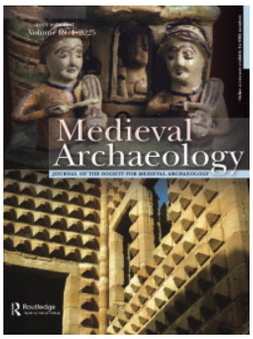

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At the Apothecary: Life in an International District in 15th-Century Bruges

By MAXIME POULAIN[1], MATHIJS SPEECKE[2], ANTON ERVYNCK[3], JAN HUYGHE[4], JAN MOENS[3], MARISSA LEDGER[5], EVA VERMEERSCH[6], LIESELOTTE DESNERCK[7], AN LENTACKER[8], WIM WOUTERS[9], WOUTER VAN DER MEER[10], KOEN DEFORCE[1,9], TOON DE MEESTER[8], NICOLAS THOMAS[11], MARIJN STOLK[8], INA VANDEN BERGHE[12], MAAIKE VANDORPE[12], ALEJANDRA GUTIÉRREZ[13], PETER VANDENABEELE[1,6], WIM DE CLERCQ[1] *and* BIEKE HILLEWAERT[†]

IN 1996, A CESSPIT was uncovered in the backyard of Bruges' Spanish nation house. The interdisciplinary study of this old rescue excavation sheds new light on life in the city's international district between the late 14th and early 16th century. The refuse in the cesspit is what is left of several generations of traders, from a well-to-do apothecary, employing alchemical apparatus in the production of pigments, to Spanish traders documented at the site from the 1480s onwards. This mercantile presence is reflected by an unprecedented array of imported goods, foods, and diseases, ranging from Italian, Spanish and Portuguese ceramics, Near-Eastern glass perfume sprinklers and luxurious silks, to olives, rice and an African parasite. These items give a material dimension to the appeal of Bruges for renowned artists such as Jan van Eyck and spark the debate on the cosmopolitan taste of (non-)local merchants in this international hub of trade.

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Medieval Bruges has been described as the 'cradle of capitalism' (Murray 2005), a status deriving from its function as an international trade hub, and the presence of mercantile communities from all over Europe. While we are relatively well informed about foreign mercantile communities trading in Bruges and the nature of the commodities they imported, less is known about their material lives and the possible influence they exerted on the lifestyle of local traders.

A hitherto unstudied late-medieval assemblage, excavated in the 1990s at the site of Bruges' Spanish nation house, contains an exceptional range of finds for medieval Flanders. These include previously undocumented Mediterranean imports, delicately crafted items, peculiar environmental remains, and apparatus and materials evoking alchemy. They give a first insight into the diet, health and material setting of successive households living in Bruges' international trading district, and show some of the activities with which individuals were engaged. While most of the archaeology of late-medieval European mercantile communities has thus far focused on the Hanseatic League (eg Gaimster 2005; 2014; Immonen 2007; Mehler 2009; Naum 2013; 2014), this contextualised case study from Bruges allows us to diversify our understanding of the materiality of international merchantry.

EXCAVATIONS AND CESSPIT

In September 1996, rescue excavations were carried out on the grounds of the *Sint-Franciscus Xaverius* hospital in Bruges (De Witte and Hillewaert 1997). Archaeologists uncovered the heavy, brick back wall of a late-medieval monumental building. Behind this structure, three cesspits were found, of which two were located on a plot that seems to belong to what would later become known as the Spanish nation house, ie the administrative seat and meeting place of the Castilian merchant community (Fig 1). One of these features, cesspit [3], stood out because of the quantity and nature of the artefacts (Fig 2). The other cesspits will not be discussed here, as they either lack finds or are of a 17th- to 18th-century date.

After emptying the southern half of cesspit [3], three stratigraphic layers could be distinguished (Fig 3). The bottom layer [C], rich in debris, likely represents the accumulation of residual material after regular cleaning of the cesspit. The presence of a fragment in proto-stoneware testifies to a use dating back to the early 14th century at least, but the feature may possibly be older. The middle layer [B] consists of faecal material and smaller organic remains, while top layer [A] represents the final fill and abandonment of the cesspit. This interpretation of gradual filling is supported by ^{14}C-dating of two cherry stones (from layers [A] and [B]) and a sheep femur (from layer [B]). The oldest cherry stone in layer [B] was deposited somewhere between 1423 and 1490 (95.4% probability).[14] This date partly overlaps with the chronological context of the bulk of the cultural finds in this assemblage, ranging from c 1375 to 1450 (see below). The two other organic samples both show two peaks in the 95.4% probability curve of their calibrated dates, respectively in 1456–1526 and 1557–1632 (femur),[15] and in 1460–1529

[14] RICH-34345: 436 ± 27 BP. All calibrations have been made using Oxcal v4.4.4 (© Bronk Ramsey 2021), on the basis of the Intcal20 curve (Reimer et al 2020).
[15] RICH-33877: 366 ± 24 BP.

FIG 1
Plan of the excavated structures (in blue) and (inset, red star) location of the site in Bruges. 1. Brick wall; 2. Cesspit [3]. *Map by Flanders Heritage Agency*.

and 1543–1635 (cherry stone).[16] The discovery of a coin minted under the reign of Charles V, in the 1540s to 1550s, and a few other objects indicate that an early to mid-16th century date seems most likely for this latest fill of the cesspit.

The material presented below is reflective of several generations living and working at the site. Most objects seem to derive from the dump of refuse in the mid-15th century, and some of the environmental remains may be contemporary (cherry stone—layer [B]). The final fill and abandonment of the cesspit, however, must be attributed to another, more recent household, as corroborated by the combination of radiocarbon dates and datable artefacts.

HISTORICAL FRAMEWORK

The plot in question is located on the eastern side of the *Spanjaardstraat* (Spaniard Street). As its name suggests, the street, known before the 16th century as the *Langhe Winkel* (Long Corner), once formed the heart of an international quarter with a marked concentration of Spanish merchants, predominantly Castilians, who specialised in wool, iron, oil and alum trade (Marechal 1953, 8–9, 21–2). The presence of these merchants dates back to the 14th century, or perhaps even earlier, when they appeared as guests of local hostellers (De Meester 2018, 17–19). However, this Spanish community was not the only group of foreign merchants attested in this area. There was also a heavy

[16] RICH-34344: 352 ± 26 BP.

FIG 2
View of the excavated structures (facing south), with cesspit [3] in the centre. *Photograph by AZ Sint-Jan, Campus Sint-Franciscus Xaverius.*

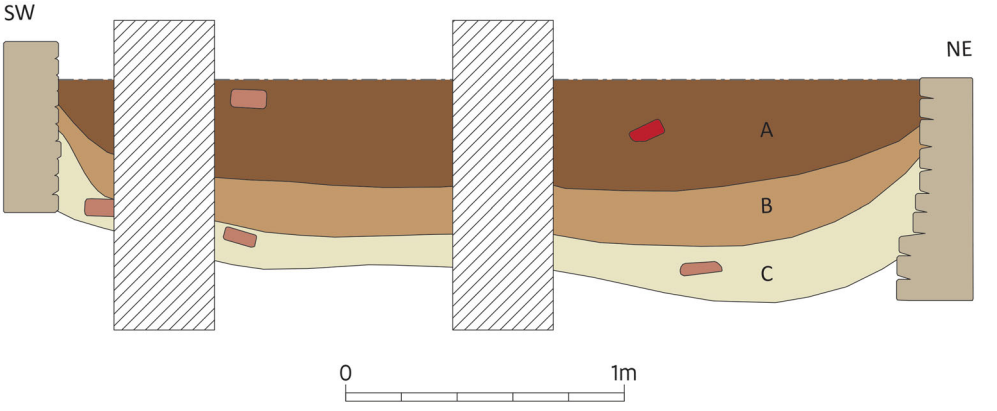

FIG 3
Profile of cesspit [3]. A. Fill; B. Cess layer; C. Debris-rich clearance layer. Hatched areas: disturbance by foundation pillars. *Drawing by Bieke Hillewaert.*

presence of Italian merchants; the neighbouring corner house, for instance, was successively owned by the merchant-hostellers Franke Aloet, a Lombard (died c 1375), and Jacop van Melane (died c 1422), whose name suggests a Milanese descent (on Franke

Aloet, see SAB, Aanwinsten, nr 7, fol 27v°; on the 'van Melane' family, see De Meester et al 2020, 131–3). The quarter must also have been frequented by Hanseatic merchants, since in 1457 the *Oosterlingen*, as the Hanseatic merchants were then called, came into possession of their own nation house a stone's throw away from the *Spanjaardstraat* (Brown and Dumolyn 2018, 168). Nevertheless, as Bruges gradually lost its leading commercial position in the second half of the 15th century, the Castilian merchants established a more dominant spatial presence by systematically buying up houses until, in 1580, they would own almost all buildings on the street (Gilliodts-Van Severen 1894, 261–2).

The house, later known as the Spanish nation house, was first explicitly mentioned in April 1440, as one of the many buildings owned by Michiel van Theimseke, a prosperous butcher and prominent politician whose family members included hostellers and spice dealers, one of whom even acquired noble status (CAB, OA, Wezerijregisters Sint-Niklaas, book 3, fol 8v°–9r°; see also Schoenmakers 2012–13, vol 1, 52–3 and vol 2, 161–2; and De Meester 2018, 12). At the time, it was known as *Groot Hertsberghe*, referring to the local well-to-do family, 'van Hertsberghe', one of whose members, Jan van Hertsberghe, had probably built the house around 1300 (CAB, OA, Confiscatierekeningen, reg 1, vol 2, fol 171r°). According to his estate, van Theimseke did not live in *Groot Hertsberghe*, so he must have rented it out. Unfortunately, we cannot determine who actually occupied the place at this time, nor trace the lists of owners and/or occupants back further. Nevertheless, the elite and cosmopolitan character of the excavation site is beyond dispute. In fact, the name of the house itself refers to its extraordinary dimensions (*groot,* meaning 'large').

Exactly how the subsequent proprietors, local nobleman Lodewijk II de Baenst and his wife Margriete, came into possession of the house remains unknown, but we do know that they sold it to Jacop Waghe and his wife Lijsbette in 1486 (CAB, OA, Klerken vierschaar Scoudharing 1484–88, fol 135). In the deed of sale, the property is described as a house with rear extensions stretching backwards from the frontside of the *Langhe Winkel* leading up to a gate that opens onto *Genthof*, an open space now identified as the *Woensdagmarkt*. The buyers, however, soon sold the property to an important Spanish wool merchant, Gómez de Soria, who was a resident of Bruges from 1483 (CAB, OA, Klerken vierschaar Scoudharing 1484–88, fol 139). De Soria remained the owner of *Groot Hertsberghe* until 1494 when the city of Bruges ultimately decided to purchase the property together with two adjacent warehouses. The city donated the property to the community of Spanish merchants to make it their nation house, as depicted in several 16th- and 17th-century images (Marechal 1953, 32–3; Cultuurbibliotheek nd, 'Sorye') (Figs 4–5). By that time, however, the glory days of Bruges' commerce had long gone and in 1705 the Spanish nation of Bruges was dissolved after more than two centuries of decline (Vandewalle 2008, 244–51).

FINDS

In this discussion of cultural and organic finds, only the artefacts that underpin the interpretation of the status and activities of the households at the site are presented. The chronology and typology of locally/regionally produced objects (ceramics, glass, leather, metal, bone, ivory, and parchment) are addressed at length in the online Supplementary Material.

FIG 4
17th-century depiction of the façade of the nation house of the Castilians in the *Spanjaardstraat* with warehouses adjacent on the right, and the buildings formerly belonging to the Spanish merchant Francisco de la Torre on the left. *Copper engraving coloured with watercolour from Antonius Sanderus (1641, vol 1, 273). © Ghent University Library.*

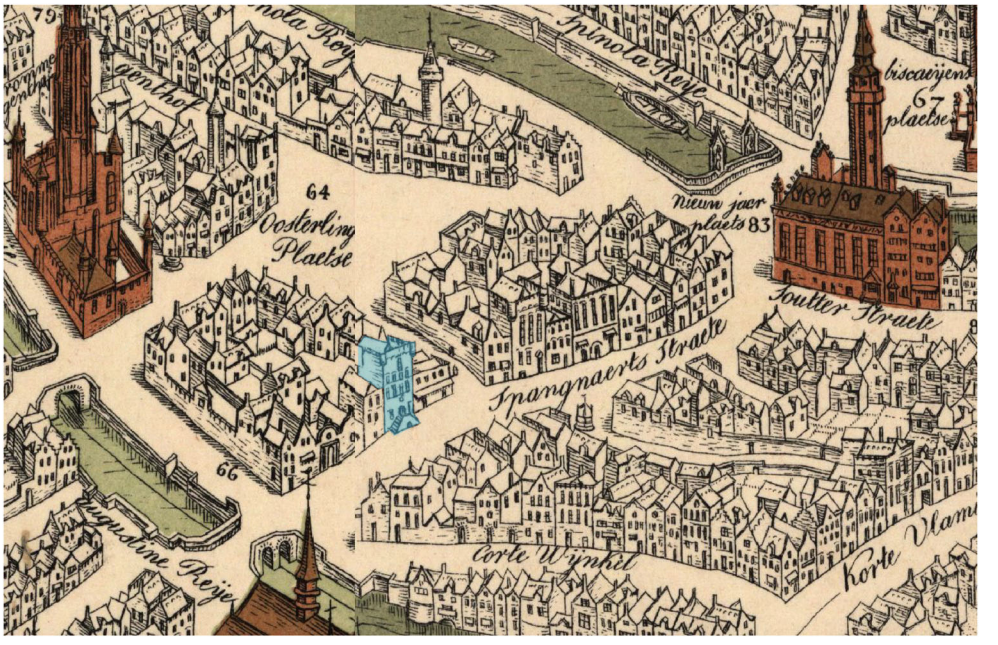

FIG 5
Detail of the 16th-century map of Marcus Gerards (1562), with the Spanish nation house highlighted by the authors in blue. *Lithograph of 1881, © City Archive Bruges.*

CERAMICS

The ceramic assemblage from cesspit [3] counts 1,354 sherds, representing a minimum number of 151 vessels (MNV). The vast majority (greyware and redware) is of local or regional provenance, although at least 17 imported vessels have been identified (Tab 1).

While most of the vessels had a domestic function related to eating, drinking, and hygiene (see Supplementary Material), others document a range of craft activities that must have developed on site. They include several bowls whose interiors are covered with a white scale. While this is sometimes associated with residue left from boiling water, Raman spectroscopy analysis of a residue sample (see below), indicates that at least one vessel (Fig 6) was used in the production of pigments (lead white and red lead).

Moreover, apparatus commonly used for distillation or sublimation were also found (Thomas and Moureau 2022). These finds are related to the glass alembic discussed below. Two types of vessels have been identified (Fig 7): one in the shape of a bottle, the other with a long, inclined neck. Despite its incomplete base, the former could correspond to the Latin *ampulla*, a flask with a wide, rounded base and a narrow neck. The latter is a retort, which is well known in modern distillation laboratories. All vessels lack glazing on the inside, making them unsuitable for proper distillation. It is more likely, as will be seen below, that they were used for sublimation. The consistent presence of soot traces on the outside leaves little doubt that they were positioned over a fire. At least one item bears the negative imprint of the lut, used to seal the opening or its junction with another pot (Thomas 2013).

