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French Colonial History, Volume 10, 2009, pp. 55-73 (Article)

Published by Michigan State University Press
DOI: *https://doi.org/10.1353/fch.0.0020*

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Iconographic (Jesuit) Rings in European/Native Exchange[1]

CAROL I. MASON *and* KATHLEEN L. EHRHARDT

On a trouvé des bagues iconographiques (bagues jésuites) au cours de fouilles archéologiques dans le territoire que les Français dénommèrent la Novelle France. On a fait la supposition que ces bagues datent les sites, d'abord en utilisant leurs motifs dans un modèle "drift." Ce modèle n'a pas reussi, et il faut faire attention à d'autres attributs metallurgiques en même que les motifs.

Iconographic rings have been an archaeological presence on early Native and colonial sites in parts of North America where French settlement, trade, political machinations, missionary work, and military operations have taken place. These rings are simple, appear to be made exclusively of copper-base metal alloys,[2] and decorated with a variety of designs in a variety of ways (Figure 1). Archaeologists have labored over the rings, focusing primarily on stylistic variation as a device through which a site could be dated and seriated. A kind of seriation of plaque designs has been the principal direction efforts have taken so far. In this paper, we

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Figure 1. Examples of iconographic rings: (A) L-Heart, cast/stamped, plain band; (B) MM cast/stamped, ridged band; (C) IHS, cast/stamped, plain band; (D) initials LI, die impressed/engraved, plain band); (E) XX (?), die impressed/engraved, filed band; (F) small, crude heart, "Markman" style, die impressed/engraved, ridged band.

Image 1A (St. Ignace 5810 2 214, sample no. 5, this study) appears with permission of the Michigan State University Museum; 1B (Riverside site, collection of Randy Champion) used with permission of James R. Paquette; 1C (Newell Fort NF 1996 54 266120) appears courtesy of the Illinois State Museum; 1D (Rock Island site RI II B5 no. 1, sample no. 18, this study) appears with permission of Collections of Lawrence University, Appleton, Wis.; 1E (Bell site 47-Wn-9 1028, sample no. 9, this study) appears with permission of Collections of the University of Wisconsin, Oshkosh; 1F (Goose Lake site, 20 Mq 140) used with permission of James R. Paquette.

examine earlier efforts to use ring design for site dating, then turn our attention to new ways to evaluate them in terms of their manufacture and the religious and/or secular roles they may have played in French/Native interaction.

Seriation by Design

In an ideal world, a simple seriation of ring designs might provide the key to when a site was occupied and when it ceased to function as a living settlement. So far, this has proven surprisingly difficult. The rings themselves fall roughly into several categories, but they are divided basically into those with raised designs (Figures 1A–1C) and those with engraved plaques (Figures 1D–1F). The former include many images that are clearly religious in nature, and some that are not. Engraved plaques may carry religious symbols as well as representations of letters, numbers, abstract designs, and even what might be described as "doodles." The means of applying the designs is a matter of some uncertainty: "engraved" simply means that the design looks as if it is cut into the metal rather than being raised above the plaque. However, there are ways that even the rings described as "engraved" might have been produced by casting. A basic error in dealing with the engraved style (however it was made) has been the failure to differentiate the engraved rings of the early seventeenth century from those of the eighteenth.[3] The former occur—apparently—in only three forms on small plaques: an L-heart, an IHS, and a crude heart ring (Figure 1F).[4] Stylistically, these rings are distinct from the rings of the eighteenth century, which have larger plaques and must be considered separately.

The most influential and elegant of the early attempts to use the rings for dating was that of Charles Cleland, whose pioneering paper on style "drift" became the foundation for dating iconographic rings and hence the sites on which they were found. For decades after its 1972 publication, Cleland's paper has been the place where all ring studies began (Figure 2).[5] His analysis was based on the concept of design drift, a technique used fruitfully in European numismatics to trace the degeneration of coin designs through time—a technique adopted in colonial archaeology for the analysis of tombstone decoration in New England.[6] The basis of design drift is that a plastic medium in the hands of artisans will exhibit changes as the artisans vary certain elements of the design, slightly shift others, and gradually alter the image, sometimes simplifying it and sometimes adding to it. The important enabling factor is the degree of supervision maintained

over the replication done by the artisans, whether quality control is exercised or speed is more highly valued. If the latter, eventually the end products may resemble the originals in only superficial ways, and new interpretations may be assigned to them by buyers or users as the designs shift.

With regard to the rings, Cleland proposed that three ring designs—IHS, L-Heart, and Double-M—formed the base from which all other ring designs degenerated (Figure 2).[7] Originally, all three of these designs were considered as religious in nature, IHS being associated with Jesus, the Double-M with Mary, and the L-Heart with a then unclear devotional message (see Figures 1A–1C). It may well be that the religious attribution was prompted by the almost universal acceptance of an initially close association of the rings with Jesuit missionaries, and the subsequent deterioration of the designs occurring as more secular ideas developed in New France.

