BOHEMIAN FACETED-SPHEROIDAL MOLD-PRESSED GLASS BEAD ATTRIBUTES: HYPOTHESIZED *TERMINUS POST QUEM* DATES FOR THE 19TH CENTURY

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Faceted-spheroidal mold-pressed beads have been manufactured in Bohemia since the 18th century. Evolution of manufacturing technology has resulted in the creation of bead attributes that can readily be observed on beads from archaeological contexts. Many North American archaeological sites contain examples of this bead type; but few reports have identified the attributes, much less recognized these beads as mold-pressed. Enough evidence now exists to suggest that some of these attributes have temporal significance for dating archaeological bead assemblages. Terminus post quem *dates for faceted-spheroidal mold-pressed bead attributes are hypothesized, and a strategy for future research is suggested so that a more precise temporal sequence can be constructed.*

INTRODUCTION

In 1972, while engaged in material culture research for the excavation of Hudson's Bay Company (HBC) Fort Vancouver, the author encountered a unique type of bead, previously unrecognized by material culture researchers. These are now recognized as faceted-spheroidal mold-pressed beads, but initially they were reported as mandrel-wound beads with a composite perforation formed by molding and punching (Hoffman and Ross 1973a). This was not the first reported occurrence of this type of bead from an historical archaeological context in North America (Murray 1964), but it was the first time they were recognized for their unique method of manufacture and abnormal pierced and punched conical perforation (final appearance with a biconical shape, *see* Table 1). After examining additional specimens from HBC Fort Vancouver and HBC Fort Okanogan, these beads were identified as mandrel molded or pressed beads with a composite perforation formed by molding and punching (Hoffman and Ross 1973b; Ross 1974, 1976). Subsequent discussions with bead scholars resulted in the decision to identify this category of beads as one sub-type of the broader type identified as mold-pressed beads (Karklins 1982; Sprague 1985; Ross 1990).

Glass bead varieties and their attributes occasionally have proven to be reliable as sensitive temporal markers (e.g., Karklins 1993; Sprague 1983, 1985). Well-dated archaeological contexts containing faceted-spheroidal mold-pressed beads appear to be restricted to the second through fourth quarters of the 19th century. The number of attributes present suggested a potential for dating bead assemblages. To assess this potential, research was undertaken to identify the country of origin for this bead sub-type, to identify the technology utilized for their manufacture, and to assess the chronological distribution of faceted-spheroidal beads within North American archaeological sites.

MANUFACTURING SOURCES

Historical technical works indicate that during the 19th century, Bohemia (presently the western portion of the Czech Republic) was the most likely source for faceted-spheroidal mold-pressed beads (Neuwirth 1994). During the 19th and early 20th centuries, the technology for their production varied from hand processes using iron tongs with precut mold shapes to hand-operated machines with removable precut dies (Pešatová 1965; Ross with Pflanz 1989). These techniques were used not just for the creation of single-perforation beads. Multiple perforations were made for specialized beads; e.g., double-pierced, Cassinian ovoidal beads possibly used as spacers between multiple strands of beads forming a single necklace (*see* Ross 2004: Variety 51). Other than beads, mold pressing also was used to manufacture a variety of artificial jewels, buttons, hat pins, etc.

Mold-pressed beads were manufactured by pinching or pressing molten glass in a two-part mold. The perforations were pierced by pushing a pin into the mold and through the glass. This technique may have been invented in Bohemia, possibly by the early 18th century. Neuwirth (1994:31, citing Loth 1859:73) noted that: "Bohemian glass beads [were]

Table 1. Potential Temporally Sensitive Attributes for Faceted-Spheroidal Mold-Pressed Beads.

