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Identifying Content through Casks

Jeroen Oosterbaan

Abstract – In the late medieval and early modern period, beer and herring emerged as the predominant export products from the coastal region of the Netherlands. The archaeological tangible evidence of these two products is represented by casks. Even though these casks are a common find during archaeological research, determining the original contents of these casks remains a challenge. This makes it difficult to connect users of the casks to specific products and their trade networks. This study is focused on the identification of Dutch beer and herring casks that were produced between the 15th and 18th centuries. To address this goal, various types of sources were utilized. Information regarding cask construction was obtained from archival legislative records. During their use, the casks were subject to monitoring by urban authorities and guild councils, who employed gauge instruments that are now preserved in museum collections, which were used to ascertain their specifications. Additionally, the casks themselves provide valuable insights into the packing material of beer and herring. Both casks depicted in artwork and those recovered from maritime archaeology sites were examined to gain a comprehensive understanding of beer and herring casks.

Inhalt – Im späten Mittelalter und in der frühen Neuzeit wurden Bier und Hering zu den wichtigsten Exportprodukten der niederländischen Küstenregion. Die archäologisch greifbaren Belege für diese beiden Produkte sind Fässer. Obwohl Fässer bei archäologischen Untersuchungen häufig gefunden werden, bleibt die Bestimmung des ursprünglichen Inhalts dieser Fässer eine Herausforderung. Dies macht es schwierig, die Benutzer der Fässer mit bestimmten Produkten und ihren Handelsnetzen in Verbindung zu bringen. Diese Studie konzentriert sich auf die Identifizierung von niederländischen Bier- und Heringsfässern, die zwischen dem 15. und 18. hergestellt worden sind. Um dieses Ziel zu erreichen, wurden verschiedene Arten von Quellen herangezogen. Informationen über den Bau von Fässern wurden aus archivierten Gesetzesunterlagen gewonnen. Während ihrer Verwendung wurden die Fässer von den städtischen Behörden und den Zunftsträten überwacht, die Messinstrumente verwendeten, die heute in Museumssammlungen aufbewahrt werden, um ihre Eigenschaften zu ermitteln. Darüber hinaus bieten die Fässer selbst wertvolle Einblicke in das Verpackungsmaterial von Bier und Hering. Um ein umfassendes Verständnis von Bier- und Heringsfässern zu erlangen, wurden sowohl Fässer untersucht, die auf Kunstwerken abgebildet sind, als auch solche, die in maritimen archäologischen Fundstätten gefunden wurden.

Introduction

Casks, the precursors of modern-day shipping containers, played a vital role in the transportation of goods during the pre-industrial era. Regions specializing in trade, such as the coastal area of the Low Countries, witnessed an increasing demand for casks beginning in the late medieval period. Cooperies in the Low Countries catered to this demand by manufacturing a wide variety of casks, intended for storage and transportation of various products. These products included

- dry merchandise like grains, seeds, and spices,
- foodstuffs such as dairy products, meat, and fish,
- alcoholic beverages like beer, wine, and spirits.

Given their ubiquity, casks are frequently discovered in urban ar-

chaeological sites throughout the Netherlands. However, despite their prevalence, determining the original contents of these casks remains a challenge, making it difficult to link the users of the casks to specific products and their trade networks. To address this issue, this study focuses on the two most significant export products from the coastal region of the Netherlands: beer and herring.

The brewing industry was primarily concentrated in the province of Holland and reached its peak during the period 1450–1650.¹ Archival sources show that during the mid-15th century, in various cities of Holland, including Amsterdam, Haarlem, and Leiden, the taxation on beer constituted as much as 50 % of the cities' total revenue.² The number of beer casks that circulat-

ed can also be calculated based on archival sources. The archives of the states of Holland show that during the period 1543–1545, approximately 950,000 beer casks were used in the nine major beer-producing cities in Holland.³

* The archival sources were carefully interpreted, assisted by the Paleography workgroup in Zeeland (PaiZ), with heartfelt appreciation to Dr. Ferry Zwaan, whose invaluable insights greatly enriched the analysis. Furthermore, Dr. Roos van Oosten from Leiden University provided valuable guidance in shaping the study and identifying relevant sources, along with valuable feedback on various drafts of this paper. Gratitude is also extended to Kerry Fast for her expert editing of the text and to Jenny Poelen of Blinq communicatie for designing Fig. 1.

¹ Unger 2001; Yntema 1992.

² Alberts 2017; Unger 2001; Yntema 1992.

³ Yntema 1992.



The second most significant export product of the coastal region of the Netherlands in the late medieval and early modern period was herring. In the 1300s, most herring were caught in the narrow waterway between the Danish mainland and islands. By a twist of nature, herring shoals moved from this narrow waterway to the North Sea in the late Middle Ages, creating favorable conditions for herring fisheries in the provinces of Flanders, Zeeland, and Holland.⁴

However, even within these provinces, the center of the herring industry shifted. During the late Middle Ages, the primary cities of importance were situated in Flanders, evidenced by the fact that it had a larger fleet of herring fishing vessels in operation than Zeeland and Holland.⁵

Beginning in the 16th century, cities in Zeeland and Holland progressively assumed a more significant role in the herring industry. Their combined herring fleets totaled approximately 1000 ships at the peak of the industry.⁶ Holland's cities, in particular, emerged as the dominant force in the herring fishery.⁷ Rotterdam, Brielle, Delfshaven, and Maassluis, situated in the Meuse estuary, and Enkhuizen, in the northern regions of Holland, collectively brought in an annual catch averaging around 25,000 last at the peak of the herring industry, in the first half of the 17th century.⁸

This information enables the quantification of the demand for herring casks by the Dutch herring fishery during the specified timeframe. According to historical sources, during the late medieval and early modern period, one last of herring corresponded to 12–14 casks.⁹ In this period, the standard equivalency is estimated to be 14 casks per last.¹⁰ In other words, the annual demand for casks used by the Dutch herring fishery totaled approximately 350,000 casks.