The three images were all cast in what has been described as a stamped-embossed manner (see Figures 1a, 1b, and 1c),[8] and it is worthwhile to examine why these three with that distinct form of decoration were chosen to become the mother rings for the whole series. From an overview of what ring designs were known at the time, they were singled out perhaps because they were complete and identifiable as to design. His so-called "embossed" style was also chosen as the "earliest" because archaeologists may have tacitly believed that this type of ring would have been the costliest and most labor-intensive to produce, leaving open the possibility of technological and design "degradation" over time.[9] Cleland's analysis proceeded through a detailed examination of rings whose designs were close to the original ones, and moved step by step to those with more and more obscure patterns through the dropping of some elements, the rearranging of others throughout, searching for bridges that would link one level of change to another. The organization of these drift progressions was a logical one, based on a close examination of the designs and an arrangement of them in some kind of order leading back to the original undrifted designs. On each step of the progressions, elements were slightly changed until the ultimate designs could be linked to the original ones. The end result was a series of progressions linking even the most peculiar and unidentifiable of ring designs to the mother patterns of IHS, L-Heart, and Double M. Since the alterations of ring styles were then linked to dates, it was possible for archaeologists to simply plug their recovered rings into the charts and come up with a date for a site based on the designs. Additional clues to dating included the shape of the plaques, which was seen to vary in a more-or-less comprehensible manner.

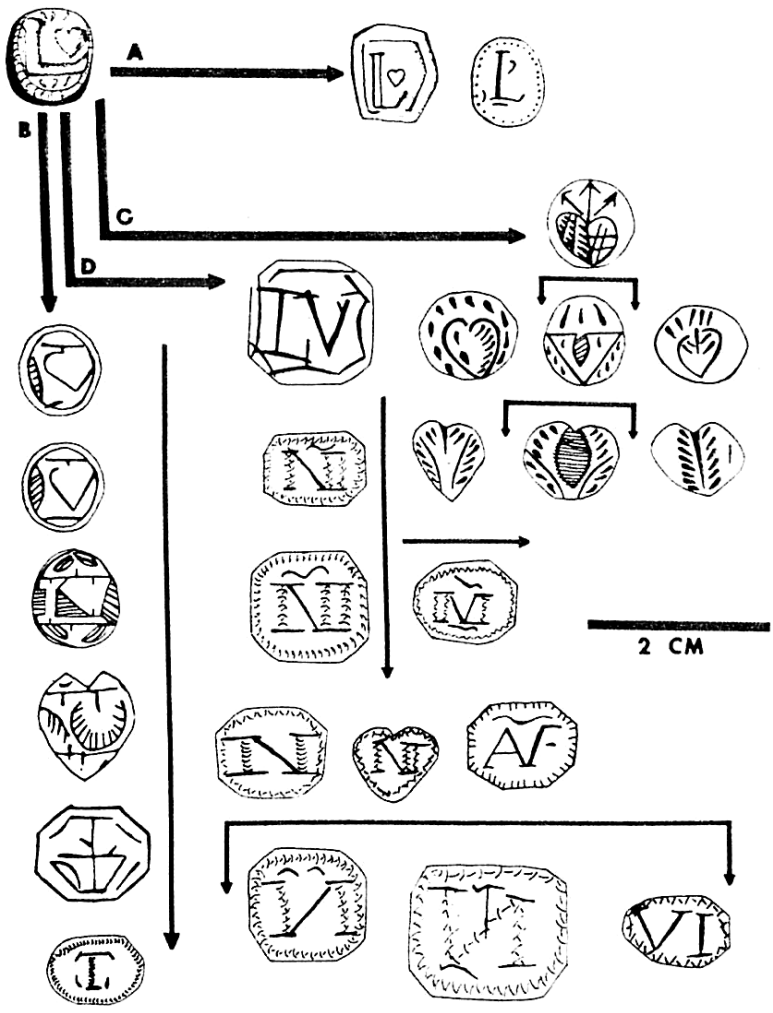

Figure 2. Charles Cleland's ("From Sacred to Profane," Figure 1) illustration of "style drift" in the L-heart series. The L-Heart ring pictured in Figure 1A of this paper is the design style that Cleland uses as his "prototype" for the L-Heart progressions. The MM and IHS rings (Figures 1B and 1C) are the prototype styles for his MM and IHS series. Image appears courtesy of Charles E. Cleland and the Society of American Archaeology.