Attribute	Variation	Sub-Variation	Final Appearance	Comments
Mold Seam Shape	Straight			With or without a vertical seam on the lower half of the bead (Pl. IVA a-j, l).
	Zig-zag			(Pl. IVA m).
Mold Seam Orientation	Horizontal			Perpendicular to the perforation and generally around the circumference of the bead; with or without a vertical seam on the lower half of the bead (Pl. IVA a-j, l-m).
	Vertical			Parallel to the perforation (Pl. IVA k).
Facets	Ground	Random		Generally confined to the circumference of the bead to remove the mold seam (Pl. IVA a-c).
		Semi-random		Covering the entire bead, but not forming distinct sides and rows (Pl. IVA d-h).
		Semi-patterned		Covering the entire bead, forming irregular sides and rows.
		Patterned		Forming regular rows and sides (Pl. IVA j-m).
	Molded	Patterned	Unmodified	Possibly polished (Pl. IVA i-m).
			Hot tumbled (perhaps some fire polished)	
			Acid polished	(Pl. IVA m).
	Molded and Ground	Patterned		Ground facets are generally confined to the mold seam (Pl. IVA j-k).
Perforation	Pierced and Punched	Conical	Biconical	Pierced conical perforation with a flat facet on the top of the bead that has its top punched out forming a biconical perforation with very sharp edges (Pl. IVA a-b, f-g, j).
		Biconical		Pierced conical perforation with a molded conical facet on the top of the bead forming an incomplete biconical perforation with the thin fin of glass between the cones punched out creating somewhat sharp edges (Pl. IVA c, i).
	Pierced	Conical		Perforation is pierced through the entire bead (Pl. IVA d-e, h, m).
		Biconical		Perforation is pierced through the entire bead.
		Cylindrical		(Pl. IVA k-l).

made from glass canes which were 'squeezed by means of a mold, pierced and lined up'."

The principal center for the production of pressed-glass beads was the market town of Gablonz in northernmost Bohemia (Neuwirth 1994:22, citing Kreutzberg 1836:25, 26). Jargstorf (1993:28) noted that "the Riedel glassworks supplied canes and tubes for lampworkers. It is also recorded that since at least 1803 they delivered the stronger canes for pressmolding workshops." She also noted that "records clearly indicate that composition-making and cutting began to concentrate in the Gablonz area in at least the 1780s" (Jargstorf 1993:33).

Benda attributes the introduction of the molding process to Gablonz to a "certain Endler":

> The invention of "molding" stones into shapes has caused the stone cutting profession to be reduced to a common trade. In Turnau they already practiced this molding in the last [18th] century, but kept the secret of how to do it very strictly.... Nevertheless, a certain Endler from Gablonz must have succeeded in finding out something about it, since he erected the first molding hut in Gablonz toward the end of the last [18th] century. This Endler, known under the name, "the old molder,' 'must have been born around the year 1760 and was, to a certain extent, a genius.... It wasn't until the years between 1817 and 1820 that Anton Mai, No. 146, erected the first composition furnace in Gablonz (farther away in the mountains there was a certain Seidel who was supposed to have made compositions earlier) and he made ruby and garnet colored compositions which he molded into beads (Neuwirth 1994:243, quoting Benda 1877:281 ff).

Analysis of the composition of 19th-century Bohemian glass and faceted-spheroidal mold-pressed beads indicates the presence of similar percentages of potassium (K) and calcium (Ca). Approximately 9.0-15.0% K and 5-7.5% Ca for Bohemian glass and 11.0-13.7% K and 5.2-5.9% Ca for mold-pressed beads (Kenyon et al. 1995:5-6).

Bohemia was a major source for faceted mold-pressed beads in the 19th century, but similar beads were manufactured under the influence of the Bohemian industry in the mountainous region of northern Bavaria (Franconia) called the Fichtelgebirge, Germany (Kenyon et al. 1996:15).

Mold pressing glass beads was not exclusively confined to Bohemia and Bavaria, but presently they are the only regions where beads of this type are positively known to have been manufactured. By at least the second quarter of the 19th century, mold-pressed beads had reached North America (Ross 1989a:156, Type MPIIa-2 bead). At least by the end of the 1860s, improved hand- and machine-operated mold-pressing machines were being patented in the United States (e.g., U.S. Patent No. 79,635, July 7, 1868). It has yet to be determined if such patents were ever placed into the factory production of mold-pressed beads.

MANUFACTURING TECHNOLOGIES

In Bohemia at the beginning of the 18th century, the Wenzel brothers and Franz Fischer in Turnau had already developed a different method for beadmaking "using iron pincer-molds for pressing out 10 to 15 and more of the same stones at one time, so that proper facets appeared on each pressed stone with this method because the iron mold was already shaped that way" (Schreyer 1790:93).

Sibylle Jargstorf, however, notes that press molding presumably began around the mid-18th century. She cites several documents: 1) "A treaty concluded in 1764 between the stonecutter's guild and the glass-cutter's guild, indicating that pressmolding was already a common procedure," and 2) "Records from between 1766 and 1780 noting Hans-Georg Pfeiffer (1711-1788) and Gottfried Pfeifer in Labau as Drücker, i.e., 'pressmolders'" (Jargstorf 1993:49-50).

