

# Brewing and Baking in Scotland, 1406-1513

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Abstract:

Because the details of the methods and importance of brewing and baking in medieval Scotland have not been so far written, this thesis has the goal of being a comprehensive exploration of that topic. Additionally, the goal is to see how unique Scottish practices were compared to others of the same era.

To do so, the author establishes a background of the main climate factors and how grains used in brewing and baking were affected. From there, both brewing and baking were examined within their historical contexts and the details behind the known manufacturing techniques and how they compared to those available in earlier centuries.

While sources from Scotland can be less detailed than from elsewhere, the traditions were unique enough to be often seen as distinctly Scottish.

## Acknowledgements

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## Abbreviations

Table 1 - Abbreviation list

<i>Abbreviation</i>	<i>Reference</i>
AC	CELT (Corpus of Electronic Texts). 2001/8. <i>Annála Connacht</i> . Cork: University College Cork.
Ancient Burgh Laws	Innes, Cosmo, and Robert Renwick, eds. 1910. <i>Ancient Laws and Customs of The Burghs of Scotland</i> . Vol. I A. D. 1124-1424. Edinburgh: Scottish Burgh Records Society.
AI	CELT (Corpus of Electronic Texts). 2000/8. <i>The Annals of Innisfallen</i> . Cork: University College Cork.
Brown, Early Travellers [Early Travels.]	Brown, Peter Hume, ed. 1891. <i>Early Travellers in Scotland</i> . Edinburgh: David Douglas.
Cal. Docs. Scot. [CDS]	Bain, Joseph, Grant G. Simpson, and James D. Galbraith, eds. 1881-8. <i>Calendar of Documents Relating to Scotland</i> vol 1-5. Edinburgh: Scottish Records Office
Chron. Auchinleck	Thomson, Thomas, ed. 1819/77. <i>The Auchinleck Chronicle, ane Schort Memoriale of the Scottis Corniklis for Addicioun</i> . Edinburgh.
Chron. Bower	Bower, Walter. 1990/1, 1996. <i>Scotichronicon</i> , in Latin and English. Edited by D. E. R. Watt, Brian Scott, Norman F. Shead, Wendy B. Stevenson and Simon Taylor. Translated by D. E. R. Watt, Simon Taylor and Brian Scott. Vols. 5-7. Aberdeen: Aberdeen University Press.
Chron. Wyntoun	Wyntoun, Andrew. 1903-1914. <i>Orygynale Cronykil of Scotland (Original Chronicle of Scotland)</i> . Edinburgh: Scottish Text Society.

Table 1 - Abbreviation list

<i>Abbreviation</i>	<i>Reference</i>
CMT	Walsingham, Thomas. 2005. <i>The Chronica Maiora of Thomas Walsingham, 1376-1422</i> . Translated by David Preest and James G. Clark. Martlesham, Suffolk: Boydell Press.
C. A. Rent.	Rogers, Charles, ed. 1879-80 <i>Rental Book of the Cistercian Abbey of Cupar-Angus</i> . London: Printed for the Grampian Club.
Changing Values	Gemmill, Elizabeth, and Nicholas Mayhew. 1995. <i>Changing Values in Medieval Scotland: A Study of Prices, Money, and Weights and Measures</i> . Cambridge: Cambridge University Press.
Dunk. Rent.	Hannay, Robert Kerr, ed. trans. 1915. <i>Rentale Dunkeldense</i> . Edinburgh: Scottish History Society.
Edin. Accts.	Marwick, J. D., ed. 1869/71. <i>Extracts from the Records of the Burgh of Edinburgh, Vols. 1-2</i> . 2 vols. Edinburgh: Scottish Burgh Records Society.
ER	Stuart, John et al, eds. 1878-98. <i>Rotuli Scaccarii regime Scotorum. The Exchequer Rolls of Scotland</i> . Vols. 1-18. 23 vols. Edinburgh: H. M. General Register House
NRS	National Records of Scotland. 2018. <i>NRS Catalogue</i> . 24 08. Accessed 09 01, 2018. <a href="http://catalogue.nrscotland.gov.uk/nrsonlinecatalogue/">http://catalogue.nrscotland.gov.uk/nrsonlinecatalogue/</a>
RPS	Brown, K. M., et al. eds, <i>The Records of the Parliaments of Scotland to 1707</i> . 2007-18. St. Andrews: University of St. Andrews. <a href="https://www.rps.ac.uk">https://www.rps.ac.uk</a>
St A. Rent.	Hannay, Robert Kerr, ed. trans. 1913 <i>Rental Sancti Andree</i> . Edinburgh: Scottish History Society
Stirling Recs.	Renwick, R. ed. 1887-9. <i>Extracts from the Records of the Royal Burgh of Stirling</i> . Vols. 1-2. 2 Vols. Glasgow: Scottish History Society.

Table 1 - Abbreviation list

<i>Abbreviation</i>	<i>Reference</i>
TA	Dickson, Thomas and Sir James Balfour Paul, eds. 1877-1911. <i>Compta Thesaurariorum regum Scotorum</i> . Accounts of the Lord High Treasurer of Scotland, Vols. 1-9. 10 Vols. Edinburgh: H. M. General Register House
TBB	Hughes, E. 1796. <i>A Treatise on the Brewing of Beer</i> . Uxbridge: Printed for the Author

## Chapter 1: Introduction

### *Introduction*

Every piece of research needs a question, and while this thesis seeks to provide an overview of brewing and baking in Scotland between 1406 and 1513, it also poses a series of questions concerning those activities. Are the brewing and baking traditions in this period in Scotland unique? How are these traditions unique? Do we have enough information to be certain?

Brewing and baking are connected in their use of grain, but also both are frequently hypothesised as being motivation for humanity to have settled down in one location to rely on cultivated crops, rather than gathering wild grains. They have both been argued as coming 'first', although currently the earliest known evidence for brewing is a 13,000-year-old fermented grain, putting that considerably earlier than bread-making.<sup>1</sup> The debate over which was truly first will continue, but the importance of this debate lies in the perception of them being the basis of settled society.

To make the case around brewing and baking in 15<sup>th</sup> century Scotland, the study is divided into six general themes for discussion. The first theme is primarily a historiographical review and an analysis of sources that have informed that historiography and materials essential for an examination of brewing and baking in 15<sup>th</sup> century Scotland. This historiography establishes both the main sources used for this study and what other academic works have been written on similar topics. The second theme explores each grain, with the goal of understanding what types of environments to which they are best suited. The discussion will also establish what is known about the varieties grown in 15<sup>th</sup> century Scotland, and the results of the malting process. With this information about each grain established, as well as knowing what sources are available the third and fourth themes go into detail on processed grain products, starting

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<sup>1</sup> Li Liu et al., "Fermented beverage and food storage in 13,000 y-old stone mortars at Raqufet Cave, Israel: Investigating Natufian ritual feasting," *Journal of Archaeological Science: Reports* 21 (2018): 792.

with brewing and then baking. Lastly, the findings of these topics are merged to discuss how the different themes explored interconnect and answer the questions which started the study.

## *Historical introduction*

### Why start in 1406?

Whenever researching a continuous aspect of life, which both baking and brewing are, there is flexibility on where the research begins and ends. The only important part about deciding where to start is having a reason. 1406 may seem arbitrary for a starting year, but it was chosen carefully. Not only was it the first regnal year of James I but, importantly, from around this time Scotland's primary written records begin to survive in greater volume than from earlier periods and, as the published volumes of the Exchequer Rolls demonstrate, in more consistent formats. Although royal charters and parliamentary records are still relatively abundant from before 1406, the royal financial accounts are more fragmentary until the closing later 14<sup>th</sup> century. Gaps do not entirely end in the 15<sup>th</sup> century – frequent royal minorities or political turmoil disrupted the accounting processes - but they become less common over the century.

Originally the study was intended to be a larger comprehensive work, starting in the mid-13<sup>th</sup> century, and ending in the mid-16<sup>th</sup> century. The reason for this stemmed from viewing the 13<sup>th</sup> and 14<sup>th</sup> centuries as times of major changes in climate, which would permit investigation of the impact on grain production of the deteriorating conditions of the later 1200s. The earliest surviving Exchequer Rolls, dating from the mid-1260s and 1280s, provide a very limited benchmark against which to view conditions in the 1300s, given the absence of surviving financial records otherwise before the mid-1320s. Much of the discontinuity in royal financial records in the late 13<sup>th</sup> and through the 14<sup>th</sup> centuries came from the widespread disruption of the Wars of Independence. Due to that conflict, many records were lost, destroyed, or never formalised due to the breakdown in Scottish administrative organisms. Because of the interrupted data from this period, the focus shifted to the late Middle Ages because more administrative records with long chronological spans are available for the 15<sup>th</sup> century. More importantly, the recalibrated date range of this study permitted a deeper

examination of the overall topics of brewing and baking in Scotland within a project of manageable size.

The 15<sup>th</sup> century was also a time of profoundly transformative social, political, economic, and environmental change. Frequently viewed as the start of the long 15<sup>th</sup> century, 1406 marked the beginning of the reign of the first of four kings called James, all of which experienced stages of minority and personal rule. These stages within each reign led to cycles of differing levels of royal and parliamentary activity, including in response to the ever deteriorating climate which had sped up at the beginning of the 15<sup>th</sup> century.