This pioneering effort to use iconographic rings for dating historic sites was both satisfying and elegant, a brilliant attempt to make sense of what was otherwise both obscure and baffling. And it used ideas that had borne fruit in other disciplines, an example of the kind of cross-fertilization that is ideally at the heart of a universal scientific enterprise. Archaeologists used it widely, and for many years it was the gold standard by which rings were understood and dated. No one looked closely at whether or not drift was actually "real," either by examining the validity of the approach itself, or by asking the essential, epistemological question of how to determine the timing or direction of "drift." The arrangement of disparate forms in order was logical, based on similarities (and linkages) *as seen by the arranger*, but whether or not the same or different "drifts" might do as well was not considered. One of the few instances in which the drift model was questioned came from work on Huron sites on Christian Island, where some Hurons fled in 1650 for a relatively short time after the major destruction of Huron villages by the Iroquois. Archaeologists there noted that what they had found in the ground violated the drift model, with supposedly later designs clearly being earlier than the model allowed.[10]

The unstated assumption behind the drift model was that the rings were analogous to coins—that is, part of a single pool with a beginning point and an end within which continuous change occurred through time as prototype designs evolved. The process was not an active one within which individuals made deliberate choices of what elements to discard and what to keep, but a passive one where traditional shapes and forms were preserved or altered, reflecting relative popularity in the society as a whole.[11] The rings were all connected, part of the same cultural gene pool. That the ring designs could have reflected different origins, different sources of supply, and a disjunct between the earlier and later groups of rings was not considered. With such a relatively tiny population of rings present at that time, why should it have been?

With the advent of better-dated collections and a vastly larger number of rings available for study, problems in the drift model began to emerge. Perhaps the most difficult issue was that of the prototype designs themselves. These mother images, cast on tiny, delicate plaques recovered in numbers from such sites as Lasanen, St. Ignace, and Ft. St. Joseph turned out not to be the earliest rings of all.[12] The rings from Christian Island joined to others from Huronia became too loud a voice to be ignored. Given their status as a kind of horizon marker on sites of the late seventeenth century, the prototype rings could not be the stylistic ancestors for a sequence that ultimately and almost instantaneously

evolved into the wildly "drifted" designs of the eighteenth century.[13] The recovery of hundreds of the prototype rings from La Salle's ship *Belle*, with its 1686 date, sealed their position in time and removed them from being the temporal head of the sequence: they were not early enough to be responsible for the changes that occurred in the ring universe once the eighteenth century arrived.

Formulating Alternate Hypotheses

Developing alternate hypotheses about the significance of ring designs requires that they be treated as any other trade object, not representing a unilineal descent from platonic forebears. If the concept of drift is discarded, then ring forms and designs can be treated like beads: i.e., described and dated from their occurrence in well-dated contexts. What emerges is a considerably less elegant picture of iconographic rings. They may be able to provide dates,[14] but they may not be, particularly when they occur on sites where more than one pool of origin of the rings is present. Discarding drift also opens the way for alternate interpretations of the designs, since they are no longer necessarily tied to the original prototypic rings and do not have to represent deteriorations, but may have meanings in their own right.

Exactly what the ring designs may be indicating is still a matter of debate, and there is still too little known about them. However, setting aside the obviously religious symbols, other meanings for several of the designs—even on some of the earliest rings—have been found to relate directly to a robust European secular iconographic tradition that communicated (often in a coded way) romantic attachments, engagements, good luck, protection from disease, political affiliations, promises of marriage, and other events or sentiments in ordinary people's lives.[15] Any one ring design may have meanings that will forever escape an observer, since the interpretations must of necessity reside with the long-gone wearers; a symbol that looks as if it might be one thing may also be another.

New Approaches to Origins and Meaning

One new avenue of inquiry involves exploring the contexts surrounding the rings' original manufacture, an area of ring research that, according to Cleland, has been neglected.[16] This can be approached from a technological and archaeometallurgical

perspective. Understanding and comparing how various types of rings are fabricated, the range of ways in which decoration is applied, and of what alloys they are actually made, should allow us to establish potentially important relationships among ring manufacture, decoration, and material content on the one hand, and styles, chronology, distribution, and use, on the other.

A pilot archaeometallurgical investigation was conducted on a sample of 25 rings of various "styles" from five seventeenth- and eighteenth-century sites in the northeast and western Great Lakes (Table 1; Appendix A). The study employed a number of materials-based archaeometric techniques to determine the method or methods of their manufacture and their compositions. Low-power microscopy and metallography[17] were used to shed light on method of manufacture and manufacturing history. Radiography (film x-rays)[18] was employed to provide further details of ring manufacture, and energy-dispersive x-ray fluorescence (EDXRF)[19] was used to determine, on a gross level, of what alloys they were made.

How Rings Were Made

Both radiographic and optical examination have produced much important information about how the rings were actually manufactured. The results of the x-ray analysis demonstrate that the rings themselves were all cast as one piece. By this we mean that the final ring shape was achieved in the initial casting (called "ready-cast"); no post-casting forming or soldering or joining of seams is evidenced. A few rings exhibited casting voids, or areas not filled with metal during the casting process, on their bands or plaques, but overall, the quality of the castings was good.

Close optical examination indicates that many of the rings may have been cast in permanent, multiple-piece molds. This type of mold was reusable, allowing for the creation of identical rings. Rings could also have been cast in multiples in a tree-like mold using the lost-wax method. While this type of mold had to be destroyed in order to release the castings, this method allows for a variety of sizes and shapes to be created in one casting pour. In either case, after the metal cooled, casting spurs or scabs were filed off the castings. Filing marks are often still readily visible, most often on the reverse of the plaques.

