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THE *A SPEO* METHOD OF HEAT ROUNDING DRAWN GLASS BEADS AND ITS ARCHAEOLOGICAL MANIFESTATIONS

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From at least the early 17th century to the latter part of the 18th century, drawn glass beads over about 4 mm in diameter were generally rounded in European glasshouses using a method called a speo *by the Italians who apparently invented it. The little-known process involved mounting a number of tube segments on the tines of a multi-pronged iron implement which was then inserted in a furnace and turned until the tubes were rounded to the desired degree. Beads produced in this manner often exhibit distinctive characteristics and are easily identified in archaeological collections.*

INTRODUCTION

In the manufacture of European hand-drawn beads, a long tube was drawn out from a hollow gather of molten glass by two men. When cool, the tube was cut or, more precisely, chopped into bead lengths. These could be marketed as is as tubular or "bugle" beads, or their forms might be altered by heat rounding.

Starting in 1817, this was accomplished using a technique that was invented by the Italian Luigi Pusinich and perfected in 1864 by Antonio Frigo (Gasparetto 1958:198). In this process, the tube segments were placed in a copper or iron drum with a mixture of lime, powdered charcoal and sand. The drum was then heated and revolved in a furnace until the segments became soft and their ends became rounded. The packing mixture in the drum kept the beads from sticking together and prevented their perforations from collapsing as the glass became viscid. Depending on how hot the fire was and how long the tubes were treated in this manner, they could range from practically unaltered tube segments to almost perfectly globular. Additional details concerning this method may be found in such reliable first-hand accounts as Anonymous (1835), Carroll (1917) and Karklins and Adams (1990).

Prior to 1817, a less efficient method was used to round the tube segments. In this process, the tubes were placed in a large copper pan with a mixture of powdered charcoal or ash and sand. The pan was placed in a *ferraccia* (*ferrazza*) furnace and the contents stirred until the tube segments were sufficiently rounded (Karklins and Adams 1990:72-73; Karklins and Jordan 1990:6). Although this method was used to round large and very large beads as well (Karklins and Adams 1990:73), it was a time-consuming operation as it took a long time for the thick tube segments to soften and become rounded.

Consequently, another process was utilized to round tubes larger than about 4 mm in diameter. Called *a speo*, this method, unlike the ones described above, is not well documented. However, data derived from written accounts, contemporary paintings and archaeological specimens allows us to reconstruct the process and its approximate temporal range. Conversely, a knowledge of the process allows us to identify the beads rounded in this manner.

THE *A SPEO* HEAT-ROUNDING PROCESS

Astone Gasparetto (1958:186) appears to be the first researcher to have described the process: "With the [*a speo* method], pieces of very thick hollow cane were softened, threaded on a sort of spit [*spiedo*], in the fire of a furnace, thus obtaining rather large beads which were the 'paternosters' proper." The spit was made of iron.

In Venice/Murano, the work was performed by the *paternostreri*, a guild distinct from the *margariteri* who made the smaller *marguerites* or seed beads. At

Figure 1. Detail from "The Glass and Coral Factory," by Jacob van Loo (1614-1670), showing three bead-rounding spits in the upper center (courtesy of The Royal Museum of Fine Arts, Copenhagen; Inv. no. Sp. 291).

the beginning of the 17th century, the two guilds, each governed by its own laws since 1604, had 251 members between them. These two guilds replaced the *cristalleri*, the original guild of beadmakers, which continued for a while, though in name only. Each *paternostri* master was restricted to a single furnace with only one opening, but could employ up to 14 workers. To become a master, a member of the *paternostreri* had to pass several tests. In 1613, a new test was added to several established in 1581: "The *speo* masters must produce two spits, one of round paternosters, the other of olive-shaped examples" (Gasparetto 1958:186).

While the technique was probably developed in Venice/Murano, it spread to other bead-producing centers as part of the technology brought there by expatriate Venetians. Thus, we find examples of the spits depicted in a painting of the interior of a 17th-century glass bead factory,[1] apparently in Amsterdam (Pl. IIB). Executed by Jacob van Loo (1614-1670), a portrait and genre painter influenced by Rembrandt and Van der Helst (Oosthoeks Encyclopedie 1968:396), the painting shows three bead spits leaning against a box behind a lad who is chopping canes into bead lengths (Fig. 1). The implements are about a meter long and the handle appears to be composed of two stout iron wires probably wired or welded together. Protruding from the upper end of the handle are six prongs about 20-25 cm in length. The tines, which are roughly parallel to one another and appear to angle in at their bases, seem to be arranged in a circular configuration, rather than in a single plane like a fork. The painting depicts the spits in each stage of the production process: one is devoid of beads, one is arrayed with tube segments ready for rounding, and the third spit holds finished barrel-shaped beads. Each of the tines holds three beads which are about 2.0 cm in diameter revealing that only about 18 beads of this size could be manipulated at one time.