In both the beer industry and the herring fishery, there was a significant demand for casks in coastal

regions of the Netherlands in the late medieval and early modern period. Local cooperies began to specialize in the production of casks specifically tailored for these products. To ensure consistency, various levels of authority (urban councils, provincial authorities, Habsburg rulers, etc.) issued legislation that mandated the specifications for beer and herring casks (e.g., height, number of staves, number of hoops). This legislation, preserved in archival sources, together with museum artefacts and casks from archaeological sites and depicted in paintings from the Low Countries shed light on the research question: how can Dutch herring and beer casks that were produced between the 15th and 18th centuries be identified?

Sources and methods

To help identify Dutch herring and beer casks built in the 15th to 18th centuries, various sources are used. These include legislation, its enforcement, and production and use of beer and herring casks.

Archival sources comprising legislation passed by various jurisdictions (urban, provincial and larger jurisdictions such as the Habsburg Empire) prescribe the specifications of beer and herring casks (size, capacity, number of staves, head components, etc.) that were produced in the coastal regions of the Netherlands.

Monitoring the specifications of herring and beer casks, that is, ensuring compliance with legislation, was crucial for the industries, and was carried out by urban and guild councils. Amsterdam Museum contains gauge instruments that were used for this purpose, and they too are a data source for identifying casks.

Paintings of the Low Countries from the 15th to 18th centuries depicting beer and herring casks are another source used in this study. Only artwork produced by artists from the Low Countries within the

designated research period were analyzed. The paintings were accessed through the online database of RKD.¹¹

Casks retrieved from maritime archaeology sites, that is, shipwrecks, proved most suitable for this study because their original contents could have been preserved. Conversely, repurposed casks recovered in urban archaeology were not suitable because their original contents cannot be identified. Only casks found at shipwrecks in Dutch waters are included in this study, as they can be directly linked to production activities in the Netherlands and consequently the corresponding legislation and enforcement in the region. The database of the Maritime Archaeological Depot of the Netherlands was consulted as a resource for this research.¹²

Cask specifications

Cooperies in the Netherlands produced casks for a wide variety of products. As stated, beer and herring casks were in highest demand. The specifications of casks differed depending on their purpose, and they also changed over time and varied from city to city. But in what manner did the casks for specific products differ from one another? The capacity, and therefore the dimensions of casks, varied according to the product they were made for. The dimensions also impacted the number of staves in a cask. Finally, the number of parts comprising the head of a cask also varied (Fig. 1).

⁴ Poulsen 2008; Unger 1978.

⁵ Van Vliet 2005.

⁶ Poulsen 2008; Van Bochove 2004.

⁷ Van Vliet 1994.

⁸ Van Bochove 2004.

⁹ Dijkman 2011; Harland 2009.

¹⁰ Unger 1980.

¹¹ <<https://rkd.nl/en/>> (April 15, 2023).

¹² <<https://easy.dans.knaw.nl/ui/datasets/id/easy-dataset:155737>> (March 31, 2021).



Achieving a watertight seal was critical in cask construction. However, this was more important when the contents exerted pressure on the casks. The thickness of the staves, the number of hoops used, and the quality of the timber used were all factors that contributed to a watertight fit. These specifications varied depending on the products for which the casks were intended.

Access to the contents of the casks was essential. Usually large bung-holes were made in the bilge of the casks, facilitating filling and emptying. Typically, the cask heads were not removed for filling, as both heads were fit into the crozes of the staves and could only be removed by bending the staves.

In casks designed to contain liquid, taps were fitted in tapholes to facilitate the extraction of the liquid. In most casks with tap holes, a small additional hole was made to allow air to enter while the liquid was being drawn. Occasionally, smaller holes were made for the purpose of sampling the liquid.

In summary, the following specifications varied in casks depending on the product it was designed for:

- Capacity
- Dimensions
- Number of staves
- Number of head parts
- Thickness of staves
- Hoop sets
- Timber used
- Type of hole

Results

Legislated cask specifications

Legislation concerning beer and herring casks was enacted by various levels of authority. Each level of authority had its own legislative jurisdiction and formulated legislation accordingly.

Urban authorities consisted of local government bodies and craft guild councils. They typically over-

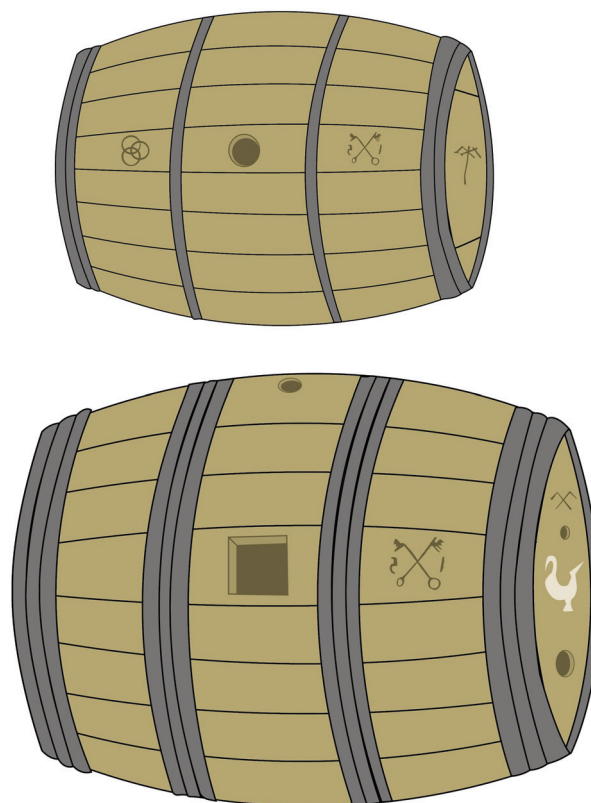


Fig. 1:
Artist impression of
a herring cask (top)

