatively small number of SMS pendants are classified as “otter” forms rather than simply “quadrupeds.” The individual specimens of even this small sample (7 known examples) have only a handful of traits in common (long bodies, relatively long heads and tails). All are made from conch/whelk shell. When decorations are present they fields of dots or lines. Two examples are dimensional or side views. One spectacular three dimensional example is unprovenienced, in as much as its Ennis collections attribution to the Dungey site cannot be considered credible (James Bradley, personal communication, 16 February 2012). The bimodal SFAP graph (1650–1710) for the 6 dated Otter pendants shows how little can be said about the dating of these ornaments as a group.

Table E.17. Distribution of dated/mappable Otter pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Long Pond	Long Is./S. New Eng.	Pequot	1660	1720	1
West Long Branch	Munsee	Munsee	1650	1700	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
Dann	Seneca	Seneca	1655	1670	1
Boughton Hill	Seneca	Seneca	1670	1687	1
Steele	Seneca	Seneca	1640	1660	1

Bird (Assigned Production 1650–1710)

Figure 1.1c–d, F.12, and G.15; Table E.18

The effigy forms designated the generic term “bird” vary in form. In general they are employed as individual pendants rather than in sets. Most are identifiable as raptors, but that is where similarities end. Some have spread wings while others are upright examples with folded wings. A number of examples are ornately decorated, and three or four forms have

Table E.18. Distribution of dated/mappable Bird pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Gros Cap	“Ontario” group–pos	Ottawa	1671	1705	1
Garrett	Cayuga	Cayuga	1640	1650	2
Mead Farm	Cayuga	Cayuga	1665	1685	1
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	1
Great Gully/Young	Cayuga	Cayuga	1675	1710	1
Horatio Nellis	Mohawk	Mohawk	1646	1666	1
Bell (Minisink)	Munsee	Munsee	1670	1690	5
West Long Branch	Munsee	Munsee	1650	1700	1
Sullivan	Oneida	Oneida	1660	1677	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
Power House	Seneca	Seneca	1640	1655	2
Boughton Hill	Seneca	Seneca	1670	1687	2
Snyder McClure	Seneca	Seneca	1687	1710	2
Dann	Seneca	Seneca	1655	1670	1
Marsh	Seneca	Seneca	1655	1670	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	1

two or more very similar examples widely distributed in the SMS core area. All are made with conch/whelk shell. But in general Bird pendants are individual executions spread over the entire span of SMS production.

Runtree Circuloid (Assigned Production 1650–1710)

Figure 1.2g, F.13 and G.16; Table E.19

Circuloid Runtrees are smaller than Disk Runtrees, almost always undecorated, and generally have only a single hole drilled through them. Both personal inspection and the bimodal distribution on the SFAP graph for Circuloid Runtrees show that the progression of forms for Circuloid Runtrees is complex. The earliest forms are plain, roughly shaped circuloid runtree beads that can be considered a counterpart to the Rectanguloid Runtree and Irregular Massive beads of the 1635–1655 time period. These are relatively rare.

A more refined version of Circuloid Runtrees with either single or double perforations appears as matched sets at Strickler site (1645–1665). Many of the undecorated Circuloid Runtrees at Strickler have dual perforations and some are made of *Mercenaria* shell.

Diameters range between 1 and 2 cm.

Circuloid Runtrees become somewhat smaller (circa .8–1.5 cm) and far more common after 1670 (making up approximately 80% of beads classified thusly). They tend to be found as matched sets in large necklaces, and are uniform, plain, and well-made. They are nearly round except they often have a facet at the top and bottom where the suspension hole is placed. These are found in sites dating circa 1670–1720. This form persists in the

Table E.19. Distribution of dated/mappable Circuloid Runties

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	1
West Long Branch	Munsee	Munsee	1650	1700	5
John Green	N. Car./Virginia	Meherrin, Weyanoke	1700	1720	59
Fredricks	N. Car./Virginia	Occaneechi	1680	1710	8
Raymond Bush	N. Car./Virginia	Pamunkey	—	—	3
Neoheroka Fort	N. Car./Virginia	Tuscarora	1713	1713	58
Quarry	Oneida	Oneida	1650	1660	1
Brewerton	Onondaga	Onondaga	—	—	3
Dann	Seneca	Seneca	1655	1670	6
Snyder McClure	Seneca	Seneca	1687	1710	2
Steele	Seneca	Seneca	1640	1660	1
Rochester Junction	Seneca	Seneca	1670	1687	1
Menzis	Seneca	Seneca	1640	1655	1
Conoy Cemetery	Susquehannock etc.	mixed groups	1718	1742	2
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	23
Strickler	Susquehannock etc.	Susquehannock	1645	1665	16

Susquehannock Byrd Liebhart site. This later form of runtee is scattered throughout the rest of the SMS core area, but is never common.

Probably not coincidental to their presence in Susquehannock sites, many of these same beads are found in southern sites outside the SMS core area such as John Green, Fredricks, and Neoheroka Fort sites in Virginia and North Carolina. SMS ornaments at Fredricks site have a strong probability of being connected to the Susquehannock migration of the 1670s. SMS and other materials at John Green and Neoheroka Fort (including a bone hair comb at Neoheroka) no doubt reflect specific Iroquoian connections to the post-1700 Northeast. Grumet (2009:226) discusses these people's interactions with northern Iroquoians in the years just before the Neoheroka Fort was built and besieged, and of course, Tuscarora survivors of this event fled north to become the sixth nation of the Iroquois confederacy.

Circuloid Runties continued to shrink through time. Sets of tiny circular runtees (under 1 cm) found at these late southern sites are also seen at Conoy site in Pennsylvania. Nearly

all post 1670 Circuloid Runties are of conch/whelk shell. A set of these Circuloid Runties is undoubtedly the runtee form portrayed by Beverley (1722:5:132).

Serpent (Assigned Production 1655–1670)

Figure G.17

This distinctive form was defined during the literature search because one example was illustrated by Parker (1920:Plate 135:4d) and another by Sempowski (1989:Fig. 18d). Both examples are from the Seneca Dann site (1655–1670). However, no more examples were encountered.

Pelt Type B (Assigned Production 1655–1680)

Figure 1.1k, F.14 and G.18; Table E.20

In surveying various quadruped forms of SMS pendants I decided that new and somewhat arbitrary terminology was needed to cover the wide variety of attempted identifications of various pendants in past literature. Although I retained specific identifications beavers, and otters, I abandoned attempts to identify other quadrupeds to species and divided them into four arbitrary groups. Because either fur trade or symbolic “power” animals seemed to be themes represented in most SMS effigies I decided that all of the quadrupeds could be interpreted in this light and seen as either actual animals or pelts—the stuff of the fur trade. Thus I defined the terms Pelt Type A, B, and C as arbitrary style divisions. The few quadrupeds that did not fit into these groups were inventoried as a generic “quadruped” group.

Pelt Type A was an elaborately decorated flattened quadruped that I perceived as a decorated beaver pelt—a counterpart to the plentiful and anatomically complete beaver

Table E.20. Distribution of dated/mappable Pelt Type B pendants

Location	General Affil.	Ethnic Affil.	Begin	End	#
Brown	Mohawk	Mohawk	1646	1666	1
“Brewerton”	Onondaga	Onondaga	—	—	4
Dann	Seneca	Seneca	1655	1670	2
Strickler	Susquehannock etc.	Susquehannock	1645	1665	3
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	1

pendants. Pelt Type B was conceived of as a literal flat pelt with appendages intact. And Pelt Type C was seen as a dressed pelt in which legs, neck, and tail were represented by neatly trimmed edges.

As it turns out the Pelt Type series roughly seriated into sequential forms, although not as neatly as Beaver pendants. Pelt Type B and C both begin circa 1655. The SFAP graph for the seven datable Pelt Type B specimens shows persistence only until 1670. The ten datable examples of Pelt Type C show persistence until circa 1690. The distinctive Pelt Type A does not appear until both Types B and C are no longer produced, being made 1690–1710.

Examples of Pelt Type B are found only in the SMS core area. They are 2.9–3.8 cm long. Over half of them are made of Mercenaria shell, including all four specimens from Brewerton. Only one example is decorated (with a line of dots down the centerline of the back).

Triangle Vertical Drilled (Assigned Production 1655–1690)

Figures 1.2j, F.15 and G19; Table E.21

These isosceles triangles measure 1.4–2.3 cm long, 1.2–1.8 cm wide, and .4–.6 cm thick. Typically there is a single vertical hole from the apex to the center of the base measuring

Table E.21. Distribution of dated/mappable Triangle Vertical Drilled pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lasanen	“Ontario” group–post	Ottawa/Tionnontate Huron	1671	1705	3
Garrett	Cayuga	Cayuga	1640	1650	1
Farmington	Long Is./S. New Eng.	Tunxis	—	—	1
Bell (Minisink)	Munsee	Munsee	1670	1690	10
Rochester Jct.	Seneca	Seneca	1670	1687	4
Dann	Seneca	Seneca	1655	1670	2
Boughton Hill	Seneca	Seneca	1670	1687	1
Snyder McClure	Seneca	Seneca	1687	1710	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	1

.1–.2 cm diameter, but examples from Dann and Lasanen sites have paired vertical holes similar to the drilling of Disk Runtees.

Two examples are made of *Mercenaria* and the rest are conch/whelk (i.e., unlike apical drilled triangles, none of these are made of mussel shell). Occasionally this form is found in sets, but typically they occur alone. Three examples are decorated with dots. Two sites having these pendants (Lasanen and Farmington) are outside the SMS core area. The period of production is assigned as 1655–1690.

Pelt Type C (Assigned Production 1655–1690)

Figures 1.11, F.16 and G.20; Table E.22

As described above under Pelt Type B, Pelt Type C is conceived of as a dressed animal pelt in which legs, neck, and tail are represented by neatly trimmed edges. This gives the form an abstract, bi-pointed appearance.

Table E.22. Distribution of dated/mappable Pelt Type C pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Bell (Minisink)	Munsee	Munsee	1670	1690	2
Indian Castle	Onondaga	Onondaga	1655	1663	2
Dann	Seneca	Seneca	1655	1670	3
Marsh	Seneca	Seneca	1655	1670	1
Rochester Junction	Seneca	Seneca	1670	1687	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	1

At least two examples have the remnants of a simple dot pattern of decoration. Two of ten examples are Mercenaria. Production span is interpreted as 1655–1690, but they are especially typical of the 1670–1690 period. These effigies are found only in the SMS core area.

Large Goose (Assigned Production 1660–1690)

Figures 1.1f, F.17, G.21; Table E.23

This rare form is much larger than the Goose/Loon category and there are no intermediate sized specimens. The overall impression is of a large plump goose. These occur as individual pendants rather than matched sets. All are manufactured of conch/whelk shell.

Metrics are available on only one headless and 3 unbroken specimens. Length ranges from 5.7–6.7 cm, width 1.7–2.7 cm, and thickness .9–1.4 cm. The drilled suspension hole through the neck ranges from .15 to .25 cm diameter. The Large Goose form is typically ornately decorated. The specimen from Dann site in Figure 1.1f (NYSM A21545) has decoration continuing onto the ventral side.

Distribution of the Large Goose form is limited to the SMS core area. Production span is assigned as 1660–1690.

Table E.23. Distribution of dated/mappable Large Goose pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Great Gully/Young	Cayuga	Cayuga	1675	1710	1
Dann	Seneca	Seneca	1655	1670	4
Boughton Hill	Seneca	Seneca	1670	1687	1
Stickler	Susquehannock etc.	Susquehannock	1645	1665	1

Quadruped (Assigned Production 1660–1690)

Figure G.22; Table E.24

Only four quadrupeds were not assigned to the categories of beaver, otter, or one of the three Pelt Forms. These are of sundry forms and conditions. One of these is a very literal effigy from the Dann site (see Figure 3.5) with strongest affinities to Pelt Type B. Another, from Mead site is either a Type A beaver effigy or Pelt Type C. An example made of Mercenaria shell from Kirkwood site is a damaged Pelt Type B or C form. Finally a three dimensional miniature quadruped illustrated by Parker (1920: Plate 135:9) is unique and unprovenienced.

Table E.24. Distribution of dated/mappable Quadruped pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Mead Farm	Cayuga	Cayuga	1665	1685	1
Dann	Seneca	Seneca	1655	1670	1
Kirkwood	Seneca	Seneca	1670	1687	1

Fish (Assigned Production 1660–1710)

Figures 1.1m, F.18, G.23; Table E.25

My “Fish” category of pendants has several fascinating aspects. Firstly, the subject matter is divided between several distinct styles of fish and marine mammals (and thus there is no generic over-arching term). All but one of the 41 known pendants derive from mappable/datable sites. Images are available for 39 examples. All but one of these pendants is drilled and each drilled pendant has the same suspension format as Disk Runtees. Two diagonal transverse holes assure that the pendant presents in a flat and properly oriented manner.

Ten of the 38 seem to be a variety of fish, 26 seem to be marine mammals, and three are unassigned. Subjective categories may be the best way to describe the variation. Divisions of the fish representations can be categorized as bowfins (4), a long-narrow arc-shaped fish (3), shark (1), sturgeon (1), flounder (1) and unidentified (3). Varieties of marine mammals are designated round-nose porpoise (6), square-nose porpoise (10), generic marine mammal (8), and whale (2).

Examples of four of these styles (bowfin, long-narrow, round nose and squared nose porpoise) show extreme similarities even when found in widely separated sites. For example, the ornately decorated bowfin-shaped pendant illustrated in Figure 1.1m from the Great Gully site (Cayuga) has two unmistakable “batch-mates” from Conestoga (Susquehannock) and the Sarf Cache, as well as a very worn specimen of this outline from Jamesville/Pen. Shape, decoration, and drilling identify this set of pendants as clearly from the same hand.

Another set of three very similar fish are the very long and narrow category. These are also ornately decorated and have a narrow arc-shaped body. Examples are from Great Gully,

Table E.25. Distribution of dated/mappable Fish pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Great Gully/Young	Cayuga	Cayuga	1675	1710	4
Gros Cap	“Ontario” group–post	Ottawa	1671	1705	2
Lasanen	“Ontario” group–post	Ottawa/Tionnontate Huron	1671	1705	3
Marquette Mission	“Ontario” group–post	Tionnontate Huron	1671	1704	1
Cayuga Reservation	Cayuga	Cayuga	—	—	2
Bell (Minisink)	Munsee	Munsee	1670	1690	5
Zimmerman	Munsee	Munsee	1660	1690	1
Wawarsing, NY	Munsee	Munsee/Esopus	—	—	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	10
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	2
Indian Castle	Onondaga	Onondaga	1655	1663	1
Fort Pontchartrain	Other	French	1707	1707	1
Sarf Cache/Parker	Other	Multiple	1740	1765	1
Dann	Seneca	Seneca	1655	1670	1
Snyder McClure	Seneca	Seneca	1687	1710	1
Rochester Junction	Seneca	Seneca	1670	1687	1
Ketchum/Damasky	Seneca	Seneca	1687	1710	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	1
Conestoga Town	Susquehannock etc.	Susquehannock and Seneca	1690	1730	1

Rochester Junction, and Pompey. Other actual fish species represented in this category appear to be a shark (Gros Cap), sturgeon (generic Cayuga), and flounder (Pen).

Two distinct forms of marine mammals represent closely related sets that are necessarily from the same hand since the similarities are unmistakable. Six round-nosed porpoises are from Bell/Minisink (2), Wawarsing (1) and Pen (3). Ten square-nosed porpoises are from Bell/Minisink (1), the Cayuga Reservation (2), Snyder McClure (1), Marquette Mission (1), Great Gully (2), and Pen (3). All examples of both these forms are ornately decorated.

Two pendants that might be considered whales are present from Gros Cap and Weston. Other generically identifiable as porpoises are from Lasanen (1), Bell/Minisink (2), Pompey (1), Ketchum (1), Pen (2), and Dann (1).

The Dann site fish-shaped pendant is an anomaly in several notable ways. Although clearly identifiable as a porpoise, it has no decoration and no suspension holes. It is also the only fish-shaped pendant made of *Mercenaria* shell. Significantly, it is the only fish-shaped pendant clearly pre-dating 1670. Another outlier is a tiny fish-shaped pendant from the 18th century Conoy site that is stylistically unconnected to any of the other SMS fish-shaped pendants.

Although some of the forms described above may represent sequential production of popular form variations this will be difficult to determine. Production of the nearly all the fish-shaped SMS pendants is restricted to only 40 years. With the exception of the Dann site specimen all fish-shaped pendants appear to have been made between 1670 and 1710. The essentially identical examples of “bowfin” fish-shaped pendants at two post-1710 sites (Sarf and Conestoga) matched by a securely dated “batch-mate” in the 1675–1710 Great Gully site seems to prove that the this study’s interpretation that most SMS production ended by 1710 (followed only by expected levels of curated specimens) is well-founded.

A few examples illustrating renewed late 17th century connections between the Tionnonate Huron and Ottawa and the SMS core area are seen in the Western Great Lakes. Otherwise all fish-shaped pendants are found in the SMS core area.

Medallion (Assigned Production 1660–1710)

Figures 1.1q and G.24; Table E.26

This category takes its name from a descriptive term initially used by Beauchamp (1876–1925) in his unpublished “Antiquities of Onondaga” volumes. Before the concept of Disk Runties was solidified as a descriptive class (prior to publication of Holmes 1883),

Beauchamp sometimes referred to decorated disks smaller than gorgets as medallions. Many of these were Disk Runties but I adopted the term as a name for small, non-runtie disks that had a connection to SMS gorgets. Unfortunately, only two such items were encountered in my survey. Both have two central holes relating them to gorget formats, but otherwise have little in common (including temporal affiliations) with each other.

The Conestoga Town ornament is clearly associated with SMS gorget production, in spite of it being only slightly larger than a Disk Runtie (4.1 cm diameter). Its decoration with a heavily encrusted six point arc rosette and bordered by an excised “beaded” brickwork concentric border is identical to many of the SMS gorgets.