Plaque decoration was either achieved as part of the initial casting process or applied afterwards to a blank plaque by stamping or punching with a die, and/or

Table 1. Ring Data Set

SITE	LOCATION	ETHNIC AFFILIATION	DATES OF OCCUPATION	RINGS *n* =
Iliniwek Village	Clark County, Mo.	Illinois	~1640–1682	1
Strickler	Lancaster County, Pa.	Susquehannock	~1640s–1665	4
Bell	Winnebago County, Wis.	Fox	1680–1730	8
Rock Island	Door Peninsula, Wis.	Potawatomi	1670–1730	6
		Ottawa	1760–1770	
St. Ignace	Sault Ste. Marie, Mich.	Huron	~1672–1698	6
TOTAL				25

by engraving (see Figure 1).[20] The decorations on some rings were executed using a combination of both engraving and punching techniques. Hand engraving and punching tools and the manner of their application remain very much the same today as they were in the seventeenth and eighteenth centuries.

One already broken, engraved ring with a small heart-shaped plaque (Bell 47-Wn-1632) was tested metallographically to confirm the method of initial manufacture. The micrographic cross-sections of the plaque and band show that the ring is only lightly to moderately corroded. Importantly, they also reveal a dendritic structure typical of casting, with zones of grain distortion noted in areas of the plaque where the ring was originally broken and in areas where it was engraved.

Ring Composition

From their general yellowish color, rings are most commonly adjudged to be made of brass, a common copper-zinc alloy, but they also have been identified as silver, silver alloy, white metal, or pewter.[21] Compositional testing by energy-dispersive x-ray fluorescence (EDXRF) spectrometry reveals that all of the rings tested are indeed fabricated of copper alloy materials (see Appendix A).[22] However, the actual results are quite interesting (Figure 3). First, *no* ring was made of pure or unalloyed copper. All were found to contain some amount of zinc. However, no ring was a straightforward 70-30 copper/zinc "cartridge" or "yellow" brass, as we commonly think of high-zinc brass. None contains that

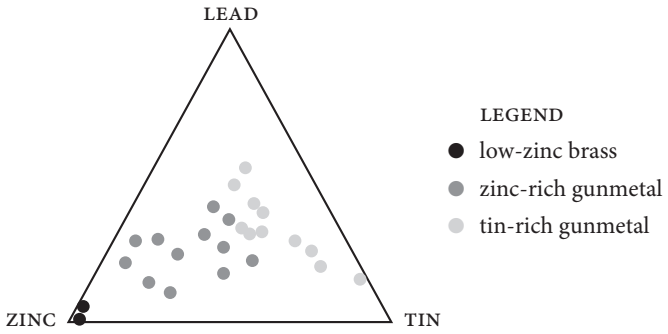

Figure 3. Ternary diagram showing the relative proportions of the three major alloying elements present in the ring compositions. This diagram uses data from the EDXRF analysis, and is for illustrative purposes only. The closer a point is to a corner, the higher the amount of that element present (see Heyworth, "Metallurgical Analysis," note 26).

much zinc. Rather, two of the rings fall into a category commonly known as "low-zinc" brass because they contain less than 20 percent zinc (14.8 percent and 18.83 percent respectively). One of these may be termed a "red" brass due to the fact that it contains less than 15 percent zinc. Both of these objects also contain a small amount of lead (0.4 percent and 1.58 percent respectively). Interestingly, both of these rings are of the cast/stamped variety.

The compositions of the remaining 23 rings fall into a broad compositional category of casting alloy known as *gunmetal*. Gunmetal is a copper-base metal alloy containing varying amounts of zinc, tin, and lead, all of which were known to have been alloyed with copper from at least Roman times.[23] The addition of zinc gives copper a golden color. The amount of zinc in these samples varies from 4.75 percent to almost 20 percent. Tin is added to increase strength and hardness, but it also lightens the color of the finished piece. In this sample, tin occurs in proportions as low as 2 percent and as high as 20.5 percent. Tin contents of 10–16 percent were not uncommon in the sample, and in 11 cases, it exceeds the zinc content. As Justine Bayley has suggested for gunmetals, the zinc and tin in this sample occur in an inversely proportional relationship; 12 rings may be considered to be zinc-rich gunmetals, while the remaining 11 are tin-rich.[24] The presence of iron in these alloys, particularly in the tin-rich gunmetals (at or exceeding 3 percent in seven of the eleven examples) is as yet unexplained.

Lead was commonly used to improve the pourability and castability of copper-base metals. The more lead an artifact contains, the more likely it is to have been cast, rather than worked. Objects containing more than 4 percent lead are considered *leaded*.[25] Neither low-zinc brass ring falls into the leaded category, while 21 of the 23 gunmetal rings may be considered leaded.

As a common "utilitarian" copper alloy material, along with brass, gunmetal was used frequently in medieval Europe for the manufacture of everyday dress accessories (buckles, fittings, studs, eyelets, etc.) and jewelry (brooches).[26] While the "formula" for the alloy from which so many of these rings were made may seem complex, it makes perfect sense if one's intention is to achieve an attractive and affordable workaday material that is strong, nonductile, durable, castable, corrosion-resistant, yet lustrous, variably hued, and easy to decorate.