and

a beer cask (bottom)
in the early modern
period

saw specific issues concerning cask construction, such as the thickness of the staves and the number of staves and head components in a cask.

Provincial authorities also involved themselves in matters related to cask production. For example, Holland prescribed the capacity of casks in certain instances. Additionally, urban craft guilds that produced the same product sometimes joined forces to pursue common interests. The beer brewers of Holland formed the General Brewers of Holland, while craft guilds in Zeeland and Holland specializing in the herring fishery established the College of the Big Fishery.

Legislation of larger jurisdictions, such as the Habsburg Empire and the union of seven northern provinces following the Dutch revolt, dealt with matters affecting the entire region and was aimed at primary issues. In the case of beer and herring casks, these jurisdictions ruled on matters such as cask capacity and granted provinces and cities the right to collect taxes.

In the early 16th century, the beer industry in the coastal region of the Netherlands was regulated by both the Habsburg Empire and provincial authorities. According to a 1531 ordinance issued by the Habsburgs, new breweries were required to be located within city walls, transforming it into an urban industry from a rural one.¹³

Beginning in 1580, the province of Holland sought to gain influence over this significant industry by issuing ordinances targeting the brewing sector. However, Holland's efforts were frustrated when the Habsburg Empire granted certain privileges to brewing cities. For instance, Charles V granted privileges to the cities of Gouda and Haarlem concerning excise and other tax collection related to beer production.¹⁴

¹³ Yntema 1992.

¹⁴ Yntema 1992.



These privileges provided both cities with a considerable degree of autonomy in regulating their brewing industries, and both the brewers and urban authorities defended these privileges vigorously because of the potential income the industry promised. However, urban brewers went beyond safeguarding their privileges and endeavored to influence decisions at the provincial level by establishing the General Brewers of Holland in 1660, a lobbying group that remained active until 1811.¹⁵

Due to the efforts of this group and other initiatives by beer-producing cities, regulating how beer casks were produced remained primarily

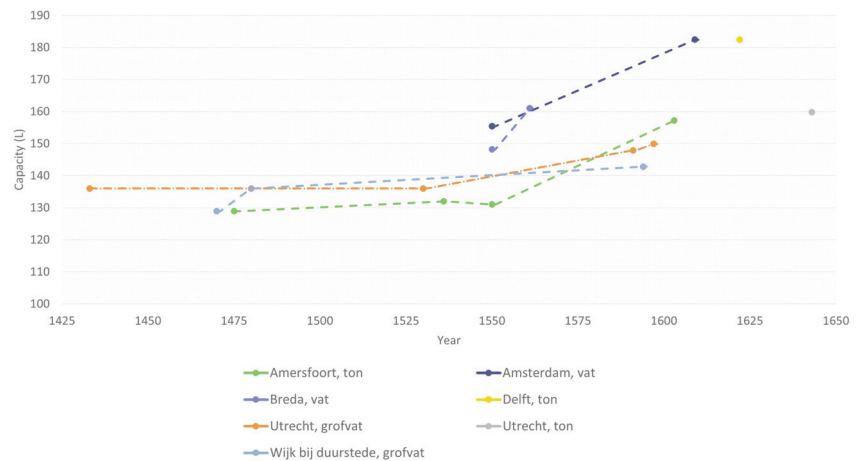


Fig. 2: Diachronic change of beer cask capacity in cities in the Netherlands (sources: Alberts 2010; Unger 2001; Verhoeff 1983)

an urban concern.¹⁶ This led to significant regional differences in leg-

islation on beer casks and hence differences in their specifications.

	Gouda (1490)	Haarlem (1567)	Dordrecht (1606)	Amsterdam (1652)	Leiden (1743)
Capacity	Same size as Hamburg's casks	Prescribed size in ordinance of Haarlem	Reference to the correct sizes as ordered by the city council	Same size as Dordrecht's beer casks: 76 stopen (2.4 L x 76=182.4 L); 1/2 cask: 40 stopen (2.4 x 40=96.1 L)	Same size as Dordrecht's beer casks
Number of staves	Not mentioned	Minimum of 14 staves	Minimum of 15 staves; 1/2 cask: 13 staves	Minimum of 15 staves; 1/2 cask: 14 staves	Minimum of 15 staves; 1/2 cask: 13 staves
Width of staves	Not mentioned	Not mentioned	Staves of equal width	Not mentioned	Not wider than 5 duymen (12.9 cm)
Thickness of staves	Not mentioned	Not mentioned	2/3 duym (1.71 cm)	Not mentioned	Minimum of 1.4 cm
Number of head parts	Not mentioned	Not mentioned	Maximum of 3 head parts	Not mentioned	Maximum of 3 head parts
Thickness of head	So thick that it cannot be bent by hand	Not mentioned	1/2 duym (1.3 cm)	Not mentioned	Not mentioned
Timber used	Good Prussian timber	Eastern timber of good quality, without sapwood	Dry timber without sapwood, knots or wormholes	Dry timber without sapwood, knots or wormholes	Dried oak without wormholes, bad knots or sapwood
Hoops	Simultaneously made hoops	Not mentioned	Simultaneously made hoops	12 simultaneously made hoops	16 simultaneously made hoops
Holes	Not mentioned	Not mentioned	Not mentioned	Bunghole must be made	Taphole and bunghole must be made
Source	Couquerque – Meerkamp van Embden 1917	Huizinga 1911	Regionaal Archief Dordrecht 1606	Smient – Smient 1663	Luchtmans 1743