Among the imported wares are some notable Mediterranean finds. Remarkably, the assemblage lacks any of the typical Spanish lustre wares which are found elsewhere in the County, and the coastal region in particular (De Groote 2012; De Groote and Verhaeghe 2016; Coll Conesa et al 2025). By contrast, the vessels found are two rare Italian ring-handled vases (Fig 8:5), a Seville tin-glazed albarello (Fig 8:4), two Portuguese lead-glazed albarellos and a Portuguese lead-glazed jug (Fig 8:1–3), and an unglazed costrel (Fig 9), also from Portugal.

TABLE 1
Quantification of ceramics recovered from cesspit [3].

	Number of sherds		**Number of vessels**	
	Count	**%**	**MNV**	**%**
Local				
Greyware	435	32	39	26
Redware	821	61	95	63
Imports				
Proto-stoneware, Germany	1	0.1	1	1
Siegburg stoneware, Germany	9	1	3	2
Langerwehe/Raeren stoneware, Germany/Belgium	13	1	5	3
Unglazed coarseware, Portugal	20	1	1	1
Lead-glazed wares, Portugal	18	1	3	2
Tin-glazed ware, Spain	16	1	1	1
Maiolica, Italy	14	1	2	1
Unknown	7	1	1	1
Total	1,354	100	151	100

FIG 6
Bowl dated c 1375–1450. Analysis has revealed its contents included lead white, red lead, calcium phosphate and gypsum. *Drawing by Maxime Poulain, photograph © Raakvlak.*

The origin of the ring-handled vessels has been much debated, due to similarities between Italian products and those made by Italian potters established in the Southern Netherlands in the early 1500s. Chemical analyses have firmly demonstrated a Tuscan provenance for the group (Blake 1999; Hughes and Gaimster 1999; Hurst 2002; Blake and Hughes 2003). An almost exact parallel with floral motifs in cobalt blue is depicted on the back of the Bladelin Triptych (Fig 10), suggesting a 15th-century date (De Vos 1999, 246; Kemperdick and Sander 2009, 340), which would pre-date the production of the so-called Italo-Netherlandish maiolica of the 1500s.

Imported redwares consist of one costrel, two albarellos and one jug. With its red, micaceous fabric, the costrel is likely to have come from Lisbon, Portugal (Gutiérrez 2021, 529–32). A similar find from Bruges dates to the 15th century (De Witte and Hillewaert 1993,

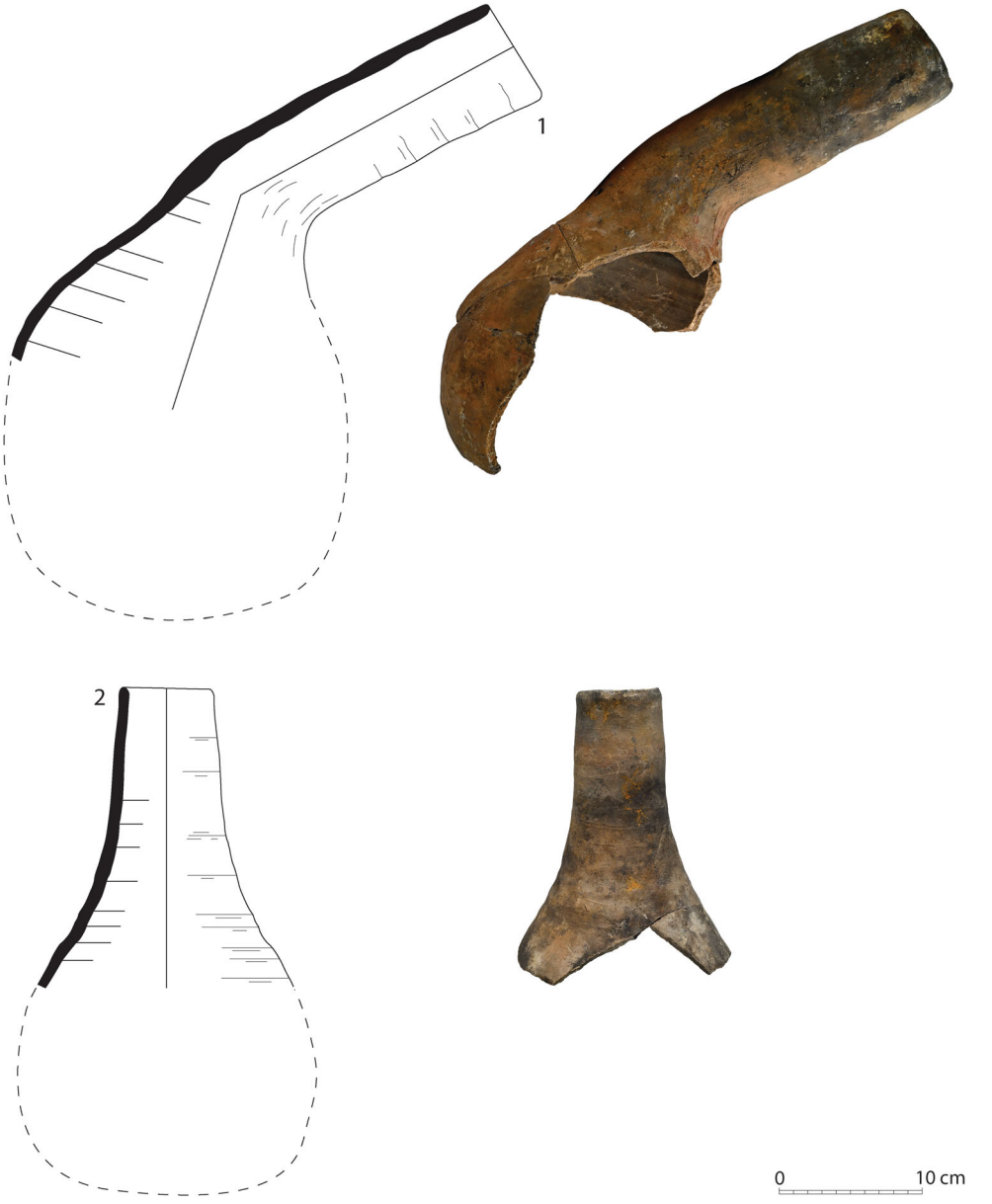

FIG 7
Distillation vessels. 1. Redware retort; 2. Bottle. *Drawings and photographs © Raakvlak.*

86–7; Hillewaert 1993, 64). Interestingly, both vessels have a merchant's mark, indicating that they were probably used as containers for imported commodities (Hillewaert 1993, 65). The albarellos and the jug are lead glazed and the latter shows some burning/soot marks on the side suggesting it might have been (re)used to heat up the contents. The jug was previously published with a proposed Spanish origin (Blake 1999, 53), but the visual examination of the fabrics now indicates Portugal to be a more likely candidate (Fig 11). A plain tin-glazed white

FIG 8
Portuguese lead-glazed redware vessels: 1–2. Albarellos; 3. Jug. Seville tin-glazed ware: 4. Albarello. Italian maiolica: 5. Ring-handled vase. 6. Unidentified tin-glazed jug. *Drawings by Maxime Poulain, photographs © Raakvlak.*

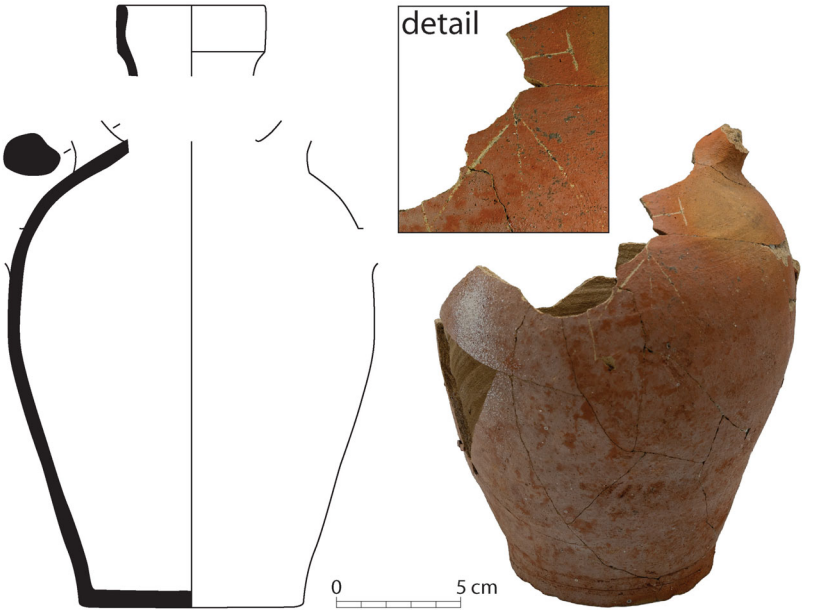

FIG 9
Portuguese redware costrel with incised merchant's mark. *Drawing by Maxime Poulain, photographs © Raakvlak.*

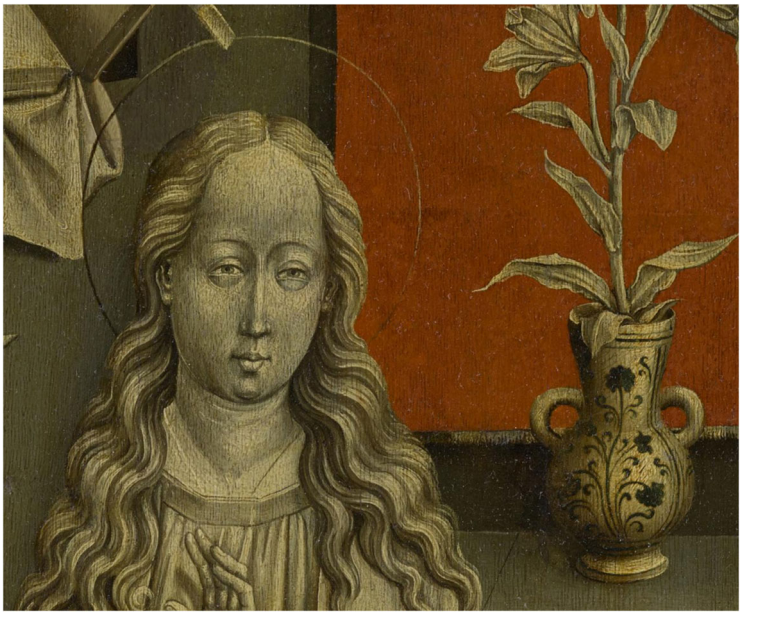

FIG 10
Detail of the Bladelin Triptych or Middelburg Altarpiece (Rogier van der Weyden, c 1450) showing an Italian ring-handled vase on the back. This grisaille (painted in grey tones) painting is a late 15th-century addition by an unknown artist. *Photograph Staatliche Museen zu Berlin, Gemäldegalerie/Dietmar Gunne.*

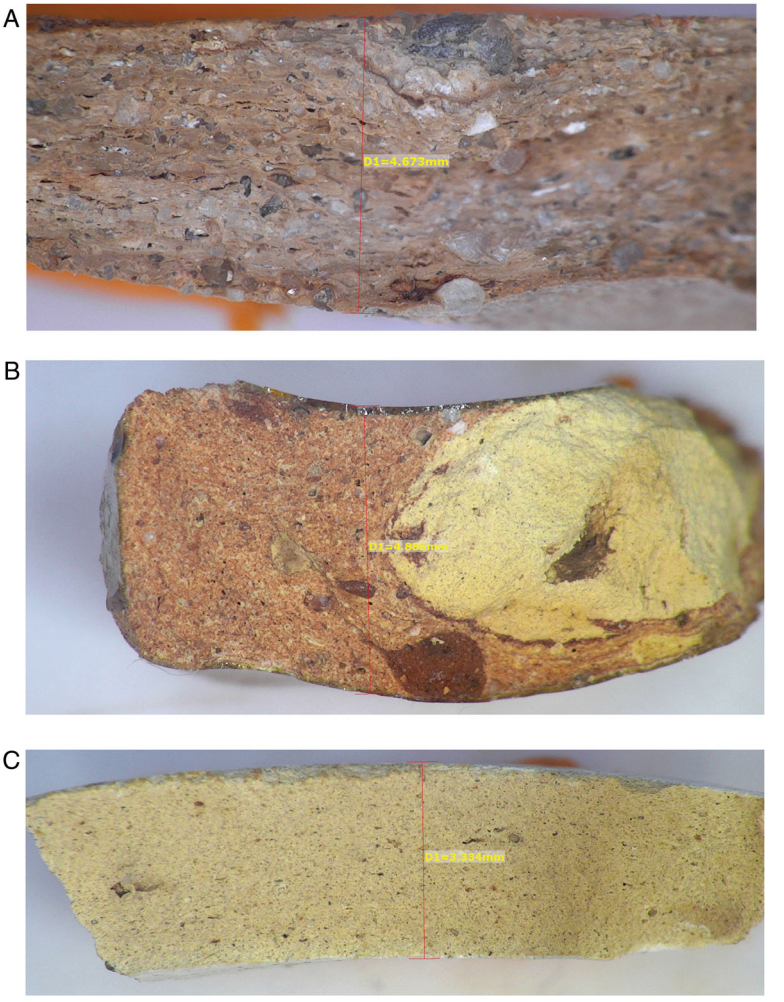

FIG 11
Fabrics of (A) Portuguese redware costrel; (B) lead-glazed albarello and Seville (C) tin-glazed albarello. *Photographs © Raakvlak.*

albarello has the typical fabric of Morisco Wares from Seville, although the shape and lack of decoration are very unusual. One tin-glazed imported jug (Fig 8:6) remains unprovenanced, as it has suffered too much from post-depositional degradation.

