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à la façon de Bohème from the Cistercian Nunnery
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THIS ARTICLE is a contribution to the study of 18th-century glass from archaeological contexts, a largely unexplored theme in northern European archaeology. Unlike glass of the 16th and 17th centuries, 18th-century archaeological glass is studied only occasionally from a multidisciplinary perspective, combining archaeological, historical, and archaeometric data.¹ To date, the study of glass from the past 200 years has been based principally on objects in museums, which has resulted in a biased data set characterized by a marked concentration on high-quality products. Unfortunately, this approach excludes the assessment of several fundamental questions regarding the production, distribution, and consumption of glass for everyday use in a period of considerable change. By studying glass from an 18th-

century archaeological assemblage from Clairefontaine Abbey, we will explore these issues.

Clairefontaine Abbey, a small Cistercian nunnery, was founded in 1247 by the Luxembourgian countess Ermesinde in the valley of the river Durbach a few miles south of Arlon. Situated in an isolated location in the woods but near the village of Eischen and the fertile acres surrounding it, the house is a classic example of a Cistercian foundation. In 1997, excavation on the site began within the framework of a European project celebrating the 750th anniversary of the founding of the abbey. Over the ensuing years, this became a long-term research excavation, with a final season in 2007.² The archaeological remains of the abbey were particularly well preserved because of a lack of notable post-suppression occupation.

Acknowledgments. The archaeological fieldwork at Clairefontaine was directed by the late Prof. Dr. Johnny De Meulemeester and financed by the Walloon government. Post-excavation research has been carried out within the framework of the FNR Ph.D. project (Fonds National de la Recherche Luxembourg, Aides à la Formation Recherche, Project BFR06-80), "The Material Culture of Clairefontaine Abbey."

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1. Rare examples are discussed in Harold E. Henkes and Cora A. Laan, "Zeventiende en achttiende-eeuws 'Boheems' glaswerk uit Nederlandse en Vlaamse bodem," in *Gevonden voorwerpen*, Rotterdam Papers, v. 11, 2000, pp. 187–207; and Manuela Maria Luis de Almeida Ferreira, "Eighteenth-Century Wheel-Engraved Glassware from Lisbon," *Post-Medieval Archaeology*, v. 39, no. 2, 2005, pp. 233–242.

2. Davy Herremans and Johnny De Meulemeester, "L'Abbaye des moniales à Clairefontaine: Synthèse concise de 10 ans de recherches sur le terrain," *Bulletin Trimestriel de l'Institut Archéologique du Luxembourg-Arlon*, v. 86, nos. 3/4, 2010, pp. 181–199.

In the field campaigns of 2003 and 2004, a latrine complex in the northern wing of the cloister was excavated. The structure came into use during the first half of the 18th century. Historical sources attest a total reconstruction of the abbey around 1730, following a devastating flood.³ The latrine remained in use until the suppression of the abbey in 1794. The dumping of an extensive set of glass objects dates from this period. The material record includes 774 glass fragments, more than 55 percent of which came from bottles and various other types of storage wares made of green high-lime, low-alkali glass and blue soda-ash glass.⁴ This article focuses on the colorless glass that constitutes the other 45 percent of the assemblage. The morphology of the vessels and the engraved decoration suggest a central European origin or, at least, stylistic inspiration. Chemical analysis points to a glass recipe combining silica, lime, and potash: a colorless potash glass reminiscent of so-called Bohemian crystal, developed in northern central Europe at the end of the 1600s and produced all over Europe during the following century.

In the first part of this article, the typology, technology, and origin of the glass objects are considered. The descriptive analysis is supported by chemical research (scanning electron microscopy–energy-dispersive X-ray spectroscopy [SEM-EDX]). In the second part, the finds are discussed in light of changing consumer habits and the emerging rock crystal–like glass production and consumption in 18th-century Europe and the Luxembourgian area.

THE CLAIREFONTAINE GLASS SET

The colorless Clairefontaine glass features a wide typological variety of vessels, all of which are dated to the 18th century. Most of these vessels are conical beakers. Although there are some undecorated examples, the majority were decorated in one of two ways. The glass was blown in a relief mold or copper-wheel engraved to produce mainly floral and geometric patterns. Similar decoration is found on other table and

drinking glasses in the assemblage, including shot glasses and jugs. There are a few goblets, along with a limited number of undecorated cups and small bottles.

Bottles

Two types of colorless bottles were included in the assemblage. Several fragments are part of similar kinds of phials (Fig. 1.17). These small (H. 12 cm) cylindrical bottles with a slightly raised base and a funnel-shaped mouth were used to store medicinal products or other volatile fluids. Some fragments belong to square storage bottles (H. 20 cm), which are characterized by rounded corners and a stockier body that tapers toward a narrow mouth with an out-turned rim (Fig. 1.16). This type of bottle was used for the consumption of snuff.

Goblets

Goblets were used for the drinking of wine. In general, 18th-century crystal goblets were less profusely decorated than the 16th- and 17th-century Venetian-style examples. The few undecorated goblets in the Clairefontaine assemblage can be clustered into three groups: (1) cup-shaped, with a hollow baluster stem and decorated with one or more globular knobs (Fig. 1.13 and 1.15); (2) with a cup-shaped bowl on a solid and knopped baluster stem (Fig. 1.14);

3. Hippolyte Goffinet, "L'Ancienne Abbaye de Clairefontaine," *Annales de l'Institut Archéologique du Luxembourg*, v. 42, 1907, pp. 117–156, esp. p. 129.

4. For a more detailed chemical analysis of the complete glass assemblage, see Davy Herremans and others, "Composition and State of Alteration of 18th Century Glass from the Cistercian Nunnery of Clairefontaine (Belgium)," in conference proceedings of the Society of Photographic Instrumentation Engineers (today known as The International Society for Optics and Photonics), Brussels, April 16–19, 2012, in press. For the chemical composition of post-medieval European soda-ash glass, see Karl Hans Wedepohl, Klaus Simon, and Andreas Kronz, "Data on 61 Chemical Elements for the Characterization of Three Major Glass Compositions in Late Antiquity and the Middle Ages," *Archaeometry*, v. 53, no. 1, February 2011, pp. 81–102.