## Why end in 1513?

1513 – the year of King James IV's death at the battle of Flodden - is one of the traditional dividing-points in Scottish historiography but, arguably, despite the high drama of the slaughter of the king and the cream of his nobility on the battlefield, little in reality changed overnight. The deteriorating climate regime that had established itself through the 15<sup>th</sup> century did not improve and the internal rivalries that had always bedevilled the minorities which opened the reign of every one of Scotland's 15<sup>th</sup> century kings did not end. But much changed in the minority and reign of the new king, James V, to make 1513 in retrospect a transitional point. In contrast to the 14<sup>th</sup> century, moreover, royal government in the 16<sup>th</sup> century generated a far greater volume and variety of documentary sources. Indeed, there are so many sources, both in the form of royal records and from noble and ecclesiastical estates, that evidence from the 15<sup>th</sup> century can be overshadowed and discussion skewed by the sheer volume of later material. Analysis of that 16<sup>th</sup>-century data is a larger project and must await separate future study.

## *Literature Review*

This thesis will use contemporary Scottish records for the bulk of its data on commodities and legislation, but it is impossible to discuss the details of 15<sup>th</sup> century Scottish brewing and baking without acknowledging research done by others on related topics. While this is the first 15<sup>th</sup> century case-study of Scottish material for the procedural study of the topic, it could not have

happened without earlier research on similar matters, such as studies of baking and brewing elsewhere in Europe as well as economic and cultural studies of 15<sup>th</sup> century Scotland. Such research generally provides different perspectives or elements of information required to complete a narrative on brewing and baking in Scotland. They also shed light on questions of how unique or otherwise these processes were to Scotland.

## Brewing and baking

There are many types of research on topics similar to this thesis, and they could be presented in many orders, but the most relevant for comparison are those on medieval brewing and baking. While very little detailed work has been done on brewing and baking in 15<sup>th</sup> century Scotland, scholars have studied these practices elsewhere in Europe, both at a general medieval European level and at an individual country level. The most valuable for comparison are studies of individual countries. Of these, the most detailed and directly relevant national study is Peter Brears' work, *Cooking and Dining in Medieval England*, which uses a variety of types of sources to provide a comprehensive analysis of English cooking traditions from c. 1100 to c. 1500, including both brewing and baking.<sup>2</sup> Most interestingly, it includes recipes which have been modified to prepare in a 21<sup>st</sup> century kitchen. Ideally this present work on Scotland would have included such information but Brears had the advantage of surviving English 14<sup>th</sup>- and 15<sup>th</sup>-century culinary manuscripts that could be converted into modern recipe formats.<sup>3</sup> Without these types of sources localised in time and place to Scotland, it is not viable to create recipes with certainty. Given the shared space of both countries in the British Isles, however, Brears' analysis of the English experience – which includes case-studies of northern English examples that are likely close to Lowland Scottish conditions - allows for some confidence in the information about the general technique for both brewing and baking. It must be acknowledged, nevertheless, that assuming everything is identical would ignore the question of

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<sup>2</sup> Peter Brears, *Cooking and Dining in Medieval England* (Totnes, Devon: Prospect Books, 2008).

<sup>3</sup> *Ibid.*, 11.

any unique traditions in Scotland, the close 15<sup>th</sup>-century relationship between Scotland and France, as well as differences in access to technologies and growing conditions.

Other works, such as *Food in Medieval England*, C. M. Woolgar's *The Culture of Food in England 1200-1500*, and Philip Slavin's *Bread and Ale for the Brethren* cover different aspects of English dietary habits, both as a whole or focussing on a specific aspect.<sup>4</sup> All of these works lack the recipes of Brears but discuss different commodities in terms of nutritional needs and diet. Slavin's work on the provisioning of Norwich Cathedral Priory is especially interesting for its focus on the two main completed food products being studied in this thesis, and for its focus on meeting the needs of a relatively smaller and enclosed population which functions as a self-contained household.

While they cannot be applied to Scotland other than as comparisons, similar works have been undertaken for other countries and regions of the world. Several works focussed on the overall European context, including Melitta Weiss Adamson's *Food in Medieval Times* and Ken Albala's *Eating Right in the Renaissance*.<sup>5</sup> Other research has been more focussed, such as the medieval Parisian traditions studied in Nicole Crossley-Holland's *Living and Dining in Medieval Paris*.<sup>6</sup> Studies, however, are not limited to one part of the world and medieval Southeast Asian culinary traditions have been studied in E. N. Anderson's *Food and Environment in Early and Medieval China* and in Eric Rath's *Food and Fantasy in Early Modern Japan*.<sup>7</sup> Bread and its social significance specifically have been studied elsewhere, with

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<sup>4</sup> C. M. Woolgar, *The Culture of Food in England, 1200-1500* (New Haven, CT: Yale University Press, 2016); *Food in Medieval England: Diet and Nutrition*, ed. C. M. Woolgar, D. Serjeanston, and T. Waldron (Oxford: Oxford University Press, 2006); Philip Slavin, *Bread and Ale for the Brethren: The Provisioning of Norwich Cathedral Priory, 1260-1536* (Hatfield: University of Hertfordshire Press, 2012).

<sup>5</sup> Melitta Weiss Adamson, *Food in Medieval Times* (Westport, CT: Greenwood, 2004); Ken Albala, *Eating Right in the Renaissance* (Oakland, CA: University of California Press, 2002).

<sup>6</sup> Nicole Crossley-Holland, *Living and Dining in Medieval Paris: The Household of a Fourteenth Century Knight* (Cardiff: University of Wales Press, 1996).

<sup>7</sup> E. N. Anderson, *Food and Environment in Early and Medieval China* (Philadelphia, PA: University of Pennsylvania Press, 2014); *ibid.*, ; Eric Rath, *Food and Fantasy in Early Modern Japan* (Berkeley and Los Angeles, CA: University of California Press, 2010).



“Bread and Class in Medieval Societies: Foodways in Anatolia”<sup>8</sup> being an especially useful comparison when considering the grades of bread and qualities of grain revealed in Scottish record sources.

Medieval brewing has also been researched in detail but not generally in the broader context of diet. The main studies are by Richard Unger, who produced two monographs which cover medieval brewing, both in an overall European context in *Beer in the Middle Ages and the Renaissance* and for the Low Countries specifically in *A History of Brewing in Holland 900-1900*.<sup>9</sup> Neither, understandably, has any discussion of Scottish experiences, nor even much on the British Isles as a whole, but they provide valuable insights on changes in brewing methods and technologies, and on beer’s role in societies. As with other geographically remote sources, they cannot be used to show confidently what was being done in Scotland, but they can help to provide generalisations about the technology of medieval brewing, especially when paired with knowledge of differences in technology and climate learned from elsewhere.

This is not to suggest that there has been no work on the culinary traditions in medieval Scotland. Alexander Fenton dedicated a chapter to the changing staple foods and regulations around them between the 12<sup>th</sup> and 17<sup>th</sup> centuries in the fifth volume of *Scottish Life and Society*.<sup>10</sup> Probably due to lack of reliable sources compared to later, it is mostly an exploration of the commodities and products in terms of price and size, but with no real attempt to discuss questions of their preparation or cultural impact. Also, because more primary evidence remains from the latter part of the 16<sup>th</sup> and 17<sup>th</sup> centuries than from the 15<sup>th</sup>, the discussion tends to focus on that early modern period and so lies outside the range of this study.

It is not until the post-medieval period that collections of recipes and other culinary documents remain for Scotland, and consequently most past research on this topic has tended to start with

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<sup>8</sup> Adam Izdebski et al., "Bread and Class in Medieval Society: Foodways in Anatolia," *Journal of Interdisciplinary History* 48, no. 3 (2018).

<sup>9</sup> Richard W. Unger, *A History of Brewing in Holland, 900-1900* (Leiden; Boston, MA: Brill, 2001); Richard W. Unger, *Beer in the Middle Ages and the Renaissance* (Philadelphia, PA: University of Pennsylvania Press, 2004).

<sup>10</sup> Alexander Fenton, *The Food of the Scots: A Compendium of Scottish Ethnology*, vol. 5, Scottish Life & Society, (Edinburgh: John Donald Publishers Ltd, 2007).

evidence from the 17<sup>th</sup> century or later. In general, where these resources exist, they will be examined directly, rather than through secondary analyses. This is important because these sources are dated well after the time of the study, leading the details of the technology and materials to vary from the studied era. These differences are important enough to examine directly and not filter through the work of others. The exception for this is the work of F. Marian McNeil, who wrote about traditional Scottish food and drink in her studies, *The Scots Kitchen* and *The Scots Cellar*.<sup>11</sup> Her work, while not aimed at an academic audience, was written to preserve knowledge of traditions that had fallen from use and were at risk of being forgotten. Its continued publication has set its status as a necessary source for any research on Scottish cookery.

As for the original Scottish recipe sources, printed sources start in the second quarter of the 18<sup>th</sup> century, with the earliest being published in 1736 under the title Mrs. McLintock's *Receipts for Cookery and Pastry-Work*.<sup>12</sup> Because earlier English recipe sources exist than Scottish ones, the earliest ones will be examined in less depth, to allow sharper focus on those closer in date to the surviving Scottish examples.