Table 1: Specifications of beer casks from guild archives of various cities in the Netherlands



	Holland and West Friesland (1619)	Holland and West Friesland (1699)
Capacity	Not mentioned	Not mentioned
Number of staves	Minimum of 13 staves	Minimum of 12 staves
Width of staves	Staves of equal width, minimum of 2 duym (5.1 cm), maximum of 5 duym (12.8 cm)	Staves of equal width, minimum of 2 duym (5.1 cm), maximum of 5 duym (12.8 cm)
Thickness of staves	minimum of 1/2 duym (1.3 cm) at the ends; 1/3 duym (0.9 cm) at the bilge	minimum of 1/2 duym (1.3 cm) at the ends; 1/3 duym (0.9 cm) at the bilge
Number of head parts	Maximum of 3 head parts	Maximum of 3 head parts
Thickness of head	Not mentioned	Not mentioned
Timber used	Good timber	Good timber
Hoops	Simultaneously made hoops	Simultaneously made hoops
Holes	Not mentioned	Not mentioned
Source	Placcaet ende Ordonnantie, beroerende het maken, keuren ende branden vande Haringhtonnen, 1619 ¹	Placcaet ende Ordonnantie, beroerende het maecken, keuren ende branden van de Haring-Tonnen, 1699 ²

Table 2: Specifications of herring casks in the ordinances of Holland and West Friesland

The variation in urban legislation that affected beer casks, usually in the form of ordinances issued by city councils, is most notable in regulations about the capacity of casks. This is illustrated in Figure 2, which depicts prescribed beer cask sizes and how this changed over the course of two centuries. As the figure shows, the prescribed capacity of beer casks differed significantly across cities. For instance, in 1550, the specified beer cask capacity in Amersfoort was 131 L, in Amsterdam it was 155 L, and in Breda, 148.2 L.

Additionally, the figure shows a trend of increasing beer cask size across cities beginning already in the 15th century. This trend is likely rooted in urban preferences for larger beer casks because this allowed for a more accurate measurement of their contents and made it harder to engage in fraudulent practices.

Other aspects of beer casks were mostly regulated by craft guilds (Tab. 1). This legislation guided coopers to ensure beer casks met regulations and also facilitated officials in verifying that casks had been constructed according to the required specifica-

tions. In most instances, beer casks were required to be constructed with 15 staves with a minimum thickness of 1.4 cm each. Additionally, the use of newly crafted hoops was required, which meant old hoops could not be reused.

During the late medieval period, rulers began standardizing herring casks in the provinces of Zeeland and Holland. For example, Duke Willem VI of Holland issued an ordinance in 1423 that mandated the size of casks in Brielle,¹⁷ although the exact dimensions of these casks are not known.

Despite measures being taken to protect the quality of herring by Holland and Zeeland, complaints about herring persisted in various cities during the mid-15th century. To address these concerns, new ordinances were introduced in the late 15th century, establishing the Dordrecht cask with a capacity of 120 L as the standard herring cask.¹⁸

At the beginning of the 16th century, the competition between the herring industries of Flanders and Holland reached its peak. To level

the playing field, the Habsburg ruler issued an ordinance standardizing the size of herring casks that applied to both counties.¹⁹

As the 16th century drew to a close, Holland dominated the herring industry. To safeguard this position, several cities with significant herring industries formed the College of the Big Fishery (College van de Grote Visserij) in 1567.²⁰

This organization served as a lobbying group dedicated to protecting the interests of Holland's collective herring fishery. Through its efforts, the capacity of herring casks remained at 120 L.

Other specifications of herring casks were mostly regulated by provincial authorities (Tab. 2).

¹⁵ Bakker et al. 1992; Timmer 1918.

¹⁶ Yntema 1992.

¹⁷ Beaujon 1885; Dijkman 2011.

¹⁸ Dijkman 2011.

¹⁹ Beaujon 1885.

²⁰ Timmer 1918.





Fig. 3: G van den Eeckhout, *The governors of the Amsterdam coopers and wine merchants' guild* (1673) (Amsterdam Museum, <<http://hdl.handle.net/11259/collection.39571>>)

Urban craft guilds had less authority to prescribe the specifications of herring casks than they did of beer casks; coopers in various cities in Holland and West Friesland that were connected to the herring fishery had to comply with provincial specifications.

Herring casks, in the main, were required to have at least 12 or 13 staves. The staves of herring casks were, with a minimum width of 0.9 cm, narrower than the staves used in beer casks by more than 1.4 cm. Additionally, new hoops had to be used, and reusing old hoops was mostly prohibited.

Enforcing cask specifications

Urban and guild councils were responsible for overseeing the

enforcement of legislation concerning beer and herring casks. To this end, they used various instruments to measure the dimensions of casks, new and used, at weighing houses located in the coastal cities of the Netherlands. Figure 3 depicts the governors of the Amsterdam coopers and wine merchants' guild (1673) with coopers' and the gauge instruments they used to check casks.