In a 1774 report by the Count von Zinzendorf, there is already talk of a pair of tongs with a mold in which the desired figure is "pinched" (Kleinert 1972:17).

For the early 19th century:

> The production is mostly headed by local entrepreneurs who supply the workers scattered throughout the neighboring dominions of Morchenstern and Kleinskall with samples and materials. The former are divided into: composition burners, who melt the supplied glass batches in the most varied colors and shades, and then shape them into canes and tubes; glass and composition press-molders (squeezers) who shape the soft mass into raw chandelier and jewelry stones with molding tongs; these are then further refined by cutting, which takes place in their own grinding mills, a single one of which often contains 6-15 work places, which the grinding mill owner turns over to individual workers to use in return for a fee; bead blowers, cutters, gilders and stringers, of which the latter... string the finished beads onto wire and thread (Neuwirth 1994:22, citing Kreutzberg 1836:25, 26).

In Bohemia during the first half of the 19th century, mold-pressed beads were made individually or in pairs by

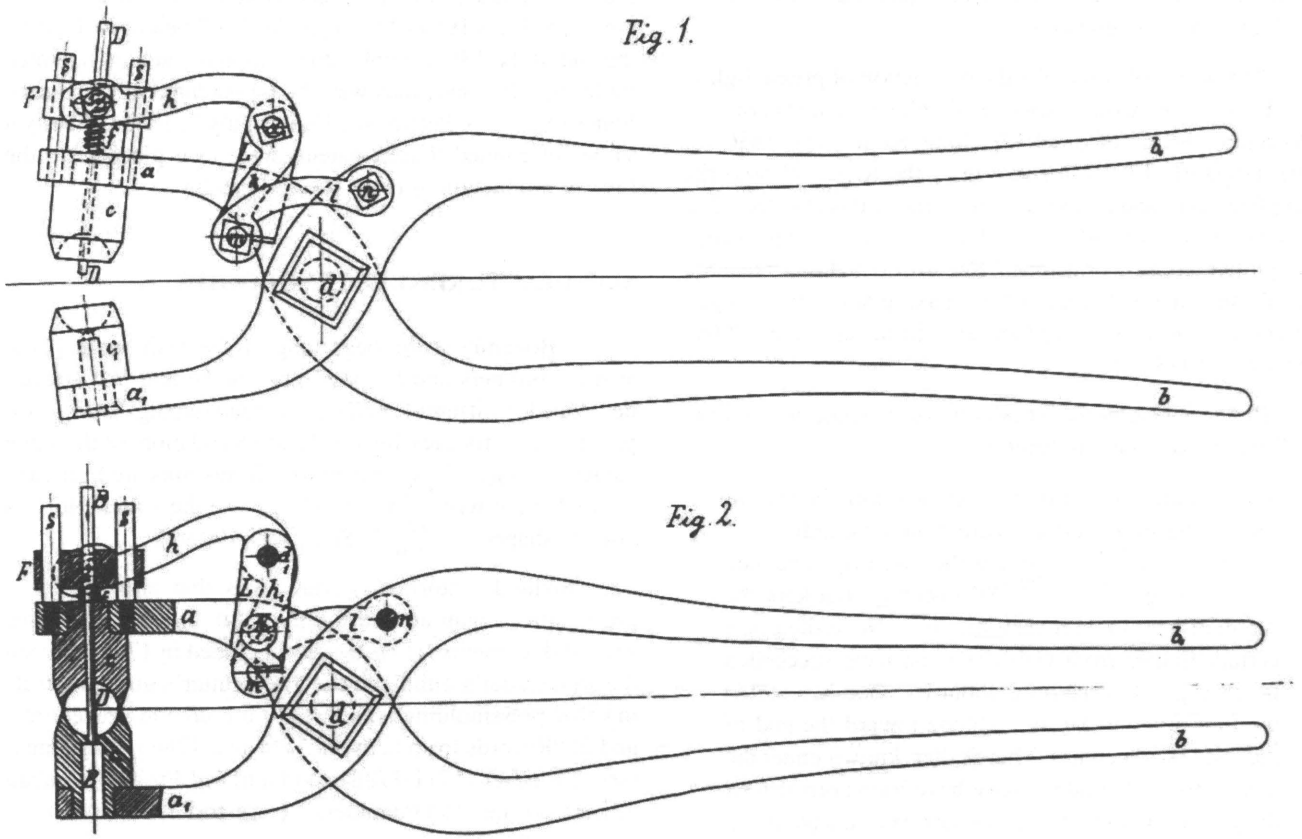

Figure 1. Tongs for making pressed glass beads, 1884. Franz Hiebel, locksmith in Friedrichswald; privilege no. 34/1872. – Austrian Patent Office, Vienna (Privilegium Nr. 34/1872. – Österreichisches Patentamt, Wien) (Neuwirth 1994:219).