While medieval cookery books exist, brewing guides of similar date are entirely lacking. Nothing was written on the details of brewing technology until the 17<sup>th</sup> century and shorter treatises on brewing practice did not exist before the 16<sup>th</sup> century.<sup>13</sup> Like other domestic tasks, knowledge of brewing was 'traditional', in that it was passed down orally and learned through practice, rather than learned from written sources. The domestic scale of brewing is a defining feature of it as a trade and affected both who brewed and even if literacy was a necessary skill. Looking back with a more modern perspective, where so much is written, it is easy to overlook the low levels of lay literacy in the medieval period or the implications that come with this knowledge. It was not until after c.1540 that anyone who was party to a written transaction even had to sign the document. Reading may have come a little earlier with the increased

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<sup>11</sup> F. Marian McNeill, *The Scots Kitchen: Its Traditions and Lore with Old-Time Recipes* (Edinburgh: Mercat Press, 1929); F. Marian McNeill, *The Scots Cellar* (Moffat: Lochar Publishing, 1992).

<sup>12</sup> McLintock and Iseabail Macloud, *Mrs McLintock's Receipts for Cookery and Pastry-Work* (Aberdeen: Aberdeen University Press, 1736; repr., 1986).

<sup>13</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 7.

availability of printed materials in the mid-16<sup>th</sup> century, but even that was after the end of the period of this study.<sup>14</sup>

While guides on brewing are mainly 17<sup>th</sup> century and later, their detailed description of the process, and understanding of brewing at a domestic scale, is extremely important for studying medieval brewing. These works started with a short essay on malting, written by Sir Robert Moray in the second half of the 17<sup>th</sup> century.<sup>15</sup> It was, however, only in 1837 that the *Scottish Ale Brewer* was published, going to a second edition in 1846.<sup>16</sup> Because they long post-date the period being studied here, these works are compared to English documents of around the same era. The earliest of these is the 1615 book, *The English Housewife*, which has sections covering malting and brewing, as well as baking bread.<sup>17</sup> Later, two guides from the 18<sup>th</sup> century were particularly of note, due to their specifications on the differences between what was – to them – modern brewing and traditional methods. The first, *The London and Country Brewer* (from here abbreviated to *LCB*), was published in 1736, and the other, *A Treatise on the Brewing of Beer* (from here abbreviated to *TBB*), in 1796.<sup>18</sup> Both guides assumed that one was making a product with hops, but the techniques required equipment types that had probably been used in earlier centuries. Just as importantly the differences in documents from a broadly similar time can help reflect on possible differences in earlier centuries. As with other uses of comparing later documents to justify hypotheses of earlier differences, this approach has flaws, but it is the clearest way to try to achieve the fullest idea of unique features of medieval Scottish brewing.

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<sup>14</sup> Margaret H. B. Sanderson, *A Kindly Place?: Living in Sixteenth-century Scotland* (East Linton: Tuckwell Press Ltd, 2002), 136.

<sup>15</sup> Robert Moray, "An Account of the Manner of Making Malt in Scotland," *Philosophical Transactions (1665-1678)* 12 (1677-8).

<sup>16</sup> W. H. Roberts, *The Scottish Ale-Brewer and Practical Maltster* (Edinburgh: A. and C. Black, 1846).

<sup>17</sup> Gervase Markham and Michael R. Best, *The English Housewife: containing the inward and outward virtues which ought to be in a complete woman* (London: MQUP, 1986).

<sup>18</sup> Anonymous, *The London and Country Brewer* (London, 1736); E. Hughes, *A Treatise on the Brewing of Beer* (London, 1796).

## Medieval Scotland

The next sources considered cover medieval Scottish ale and bread but will not discuss the preparation of bread doughs. While the overarching focus of this thesis is on the culinary and cultural importance of foodstuffs, this research has relied on information known about the economic factors around brewing and baking. Ale and bread prices have been a more common topic of research than has been the preparation of either commodity. The first systematic study to focus on these economic aspects for medieval Scotland is that published as *Changing Values in Medieval Scotland: A study of prices, money, weights, and measures* by Gemmill and Mayhew (hereby shortened to *Changing Values*).<sup>19</sup> In their study of prices and commodities in medieval Scotland, for example, they examined the relationship between the assize of ale and bread<sup>20</sup> and the number of prosecutions related to ale in Aberdeen between 1430 and 1540.<sup>21</sup> Their work is not the only modern secondary analysis, for while primary sources can be used to find the legal prices set for ale, an appendix in R. D. Conner and A. D. C Simpson's *Weights and Measures in Scotland: A European Perspective* listed the assizes of ale, along with its relation to malt prices of the same time.<sup>22</sup> The prevalence of these examples of assize and the punishments for breaches reflect how common and yet important brewing was.

A significant amount of research has been done around the role of brewsters, the Scottish term for a female brewer. Most published discussions have arisen from research by Elizabeth Ewan, principally her "Crime of Culture? Women and Daily Life in Late-Medieval Scotland", "For Whatever Ales Ye': Women as Consumers and Producers in Late Medieval Scottish Towns", and "Mons Meg and Merchant Meg: Women in Later Medieval Edinburgh."<sup>23</sup> Additionally,

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<sup>19</sup> *Changing Values in Medieval Scotland: A Study of Prices, Money, and Weights and Measures* (Cambridge: Cambridge University Press, 1995).

<sup>20</sup> Assize meaning the regulations around price, quantity, and quality, which had fines if it were broken.

<sup>21</sup> *Changing Values*, 48-53.

<sup>22</sup> R. D. Connor and A. D. C. Simpson, *Weights and Measures in Scotland: A European Perspective*, ed. A. D. Morrison-Low (East Linton: Tuckwell Press, 2004).

<sup>23</sup> Elizabeth L. Ewan, "For Whatever Ales Ye': Women as Consumers and Producers in Late Medieval Scottish Towns," in *Women in Scotland, c. 1100-1750*, ed. Elizabeth L. Ewan and Maureen M. Meikle (East Linton: Tuckwell Press, 1999); Elizabeth L. Ewan, "Mons Meg and Merchant Megs: Women in Later Medieval Edinburgh," in *Freedom and Authority: Scotland c.*

Nicholas Mayhew's "The Brewsters of Aberdeen in 1509" focusses on 16<sup>th</sup> century brewsters in the context of a single burgh community.<sup>24</sup> These works demonstrate the importance of brewsters in the local economies, but, as with other research on Scottish brewing, these are not sufficient to inform the full range of discussion on processes on their own. To aid in this task requires support from other works focussed on other national contexts, such as Judith Bennet's work *Ale, Beer, and Brewsters in England*, which both explores women's role in English medieval brewing and how it changed with the introduction of beer.<sup>25</sup> These studies of brewsters complete the modern sources on the fundamental topics of this thesis and allow the discussion to move to primary sources.

Political narratives are not explored in any detail within this work but are well-explored by a variety of authors. Many of those from the late 20<sup>th</sup> century disregard factors beyond the political, as was the general trend, but are worth seeking out for context outside the range of this thesis. Such details will not be covered here because it would take space away from the greater discussion on brewing and baking. The most regarded of these political narratives are monographs around individual kings, such as Brown's *James I*, McGladdery's *James II*, and Macdougall's *James III*.<sup>26</sup> Similarly politically focused books cover the long 15<sup>th</sup> century in detail, such as Grant's *Independence and Nationhood*, Dawson's *Scotland Re-formed*, and Stevenson's *Power and Propaganda*.<sup>27</sup>

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*1050-1650*, ed. Terence Brotherstone and David Ditchburn (East Linton: Tuckwell Press, 2000); Elizabeth L. Ewan, "Crime or Culture? Women and Daily Life in Late-Medieval Scotland," in *Twisted Sisters: Women, Crime, and Deviance in Scotland Since 1400*, ed. Yvonne Galloway Brown and Rona Ferguson (East Lothian: Tuckwell Press, 2002).

<sup>24</sup> Nicholas Mayhew, "The Brewsters of Aberdeen in 1509," *Northern Studies* 32 (1997).

<sup>25</sup> Judith Bennett, *Ale, Beer, and Brewsters in England: Women's Work in a Changing World, 1300 to 1600* (Oxford: Oxford University Press, 1996).

<sup>26</sup> Michael Brown, *James I*, The Stewart Dynasty in Scotland, (Edinburgh: Canongate Academic, 1994); Christine McGladdery, *James II*, ed. Norman Macdougall, 1st ed., The Stewart Dynasty in Scotland, (Edinburgh: John Donald Publishers Ltd, 1990); Norman Macdougall, *James III: A Political Study* (Edinburgh: John Donald Publishers Ltd, 1982).