GLASS

The excavations yielded a total of 366 sherds of glass, belonging to a minimum of 31 vessels. Vessels from Belgium and its neighbouring countries, mainly Germany and France (see Supplementary Material), normally make up the majority of glass assemblages found in Bruges. This strongly contrasts with the pattern at the site in question, which also displays a very atypical range of other forms and provenances. These finds

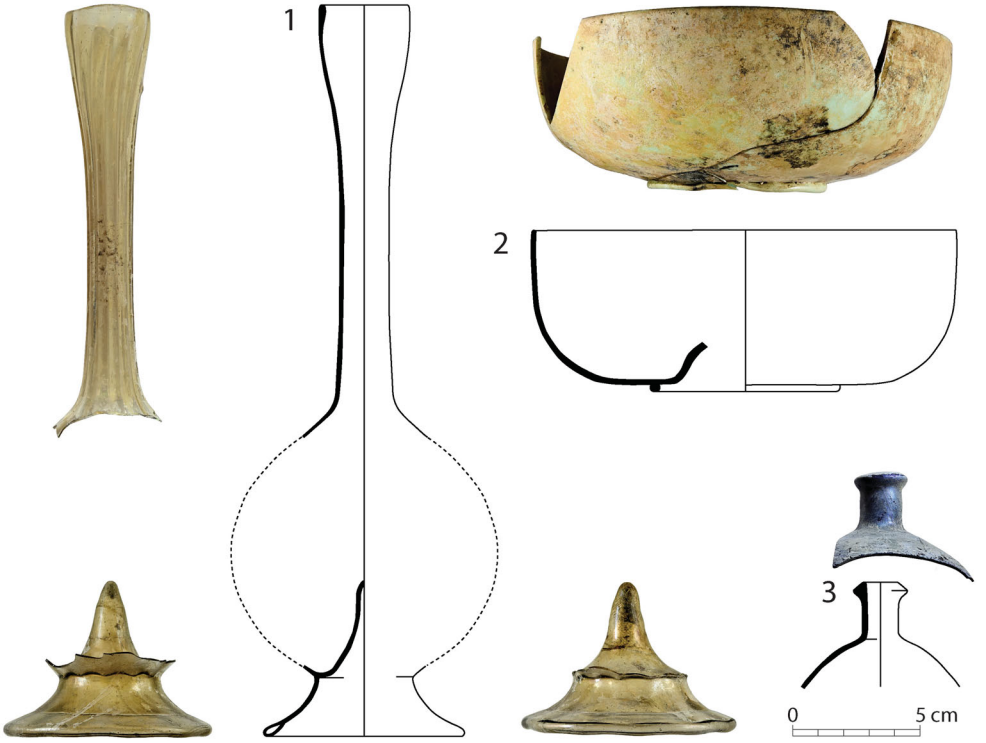

FIG 12
Italian glass fragments: 1. *Inghistera* bottle; 2. *Lattimo* bowl; 3. Cobalt-blue bottle. *Drawings by Lieselotte Desnerck, photographs © Raakvlak.*

are indicative of both the activities in which households engaged and of the trade networks to which they had access, stretching across the Mediterranean.

A first imported item in colourless glass with yellowish hue belongs to an Italian *inghistera*, a bottle with a long neck, decorated with vertical ribs (Fig 12:1). These vessels are mentioned in Venetian sources from the 12th century onwards and were produced in Murano for centuries (Fondazione Musei Civici di Venezia 2023, § 1). A painted parallel is dated to c 1440 (Fig 13). Two bases in a similar glass type were identified, of which one possibly belongs to the same bottle. These fragments may have belonged to apothecary bottles, with their highly raised base allowing one to stir medicinal fluids. The bowl in Fig 12:2 is made of an opaque white glass, also known as *lattimo* or milk glass. The first *lattimo* glass was probably made in Venice in the late 13th or early 14th century and was rapidly exported (Pezzella 1976, 28; Tait 2012, 149). Several lids in *lattimo* glass have for example been found in a waterfront dump from London, dated between 1350 and 1400 (Tyson 2000, 71–2). Another glass object that may have been imported from Venice is a small, blue bottle, possibly used for storing valuable liquids such as perfume (Fig 12:3). Blue cobalt-coloured soda glass is certainly not of a local/regional origin, but was produced in Venice from the 14th century onwards. Unfortunately, the scarcity of reference materials for late-medieval Venetian glass does not allow further interpretation at this point.

Two tubular fragments belong to sprinklers made of thin, green-yellowish glass (Fig 14). They were made for the first time in 12th-century Syria and their production continued

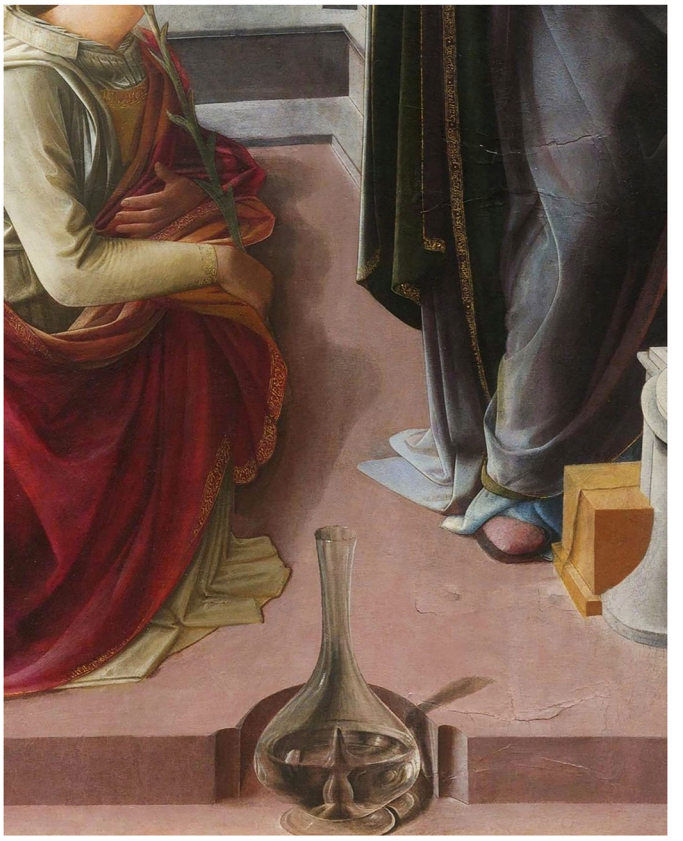

FIG 13
Glass *inghistera* on a detail of Filippo Lippi's Martelli Annunciation (c 1440) in the basilica of San Lorenzo, Florence. *Photograph in public domain, image from Wikimedia Commons.*

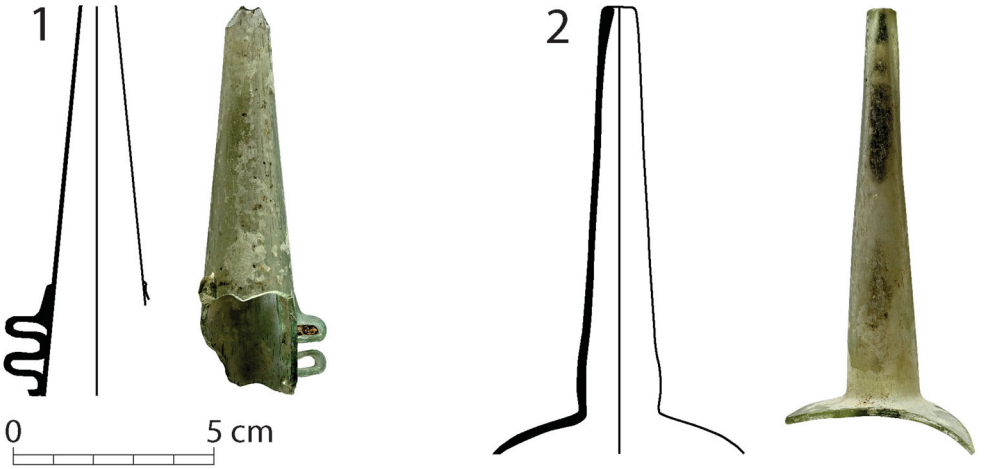

FIG 14
Sprinklers in Islamic-style glass. *Drawings by Lieselotte Desnerck, photographs © Raakvlak.*

throughout subsequent periods in the wider region. These vessels were used to sprinkle perfume or rose water. Venice had a near monopoly on the trade in such luxury Islamic glassware and exported these goods to Northern Europe (Pinder-Wilson 2012, 129; Tyson 2013, 71). Venetian ships unloaded glasses in Flanders in 1394 and in London in 1399, although the exact origin of these wares cannot be identified (Mack 2002, 116). One of the sprinklers in this assemblage is ornamented with a glass wire decoration on both sides of the neck, while the other one remains undecorated. Examples from Jerusalem show strong similarities with the ones found in Bruges (Brosh 2005, 186–7). Although Islamic glass centres declined from the late 14th century onwards, both typological aspects and the visible elongated air bubbles in the glass argue in favour of a Near-Eastern origin for these vessels and not for a Venetian provenance of Islamic-style vessels. Yet another, unpublished bright-blue sprinkler was found in a 15th-century assemblage at the site of the Bruges-Garenmarkt (1990, feature [54]), but was not identified as such at the time. Internationally, parallels are known from the Plantation Place site in London, an area characterised by many shops, warehouses and merchants' residences, where they were found together with other glassware imported from the Islamic world (Tyson 2013, 71).

The tableware finds in this assemblage are complemented by parts of distilling apparatus. Several elements of an alembic were identified, such as the spout and collecting channel (Fig 15:1–2; for a discussion of terminology, see Moorhouse et al 1972; Thomas 2009). An alembic consists of at least three parts: a cucurbit which contains the liquid to be distilled, the helmet placed over the cucurbit, in which vapours condense

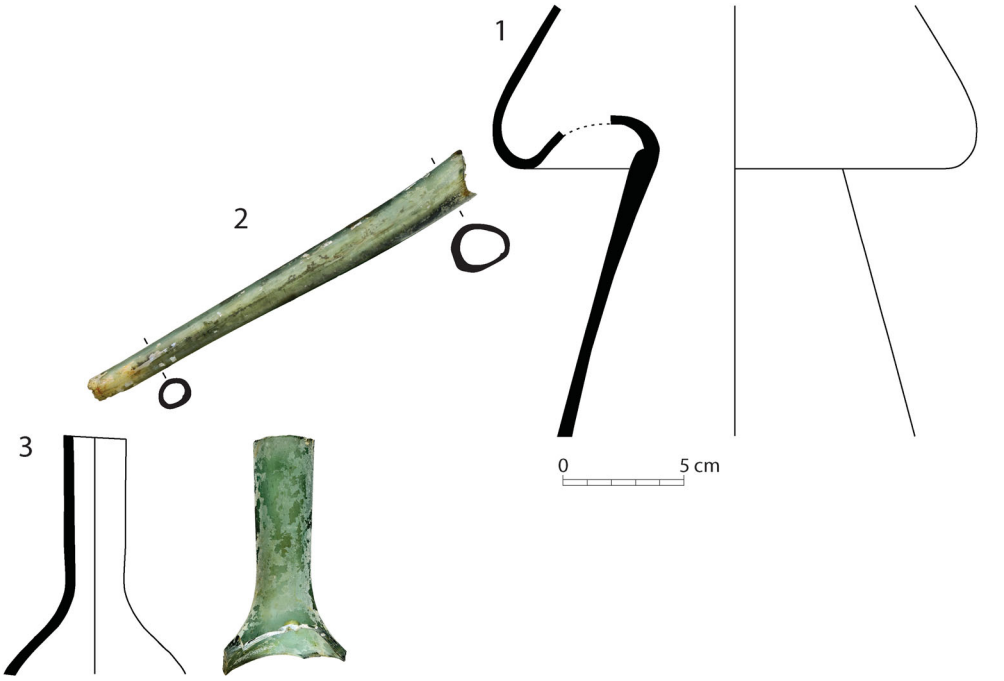

FIG 15
Fragments of an alembic. 1. Collecting channel; 2. Spout; 3. Receiver. *Drawings by Lieselotte Desnerck, photographs © Raakvlak.*

and liquid is led to the receiver (possibly the bottleneck in Fig 15:3). Alembics were often made in glass as it is nonporous, more resistant to acids than ceramics or metal, and allows observation of the distillation process, in addition to more ideological conceptions behind glass as a pure material (Henkes 1994, 322; Thomas and Rodrigues 2017, 198).

PIGMENTS AND THE SYNTHESIS OF VERMILION

While excavating the cesspit, archaeologists encountered various red, yellowish and black powders, together with liquid globules of heavy metals. These were analysed by X-ray crystallography and Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) respectively in 1999. Although these samples are no longer preserved, an unpublished report of the results is kept at the City Archaeological Service of Bruges (Lagas 2000; Tabs 2, 3).

More recently, four extra samples were taken of the residue inside the bowl with white scale (Fig 6) and of the ceramic distilling apparatus (Fig 7), all of which had not been analysed before. For this analysis, Raman spectroscopy was employed,[17] which, as

TABLE 2
X-ray crystallography of recovered powders (data from Lagas 2000).

	Mineral	**Contents (based on weight)**
Red powder	Haematite (Fe_2O_3)	97–99%
Yellow powder	Sulphur (S)	40–60%
	Lepidocrocite (γ-FeO(OH))	40–60%
Black powder	Mercury sulphide (α-HgS)	80–95%
	Metacinnabar (β-HgS)	5–20%

TABLE 3
ICP-AES Data of liquid mercury globules recovered from a soil sample (data from Lagas 2000).

Element	**Dry matter mg/kg**
Mercury (Hg)	68,000
Zinc (Zn)	290
Copper (Cu)	290
Lead (Pb)	160
Silver (Ag)	36
Arsenic (As)	36
Tin (Sn)	32
Vanadium (V)	15
Chrome (Cr)	10
Molybdenum (Mo)	2
Cadmium (Cd)	0.5

Analysis shows mercury with very few impurities, some of which may originate from the archaeological surroundings of the sample location.

[17] Raman spectroscopic analysis was performed with a Bruker Optics Senterra dispersive Raman spectrometer equipped with an Olympus microscope. The measurements were obtained using the 785 nm laser with a laser power of 0.73 mW. Integration time ranged from 10 to 60 seconds with 3–30 accumulations.

TABLE 4
Overview of the materials (X), identified by Raman spectroscopy.

	Hydrocerussite/ lead white $2PbCO_3{\cdot}Pb(OH)_2$	**Red lead Pb_3O_4**	**Newberyite $Mg(PO_3OH){\cdot}3H_2O$**	**Calcium phosphate $Ca_3(PO_4)_2$**
Bowl with white scale (Fig 6)	X	X	X	X
Retort: neck (Fig 7:1)	–	–	–	X
Retort: base (Fig 7:1)	–	–	–	X
Bottle (Fig 7:2)	–	–	–	–

	Gypsum $CaSO_4$	**Cinnabar/ vermilion α–HgS**	**Mercury chloride $HgCl_2$**	**Titanium dioxide TiO_2**
Bowl with white scale (Fig 6)	X	–	–	–
Retort: neck (Fig 7:1)	X	X	?X	X
Retort: base (Fig 7:1)	–	X	–	X
Bottle (Fig 7:2)	–	X	–	–

a molecular technique, provides a complementary perspective to the first results obtained more than 25 years ago (Tab 4). It should be noted that during sampling a small drop of liquid mercury was observed on one of the retorts.

How should these results be interpreted? Certain compounds that appear either as neo-formations or as naturally present in the samples must be excluded from the discussion. The first category undoubtedly includes newberyite, a mineral formed by precipitation in an acid phase and in the presence of organic remains, particularly phosphates (Edwards et al 2007). Similarly, mercury chloride is likely to have formed from the metallic mercury present and Cl-ions, which are ubiquitous in soils. Finally, although titanium dioxide is now a pigment, its use as such is very recent (Eastaugh et al 2004, 364). Therefore, its presence likely derives from the clay material used to make the distillation equipment.