The Dann site specimen has these same central paired holes and is only slightly larger (circa 5.2 cm diameter, but is decorated with a star pattern of zoned dots, making it less like SMS ornaments and more connected to early historic Mid-Atlantic gorget decoration.

Table E.26. Distribution of dated/mappable Medallions

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Dann	Seneca	Seneca	1655	1670	1
Conestoga Town	Susquehannock etc.	Susquehannock and Seneca	1690	1730	1

Cone/Pyramid (Assigned Production 1660–1710)

Figure 1.2o and G.25; Table E.27

Three similar-sized (2.3 cm), dot-decorated, heavy shell cones or pyramids are known. The Marsh site specimen (Figure 1.2o) is a vertically perforated pyramid of heavy conch shell. A specimen from West Long Branch is relatively similar except for being cone shaped. A hollowed cone from a later context (coins in the same context date this items to after

1728) at Lilly Hill is unperforated. Although the first two examples may possibly share some production connection to each other, the latter is apparently unique.

Table E.27. Distribution of dated/mappable Cones/Pyramids

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Lilly Hill	Long Is./S. New Eng.	Montauk	—	—	1
West Long Branch	Munsee	Munsee	1650	1700	1
Marsh	Seneca	Seneca	1655	1670	1

Birdman (Assigned Production 1665–1710)

Figures 1.1a, 1.3, F.19, and G.26; Table E.28

The birdman pendant is a three dimensional representation of a well-known and widely distributed Native iconological concept—the personification of a paramount celestial being known across North America. With only 9 known examples, these striking 7–10 cm tall anthromorphs are by no means a common SMS form. Birdman pendants are known to have been used as the central feature on elaborate SMS necklaces flanked by disk runtees (e.g. Anonymous 1991).

The SFAP graph for Birdman (Figure F.19) reveals that this form appears slightly before 1670, but the earliest terminal date (1670) derives from a small, atypical example at the Dann site. The latter part of the bi-modal distribution of Birdman pendants is interpreted as curation, deriving from the fact that two classic birdman pendants were found in the mid-18th century Sarf Cache and the lack of clarity about the dating of the Galligan 2 site. Thus it is notable that both the Sarf birdman pendants and the Galligan 2 pendant closely resemble examples common at the 1670–1687 Rochester Junction site. The Galligan 2 example is essentially identical to Rochester Junction birdman pendants, while the Sarf specimens have

a more detailed execution that might possibly be slightly later (as are some of the other items in that cache). Accordingly, I interpret that Birdman pendants were manufactured 1665–1710. Not surprisingly, Birdman pendants are only found in the SMS core area.

Table E.28. Distribution of dated/mappable Birdman pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Galligan 2	Mohawk	Mohawk	1693	1755	1
Indian Hill	Onondaga	Onondaga	1663	1682	1
Sarf Cache/Parker	Other	Multiple	1740	1765	2
Rochester Junction	Seneca	Seneca	1670	1687	4
Dann	Seneca	Seneca	1655	1670	1

Bird Head Bead (Assigned Production 1665–1690)

Figures 1.2a–b, F.20, and G.27; Table E.29

These distinctive tiny pendants were originally designated “tooth beads” by Charles Wray (1973:16, 30), based on their diminutive (generally 2–3 cm) canine-like shape. The omnipresent eye dots and occasional mouth representation leave no doubt that these represent bird heads, although some look more like billed waterfowl, while others resemble herons. Bird Head beads are typically found as matched sets of 3–8 beads on necklaces spaced by wampum or glass beads. They are always made of conch/whelk shell. A few show use of small columella as the raw material. Bird Head beads were manufactured 1665–1690. They are found only in the SMS core area.

Table E.29. Distribution of dated/mappable Bird Head beads

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
West Long Branch	Munsee	Munsee	1650	1700	8
Indian Hill	Onondaga	Onondaga	1663	1682	2
Indian Castle	Onondaga	Onondaga	1655	1663	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1
Dann	Seneca	Seneca	1655	1670	14
Beal/Cherry Street	Seneca	Seneca	1670	1687	9
Marsh	Seneca	Seneca	1655	1670	2
Boughton Hill	Seneca	Seneca	1670	1687	2
Snyder McClure	Seneca	Seneca	1687	1710	2
Rochester Junction	Seneca	Seneca	1670	1687	1
Canandaigua	Seneca	Seneca	—	—	1
Byrd Leibhart	Susquehannock etc.	Susquehannock	1665	1680	1
Strickler	Susquehannock etc.	Susquehannock	1645	1665	1

SMS Gorget (Assigned Production 1670–1710)

Figures 1.1p, 3.4, F.21, G.28; Table E.30

SMS gorgets combine an ancient marine shell ornament format with a distinctive set of technologically driven SMS decorative traits. Significantly, and as with other literal examples of Native symbolism, this form emerges well after SMS ornament manufacture begins.

A number of traditional style Native marine shell gorgets are found alongside the SMS gorgets on Northeastern sites, and these persist into the 18th century. But only gorgets with drilling and decoration linking them to the SMS industry are included in this category. Fifteen SMS gorgets are known, although one of these (Deerfield) was added after analysis.

SMS gorgets are placed on the concave side of large whelk disks in very much the same format as traditional North American gorgets of the last two millennia. Contexts for SMS gorgets have not been examined but at least one of them was found on a necklace with 9 Disk Runtees. SMS gorget diameters range from 5.9–10 cm. Gorget disks tend to be relatively thin compared to tradition North American gorgets, seldom exceeding .4 cm.

SMS gorget suspension holes are generally .2–.3 cm diameter. Number and placement of suspension holes varies only slightly. Either one or two center or near-center holes are the norm. Of thirteen SMS gorgets with intact suspension, three have a single central hole, six have two holes at center, and four have two holes off center. No chronological trends within these suspension modes are evident.

Decorations of most SMS gorgets are quite closely related and indicate a common technical and artistic tradition. All SMS gorgets exhibit use of compass/dividers to inscribe perfectly concentric circles and various arc rosette and “saw-toothed” patterns. In many cases the “set holes” where arcs were struck are clearly visible, as they are on arc designs on other SMS forms. Many of SMS gorgets have nested concentric lines with excised bars creating a brickwork pattern at either the outer edge or at different distances from center, creating concentric rings with varying design elements such as excised zones, simple arcs, and petaloid designs.

Only two SMS gorgets depart significantly from these attributes. One of two SMS gorgets from Weston/Bloody Hill includes a radically different “circle and cross within a four point star within four point star” central design. Even here a compass/divider was still used to execute a concentric circle in the middle of the design. Another gorget, totally unprovenanced and among the collections of the Potomac Valley Memorial Association in Deerfield, Massachusetts, has similar four part design, but shares a central four petal arc rosette and a brickwork border with many of the other SMS gorgets.

SMS gorgets are introduced about in the 1670s, with the earliest terminal date being 1682 (Indian Hill site). Although three of the SMS gorgets were found on sites completely post-dating the projected 1710 termination date for this form, their technological and decorative

attributes link closely to sites ending before this, implying curation. Two of the three SMS gorgets from the latest sites (Conoy and Kendaia) were notably worn and damaged. Only the Deerfield PVMA gorget may fall outside the SMS core area, but it is unprovenienced.

Table E.30. Distribution of dated/mappable SMS Gorgets

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
“Minisink area”	Munsee	Munsee	—	—	1
Bell (Minisink)	Munsee	Munsee	1670	1690	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	2
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	2
Indian Hill	Onondaga	Onondaga	1663	1682	1
Boughton Hill	Seneca	Seneca	1670	1687	1
White Springs	Seneca	Seneca	1688	1715	1
Ketchum/Damasky	Seneca	Seneca	1687	1710	1
Kendaia	Seneca	Seneca	1710	1779	1
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	2
Conestoga Town	Susquehannock etc.	Susquehannock & Seneca	1690	1730	1
Deerfield PVMA (post-analysis)	Long Is./S. New Eng.?	Unknown	—	—	1

Effigy Unique (Assigned Production 1670–1710)

Figure G.29; Table E.31

Effigy Unique is serves to grouping forms that may be unique or representative of low-frequency standardized forms. A parallel category is Geometric Unique. Only 3 specimens accumulated in this category. As one might expect, there is little similarity between the examples. One unique item is a well published “lamprey” from the Bell (Minisink) site. This ornament is clearly executed in standard SMS format, but is a unique form. Another is an ovoid item decorated with erratic dot patterns from Jamesville/Pen. Since it has a feature that might be interpreted as a nose it probably would have been classed as a mask if masks had been

inventoried. The final item is an unprovenienced flat bodied item that somewhat resembles a Large Goose/Loon but is set aside by its odd body shape (see Parker 1920:Plate 135:10c).

Table E.31. Distribution of dated/mappable Effigy Unique items

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Bell (Minisink)	Munsee	Munsee	1670	1690	1
Jamesville/Pen	Onondaga	Onondaga	1696	1710	1

Star/Cross (Assigned Production 1675–1700)

Figures 1.2p, 3.5 and G.30; Table E.32

Nine items were classified in this group, but the category was plagued by diverse forms, a lack of dated sites, and vexing provenience questions. Four four-pointed stars from the Cayuga Reservation had central perforations and little resembled other crosses or starse. The drilling and scale of a marine shell cross from the Oneida Valley area is undocumented, making it difficult to come to any conclusion about this form.

Two very similar small diagonal crosses drilled in a fashion similar to runtees are both open to provenience questions. Parker (1920:Plate 26.8) listed one of these as from Dann site, but its NYSM catalog card describes it as from Gebhard Collection from “West Bloomfield.” Another very similar runtee-drilled cross is RMSC item 75/96 which indicates a Cornish site provenience. However Cornish (1625–1640) has no other SMS material at all. A catalog error or other mix-up is suspected.

A broad armed diagonal cross with dot-decorations from Beal (Figure 3.5) is well dated, as is a very similar item from Weston (Beauchamp 1901:5:64). Accordingly, this specific

form is assigned a production period of 1675–1700. Little else can be said of the cross or star-shaped SMS ornaments.

Table E.32. Distribution of dated/mappable Star/Cross pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
“West Bloomfield	—	Seneca	—	—	1
“Oneida Valley”	—	Oneida	—	—	1
“Cayuga Reservation”	Cayuga	Cayuga	—	—	4
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	1
Beal/Cherry Street	Seneca	Seneca	1670	1687	1
Cornish?	Seneca	Seneca	1625?	1640?	1

Pelt Type A (Assigned Production 1690–1710)

Figure 1.1j, 3.4, F.22, and G.31; Table E.33

As described above under Pelt Type B, my series of “Pelt Type” forms were developed to group forms stylistically as a remedy to a myriad of attempted species identifications for various quadrupeds and especially to overcome the apparent abstract features of some of the SMS quadrupeds forms. Pelt Type A is one of the most distinctive and stylistically uniform of the ornate SMS forms.

Archaeologists have long (and somewhat inscrutably) referred to this form as a turtle. The terminology proceeds (with very little review) from Beauchamp (1901:Figures 96, 98, 99) who, also used the descriptor “turtle” to categorize items that that are neither Pelt Type A nor anatomically correct turtles (see Beauchamp 1901:Figures 95 and 216). As I have described in the main body of this study, if forced to assign a meaning to Pelt Type A, I would interpret it as a stylized representation of a dressed and partly trimmed beaver pelt,

which typically retains the eye holes. I suspect that the decoration of this and other ornate SMS forms reflects a stylization of embodied power.

Disregarding one atypical specimen from Snyder McClure (see Houghton 1922: Plate XI:a), these ornaments tend to range between 3.5–4.5 cm in length, 2–3 cm wide, and average .5 cm thick. The perforation through the neck is typically .15 cm diameter. All known examples are made of conch/whelk shell.

The earliest terminal date for Pelt Type A is 1710 but this is also the point in time that the SFAP graph shows a drastic reduction in their frequency. The fact that this form is totally absent in many of the sites that end circa 1687 is taken as significant. My assigned production span is 1690–1710. Unprovenienced examples from “Pompey” and “New York” fill out the sample for this form, showing that Pelt Type A distribution is limited to the SMS core area.

Table E.33. Distribution of dated/mappable Pelt Type A pendants

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
Great Gully/Young	Cayuga	Cayuga	1675	1710	1
Wawarsing, NY	Munsee	Munsee/Esopus	—	—	4
Jamesville/Pen	Onondaga	Onondaga	1696	1710	4
Sarf Cache/Parker	Other	Multiple	1740	1765	2
Snyder McClure	Seneca	Seneca	1687	1710	3
Conestoga Town	Susquehannock etc.	Susquehannock & Seneca	1690	1730	2

Turtle (Assigned Production 1690–1710)

Figures/Tables (none)

This form was created at the beginning of the literature survey when examples of what I now call Pelt Type A ornaments were routinely referred to as “turtles.” After these other forms were reassigned only a single anatomically correct turtle from the Snyders McClure site (1687–1710) remained and no more examples were encountered in repository visits. This specimen is well published (Beauchamp 1901:6:103; Beauchamp 1876–1925:7:Fig. 1194; Houghton 1922:Plate XI:b). Lacking its head, it measures 5.2 by 3.8 cm. Thickness is 1.1 cm and the ventral side includes an unmodified interior surface of a large conch shell. The .15 cm diameter hole through the neck verifies the pendant as part of the SMS industry.

Ovoid Barrel Bead (Not Tracked)

Occasional examples of heavy barrel-shaped beads with metal drilled longitudinal holes were encountered during repository visits, but no records were kept of these. Some examples that were incidentally recorded are in Arikara sites, such as Larson in South Dakota, but my impression is that they span much of the period of SMS manufacture.

Funnel Tube Bead (Not Tracked)

Although no effort was made to keep track of a few small tubular beads with a funnel-shaped end, it is known that two of these were found at Bell (Minisink) and one at Dann site.

Triconcave (Assigned Production 1695–1765)

Figures 1.21, F.23, and G.32; Table E.34

Known from 18th century trade documents as “arrowhead” beads (see discussion and citations in the main body of this study), these small triangles with vertical holes began during the late stages of SMS production and became very popular after the end of the SMS industry. As such Triconcave beads in the absence of SMS forms (such as are found in the western Great Lakes) are typical of what I have designated the Albany-Montreal shell ornament trade. Their typical use throughout their tenure is as large matched sets. Finished necklaces of these are known to have been traded to the western Great Lakes. In fact, records from one Montreal merchant during the second quarter of the 18th century alone chronicle the sale of 144 such necklaces (Timothy Kent 2001:881).

Some sets of Triconcave beads are well-made with longer more tube-like necks while others are very expedient and show little finishing. Width (ranging from .7–2.0 cm) typically slightly exceeds height (ranging from about .6 to 1.8 cm). Thickness is relatively uniform (.3–.4 cm) as is bore diameter (.1–.15 cm). All are made of white conch/whelk shell. It should be noted that an identical form in red stone occurs at this same time.

The SFAP graph for Triconcave beads documents their sudden appearance in the 1690s. An outlier in these data is constituted by a single small set of these beads in a private collection from the Indian Castle site. This record almost certainly represents either an intrusive later deposit or an incorrect record, since no other similar beads are seen for another 30 years after this.

The overall distribution of Triconcave beads reflects the participation of the Albany merchants in the western Great Lakes trade starting in the 1710s. Between the documents

and the archaeological information, we can predict that Triconcave beads west of the Great Lakes can be expected anywhere between southern Illinois and the Rainy River territory. The absence of the Triconcave form in the Upper Missouri sites that do have Disk Runties and Pipe Beads creates a fascinating set of chronological conditions for the penetration of the latter items so far west. The connections of the Five Nations to the Mid-Atlantic after 1700 (Aquila 1983:17, 205), and the general southwesterly movements of Iroquoians into western Pennsylvania and Ohio after 1740 (McConnell 1992b) can also be seen. It is the absence of other SMS forms in this greatly expanded post-1700 distribution that provides the most resounding evidence that the SMS industry draws to a close soon after 1710.

Table E.34. Distribution of dated/mappable Triconcave beads

Location	General Affiliation	Ethnic Affiliation	Begin	End	#
West Pittsburg	“Ontario” group–post	Wyandot	1747	1751	7
Rock Island II	18th cent. WGL	Ottawa	1760	1770	14
Fletcher	18th cent. WGL	Ottawa	1745	1765	81
River L’Abbe	18th cent. WGL	Peoria	1735	1752	28
Pattington/Scipioville	Cayuga	Cayuga	1710	1730	2
John Green	N. Car./Virginia	Meherrin, Weyanoke	1700	1720	3
Weston/Bloody Hill	Onondaga	Onondaga	1690	1696	5
Indian Castle	Onondaga	Onondaga	1655	1663	6
Jamesville/Pen	Onondaga	Onondaga	1696	1710	30
Lot 19, Con. 3, London	Other	—	—	—	1
New Ganechstage complex	Seneca	Seneca	1710	1754	1
Geneva	Seneca	Seneca	—	—	1
Snyder McClure	Seneca	Seneca	1687	1710	2
Huntoon	Seneca	Seneca	1710	1745	2
White Springs	Seneca	Seneca	1688	1715	11
West Fall Brook	Seneca	Seneca	1740	1775	20
Townley-Read	Seneca	Seneca	1710	1754	77
Conoy Cemetery	Susquehannock etc.	Mixed groups	1718	1742	16

APPENDIX F

SPAN FACTORED ANNUAL PERCENTAGE GRAPHS FOR LEVEL 2 SMS FORMS

SFAP Methodology

To illustrate my method of generating Span Factored Annual Percentage graphs I present a spread sheet for a hypothetical form (Table F.1). For simplicity, this hypothetical ornament form consists of only ten examples from only six sites with known occupation spans. In reality many more columns and rows are generally represented for most of my forms. Manipulation of the data proceeds in four steps.