<sup>27</sup> Alexander Grant, *Independence and Nationhood: Scotland 1306-1469*, ed. Jenny Wormald, The New History of Scotland, (London: Edward Arnold, 1984); Jane Dawson, *Scotland Re-formed, 1488-1587* (Edinburgh: Edinburgh University Press, 2007); *ibid.*,

## Primary documents

Without records for how medieval Scottish ale was prepared, we are obliged to identify other sources which can illuminate how it was made. Such an approach includes analysis of management data concerning bulk commodities, rather than data relating to their use in small-scale private households. *The Exchequer Rolls of Scotland* (from here abbreviated as *ER*) focus on the larger movements of grains, and it was perhaps because of this emphasis on bulk transactions, in what is the primary record of receipts and discharges for the royal household, that both ale and bread were so infrequently mentioned compared to other foods, instead of it being evidence that they were unimportant commodities. Despite it being an unintentional focus, information on brewing topics was spread through records for the whole of the period covered by the 4<sup>th</sup> through the 13<sup>th</sup> published *ER* volumes.<sup>28</sup> Similarly, *The Accounts of the Lord High Treasurer of Scotland* (from here abbreviated as *TA*), contain information related to brewing, but that data only began to be recorded in this source around the beginning of the 16<sup>th</sup> century, although surviving accounts begin in 1473.<sup>29</sup>

Legislation regarding brewing was spread over sources related to both national and burgh laws. *The Records of the Parliaments of Scotland* (hereafter *RPS*) and the *Ancient Laws and Customs of the Burghs of Scotland 1124-1424* (hereafter *Ancient Burgh Laws*) were national in the sense of them being collections of a variety of sources, some of which are enactments that end up published in both sources.<sup>30</sup> Another valuable collection is that from the *Aberdeen Registers Online: 1398-1511* (hereafter *Aberdeen Online*).<sup>31</sup> While they are not complete, limited published versions of burgh records are present in other Scottish burghs, e.g. *Extracts from the Records of the Burgh of Edinburgh* (hereafter *Edinburgh Burgh Recs.*) and *Extracts from the*

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<sup>28</sup> *Rotuli Scaccarii Regum Scotorum. The Exchequer Rolls of Scotland*, ed. George Burnett and Æneas J. G. Mackay, XXIII vols., vol. IV-XIII (Edinburgh: H.M. General Register House, 1880-1891).

<sup>29</sup> *Accounts of the Lord High Treasurer of Scotland*, ed. Thomas Dickson and James Balfour Paul, ed. Thomas Dickson and James Balfour Paul (Edinburgh: H. M. General Register House, 1877-1903).

<sup>30</sup> *Ancient Laws and Customs of The Burghs of Scotland, Volume I, A.D. 1124-1424*, ed. Cosmo Innes and Robert Renwick (Edinburgh: Scottish Burgh Records Society, 1868).

<sup>31</sup> *Aberdeen Registers Online: 1398-1511* (Aberdeen: University of Aberdeen, 2019), <https://www.abdn.ac.uk/riiss/projects/aberdeen-registers-online-213.php>.

*Records of the Royal Burgh of Stirling* (hereby shortened as *Stirling Recs*).<sup>32</sup> Collectively, they contain much information relating to brewing and baking crafts and trades in the late medieval and early post-medieval period.

## Archaeology

There have been many excavations of medieval sites around Scotland, both urban and rural, upland and lowland. Many of the largest and most recent ones have been published as parts of the Society of Antiquaries of Scotland monograph series. Even where evidence of grain processing was found, however, few of the report authors put emphasis on aspects immediately linked to brewing or baking. For that reason, from this collection only a few have been selected for their coverage of plant remains or structures that may have been used for preparing grain, or in brewing or baking. The excavation locations of the chosen reports are geographically widespread, but all are essentially lowland and urban: Aberdeen, Dunbar, Edinburgh Castle, and Perth.<sup>33</sup> Further, shorter reports have appeared in *Proceedings of the Society of Antiquaries of Scotland*, the journal of that body. Because of the number of papers from this series used in this study, it is impractical to replicate here all those listed in the bibliography. This collection, however, includes further discussion of the excavations explored in the monographs but also includes many excavations in other locations around the country.

A third major source of archaeological reports produced by the Society of Antiquaries of Scotland is SAIR (Scottish Archaeological Internet Reports), which published 97 volumes

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<sup>32</sup> *Extracts From the Records of the Burgh of Edinburgh, 1403-1528*, 2 vols., vol. 1, ed. J. D. Marwick (Edinburgh: Scottish Burgh Records Society, 1869); *Extracts from the Records of the Royal Burgh of Stirling*, 2 vols., vol. 1-2, ed. R. Renwick (Glasgow: Printed for the Glasgow Stirlingshire and Sons of the Rock Society, 1887, 1889).

<sup>33</sup> Alison S. Cameron et al., *Aberdeen: An In-Depth View of the City's Past* (Edinburgh: Society of Antiquaries of Scotland, 2001); Stephen T. Driscoll et al., *Excavations Within Edinburgh Castle in 1988-91* (Edinburgh: Society of Antiquaries of Scotland, 1997); P. Holdsworth et al., *Excavations in the Medieval Burgh of Perth 1979-1981*, ed. P. Holdsworth (Edinburgh: Society of Antiquaries of Scotland, 1987); J. C. Murray et al., *Excavations in the Medieval Burgh of Aberdeen 1973-81* (Edinburgh: Society of Antiquaries of Scotland, 1982).

between 2001 and 2021.<sup>34</sup> While a substantial number of these relate to excavations of prehistoric and post-medieval sites, the series also contains key analysis of medieval sites that include the kitchens at Dundrennan Abbey in Galloway, from which considerable data relating to food-preparation processes was obtained.

## Climate and other events

A significant body of research exists on different aspects of medieval climate. Climate trends have been studied through use of both chronological data, as well as proxy climate data. Rather than repeating the published work of environmental historians through re-interpretation of the original climate data, that work will be drawn upon to determine general climate trends and their potential impact on the ability of people in Scotland to meet their obligations for rents paid in grain and the general ability to feed the population reliably.

The most effective presentation of climate data requires acknowledgement of the flaws in available climate sources. This must be paired with discussion of why specific sources are used and how the available sources affect the overall ability to make definitive statements about Scottish climate and its impacts. These sources are spread over an extensive geographic range and are in many forms. Geographically, they range from research into European trends in general to specific regions of Scotland. As for the forms, they include everything from overall climate narratives to specific scientific reports on climate factors.

Brewing and baking represent the bulk of the discussion in this thesis, but the finished products did not exist independently of the range of factors affecting their production, such as changing climate and disease. With this in mind, basic understanding of medieval Scotland's climate starts with texts discussing pan-European climate trends, such as John Aberth's *Environmental History of the Middle Ages: The Crucible of Nature*, Richard Hoffman's *An Environmental History of Medieval Europe*, Ian Simmons's *An Environmental History of Great*

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<sup>34</sup> "Scottish Archaeological Internet Reports," (Society of Antiquaries of Scotland, 18/4/2022 2001-2022). <http://journals.socantscot.org/index.php/sair>.



*Britain: From 10,000 Years Ago to Present*, and Alastair Dawson's *So Fair and Foul a Day*.<sup>35</sup>

These general overviews really explore the most significant climate trends but they also help to build a broader, more complete narrative of that climate.

Related to, but not directly connected to, the climate is the issue of famine. Medieval famine was not always caused by climate change or weather patterns and inclement weather events would not necessarily determine whether there would be a famine following a poor or failed harvest. Instead, it was often as much a consequence of technological, social and economic factors which prevented the production of surpluses. Widespread socio-economic and technological conditions to deliver such sustained surpluses did not occur until the 17th century in England, and later in France.<sup>36</sup>

The principal Scottish sources of historic climate and weather evidence are entries in contemporary or near-contemporary annals and chronicles. The annals are mostly short unconnected notes about significant events, and the chronicles are more commonly lengthy narratives of events, which include information on weather events as part of the details.<sup>37</sup> In either instance they tend to focus on weather events that are extreme or out of the ordinary.<sup>38</sup> These reports can help define what is normal for the time but can lead to a focus on the extraordinary, rather than the significant trends. They may also not use terms the same way as would current readers, such as using winter to mean snow-cover, so that saying there was 'no winter' could mean there was no sustained snow cover.<sup>39</sup>

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<sup>35</sup> John Aberth, *An Environmental History of the Middle Ages: The Crucible of Nature* (London: Routledge, 2012); Richard Hoffman, *An Environmental History of Medieval Europe* (Cambridge: Cambridge University Press, 2014); I. G. Simmons, *An Environmental History of Great Britain: From 10,000 Years Ago to Present* (Edinburgh: Edinburgh University Press, 2001); Alastair Dawson, *So Foul and Fair a Day: A History of Scotland's Weather and Climate* (Edinburgh: Birlinn Ltd, 2009).

<sup>36</sup> Andrew B. Appleby, "Epidemics and Famine in the Little Ice Age," *The Journal of Interdisciplinary History* 10, no. 4, History and Climate: Interdisciplinary Explorations (1980): 661.

<sup>37</sup> C. Pfister, G. Schwartz-Zanetti, and M. Wegmann, "Winter severity in Europe: The fourteenth century," *Climate Change*, no. 34 (1996): 92.

<sup>38</sup> *Ibid.*, 93.

<sup>39</sup> *Ibid.*, 97-98.

One of the most challenging aspects of researching medieval Scotland is the lack of remaining documents compared to elsewhere in Europe. This position is compounded by the existence of a far more limited body of research into medieval Scotland in general. While it would be ideal to be able to rely on Scottish sources alone, there is simply not enough evidence, either documentary or proxy, to produce a sufficiently detailed picture. This lack of evidence has led those wishing to study medieval Scotland to use other sources of climatic data, such as those from Ireland and England, to have enough data to produce with certainty an overarching narrative.<sup>40</sup> These external sources are broken down into the same combination of annals and chronicles. They are used in preference to material from elsewhere in Europe due to their geographical proximity, meaning that they are more likely to reflect climate trends that also affected Scotland. Such sources, however, must be looked at critically as local weather and the impact of political events in response to local conditions were likely to have been different. This reliance on data from other locations has flaws but is necessary if there is to be any possibility of having sufficient detailed information to produce a 'complete' climate narrative which spans this era. While individual weather events may not have had exactly similar impacts in Scotland and the wider British Isles, the general trends are likely to have had important parallel effects. Comparison and context are important, therefore, even if only to understand the world with which the people in Scotland interacted.