The detail of the painting is such that it may be accepted as an accurate representation of the spits, though it is likely that they varied somewhat through time and from factory to factory. The detail even allows us to determine the Kidd variety of the beads being produced: IIa1, opaque brick red, and IVb35-36 which have a translucent dark navy blue exterior with 8-12 white stripes, an opaque white middle layer, and a translucent dark navy blue core (Kidd and Kidd 1970:70, 80). These varieties, in the sizes shown, are attributable to the late 16th and 17th centuries (Kent 1983; Rumrill 1991; Wray 1983). The striped beads are definitely known to have been made by the Dutch (Karklins 1974:77).

The detail of the clothing of those depicted in the painting also allows us to say something of the date and location of the factory:

> Regarding the costume in the painting, it is virtually impossible to identify it, except to say that it probably comes from the north of Europe. Strangely enough, it is easier at this period to distinguish nationality in the upper classes of society than in the lower, due to the paucity of visual material in the latter case.
>
> The most fashionable man in the painting is seated on the far left; the length of his hair, the collar, the slash in the doublet sleeve and the square-toed ?boots indicate a date of the early 1640s. The others are twenty or more years behind in their dress with no pretensions to fashion; the large shoulder wings and baggy breeches were fashionable in the early 1620s, so that there is a considerable time lag here. This is probably to be expected in terms of their class in society, but it is interesting to note that the master glassworker on the right (if that is who he is) is wearing uncompromising working clothing even down to the short jacket which was widely worn by sailors and artisans in the Netherlands in the first half of the 17th century. His clothing in fact seems to be either Dutch or Flemish; if he is Venetian, he may very well have adopted the clothing of the country in which he is working (Aileen Ribeiro 1983: pers. comm.).

However, based on the stylistic influence from the Le Nain brothers which is apparent in the painting, Eduard Plietzsch (1960:77, 104) believes that the painting was produced in Paris after van Loo departed from Amsterdam. In any event, the evidence suggests that the painting portrays an Amsterdam bead factory of the 1640s, quite likely part of the grand glass-works established on the Keizersgracht canal by Claes Rochusz Jacquet in 1621 (Baart 1988:69). The