pressing glass in simple iron tongs equipped with opposing hemispherical cavities. Perforations were partially formed by either a tapered pin that appears to have been an integral part of one cavity (Ross 1974:17 and Fig. 3; 1976:759-762), or by a pin inserted through one cavity (Anonymous 1913; Pešatová 1965; Ross with Pflanz 1989). Later, various patents were issued for a number of improved hand-operated tongs (e.g., Fig. 1). Upon removal from the mold, the preform had a partially formed perforation and a mold seam around its circumference with fine glass fins protruding from the seam. Facets were subsequently ground on the bead, thus removing the fins (the fins could also be removed prior to faceting by sieving or abrasion), and the incomplete perforation was punched through, forming a roughly spherical faceted bead with a biconical perforation. At least between 1860 and 1880, facets were molded and fins were ground off (Neuwirth 1994:246).

On July 7, 1868, George J. Capewell of West Cheshire, Connecticut, was issued U.S. Patent No. 79,635 for an improved glass-pressing machine (Fig. 2). His patent described a hand-operated lever molding machine that was designed to form glass beads by molding glass around a

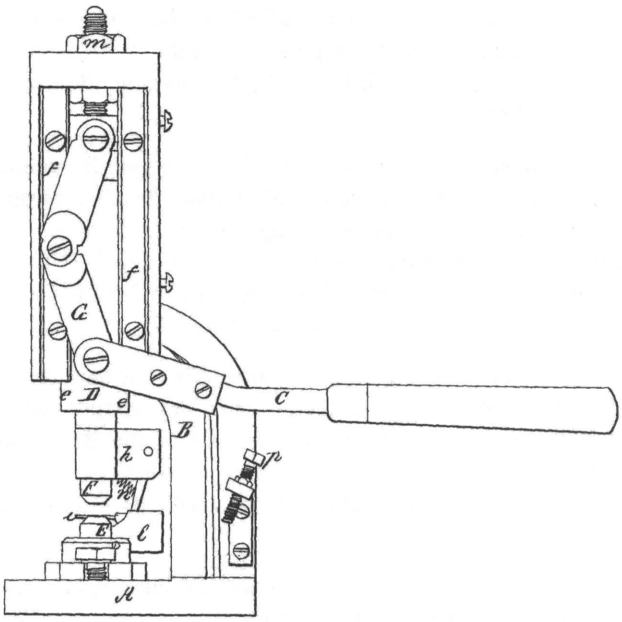

Figure 2. Improved glass-pressing machine patented by George J. Capewell (U.S. Patent No. 79,635) on July 7, 1868.

nipple and pressing a pin through the bead. Since this patent was for an "improved" machine, the assumption is that there were similar earlier devices. A search of all U.S. Patent Office records for glass manufacturing patents located nothing earlier.

By the end of the 19th century, techniques and mold-pressed products increased in complexity:

> Glass molding... concerns itself with the molding of stones, buttons, beads, kernels, laurel berries, cubes and so on. The method of production is already indicated in the word, "mold." For it, the molder uses iron tongs into which the shape of the particular design is engraved which the article is to acquire. The production of these molds (called "Kappel," i.e., the main component of these tongs) gives work to many engravers, specifically in Gablonz and its environs. In order to protect their designs, some of the exporters of such "Kappel" make them in factories built especially for this purpose. One of the first molders was a certain Endler (beginning of this century), Waldgasse No. 10 in Gablonz, not far from the furnace of Clemens Huyer.
>
> Among the molded glass articles made during the years 1867-1873, the little glass stones with holes, the so-called "Flüssel," had especially enormous sales. In molded buttons and the like, either holes for sewing or threading or applying are pressed in with the mold, or metal shanks were inserted as a part of the molding process.... Molded beads, mostly black, but also in all the other colors, are molded in iron molds in the molding works, then cut in different ways and decorated (iridized, etc.) for sale. If the pressing is done in molds of steel or nickel (which makes the corners turn out more sharply defined and the surfaces smoother), then they are called abraded or "sanded" beads; these are usually not cut, but supplied to be used in this state (Neuwirth 1994:244, citing Lilie 1895:164-166).
>
> By abraded or sanded buttons, one means those which are not cut, but which are made to imitate cut buttons by using a press-mold that is polished so smooth on the inside with an abrasive that the buttons pressed in them acquire the appearance of being cut (Neuwirth 1994:244 citing Benda 1877:287).