Just as importantly, even when Scottish sources are being used, it is too often done as if there is minimal variation of climate regionally within the country. While this is demonstrably not the case, it is unfeasible for a general overview such as this to attempt to divide the climate more regionally other than into Atlantic-facing western and rain-shadowed eastern zones. This binary variation is very evident in sources and is based on the topographical character of Scotland and its relationship with the ocean masses which flank it.

Climate reconstruction may also be done via proxy methods in the form of studying physical evidence – in the form of, for example, ice cores, cave speleothems, tree-ring sequences, lake-bed and ocean-floor sediments - from a variety of locations, to determine the history of

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<sup>40</sup> See, for example Richard Oram, "The Worst Disaster Suffered by the People of Scotland in Recorded History": Climate Change, Dearth and Pathogens in the Long Fourteenth Century " *Proceedings of the Society of Antiquaries of Scotland* 144 (2014).

climatic events of that region. While they seem more reliable than documentary sources, these proxy data have flaws. Firstly, they cannot be used with any confidence to determine daily, weekly, or monthly climate.<sup>41</sup> Secondly, each type can only represent a specific time of year and not variation within that year, other than at best a summer/winter division.<sup>42</sup> Lastly, each type of proxy data can only be used for specific areas.<sup>43</sup> As with documentary sources, these flaws do not negate their use but do mean they must not be taken to be reflective of all situations. Proxy records show as more variation in precipitation than in temperature and that these variations were more effective in determining success with harvests than temperature.<sup>44</sup>

While there are many methods for determining climate trends, they will not be covered within this work. A combination of these sources has been used in the earlier mentioned secondary works on climate and can be read for detailed discussions. Climate still plays a role within this thesis as when it would impact a single grain or only a small set of grains, it will be discussed in Chapter 2: Establishing background on grains.

## Science

While this is a work of history, the lack of compositional details about the variety of grains grown in medieval Scotland, the detail of the malt used, or the preparation methods of brewing and baking requires consideration of more modern scientific works on those topics. These will often include both more modern varieties of cereals grown in medieval Scotland and grains not yet grown in Scotland before 1500 (such as maize), but can still be used to help determine under which conditions each grain would have grown best and help pair their presence to climate events.

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<sup>41</sup> Bernd R. Schöne and Jens Fiebig, "Seasonality in the North Sea during the Allerød and Late Medieval Climate Optimum using bivalve sclerochronology," *International Journal of Earth Sciences* 98, no. 1 (2009): 84.

<sup>42</sup> Ibid.,

<sup>43</sup> Ibid.,

<sup>44</sup> Henry F. Diaz et al., "Spatial and Temporal Characteristics of Climate in Medieval Times Revisited," *American Meteorological Society* 92, no. 11 (November 2011); Pfister, Schwartz-Zanetti, and Wegmann, "Winter severity in Europe: The fourteenth century."

Starting with work on multiple grains is Warren H. Leonard and John H. Martin's *Cereal Crops*, which covers every type of grain grown in medieval Scotland, and Elke K. Arendt and Emanuele Zannini's *Cereal Grains for the Food and Beverage Industries*, which includes both overviews of all the varieties of grain and their roles in food and drink.<sup>45</sup> Alongside these, there are also several books on single varieties of grain, including Dennis E. Briggs' *Barley*, R. F. Peterson's *Wheat*, and YiFang Chu's *Oats: Nutrition and Technology*, which focus on the grains named in each.<sup>46</sup>

As with their roles in the overall study, bulk commodities are not the only items worth examining in a modern context. The science of brewing, while not understood by the medieval brewer, helped clarify what would have come as a product from the techniques of traditional brewing without needing to attempt to replicate the results. For this J. S. Hough, D. E. Briggs, and R. Stevens' *Malting and Brewing Science* provides fundamental data on the process of brewing and the ale it produces.<sup>47</sup> Malt continues as a topic within the context of brewing guides, in books such as Charles W. Bamforth's *Beer: Tap into the Art and Science of Brewing*, Ian S. Hornsey's *Brewing*, and Dennis E. Briggs, Chris A. Boulton, Peter A. Brookes, and Rogers Stevens' *Brewing: Science and Practice*.<sup>48</sup> Even specific aspects of brewing have dedicated books to them, such as *Yeast Research: A Historical Approach*, as well as the *Brewing Elements* series of books which includes John Palmer and Colin Kaminski's *Water: A Comprehensive Guide for Brewers*, John Mallett's *Malt: A Practical Guide from Field to Brewhouse*, and Chris

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<sup>45</sup> Warren H. Leonard and John H. Martin, *Cereal Crops* (New York, NY: The Macmillan Company, 1963); E. Arendt and Emanuele Zannini, *Cereal Grains for the Food and Beverage Industries: Cereal Grains for the Food and Beverage Industries* (Cambridge: Elsevier Science & Technology, 2013).

<sup>46</sup> Dennis E. Briggs, *Barley* (London: Chapman and Hall Ltd., 1978); R. F. Peterson, *Wheat* (London: Leonard Hill Books, 1965); YiFang Chu, *Oats Nutrition and Technology* (Oxford: Wiley-Blackwell, 2013).

<sup>47</sup> Dennis E. Briggs, J. S. Hough, and R. Stevens, *Malting and Brewing Science* (London: Chapman and Hall Ltd., 1971).

<sup>48</sup> Charles Bamforth, *Beer: Tap into the Art and Science of Brewing*, 2nd ed. (Oxford: Oxford University Press, 2003); Ian S. Hornsey, *Brewing* (Cambridge: The Royal Society of Chemistry, 1999); Dennis E. Briggs et al., *Brewing: Science and Practice* (Cambridge: Woodhead Publishing, 2004).

White and Jamil Zainasheff's *Yeast: A Practical Guide to Beer Fermentation*.<sup>49</sup> All of these inform understanding of brewing processes and constraints upon them.

Because of changes in brewing technology, including the later introduction of hops and the even later addition of lagering (the process of making lager rather than ale), not all factors discussed apply to medieval brewing. It was enough, however, to add a keen understanding of medieval brewing. Baking is also well-researched, with several overview studies, e.g. William P. Edwards' *The Science of Bakery Products, The Technology of Bread-Making, and Flour and Breads and Their Fortification in Health and Disease Prevention*.<sup>50</sup> As with the similarly styled works on brewing, their focus on modern baking informs understanding of the baking process and any limitations.

## Summary

In the introduction to this chapter the topics to be addressed in this paper were stated. They were to define Scottish brewing and baking, 1406-1513, and to learn if it was unique compared to the traditions of elsewhere in Europe at the same time. The decision to focus this study on the long 15<sup>th</sup> century is influenced by a desire to enable deeper analysis of a time of major change, within the constraints of a research project at this level. Research was originally done with the goal of starting in the mid-13<sup>th</sup> century but beginning this work in 1406 allows a focus on the relatively continuous remaining records of the Exchequer Rolls and Treasurers Accounts that span the century. Similarly, ending in 1513 keeps the focus on a standard set of record types, before the start of surviving runs of new types of written records thus providing a continuum of data forms across a period of just over a century that will enable robust conclusions to be drawn without the skewing caused by the increasing volume of material available after 1513.

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<sup>49</sup> John Palmer and Colin Kaminski, *Water: A Comprehensive Guide for Brewers* (Boulder, CO: Brewers Publications, 2013); John Mallett, *Malt: A Practical Guide from Field to Brewhouse* (Boulder, CO: Brewers Publications, 2014); Chris White and Jamil Zainasheff, *Yeast: A Practical Guide to Beer Fermentation* (Boulder, CO: Brewers Publications, 2010).

<sup>50</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*.

While an economic history has value on its own, the goal of this thesis is to construct more of a cultural history that uses the exchange patterns of barley and malt as part of a study of their socio-economic importance and of the production methods for malt and, subsequently, the preparation of ale. There are many challenging aspects to this objective, especially given the gaps that still exist in even the surviving written sources; namely, the lack of contemporary Scottish written accounts that discuss the exact nature of the barley and malt being exchanged or the methods for preparing ale.

With the questions established we explored what has generally been written about on similar topics. Both brewing and baking have been explored elsewhere in Europe in detail, both in method and in their economic impact. In comparison, while some researchers have written about brewing and baking in Scotland, their work tended to be entirely focused on ale and bread as a smaller part of the economy, rather than on how either were produced, or even focussed on them very closely. Gaining more details about preparation benefits the study of brewing and baking for all places, but especially for Scotland as the resources tend to trend post-medieval. These post-medieval sources will also be used to help inform a Scottish narrative, as they were used to help other medieval studies.<sup>51</sup>

Because this aspect of Scottish society has not been explored in detail, it requires examining a wider variety of sources. The first of these was original source material, especially those talking of bulk commodities and legislation. These often led to economic and legal data but had not been analysed with the same focus. These also included contemporary narratives. The second set of sources were already interpretations in the form of archaeological reports and climate studies.