These compounds aside, several other minerals detected in the X-ray crystallography and Raman spectroscopy relate to pigments used in illumination and for oil and wall painting. Haematite is the principal colourant in various iron oxide-based pigments, such as red ochre (Eastaugh et al 2004, 183; Helwig 2007). Lepidocrocite, as an iron oxyhydroxide, is equally a constituent of ochre, with colours ranging from yellow to orange (Eastaugh et al 2004, 236; Helwig 2007). However, as the nature of the samples is not really well defined, these iron-based pigments could have originated in the cesspit due to the alteration of iron objects.

There is less doubt about the link between the lead compounds found in the bowl and their use as pigments. Since Antiquity, lead white has been obtained by corroding lead plates with vinegar fumes, manure, tan bark or urine (Gettens et al 1993a). Red lead is subsequently prepared by heating lead white (Fitzhugh 1986; Eastaugh et al 2004, 229). Calcium phosphate or bone white, present in the same bowl, has equally

been employed in Flemish painting as a substrate for metal-point drawing, in the priming layer or as an additive to accelerate the drying of the oil binder (Sanyova et al 2021). Gypsum could also be used in ground layers. However, this practice is mainly associated with southern Europe (*gesso*), while calcium carbonate was preferred north of the Alps (Stols-Witlockx 2012, 162–3). Therefore, one can wonder whether the presence of gypsum is also due to its natural presence in the soil. At this stage, it is difficult to explain the association of these different minerals on the inside of the same vessel. The bowl might have served to prepare a particular mixture, which could either suggest an artistic practice on site, or the preparation of ready-to-use products for painters.

Both the bottle and retort contained traces of mercury sulphide (HgS), popular throughout history as a bright red pigment (Gettens et al 1993b). Mercury sulphide can either be mined or synthesised from mercury and sulphur. In the latter case, it is purer and brighter. In art history, it is commonly called cinnabar when occurring naturally, and vermilion when it is manufactured and used as a pigment. The most important source of cinnabar and mercury worldwide lies in Almadén (Spain), and this has been the case since medieval times. Wendy Childs (1995, 29) mentions the arrival of Spanish mercury in pots at Southampton and Sandwich in the 1460s. Chemical analyses of so-called 'mercury jars' found in the Flemish fishing village of Raversijde also point to a provenance in the Mediterranean and further support Almadén as a source for mercury in Flanders (Zeebroek et al 2009, 50; Vince 2013; 1115), either as an unprocessed ore, but more likely in its refined elemental form (on the extraction of mercury from cinnabar: Marchini et al 2022). In Bruges, the occurrence of elemental mercury globules and sulphur in the assemblage indeed seems to suggest that vermilion was produced *in situ*. Various experimental studies have recreated this pigment on the basis of medieval recipes (Garcia-Moreno and Thomas 2008; Miguel et al 2014). These recipes used sublimation, also known as the 'dry method'.

In the medieval Occident, numerous recipes on the making of vermilion exist according to this dry method. All these recipes are quite simple and can be summarised as follows: put sulphur and mercury in a container, preferably into an aludel (Moureau and Thomas 2015), which is placed on top of candescent charcoal. Vermilion is formed on the inner surface of the lid or base of the container. All the recipes dating before the 14th century form one single group assimilated to a 'direct process' of vermilion fabrication. The 'indirect process', of higher complexity, commences from the 14th century onwards. It consists in heating mercury together with sulphur, most of the time in a crucible, in order to form a black, compact, solid, and fragile sulphide (probably metacinnabar). This product is collected and ground, and finally sublimated into red mercury sulphide in an aludel or a retort. Both processes are mentioned in texts of the time (Lagercrantz 1924, 16; Merrifield 1999, 478–81, 522). In his *Secrets*, Alexis of Piedmont, pseudonym of the alchemist Girolamo Ruscelli, describes the second method as the best for making vermilion in high quantities, as done by the Germans (Ruscelli 1559, fol 85r). This indirect process seems to be preferred until the generalisation of the less toxic 'wet method' in the 19th century, which was basically dissolving the mixture of mercury and sulphur in a solution of potash and water.

While there is a strong probability that synthetic cinnabar was manufactured *in situ*, specifying whether a direct or indirect process was used is difficult. The presence of metacinnabar (β-HgS) is not sufficient to confirm that the indirect process was the preferred method, as this compound is an alteration product of cinnabar (α-HgS) that can

also be produced during the direct process. However, the presence of two types of sublimation vessels, *ampulla* and retort, in the same layer makes the indirect process more likely.

TEXTILE

The waste from the cesspit contained 39 small textile fragments, originating from at least ten different fabrics. Parts of the same fabric were found scattered throughout the different layers [A] and [B], which is why all of the textiles will be discussed here as one assemblage. Most of the fabrics seem to be made of wool and degummed, cultivated silk (*Bombyx mori* L.). This is most likely because they are animal-based fibres, which have a good chance to survive in the relatively wet and acidic conditions of a cesspit, whereas plant-based fibres, like linens, are not as likely to survive such circumstances (Teunissen and Stolk 2024, 16; Comis 2017).

Among the silk fragments are two very fine fabrics. One of them is a plain weave, with c 26 threads/cm (Figs 16, 19:1). The refined weave still bears traces of a red dye, identified as kermes.[18] Kermes, derived from the kermes scale insect (*Kermes vermilio* Planchon), was one of the most prestigious and expensive dyes of the Late Middle Ages. Its popularity dwindled with the advent of Mexican cochineal in the first half of the 1500s (Cardon 2007, 614–7). Another piece of silk cloth is woven in an extremely fine satin weave—with one thread going over four perpendicular threads—and a number of no fewer than c 80 threads/cm (Fig 17, 19:2). Here, HPLC-PDA analysis detected only tannins, which could have been used to enhance the colour fastness of the dye. Both these fabrics seem to have been used for clothing, given their soft character and the clearly visible sewing traces. The cloths were likely imported from Italy or Spain, since a number of cities in these countries had a flourishing and developed silk industry in the course of the Late Middle Ages. But it cannot be ruled out that the fabrics were produced locally in Antwerp, Bruges, or Lille, where silk industries developed from the early 16th century onwards as a result of the transfer of knowledge and craftsmanship from the Mediterranean (Colenbrander 2010, 25; Teunissen and Stolk 2024, 36). Two silk ribbons were also present, made in grosgrain binding and using a heavier yarn for the weft than for the warp (Figs 18, 19:3). Again, analysis showed the presence of tannins, but this time also dyed yellow with a luteolin-containing dye source, such as weld, saw-wort, dyer's broom, chamomile, daphne, or another equivalent plant (Cardon 2007, 167–85). Ribbons like these were often used as trimmings for clothing or accessories (Teunissen and Stolk 2024, 69, 85). Furthermore, there was some silk yarn that had been looped through itself several times and was most likely used to stitch or embroider a linen fabric of clothing or such, from which the linen fabric had perished and only the silk thread was preserved.

Among the textiles found are a couple of woollen fragments. The most diagnostic pieces are a fabric in a basic plain weave (Fig 19:4) and a fragment in a twill weave (Fig 19:5). The plain-weave fabric counts c 20 threads/cm and shows traces of surface treatment. It seems that after the weaving the wool was fulled to create a denser and water-repellent fabric. This idea is supported by the fact that the threads of the warp and the

[18] The identification of organic dye components was performed at the Royal Institute for Cultural Heritage, using high-performance liquid chromatography with photodiode array detection (HPLC-PDA). The procedure is described in Vanden Berghe et al (2009).

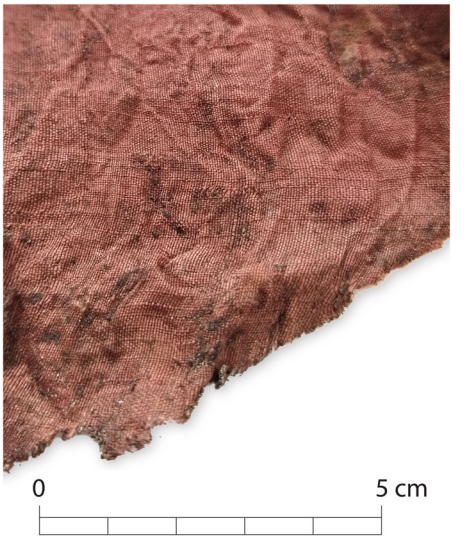

FIG 16
Detail of the red-dyed silk fabric. *Photograph by Marijn Stolk.*

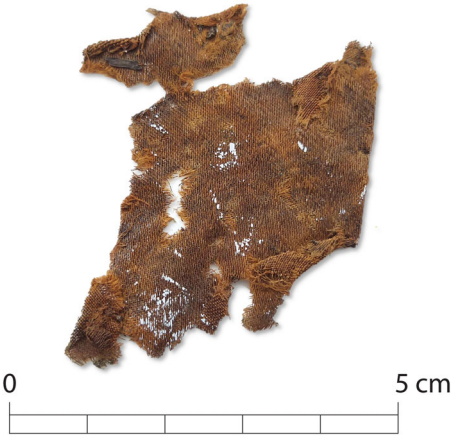

FIG 17
One of the silk fragments showing a satin weave. *Photograph by Marijn Stolk.*

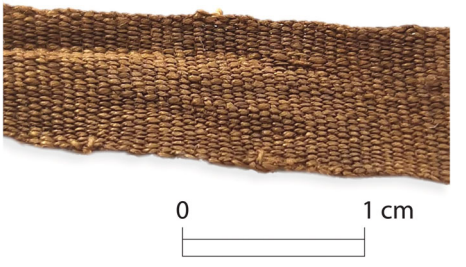

FIG 18
Detail of one of the two silk ribbons. *Photograph by Marijn Stolk.*

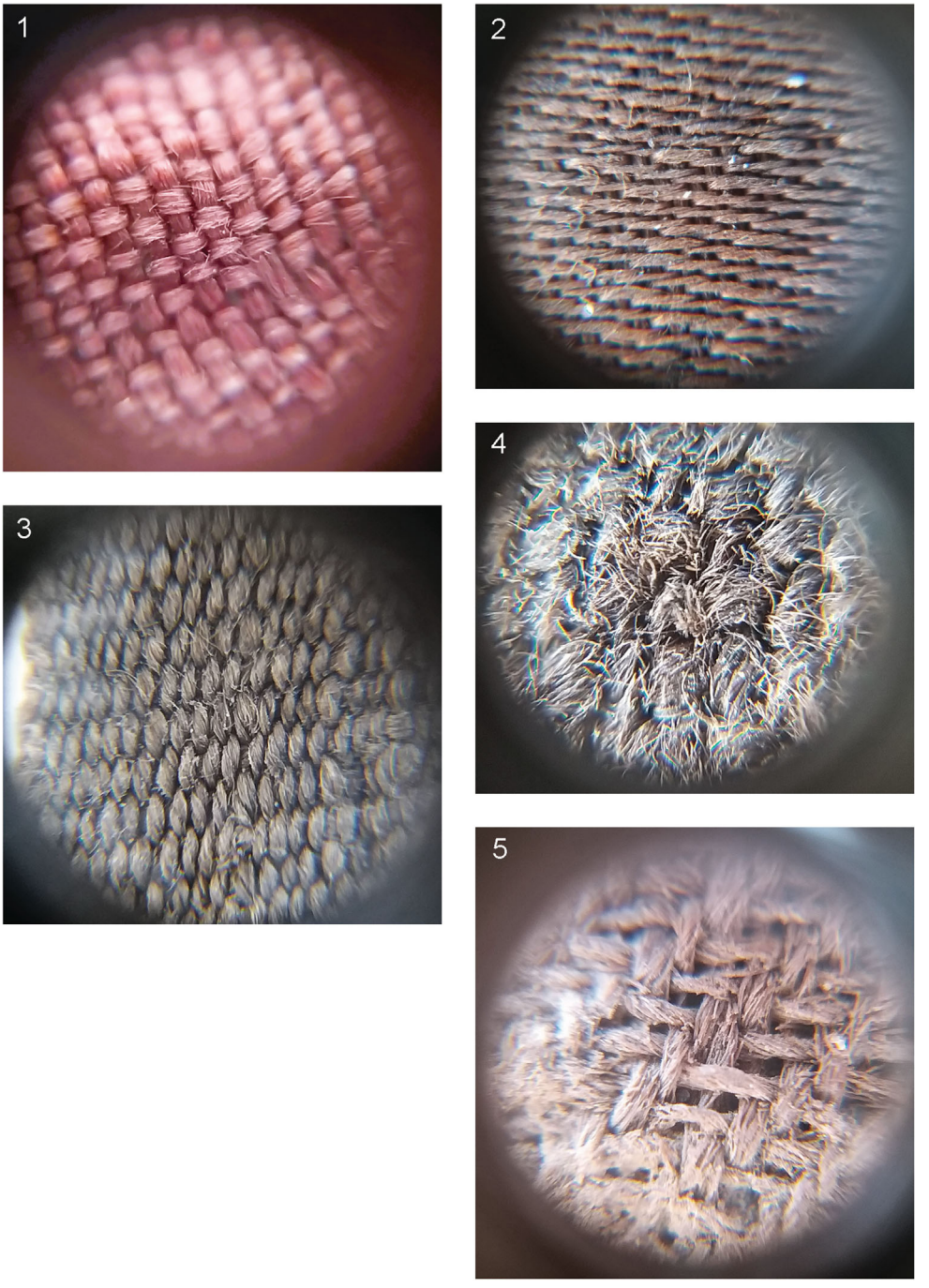

FIG 19
Magnifications x 60 of some of the silk and wool fabrics: 1. Red-dyed silk in plain weave; 2. Refined silk in satin weave; 3. Ribbon in grosgrain binding; 4. Woollen fabric in plain weave; 5. Woollen fabric in 2/2 twill weave. *Photographs by Marijn Stolk.*

weft are twisted in different directions; the so-called S-twist and Z-twist, which was applied to increase the effect of the fulling of the wool (Zimmerman 2007, 60–1). The twill fabric shows a refined and especially regular quality, which seems to have been made of worsted, a fine, smooth yarn spun from combed long-staple wool. These types of fabrics, of a subtler and softer quality, were used to make clothes (Zimmerman 2007, 59; Teunissen and Stolk 2024, 34). Both of the woollen fabrics show a certain level of specialisation regarding the wool industry that one might expect in these regions during the late-medieval and early modern periods.

Besides the clearly recognisable pieces of silk and woollen cloth, there were a number of small fragments in plain and twill weave which felt hard and appeared to be impregnated, causing the textile to crumble into smaller fragments. Fragments like these commonly appear in cesspit contexts. Further research is needed in order to interpret these finds.

In conclusion, although a comparative framework is lacking, we can say that both the silk and wool fragments are of a (very) high quality and show a high level of skill and specialisation. While suggestive of financial status at first glance, it should however be noted that most luxurious, expensive fabrics were likely used for a long time, and subsequently reused, repaired, repurposed, inherited, and sold at second-hand markets (Teunissen and Stolk 2024, 11–13; Du Mortier 1991).