Step 1: Partitioning and Span Factoring

The first chore is to “partition the artifact” into a proportionate annual presence for each year. In Excel the if-statement formula in cell B8 would thus read =IF(AND(\$A8>=B\$2,\$A8<B\$3),B\$5,0)/B\$4 which loosely translates as “if the year in A8 falls into the site span above, divide the site span into the artifact count, entering that frequency here.” Filling this formula into the cells for all sites and years populates the spreadsheet. As a check, the columns for each site’s annual values should total the number of artifacts listed for that site.

Step 2: Reassembling the Raw Number of Artifacts/Year

Column H tabulates the partitioned annual contributions from all sites. The resulting number is the artifact/year for the form. As a check, this column total replicates the total number of artifacts in the sample.

Table F.1. Simulated spreadsheet computing span factored annual percentages for an ornament form

	A	B	C	D	E	F	G	H	I
1									
2		Strickler	Ind. Castle	Dann	Marsh	Roch. Jct	Bell		
3	Begin	1645	1655	1655	1655	1670	1670		
4	End	1665	1663	1670	1670	1687	1690		
5	Span	20	8	15	15	17	20		
6	Form "A"	1	2	3	1	1	2	10	
7								#	%
8	1645	0.05000						0.05000	0.00500
9	1646	0.05000						0.05000	0.00500
10	1647	0.05000						0.05000	0.00500
11	1648	0.05000						0.05000	0.00500
12	1649	0.05000						0.05000	0.00500
13	1650	0.05000						0.05000	0.00500
14	1651	0.05000						0.05000	0.00500
15	1652	0.05000						0.05000	0.00500
16	1653	0.05000						0.05000	0.00500
17	1654	0.05000						0.05000	0.00500
18	1655	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
19	1656	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
20	1657	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
21	1658	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
22	1659	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
23	1660	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
24	1661	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
25	1662	0.05000	0.25000	0.20000	0.06667			0.56667	0.05667
26	1663	0.05000		0.20000	0.06667			0.31667	0.03167
27	1664	0.05000		0.20000	0.06667			0.31667	0.03167
28	1665			0.20000	0.06667			0.26667	0.02667
29	1666			0.20000	0.06667			0.26667	0.02667
30	1667			0.20000	0.06667			0.26667	0.02667
31	1668			0.20000	0.06667			0.26667	0.02667
32	1669			0.20000	0.06667			0.26667	0.02667
33	1670					0.05882	0.10000	0.15882	0.01588
34	1671					0.05882	0.10000	0.15882	0.01588
35	1672					0.05882	0.10000	0.15882	0.01588
36	1673					0.05882	0.10000	0.15882	0.01588
37	1674					0.05882	0.10000	0.15882	0.01588
38	1675					0.05882	0.10000	0.15882	0.01588
39	1676					0.05882	0.10000	0.15882	0.01588
40	1677					0.05882	0.10000	0.15882	0.01588
41	1678					0.05882	0.10000	0.15882	0.01588
42	1679					0.05882	0.10000	0.15882	0.01588
43	1680					0.05882	0.10000	0.15882	0.01588
44	1681					0.05882	0.10000	0.15882	0.01588
45	1682					0.05882	0.10000	0.15882	0.01588
46	1683					0.05882	0.10000	0.15882	0.01588
47	1684					0.05882	0.10000	0.15882	0.01588
48	1685					0.05882	0.10000	0.15882	0.01588
49	1686					0.05882	0.10000	0.15882	0.01588
50	1687						0.10000	0.10000	0.01000
51	1688						0.10000	0.10000	0.01000
52	1689						0.10000	0.10000	0.01000
53									
54		1.00000	2.00000	3.00000	1.00000	1.00000	2.00000	10.00000	1.00000

Step 3: Converting the Artifacts/Year to an Annual Frequency

Column I divides the artifact/year values by the total number of artifacts, generating an annual percentage of the total sample for the form for each year. The total of this column is thus one.

Step 4: Graphing Annual Frequencies

The frequency of artifacts per year can easily be expressed as a bar graph. My preference is to set the bars to present with no gaps to emphasize the cumulative nature of the data, but this is purely a matter of choice. The horizontal axis displays the percentage of the total sample size present per year as a decimal. For comparability I set the vertical axis (years) to encompass the entire span of occurrence of all SMS forms (1635–1780) regardless of how few examples inhabit the hinter regions of the graph.

This appendix presents SFAP graphs for the individual forms for which there was sufficient sample size. In the main body of this thesis I have presented such a graph for all SMS ornaments (Figure 8.1) and discussed the limitations and my preferred method for interpreting these graphs, with particular emphasis on understanding their propensity to present a “false lead” in the years just before a form is introduced and the ways in which use-life cycling and curation of artifacts would tend to express themselves.

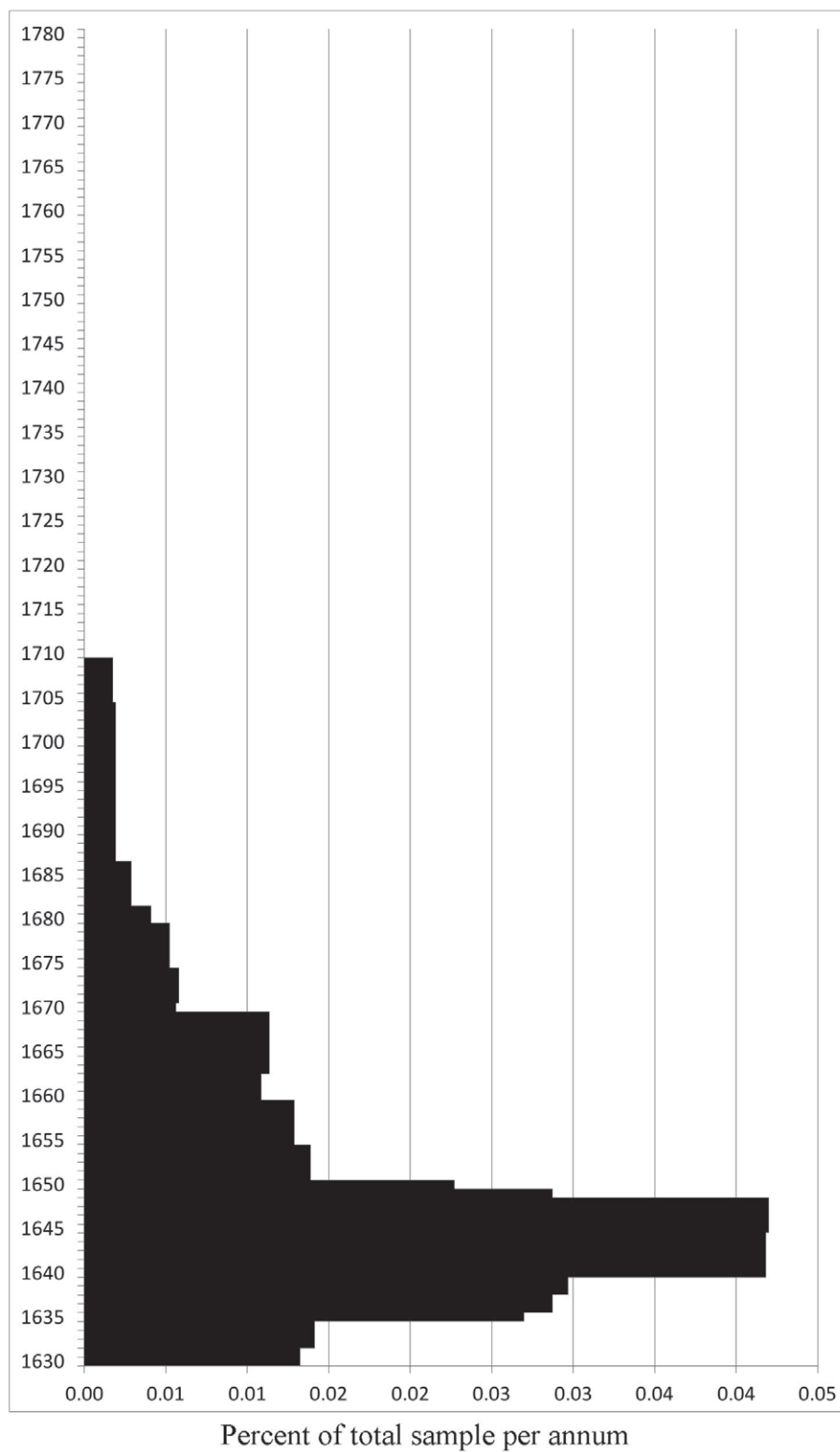


Figure F. 1
SFAP graph of Rectanguloid Runtree form (174 dated examples)

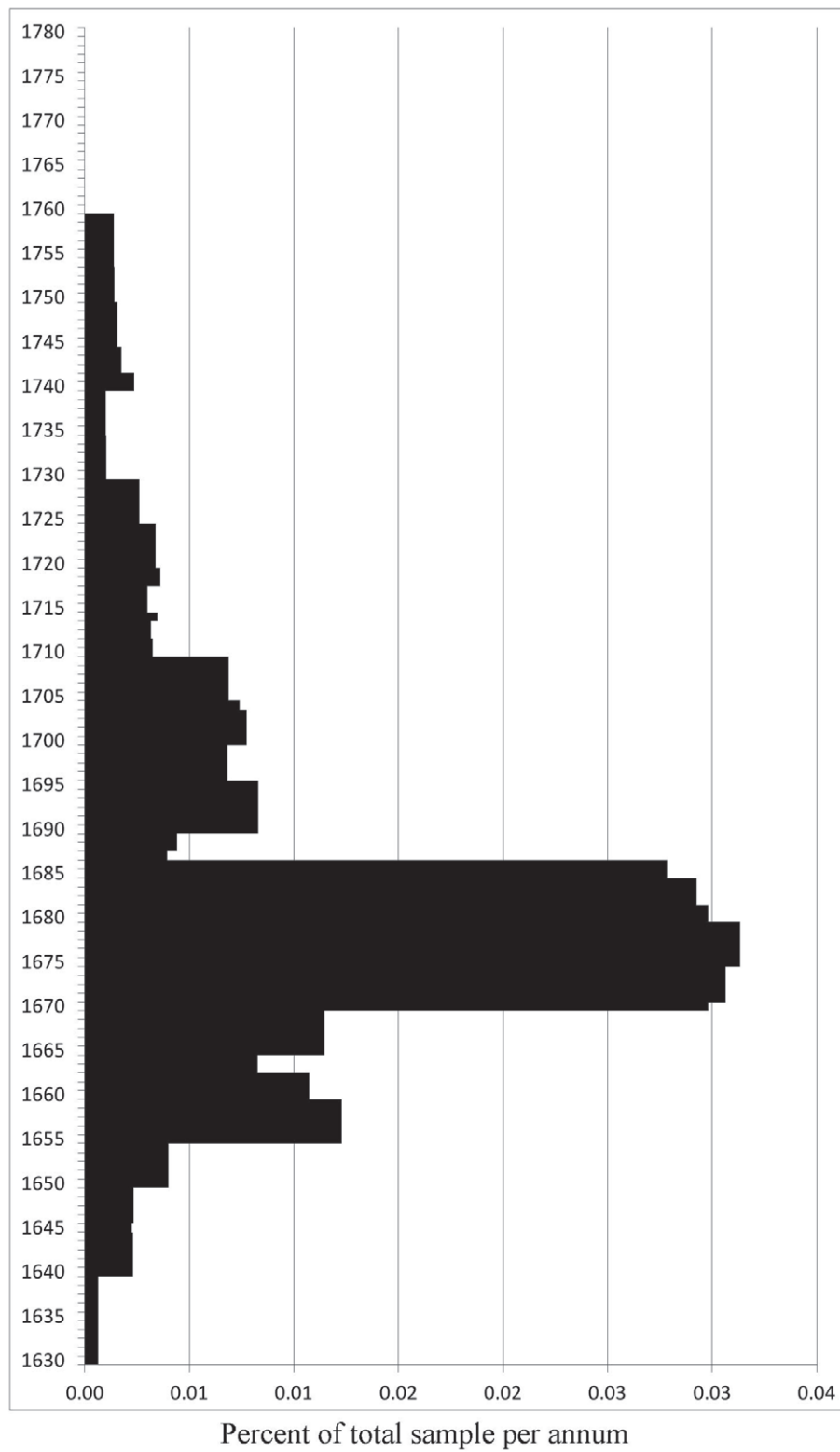


Figure F. 2
SFAP graph of Pipe Bead form (1451 dated examples)

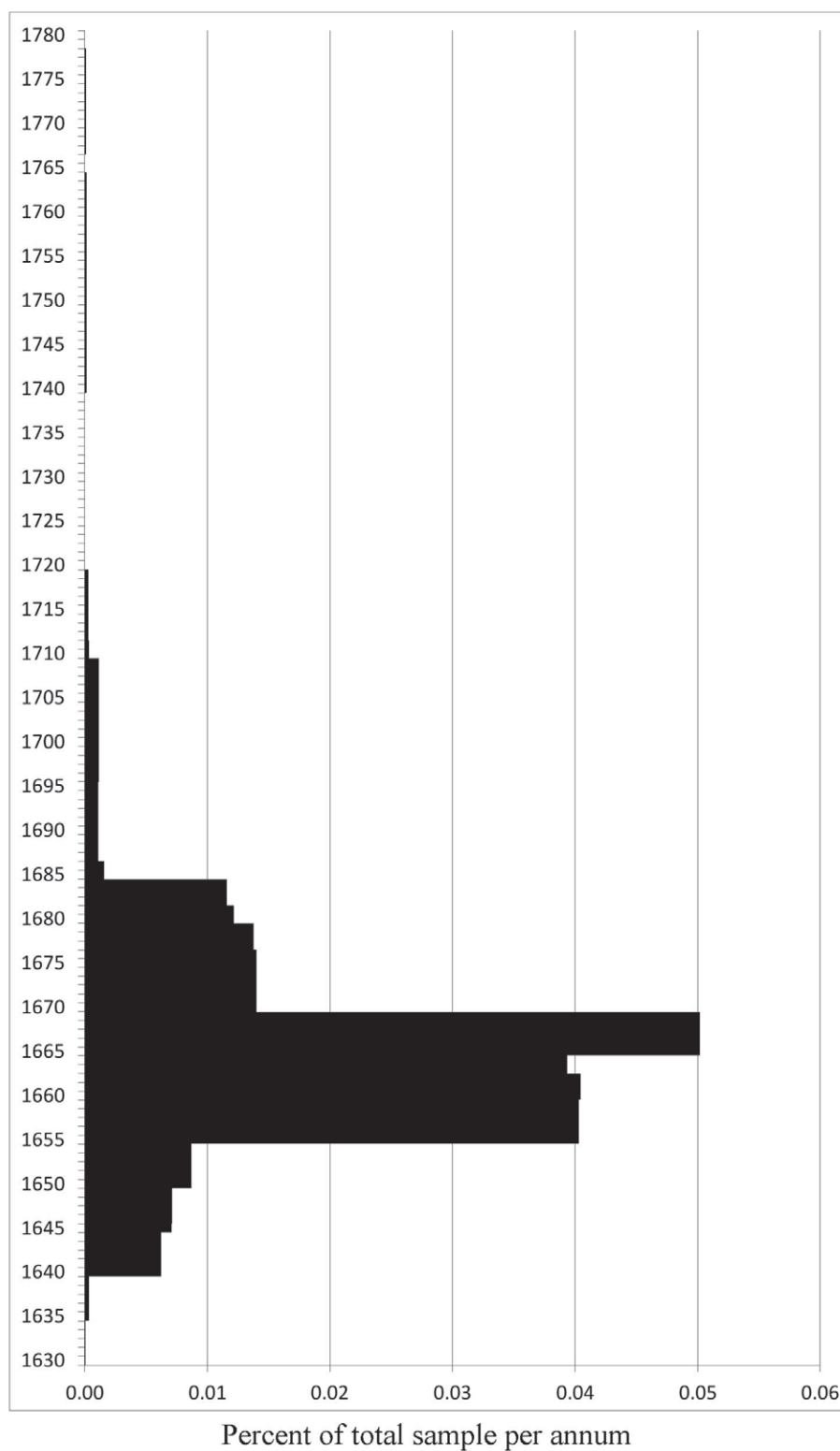


Figure F. 3
SFAP graph of Standard Crescent form (857 dated examples)