None of these sources contain a complete narrative of 15<sup>th</sup> century Scottish brewing and baking, but together they will be used to write one. For now, the first task will be to establish details each individual grains, focusing on the features of each grain and how the overall

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<sup>51</sup> Brears, *Cooking and Dining*, 91. Brears uses evidence of malting kilns used until the eighteenth century in Scotland to support medieval designs in England.

known climate of Scotland would affect the ability to produce sufficient grain to brew and bake enough to sustain the medieval Scottish population.

## Chapter 2: Establishing background on grains

### *Introduction*

Although much past research has focused on the value of grains in 15<sup>th</sup> century Scotland, little was undertaken with the primary goal of exploring its use in completed food products.

Discussions of ale and brewing more usually appear as very minor parts of broader economic or social history overviews, similar to the approach taken in the previously discussed work of Gemmill and Mayhew.<sup>52</sup>

This present work seeks to be more cultural and culinary in scope but remains focused on understanding the material components in the recipes for bread and ale. Modern consumers usually have access to a global market in which local environmental conditions no longer limit the type of products available, but consumers in the 15<sup>th</sup> century lacked this advantage. Instead, most people consumed products that were mainly locally grown and were reliant on these sources for what they used in their brewing and baking activities.

Researchers in many disciplines have long studied and written about the types of conditions required to best produce each of the main cereal crops.<sup>53</sup> Many of these same details are included here simply to establish a basic level of knowledge on which to build more concrete understanding of the qualities of each grain. Modern strains of each grain were not available until several centuries after the period of this study, but varieties existed. Bulk commodity records did not take note of anything beyond general grain type, and archaeological reports rely on remains which do not allow more in-depth classification. The conclusions about the types of grains likely produced in 15<sup>th</sup> century Scotland cannot be verified with certainty, but this does not mean the discussion is without value.

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<sup>52</sup> *Changing Values*.

<sup>53</sup> See, for example, Leonard and Martin, *Cereal Crops*; Peterson, *Wheat*.



## Barley and Malt

It is common to start discussions on grains with wheat, but barley is explored first here to reflect its greater presence in 15<sup>th</sup> century Scottish written records.<sup>54</sup> Barley was not the most prestigious of grain in Scotland; it was neither the highest priced nor the most preferred. Nevertheless, it was grown all over Scotland and used on its own and as an ingredient in food, both processed and not. More importantly, barley is used in both brewing and baking to a greater extent than other grains.

Barley and malt are considered one topic for discussion, despite not all barley being used in malt and not all malt being made from barley. This pairing, however, reflects the fact that barley and malt were often listed under the same heading in the Scottish Exchequer rolls and sometimes even added together in accounts.<sup>55</sup>

### Barley

In the most basic terms, barley (*hordeum vulgare*) is a grass and a cereal grain. It is an ancient grain with remains found across the world and dating to at least as far back as c.8000 BCE.<sup>56</sup> Barley is both genetically diverse and able to adapt to a wide variety of climates.<sup>57</sup> Accordingly, it is grown in more extreme climates than other cereals.<sup>58</sup> In general, barley has been regarded as less valuable than wheat, and two-thirds of the current barley crop is exclusively used for

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<sup>54</sup> *Changing Values*; Leonard and Martin, *Cereal Crops*. Both are representative of the trend to put wheat before barley. Leonard and Martin start with maize, but it had not yet spread to Europe in the 15th century..

<sup>55</sup> *ER*, IV-XIII, vii.457-8, 571; viii.180-1, 294-6, 447-8. [hereafter *ER*] One such example is the series of accounts for Fife. Starting in 1467, malt bookkeeping is presented along with barley and under the same section, sometimes labelled as barley and sometimes as barley and malt. These are not comprehensive by any means but reflect a pattern.

<sup>56</sup> Leonard and Martin, *Cereal Crops*, 478-479.

<sup>57</sup> Byung-Kee Baik, C. Walter Newman, and Rosemary K. Newman, "Food Uses of Barley," in *Barley: Production, Improvement, and Uses*, ed. Steven E. Ullrich (Oxford: Wiley-Blackwell Publishing Ltd, 2011), 555.

<sup>58</sup> Bamforth, *Beer*, 87.

animal feed.<sup>59</sup> On its own barley can be used as animal fodder or cooked into pottages, but its uses expand once it is processed, including its historical use in both bread and in making beverages, both alcoholic and non-alcoholic.<sup>60</sup> No matter its value in relation to other grains, barley had long held value to cultures due to its multiple uses and its hardiness. As with other grains, fresh barley has a limited shelf life, but processing can both add to that useful life and add more direct use for further products.

## Barley growth

While barley is generally regarded as a hardier grain than wheat, it has limits on the types of climatic regime within which it can successfully grow. Its success in Scotland is not hindered by colder weather, as the seed dormancy caused by cold and damp allows for them to survive better than they would in warmer weather.<sup>61</sup> However, even barley's tolerance for high moisture levels does not allow it to survive in waterlogged soil, and it will not germinate under those conditions.<sup>62</sup> Also, despite its reputation for tolerating a wide variety of climate, it does not handle severe cold as well as wheat does.<sup>63</sup> This would indicate that other climatic or environmental factors in Scotland cause barley to be the preferred grain. Climate was certainly a major reason for this but other grains that thrived in Scottish climate were not necessarily as prevalent (namely rye). Growth of barley is also affected by the quality of the soil, as it benefits from well-drained conditions, presumably because it prevents the seed from being saturated.<sup>64</sup>

Even if the ground is not waterlogged, heavy winter rainfalls leach nutrients from the soil and hinder barley growth. This is a factor that affects spring sown harvests more than those of the

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<sup>59</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 156; Leonard and Martin, *Cereal Crops*. There is evidence to suggest that there was a point at which barley was held in higher esteem than wheat, although this was only for a short time and only helps highlight how unusual it was for the value to be higher than wheat.

<sup>60</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 156.

<sup>61</sup> Briggs, *Barley*, 188.

<sup>62</sup> *Ibid.*, 309.

<sup>63</sup> John R. Garstang and John H. Spink, "Cultural Practices: Focus on Major Barley Producing Regions," in *Barley: Production, Improvement, and Uses*, ed. Steven E. Ullrich (Oxford: Wiley-Blackwell Publishing Ltd, 2011), 224.

<sup>64</sup> Leonard and Martin, *Cereal Crops*, 482.

following autumn.<sup>65</sup> Ideally, barley favours moist, but not waterlogged, conditions during the growing season, but dry during harvest, as high precipitation at that time impedes safe storage.<sup>66</sup> This means that the effects of a wet year depend more on when it rains than on how much falls.

How effective barley was grown can, in part, be estimated by yield relative to how much is sown. For England, the yield ratios for barley varied from 3.5:1 to 7:1, although the 7:1 was a rare feat.<sup>67</sup> While not indicative of the general situation in Scotland, at least some late 15<sup>th</sup> century assessments put the expected ratio at 3:1 to 4:1.<sup>68</sup> As these yield ratios both occur during a period of generally adverse conditions, they were likely at the poorer end of expectations more broadly across the Middle Ages.

## Types of barley

Barley can most easily be divided into two sets of traits, which have slightly different properties. These are whether the barley has two or six rows of seeds on each stalk, and whether the barley was sown in the autumn or the spring. The primary differences between two-row and six-row varieties lie in the number of rows of grain on the barley head, but they are also different because two-row barley kernels are larger and heavier, which leads to more fermentable sugars, while six-row contains more protein.<sup>69</sup> Both rows in two-row varieties are symmetrical to each other, while in six-row varieties only one third are symmetrical, with the rest being twisted in order to fit. Having six rows in the same area is why the kernels are smaller than their two-row counterparts.<sup>70</sup> Six-grain barley also requires closer sorting by size

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<sup>65</sup> Briggs, *Barley*, 309.

<sup>66</sup> Garstang and Spink, "Cultural Practices: Focus on Major Barley Producing Regions," 230.

<sup>67</sup> William Chester Jordan, *The Great Famine: Northern Europe in the Early Fourteenth Century* (Princeton: Princeton University Press, 1996), 25.

<sup>68</sup> Unclear if these refer to gross or net yields. *The Records of the Parliaments of Scotland to 1707*, 2021 (St Andrews2007-21), 1478/6/75, 1489/1/11, <http://rps.ac.uk>.

<sup>69</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 159.

<sup>70</sup> Baik, Newman, and Newman, "Food Uses of Barley," 545; Bamforth, *Beer*, 88.

(grading) because there was a wider variety of kernel sizes even within the same crop.<sup>71</sup> Generally, this meant that two-row barley was viewed as better for malting and brewing by British ale brewers, a trend which continues to present.<sup>72</sup> Whether medieval Scotland primarily had two-row or six-row is still open to debate, and evidence is split on which was more favoured and it may have been entirely based on what could be obtained locally. Two-row barleys tend to be grown during the spring, which may explain its continued preference, although it does not prove medieval growth.<sup>73</sup> Overall, two-rowed barley was cultivated two-thousand years before six-row barley, was an ancestor of the six-row form, and it would seem more likely for medieval Scotland to reflect the trends of modern Britain than North America.<sup>74</sup> The challenge in this is because some experts, such as Briggs, state that two-row barley was not introduced to North Europe from the Mediterranean until the medieval era, but both two-row and six-row barleys have been found at Neolithic sites in Scotland, although not all sites studied had verifiable two-row barley.<sup>75</sup> Physical evidence of both types of barley mean the higher sugar content and later European introduction of two-rowed barley puts it at an advantage once it was introduced. And yet in the 17<sup>th</sup> century in Scotland it was noted that six-row (referred to as four-row) was more common, but two-row made the best malt.<sup>76</sup> Clearly, based on modern preference and post-medieval sources, one cannot be certain of the more common type and instead further traits must be examined. One method through which to view

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<sup>71</sup> Paul Schwarz and Yin Li, "Malting and Brewing Uses of Barley," in *Barley: Production, Improvement, and Uses*, ed. Steven E. Ullrich (Oxford: Wiley-Blackwell Publishing Ltd, 2011), 480.