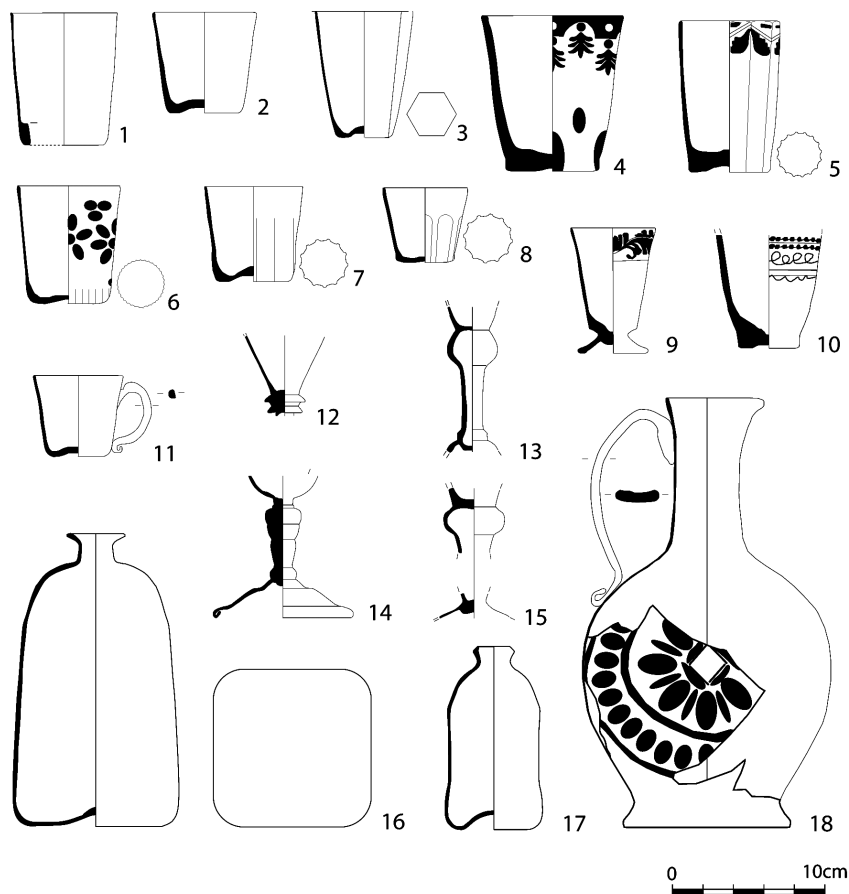


FIG. 1. Typology of colorless glass from Clairefontaine.

and (3) with a conical bowl and a solid stem with applied ribs, also known as *mezza stampatura* (Fig. 1.12).

Beakers

Beakers or tumblers became the most common type of drinking vessel from the end of the 17th century onward. Morphologically, they vary only slightly (Fig. 1.1–1.8). Their most common form is conical. The variance in size is also slight; rim diameters range between six and nine centimeters, and heights are between 10 and 11 centimeters. Both thick- and thin-walled beakers are present in the Clairefontaine assemblage. The thick-walled examples are characterized by a heavy, solid base that is sometimes slightly inverted, while the thin-walled beakers

have a lighter and more defined inverted base. Both kinds of beakers were introduced in the north by central European glassmakers: a 1769 inventory from a trade company in Amsterdam mentions both “*Becher glatte Dickboden*” (smooth beakers with a heavy base) and “*Becher Dünnboden runde glatte*” (smooth beakers with a thin base).⁵

Although a significant number of beakers are undecorated, many of the tumblers display profuse ornamentation. Several decorative techniques can be recognized, and they are often

5. Henkes and Laan [note 1], p. 190; Edmund Schebek, *Böhmen Glasindustrie und Glashandel: Quellen zu ihrer Geschichte*, Prague: Verlag des Handels- und Gewerbeamtes, 1878, pp. 221–254.

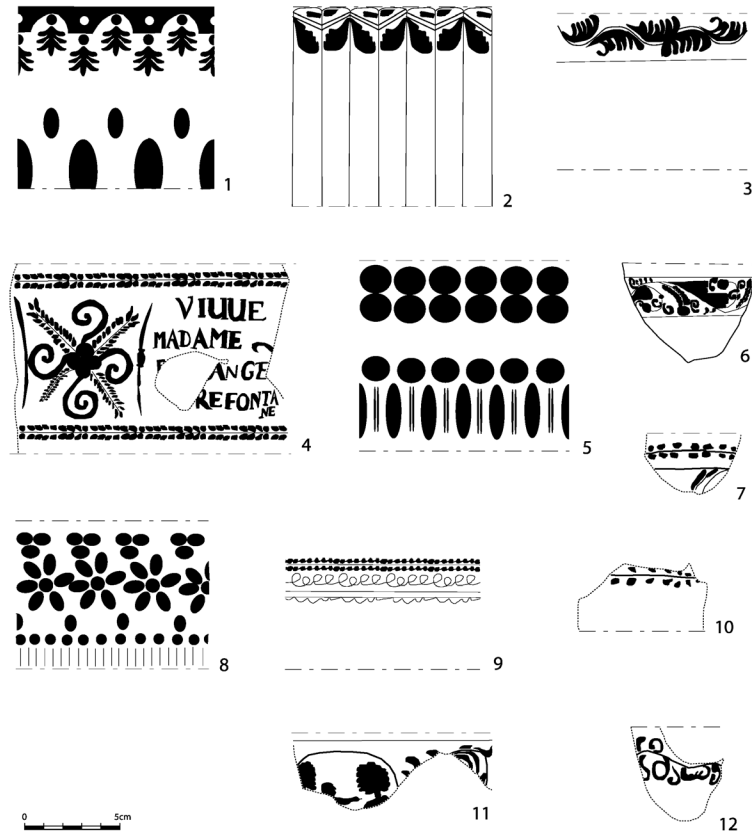


FIG. 2. *Decorative patterns on Bohemian-style colorless tableware.*

used in combination. The relationship between the thickness of the glass and the choice of decorative technique is striking. For example, many of the thick-walled tumblers are facet-cut or covered with abundantly engraved designs. In the latter case, decorative patterns were copper-wheel engraved.⁶ This technique was introduced into glass production during the late 16th century, and it continued to be employed well into modern times. The Bohemian potash glass, which was soft and calcareous, was well suited to engraving.

The designs were often restricted to certain parts of the glass objects. In the case of the various types of drinking vessels, a band of subtle, ornamental lacework generally runs around and just below the rim. For example, a decorative

frieze appears on the upper part of a fragmentary beaker. The design consists of festoons squeezed inside a linear motif (Fig. 2.6). Another common motif is the bucolic scene (Fig. 2.11). In this instance, two individuals are shown in a rural setting, surrounded by trees, and one of the figures points toward something unidentifiable in the background.