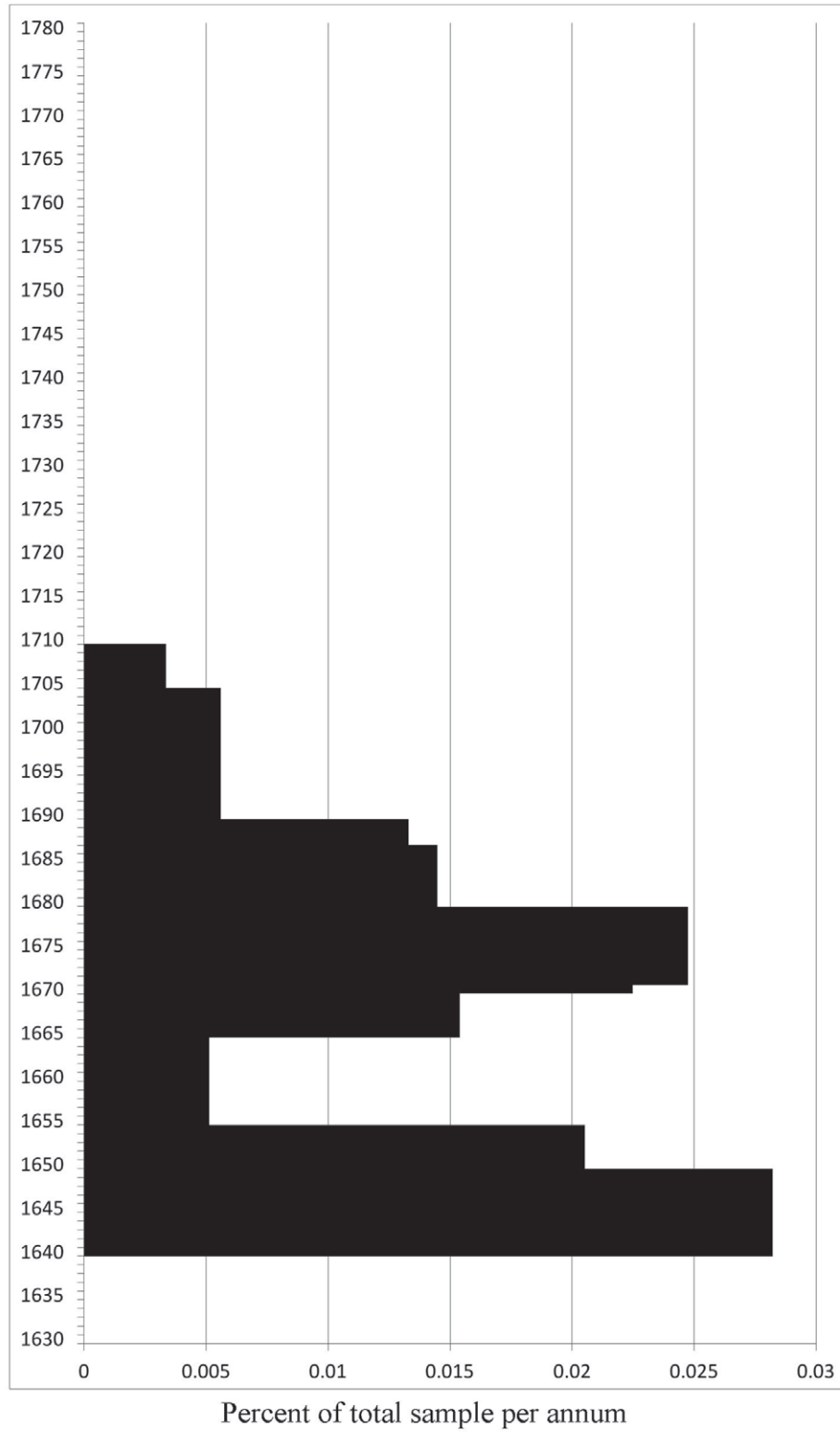


Figure F. 4
SFAP graph of Geometric Unique form (13 dated examples)

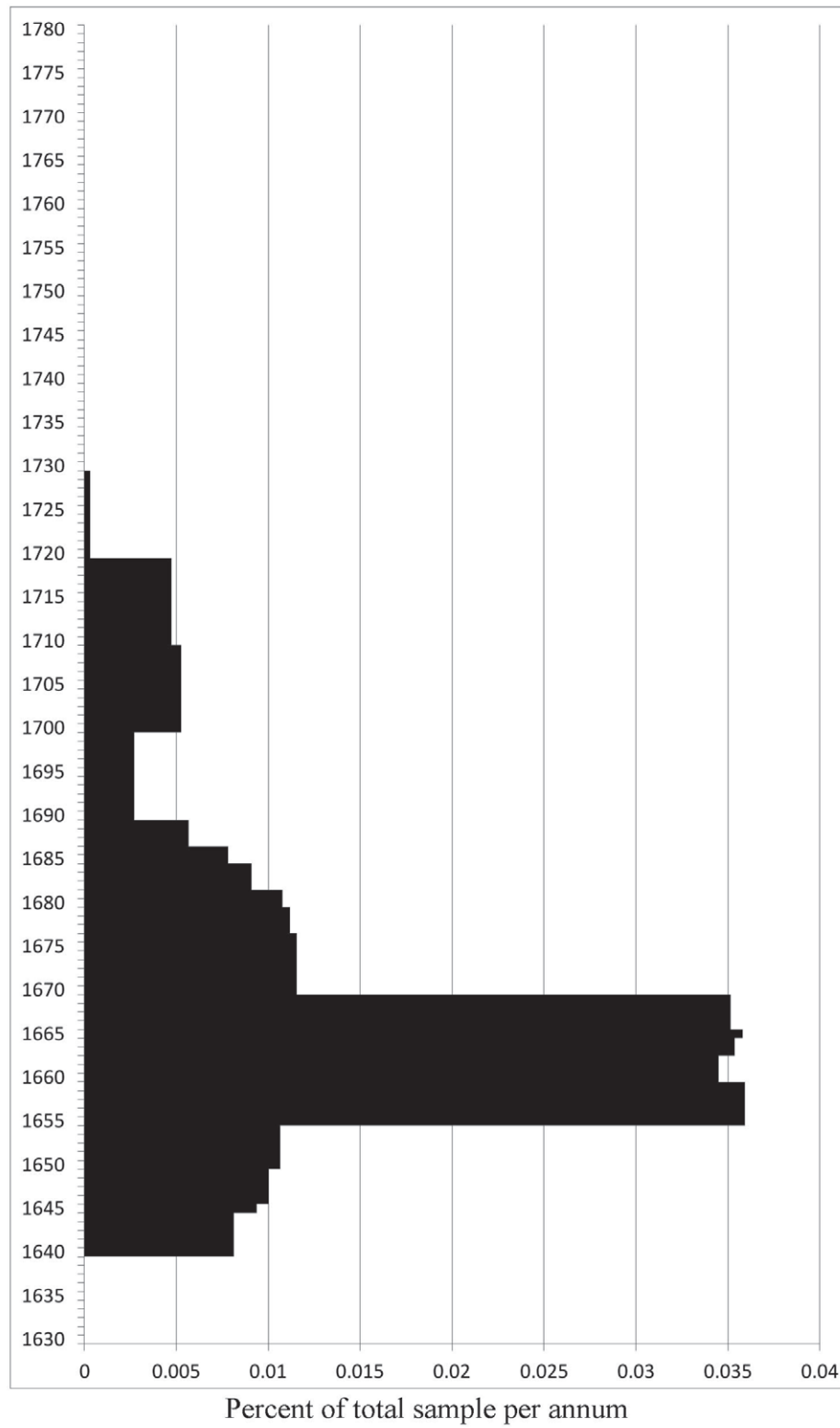


Figure F. 5
SFAP graph of Claw form (158 dated examples)

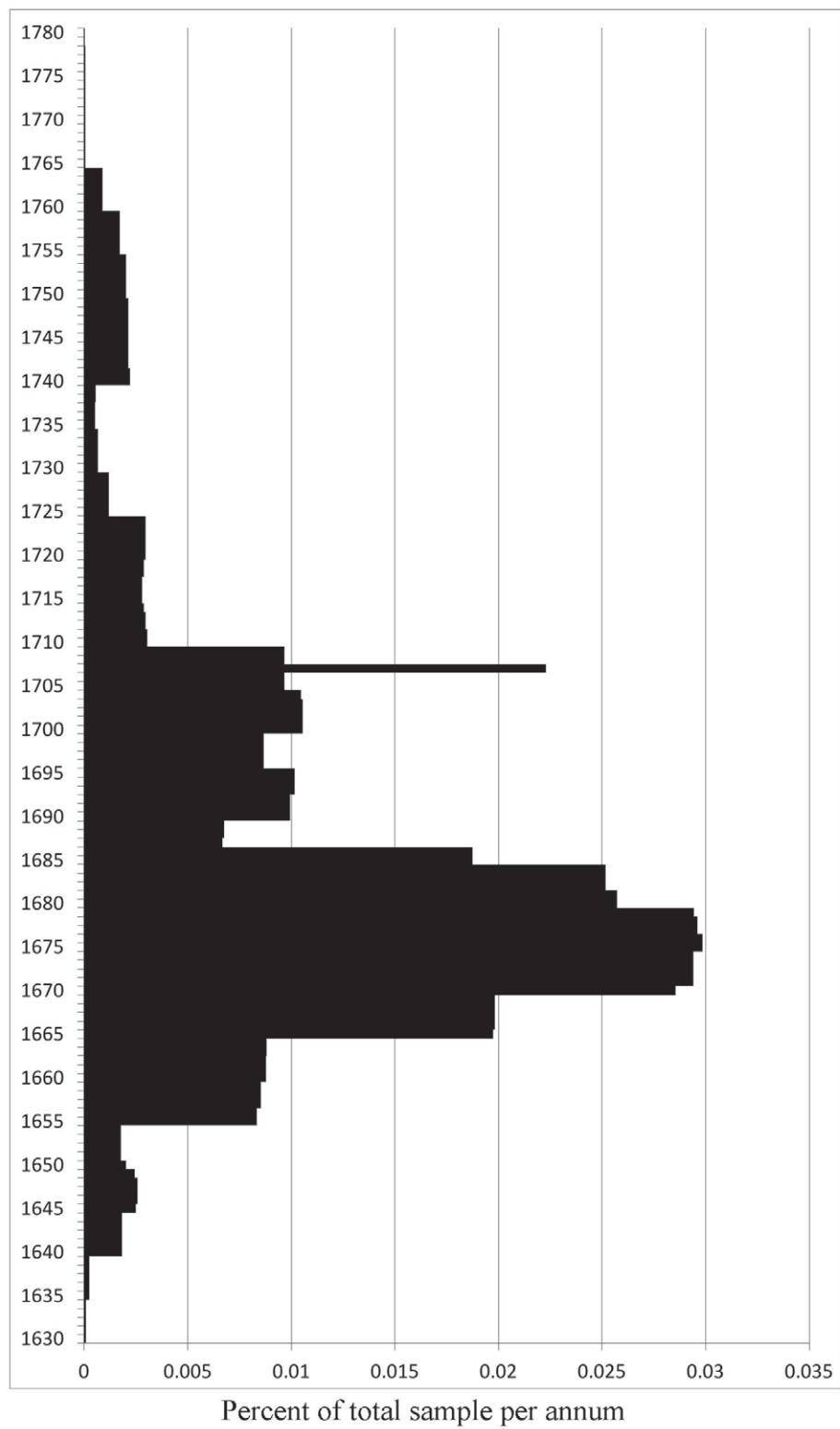


Figure F. 6
SFAP graph of Runtree Disk form (476 dated examples)

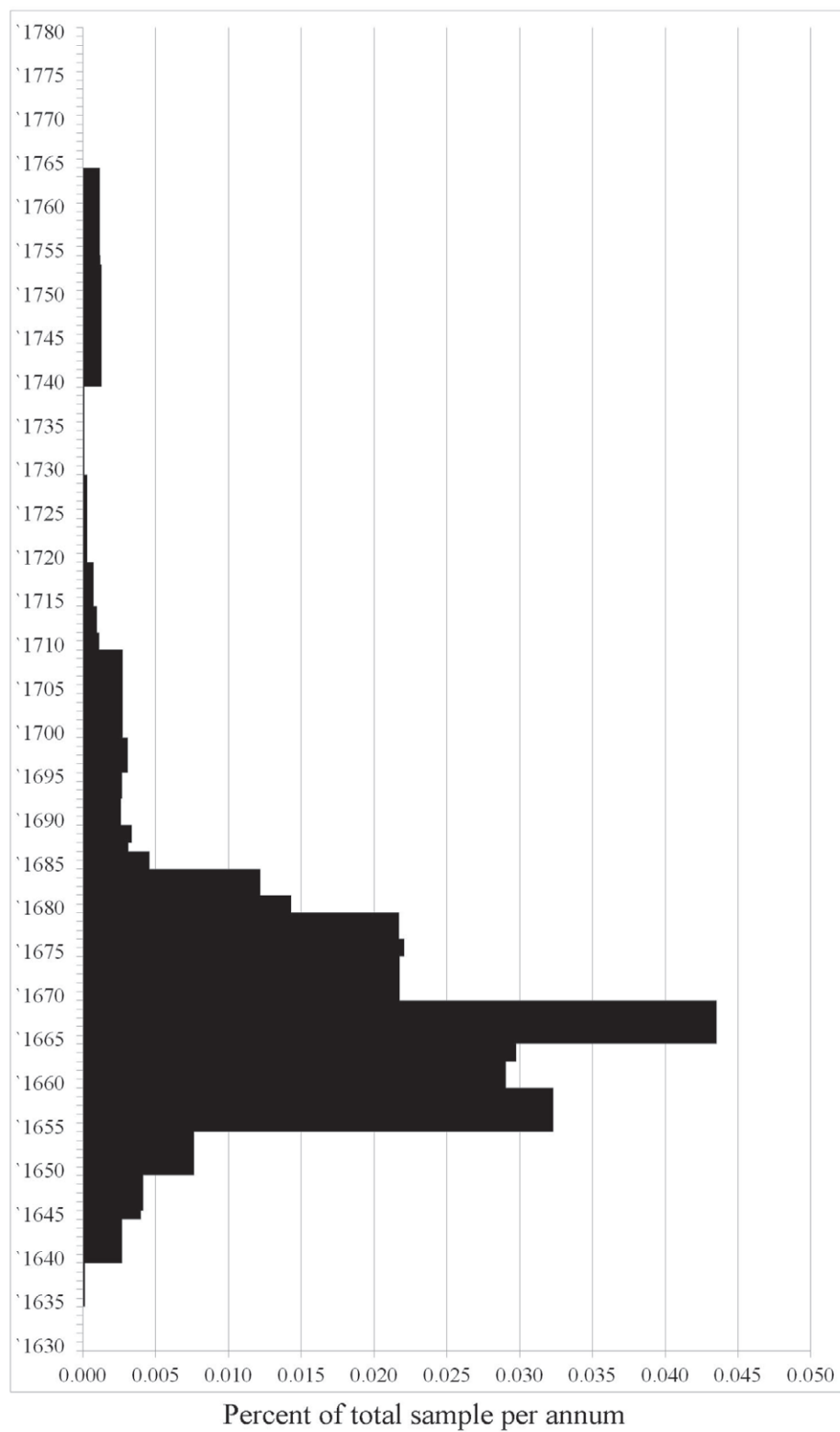


Figure F. 7
SFAP graph of Goose/Loon form (348 dated examples)

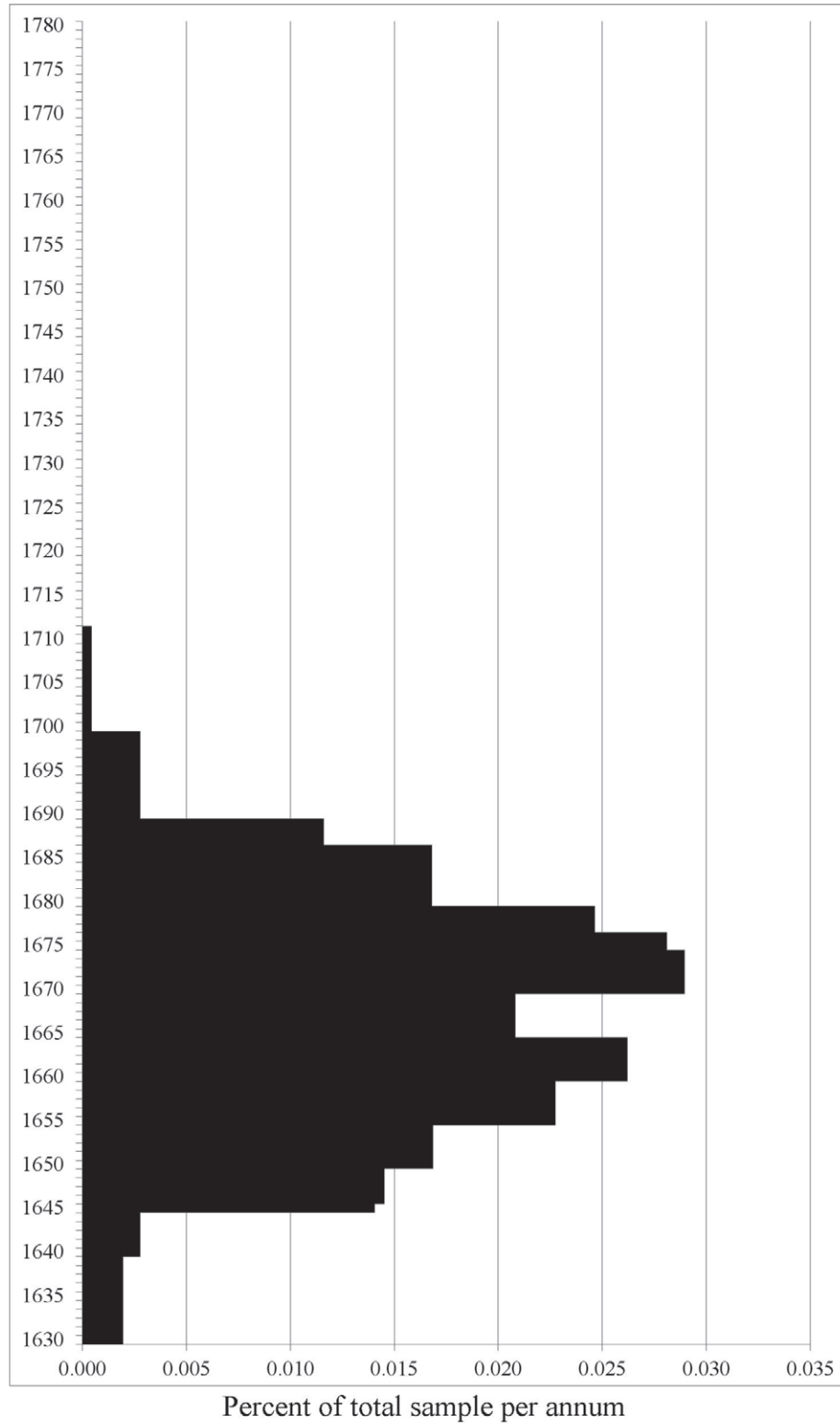


Figure F. 8
SFAP graph of Owl form (34 dated examples)