<sup>72</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 159; Hornsey, *Brewing*, 19. This preference is not universal as North American brewers tend to prefer six-row barley.

<sup>73</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 159.

<sup>74</sup> *Ibid.*, 155; Roland von Bothmer and Takao Komatsuda, "Barley Origin and Related Species," in *Barley: Production, Improvement, and Uses*, ed. Steven E. Ullrich (Oxford: Wiley-Blackwell Publishing Ltd, 2011), 44.

<sup>75</sup> Briggs, *Barley*, 81; Camilla Dickson, "The Plant Remains," in *Kebister: The four-thousand-year-old story of one Shetland township*, ed. Olwyn Owen and Christopher Lowe, Society of Antiquaries of Scotland, Monograph Series (Edinburgh: Society of Antiquaries of Scotland., 1999), 243.

<sup>76</sup> Moray, "An Account of the Manner of Making Malt in Scotland," 1069.

the motivation for choosing one variety over the other is to determine price differentials, but the records for Scotland did not specify which type was being traded.

The next factor arises from the difference between autumn and spring-sown barley. Autumn-sown is sometimes referred to as 'winter' barley and is planted in mid-September, while spring-sown is planted in March and April, depending on when it is safe from frost.<sup>77</sup> The earlier a seed was sown, the more yield it would have as it would have more time to grow and develop starch over the longer season.<sup>78</sup> This greater growth would be true, whether or not the barley was sown in winter or spring. Yields, however, were not the same between these two types as autumn/winter varieties produced more grain than spring varieties. Winter varieties cost more to sow, perhaps because the ground was more difficult to work with.<sup>79</sup> The extra yield in the winter varieties help offset the cost.<sup>80</sup>

Modern farmers split the growth almost evenly between the two types; winter barley has a higher quantity of lower quality output; spring barley is a higher quality barley, but yields less per acre.<sup>81</sup> Of course, proportions vary and reflect changing annual needs and variables like annual temperatures. A year with especially cold winters would benefit from later sown barley, but a wet autumn would hinder the harvest if one waited too long for a spring planting. It also depended on the growing location because, while spring barley was 56% of the total UK barley production (2002-5), 56% of the spring barley was produced in Scotland because the more northerly latitudes mean long, moderate days through the summer and Scotland's high precipitation led to high yields.<sup>82</sup> The early 21<sup>st</sup> century data does not specify the seasonal split of the barley crop in Scotland, so one cannot be sure of how much of the Scottish harvest was spring barley, but some guesses can be made based on what was done elsewhere. There was too wide a variety in spring barley production in Europe as a whole at the same time, but the most geographically similar location that had its own data, Ireland, grew 89% of the overall barley

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<sup>77</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 159-161.

<sup>78</sup> Bamforth, *Beer*, 94.

<sup>79</sup> Hornsey, *Brewing*, 20.

<sup>80</sup> *Ibid.*,

<sup>81</sup> Leonard and Martin, *Cereal Crops*, 496.

<sup>82</sup> Garstang and Spink, "Cultural Practices: Focus on Major Barley Producing Regions," 222-224.

production as spring barley.<sup>83</sup> Generally, if an area has milder winters, they are more likely to grow winter barley rather than spring, with the additional caveat that spring barley is preferred for ale.<sup>84</sup> Winter barley only did well if it had grown enough to be able to survive frost and cold once the winter proper had started.<sup>85</sup> Overall, this would suggest that Scotland was generally biased towards the production of spring barley, especially as the temperature trended colder during the 15<sup>th</sup> century. Barley's need for mild weather would also explain why growing seasons cut off during the late summer were particularly upsetting.



*Illustration 1 – Two-row and six-row barley,*  
[https://commons.wikimedia.org/wiki/File:Barley\\_Ears.JPG](https://commons.wikimedia.org/wiki/File:Barley_Ears.JPG)




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<sup>83</sup> Ibid., 222-223. This 89% was also referred to as a 6:1 ratio of spring barley to winter.

<sup>84</sup> Ibid., 222.

<sup>85</sup> Ibid., 229.

*Illustration 2 - Barley, with and without husk -*

[https://commons.wikimedia.org/wiki/File:Barley\\_Seeds.jpg](https://commons.wikimedia.org/wiki/File:Barley_Seeds.jpg)

There are other variations that stand outside the basic number of rows or season of sowing. One variation is between 'naked' and 'hulled' barley. 'Naked' varieties have a hull which is easier to remove than 'hulled' varieties.<sup>86</sup> Regardless of whether the barley is classed as naked or hulled, there is still a hull to be removed for the grain to be edible.<sup>87</sup> This restriction is not reflected in brewing needs as when it is malted and used in brewing the hull helps protect the malt from moulding, acts as a filter during brewing, and adds flavour,<sup>88</sup> but varieties without hulls generally contain more protein than those with hull.<sup>89</sup> Overall, this indicates that the benefits gained from naked varieties were negligible for medieval farmers and brewers. This preference for hulled varieties in brewing remains, as modern brewers seek to have as much of the hull left as is possible, to help produce a clearer product.<sup>90</sup>

Another variation is in *bere*, which is a barley variant that was introduced to Orkney in the 8<sup>th</sup> century and is the oldest variety labelled with its own designation.<sup>91</sup> Little is known of the exact details of medieval *bere* use beyond it being considered sufficiently different from other varieties of barley to merit this naming. It may have also been available in six-row and two-row forms as *bere* found in excavations at Dunbar was identified as the six-row variant.<sup>92</sup> Although it is currently only produced on a small scale, *bere* was a common barley variant and found all over Scotland. It was especially important in the less centrally located areas, such as Orkney.<sup>93</sup>

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<sup>86</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 161. 'Naked' varieties may also be referred to as hullless.

<sup>87</sup> Baik, Newman, and Newman, "Food Uses of Barley," 544.

<sup>88</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 186-187.

<sup>89</sup> Baik, Newman, and Newman, "Food Uses of Barley," 539.

<sup>90</sup> Bamforth, *Beer*, 54.

<sup>91</sup> Baik, Newman, and Newman, "Food Uses of Barley," 533.

<sup>92</sup> Alan D. Fairweather, "The Environmental Samples," in *Castle Park Dunbar: Two Thousand Years on a Fortified Headland*, ed. David R. Perry (Edinburgh: Society of Antiquaries of Scotland, 2000), 281.

<sup>93</sup> Russel Coleman and Catherine Smith, "The archaeology of burgage plots in Scottish medieval towns: a review," *Proceedings of the Society of Antiquaries of Scotland* 134 (2004): 309; S. S. M. Shah, X. Chang, and Peter Martin, "Effect of dose and timing of application of

## Malt

Malt is unique in that it is a process which can be done to any type of cereal, as well as being the name of the resulting product. Creating malt requires the grain being soaked long enough to germinate, and then dried to stop growth.<sup>94</sup> The equipment to make malt may have changed since the Middle Ages, but the science behind it has not. Because the process requires more effort than other uses of grain, there must be a reason to justify the extra labour and time. For malt the reason is partly because a malted grain is more stable during storage than an unprocessed version and because it is more easily crushed for further processing.<sup>95</sup> Making malt also converts the starch in grains to more easily fermentable sugars, which allows it to be made into more products, but especially into ale and beer.<sup>96</sup>

Malting may have also been a seasonal activity, as before modern refrigeration it could only be done in the cooler months.<sup>97</sup> Even as late as the 18<sup>th</sup> century it was noted that malt produced in the summer was never very good, and that it would take more time to prepare in the winter, leaving the ideal time to be spring or autumn.<sup>98</sup> Calling summer malt 'not good' is misleading as the warmer and more humid conditions deliver darker malt than that made during other times of the year, but it does lack the deeper flavours normally associated with darker malt.<sup>99</sup> It is important to note that the seasonality of malting does not mean that malt usage was seasonal, as once the malt was made it could be stored for months, allowing for year-round use.<sup>100</sup>

Grains meant to be malted must meet specific standards to be successful. No matter the variety, the grain needs to remain living so it can germinate and also must be active, rather than

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different plant growth regulators on lodging and grain yield of a Scottish landrace of barley (Bere) in Orkney, Scotland," *International Journal of Environment, Agriculture, and Biotechnology* 2, no. 4 (2017): 2.

<sup>94</sup> The details of this process will be discussed below.

<sup>95</sup> Briggs, *Barley*, 527.

<sup>96</sup> Schwarz and Li, "Malting and Brewing Uses of Barley," 478-479.

<sup>97</sup> Hornsey, *Brewing*, 23.