Another source mentions that the so-called "sanded bead" was press-molded in hot nickel molds which gave them a surface that looked almost cut (Fischer n.d.). Arnold (1909:92) calls "Flüssel" "little black stones" that have two pierced holes and are marketed strung for use in passementerie (Neuwirth 1994:245-256). Around the turn-of-the-century, Winter (1900:16) reports on molders and the use of double molds which were forbidden at times (Neuwirth 1994:246).

FACETED-SPHEROIDAL MOLD-PRESSED BEAD ATTRIBUTES

Among collectors, faceted-spheroidal mold-pressed beads are called "cut," "Czech," or "vaseline" beads (e.g., Johnson 1975), presumably for their technique of manufacture, emulating cut stone beads, country of manufacture, and glossy appearance, respectively. Early 18th-century varieties manufactured in Bohemia lacked the high polish exhibited by later varieties. This glossy finish may have been created by washing the beads in an acid bath, similar to the 20th-century technique used to polish cut lead crystal glassware (Jones and others 1985:55, 56).

For the faceted-spheroidal beads, a succession of techniques used throughout the 19th century created a variety of attributes. These attributes and their potential combinations can create a wide variety of finished faceted-spheroidal mold-pressed beads. Presently, it is not possible to define discrete bead sub-varieties on the basis of the various combinations of attributes. Rather, the discrete attributes must be identified and reported (Fig. 3 and Table 1).

FACETED-SPHEROIDAL MOLD-PRESSED BEAD ATTRIBUTE TEMPORAL ASCRIPTIONS

Beads with these attributes from temporally sensitive archaeological contexts in North America have been recognized at 11 sites (Table 2). From these sites, *terminus post quem* dates for specific attributes can be suggested (Table 3).

Based upon limited archaeological evidence, it appears that molded facets post-date ground facets. This observation is supported by historical accounts of the beadmaking industry in 19th-century Bohemia (Pešatová 1965; Ross with Pflanz 1989). Further, the presence of both ground and molded facets on the same bead appears to represent a technical transition from totally ground to totally molded facets.

It also appears that there may be a technical transition for the formation of perforations: from pierced and punched conical, to pierced and punched biconical, to pierced biconical, and finally to pierced cylindrical perforations. The pierced and punched conical perforation had become a standard trait of the early forms of mold-pressed beads, but it may represent an even earlier trait associated with stone-