LEATHER

From the cesspit, 383 leather fragments were recovered, scattered throughout the fill (see Supplementary Material and Moens et al 2023). In general, the leather finds form a homogeneous assemblage, dating to the last quarter of the 14th or the early 15th century. The most remarkable characteristic of the finds collection is that, apart from a few composite specimens, the soles show almost no traces of wear. At the same time, there are also no patches in the entire assemblage. This indicates that the shoes were discarded before they were worn-out. Given the homogeneous nature of the assemblage, this may even have happened as part of a single clearance event. Olaf Goubitz et al (2001, 12) believe that the lack of wear on shoes is an indication of a higher status of the owners. Possibly, they could afford to follow trends more quickly and get rid of shoes that were 'out of fashion' before any visible wear had occurred.

Despite its limited size, the collection shows a varied picture in terms of shoe types, the majority being rather low types (Fig 20). In terms of social differentiation, Willy Groenman-van Waateringe and Velt (1975, 104–10) were able to establish in their study of iconographic material that in the 14th and 15th centuries the well-to-do members of society were the ones depicted with low shoes.

A further indication for high status is provided by the soles with very pronounced long S-shaped noses and some upper fragments indicating the presence of long-pointed shoes or *poulaines* (Fig 21). Written and iconographic sources show that this type of footwear was indeed worn by the upper social classes. A final remarkable characteristic of the collection is the large number of soles and straps from wooden and leather pattens. It has been stated that the proportion of pattens could be indicative of the status of a particular household or context (Goubitz et al 2001, 12; Swann 2001, 78). Pattens used as overshoes represent an additional cost to regular footwear, thus they would be more

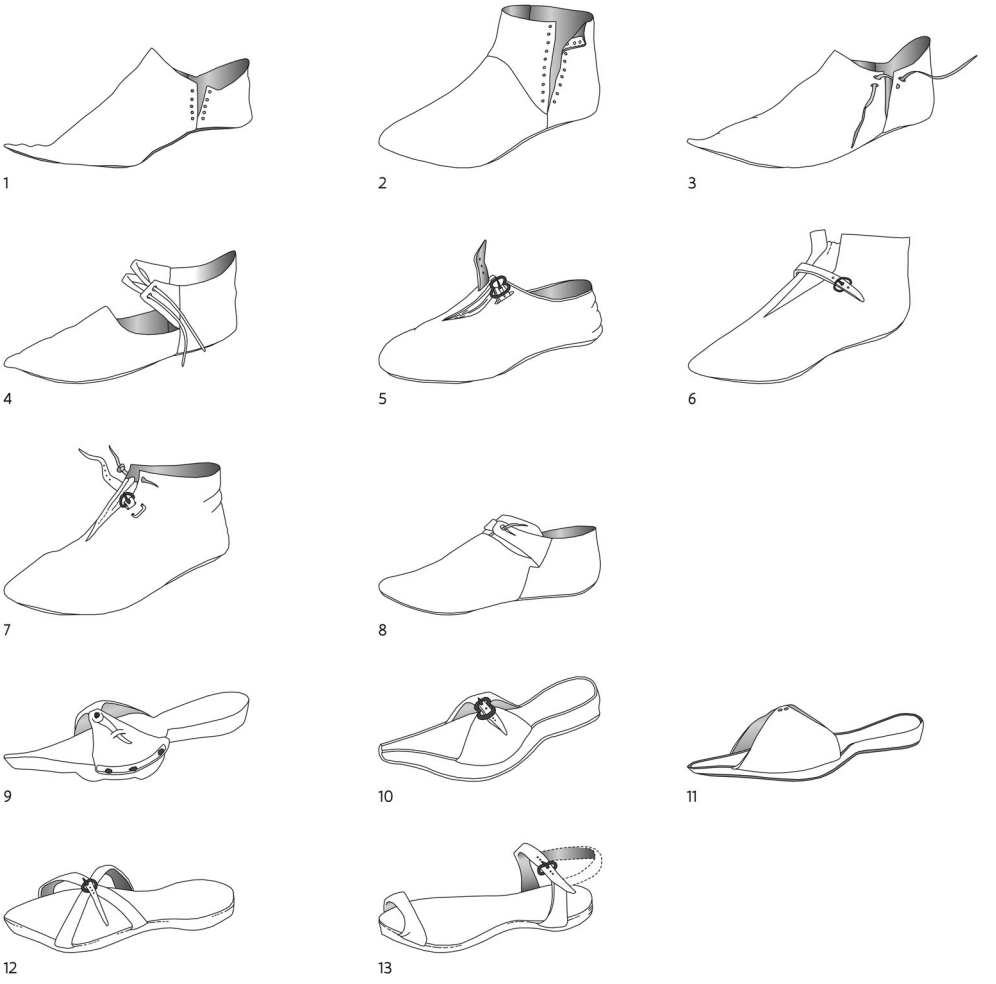

FIG 20
Shoe types found in the cesspit. Shoes with side-laced fastening: 1. Aquilia type; 2. Criblet type; 3. Shoe with double lace pair on the medial side; 4. Shoe with a bifurcated lace pair (Baynard's type); 5–6. Buckle shoes; 7. Shoe with combined fastening; 8. Button shoe with overlapping back section (Lemoine type); 9. Wooden patten; 10–12. Leather pattens; 13. Sandal. *Drawings by Jan Moens.*

FIG 21
Composite sole fragments with pronounced long S-shaped noses. *Photographs © Raakvlak.*

likely to occur among the upper social classes (Haak 2018, 42–4). Specifically leather pattens, with their complex construction method and combined use of multiple materials, must have been an expensive type of footwear.

ANIMAL REMAINS

The assemblage of animal remains from the cesspit (Tabs 5, 6) was mainly collected by hand; only a few pieces derive from sieved samples. Most of the material was found in layer [A], with the finds from layers [B] and [C] possibly belonging to the same (gradual) deposition. Based on a radiocarbon date (see above), it is assumed that the animal assemblage dates from the second half of the 15th to the first quarter of the

TABLE 5
Quantification of mollusc, avian and mammalian remains (+ = present, not quantified).

Layer	**A**	**B**	**C**	**?**	**Total**
Marine molluscs					
Common whelk *(Buccinum undatum)*	1	–	–	–	1
Common mussel (*Mytilus edulis*)	190	2	2	5	199
Flat oyster (*Ostrea edulis*)	39	29	–	6	74
Common cockle (*Cerastoderma edule*)	10	–	–	–	10
Birds					
Eurasian goshawk (*Accipiter gentilis*)	–	1	–	–	1
Greylag or domestic goose (*Anser anser* ?f. domestica)	1	–	2	–	3
Mallard (*Anas platyrhynchos*)	6	–	–	1	7
Common teal (*Anas crecca*)	1	–	–	–	1
Grey partridge (*Perdix perdix*)	1	–	–	–	1
Domestic fowl (*Gallus gallus* f. domestica)	156	17	1	36	210
Carrion crow (*Corvus corone)*/rook (*Corvus frugilegus*)	1	–	–	–	1
Small passerine (Passeriformes sp.)	1	–	–	–	1
Eggshell	+	–	–	–	+
Unidentified bird remains	140	7	3	12	162
Mammals					
Rabbit (*Oryctolagus cuniculus*)	13	–	–	5	18
Black rat (*Rattus rattus*)	–	1	–	–	1
Rat (*Rattus* sp.)	1	–	–	–	1
Rodent (Rodentia sp. cf. *R. rattus*)	–	2	–	–	2
Cat (*Felis silvestris* f. catus)	60	61	1	15	137
Dog (*Canis lupus* f. familiaris)	10	2	3	–	15
Pig (*Sus scrofa* f. domestica)	19	5	1	3	28
Cattle (*Bos primigenius* f. taurus)	72	7	–	8	87
Sheep (*Ovis ammon* f. aries)	17	9	1	3	30
Sheep (*Ovis ammon* f. aries)/goat (*Capra aegagrus* f. hircus)	265	42	–	48	355
Rib large mammal	35	1	2	8	46
Rib medium-sized mammal	123	3	–	5	131
Rib small mammal	1	–	–	–	1
Vertebra large mammal	15	–	–	1	16
Vertebra medium-sized mammal	13	–	–	5	18
Unidentified mammal remains	310	11	1	22	344
Coprolite	2	–	–	–	2
Total	1,503	200	17	183	1,903

TABLE 6
Quantification of fish remains.

Layer	A	B	C	?	Total
Thornback ray (*Raja clavata*)	2	–	–	–	2
Ray (Batoidea sp.)	2	–	–	–	2
European conger (*Conger conger*)	3	–	–	–	3
Atlantic herring (*Clupea harengus*)	7	–	–	–	7
Atlantic cod (*Gadus morhua*)	11	–	–	4	15
Haddock (*Melanogrammus aeglefinus*)	147	–	–	8	155
Whiting (*Merlangius merlangus*)	2	–	–	–	2
Codfish (Gadidae sp.)	6	–	–	–	6
Gurnard (Triglidae sp.)	12	–	–	1	13
Atlantic horse mackerel (*Trachurus trachurus*)	3	–	–	–	3
Black seabream (*Spondyliosoma cantharus*)	2	–	–	–	2
Turbot (*Scophthalmus maximus*)	1	–	–	–	1
Turbot or brill (*Scophthalmus* sp.)	3	–	–	–	3
European plaice (*Pleuronectes platessa*)	49	–	–	–	49
European flounder (*Platichthys flesus*)	33	–	–	1	34
Flatfish (Pleuronectidae sp.)	212	–	–	2	214
Common sole (*Solea solea*)	108	–	–	–	108
European eel (*Anguilla anguilla*)	1	–	–	–	1
Common carp (*Cyprinus carpio* f. domestica)	6	–	–	–	6
Carp family (Cyprinidae sp.)	8	–	–	–	8
Northern pike (*Esox lucius*)	2	–	–	–	2
Unidentified fish remains	43	–	–	2	45
Total	663	0	0	18	681

16th century, or from the second half of the 16th to the first third of the 17th century. As a technical report on these finds is available in Dutch (Ervynck et al 2023), only the most relevant information will be summarised here.

Marine products were common at the table of the Bruges' household and comprise both molluscs (common whelk, common mussel, flat oyster and common cockle) and fish. Among the latter, the large numbers of flatfish (Pleuronectidae sp.), including European plaice and European flounder), common sole and haddock are striking. These latter two in particular could indicate frequent consumption of fresh fish caught in the southern part of the North Sea, a pattern in stark contrast to the low numbers of cod, of which, at that time, large specimens were imported from the North in processed form, such as stockfish (fresh dried, not salted) or klipfish (salted and dried). Other marine species that will have arrived mostly as processed products at the Bruges' market, ie Atlantic herring and (possibly) whiting, were also found rarely in the cesspit: however, this could also be due to the lack of extensive sieving. Other less common marine fish include thornback ray, European conger, gurnard, Atlantic horse mackerel, black seabream and turbot and/or brill. Freshwater fish hardly contributed to the diet (although extensive sieving could have yielded more evidence for smaller species such as the cyprinids) but include appreciated products in culinary terms, ie European eel, common carp and northern pike. The latter two species will have been eaten fresh and indicate fish breeding in ponds (Benoit and Matteoni 2004), an enterprise of the richer landowners of that time.

The consumption of birds was rather high but dominated by domestic fowl. Other species will most probably have been hunted in the wild (mallard, common teal, grey partridge, small passerine) or were possibly not eaten at all (carrion crow or rook). The status of the greylag goose (wild or domestic) could not be ascertained. An exceptional find is that of a bone from the Eurasian goshawk, a hunting bird associated with the leisurely activities of the elite (see Van den Abeele 1994).

The not infrequent presence of rabbit remains could also be seen as a link with the higher classes, as the animal was kept in warrens (often together with partridges, see Ervynck et al 1994) or was put out in uncultivated areas such as the dune belt, the exploitation of which was the privilege of the wealthy. Large game species are absent in the assemblage; meat consumption was clearly based upon the slaughtering of domestic mammals, ie pig, cattle and sheep. The presence of goat remains could not be totally excluded but no conclusive evidence for this animal was recognised (an omnipresent pattern in urban sites from the late- and post-medieval Low Countries). Sheep was the most frequent domestic meat provider (77%), followed by cattle (17%) and pig (6%). Sheep and, as always, pigs were slaughtered at rather young ages, while the cattle remains show the presence of both young calves and mature animals. The mammal collection is completed by bones of rodents, cats, and dogs, none of which show traces of human processing or modification.

In general, the animal assemblage indicates a rather wealthy household, frequently consuming fresh fish, chicken and some wild birds, and the meat of young sheep and cattle (in addition to pigs). There are links to the higher part of society, such as the goshawk, rabbit and partridge remains, and the consumption of fish from fishponds. Whether the preference for mutton was a culinary pattern linked to the cultural background of this household of immigrants cannot be proven. It could be explained as a reflection of the deforested landscape around Bruges, more suited for sheep- and cattle breeding than for pig herding. Unfortunately, at present, these alternative explanations cannot be further explored due to the poor availability of enough contemporary assemblages from Bruges or surrounding sites for comparison with the finds from the *Spanjaardstraat*.

BOTANICAL MACRO-REMAINS

During the excavation, botanical bulk samples were taken from layers [A] and [B]. Part of the samples were sieved soon after and subsequently air dried and stored in plastic bags. Drying inhibits identification of 'soft' botanical macro-remains that consequently lose their morphology. Additionally, from both layers some samples were kept untreated, and also stored in bags and dried out to unmanageable hard lumps. These samples were submerged in water to remove probable mercury contamination by float sink separation. Afterwards, they were gently boiled in a 5% potassium hydroxide (KOH) solution to improve separation, and sieved. The residues were analysed with a stereo microscope (10×5).

The botanical contents of the sieved and dried samples are presented in Table 7. As expected, most macro-remains derive from edible cultivated plants or from wild species known to have been gathered for edible parts. These species can be grouped in several economic or culinary categories: cereals, vegetables, herbs and spices, nuts, fruits, and 'other'. Most species fall in the categories of herbs and spices, and fruits.

TABLE 7
Botanical macro-remains in layers [A] and [B].