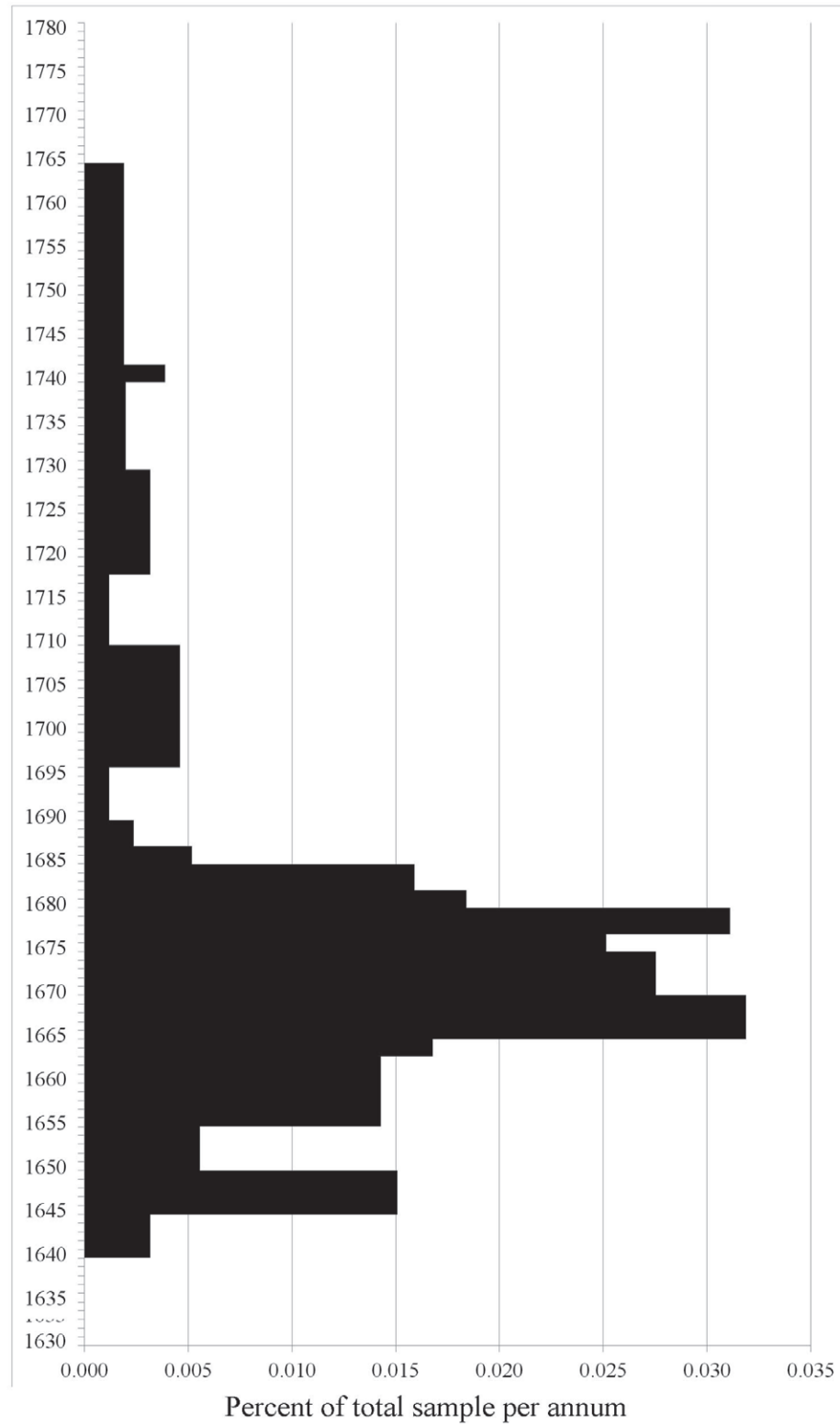


Figure F. 9
SFAP graph of Beaver form (21 dated examples)

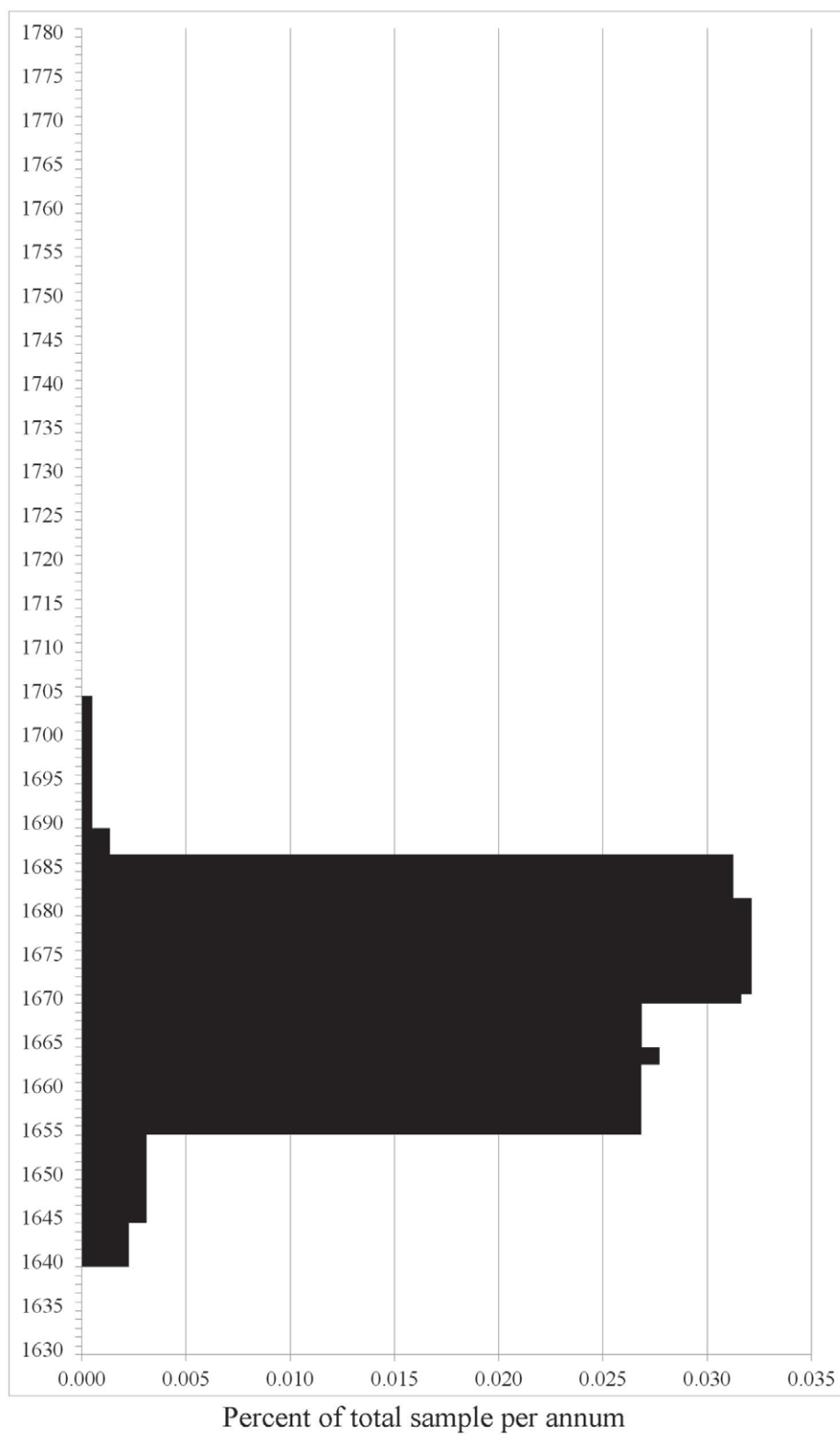


Figure F. 10
SFAP graph of Triangle Apical Drill form (59 dated examples)

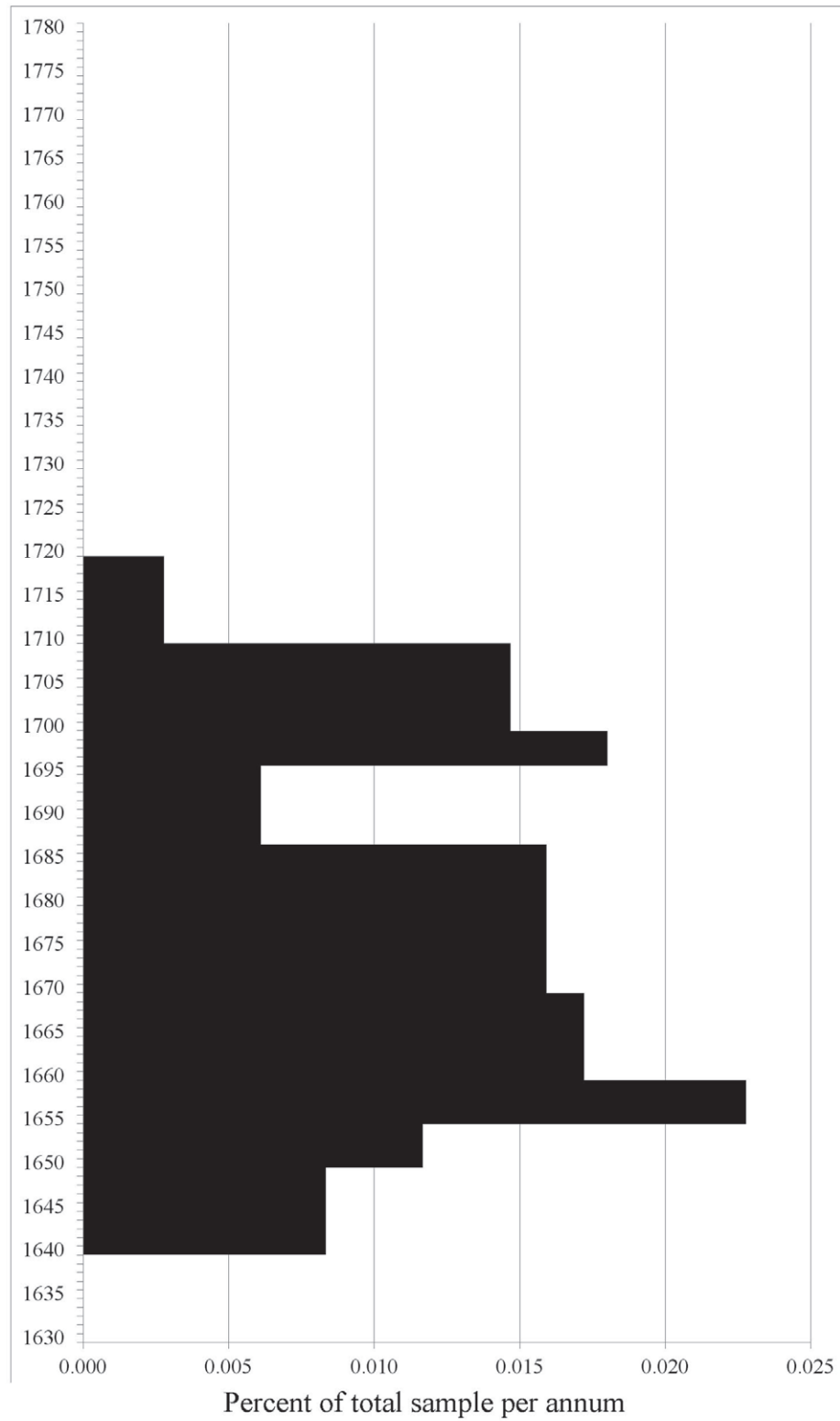


Figure F. 11
SFAP graph of Otter form (6 dated examples)

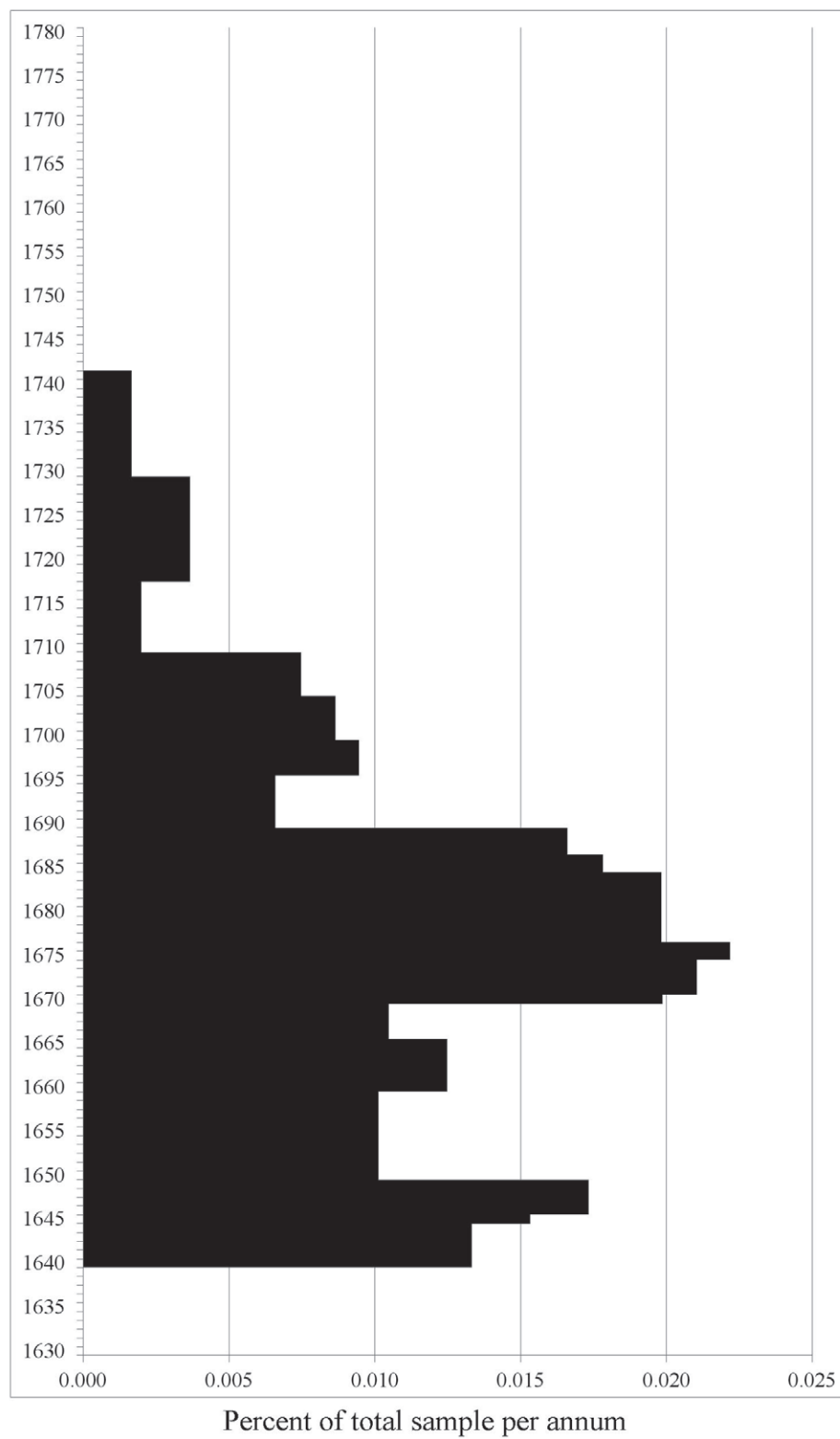


Figure F. 12
SFAP graph of Bird form (25 dated examples)

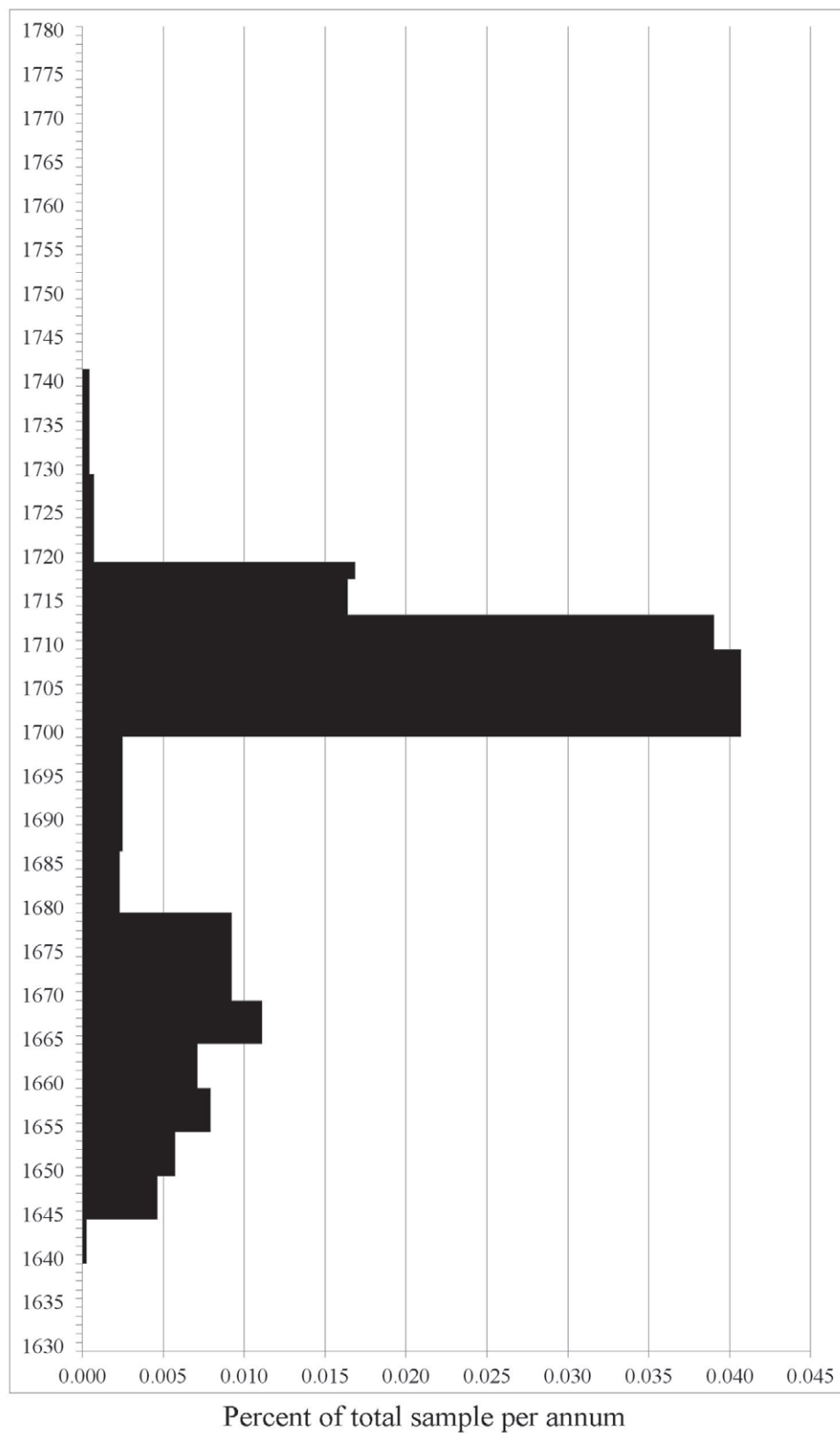


Figure F. 13
SFAP graph of Runtree Circuloid form (184 dated examples)