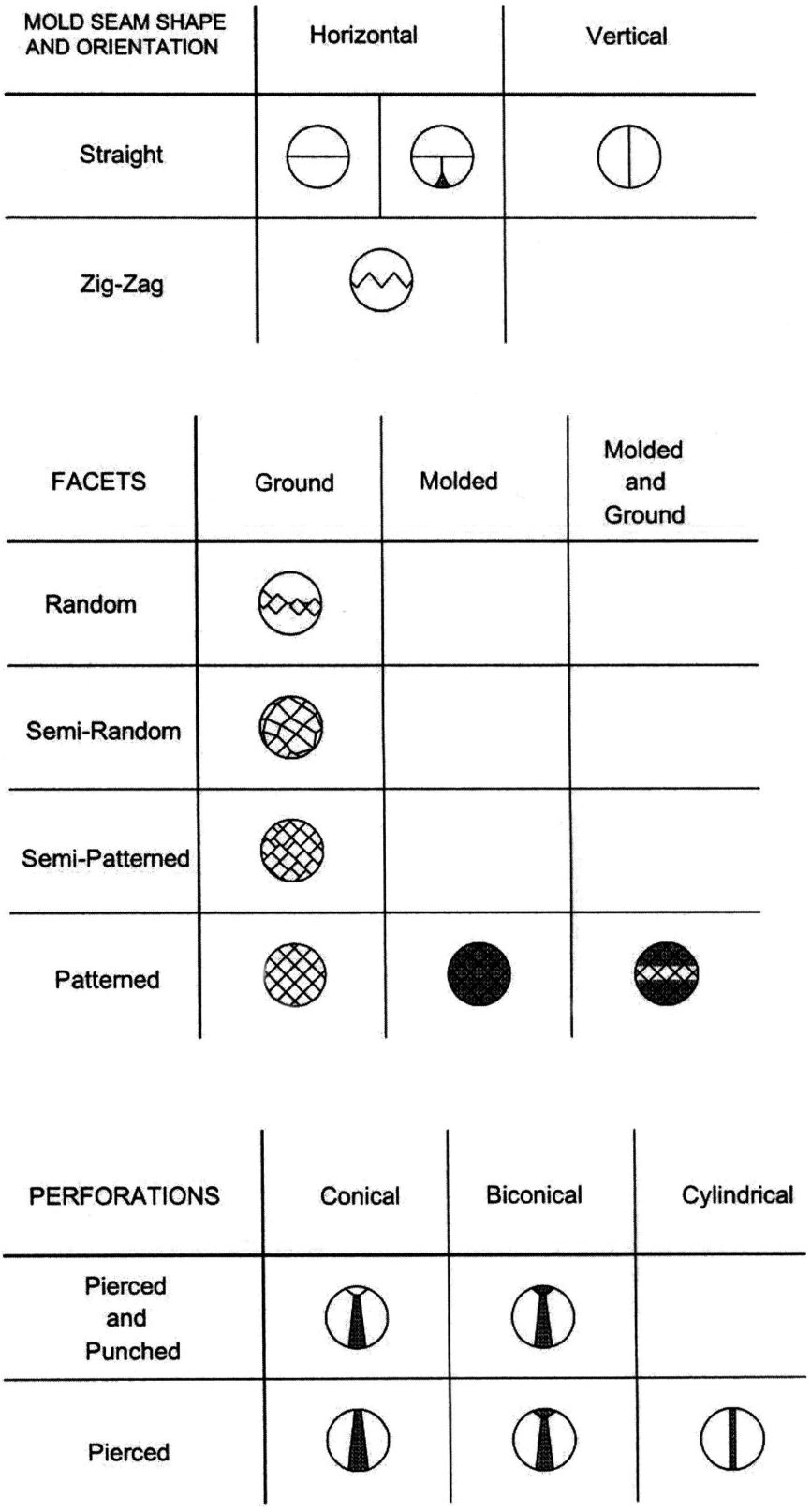

Figure 3. Attributes of faceted-spheroidal mold-pressed beads (drawing by L.A. Ross).

Table 2. North American Archaeological Sites with Faceted-Spheroidal Mold-Pressed Beads with Potential Temporally Sensitive Attributes from known Temporal Contexts.

Site	Variety Number	Mold Seam		Facets	Perforation	Comments
		Shape	Orientation			
Spanish Mission Santa Ines, California, post-1804 (Ross 1989a)	MPIIa-2	Straight	Horizontal	Random ground	Pierced and punched conical	Associated with a ca. 1804-1835 context
	MPIIa-1	Straight	Horizontal	Patterned molded and ground	Pierced and punched conical	With 7 sides and 5 rows; associated with an 1833-1870 context
Kiusta, Queen Charlotte Island, pre-1850s (personal examination)		Straight	Horizontal	Patterned molded and ground	Pierced and punched conical	
Fort William, Ontario, 1803-1878 (Karklins 1973)		Straight	Horizontal	Random ground	Pierced and punched conical	
Hudson's Bay Company Fort Vancouver, Washington, ca. 1829-1860 (Ross 1990:51-55)	10 varieties	Straight	Horizontal	Random to semi-random ground	Pierced and punched conical	Principally dated to the 1830s-1850s
American Fur Company Fort Pierre I, South Dakota, 1832-1857 (Billeck 2006:pers. comm.)		Straight	Horizontal	Patterned molded	Pierced cylindrical	Information based upon a preliminary analysis
American Fur Company Fort Union, South Dakota, ca. 1828-1865 (Ross 2000)	329	Straight	Horizontal	Semi-patterned ground	Pierced and punched conical	With 6 sides and 3 rows
	159					With 6-7 sides and 3 rows
	318					With 6-8 sides and 5 rows; associated with an 1850s-1860s context
	42					With 7-8 sides and 3-5 rows
	98 and 165					With 10 sides and 5 rows
	300	Straight	Horizontal	Semi-patterned ground	Pierced conical	With 7-8 sides and 5 rows