Category	Scientific name	Vernacular name	A	B
Economic plants				
Cereals	Cerealia, pericarp fragment	Cereals, bran fragment	++++	++++
	Oryza sativa, palea/lemma	Rice, chaff	+	–
	Triticum aestivum/durum (c)	Wheat	1	–
Vegetables	*Portulaca oleracea*	Purslane	+	+
Culinary herbs/spices	*Aframomum melegueta*	Grains of paradise	2	–
	Apiaceae (m)	Parsley family	–	+
	Brassica nigra	Black mustard	+	++
	Capparis spinosa	Caper	–	1
	Pimpinella anisum (m)	Anise	–	3
	Coriandrum sativum	Coriander	+	+
	Foeniculum vulgare	Fennel	++	+
	Foeniculum vulgare (m)	Fennel	+	++
	Papaver somniferum	Opium poppy	1	++
Nuts	*Castanea sativa*	Sweet chestnut	+	1
	Corylus avellana	Hazel	+	+
	Juglans regia	Walnut	–	+
Fruit	*Ficus carica*	Fig	+++++	++++
	Fragaria vesca	Wild strawberry	++	++
	Malinae, sclereid	Apple subtribe, stone cells	+++	1
	Malus domestica	Apple	+	–
	Malus domestica, endocarp	Apple, core fragment	++	1
	Malus/Pyrus	Apple/Pear	+++	++
	Mespilus germanica	Medlar	2	–
	Morus nigra	Black mulberry	+++	++
	Olea europaea	Olive	1	4
	Physalis alkekengi	Chinese lantern plant	1	–
	Prunus avium	Sweet cherry	1	–
	Prunus avium/cerasus	Sweet/sour cherry	++	+
	Prunus cf. *cerasus*	?Sour cherry	1	–
	Prunus spinosa	Sloe plum	1	–
	Prunus domestica	Plum	+	3
	Punica granatum	Pomegranate	2	1
	Pyrus communis	Pear	++	+
	Pyrus communis, calyx	Pear, core fragment	+	1
	Ribes	Currant	1	–
	Ribes rubrum, calyx	Red currant, sepal	–	1
	Rubus fruticosus	Blackberry	++	++
	Vitis vinifera	Grape	+++	+++
	Vitis vinifera, fruit (m)	Grape, fruit	–	+
Other	*Humulus lupulus*	Hops	1	–
Wild plants				
Arable weeds	*Agrostemma githago*	Corn cockle	++	+
	Atriplex patula/prostrata	Common/spear-leaved orache	–	1
	Chenopodium album	Fat hen	+	1
	Fallopia convolvulus	Black bindweed	+	–
	Knautia arvensis	Field scabious	1	1
	Medicago minima, fruit	Burclover, pod	1	–
	Persicaria lapathifolia	Pale persicaria	1	–
	Persicaria maculosa	Lady's thumb	1	–
	Sinapis arvensis	Wild mustard	+	–
	Sonchus asper	Prickly sow–thistle	1	–
Grassland species	*Carex panicea*	Carnation sedge	1	–
	Equisetum, nodium	Horsetail	1	–
	Galium palustre	Common marsh-bedstraw	1	–
	Poaceae	Grass family	+	–

(*Continued*)

TABLE 7
(*Continued*).

Category	Scientific name	Vernacular name	A	B
	Ranunculus sardous	Sardinian buttercup	1	–
	Rumex acetosella	Sheep's sorrel	+	–
	Rumex crispus, perianth	Curly dock, perianth	–	1
	Rumex crispus/obtusifolius	Curly/broad-leaved dock	1	–
	Rumex, stem	Dock, stem	–	1
	Trifolium, calyx	Clover, sepal	+	–
Marshland species	*Oenanthe fistulosa*	Tubular water-dropwort	–	1
Trees and shrubs	Indeterminate, bud	Indeterminate, bud	1	–
	Populus, bud	Poplar, bud	+	–
	Quercus, bud	Oak, bud	1	–
	Salix, bud	Willow, bud	++	–
Peat-forming species	Bryophyta, stem	Mosses, stem	1	–
	Calluna vulgaris, perianth	Heather, sepal	1	–
	Calluna vulgaris, wood	Heather, wood	+	–
	Calluna vulgaris, twig	Heather, twig	–	1
	Erica tetralix, leaf	Cross-leaved heath, leaf	+	–
	Erica tetralix, twig	Cross-leaved heath, twig	–	+
	Molinia caerulea, epidermis	Purple moor-grass, epidermis	++	–
	Monocots, rizome	Monocots, rizome	–	+
	Rhynchospora alba, stem tissue	White beak sedge, stem tissue	+	–
	Sphagnum, leaf	Peat moss, leaf	+	1

(c) = charred, (m) = mineralized, – = absent, + = 1–10, ++ = 10–100, +++ = 100–1000, ++++ > 1000. Rare finds are represented by their actual numbers.

The wild species can be subdivided into: arable weeds, grassland species, marshland species, trees and shrubs, and peat-forming species. The botanical macro-remains in these categories were either brought into the household(s) unwittingly (as food contaminants, or in mud, dung or street waste tracked inside), or as part of economically useful plant material. Examples of economic plant materials in households are straw, hay, and fuel (peat or wood). One of the dried-out lumps from layer [A] turned out to consist of stem epidermis and rizomes of purple moor-grass (*Molinia caerulea*) and white beak sedge (*Rhynchospora alba*), both peat-forming species. As such this lump might have been a fragment of a peat brick used for heating. Twigs of heather and other woody species may have been used for brooms and brushes. Horsetail (*Equisetum* sp.) might be used as a polishing agent or for scouring pots. Here, emphasis will be placed on the culinary species.

The species found in the cesspit are attributed mostly to the consumption of products prepared with locally produced, everyday items such as grain, herbs, fruits and nuts. Botanical macro-remains of vegetables are a relatively rare occurrence in cesspits, owing to a lack of corrosion resistant parts. Some species of leafy vegetable found here are an exception to this, eg purslane (*Portulaca oleracea*).

In spite of the predominance of domestic products, finds of more exotic species are rather frequent in this cesspit. These species may be of indicative value for the social classification of the residents' dietary customs. To classify this indicative value, the relative frequency of several selected species in Flemish cesspits from the 15th and 16th centuries has been charted (Fig 22). This shows that some Mediterranean-originating products like grapes (*Vitis vinifera*), figs (*Ficus carica*) and mulberries (*Morus nigra*) were very common products for the inhabitants of Flanders, at least with the occupants of houses

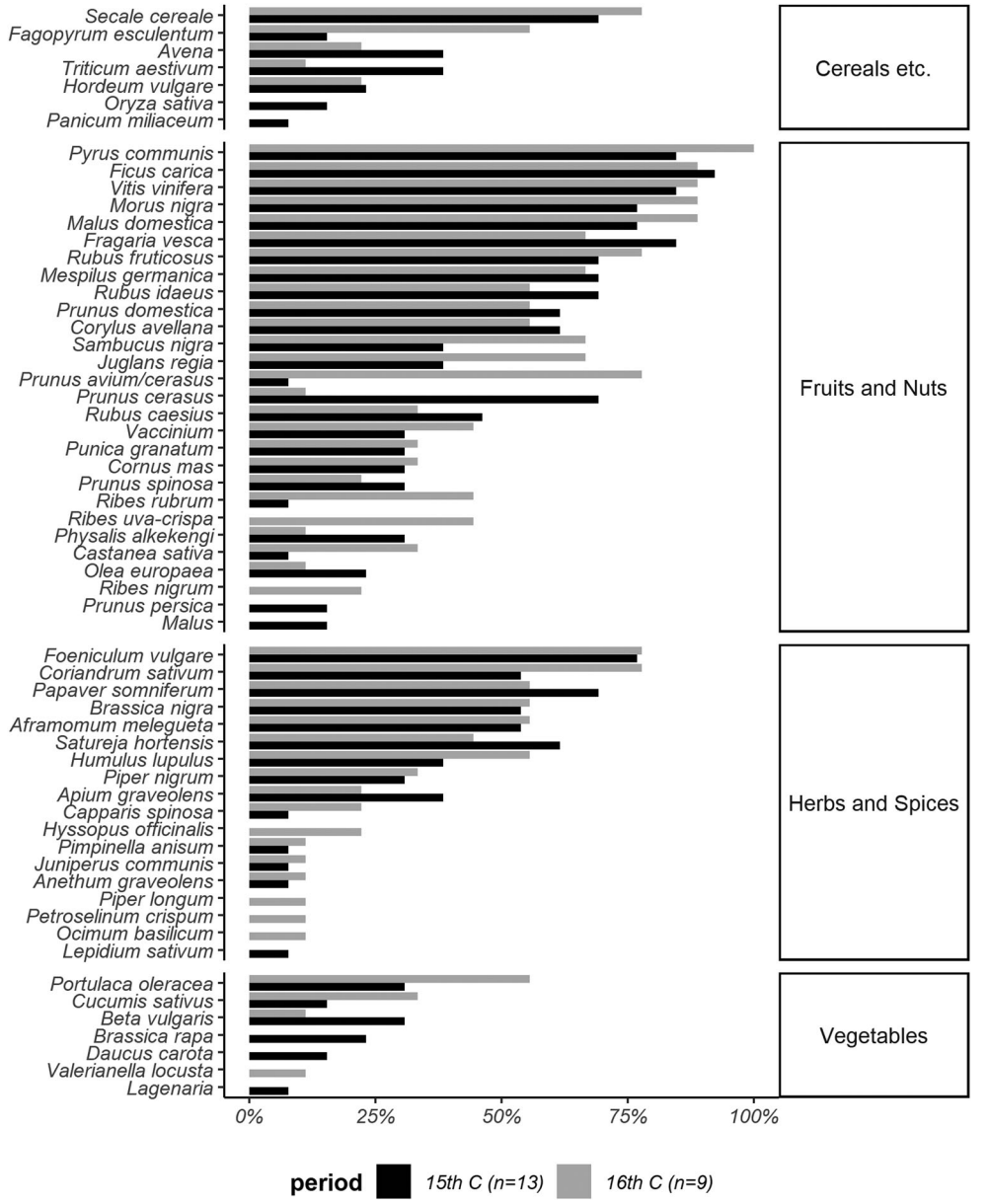

FIG 22

Frequency of species from several categories of botanical macro-remains in cesspits in Flanders from the 15th and 16th century. The assignment to either century is based on the end date of the feature. Data were obtained from BELRADAR, the archives of BIAX Consult and reports provided by the Flanders Heritage Agency. Included are cesspits from Bruges (Hillewaert and Van Besien 2007; Assië 2022; Van Remoorter 2022); Mechelen (van der Meer 2019; 2022; Coremans 2020; Speleers 2020); Leuven (Smeets and Vander Ginst 2012); Antwerpen (Terryn 2021); Geraardsbergen (De Smaele et al, in prep); Aalst (De Groote et al 1999; 2004; 2009; De Groote and Moens 2018); Dendermonde (Beeckman and Van Hecke 2017); Ename (Ervynck et al 1999); and Raversijde (Pieters et al 1999).

with cesspits. Historical sources point to local production of grapes and figs, but also to large-scale trade in dried fruits from the Mediterranean (van Haaster 2008). Other Mediterranean products, like rice (*Oryza sativa*), olives (*Olea europaea*), pomegranates (*Punica granatum*), and capers (*Capparis spinosa*), are less common, or even quite rare in Flemish cesspits. Their macro-remains are durable, so taphonomy cannot explain their relative scarcity. Exclusivity might have limited their consumption, but these species are found in both high-status and (upper) middle-class households. The latter might have emulated dietary customs of the former, but perhaps their consumption was less a matter of exclusivity and more of (an acquired) taste. The only spice encountered is grains of paradise (*Aframomum melegueta*), a product of West Africa, which is commonly found in cesspits of the 15th and 16th centuries.

In conclusion, the majority of the botanical macro-remains are from everyday products such as cereals and local produce. They indicate a diet that included many different kinds of fruit, herbs and at least some vegetables. Several species have a Mediterranean or more exotic origin. Some of these, such as fig, grape, and mulberry, were common. Others were more exclusive, or rarer at the least, such as olive, rice, caper, pomegranate, and grains of paradise. They can be considered signs of upper-class dietary habits, or perhaps of a Mediterranean influence on culinary customs.

POLLEN ANALYSIS

Three subsamples for palynological analysis were taken from the bulk samples prior to their sieving for the study of botanical macro-remains, one from layer [A] and two from layer [B]. These subsamples, c 2 cubic cm each, have been treated according to standard methods for pollen analysis (Moore et al 1991). From each sample, a minimum of 400 pollen grains were studied using a transmitted light microscope with magnifications of 400x and 1000x. Identifications are based on Punt et al (1976–2003), Valdés et al (1987), Moore et al (1991), and Beug (2004).

The pollen assemblages of all studied samples show low percentages of arboreal pollen and high percentages of food plants and associated weeds (Tab 8), indicating that food and faecal material was the major source for pollen entering the cesspit and not atmospheric pollen deposition (Deforce 2017).

The high values of cerealia pollen, a common feature of (post-)medieval cesspits, reflects the importance of cereal-based food in the diet of the users of the cesspit (Deforce 2017; De Cupere et al 2022). Other food plants from which pollen has been found are chervil (*Anthriscus cerefolium*), chard/beetroot (*Beta vulgaris*), borage (*Borago officinalis*), capers (*Capparis spinosa*), anise (*Pimpinella anisum*), pea (*Pisum sativum*), spinach (*Spinacia oleracea*), cloves (*Syzygium aromaticum*), rye (*Secale cereale*) and grape (*Vitis vinifera*). Several of these plants also have been identified during the analysis of the botanical macro-remains (see above), but chervil, chard, borage, pea, spinach, cloves and rye have only been found during pollen analysis.

Cloves are the dried flower buds of *Syzygium aromaticum*, which explains the rather high percentages of pollen found from this exotic spice. Cloves, imported from the Moluccas, an archipelago in today's Indonesia, are believed to have been very expensive in late-medieval Europe (Collet 1992). However, the frequent occurrence of pollen from *S. aromaticum* in cesspits from this period in the Low Countries suggests that it was rather widely used (Deforce 2017; Deforce et al 2019). Additionally, capers are exotic to north-

TABLE 8
Pollen assemblages (in percentages) from the three cesspit samples.