The artefact collection at the Amsterdam Museum includes gauges that were used in Amsterdam's weighing house. These instruments can be categorized into three distinct types (Fig. 4):

1. Gauge set. It consists of a ring, bracket and calipers that were used to measure the diameter of

the cask at the top and at the bilge, as well as the height of the cask and the correct position of the heads within the staves.

2. Croze gauge. This instrument is specifically designed to gauge the diameter of the top of the cask and its height.
3. Gauge plank. The cask was placed on the plank horizontally and vertically to gauge the height of the cask and the diameter of the bottom of the cask, respectively.

The gauge instruments from the Amsterdam Museum provide insight into how the required specifications of beer casks were checked to ensure compliance during construction. The cask type for which the instrument was designed and the year and city in which it was commissioned are etched into



Fig. 4:
Gauge set (left, KA 9532), croze gauge (middle, KA9533)
and gauge plank (right, KA 9972) measuring a half her-
ring cask from the 19th century (KA9921).
The inventory numbers refer to the collection in the
Amsterdam Museum.



the tool. It is notable that on the gauge instrument for beer, the city is etched next to the type of cask. This underlines the possibility that beer casks from different cities differed in size. However, the gauge instruments in the Amsterdam

Museum's collection were used to monitor beer casks made by the specifications of the city of Dordrecht, and consequently, a comprehensive comparison between cities based on these gauge instruments is not possible.

The specifications of casks from Dordrecht can be traced diachronically from 1658 to 1801. The cask specifications were consistent throughout this period (Tab. 3).

Type of cask	Year	Text on gauge instrument	Length of staves (cm)	Croze distance (cm)	Max. Ø (cm)	Min. Ø (cm)	Capacity (L)	Inv. No.
Beer cask	1658	A:1658 XXX DORTSE BIER TON BESLAAT 15 DUYGEN	82.1	71.1	58	56	181.4	KA9500, KA9501, KA9508
1/2 beer cask	1658	A: 1658 XXX DORTSE BIER 1/2 VADT BESLAAT 13 DUYGEN	68.8	61.5	45.5	43	94.6	KA9502, KA9503, KA9508
1/4 beer cask	1658	A: 1658 XXX DORTSE BIER 1/4	57.0	49.5	35.5	34	46.9	KA9504, KA9505, KA9508
1/8 beer cask	1658TSE BIER 1/8 TON	48.4	40.9	27.7	26	23.1	KA9899, KA9508
1/8 beer cask	1769	XXX A1769 Dortse bier 1/8 ton	42.8	40.8	27.8	25.5	22.7	KA9506, KA9507, KA9509
Beer cask	1801	A 1801 Dortse bier el	82.6	71.5				KA9964
1/2 beer cask	1801	A 1801 Dortse bier el	68.3	61.0				KA9964
1/4 beer cask	1801	A 1801 Dortse bier el	55.0	46.5				KA9964
1/8 beer cask	1801	A 1801 Dortse bier el	41.8	37.5				KA9964

Table 3: Specifications of Dordrecht beer casks calculated using the gauge instruments from the Amsterdam Museum. The capacity was calculated using the formula for the calculation of a cylinder: $\pi \times r^2 \times h$. To incorporate the height of the cask, the distance between the crozes was included in the formula. To account for the curvature of the cask, the averages of the maximum and minimum radiuses were used. The inventory numbers of the instruments are those of the Amsterdam Museum.



Type of cask	Year	Text on gauge instrument	Length of staves (cm)	Croze distance (cm)	Max. Ø (cm)	Min. Ø (cm)	Capacity (L)	Inv. No.
Herring cask	1658	B XXX 1658 HARING TON			51.7	49.1		KA9524
								KA9525
1/2 herring cask	1658	1658 1/2 HARING VADT			40.5			KA9903
1/2 herring cask	1658	1658 1/2 HARING VADT			40.5			KA9527
1/8 herring cask	1658	B 1658 HARING 1/8				24.5		KA9530
1/8 herring cask	1658	B1658 XXX HARING 1/8				26.6		KA9531
Herring cask	1722	17 XXX 22 HARING EL	71.4	65.1	49.6	47.6	120.7	KA9533
1/2 herring cask	1722	17 XXX 22 HARING EL	57	50.5	40.1	38.6	61.4	KA9533
1/4 herring cask	1722	17 XXX 22 HARING EL	44	39.5	29.9	28.5	26.4	KA9533
1/8 herring cask	1722	17 XXX 22 HARING EL	35.5	30.5	24.4	23.2	13.5	KA9533
1/4 herring cask	1722	B 1722 XXX HARING 1/4						KA9528
								KA9529
								KA9532
Herring cask	1770	B 1770 XXX HARING EL	70.4					KA9965
1/2 herring cask	1770	B 1770 XXX HARING EL	55.5					KA9965
1/4 herring cask	1770	B 1770 XXX HARING EL	44.8					KA9965
1/8 herring cask	1770	B 1770 XXX HARING EL	36.5					KA9965
Herring cask	1800		69.5	63.6	51	47	119.9	KA9920
	1900							
1/2 herring cask	1800		54.5	51.5	40	37.2	60.2	KA9921
	1900							
1/8 herring cask	1800		33.5	29.5	24	22.5	12.5	KA9922
	1900							

Table 4: The specifications of herring casks in Amsterdam calculated using the gauge instruments from the Amsterdam Museum. The capacity was calculated using the formula for the calculation of a cylinder: $\pi \times r^2 \times h$. To incorporate the height of the cask, the distance between the crozes was included in the formula. To account for the curvature of the cask, the averages of the maximum and minimum radiuses were used. The inventory numbers of the instruments refer to the Amsterdam Museum.