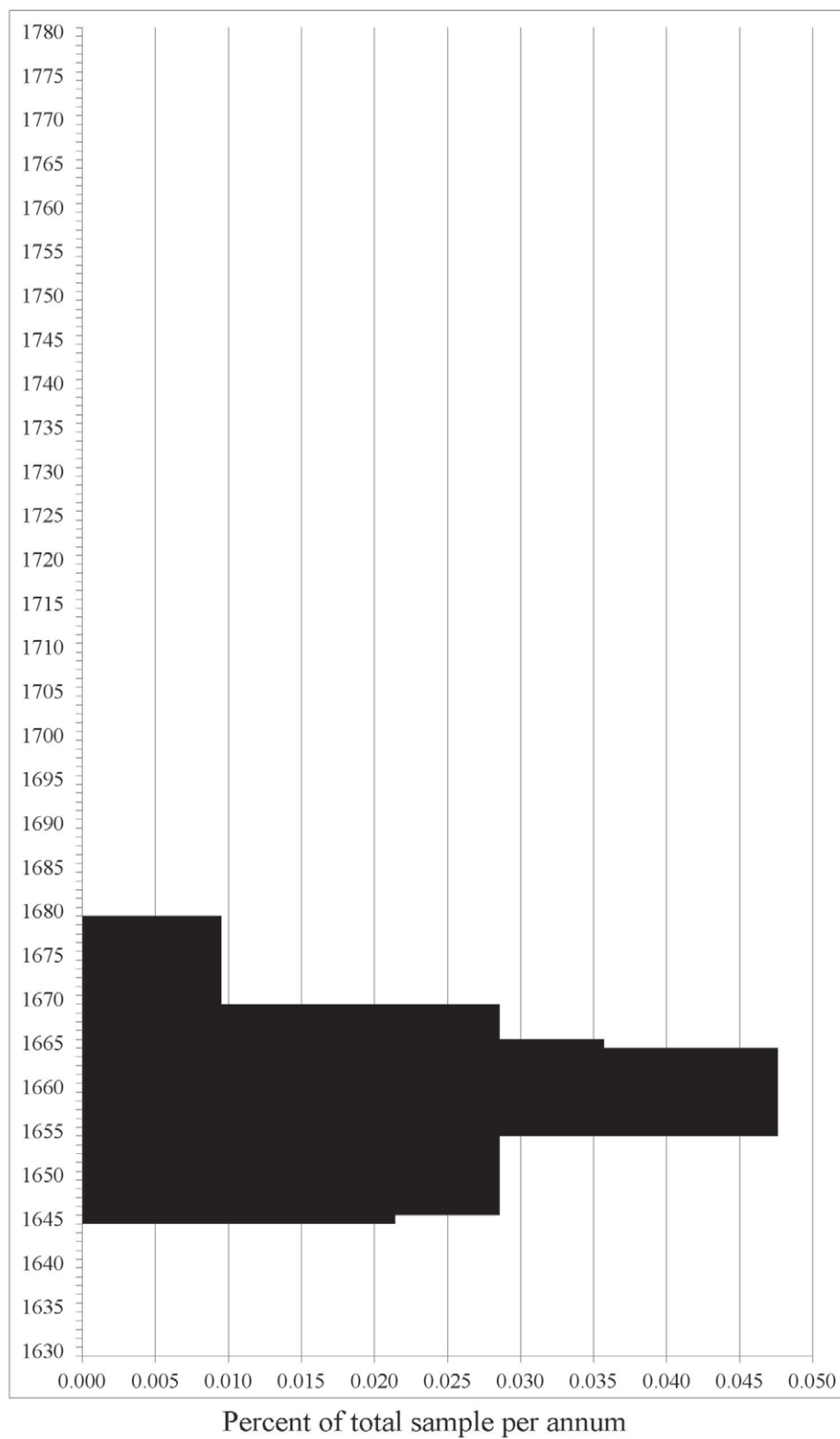


Figure F. 14
SFAP graph of Pelt Type B form (7 dated examples)

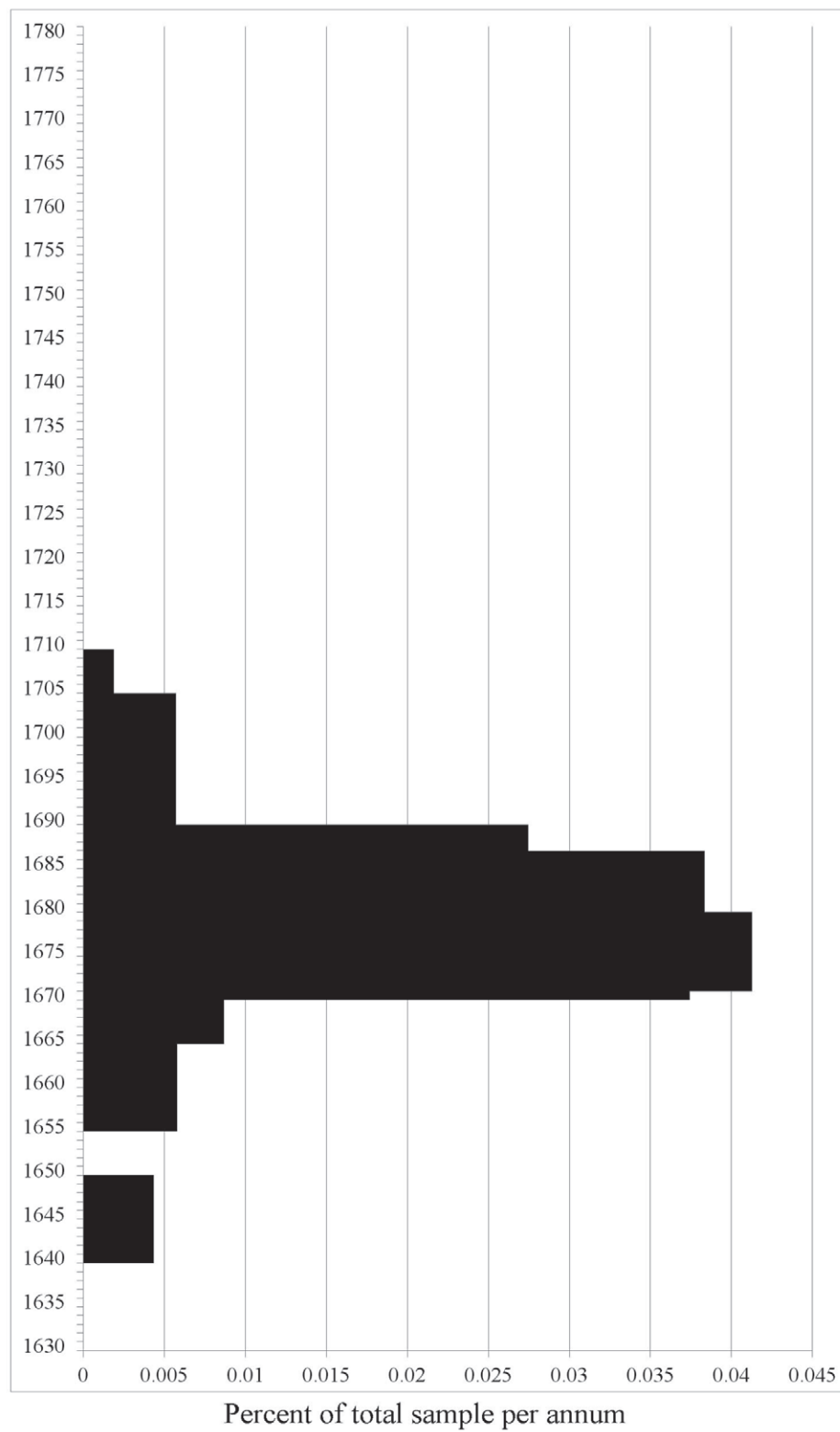


Figure F. 15
SFAP graph of Triangle Vertical Drill form (23 dated examples)

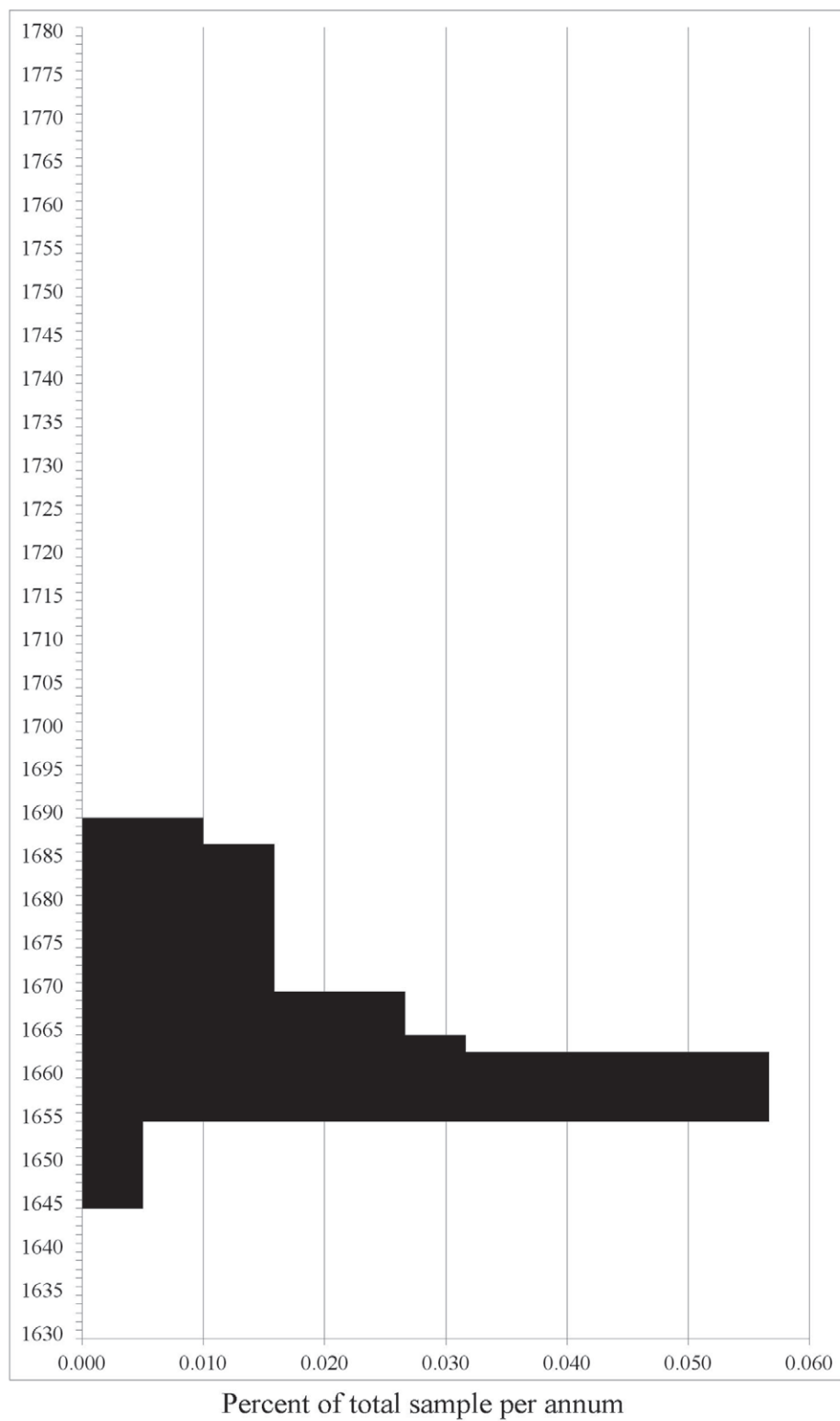


Figure F. 16
SFAP graph of Pelt Type C form (10 dated examples)

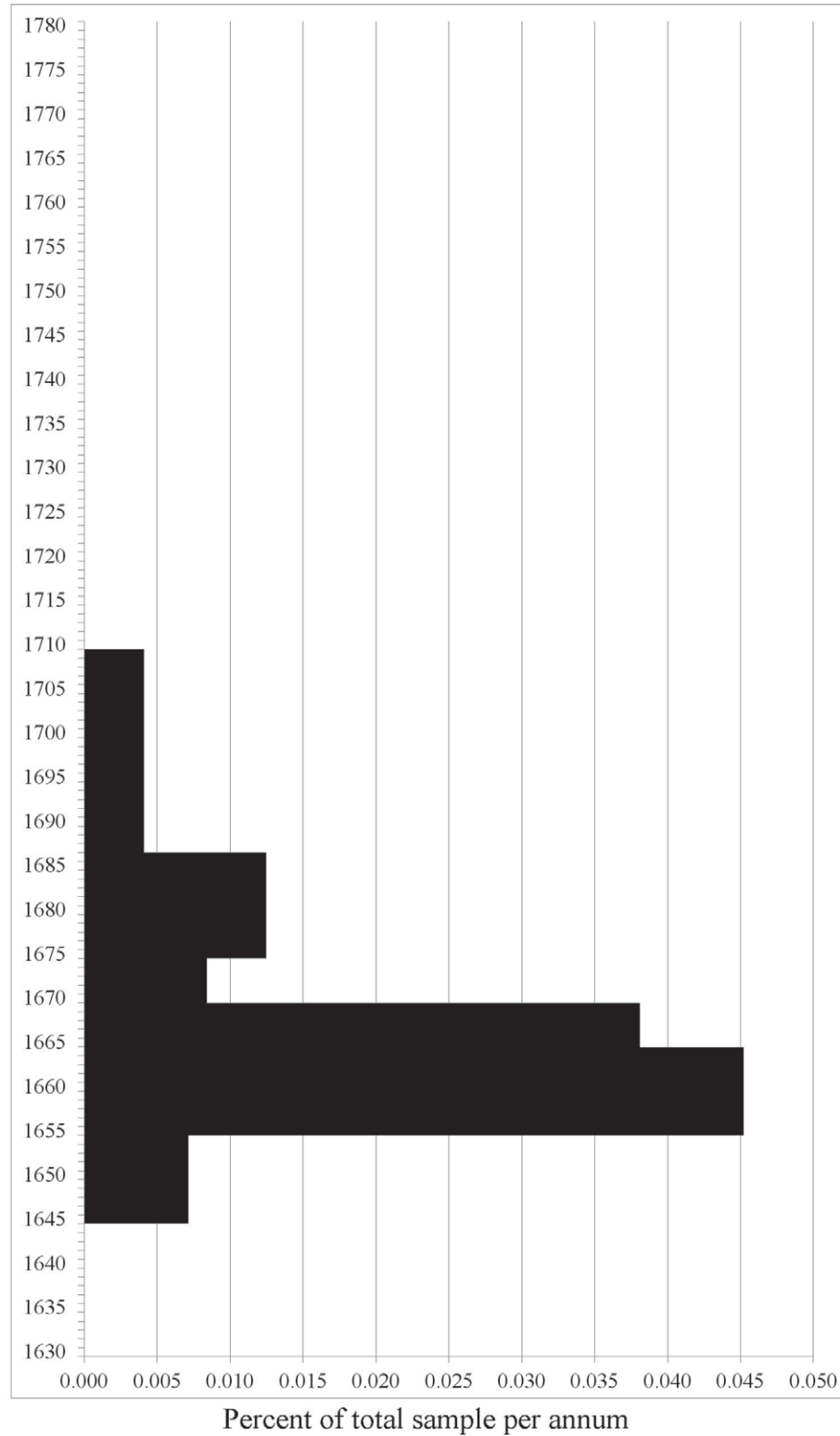


Figure F. 17
SFAP graph of Large Goose form (7 dated examples)