Category	Scientific name	Vernacular name	A	B-1	B-2
Cultivated plants	*Anthriscus cerefolium*	Chervil	0.4	–	–
	Beta vulgaris	Chard/beetroot	0.2	–	0.2
	Borago officinalis	Borage	–	0.7	0.2
	Capparis spinosa	Capers	4.1	6.0	4.1
	Cerealia undiff.	Cereals	13.3	22.6	36.5
	Coriandrum sativum	Coriander	–	0.2	–
	Pimpinella anisum	Anise	0.2	–	–
	Pisum sativum	Pea	1.1	–	0.2
	Spinacia oleracea	Spinach	3.9	0.5	6.8
	Secale cereale	Rye	–	0.2	–
	Syzygium aromaticum	Cloves	4.8	–	0.5
	Vitis vinifera	Grape	0.2	–	0.5
Total cultivated plants			28.4	30.2	49.1
Wild plants					
Trees and shrubs	*Alnus*	Alder	0.2	–	0.2
	Arbutus unedo	Strawberry tree	–	0.5	–
	Betula	Birch	0.2	–	1.0
	Calluna vulgaris	Heather	0.2	1.0	0.2
	Castanea sativa	Sweet chestnut	1.1	–	–
	Cistus undiff.	Rockrose	–	1.2	0.5
	Cistus ladanifer	Gum rockrose	0.2	1.7	1.5
	Cistaceae undiff.	Rockrose family	–	0.7	1.0
	Corylus avellana	Hazel	1.1	0.2	0.7
	Ericaceae undiff.	Heath family	2.4	4.0	2.4
	Erica umbellata type	Dwarf Spanish heath	1.7	2.4	–
	Hedera helix	Ivy	–	–	0.2
	Helianthemum	Sunrose	0.4	–	0.2
	Lavandula stoechas type	Spanish lavender	–	1.0	0.5
	Pinus	Pine	1.1	–	–
	Quercus	Oak	0.2	–	0.2
	Salix	Willow	0.4	–	–
	Sambucus nigra type	Elderberry	0.4	–	–
Total arboreal pollen			9.8	12.6	8.8
Herbaceous taxa	Apiaceae undiff.	Carrot family	2.0	2.1	1,0
	Artemisia	Mugwort	1.1	–	–
	Asteraceae-Liguliflorae	Dandelion family	0.2	–	0.2
	Brassicaceae	Mustard family	2.8	0.7	1.5
	Campanulaceae	Bellflower family	–	0.2	0.2
	Caryophyllaceae	Pink family	0.2	0.2	0.2
	Centaurea cyanus	Cornflower	0.7	0.7	0.7
	Centaurea nigra type	Common knapweed	0.9	0.2	0.5
	Chenopodiaceae-Amaranthaceae	Goosefoot and amaranth family	0.2	0.5	–
	Cirsium	Thistle	–	0.5	–
	Convolvulus arvensis	Field bindweed	–	–	0.5
	Cyperaceae	Sedge family	–	0.2	0.5
	Echium	Viper's bugloss	0.7	0.7	0.5
	Fabaceae undiff.	Legume family	1.1	0.2	0.7
	Fallopia	Knotweed	0.2	–	–
	Lamiaceae undiff.	Mint family	–	0.2	0.7
	Lotus type	Trefoil	0.2	–	0.2
	Matricaria type	Chamomile	1.5	0.5	1.0
	Orlaya grandiflora	Large bullwort	0.2	0.5	–
	Plantago lancealata	Ribwort plantain	–	–	0.2
	Poaceae	Grass family	1.5	5.2	5.6
	Polygonum aviculare type	Knotgrass	0.2	0.2	–
	Potentilla type	Cinquefoil	0.2	–	–
	Ranunculus acris type	Meadow buttercup	0.2	–	0.2

(*Continued*)

TABLE 8
(*Continued*).

Category	Scientific name	Vernacular name	A	B-1	B-2
	Rosaceae undiff.	Rose family	0.9	0.2	–
	Rumex acetosa type	Sorrel	–	0.7	1.5
	Senecio type	Groundsel	–	–	0.5
	Trifolium pratense type	Red clover	0.4	0.5	–
	Trifolium repens type	White clover	1.3	1.2	1.5
Total herbs			16.8	15.7	18.0
	Indet type 1		41.5	39.3	22.1
Mosses	Spaghnum	Peat moss	0.2	–	–
	Indetermined		3.3	2.1	1.9
Total pollen and spores			458	420	411

western Europe and must have been imported from the Mediterranean (Kiple and Ornelas 2000). The occurrence of both pollen and seeds (see above) from capers indicates that both the pickled flower buds and fruits were consumed at the site. Spinach originates from the Caucasus or Central Asia and was introduced as a cultivated plant to southern Europe during the 11th century, from where it subsequently spread northwards (Andersen and Torp 2011; Hallavant and Ruas 2014). Spinach pollen occurs in cesspits in the Low Countries from the 14th century onwards (Deforce et al 2019). One type of pollen grain that occurs with very high percentages in all three of the studied samples could not be identified (indeterminate type 1), (Fig 23:A, B). In view of these numbers, it likely originates from the consumption of (a food product based on) flowers or the flower buds of a specific plant.

The most remarkable feature is a high amount of taxa that have a Mediterranean distribution and which are not food plants. Strawberry tree (*Arbutus unedo*), rockrose (*Cistus* sp.) (Fig 23:C), gum rockrose (*Cistus ladanifer*) (Fig 23:D), dwarf Spanish heath (*Erica umbellata*), and Spanish lavender (*Lavandula stoechas*) all have a natural distribution largely restricted to the Mediterranean vegetation zone, with *C. ladanifer*, *E. umbellata* and *L. stoechas* specifically restricted to the western Mediterranean (Tutin et al 1964–1980). Additionally, viper's bugloss (*Echium*) and sunrose (*Helianthemum*) are typical Mediterranean plants, although their distribution spreads further into north-western and central Europe, where they occur sporadically. A similarly high number of (western) Mediterranean taxa have been found in a 15th-century cesspit from the palace of the dukes of Burgundy, also in Bruges (Deforce 2010). Some Mediterranean pollen types, mostly *Cistus* species, have also been found in other late- and early post-medieval cesspits in the Low Countries (De Groote et al 2004; Deforce 2006; 2013; 2017; van Haaster 2010; 2011; 2012).

There are different potential explanations for the presence of these Mediterranean pollen types in (post-)medieval cesspits in the Low Countries. Initially, it was believed to result from the use of ladanum (labdanum), an aromatic resin produced by several *Cistus* species, employed in the production of perfumes and in medicine (Deforce 2006). With an increasing number of Mediterranean taxa identified from these cesspits and not just members of the Cistaceae family, the consumption of honey originating from the Mediterranean seems a much more likely source for these pollen types (Deforce 2010; 2017). This is corroborated by the fact that all these taxa are typically pollinated by bees and are also important elements in the pollen assemblages of modern honeys from the

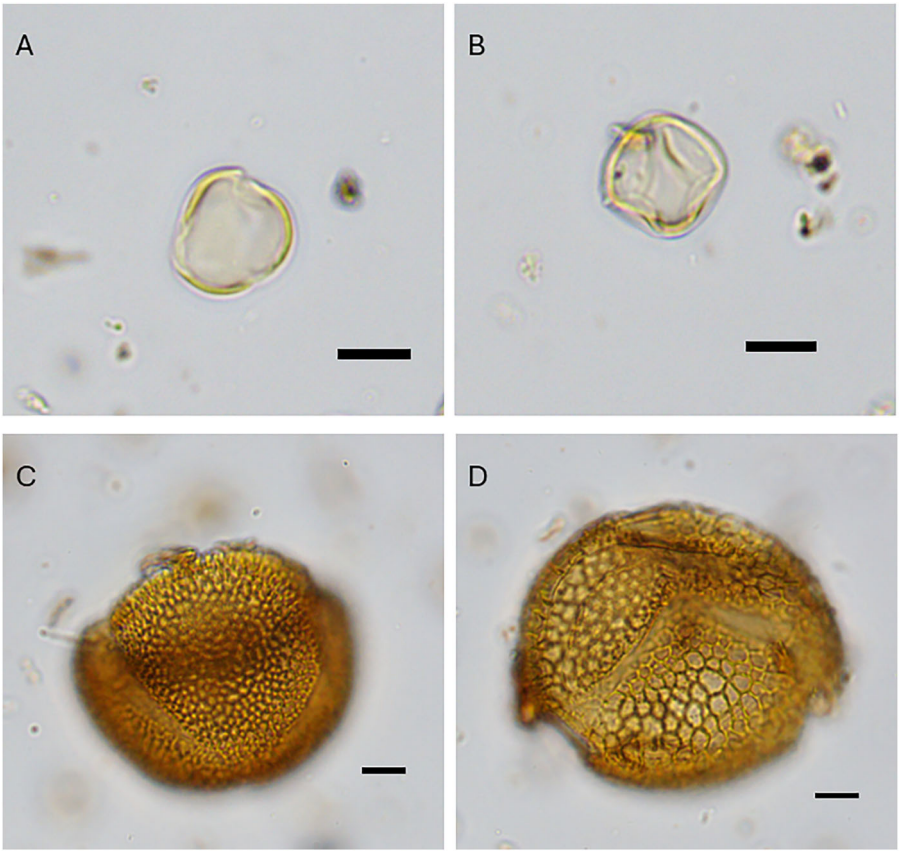

FIG 23
Pollen grains from sample B1: A. Indeterminate 1, polar view; B. Indeterminate 1, equatorial view; C. *Cistus* sp.; D. *Cistus ladanifer*. Scale bar = 10 µm. *Photographs by Koen Deforce.*

western Mediterranean (Gomez Ferreras and Sáenz de Rivas 1980; Bonvehi and Coll 1993; D'Albore 1998). Moreover, there is growing historical evidence for large-scale export of honey from the western Mediterranean to north-western Europe during the late-medieval period (Sapoznik et al 2023).

PARASITES

The results of parasite analysis of the latrine contents have been published elsewhere (Ledger et al 2024), but the relevant results are presented and contextualised more broadly here. Three sediment samples, one from layer [A] and two from layer [B], were analysed by microscopy for preserved parasite helminth eggs (Tab 9). The state of preservation of eggs within the cesspit samples was very good as indicated by nearly all *Ascaris* (roundworm) eggs (97%) having a mammillated coat, and by many *Trichuris* (whipworm) eggs (69%) retaining both polar plugs, and overall by the high concentration of eggs found.

The highest concentrations by type found in all subsamples were *Ascaris* and *Trichuris* (Fig 24:A). Eggs of *Ascaris* are not identified to species level due to an inability

TABLE 9
Concentration (eggs per gram) of parasite eggs recovered from layer [A], and two subsamples (1, 2), from layer [B].

Parasite	Vernacular name	A	B-1	B-2
Ascaris sp.	Roundworm	710	8,095	2,170
Dicrocoelium dendriticum	Lancet liver fluke	250	10	10
Echinostoma/Fasciola	Liver fluke	0	5	0
Taenia sp.	Beef/pork tapeworm	0	15	0
Trichuris sp.	Whipworm	6,190	345,000	9,560
Schistosoma mansoni	Intestinal schistosomiasis	0	5	0

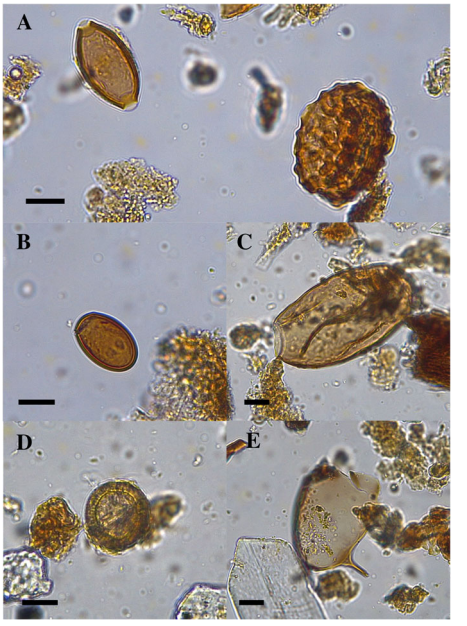

FIG 24
Parasitic remains: A. *Trichuris* sp. (whipworm) egg (left) and *Ascaris* sp. egg (right); B. *Dicrocoelium dendriticum* egg; C. *Fasciola/Echinostoma* egg; D. *Taenia* sp. egg; E. *Schistosoma mansoni* egg. Scale bars all 20 μm. *Photographs by Marissa Ledger.*

to distinguish between *Ascaris suum* and *Ascaris lumbricoides*. Given the human context of the cesspit, the eggs most likely derive from the human-infecting species *Ascaris lumbricoides*. The average size of the *Trichuris* eggs found in the cesspit are 55.3 μm long and 28.7 μm wide. This fits within the overlapping size range for *T. trichiura* (human whipworm) and *T. suis* (pig whipworm), although the width is at the larger end of the range for typical human whipworm eggs. Again, given the human origin of the cesspit contents, these eggs are expected to be from *T. trichiura*. However, it is possible that there is a mix of human and pig whipworm eggs in the latrine, which may occur if offal from pigs also was discarded here. Whipworm and roundworm are common causes of parasite infection in Roman and medieval Europe, including Belgium (Deforce 2010; Rabinow et al 2023; Wang et al 2024).

Eggs from *Dicrocoelium dendriticum* (lancet liver fluke) were also recovered from all subsamples (Fig 24:B). *D. dendriticum* is a liver fluke that can cause true infection in humans but is also found in faeces as a result of false parasitism, resulting from the ingestion of liver of infected animals (Cabeza-Barrera et al 2011). Therefore, in most cases, the presence of these eggs in latrine contexts may indicate consumption of animal liver, rather than true infection. *D. dendriticum* has been found in other medieval latrines from Belgium (Rabinow et al 2023; Graff et al 2020).

The highest taxonomic diversity and concentration of parasite eggs was found in layer [B], subsample 1. A single trematode egg was found (Fig 24:C). Based on morphometric characteristics, this could be *Fasciola hepatica* or *Echinostoma* sp., both of which also previously have been found in latrines from medieval Belgium (Rabinow et al 2023; Graff et al 2020). It measures 123.0 μm long (the operculum was not preserved) and is 67.3 μm wide.

Additionally, this sample also contained *Taenia* sp. (tapeworm) and *Schistosoma mansoni* (blood fluke) (Fig 24:D–E). The two main species of *Taenia* that infect humans in Europe are *T. saginata* (beef tapeworm) and *T. solium* (pork tapeworm). It is not possible to identify *Taenia* eggs to the species level based on the egg morphology. Thus, the eggs in the latrine could represent infection through ingestion of raw or undercooked beef or pork.

While all the above-mentioned parasites have been found elsewhere in medieval Belgium and are likely representative of parasites endemic within the community, this is the first evidence for *S. mansoni* from an archaeological site in Belgium. In fact, the only archaeological evidence for *S. mansoni* in Europe is from 15th–16th century France (Bouchet et al 2002). *S. mansoni* is a fluke that causes intestinal schistosomiasis. *S. mansoni* is not endemic in north-western Europe thus the individual whose faeces were deposited in the cesspit must have been infected elsewhere. Today, the majority of *S. mansoni* infections occur in Africa, although infections also occur in the Middle East, South America and the Caribbean (Colley et al 2014). Current evidence suggests that *S. mansoni* was introduced into South America and the Caribbean in more recent human history through the Atlantic slave trade (Morgan et al 2005; Platt et al 2022). Given the known epidemiology of schistosomiasis, finding an *S. mansoni* egg provides evidence for long-distance travel, most likely between Africa and Bruges. However, it is also possible that the infected individual acquired the infection in the Arabian Peninsula.

DISCUSSION

PRACTISING CHEMISTRY IN LATE-MEDIEVAL FLANDERS

Several ceramic vessels and parts of a glass alembic provide information about the chemical production processes undertaken on the site, or in its immediate vicinity. While they represent rare finds for medieval Flanders, comparable artefacts have been found in Europe from the 13th century onwards (see Thomas and Moureau 2022 for a recent overview).

Although many archaeological discoveries of alchemical apparatus have been made in elite or religious contexts, some other findings and historical sources show that by the late-medieval period the practice of chemistry was not limited to a small circle of clerics,

academics and court scientists. Instead, (al)chemical recipes were widespread among the educated urban populace and eagerly exchanged. To give but one telling example: a mid-15th-century notebook of a German merchant from Cologne based in Flanders contains several alchemical recipes for the processing of gold, silver and pearls, including one he had learned from a certain Jan Spyser, 'who wanted to be an alchemist' (*ende wilde een alckemiste syn*), and another one learned from a man named Pyrlin who, in turn, had heard it from the chamberlain of the Duke of Bourbon (CAC, Hs 262, fol 3r-5v).