What, if anything, do the compositional results reveal about potential associations between their material makeup and method of ring manufacture, form, design, method of design application, meaning, and/or source? Notably, both of the rings that fell into the low-zinc brass category were cast/stamped and carried ecclesiastical motifs. Both had oval plaques and plain bands. However, rings of all decorative types, including stamped/cast, die-impressed, and engraved varieties, with both ridged and plain bands, and carrying ecclesiastical and secular motifs, also fell into the gunmetal category. Given this clear overlap in results and our small sample size, it is much too early in this research to draw any kinds of meaningful conclusions about the relationships among these variables. While the variation in materials may ultimately prove to have some further significance, right now we can only say that it may simply mean that the low-zinc brass rings came from (1) a different foundry, (2) a particular "pour," or (3) a particular batch that was commissioned to be made from a certain "recipe" to obtain a specific color or level of quality.

Another revealing consideration is that these rings, which were undoubtedly decorated in a local folk style whose iconography and meanings were well understood by local French wearers, are clearly *not* made of the same metals as many of their counterparts that now reside in museums, nor are they executed in such finely finished ways. As a point of contrast, many curated examples of French and British *bagues à foi* not only show a high level of craftsmanship but also reveal that they were frequently manufactured of precious metals—gold, and more often silver—and were sometimes inlaid with precious stones.[27] Copper-base metal specimens are infrequent. This is not to say, however, that

all or even most of the rings of this type made for consumption in France were manufactured by goldsmiths of precious metals. Indeed, museum specimens may form a distinct minority. As an expert on French jewelry, Claudette Joannis, has said, "For two hundred years, these rings remained in favor with princesses as with peasants."[28] Various styles (often linked to particular regions) are known to have been widely available to all as tokens, souvenirs, keepsakes, or objects of religious and/or secular sentiment. Religious pilgrimage sites were prime locales for the local sale of cheaply manufactured rings carrying religious iconography. IHS, the Virgin Mary, and the Crucifixion were common motifs.

We can now say with confidence that it is these less expensive, "mass-produced," and often crudely decorated rings made of everyday-use alloys that were destined for export to New France. What is not yet clear are the reasons for, and the circumstances surrounding, selection of these particular objects. Had trading agents, merchants, and purveyors, even representatives of the Jesuit order, ingeniously managed to co-opt a locally familiar and aesthetically pleasing group of items carrying suitable motifs that were *already* being produced cheaply in their own country for their own uses on the other side of the Atlantic? French suppliers and those who ultimately distributed them would have thought of these rings as nothing more than "pacotille,"[29] while Jesuits may well have viewed them as cheap but potentially useful devices for communicating aspects of the faith. Further, did these "trinket" rings, manufactured in Paris or closer to LaRochelle (likely their point of export), handily fit the needs and desires of multiple players (Europeans *and* Natives) on both ends of the quickly evolving world of European/Native interaction and intercultural communication?

Discussion

One of the more difficult things to see in the overall culture-contact situation in New France is exactly what the rings were for and how they were used in interactions between Native peoples and Frenchmen. Early on, the rings were interpreted as somehow associated with religious conversion, being given out to converts as a kind of reward for learning prayers and professing adherence to Christian doctrine.[30] As such, they were interpreted as "valuables" in the eyes of Native peoples in a religious context, rather than being merely baubles handed out with other more useful things (such as awls or knives, for example)

as part of a stream of gifts given to people by the French to smooth their way and induce reciprocity. Perhaps the earliest mentions of rings (variety unknown) being given out to Indians in New France come from Jacques Cartier, who was throwing them out to children and offering them specifically to women.[31] In either case, they do not seem to have been highly valued—not, at least, by Cartier, and perhaps not by those who received them. "Trifles" given to women and children were not of the same order as gifts given to those perceived to have real power and influence, i.e., men.

So far, it is impossible to know how often people of power and influence actually received or wore rings; when rings have been recovered in some sort of context, usually burials, they have often been on strings around the necks of children, in bags, or sometimes on the hands of adults. The interesting thing about the recovery of rings on hands is that the rings occur in numbers, far too many to have been comfortable as jewelry. Could they have been things given to the family of the dead, placed ostentatiously or kindly on the hands of the departed as part of the burial ritual, and not truly valued enough to want to keep among the living? This disposal of rings is entirely speculation, but Walthall's perceptive comment on the absence of rings as common jewelry among the living is pertinent.[32] Another possible use for rings might be in gaming—many of the rings recovered from the Bell site lack bands, too many to suppose the broken bands to have been accidental. It is possible that the plaques could have been part of simple gambling games where designs on one side and not the other could have functioned as pieces. Direct archaeological information on actual uses for the rings is relatively scanty since—except for their inclusion in some burials—most rings have been recovered as surface finds, randomly distributed in site fills, or recovered by collectors with metal detectors. Until uses for rings in Native societies can be teased out of an ethnohistorical record not remotely interested in recording them, all functions for them must remain speculative.