Table 2. Continued

Site	Variety Number	Mold Seam		Facets	Perforation	Comments
		Shape	Orientation			
American Fur Company, cont.	338					With an unknown number of sides and 5 rows
	323	Straight	Horizontal	Patterned ground	Pierced and punched biconical	With 7-8 sides and 5 rows
	292 and 299					With 8 sides and 5 rows
	332					With 10 sides and 5 rows
	74	Straight	Horizontal	Patterned ground	Pierced conical	With 8 sides and 5 rows; associated with an 1850s-1860s context and a ca. 1867-1880 intrusive burial
	260					With 10 sides and 5 rows
	314	Straight	Horizontal	Patterned molded and ground	Pierced and punched biconical	With 8 sides and 2 rows; associated with a post-1864 context and a ca. 1867-1880 intrusive burial
	136 and 214	Straight	Horizontal	Molded and ground	Pierced biconical	With 6 sides and 3 rows
	4					With 6-8 sides and 3-4 rows
	264					With 7 sides and 3 rows
	5					With an unknown number of sides and 3 rows; associated with an 1820s-1830s context
	289	Straight	Horizontal	Molded and ground	Pierced cylindrical	With 5 sides and 3 rows
	53					With 9 sides and 5 rows; associated with an 1820s-1830s context
Jasper House, Alberta, ca. 1830s-late 19th century (Karklins 1986)		Straight	Horizontal	Random ground	Pierced and punched biconical	
Palus Burial Site (45FR36B), Washington, 1840-1914 (Sprague 1965, 1967; Fenstermaker 1976; personal examination)		Straight	Horizontal	Random ground	Pierced and punched conical	Burials 6, 19, 37, 57, 67, 81, 84, 117, 158, 1840-ca. 1914 Burial 21, 1840-1890 Burial 131, 1840-1904 Burial 162, 1840-1881 Burial 181, 1840-1851

Table 2. Continued

Site	Variety Number	Mold Seam		Facets	Perforation	Comments
		Shape	Orientation			
Palus Burial Site, cont.		Straight	Horizontal	Patterned molded and ground	Pierced biconical	Burial 67, 1840-ca. 1914
		Straight	Horizontal	Patterned molded	Pierced cylindrical	Burial 67, 1840-ca. 1914
U.S. Army Yuma Quartermaster Depot, Polhamus House, Arizona, ca. 1862-1880s (Ross 1989c)		Straight	Horizontal	Semi-random ground	Pierced conical	With roughly 8 sides and 5 rows
Shepherd Ranch, Locus J, California, ca. 1872-1905 (Ross 2004)	73	Straight	Horizontal	Random ground	Pierced and punched conical	
	55	Straight	Horizontal	Patterned molded and ground	Pierced cylindrical	With 5 sides and 3 rows
	38					With 5 sides and 5 rows
	56					With 6 sides and 5 rows
	52	Straight	Vertical	Patterned molded and ground	Pierced cylindrical	With 8 sides and 5 rows
	17, 18, and 70	Straight	Horizontal	Patterned molded	Pierced cylindrical	With 5 sides and 3 rows, possibly hot tumbled
	68	Zig-zag	Horizontal	Patterned molded	Pierced conical	With 7 sides and 5 rows; acid polished
	61					With 8 sides and 5 rows; acid polished
Batoche, Letendre House, Saskatchewan, ca. 1878-1906 (personal examination)	21N9E 1001-3951	Straight	Horizontal	Random ground	Pierced and punched conical	
	21N9A 10-2784	Straight	Horizontal	Random ground	Pierced biconical	

bead technology, the drilling of two conically shaped holes from opposite ends of the bead. It is possible that following this stone perforation technology the earliest faceted mold-pressed beads may have had drilled biconical perforations, however, no evidence presently exists to evaluate this inference.

For the glass bead industry, it is suspected that the early form with the pierced and punched conical perforation may reflect a fortuitous event whereby an artificial-jewel pin head with its partial perforation was converted into a bead by punching out the remaining glass. Bohemia was known for its artificial jewelry trade prior to the 19th century, and if faceted-spheroidal pin heads were precursors to faceted-spheroidal beads, then beadmakers may have adopted an existing technology to create a new product.

CONCLUSIONS

Based upon the limited evidence presently available, it is suggested that the attributes now recognized for faceted-

Table 3. Hypothesized *Terminus Post Quem* Dates for Attributes of Faceted-Spheroidal Mold-Pressed Beads based upon known North American Archaeological Contexts.