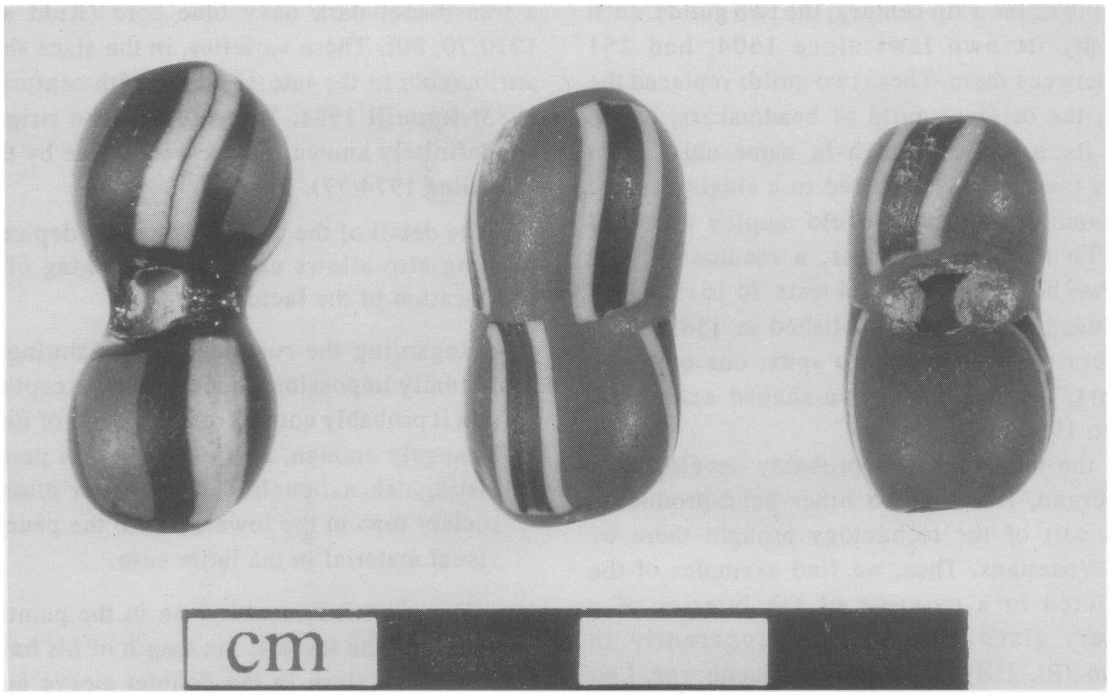

Figure 2. Several examples of two beads fused end to end, partly (left and right) and completely (center). Specimens are from the Factory Hollow site (1615-1625), New York; Rochester Museum and Science Center (photo by Brian D. Fox).

presence of a very large chevron bead on a thick iron wire in the bead manufacturing wasters at site Kg10 (ca. 1601-1610; Jan Baart 1988:70) in Amsterdam confirms that the a *speo* process was in use there during the very early 17th century.

Once the tube segments were pushed onto the tines, it is likely that the spit was inserted into a furnace through a glory hole and slowly rotated to keep the beads from sagging or melting off the spit. The implement was doubtless inclined upward so that the beads would not slip off the tines. When the beads were sufficiently rounded, the spit was removed from the glory hole and probably continued to be rotated until the beads hardened. Based on the van Loo painting, the spits were then simply leaned against convenient objects until the beads were cool enough to remove from the tines.

THE CHARACTERISTICS OF BEADS ROUNDED *A SPEO*

If the rounding procedure was carried out perfectly, the beads bore no evidence of the process. However, things did not always go the way they should (e.g., beads slipped down the tines or the glass was still viscid when the spit stopped being rotated) and many beads exhibit characteristics that identify the error:

1. Two or, occasionally, three beads fused partly or completely at the ends with the perforations perfectly aligned. In some cases, a bead simply slipped down a tine and fused to the one below it. This is clearly what happened to the specimens illustrated in Fig. 2 (these should not to be confused with beads of *wound* manufacture which also appear in this configuration). However, more often than not, two beads apparently touched but one subsequently pulled away from the other as the spit was manipulated (or, perhaps, they were pushed apart by the worker on periodic inspections), leaving the beads connected by a slight "bridge" (Fig. 3). The fact that a number of such manufacturing errors have been found at various 17th- and 18th-century Indian sites across the eastern United States reveals that they were acceptable to both European entrepreneurs, as well as the Native Peoples they encountered.
2. A distinct broken projection or conchoidal scar, sometimes quite large, on one or (infrequently)

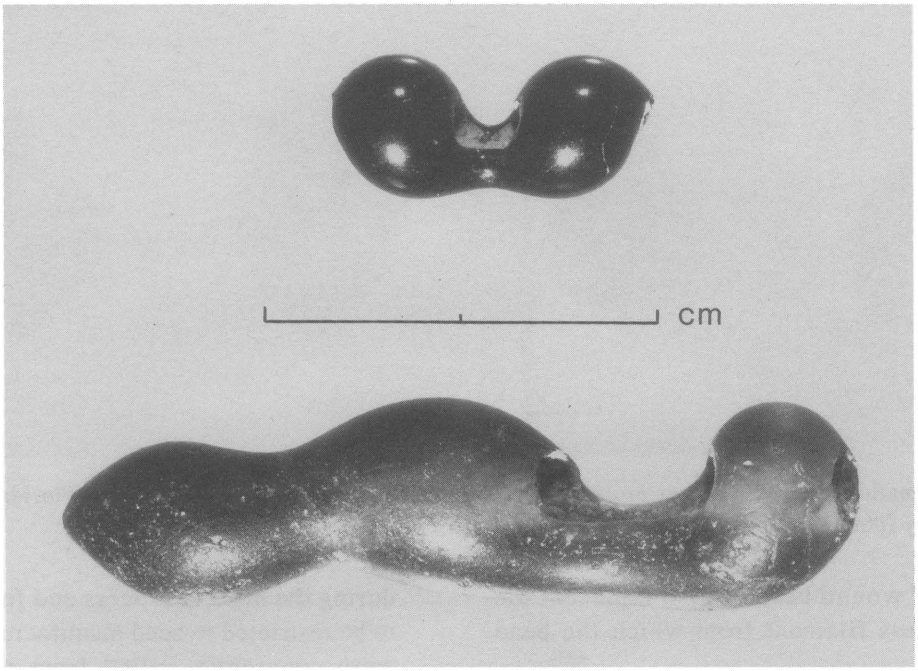

Figure 3. Two to three *a speo* beads partially fused at the ends from factory wasters at site Kg10 (1601-1610) in Amsterdam, the Netherlands. It is interesting to note that the left-hand bead of the lower specimen differs in color from its two neighbors (photo by Rock Chan).