Conclusion

In the final analysis, then, the ring designs themselves may not be as important or informative as once thought for doing the essential archaeological business of establishing a timeline for their distribution. In this context, an idealized seriation of designs, or a minute identification of the symbols expressed on the

plaques may be a useful exercise and certainly an interesting one, but neither can reveal what archaeologists most need to know: whether indeed the rings can be used as chronological indicators.[33] Once the rings can be set in time, what roles they played and meanings they assumed within the context of New World interaction of Native peoples with newcomers and with each other can be considered. Except in the gross sense of being generally associated with one particular form of decoration or one particular form of manufacture, plaque designs are essentially irrelevant to the major archaeological end of chronological placement. A ring with the stamped, embossed image of St. Francis is simply a ring with a stamped-embossed image; whether it is St. Francis or Louis XIV or Mary Magdalene does not matter at this point. A ring with one kind of engraved design is a ring with that kind of engraved design, whether it is an L-Heart or an IHS. It is the way the design was applied that is significant for the beginning of analysis.

These rings still have a significant amount to teach us, and we are far from knowing even part of what is clearly a complex story. Further investigations into the rings' connections with the Old World through (1) technological studies of their original manufacture and a search for their sources, and (2) historical explorations into their meanings as love and friendship rings in rural France will be revealing as the rings become set into a larger historical context. How they were used, how they changed in meaning and function as they moved into the new universe created by contact is a whole new direction of study. Further systematic reevaluation of their appearances and associations in New World foreign *and* Native contexts should reveal much that we have been missing about these rings and the changing roles they played in both French and Native lives.

NOTES

1. The senior author would like to acknowledge the scholars whose work, advice, and endless cheerful sharing of data has made our work on the rings so fruitful: Charles Cleland, Charles Garrad, Jeffrey Behm, Robert Birmingham. James R. Paquette provided photographs. I am indebted to my colleague Kathleen Ehrhardt for her expertise, enthusiasm, and company on this exercise in historic research.

The second author wishes to thank the Missouri Department of Natural Resources for funding the archaeometallurgical component of this study, and William Hunter Branch

and Peter Branch from Branch Analytical Laboratory, Cranford, New Jersey, for their cooperation in the metallurgical (EDXRF and radiographic) testing. I am indebted to my colleague Dr. Sam Nash for assisting me with the metallography, which was carried out at the Museum Applied Science Center for Archaeology (MASCA), University of Pennsylvania Museum. My gratitude is also extended to the donors and their institutions for the loan of rings used in this study. I also wish to thank Mme. Anne Tricaud of the Musée national des arts et traditions populaires (Paris), and Mme. Claudette Joannis, Musée national du Château Malmaison (Rueil-Malmaison), whose personal attention to this research has added significantly to its content, and Ron Strojny for his technical expertise in metal-working technique.

2. Rings are often referred to as "brass" or "latten" in the literature. See note 23 below. Our characterization of these rings as copper-base metal reflects the current state of our archaeometallurgical knowledge as to their composition.
3. See Carol Mason, "Jesuit Rings, Jesuits, and Chronology," *Midcontinental Journal of Archaeology* 28, no. 2 (2003): 233–57.
4. The crude heart ring is what Mason has called "Markman" style. Carol I. Mason, "Iconographic ('Jesuit') Rings: A Case Study in Chronological Placement," to appear in the festschrift volume for James V. Wright, edited by David Keenlyside; and in press with the Mercury Series, Canadian Museum of Civilization.
5. Charles Cleland, "From Sacred to Profane: Style Drift in the Decoration of Jesuit Finger Rings," *American Antiquity* 37, no. 2 (1972): 202–10.
6. *Ibid.*, 208–9.
7. *Ibid.*, 202–10.
8. Carol I. Mason, "Jesuit Rings, Jesuits, and Chronology," *Midcontinental Journal of Archaeology* 28, no. 2 (2003): 233–57.
9. For comments on ring style and technology, see John A. Walthall, "Stylistic and Temporal Analysis," *Illinois Archaeology* 5, nos. 1 and 2 (1993): 500.
10. D. G. Smith and H. U. Matilla, "French Jesuit L-Heart Rings from Christian Island," *Palisade Post* 10, no. 1 (1987): 5–6.
11. Cleland, "From Sacred to Profane," 202–10.
12. Carol I. Mason, "Iconographic ('Jesuit') Rings," in press; see note 4.
13. Mason, Carol I., "Jesuit Rings, Jesuits, and Chronology." *Midcontinental Journal of Archaeology* 28, no. 2 (2003): 238.
14. See Carol I. Mason, "Iconographic (Jesuit) Rings at the Utz Site," *North American Archaeologist* 27, no. 1 (2006): 35, for an example.
15. See Carol I. Mason, "Reading the Rings: Decoding Iconographic ('Jesuit') Rings, n.d.,

Caroline Mercier, "Des gages d'amour pour la traite des fourrures: Transferts de sens et réappropriations des bagues 'jésuites' à motif L-Coeur et des bagues à motif foi en Amérique du Nord-est aux XVII et XVIII siècles," *Material Culture Review* 63 (Spring 2006): 28–41; and Kathleen L. Ehrhardt, "Among Their Most Precious Jewels: Exploring 'Jesuit' Rings as Evidence of Jesuit/Native Encounter," paper presented at the Annual Meeting of the American Society for Ethnohistory, Chicago, 27–31 October 2004.