The lower parts of the beakers are mostly undecorated. Only occasionally is the entire body covered with an engraved pattern. One example has an engraved maxim on the front and a floral design on the back, with fasces on both sides

6. Zuzana Pesatova, *Bohemian Engraved Glass*, Prague: Paul Hamlyn, 1968, pp. 7–9.

(Fig. 2.4). Beneath the rim and above the base, a wavy line is displayed. The inscription suggests that the vessel was made for a particular individual. The surviving letters, of uneven quality, can be read as “VIVU MADAME F. . . ANGE . . . REFONTA[I]NE.” A wish for good health (Viva) is occasionally found on 18th-century drinking vessels all over Europe,⁷ but the custom of decorating glasses with such sentiments dates back to Roman times.⁸ The beaker was probably owned by Cécile de Florange, precentor in the nunnery of Clairefontaine in the first half of the 18th century.⁹

Some of the tumblers in the assemblage were cut as well as engraved. A well-preserved example has an engraved lambrequin (Fig. 3), while the lower portion of the object is decorated with cut facets (Fig. 2.1). Very common are tumblers with an undecorated upper part and cut facets in the base, resulting in rows of contiguous arcades (Fig. 1.8). In a more advanced variation, cutting was used to shape the body of the glass, as shown here in one late 18th-century faceted tumbler (Fig. 1.3).

The use of relief molds afforded some of the other beakers a varied appearance. Several of these objects have parallel oblique ribs covering the base (Fig. 1.7) or even the entire body (Fig. 1.5). One complete vessel has engraved lacework, consisting of geometrical lines and rather abstract leaves, just below the rim (Fig. 1.5). A single late 18th-century beaker illustrates the choice of very elaborate relief molds; instead of a wheel-engraved design, it presents a rather abstract domed floral pattern (Figs. 1.6 and 2.8).

Cups

These glasses, which were also used in the drinking of beverages, are related in form to the beakers described just above. The body of these vessels is shaped like a truncated cone (Fig. 1.11). The main difference here, in contrast to the tumblers, is the presence of a vertical handle applied to the body. The cross section of the handle varies from round to oval. Another difference can be seen in the dimensions: the cups



FIG. 3. Well-preserved beaker with engraved lambrequin.

are smaller in height (5 cm) than in width (6 cm), which results in a stockier shape. There were no decorated cups among the Clairefontaine assemblage.

Shot Glasses

These small, stemmed drinking vessels were used for the consumption of liquor. The conical body slowly tapers to a foot (Fig. 1.9). The height (including the foot) varies between eight and 10 centimeters, while the diameter of the rim is usually about five centimeters. Although some of these glasses are undecorated, most of them have bands of engraved designs just below the rim.

Jugs

Highly decorated jugs, which were used for serving wine and other liquids, were an indispensable part of 18th-century tableware. The

7. Henkes and Laan [note 1], p. 203.

8. Susanna Künzl, *Die Trierer Spruchbecherkeramik: Dekorierte Schwarzfirniskeramik des 3. und 4. Jahrhunderts n. Chr.*, Trierer Zeitschrift für Geschichte und Kunst des Trierer Landes und seiner Nachbargebiete, v. 21, Trier: Selbstverlag des Rheinischen Landesmuseums, 1997.

9. Goffinet [note 3], p. 130.



FIG. 4. *Abstract floral motif on fragmentary wine jug.*

two fragmentary specimens in the Clairefontaine assemblage are quite similar in form. The body is a flattened sphere with a domed front and back. The neck is long and narrow, and there is a flaring rim with spout. A vertical handle with a strap profile extends from the neck to the body. These jugs would have been about 25 centimeters tall, with a rim diameter of about four centimeters. The front of one of the Clairefontaine jugs is heavily decorated (Figs. 1.18 and 4). At the center of the motif, which is situated inside two concentric circles, is a flower with a diamond-shaped pistil and alternating elongated and rounded petals. The space between the circles is filled with rounded petals. The wheel-engraved design has an abstract appearance, created through a combination of cutting and engraving.

Judging from glass recovered during archaeological research in the Low Countries, there was a marked interest in abstract designs during the second half of the 18th century.¹⁰ One preserved tumbler was probably part of a table set consisting of a jug and several beakers. While not identical, the decoration on the tumbler is clearly related stylistically to that on the jug: two rows of cut facets appear just below the rim. The base has cut facets alternating with vertical incisions. The pattern resembles that on the ribbed bases of the mold-blown beakers. Above this band is another row of cut facets.

Saltcellar

Saltcellars are hard to distinguish from tumblers unless the base of the vessel is preserved. The lower body is another distinguishing feature, tapering more distinctively toward a narrow, solid base (Fig. 1.10). The diameter of the base of the sole example in the abbey's assemblage is about four centimeters. The upper part of the vessel is decorated with rudimentary linear engraving (Fig. 2.9).

FASHIONABLE GLASS OF DOUBTFUL QUALITY

Experimental Glass

The composition of the colorless glass found at Clairefontaine Abbey is generally similar to that of glass made with recipes developed by northern central European glassmakers in the late 17th century.¹¹ Recipe books mention the raw materials for the production of this kind of glass. It was normally made by melting together purified white sand, relatively high amounts of lime derived from crushed limestone or chalk, and a source of potash. The high purity of the sand, the low amount of iron, and the presence of manganese enabled the glassmakers to obtain colorless glass.¹²

During the 18th century, both kinds of colorless glass were produced in the forests of southern Bohemia and elsewhere in central Europe.

10. Henkes and Laan [note 1], p. 188.

11. Olga Drahotová, "Late 17th-Century Changes in Bohemian Glassmaking," in Dedo von Kerksenbrock-Krosigk and others, *Glass of the Alchemists: Lead Crystal-Gold Ruby, 1650-1750*, Corning: The Corning Museum of Glass, 2008, pp. 74-95.

12. Jerzy J. Kunicki-Goldfinger and others, "Analyses of 18th-Century Central European Colourless Glass Vessels," *Annales de l'Association Internationale pour l'Histoire du Verre*, v. 15, New York and Corning, 2001 (Nottingham, 2003), pp. 224-229; Martin Mádl and Jerzy J. Kunicki-Goldfinger, "Eiland: Georg Gundelach and the Glassworks on the Děčín Estate of Count Maximilian Thun-Hohenstein," *Journal of Glass Studies*, v. 48, 2006, pp. 255-277.