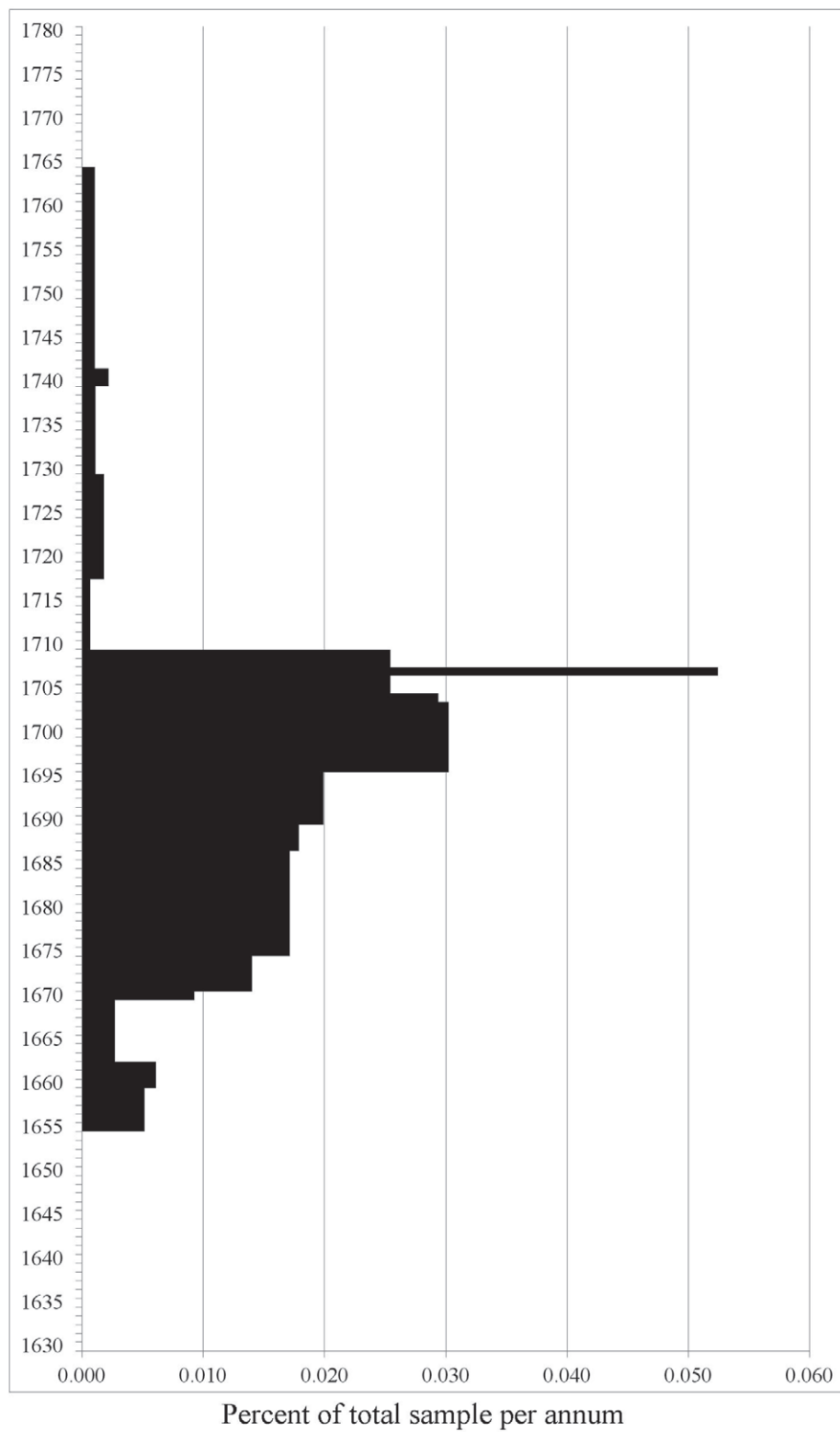


Figure F. 18
SFAP graph of Fish form (37 dated examples)

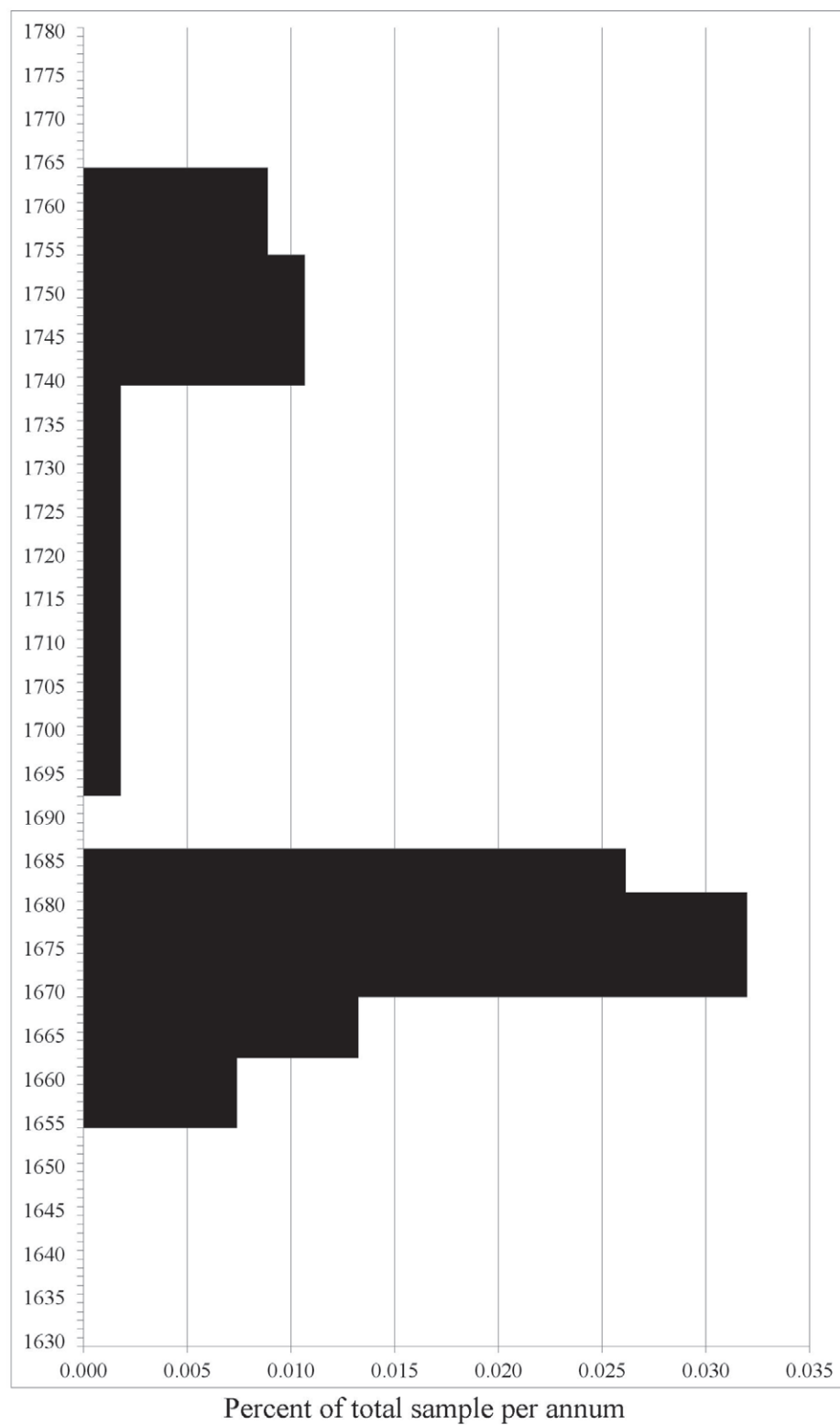


Figure F. 19
SFAP graph of Birdman form (9 dated examples)

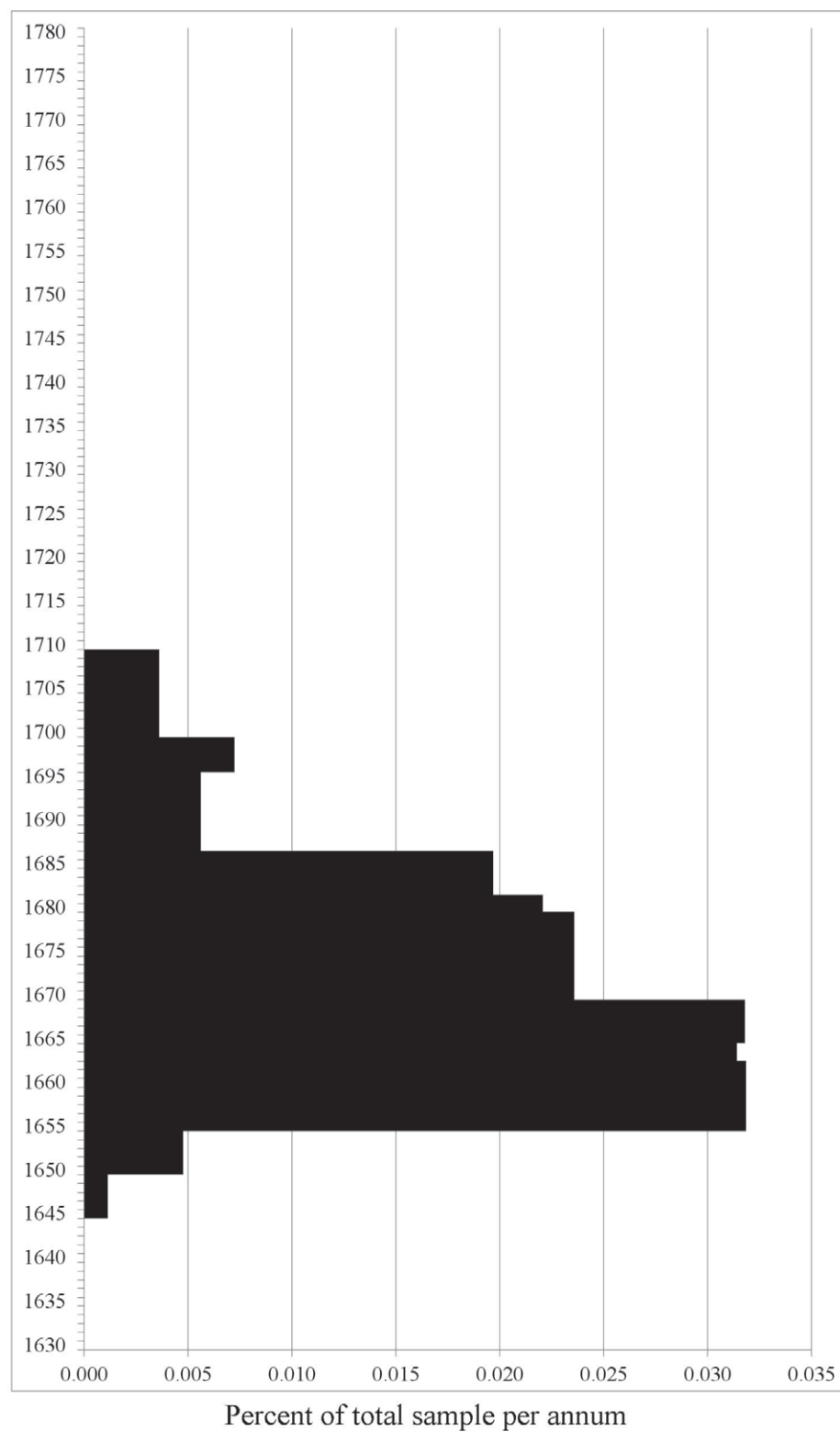


Figure F. 20
SFAP graph of Bird Head bead form (44 dated examples)

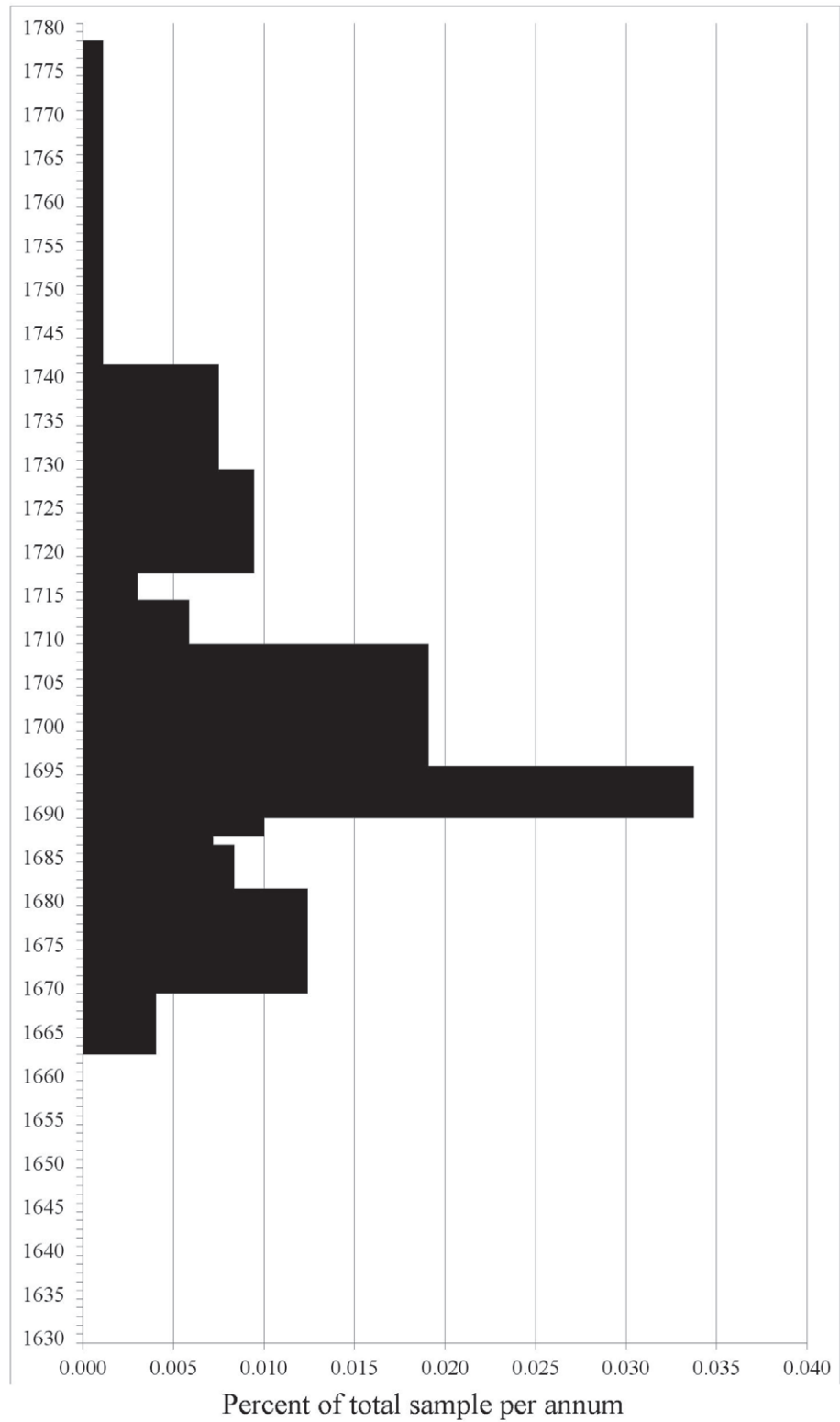


Figure F. 21
SFAP graph of SMS Gorget form (13 dated examples)

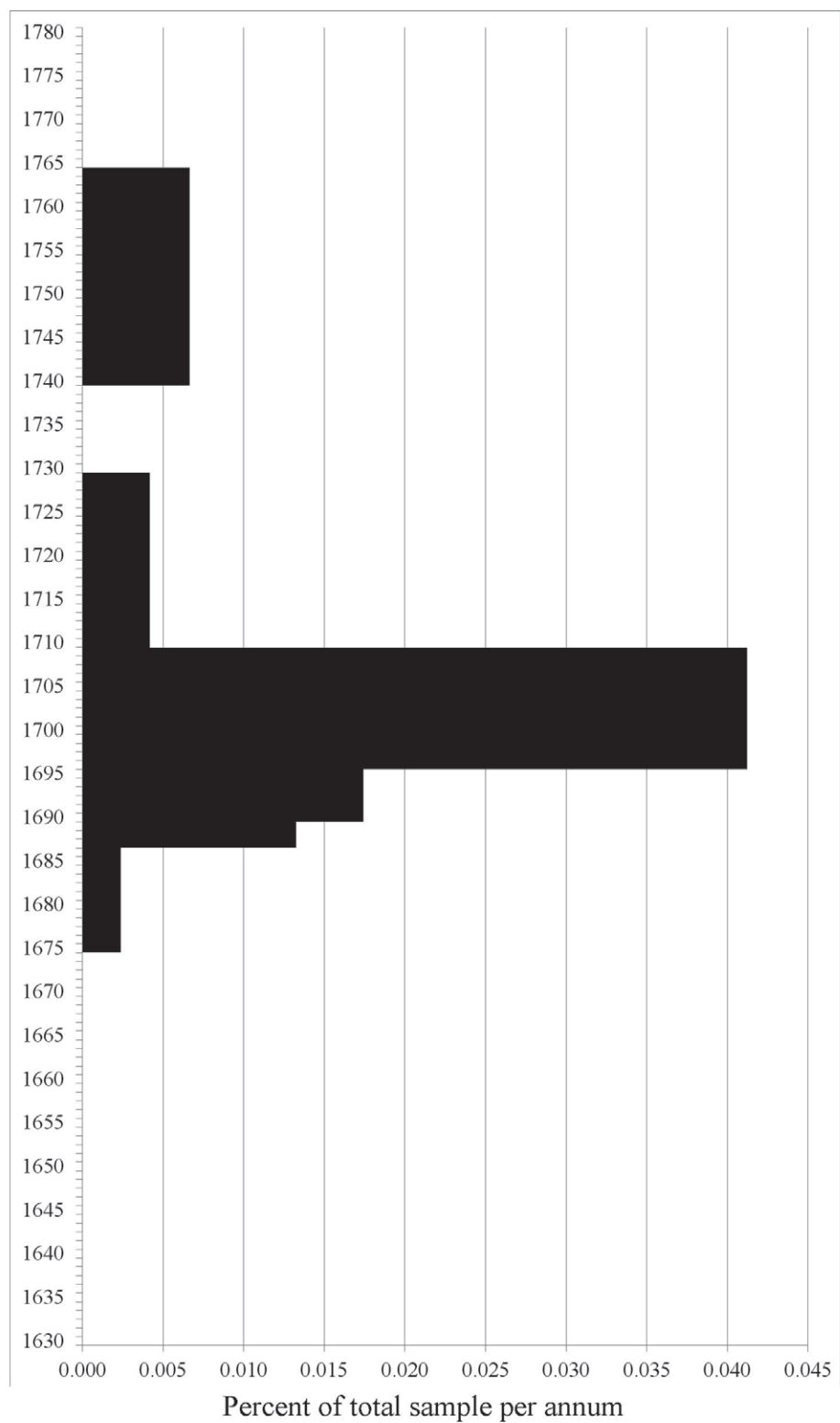


Figure F. 22
SFAP graph of Pelt Type A form (12 dated examples)