16. Cleland, "From Sacred to Profane," 202.
17. Metallography is the study of the nature, structure, and fabrication history of metals and alloys through examination, by optical and electron microscopy, of prepared surfaces. Standard preparation techniques of mounting, grinding, and etching were used. The samples investigated consisted of a lengthwise cross section of the plaque, and a cross section of the band of an engraved ring from the Bell site (Bell 47-Wn-9 1632). These specimens were hot-mounted in epoxy and examined in both unetched and etched conditions at magnifications of 55–200x. Alcoholic ferric chloride ($AlFeCl_3$) was used as an etchant.
18. Twenty-two of the 25 rings in the overall sample were x-rayed using a GE industrial X-ray machine. Voltage ranged from 90–120 kilovolts with five milliamperes. Objects were shot for approximately 55–60 seconds and were positioned at different angles to assure unobstructed coverage. Fine-grained industrial x-ray film was used.
19. Positive Material Identification tests were performed at Branch Radiographic Laboratories, Cranford, New Jersey, using two types of industrial energy dispersive x-ray fluorescence spectrometric (EDXRF) analyzers—TN Spectrace (4 objects), and Innov-x Alloy Analyzer (21 objects). Instruments were calibrated on standards of known elements before each use. Objects were laid plaque-down on the detector window, and exposure was approximately 15 seconds. It is important to note that some artifacts had already been cleaned, but the corrosion layer was still present on many specimens (see Appendix A). While surface condition can influence results, cleaning was not permitted.
20. See Marian Campbell, "Gold, Silver, and Precious Stones," in *English Medieval Industries*, (1991; London: Hambledon Press, 2001), 126; and Oppi Untracht, *Metal Techniques for Craftsmen* (Garden City, N.Y.: Doubleday, 1968), 84–93, 111–19, for discussion.
21. George Quimby, *Indian Culture and European Trade Goods: The Archaeology of the Historic Period in the Western Great Lakes Region* (Madison: University of Wisconsin Press, 1966), 76; Larry D. Grantham, "The Illini Village of the Marquette and Jolliet Voyage of 1673," *Missouri Archaeologist* 54 (1993): 5; Carol I. Mason, "Jesuit Rings of Metals Other than Brass," *Midcontinental Journal of Archaeology* 30, no.1 (2005): 165–77.
22. Although we follow modern nomenclature for the characterization of the alloys presented here, it should be remembered that historic "recipes" for production of various alloys

were not nearly as precise as they are today. Scrap metals were frequently recycled, which complicates the picture significantly, and some of the alloys found in historic times are not in use today. Archaeometallurgists are continually challenged when attempting to classify ancient and historic alloys. See Justine Bayley, "Alloy Nomenclature," in *Dress Accessories c.1150–c.1450*, ed. Geoff Egan and Frances Pritchard (Woodbridge, Suffolk: Museum of London, Boydell Press, 2002), 13–17; and Claude Blair and John Blair, "Copper Alloys," in *English Medieval Industries*, ed. John Blair and Nigel Ramsay (New York: Hambledon Press, 2001), 81–83, for informative discussions.

23. Justine Bayley, "The Production of Brass in Antiquity with Particular Reference to Roman Britain," in *2000 Years of Zinc and Brass*, ed. P. T. Craddock (London: British Museum Press, 1998), 7.
24. Justine Bayley, "Alloy Nomenclature," 14–15.
25. *Ibid.*, 15.
26. Geoff Egan, "Introduction," in *Dress Accessories, c.1150–c.1450*, ed. Egan and Pritchard, ix; Mike Heyworth, "Metallurgical Analysis of the Dress Accessories," in *Dress Accessories, c.1150–c.1450*, ed. Egan and Pritchard, 388, 394.
27. Claudette Joannis, *Bijoux des régions de France* (Paris: Flammarion, 1992), 78; Ann-Michele Margerie and Monique Poulenc, *Les bijoux traditionnels français* (Paris: Musée National des Arts et Traditions Populaires, 1998), 118–23, 158–61.
28. Claudette Joannis, "Le coeur bijou, emblème sentimental religieux, historique," in a special newsletter prepared by the Conservation Départementale des Musées, Vendée in conjunction with the traveling exhibit "Bijoux des Régions de France," 18 October–31 December 1994, Galerie d'historie de la Vendée Écomusée Départemental, Château du Puy du Fou (les Épesses), 1–2; translation K. E.
29. "Pacotille" is roughly defined from the French as "cheap things or shoddy goods traded to natives." K. E. is indebted to Mme. Claudette Joannis, who pointed us to the use of the term.
30. See note 3.
31. H. P. Biggar, *The Voyages of Jacques Cartier* (Ottawa: Publications of the Public Archives of Canada, 1924), 176.
32. J. A. Walthall, "Stylistic and Temporal Analysis of Jesuit Rings in the Illinois Country," *Illinois Archaeology* 5, nos. 1–2 (1993): 504.
33. Carol I. Mason, "Reading the Rings: Decoding Iconographic ('Jesuit') Rings," n.d.