The production of crystal was more costly, and its purchase was therefore limited to members of the upper class. Purified potash and other technical innovations, such as a furnace with two hearths, allowed Bohemian glassmakers to create relatively inexpensive but high-quality chalk glass on a large scale. This glass would become the most highly valued export of Bohemia's glass industry.¹³

Based on the compositional analysis of several central European and German Baroque glass samples, Jerzy J. Kunicki-Goldfinger distinguished between crystal and white (chalk) glass, a division that is also noted in recipe books and other historical accounts.¹⁴ It seems that Baroque crystal and chalk glass followed the tradition of Venetian *cristallo* and *vitrum blanchum*. However, the recipes were altered by substituting potash for soda as a flux and by the introduction of lime. The distinction between the two types of central European Baroque glass is generally made by calculating variables from the alkaline and alkaline earth oxide concentrations and by assessing the potassium:calcium ratio. The presence or absence of arsenic and lead may also be an indicator.¹⁵ In the case of the Clairefontaine glass, two subgroups of potash glass can be identified by quantitative analysis with SEM-EDX (Fig. 5).¹⁶ Group CLF1.1 is characterized by a K₂O:CaO ratio of 1.67, with the occasional presence of arsenic and lead, and it more closely resembles the recipe for white glass. The more abundant CLF1.2 group features a clearly unbalanced K₂O:CaO ratio of 5.25 and an absence of arsenic, which resembles the recipe for central European crystal. The

	CLF1.1 (n=20)	CLF1.2 (n=41)
Na ₂ O	1 ± 1	1.2 ± 0.4
MgO	1.3 ± 0.8	0.3 ± 0.3
Al ₂ O ₃	1 ± 1	1.6 ± 0.6
SiO ₅	71 ± 3	71 ± 2
P ₂ O ₅	n.d.	n.d.
Cl	0.1 ± 0.1	0.1 ± 0.1
K ₂ O	15 ± 2	21 ± 2
CaO	9 ± 1	4 ± 1
MnO	0.4 ± 0.3	0.6 ± 0.2
Fe ₂ O ₃	0.2 ± 0.1	0.2 ± 0.1
As ₂ O ₃	1 ± 1	n.d.
PbO	1 ± 1	1 ± 1

FIG. 5. Composition of Clairefontaine potash glass, as determined by SEM-EDX.

alkaline and alkaline earth oxide concentrations confirm this subdivision.

A clear relationship has been found between the type of alteration observed macroscopically and the glass composition, as determined by SEM-EDX. A significant part of the glass seems to be unweathered (Fig. 6); there are no visible signs of alteration. An equally sizable part has an opaque white patina on the surface. The cloudy appearance indicates the presence of alkali and incipient crizzling. A smaller number of samples are heavily crizzled: the cracking has progressed, and, in many cases, spalling has occurred, resulting in the loosening of small chips

13. Drahotová [note 11].

14. Kunicki-Goldfinger and others [note 12]; Jerzy Kunicki-Goldfinger, "Preventive Conservation Strategy for Glass Collections: Identification of Glass Objects Susceptible to Crizzling," *Cultural Heritage Research: A Pan-European Challenge*, proceedings of the 5th European Communities Conference, Kraków, 2003, pp. 301–304; Mádl and Kunicki-Goldfinger [note 12].

15. Mádl and Kunicki-Goldfinger [note 12], pp. 271–277.

16. Small glass samples (a few mm²) were removed from the archaeological finds and embedded in acrylic resin. The resin blocks were mechanically ground with silicon carbide paper and

polished with diamond paste down to a particle diameter of 0.25 mm in order to obtain a smooth surface of unaltered glass. Finally, the resin blocks were coated with a thin carbon layer and SEM-EDX measurements were performed with a JEOL 6300 SEM equipped with an energy-dispersive X-ray detector. The spectra were collected for 100 seconds by using a 2 nA electron beam current, an accelerating voltage of 20 kV, and a microscope magnification of 500X. The net intensities were calculated with the program AXIL and quantified by means of a standardless ZAF program. Precision and accuracy were tested by analyzing NIST and Corning glass standards.



FIG. 6. Visible alteration of colorless glass. Left to right: unweathered, white patina, and crizzled.

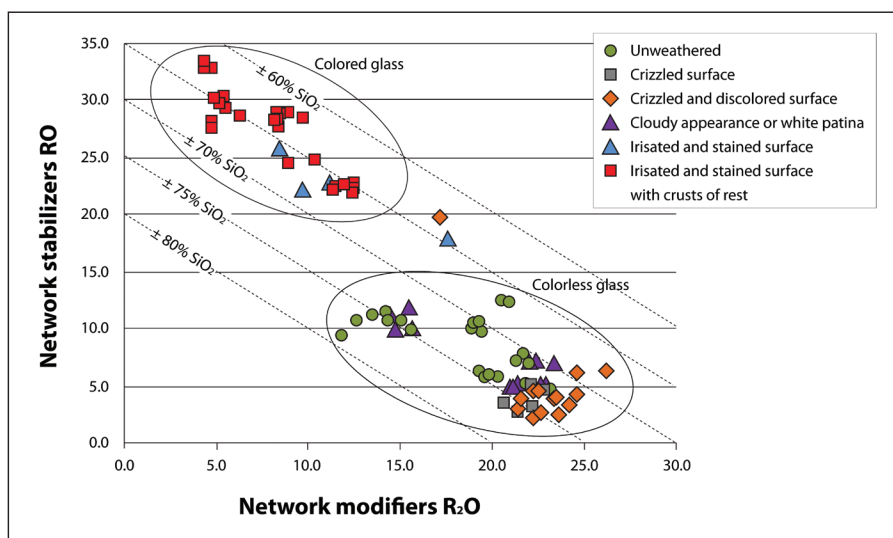


FIG. 7. Network modifiers/stabilizers in Clairefontaine glass, with samples divided according to their state of alteration. The colorless glass clusters at the bottom right of the figure.

or flakes from the surface. Several of these heavily altered fragments are discolored, turning the glass from colorless to brownish.¹⁷ The heavily crizzled glass corresponds to group CLF1.2, the potash glass with unbalanced levels of potassium and calcium. The lack of calcium, a glass stabilizer, creates a glass that is easily subject to weathering because of the leaching of potassium (Fig. 7). The change from colorless to pinkish might be explained, according to Kunicki-Goldfinger, by the changes to the structural position of manganese in the deteriorated glass and/or by light scattering because of the presence of alteration bodies.¹⁸

Because of the small number of published chemical analyses of Baroque colorless glass, it is hard to attribute the Clairefontaine glass to a particular area of origin. Nevertheless, the chemical composition of the glass offers several indirect indications of a local or at least regional

17. Jerzy J. Kunicki-Goldfinger, "Unstable Historic Glass: Symptoms, Causes, Mechanisms and Conservation," *Reviews in Conservation* (The International Institute for Conservation of Historic and Artistic Works), v. 9, 2008, pp. 52–53.