The gauge instruments at the Amsterdam Museum also provide insight into the specifications of herring casks from 1658 until the 19th century (Tab. 4). Additionally, the museum's collection includes three intact herring casks (KA9920, KA9921, and KA9922), which likely served as the standard by which herring casks were measured at the weighing house in Amsterdam. Unlike the gauge instruments used for beer casks, the ones used for herring casks do not bear inscriptions indicating the city in which they were used. This suggests that

the dimensions of herring casks measured in Amsterdam were universal.

The oldest gauge instrument that enables the calculation of cask capacity dates from 1722 (KA9533). Its capacity of 120.7 L closely aligns with the prescribed capacity for herring casks mentioned in archival sources. The inclusion of an intact 19th-century herring cask (KA9920) in the collection, with a capacity of 119.9 L, suggests that the capacity measure remained consistent in the 18th and 19th centuries.

Specifications based on casks

An important source for determining cask specifications are paintings from the late medieval and early modern period. They shed light on certain characteristics that are absent in archival sources, such as the number and size of holes and the number of hoops per cask. To be sure, paintings display characteristics that are mentioned in archival sources, like the number of staves and head components, and as such, they supplement archival





Fig. 5: The battle between Carnival and Lent. Unknown artist, follower of Pieter Bruegel (1600–1625). On the left, a beer cask, identified as such because of its association with meat and waffles, is part of Carnival. On the right, a herring cask, along with ecclesiastical figures, is illustrative of Lent, a period of fasting (RKD Netherlands Institute of Art History, <<https://rkd.nl/explore/images/69302>>).

Number of staves	Beer (105 casks)	Herring (44 casks)
Number of casks on which one side of the casks is completely visible	48	20
5 staves	21	13
6 staves	16	2
7 staves	8	4
8 staves	3	1
Average number of staves	5.9	5.7
Number of head components		
Number of casks of which at least one head was visible	13	2
1 head component	7	0
2 head components	1	0
3 head components	2	1
4 head components	1	1
5 head components	2	0
Average number of head components	2.2	3.5

Table 5: Number of staff and head components of casks in paintings

sources. But they also are a source in their own right.

Using RKD's online dataset to analyze paintings containing casks, 105 beer casks and 44 herring casks were identified. They were identi-

fied as either beer or herring casks based on their visible contents or the context in which they are situated in the paintings, such as an inn or a fish market. The analyzed paintings date from 1554 to 1896 and exhibit specifications that can

be cross-referenced with the legislation in archival sources. An early 17th-century painting of the battle between Carnival and Lent features a beer cask and a herring cask (Fig. 5).

Of the 105 beer casks identified in





Fig. 6: Paintings of casks with holes. 1. Square bunghole in beer cask, 2. Round bunghole in beer cask, 3. Taphole and ventilation hole in beer cask, 4. Round bunghole in herring cask

(1. RKD Netherlands Institute of Art History, <<https://rkd.nl/explore/images/217593>>; 2. RKD Netherlands Institute of Art History, <<https://rkd.nl/explore/images/11802>>; 3. Museum De Lakenhal, <www.lakenhal.nl/nl/collectie/s-527>; 4. The Wallace Collection, <<https://wallace-live.wallacecollection.org:443/eMP/eMuseumPlus?service=ExternalInterface&module=collection&objectId=65168&viewType=detailView>>)

the paintings, 48 were visible in such a way that 40% of the cask could be seen. This resulted in an average number of 5.9 visible staves per beer cask (Tab. 5). The average number of visible staves of herring casks was 5.7 (on 20 out of 44 casks identified in the paintings). These findings align with the 1606 legislation on beer casks in

Dordrecht, which specified that a beer cask should consist of a minimum of 15 staves (Tab. 1). It should be noted that since the casks in the paintings are depicted from a single perspective, only 40% of the staves are visible. The same legislation from Dordrecht prohibited a head of more than three components (Tab. 1). The beer casks in the

paintings were in compliance with this legislation in most cases. Only three beer casks had heads of more than three components.

The presence of holes in casks, often absent in archival sources, can be considered a distinguishing feature of casks intended for specific products. Among the 105 beer

Holes in casks	Beer (105 casks)	Herring (44 casks)
Number of holes	96	29
Bunghole (round)	37	13
Bunghole (square)	36	2
Tap hole	21	0
Ventilation hole	2	0
Sampling hole	0	0
Number of hoops per set		
Number of casks on which all hoops are visible	65	24
2 sets of hoops	2	1
3 sets of hoops	9	2
4 sets of hoops	53	19
5 sets of hoops	0	1
6 sets of hoops	1	1
Average number of hoops per set	3.8	4
Marks on casks		
Number of marks	13	3
Marks on heads	10	0
Marks on staves	3	3

Table 6: Holes, hoops and marks of casks

casks depicted in paintings, a total of 96 holes were shown. Similarly, among the 44 herring casks depicted, 29 holes were visible. These holes can be categorized as bung-holes, tap holes, ventilation holes and sampling holes (Fig. 6).

Both herring and beer casks had bungholes. These holes were used to fill and empty the cask, and they also provided access to the cask for cleaning the interior. In herring casks, 87% of the bungholes were round. In beer casks, about equal numbers of holes were square or round (Tab. 6). There was no specific period in which either round or square bungholes were used in beer casks; they both appear continuously throughout the modern period.