Appendix A. Iconographic Rings Compositional Results by EDXRF[1]

REF NO.	ARTIFACT NO.	SITE	DESIGN	BAND DEC	DESIGN APPLICATION[3]
Low-zinc brasses					
5	5810.2.214	St. Ignace	L-Heart	plain	c/s
6	5810.2.163.01	St. Ignace	Jesus	plain	c/s
High-zinc (zinc-rich) gunmetals					
12	5810.2.205.01.06	St. Ignace	bezel	plain	n/a
4	5810.2.182.01	St. Ignace	St. Francis	plain	c/s
1	1990-10-926 B519	Bell	A-heart	plain	di
24	JR1	Iliniwek Vil	I H S	ridged	di/e
20[2]	GF51148-16	Strickler	I H S	ridged	di/e
8	RI II B5 No. 5	Rock Island	heart/crown	plain	di
15	RI II 29E B2	Rock Island	scroll	plain	di/e
18	RI II B5 No.1	Rock Island	LI	plain	di
11	47-Wn-9 1608	Bell	sun	plain	di/e
17	RI II Tr2 B3 No.2	Rock Island	XX	plain	di
14	5810.2.184.01	St. Ignace	St. Francis	plain	c/s
16	RI II Tr2 B3 No.1	Rock Island	IA	plain	di/e
High-tin (tin-rich) gunmetals					
25	1990-190-924 B518	Bell	fish?	plain	e
21[2]	GF51148-17	Strickler	I H S	ridged	di
2	1990-10-925 B519	Bell	XX	plain	di
23	47-Wn-9 1632	Bell	fish?	plain	di/e
3	47-Wn-9 600	Bell	Fern	plain	di/e
7	RI II H 48B2	Rock Island	XX	plain	e
10	47-Wn-9 B520	Bell	star	plain/filed	e
9	47-Wn-9 1028	Bell	XX	plain/filed	di/e
19[2]	GF51148-15	Strickler	mirror hearts	ridged	di/e
22[2]	S4060	Strickler	L-Heart	ridged	di/e
13	MD6-145 550E510	St. Ignace	I H S	plain/filed	e

1. Results of the six most frequently occurring constitutents are included here; however, nickel, cobalt, manganese, vanadium, and bismuth were also incidentally detected in some rings. Results are expressed in percentage concentration.
2. Indicates those rings tested with TN Spectrace machine (see note 19)
3. KEY: c/s = cast/stamped; di = die impressed only; e = engraved only; di/e = die impressed and engraved; n/a = not applicable

Cu	Zn	Sn	Pb	Fe	Ti	CONDITION WHEN TESTED
83.46	14.81		0.43	1.13		cleaned
78.44	18.83		1.58	0.85	0.31	cleaned
84.34	9.67	3.63	2.50	0.80		cleaned
79.47	11.06	3.01	4.04	1.38		cleaned
73.31	19.67	2.17	4.81	0.43	0.36	partially cleaned
79.50	7.41	4.92	5.36	2.41	0.52	not cleaned
77.87	7.12	6.31	4.10	5.08	0.16	not cleaned
71.63	16.11	7.24	4.22	0.54	0.37	partially cleaned
71.40	10.76	8.24	7.54	1.10	0.96	not cleaned
71.28	15.38	6.93	5.83	0.58		partially cleaned
70.45	10.87	8.78	8.08	1.72	0.42	not cleaned
70.39	13.76	8.22	6.08	0.73	0.77	not cleaned
69.78	12.91	11.15	4.10	2.03		not cleaned
62.94	14.02	11.52	9.74	0.55	1.24	not cleaned
82.37	4.75	5.69	6.12	0.63	0.31	not cleaned
77.20	6.75	7.31	5.41	3.84	0.13	not cleaned
75.41	7.15	9.51	6.05	1.88		not cleaned
70.08	5.64	12.13	8.77	3.62		not cleaned
69.22	6.66	12.17	8.56	2.99	0.45	not cleaned
69.06	9.26	9.86	9.52	1.19	0.77	not cleaned
71.41	6.95	10.24	6.65	4.07	0.91	not cleaned
67.40	8.05	9.92	13.33	1.20		not cleaned
66.46	9.07	13.83	6.05	4.15	0.20	not cleaned
65.27	8.69	14.09	5.58	4.64	0.38	not cleaned
58.15	12.49	20.48	3.30	5.59		not cleaned