18. *Ibid.*; Simone Cagno and others, "Evaluation of Manganese-Bodies Removal in Historical Stained Glass Windows via SR- μ -XANES/XRF and SR- μ -CT," *Journal of Analytical Atomic Spectrometry*, v. 26, no. 12, 2011, pp. 2442–2451.

genesis. The spread of concentrations of major components within the compositional groups CLF1.1 and CLF1.2 and the relatively high potassium:calcium ratio found in the Clairefontaine glass, with respect to the reference values for 18th-century potash glass,¹⁹ suggest that the glass objects found in the nunnery were of a less stable type of chalk-based glass than was produced by experienced central European glassmakers.

From the early 18th century onward, the glass industry flourished in the Walloon area, the Vosges, the Lorraine, and along the river Saar, all of which are located (not coincidentally) near charcoal resources.²⁰ Desiring to share in the success of the new kinds of relatively inexpensive high-quality glass, local industries were soon making colorless glass in both British and central European styles. In the face of competition and in an effort to meet market demands, glass companies needed to offer a variety of vessel types. Most factories produced, to a minor extent, high-quality products for local courts and nobility, as is known from museum catalogs. At the same time, they became the leading suppliers of cheaper and more common colorless glass in the southern Low Countries and surrounding areas.²¹

The major challenge for the young local industries during the first half of the 18th century was replicating the original British and central European recipes. Historical sources demonstrate that glassmakers struggled with the stability of their glasses. Their lack of knowledge and experience made their products much more susceptible to deterioration and crizzling.²² Because recipes were retained as family secrets and were passed down from father to son, success was, for a long time, tied to the presence of one or more foreign master glassworkers on the companies' payroll. This was the case, for example, with the Walloon industry; it was not until 1746 that Sebastien Zoude, a glassmaker in Namur, proudly claimed to have developed the ideal recipe for high-quality potash-lime and potash-lead glass.²³ The lower quality of the Clairefontaine glass, and particularly the unbalanced alkaline

and alkaline earth element ratio, caused extensive alteration visible in the form of crizzling, a problem experienced by many glassmakers during the 18th century.²⁴ Given the location of Clairefontaine Abbey—near Arlon, close to the glass manufactories in Wallonia, the Lorraine, and the Saarland—it would not be surprising to learn that the sisters bought their glass from a merchant supplied by one of these emerging industries.

Decorated in a Hurry

The patterns of decoration on the colorless Clairefontaine glass provide samples of wheel-engraved motifs employed in the northern European glass industry. Although some of these designs seem to have been made by more experienced and talented glass cutters (e.g., Fig. 2.1, 2.3, and 2.11), most of them are rather clumsy and appear to have been hastily made, and they are of little aesthetic value (e.g., Fig. 2.2, 2.9, and 2.12). The collection includes a fragmentary beaker and a shot glass with related patterns of festoons inside a linear motif. The decoration on the beaker is detailed and refined, displaying leaves alternating with lilies of the valley. The design on the shot glass is less ornate, with a festoon consisting only of leaves. Other beakers

19. Kunicki-Goldfinger and others [note 12]; *idem* [note 14]; Mádl and Kunicki-Goldfinger [note 12], pp. 271–277.

20. Hubert Cabart, *La Verrerie archéologique: Dieulouard et l'Est de la France aux XVI^e et XVII^e siècles*, Nancy: Presses Universitaires, 2011; Luc Engen, *Het glas in België: Van de oorsprong tot heden, onder leiding*, Antwerp: Mercatorfonds, 1989; Eva Mendgen, "'Genie du travail': Kristallglasmacher in der Großregion Saarland-Lothringen-Luxemburg-Rheinland-Pfalz-Wallonien," *Pressglas-Korrespondenz*, no. 4, 2010, pp. 386–393.

21. Engen [note 20], pp. 67–192.

22. Peter Francis, "The Development of Lead Glass: The European Connections," *Apollo*, v. 151, no. 456, February 2000, pp. 47–53, esp. p. 47.

23. Raymond Chambon, *L'Histoire de la verrerie en Belgique du 11^{me} siècle à nos jours*, Brussels: Librairie Encyclopédique, 1955, p. 133; David C. Watts and Hugh Tait, "Assessing the Authenticity of the Putative Sebastien Zoude Catalog of 1762," *Journal of Glass Studies*, v. 49, 2007, pp. 153–178.

24. Francis [note 22].

are decorated with a vine below the rim or just above the base. This is one of the most common decorative patterns on Bohemian-style crystal from the early 18th century onward. Tableware with this kind of vine, consisting of a stem with repeating leaves on both sides, was produced in northwestern Europe and Bohemia until the late 18th century. Some of the vines on the Clairefontaine glass are carefully engraved (Fig. 2.10), but others were carelessly and poorly executed (Fig. 2.7). The vines on the saltcellar are abstract to such an extent that they are hardly recognizable (Fig. 2.9).

Scholars tend to emphasize the importance of the migration of Bohemian and German glass cutters through Europe during the 18th century.²⁵ Indeed, craftsmen wandered from factory to factory, offering their skills. Karel Hetteš refers to a guild book that mentions several glass cutters who left Bohemia to work in the northwestern European glass industry; among them was Elias Horn, a native of Kamenický Šenov, who established himself, by royal permission, in Stockholm. He was followed, a few years later, by his colleague Tobias Oppits. The Gerners, father and son, who came from Polevsko, were employed in the Kungsholm glass industry in the 1740s.²⁶ Researchers have traced the movement of glass cutters from Bohemia who took their pattern books to Portugal, where they were hired by the Royal Manufactory of Glass in Coïna, near Lisbon.²⁷

The impact of these master craftsmen on the mass production of more common household glass should not be overestimated. In 1764, there were 38 glassworkers on the payroll of the glass manufactory of Sebastien Zoude in Namur: six master glassmakers, six servants, a variety of laborers, and only one glass cutter.²⁸ Master glass cutters hired by larger manufactories were probably involved mainly in the finishing of high-quality wares, while merchants' houses enlisted various glassworkers with differing backgrounds. It seems that only a small number of them were actually schooled in the art of glass cutting. At best, the others were active in a related artistic field. Some of them appear to have

combined their activities as glass cutters with working as painters. A major part of the glass was probably decorated in the merchant's house or in the marketplace by traveling merchants and less refined artisans such as knife grinders.²⁹ Many half-finished products that were undecorated (or decorated only in part) left glass manufactories in Bohemia and northwestern Europe to be finished by local merchants. It is likely that this practice continued when the local manufactories upgraded their production.