Both beer and herring casks generally exhibited sets of the same number of hoops, with both types having, on average, four sets of hoops binding the staves. However, a notable difference between the two is the presence of markings on

the casks. The paintings showed 13 marks on beer casks, while herring casks only displayed 3 marks (Tab. 6).

Casks are common artefacts in the excavation of shipwrecks. They served as containers for merchandise, ship equipment and crew provisions. This explains why casks are found not only on merchant ships but also on fishing vessels and war-ships.

It might be expected that casks containing either beer or herring would be frequently discovered during shipwreck excavations in Dutch waters given the importance of these industries. However, the opposite is true. In the case of Dutch shipwrecks, only three casks with herring residue have been excavated during maritime archaeological research and no beer casks have been identified.

A possible explanation for the paucity of beer and herring casks in Dutch maritime archaeology is that a significant number of casks

were found disassembled, making it difficult to ascertain their original contents. Furthermore, not all content leaves detectable residue in casks. While the herring can be identified by the presence of fish bones, the remnants of liquids such as beer or wine are not easily traceable.

On the 16th-century shipwreck OM11, also known as the Biddinghuizer Colfschip because of the discovery of 16 remarkably well-preserved golf clubs on board, three casks containing herring bones were recovered (Tab. 7; Fig. 7).²¹ One is a full herring cask and two are quarter casks. Based on archival legislation and the gauge instruments used for monitoring, we know that the prescribed capacity of a full herring cask was 120 L, which coincides with the capacity of the herring cask found on the Biddinghuizer Colfschip.

²¹ Jacobs 1619.

Shipwreck	Cask identification	Cask type	Date of wreck	Height of cask (cm)	Max. Ø (cm)	Min. Ø (cm)	Thickness of staves (mm)	Capacity (L)
OM11	OOM11_1	1/4 herring cask	16 th century	41.5	31	28	1.1	24.6
OM11	OOM11_2	Herring cask	16 th century	73	51	44	1.1	119
OM11	OOM11_3	1/4 herring cask	16 th century	42	31	28	1.1	24.6

Table 7: Specifications of beer and herring casks recovered from the Biddinghuizer Colfschip



Fig. 7: Herring cask OOM11_1 from the Biddinghuizer Colfschip

	Legislation: Archival sources from large, regional jurisdictions	Legislation: Archival provincial sources	Legislation: Archival urban sources	Enforcement: Museum artefacts	Casks in use: Paintings	Casks in use: Archaeology
Timeframe	1423–1900	1481–1900	1392–1900	1658–1900	1554–1900	1500–1900
Capacity	X	X		X		X
Number of staves		X	X	X	X	X
Width of staves		X	X			X
Thickness staves		X	X			X
Number of head parts			X		X	X
Thickness of head		X	X			X
Timber used		X	X			X
Hoops		X	X		X	X
Holes			X		X	X

Table 8: Types of sources used to determine timeframe and specifications of beer and herring casks

5. Conclusion

Studying the source types used in this paper in tandem provided insight into the identification of 15th–18th-century beer and herring casks. Data concerning cask construction was derived from archival legislative sources produced by authorities ranging from the Habsburg Empire to provincial authorities to urban councils. Gauge instruments from the Amsterdam Museum were used to create the dataset on the monitoring of specifications of casks. Beer and herring casks depicted in paintings and recovered at maritime archaeology sites were studied in order to gain insight into casks that were being used. Each type of source offered valuable insights into casks from specific timeframes within the research period, and a unique set of cask specifications was derived from each source type (Tab. 8).

The data on cask specifications garnered from legislation, museum artefacts, and artwork and shipwrecks corroborate each other for the most part. For example, a capacity of 120 L for herring casks was consistently documented in archival sources from the late medieval period throughout the

early modern period. This capacity measure was also verified by one of the 1722 gauge instruments from the Amsterdam Museum (Tab. 4).²² Additionally, the only full herring cask discovered in the Biddinghuizer Colfschip also had a capacity of 120 L (Tab. 7, OOM11_2).

The specifications of Dutch beer casks differed from those of herring casks. The standard 120-L capacity for herring casks was first instituted in the 15th century in the coastal region of the Netherlands and remained in place for several centuries. This is confirmed by the gauge instruments and the casks from the Biddinghuizer Colfschip. Unlike herring casks, beer casks from the coastal region of the Netherlands varied in volume throughout the late medieval and early modern period.

There are several explanations for this disparity. Herring from Zeeland and Holland were marketed collectively; consumers bought herring from a province and not from a specific city such as Enkhuizen or Rotterdam. As a result, herring producers were more amenable to standardization. Conversely, a beer's reputation remained closely tied to the city or brewery of origin, much like it is today. Additionally, there

was a broader array of beer types, such as kuit beer, hop beer, and gruit beer, each associated with specialized breweries. This diversity in beer types prevented interregional and national standardization of beer casks.

Another contributing factor is financial in nature. Herring played a smaller role than beer in the economies of provinces like Holland. Urban income relied heavily on tax revenue from beer, leading local authorities to fiercely protect their tax collection privileges. As a result, regulations concerning beer often remained the jurisdiction of urban authorities rather than that of larger administrative bodies.

This study offers valuable insights into the specifications of beer and herring casks. Some of the specifications were more useful than others in identifying casks (tab. 9). Other specifications, such as the width of staves, number of head parts, thickness of the head, and the type of timber and hoops used were found to be widespread and were of limited value in the identification process.

²² Beman 1699.