Attribute	Variation	Sub-Variation	Final Appearance	Terminus Post Quem
Mold Seam Shape	Straight			Early 19th century
	Zig-zag			Early to mid-19th century
Mold Seam Orientation	Horizontal			Early 19th century
	Vertical			Late 19th century
Facets	Ground	Random		Early 19th century
		Semi-random		Mid-19th century
		Semi-patterned		Mid-19th century
		Patterned		Mid-19th century
	Molded	Patterned	Unmodified	Early 19th century
			Fire polished, hot tumbled, or acid polished	Mid- to late 19th century
	Molded and ground	Patterned		Early 19th century
Perforation	Pierced and punched	Conical	Biconical	Early 19th century
		Biconical		Mid-19th century
	Pierced	Conical		Early to mid-19th century
		Biconical		Mid-19th century
		Cylindrical		Mid- to late 19th century

spheroidal mold-pressed beads from the 19th century may have potential *terminus post quem* dates that could prove useful for dating North American sites (Table 3). The hypothetical dates postulated here can be used cautiously to place bead assemblages into relative temporal sequences, but they should not be used strictly for dating archaeological contexts. Additional historical, ethnographical, and archaeological research is required to evaluate these temporal hypotheses.

Historical sources for the distribution of many of the faceted-spheroidal mold-pressed beads found in North American sites probably consist of a few major distribution centers. For example, within the Pacific Northwest, including Washington, Oregon, Idaho, northern California, British Columbia, and coastal southern Alaska, one primary distribution source has been demonstrated to be the Hudson's Bay Company, and for the years 1829-1860 (especially 1829-1850), the center for distribution was Fort Vancouver. The same pattern appears to exist for British Canada, with the source again being the Hudson's Bay Company, and primary distribution centers being York Factory, Lower Fort Garry, and Fort Temiscamingue. The existence of faceted-spheroidal mold-pressed beads at Spanish sites may reflect the use of relatively large and well-decorated beads as rosary beads. Their presence at Native American sites may reflect casual loss during beading activities, discard, or interment of personal ornamentation; or from purposeful deposition during religious ceremonial activities. Finally, their presence in Euro-American residential and mercantile sites of the late 19th century may reflect casual loss from fashion accouterments, including clothing, jewelry, and sewing baskets.

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APPENDIX A: PLATE IVA PROVENIENCE AND ATTRIBUTE DATA

a. Hudson's Bay Company Fort Vancouver, Washington; 1829-1860; bottom view. Random ground facets; pierced and punched conical perforation; horizontal straight mold seam with a vertical lower seam.

b. Hudson's Bay Company Fort Vancouver, Washington; 1829-1860; side view. Random ground facets; pierced and punched conical perforation; horizontal straight mold seam showing intensified color at mold seam.

c. Shepherd Ranch, Owens Valley, California; 1864-1905; top view. Random ground facets; pierced and punched conical perforation; horizontal straight mold seam.

d. U.S. Army Yuma Quartermaster Depot, Polhamus House, Arizona; ca. 1862-1880s; top view. Semi-random ground facets; pierced conical perforation; horizontal straight mold seam.

e. U.S. Army Yuma Quartermaster Depot, Polhamus House, Arizona; ca. 1862-1880s; bottom view. Semi-random ground facets; pierced conical perforation; horizontal straight mold seam.

f. Hudson's Bay Company Lower Fort Garry (1K4A1-613), Manitoba (photo RA-4243T by Rock Chan, Parks Canada); view from side showing top. Semi-patterned ground facets; pierced and punched conical perforation; horizontal straight mold seam.

g. Hudson's Bay Company Lower Fort Garry (1K3H2-122), Manitoba (photo RA-4248T by Rock Chan, Parks Canada); side view. Semi-patterned ground facets; pierced and punched conical perforation; horizontal straight mold seam.

h. Hudson's Bay Company Fort Temiscamingue (15G7Z2), Quebec; 1720-1901 (photo RA-4240T by Rock Chan, Parks Canada); view from side showing top. Semi-patterned ground facets; pierced conical perforation; horizontal straight mold seam.

i. American Fur Company Fort Union, South Dakota; 1828-1865; top view. Patterned ground facets; pierced and punched biconical perforation; horizontal straight mold seam.

j. Spanish Mission Santa Inez, California; post-1804; side view. Patterned molded and ground facets; pierced and punched conical perforation; horizontal straight mold seam.

k. Shepherd Ranch, Owens Valley, California; 1864-1905; side view. Patterned molded and ground facets; pierced cylindrical perforation; vertical straight mold seam.

l. Olive Jones, personal collection; date unknown; side view. Patterned molded facets; pierced cylindrical perforation; horizontal straight mold seam showing mold fin.

m. Shepherd Ranch, Owens Valley, California; 1864-1905; bottom view. Patterned molded facets; pierced conical perforation; horizontal zig-zag mold seam; acid polished.

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