It is also worth noting that the engraving on the Clairefontaine glass appears to have been only slightly affected by stylistic changes during the 18th century. The high-quality engraved glasses found in museum collections and various publications³⁰ display detailed figural designs that clearly reflect Baroque, Rococo, and Classical styles. Their decoration thus affords a trustworthy basis for accurate dating. In contrast, the motifs found on the glass from Clairefontaine and other archaeological sites seem to have evolved very little. They are dominated by festoons, floral themes, and wavy lines. These patterns, together with a pronounced enthusiasm for symmetry and repetition, clearly originated in the Baroque aesthetic.³¹ Therefore, it is hard to believe that they were made by master

25. Pesatova [note 6], pp. 7–21.

26. Karel Hetteš, "O tradici českého skla a jeho původnosti (On the tradition of Bohemian glass and its originality)," *Tvar*, v. 13, no. 1, 1962, pp. 2–28, esp. pp. 15–16.

27. Ferreira [note 1]; Jorge Custódio, *A Real Fábrica de Vidros de Coïna (1719–1747) e o vidro em Portugal nos séculos XVII e XVIII: Aspectos históricos, tecnológicos, artísticos e arqueológicos*, Lisbon: Instituto Português do Património Arquitectónico, 2002.

28. Engen [note 20], p. 89.

29. Henkes and Laan [note 1], p. 193.

30. Georg Höltl, *Das Böhmische Glas, 1700–1950*, v. 1, *Barock, Rokoko, Klassizismus*, Passau: Passauer Glasmuseum, 1995; Sylva Petrová and Jean-Luc Olivie, eds., *Bohemian Glass, 1400–1989*, New York: Abrams, 1990; Olga Drahotová, *European Glass*, London: Peerage Books, 1983, pp. 92–133; Antonín Langhamer, *The Legend of Bohemian Glass: A Thousand Years of Glassmaking in the Heart of Europe*, Zlín, Czech Republic: Tigris, 2006; Pieter C. Ritsema van Eck, *Glass in the Rijksmuseum*, 2 vv., Zwolle: Waanders Uitgevers, 1995, v. 2, pp. 172–478.

31. Olga Drahotová, "Geschnittene und geschliffene Gläser," in Höltl [note 30], pp. 42–43.

Bohemian glass cutters, all of whom were well-educated men moving among the higher levels of society and therefore familiar with the latest stylistic and cultural developments.³²

That one glass object could be decorated by more than one engraver is illustrated by the beaker with the engraved motto in the Clairefontaine assemblage. In the first stage of decoration, the tumbler was ornamented with the floral motif between the fasces. Although the twigs in the central theme are unequal in length, the design is detailed and carefully engraved. However, the unpolished style of the engraved maxim squeezed between the two fasces should be noted (Fig. 2.4). The engraver failed to estimate the space for the inscription correctly: the last two letters of what was supposed to be “CLAIRE-FONTAINE” were awkwardly placed beneath the rest of the word. It seems that the beaker was personalized on the way from the manufactory to the customer.

HOLY VOWS, WORLDLY MANNERS

Fundamental changes in material culture can be noted from the late Middle Ages onward,³³ although it seems that advances beginning in the 17th century were more radical and extended to a wider range of social groups. In this period, a new kind of material consumerism emerged, and it reached its apogee in the 18th century. The archaeological and historical study of housing culture shows that from the late 17th century

onward, in noble and upper-class circles, pewter and silver table wares were replaced by a variety of crockery, based on the latest fashions, including high-quality Asian porcelain and abundantly engraved “exotic” British and central European glasses.³⁴ The transformation in material culture was, in fact, only a marginal change, shaped by the rise of a global market and the establishment of a new European lifestyle. Colonial trade gave access to exotic imported goods—such as chocolate, tea, coffee, sugar, and tobacco—that were soon being consumed by large portions of the European population.³⁵ New dietary customs and related social practices resulted in the need for an adopted material culture.³⁶ In the late Middle Ages and the 16th century, the wealthy saw material culture as a tool for display and a store of value: objects needed to be of high quality, beautiful, and—even more important—very durable and of high secondary value.³⁷ In the 17th century, material goods lost their significance as symbols of wealth and became a material testimony to a civilized way of life. The true meaning of material culture was no longer related to secondary market value. On the contrary, most of the new consumer items were very fragile and breakable. Objects needed to be in fashion. Equally important was their suitability for the performance of social practices, such as drinking tea, coffee, or hot chocolate, and the habit of convivial dining.

During the 18th century, these ways of living became generally accepted by individuals at all

32. Pesatova [note 6], p. 18.

33. Frans Verhaeghe, “Towns, Culture and Material Culture: A Few Thoughts following a Conference,” in *La Ville et la transmission des valeurs culturelles au bas Moyen Age et aux temps modernes. 17^e Colloque International: Actes, Pro Civitate*, Collection Histoire, v. 8, Brussels: Crédit Communal de Belgique, 1996, pp. 335–344.

34. Bruno Blondé, “Tableware and Changing Consumer Patterns: Dynamics of Material Culture in Antwerp, 17th–18th Centuries,” in *Majolica and Glass from Italy to Antwerp and Beyond: The Transfer of Technology in the 16th–Early 17th Century*, ed. Johan Veeckman and others, Antwerp: [Stad Antwerpen], 2002, pp. 295–312.

35. John Elliot Wills, “European Consumption and Asian Production in the Seventeenth and Eighteenth Centuries,” in

Consumption and the World of Goods, ed. John Brewer and Roy Porter, London and New York: Routledge, 1993, pp. 133–147.

36. Sara Pennell, “‘For a Crack or Flaw Despis’d’: Thinking about Ceramic Durability and the ‘Everyday’ in Late Seventeenth- and Early Eighteenth-Century England,” in Tara Hamling and Catherine Richardson, *Everyday Objects: Medieval and Early Modern Material Culture and Its Meanings*, Farnham, Surrey, U.K., and Burlington, Vermont: Ashgate Pub., 2010, pp. 27–40.