	Beer casks	Herring casks
Capacity	Capacity of casks differed, depending on the city of origin. Beer casks mostly had a larger capacity (>130 l) than herring casks.	120 L from the late 15 th to 18 th century.
Number of staves	Minimum of 14/15 staves for a full beer cask and 13/14 staves for a 1-2 beer cask.	Minimum of 12/13 staves for a full herring cask.
Thickness of staves	Minimum of 1.4 cm.	Minimum of 0.9 cm.
Holes	A round or square bunghole in the bilge of beer casks, a round taphole in the head and sometimes a round ventilation hole in the extremity of a stave or the head.	Only a bunghole in the bilge of the cask; mostly round.

*Table 9:
The most distinctive features of beer and herring casks*

A variety of source types offers valuable insights into the characteristics of beer and herring casks from the coastal regions of the Netherlands during the late medieval and early modern period. It successfully identified several distinct features of these casks. Hopefully, this research will inspire archaeologists and historians to collect additional data on beer casks, herring casks, and casks used for other products, further enriching our understanding of their contents.

Bibliography

Alberts 2010

L. Alberts, Bier drinken met maten. Dronkenschap en het alcoholgehalte van Stichtse en Hollandse bieren in de late middeleeuwen, Jaarboek voor middeleeuwse geschiedenis 13, 2010, 113–166

Alberts 2017

L. Alberts, Brouwen aan de Eem. Amersfoort, een Stichtse bierstad in de late middeleeuwen (Hilversum 2017)

Bakker et al. 1992

M. S. C. Bakker – E. Homburg – D. van Lente – H. W. Lintsen – J. W. Schot – G.P. I. Verbong, Geschiedenis van de techniek in Nederland. De wording van een moderne samenleving 1800–1890, Deel I (Zutphen 1993)

Beaujon 1885

A. Beaujon, Overzicht der geschiedenis van den Nederlandse Zeevisscherijen (Leiden 1885)

Beman 1699

A. Beman, Placcaet ende Ordonnantie, beroerende het maecken, Keuren ende Branden van de haring-tonnen (Delft 1699)

Van Bochove 2004

C. van Bochove, De Hollandse haringvisserij tijdens de vroegmoderne tijd, Tijdschrift voor Sociale en Economische Geschiedenis 1.1, 2004, 3–27

Couquerque – Meerkamp van Embden 1917

L. Couquerque – A. Meerkamp van Embden, Oud-Vaderlandsche Rechtsbronnen. Rechtsbronnen de stad Gouda (Gouda 1917)

Dijkman 2011

J. Dijkman, Shaping Medieval Markets:

The organisation of commodity markets in Holland, c. 1200–c. 1450 (Leiden/Boston 2011)

Harland 2009

J. Harland, Technical Report: Fish Remains from the Drogheda Boat (York 2009)

Huizinga 1911

J. Huizinga, Rechtsbronnen der stad Haarlem. Van de cuypers ('s-Gravenhage 1911)

Jacobs 1619

H. Jacobs, Placcaet ende Ordonnantie, beroerende het maecken, keuren ende branden van de haring-tonnen ('s-Gravenhage 1619)

Lauwerier – Laarman 2008

R. Lauwerier – F. Laarman, Relics of 16th-Century Gutted Herring from a Dutch Vessel, Environmental Archaeology 13, 2008, 135–142

Luchtmans 1743

S. Luchtmans, Reglement of instructie, waar na de Brander van de Biertonnen, Halfvaten, en Vierendeelen, hem zal hebben te gedragen (Leiden 1743)

Poulsen 2008

B. Poulsen, Dutch Herring: An environmental history, c. 1600–1860 (Amsterdam 2008)

Regionaal Archief Dordrecht, 1606

Regionaal Archief Dordrecht, Archive Gilden en confrérieën (16), Inv.nr 563 Ordonnantie op het maken van biertonnen (1606), <<https://proxy.archieven.nl/0/F616E180BF7A4B258268A6C243718DFC>>

Smient – Smient 1663

O. Smient – J. Smient, Handvesten, privilegien, octroyen, costumen en willekeuren der stad Amstelredam (Amsterdam 1663)

²³ Lauwerier – Laarman 2008.

²⁴ Inv. no. KA9533.



Timmer 1918

E. M. A. Timmer, *De generale brouwers van Holland. Een bijdrage tot de geschiedenis der brouwning in Holland in de 17de, 18de en 19de eeuw* (Haarlem 1918)

Unger 1978

R. W. Unger, *The Netherlands Herring Fishery in the Late Middle Ages: The false legend of Willem Beukels of Biervliet*, in: R. C. Hoffmann (ed.), *Viator* 9 (Berkeley 1978) 345–366

Unger 1980

R. W. Unger, *Dutch Herring, Technology, and International Trade in the Seventeenth Century*, *Journal of Economic History* 40.2, 1980, 253–280

Unger 2001

R. W. Unger, *A History of Brewing in Holland, 900–1900: Economy, technology and the state* (Leiden 2001)

Verhoeff 1983

J. M. Verhoeff, *De oude Nederlandse maten en gewichten* (Amsterdam 1983)

Van Vliet 1994

A. P. van Vliet, *Vissers en kapers. De zeevisserij vanuit het maasmondgebied en de duinkerker kapers (ca. 1580–1648)*, *Stichting Hollandse Historische Reeks* 20 (Den Haag 1994)

Van Vliet 2005

A. P. van Vliet, *Vissers in oorlogstijd. De Zeeuwse zeevisserij in de Jaren 1568–1648* (Middelburg 2005)

Yntema 1992

R. D. Yntema, *The Brewing Industry in Holland, 1300–1800: A study in industrial development* (Doctoral dissertation, University of Chicago 1992)

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