both ends of a bead (Figs. 4-5). This marks the spot where two or three beads had partly fused but could be broken apart, either by the manufacturer or the purchaser. Beads exhibiting these projections are quite common and found on many Indian sites in eastern North America. The projections are not to be confused with those occasionally encountered

Figure 4. Very large beads exhibiting blunt broken projections and conchoidal scars on their ends. From the Dutch Hollow (1612-1623) and Power House (1645-1655) sites, New York; Rochester Museum and Science Center (photo by Brian D. Fox).

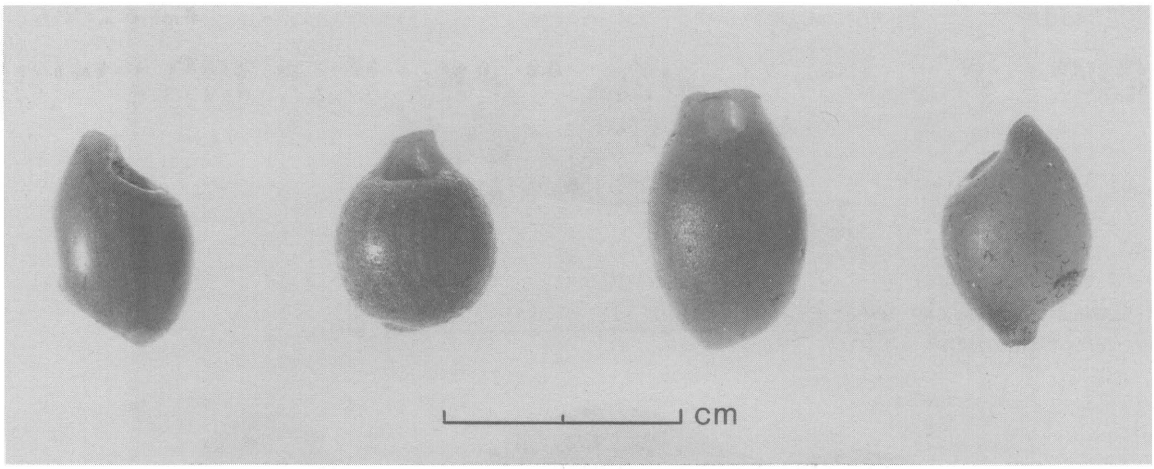

Figure 5. Smaller beads with broken projections on one or both (right) ends. Philip Mound, Florida; probably 17th century (photo by Rock Chan).

on the ends of wound beads which represent the end of the glass filament from which the bead was formed.

3. Two beads fused side by side with the perforations parallel to each other (Fig. 6,a,e,g). In this case, two beads on adjacent tines touched during the heating process and fused. These seem to be restricted to bead manufacturing wasters and were apparently culled from production runs. Occasionally, the beads could be snapped apart, leaving a slightly raised, circular scar on the side (Fig. 7).