37. Bruno Blondé and Ilja van Damme, “Retail Growth and Consumer Changes in a Declining Urban Economy: Antwerp (1650–1750),” *The Economic History Review*, v. 63, no. 3, 2010, pp. 638–663.

social levels—from working class to middle class to nobility.³⁸ The transition from a purely agricultural society to a proto-industrial wage economy allowed a wider range of social groups to enter the market.³⁹ For most common people, the reorganization of employment meant more continuity in labor demand and an increase in annual household income. As they were forced into the constraints of a full-time job, their time was reordered, with clear divisions between work and leisure.⁴⁰ On the other hand, a new wealthy middle class of proto-industrialists and urban merchant entrepreneurs emerged.⁴¹ Exotic goods were quickly transformed from luxury articles into products for everyday use, even for a large portion of the poor and lower middle classes.⁴² The more colorful and diversified material culture associated with such new consumer practices entered most 18th-century households by means of porcelain and glass of various qualities. Next to these products, a range of locally or regionally produced crockery appeared, such as porcelainlike tin-glazed delft ware and lead-glazed earthenware. From the second half of the century onward, saucers, cups, and other tea wares in English industrial ceramics became fashionable.⁴³ Archaeological research in the Low Countries shows that, during this period, rather ungracefully engraved colorless glass *à la*

façon de Bohème was present in almost every urban middle-class household.⁴⁴ It is probable that the purchase of top-grade products, as known from museum catalogs, was the privilege of the upper and middle classes and the aristocracy.⁴⁵ The same can be noted for porcelain: imperial quality was found mainly in courtly and high-class urban repertoire.⁴⁶ Most of the high-quality goods, expensive even for the wealthy, were not for daily use and were kept and displayed by the owners as marks of their social position.

How can we apply these general observations on 18th-century consumer culture to daily life and the consumption of colorless glass inside Clairefontaine Abbey? Assessing material culture and female monastic life is a difficult exercise, because human behavior inside the abbey's walls was conditioned by several conflicting social identities. Monastic life and, often, gender-specific restrictions forced those who had taken holy orders into a straightjacket of multiple regulations, creating a new habitus for the daughters chiefly of the elite, who had been raised in a liberalizing secular society.⁴⁷ Therefore, in order to fully understand the consumption behavior of the sisters of Clairefontaine, it is necessary to focus both on their background and on the social setting in which they were living.

38. Anne E. C. McCants, "Poor Consumers as Global Consumers: The Diffusion of Tea and Coffee Drinking in the Eighteenth Century," *The Economic History Review*, v. 61, no. 1, 2008, pp. 172–200.

39. Franklin F. Mendels, "Proto-Industrialization: The First Phase of the Industrialization Process," *The Journal of Economic History*, v. 32, no. 1, March 1972, pp. 241–261.

40. Jan De Vries, *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present*, Cambridge: Cambridge University Press, 2008, pp. 25–40.

41. Blondé and van Damme [note 37].

42. McCants [note 38].

43. Blondé [note 34].

44. E.g., Henkes and Laan [note 1]; Arnold Carmiggelt and V. L. C. Kersing, *Tussen hof en herberg: Archeologisch onderzoek aan de zuidzijde van het Binnenhof in Den Haag*, The Hague: Gemeente Den Haag, Dienst Stadsbeheer, Hoofdafdeling Archeologie, 1992, p. 63; Hemmy Clevis and Jaap Kottman, *Weggegooid en teruggevonden: Aardewerk en glas uit Deventer vondstcomplexen 1375–1750*, Kampen: Stichting Archeologie IJssel/Vechtstreek, 1989; Harold Henkes and Johan Veeckman,

"Schitterende scherven: Het glas uit een afvalput op de Antwerpse Eiermarkt," in Johan Veeckman, *Berichten en rapporten over het Antwerps bodemonderzoek en monumentenzorg*, v. 5, Antwerp: Stad Antwerpen, 2002, pp. 29–35; Jaap Kottman, "Glas," in Michiel Bartels and others, *Steden in scherven: Vondsten uit beerputten in Deventer, Dordrecht, Nijmegen en Tiel (1250–1900)*, Zwolle: Stichting Promotie Archeologie, 1999, pp. 939–1028; Cora Laan, *Drank & drinkgerei: Een archeologisch en cultuurhistorisch onderzoek naar de alledaagse drinkcultuur van de 18de-eeuwse Hollanders*, Amsterdam: Bataafsche Leeuw, 2003, pp. 145–178; and Natasja Reyns, "Gent: Consumptiepatronen in drinkglas (16de–18de eeuw)," in *Archeologisch onderzoek in Gent, 2000–2009*, Stadsarcheologie, Bodem en monument in Gent, v. 2, no. 3, 2009, pp. 180–187.

45. Ferreira [note 1]; Engen [note 20], p. 77.

46. Laan [note 44], pp. 143–144; Ferreira [note 1].

47. Roberta Gilchrist, *Gender and Material Culture: Archaeology of Religious Women*, London and New York: Routledge, 1993; Silvia Evangelisti, "Monastic Poverty and Material Culture in Early Modern Italian Convents," *The Historical Journal*, v. 47, no. 1, 2004, pp. 1–20.

Before the 18th century, it was mainly daughters of the local gentry who entered the convent. From the end of that century, however, their interest in a religious life seems to have decreased gradually—a phenomenon noted in many other Cistercian houses and doubtless influenced by the new philosophy of the Enlightenment, which questioned the social utility of the contemplative life.⁴⁸ This growing disinterest meant that, from the early 18th century, houses had to recruit from other areas and social strata. Previously, most of the Clairefontaine sisters had come exclusively from Luxembourgian families. During the 18th century, however, more and more French and German women appeared in the lists of inhabitants; Cécile de Florange, for example, came from the Lorraine. On the other hand, an increasing number of rural and urban middle-class daughters entered the religious community. In monastic life, they found a way to communicate their social status and to adopt the traditions and practices of the old aristocracy. In the case of Clairefontaine, the historical accounts attest to a new generation of young women from well-established but nonaristocratic families joining the community from the early 18th century onward.⁴⁹

At that time, the abbey prospered, largely because of continuing income from gifts, endowments, and a large estate with various farms, mills, and ponds that were leased to lay tenants. The community did not suffer at all from the famines and economic crises that struck the Luxembourgian area during the 18th century.⁵⁰ The sisters in Clairefontaine could afford the best consumer products on the market. However, at first sight, the material culture of the abbey seems relatively modest for a community of upper-middle-class and aristocratic women. As noted above, their colorless glass was of rather ordinary quality and decoration, and it seems to have been very similar to glass vessels that are usually found during excavations of ordinary urban middle-class households. In addition, the abbey's cups and saucers in Qianlong and Kangxi porcelain appear to have been of secondary quality. The vessels are clearly from the same

production line as the imperial-class porcelain found in the Ca Mau shipwreck and recently sold at auction by Sotheby's.⁵¹ Although the designs on the abbey's porcelain are quite similar to those found in the hull of the Ca Mau ship, the quality of the decoration differs. The painting on the Clairefontaine porcelain is good but clearly inferior to that on the top-grade products. Moreover, the amount of Chinese porcelain owned by the sisters (about 10 percent of the wares) was eclipsed by the number of cups, saucers, and teapots in other materials, such as tin-glazed pottery, locally produced lead-glazed red ware, and English creamware, pearlware, and Staffordshire pottery (Fig. 8). Some of these vessels even showed evidence of having been repaired.