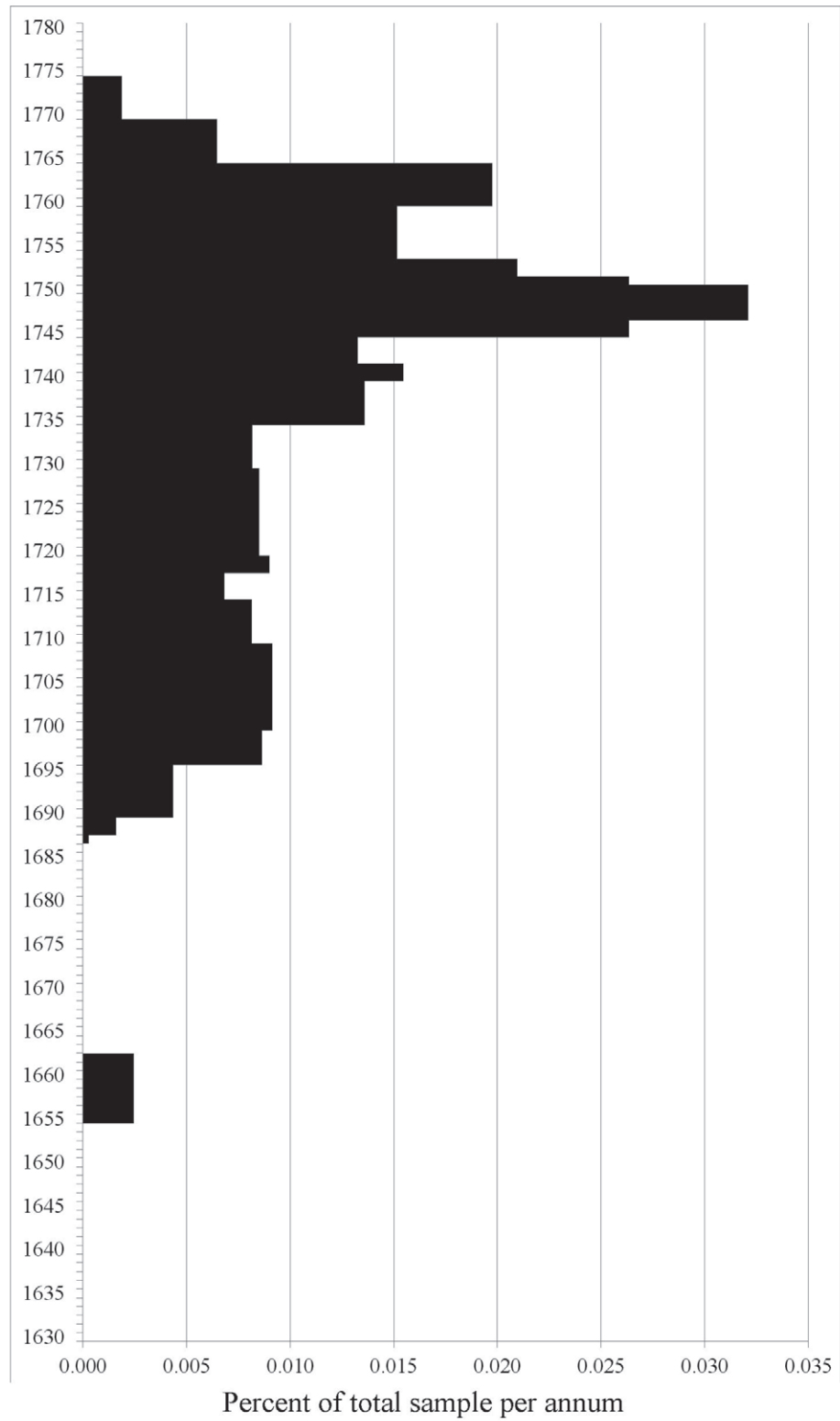


Figure F. 23
SFAP graph of Triconcave form (305 dated examples)

APPENDIX G
LEVEL 2 SMS FORMS:
DISTRIBUTION MAPS

Figure 1.4 in the body of this study provides an overall distribution all ornaments assigned to the SMS industry. The maps in Appendix G provide distribution of mappable SMS ornament locations per form. The number of mappable sites falls between the total number of known SMS “locations” (which includes unprovenienced and poorly provenienced) and the number of SMS specimens from the datable sites that were used to generate the SFAP graphs in Appendix F. See Table E.1 tabulations versus the tabulations of mappable/datable examples for each form in Appendix E.

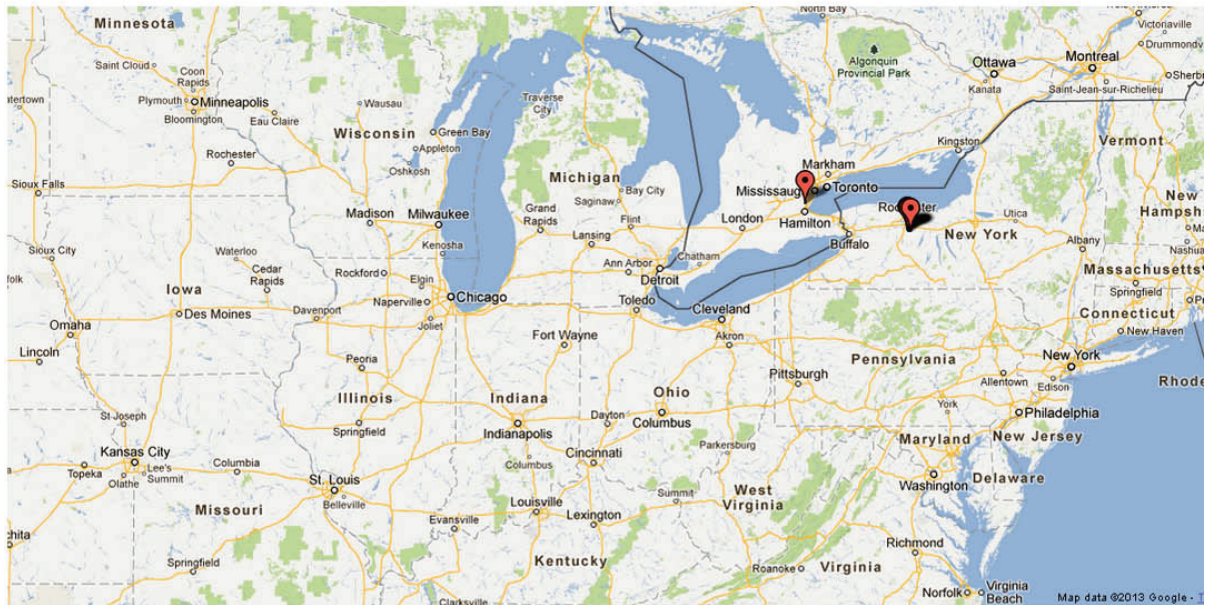


Figure G. 1
Distribution of Large Tube form



Figure G. 2
Distribution of Large Crescent form



Figure G. 3
Distribution of Rectanguloid Runtree form

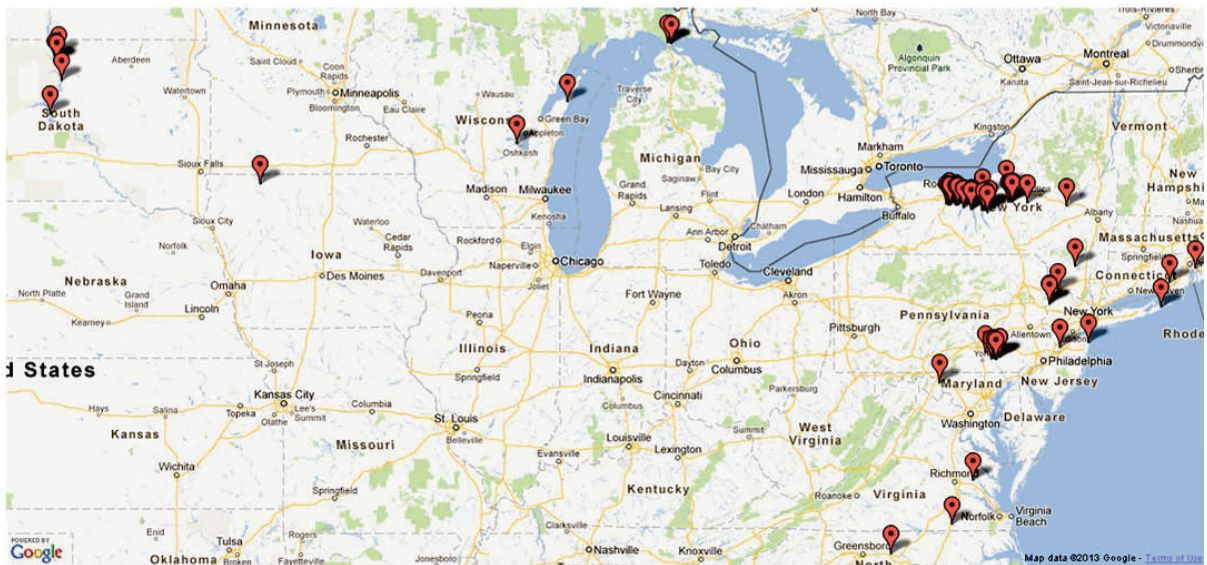


Figure G. 4
Distribution of Pipe Bead form



Figure G. 5
Distribution of Standard Crescents



Figure G. 6
Distribution of Geometric Unique forms



Figure G. 7
Distribution of Claw pendants



Figure G. 8
Distribution of Effigy Unidentified



Figure G. 9
Distribution of Disk Runtees



Figure G. 10
Distribution of Goose/Loon pendants



Figure G. 11
Distribution of Owl pendants



Figure G. 12
Distribution of Beaver pendants



Figure G. 13
Distribution of Triangle Apical Drilled pendants



Figure G. 14
Distribution of Otter pendants



Figure G. 15
Distribution of Bird pendants

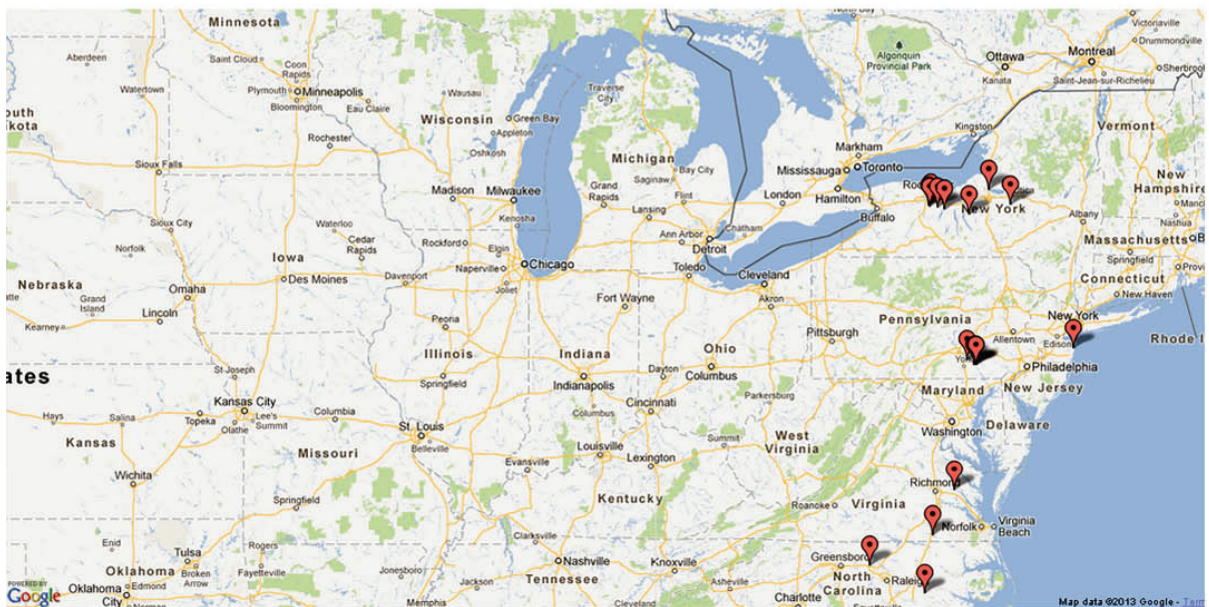


Figure G. 16
Distribution of Runtie Circuloid beads



Figure G. 17
Distribution of Serpent pendants



Figure G. 18
Distribution of Pelt Type B pendants

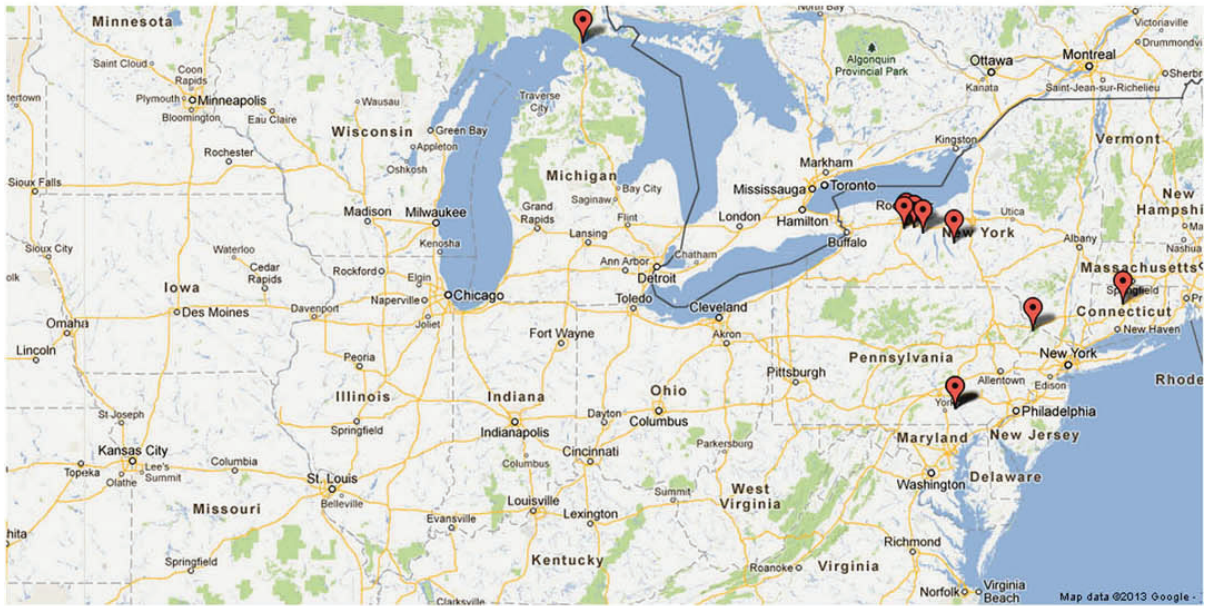


Figure G. 19
Distribution of Triangle Vertical Drilled pendants



Figure G. 20
Distribution of Pelt Type C pendants



Figure G. 21
Distribution of Large Goose pendants

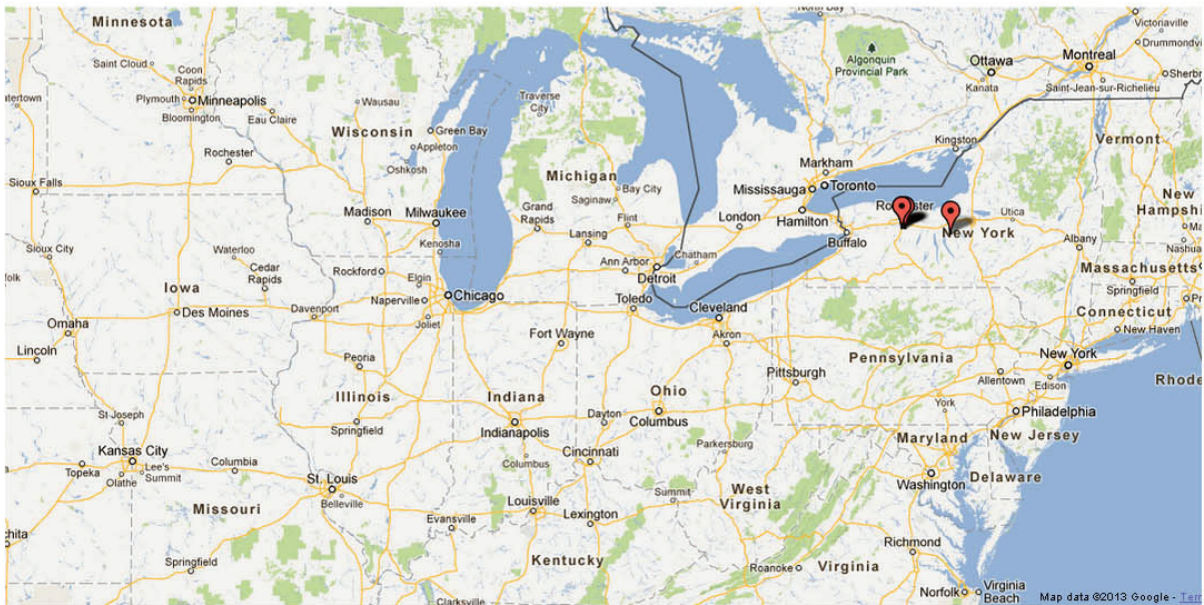


Figure G. 22
Distribution of Quadrupeid pendants



Figure G. 23
Distribution of Fish pendants



Figure G. 24
Distribution of Medallions



Figure G. 25
Distribution of Cone/Pyramids



Figure G. 26
Distribution of Birdman pendants



Figure G. 27
Distribution of Bird Head beads



Figure G. 28
Distribution of SMS gorgets



Figure G. 29
Distribution of Effigy Unique ornaments



Figure G. 30
Distribution of Star/Cross pendants



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