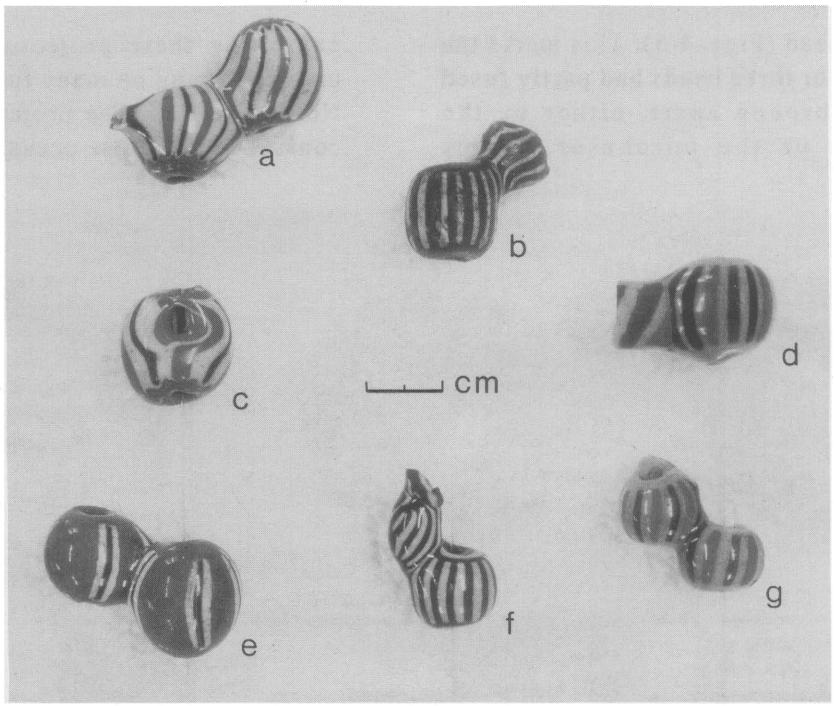

Figure 6. *A speo* beads from 17th-century factory wasters at the Boeren-Wetering site in Amsterdam, the Netherlands: a, e, g, beads fused side to side with parallel perforations; b, d, f, distorted beads fused to intact ones; c, bead with a hole in its side. Van der Sleen collection, Amsterdam (photo by K. Karklins).

Figure 7. A very large bead with a slightly raised, circular scar on its side. From the Carley site (1635-1650), New York; Rochester Museum and Science Center (photo by Brian D. Fox).

4. Occasionally, two beads on adjacent tines touched but were separated and continued to be rounded in the furnace. Such beads sometimes exhibit a rounded protrusion or some other irregularity on one side (Fig. 6,c), or a distortion of the surface decoration (Fig. 8). They are found both in factory wasters and at Indian sites in small numbers.
5. In a similar configuration, a large malformed bead is fused to the side of a perfect bead (Fig. 6,b,d,f). This may represent an instance where a bead melted off its tine and fell onto a bead on another tine. However, it is also quite possible that these beads are products of the *ferraccia* (pan) method. Beads rounded in this manner are frequently found fused together in factory wasters but the fusing is haphazard and the perforations are rarely parallel (Fig. 9).
6. Lopsided beads where one wall is substantially thicker than the one opposite it and the perforation is sometimes distinctly distorted (Fig. 10). This configuration was apparently caused when the spit ceased to be rotated while the glass was still in a viscid state or was not sufficiently rotated at some point, allowing the beads to sag.

An examination of the beads exhibiting the above characteristics from a wide range of sites, but

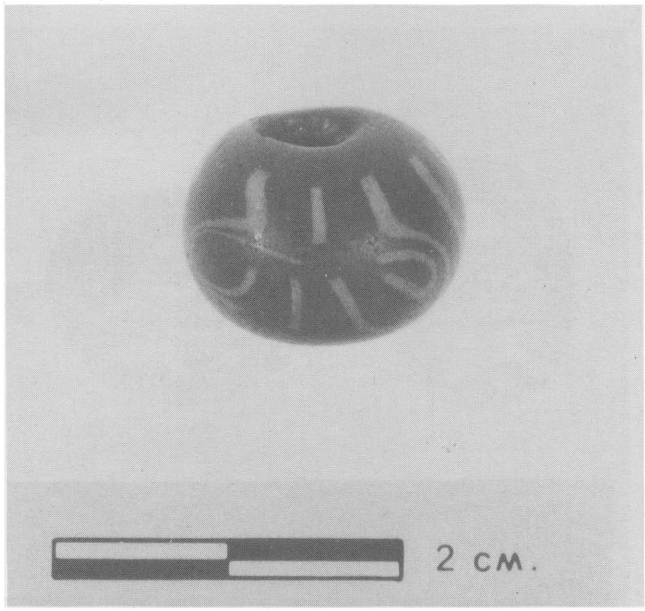

Figure 8. Bead with distorted stripes. From the Snyder-McClure site (1687-1710), New York; Rochester Museum and Science Center (photo by K. Karklins).