The foods eaten by the sisters, on the other hand, were of markedly higher quality. Tenants supplied them with a variety of excellent cereals, meat, poultry, and fish.⁵² The abbey's accounts record purchases of tobacco, tea, chocolate, crustaceans, and other goods. They also describe the acquisition of beer and mead, while the colored glass bottles point to the consumption of French wines. The larger beakers in Bohemian style were definitely used for the consumption of beer and mead, while the smaller

48. Armelle Bonis, Sylvie Dechavanne, and Monique Wabont, "Introduction," in *Cîteaux et les femmes: Architectures et occupation de l'espace dans les monastères féminins*, ed. Bernadette Barrière and Marie-Elisabeth Montulet-Henneau, Grâne: Créaphis, 2001, pp. 7–17.

49. Goffinet [note 3], p. 130.

50. Gilbert Trausch, "Comment rester distinct dans le filet des Pays-Bas?," in Gilbert Trausch, *Histoire du Luxembourg: Le Destin européen d'un petit pays*, Toulouse: Privat, 2003, pp. 190–191.

51. Victor Bouman and Caroline Schulten, *Made in Imperial China: 76,000 Pieces of Chinese Porcelain from the Ca Mau Shipwreck, circa 1725* (sale catalog), Amsterdam: Sotheby's, January 29–31, 2007.

52. This finding seems to be ascertained by the archaeozoological study that will be published in combination with the material record and the detailed analysis of the historical sources. For the study of the archaeozoological remains, see Quentin Goffette, "Clairefontaine: Etude faunique. Rapport préliminaire" (unpublished research report, Museum of Natural Sciences, rue Vautier 29, B1000 Brussels).



FIG. 8. Selection of crockery in Chinese porcelain and substitute wares, identified from right to left. Row 1: cup in pearlware and cup in creamware, both second half of 18th century. Row 2: teapot of Staffordshire ware (second half of 18th century), saucer in Kangxi porcelain (first half of 18th century), and cup for chocolate in tin-glazed pottery (18th century).

beakers, as well as the shot glasses, were employed for spirits and other strong drinks. Social drinking became increasingly popular in upper-middle-class circles in the early 18th century and later among the lower social strata.⁵³ It is obvious that the sisters' consumer habits were barely influenced, if at all, by their monastic vows, as is evidenced by the presence of handmaidens in the abbey. The provision of servants, which was at odds with the monastic rules of poverty and containment, was disputed by the order's superiors during canonical visits to the abbey.⁵⁴ Regular visits by family members, as noted in the historical records,⁵⁵ would also have afforded ample opportunities to purchase luxury items.

The significance of the Clairefontaine glass is revealed in an examination of habits of consumption among the Luxembourgian middle class in the 18th century. Without doubt, these were people of substance who were nevertheless circulating in a provincial setting.⁵⁶ Although

they had been educated in a rural middle-class environment, they had come into contact with fashionable consumer habits and innovations. However, because the sisters had been born and raised in the Luxembourgian area, their patterns of consumption were shaped mainly by life in such small market towns as Arlon and Thionville. The daily routines of the provincial elite were determined by new consumer habits and new forms of sociability.⁵⁷ Because they were a considerable distance from the trading capitals

53. Laan [note 44], pp. 179–193.

54. Goffinet [note 3], pp. 125–126.

55. *Ibid.*, pp. 125–150.

56. Camille-Jean Joset, *L'Abbaye noble de Notre-Dame de Clairefontaine, 1216–1796*, Brussels: J. Vermaut, 1935, pp. 84–85.

57. Hester C. Dibbitts, "Pronken as Practice: Material Culture in the Netherlands, 1650–1800," in *Luxury in the Low Countries: Miscellaneous Reflections on Netherlandish Material Culture, 1500 to the Present*, ed. Renggenier C. Rittersma, Brussels: Pharo Publishing, 2010, pp. 137–158.

and larger cultural centers of the Low Countries and France, such as Brussels, Amsterdam, and Paris, the influx of fashionable and top-quality material goods was limited. The material culture of the Clairefontaine sisters was surely influenced by the availability of goods on the local markets. Although the engraved glass and the other commodities found in the community's material inventory are not of the highest quality, they testify, together with the purchase of refined foods, to a cultivated consumption pattern in line with an 18th-century lifestyle. It is clear that the sisters were children of their time, who were well aware of worldly pleasures and fashionable consumer practices.

CONCLUSIONS

The composition of the Clairefontaine potash glass is generally similar to the recipes for crystal and white glass developed in central Europe during the late 17th century. The glass from the abbey seems to reflect an experimental stage of manufacture in relation to genuine Bohemian products. The instability of the glass and the slightly different chemical composition indicate an experimental recipe. We may assume that this glass was produced by local glass

industries that were taking part in the mass production of Bohemian-style colorless glass from the early 18th century. The decoration on the Clairefontaine glass is rather clumsily executed and of mediocre quality, bearing no resemblance to the high-quality engraving of master Bohemian glass cutters.

The glass from Clairefontaine reflects the engraved Bohemian-style glass found in urban middle-class households in the Low Countries and elsewhere in northwestern Europe. The study of the abbey's glass provides an insight into the consumer habits of a religious community of middle-class women in a remote location in the southern Low Countries during the 18th century. The material inventory is somewhat comparable with that of an average middle-class home, which is not surprising, considering the background of the inhabitants of the nunnery. Material culture suggests a community of religious women who were well aware of fashion and worldly pleasures—an image that seems to be confirmed by the foods they consumed and by their purchases of tea, chocolate, and other fashionable goods, as recorded in the abbey's accounts. Further study of this material culture and the dietary customs of the sisters will bring more clarity to this image.