As early as the 13th century, scholars such as Roger Bacon distinguished between so-called 'theoretical' or 'speculative alchemy' (*alkimia speculativa*), which concerns the generation of things from the elements, and 'practical alchemy' (*alkimia operativa et practica*), which deals with the manufacture of precious metals and pigments, and other items of chemical technology such as the counterfeiting of gems and the distillation of medicinal waters, such as rose water, alcohol, and *quinta essentia*, a liquid believed to extend life (Huizenga 1997; Newman 1997). In his handbook on painting (c 1400), Cennino Cennini explains that various pigments, such as ceruse, lead white and vermilion, are 'made by alchemy', evidently because of the close similarity between pigment manufacturing and the transmutation process, and also because of the symbolic value of colours (and colour changes) in the transmutation process. Rather than artists producing pigment themselves, Cennini suggested they should be collected 'at the druggists' (Bucklow 2016).

Indeed, artists did not routinely manufacture pigments, but instead would purchase them in powdered form from specialised merchants and spice dealers/apothecaries (Kirby et al 2010). According to the 'chosen law' of the Spice Hall of 1317, the Bruges spice dealers (many of whom were also active as apothecaries) not only sold a wide variety of exotic herbs and spices, but also metals such as mercury and tin, as well as precious minerals, mordants and dyestuffs such as brazilin, sulphur, orpiment, alum and lacquer (De Meyer 1842, 27), all of which were used in the production of (oil) paint. A later document, from 1470, also adds ceruse ('Spanish white'), vermilion, verdigris ('Spanish green'), white lead, the blue-purple colourant 'turnsole', the red colourant 'alquenecte' (*alkanna tinctoria*), as well as turpentine, arsenic, mastic, borax and galipot, to name but a few examples, to the list of products sold at the Spice Hall (Vanden Bussche 1874, 193–201). Interestingly, 15th-century records show that spice dealers also dealt in distilling equipment. In 1424, for example, a spice dealer/apothecary from Bruges sold two distilling glasses (*twee glazen daermede men distuleert*) to John of Bavaria, Count of Holland, just a few days prior to his death (NA, Archief van de graven van Holland, nr 1283, fol 27v°–28r°, 68v°).

The easy availability of high-quality artists' materials and pigments in Bruges undoubtedly exerted a strong attraction on talented illuminators and painters, such as Jan van Eyck, Petrus Christus and Hans Memling, all of whom came to settle in this international trade centre in the course of the 15th century. So far, no painter's workshop has been traced near the excavation site (Verheyen 2023). Yet, we do know that in the late-medieval period the neighbourhood of the present-day *Spanjaardstraat* was home to a large concentration of spice dealers/apothecaries. In a source from 1424, for example, one of the spice dealers/apothecaries of the Burgundian Duke Philip the Good, Jacob van den Leene, is mentioned living on this street (CAB, OCMW, Begijnhof De Wijngaard, reg 1649 [oud nummer] F7), fol 26; see also Baveye Kouidrat 2015, 541–2). The house of Jan Voet, a Bruges-based spice dealer who supplied

apothicairies to Duke Philip the Bold in 1375, was located on the corner of the *Spanjaardstraat* and Jan van Eyckplein, but also had properties on the northern side of the nearby Genthof (EAB, Sint-Salvators, S291, fol 14v°; see also Baveye Kouidrat 2015, 565). In addition, spice dealers such as Jacob van den Vagheviere (died 1421) and Rogier van der Steghele (died 1430) had several properties close to the excavation site (CAB, OA, 208. Wezenregisters, Sint-Niklaas, boek 3, fol 130v–131r; CAB, OA, Carmers, boek 3, fol 95r). Many more examples could be cited. In fact, the aforementioned Jan van Hertsberghe, after whom *Groot Hertsberghe* may have been named, is probably the same as *Jehan de Hertsberghe, li espesier* ('the spice dealer') mentioned in a source from the 1320s (GSA, Rekenkamers, Delen en banden. Registers, n° 45925, fol 9v°). If this is indeed the case, the presence of spice dealers at the excavation site can be traced back at least to the early 14th century.

CONSUMPTION PRACTICES OF MERCANTILE COMMUNITIES

The location in the heart of Bruges' commercial district, the large array of imported goods and foodstuffs, and the presence of artisanal utensils all point in the direction of the cesspit contents reflecting multiple generations of traders. The oldest material likely relates to a rather well-to-do apothecary, involved in the import and export of multiple commodities, and the production of pigments and of distilled medicinal waters, perhaps stored in some of the vessels found in the assemblage. The complexity of cesspit excavations in combination with the lacunary historical sources do not allow us to identify with certainty whether this trader was local or of Spanish/Italian origin. In any case, Spanish merchants were certainly present from the 1480s onwards, first the wool trader Gómez de Soria and later, from 1494, Castilian members of the Spanish nation. It is uncertain whether the identified *S mansoni* parasite egg is attributable to one of the Mediterranean occupants at the site, since the indirect trade between Bruges and Africa was mainly mediated by Spanish, Italian or Portuguese merchants (Bonduel 2022), or perhaps to another individual whose origin was from an endemic area such as Africa and was living in or visiting the household (the first recorded mention of an African in Bruges dates to 1440: Viaene 1970). However, the presence of 16th-century objects allows us to attribute at least a part of the assemblage to the residents of the Spanish nation house with confidence.

The archaeology of medieval mercantile communities has, until now, studied mainly within the framework of the German Hanse. Hanseatic merchants in the Baltic are viewed as bound through common brick gable architecture and domestic goods, notably stoneware (Gaimster 2005; 2014). However, the idea of a Hanseatic 'cultural package' spreading across Europe has been nuanced through the study of its expression in various local case studies (eg Mehler 2009; Naum 2013; 2014). The result is a plea for a more contextual approach (Immonen 2007; Müller 2013), opening the way for a plurality of cultural interactions with and by Hanseatic merchants, in which objects play a mediatory role (Jervis 2017).

Only rarely have traces of Mediterranean merchants been uncovered in archaeological fieldwork in Northern Europe, so comparison is difficult. In Antwerp, a ceramic study of the 16th–17th-century Portuguese merchant family Ximenez revealed the presence of pottery circulating outside of regular trade networks—comparable to the possible Portuguese and Spanish jug and albarellos found at Bruges—and potentially acquired as

a gift or acquired directly from abroad (Poulain et al 2017). Internationally, most notable are the excavations at Bucklersbury and Poultry (London), where several shops were unearthed in an area closely associated with Italian merchants working as druggists or apothecaries in the trade of spices and fine textiles (Burch et al 2011, 98, 116, 231–3). At this site in London, however, no finds relate directly to this Mediterranean mercantile presence. The nationality or cultural identity of merchants or occupants is thus not necessarily reflected in the range of tablewares used in their foreign homes (Allan 1995; Jeffries 2001; Gutiérrez 2012). The many imports and particular forms in the Bruges' assemblage studied here should not therefore be interpreted as the exclusive constituents of a uniform Spanish/Italian 'cultural package'. The occurrence of Mediterranean honey, rice and olives at various high-status/mercantile sites serves as a case in point. Both locals and non-locals may thus have used these goods to navigate everyday life and trade in the multicultural city that was medieval Bruges.

The cosmopolitan tastes of local or foreign merchants in Bruges demonstrated here recall earlier work by Mack (2002) on Renaissance Italy, in which the author observes a rising demand for luxurious, Oriental-style household furnishings. For example, even with the declining quality of Syrian glass at the end of the 14th century, it was still widely imported to Italy. And locally made maiolica continued to draw inspiration from techniques, colours and motifs used in Islamic lands (Mack 2002, 95–123). The well-established shipping network between Bruges and the Mediterranean meant that this 'community of taste' (Mack 2002, 171) could be continued away from home or newly adopted without much effort. Although previously the importance of this cosmopolitan demand for luxury goods in late-medieval Bruges has been questioned because of limited indications for such imports in historical sources (Stabel 2011), the archaeological data from this cesspit seem to suggest that, at least for merchants in Bruges' international quarter, such goods were within reach and an intrinsic part of their lives, either as luxuries bought at the Bruges market or as ordinary utensils brought from the homeland. The majority of locally crafted goods, also in top layer [A], more likely reflective of Spanish occupation at the site, suggests however that even for these Mediterranean merchants, this 'community of taste' was not simply transplanted, but rather adapted through interaction and exchange with the local population and its material culture.

CONCLUSION

This interdisciplinary re-evaluation of an old rescue excavation has allowed for new perspectives on the supply side of painting, illumination and alchemy, and given a glimpse of the material lives of those involved in the production chain of pigments and medicinal waters, among other things unrecognised during excavation. The results relating to the probable presence of a 15th-century apothecary at, or in the vicinity of, the site tie in neatly with the historical records of Bruges as one of the—if not the most important—centres of trade for spices and dyes in northern Europe during the 14th and 15th centuries. As such, this contextualised case study contributes to the 'colourful mosaic' of alchemical practices in medieval Europe (Martinón-Torres 2012, 23), providing further insight into its diversity and modes of functioning. Moreover, the finds from the cesspit further diversify our understanding of the material manifestation of mercantile communities outside of contexts directly relating to the Hanseatic League. While the evidence seems to hint at a rather cosmopolitan taste in this international quarter, consumption practices of goods and foods remain firmly rooted in local provisioning. As

few comparable assemblages are currently available in Europe, we hope that this research can serve as a reference for future studies on the medieval archaeology of merchants.

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Abbreviations

CAB	City Archives Bruges
CAC	City Archives Cologne
EAB	Episcopal Archives Bruges
GSA	General State Archives Brussels
NA	National Archives, The Hague
OA	Old Archive
OCMW	*Openbaar Centrum voor Maatschappelijk Welzijn*
SAB	State Archives Bruges

Résumé

Chez l'apothicaire: la vie dans un quartier international de Bruges, au 15^{e} siècle *par* Maxime Poulain, Mathijs Speecke, Anton Ervynck, Jan Huyghe, Jan Moens, Marissa Ledger, Eva Vermeersch, Lieselotte Desnerck, An Lentacker, Wim Wouters, Wouter van der Meer, Koen Deforce, Toon De Meester, Nicolas Thomas, Marijn Stolk, Ina Vanden Berghe, Maaike Vandorpe, Alejandra Gutiérrez, Peter Vandenabeele, Wim De Clercq *et* Bieke Hillewaert

En 1996, une fosse d'aisance a été mise à jour dans la cour de la maison de la nation d'Espagne (Perez de Malvenda is another house!!) à Bruges. L'étude interdisciplinaire de cette ancienne campagne de fouilles éclaire d'un jour nouveau la vie dans ce quartier cosmopolite de la ville, entre la fin du 14^{e} et le début du 16^{e} siècle. Les déchets de la fosse d'aisance sont les témoins de plusieurs générations de négociants, que ce soit un apothicaire aisé qui utilise des instruments alchimiques pour la production de pigments, ou des commerçants espagnols qui sont attestés sur le site dès les années 1480. Cette présence mercantile est reflétée par un éventail inégalé de marchandises, de nourritures et de maladies importées : céramiques d'Italie, d'Espagne et du Portugal ; aspersoirs de parfum en verre et soies somptueuses du Proche-Orient ; olives, riz et un parasite africain. Ces éléments confèrent une dimension matérielle à l'attractivité de Bruges pour des artistes de renom tels que Jan van Eyck et engendrent des débats sur les penchants cosmopolites des marchands (non-) locaux dans ce centre de négoce international.

Zussamenfassung

In der Apotheke: Leben in einem internationalen Viertel im Brügge des 15. Jahrhunderts *Von* Maxime Poulain, Mathijs Speecke, Anton Ervynck, Jan Huyghe, Jan Moens, Marissa Ledger, Eva Vermeersch, Lieselotte Desnerck, An Lentacker, Wim Wouters, Wouter van der Meer, Koen Deforce, Toon De Meester, Nicolas Thomas, Marijn Stolk, Ina Vanden Berghe, Maaike Vandorpe, Alejandra Gutiérrez, Peter Vandenabeele, Wim De Clercq *und* bieke hillewaert

Im hinterhof des ‚spanischen hauses' in Brügge wurde 1996 eine Senkgrube entdeckt. Die interdisziplinäre Untersuchung dieser alten Rettungsgrabung wirft ein neues Licht

auf das Leben im internationalen Viertel der Stadt zwischen dem späten 14. und frühen 16. Jahrhundert. Der Abfall in der Senkgrube ist das, was mehrere Generationen von Händlern hinterlassen haben: von einem wohlhabenden Apotheker, der alchemistische Apparate zur Herstellung von Pigmenten benutzte, bis hin zu spanischen Händlern, deren Anwesenheit an diesem Ort ab den 1480er Jahren dokumentiert ist. Die Handelspräsenz spiegelt sich in einer beispiellosen Vielfalt an importierten Waren, Lebensmitteln und Krankheiten wider, die von italienischer, spanischer und portugiesischer Keramik, gläsernen Parfümzerstäubern aus dem Nahen Osten und luxuriöser Seide bis hin zu Oliven, Reis und einem afrikanischen Parasiten reichen. Diese Gegenstände verleihen der Anziehungskraft von Brügge für berühmte Künstler wie Jan van Eyck eine materielle Dimension und entfachen die Debatte über den kosmopolitischen Geschmack (nicht-) lokaler Kaufleute in diesem internationalen Handelszentrum.

Riassunto

Alla bottega dello speziale. Vita in un quartiere internazionale di Bruges nel Alla bottega dello speziale. Vita in un quartiere internazionale di Bruges nel XV secolo *di* Maxime Poulain, Mathijs Speecke, Anton Ervynck, Jan Huyghe, Jan Moens, Marissa Ledger, Eva Vermeersch, Lieselotte Desnerck, An Lentacker, Wim Wouters, Wouter van der Meer, Koen Deforce, Toon De Meester, Nicolas Thomas, Marijn Stolk, Ina Vanden Berghe, Maaike Vandorpe, Alejandra Gutiérrez, Peter Vandenabeele, Wim De Clercq *e* Bieke Hillewaert

Nel 1996, nei pressi della casa della Nazione Spagnola a Bruges, tornò alla luce un pozzo nero. Lo studio interdisciplinare di questo vecchio scavo preventivo ha fatto nuova luce sulla vita nel quartiere internazionale della città tra il tardo XIV secolo e gli inizi del XVI secolo. Le materie di rifiuto nel pozzo nero sono quanto è stato lasciato da generazioni di commercianti a partire da un ricco speziale che usava apparati alchemici per la produzione di pigmenti fino ai commercianti spagnoli la cui presenza in questo sito è documentata a partire dal 1480 in poi. La presenza dei mercanti è testimoniata dalla straordinaria varietà di merci importate, di cibi e di malattie: si va dalle ceramiche italiane, spagnole e portoghesi agli spruzzatori di profumo in vetro dal vicino oriente, dalle sete lussuose alle olive, al riso e a un parassita africano. Questi oggetti documentano la dimensione materiale dell'attrazione esercitata da Bruges su artisti rinomati quali Jan van Eyck e accendono il dibattito sui gusti cosmopoliti dei mercanti (non-)locali in questo centro commerciale internazionale.