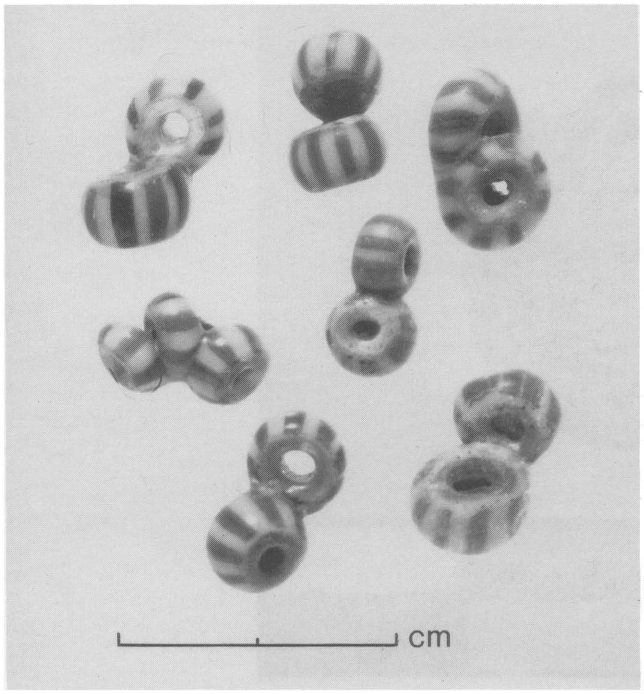

Figure 9. Haphazardly fused beads indicative of the *ferraccia* heat-rounding process from factory wasters at site Kg10 (1601-1610) in Amsterdam (photo by Rock Chan).

especially the Seneca sequence at the Rochester Museum and Science Center, reveals that beads with diameters as small as 3.6 mm were rounded using the *a speo* method.

TEMPORAL RANGE OF THE *A SPEO* METHOD

When the *a speo* method began to be used has yet to be determined. However, it was certainly in use by the early 17th century as revealed by historical documentation (Gasparetto 1958:187) and a very large bead with a spit tine in its perforation at site Kg10 (ca. 1601-1610) in Amsterdam (personal observation). This site also produced examples of beads with broken projections at one end and at least one specimen where two large beads were fused side by side with their perforations in a parallel configuration.

A survey of sundry archaeological reports and bead collections reveals that beads exhibiting the *a speo* traits described above occur over much of eastern North America from around 1612 to the 1770s (this is based on specimens found at the Feugle site [ca. 1612-1622], and the Pen [ca. 1720-1779] and Sand Hill [ca. 1750-1770] sites in western New York). It is interesting to note that the large and very large beads that characterize the 1610-1760 period have pretty much faded from the scene by this time (Quimby 1966:83-90), possibly because they had become too costly to

Figure 10. Lopsided beads from several 17th-century Seneca sites. The second specimen from the right is an excellent example of a bead that sagged during *a speo* rounding. Rochester Museum and Science Center (photo by Brian D. Fox).

produce. This is also about the time that the large and very large fancy wound beads come on the scene in relative abundance, apparently as a cheaper substitute for the drawn versions. It is likely that the process was extinct by the advent of the rotating-drum method of heat-rounding beads.

CONCLUSION

The *a speo* method was apparently developed as a more efficient alternative to the pan or *ferraccia* method for heat rounding medium-sized and larger glass beads, though it was also employed to round beads as small as 3.6 mm in diameter.

Archaeological evidence reveals that the process was definitely in use by the early 17th century. It was subsequently commonly employed until around 1760, when the large and very large beads that characterize Quimby's (1966:83-87) Early and Middle Historic periods fell from popularity. If the process continued in use thereafter for beads at the smaller end of the *a speo* size range, it is likely that it did not survive the introduction of the much more efficient rotating-drum method in 1817. Thus, beads that exhibit the characteristics enumerated above may be attributed to the period from around 1600 to 1817. While tighter dates may generally be ascribed to beads of this period on the basis of their other physical attributes — namely shape, color and decoration — the presence of *a speo* characteristics on stylistically nondescript beads or on beads of varieties with extremely long temporal ranges will help to differentiate the earlier examples from the more recent ones.

ACKNOWLEDGEMENTS

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ENDNOTE

1. Although the painting is presently called "The Glass and Coral Factory," its original title was "*Einer Korallen Machery*" (H. Jönsson 1983:pers. comm.). This effectively translates as "A Glass Bead Factory," the word *Korallen* not meaning "coral" in this instance but "glass bead" (van der Sleen 1967:56).

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Plate IIB. *A Speo:* "The Glass and Coral Factory," by Jacob van Loo (1614-1670)(courtesy of The Royal Museum of Fine Arts, Copenhagen; Inv. no. Sp. 291).