<sup>98</sup> Moray, "An Account of the Manner of Making Malt in Scotland," 1070.

<sup>99</sup> Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 83, 98.

<sup>100</sup> Hornsey, *Brewing*, 28.



dormant.<sup>101</sup> In the case of barley this dormancy is to prevent premature germination and is more likely to happen in places that are particularly cold or wet.<sup>102</sup> Unlike with the permanency of death, barley can be recovered from dormancy by either warm storage or cold storage.<sup>103</sup> For other grains it depends on the variety, but a similar set of problems around dormancy is likely.

## Variety

While malting is a process that can be done with any type of grain, here it is discussed in conjunction with barley because the written records of medieval Scotland simply do not allow them to be separated in any meaningful way. Not only do accounts in the *ER* blend barley and malt totals within both income and expense records, but sections labelled as barley will then discuss malt, and sections labelled malt will include barley.<sup>104</sup> This mixture of terms is true for neither wheat nor oats, and any malt made from these grains is labelled as such very explicitly, still often under the heading of malt.<sup>105</sup> Malts made from grains other than barley that were not listed simply under malt were also recorded primarily in the surviving early *ER* from the 13<sup>th</sup> and 14<sup>th</sup> centuries, and were written into a section separate from the combined barley and malt section.<sup>106</sup> The 15<sup>th</sup> century was far more uniform, with malt being specifically referred to as barley malt or simply as malt.<sup>107</sup> Even with these exceptions, the connection between barley and malt was so strong that it could be argued that the main purpose for barley outside animal feed was for malt and its resulting products.<sup>108</sup>

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<sup>101</sup> Bamforth, *Beer*, 92.

<sup>102</sup> *Ibid.*, 2

<sup>103</sup> *Ibid.*,

<sup>104</sup> *ER*, IV-XIII. These include the examples of those given in Fife earlier in the chapter.

<sup>105</sup> It is often only when accounts name other types of malt as well that barley malt is specified.

<sup>106</sup> To complicate matters, in some cases, barley malt is put with barley and oat malt is put with oats (*ER*, i,124-125,132-133), In other cases, barley malt and oat malt each have a section (*ER* i.329). In yet others, barley is listed together in a section labelled barley and/or malt (*ER* i.188,252,345). And lastly, it doesn't make clear divides other than grain expenses (*ER* i.146).

<sup>107</sup> *ER*, IV-XIII. Examples are widespread over these volumes.

<sup>108</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 156.

This emphasis on barley malt may have been unique to Scotland as the records of Dame Alice de Breynen in England, dated from October 1412 to September 1413, describe a combination of wheat malt and barley malt, or oat malt and barley malt, for much of the year, with pure barley malt being reserved for a small part of the year.<sup>109</sup> However, this variety of malt grains may have been unique to England, rather than barley malt being unique to Scotland, as primarily barley malt was also common in other locations. One example was a late medieval brewhouse or malt storage location in Berlin, which contained remains from a mixture of grains, most of which were barley, with the others being such a small part of the overall total that it suggested that only barley was being intentionally malted and that the remaining grains were contaminants.<sup>110</sup> If the type of grain used in malt in Scotland was from a wider variety of grains as it was in England during that time, rather than being almost barley, as it was in Germany, it was not reflected well in the *ER*, other written records, or even found in physical remains. Even in England, the malting tradition involving a wide variety of grain fell out of favour by the 17<sup>th</sup> century, during which time English brewing books assumed that barley was the main source of malt. They only mentioned oats and wheat as another option for other possible malt, with oats only being recommended when barley was not available.<sup>111</sup>

The assumption that barley should be the main type of malt continues today and unless another type of grain is mentioned it is still assumed to be barley malt.<sup>112</sup> Malt is currently also the most common use for barley in human consumption, as one-third of the crop is malted.<sup>113</sup> Currently, barley is divided into types that are considered best for malting or not for malting (essentially for feed), but there is no reason to believe medieval farmers had such specialisation.<sup>114</sup>

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<sup>109</sup> Brears, *Cooking and Dining*, 88.

<sup>110</sup> Hans-Peter Stika, "Early Iron Age and late mediaeval malt finds from Germany: attempts at reconstruction of early Celtic brewing and the taste of Celtic beer," *Archaeological and Anthropological Sciences* 3 (2011): 42.

<sup>111</sup> *LCB* 32; Markham and Best, *The english housewife*, 180-181.

<sup>112</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 185.

<sup>113</sup> *Ibid.*, 156.

<sup>114</sup> Bamforth, *Beer*, 90.

## Malthouses and kilns

More important than which grain is being used is the fact that the malt can vary significantly, based on the preparation method. All grains needed to be dried via kiln in areas with moderate climate and with cool and damp summers.<sup>115</sup> The reasons grains were kilned included the need to save seed for the next year's sowing, to make the grain sufficiently dry for grinding, and as part of the requirements for malting; but kilns will be examined in the context of malting because the kilning process did more to the grain than simply dry it.<sup>116</sup> The equipment was also identical and cannot be differentiated when found in archaeological sites. The main difference in the malt-making kilning process is that malt will be kilned at higher temperatures than grains that simply need to be dried for general use.<sup>117</sup> It is done to both make the malt darker, and have more complex flavours than those that were merely dried.<sup>118</sup> There is no evidence that medieval maltsters aimed to create darker malt, but as especially pale malts can have sulphuric tastes they could be undesired.<sup>119</sup>

Malt responds very differently, especially in brewing, depending on how light or dark the malt is and whether it is smoky or not. The lighter and more evenly coloured a malt is, the more of the starch in that malt is a variety that can be converted into a fermentable sugar.<sup>120</sup> Conversely, the darker a malt is, the less fermentable sugar it has, which leaves a sweetness that can be tasted but not actually converted into alcohol by yeast.<sup>121</sup> The extreme is that charred grain cannot be fermented at all.<sup>122</sup> Smoky malt does not influence the general brewing process but can end up a large part of the flavour profile of a finished product. Those who make

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<sup>115</sup> Paul Duffy, Sarah Cobain, and Helen Kavanagh, "From skill to skill': evidence for medieval brewing at Balbriggan, Co. Dublin," *The Journal of Irish Archaeology* 11 (2013): 65; Annemarie Gibson, "Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire," *Proceedings of the Society of Antiquaries of Scotland* 118 (1989): 219.

<sup>116</sup> Gibson, "Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire," 219.

<sup>117</sup> Bamforth, *Beer*, 52, 102.

<sup>118</sup> *Ibid.*,

<sup>119</sup> *Ibid.*, 53.

<sup>120</sup> Greg Hughes, *Home Brew Beer* (London: Dorling Kindersley Limited, 2013), 22.

<sup>121</sup> Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 99.

<sup>122</sup> Hughes, *Home Brew Beer*, 22; Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 99.

traditional smoked German beers (*rauchbiers*) argue that all beers were traditionally smoky, as they believe it was impossible to dry traditional malt without smoke affecting the product.<sup>123</sup> However, this assertion is uncorroborated and may only be a modern narrative created to give a spurious time-depth to *rauchbier*. It may have also been sought after only in that area.

Unfortunately, because malt-making was a part of ordinary life and the techniques were not documented in medieval Scotland, the method for it needs to be discussed through use of later documents and evidence from archaeological contexts. The colour of traditional malt would be very difficult to keep even, especially given that traditional British malting kilns are built to have more direct heating than those used elsewhere in Europe.<sup>124</sup> The most common design found in medieval sites is best described as lined pits with circular combustion chambers, where the fire was lit near a covered flue and where the heat was carried to a cylindrical chamber on top, with layers of small sticks and straw to support grains and a covering to stop rain from leaking into the drying grain.<sup>125</sup> The question for how widespread or early such kilns were in use is debatable. While originally only seen in use from the 16<sup>th</sup> to 19<sup>th</sup> centuries, round kilns found in Abernethy and Capo were possibly in use from as early as the 11<sup>th</sup> century.<sup>126</sup> It is dangerous to assume use based on such few examples, but similar kilns are common in surviving examples in Orkney and Shetland, where two-types survive in the form of four-sided kilns and rounded kilns.<sup>127</sup> Similarly, while Brears's work on malthouses is based in England, he says that such designs continued in use in Scotland into the late 18<sup>th</sup> century and were fuelled by peat, wood, or dry corn.<sup>128</sup>

More elaborate kilns were thought to be much more modern than excavation has now revealed, as grain-drying kilns have been found around Scotland. They are of a design thought

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<sup>123</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 69; "Raichbier," 2006, accessed 03/03, 2016, <http://www.germanbeerinstitute.com/Rauchbier.html>.

<sup>124</sup> Briggs, *Barley*, 543.

<sup>125</sup> Brears, *Cooking and Dining*, 91; Gibson, "Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire," 219.

<sup>126</sup> Gibson, "Medieval corn-drying kilns at Capo, Kincardineshire and Abercairny, Perthshire," 220-226.

<sup>127</sup> *Ibid.*, 219-220.

<sup>128</sup> Brears, *Cooking and Dining*, 91.

only to become common in the post-medieval period and are found at locations dispersed from Linlithgow burgh to rural Perthshire. The excavated examples show that the design was essentially unchanged from the 13<sup>th</sup> century to the 18<sup>th</sup>.<sup>129</sup> Similar-shaped kilns are also found in Ireland, dating from the thirteenth and 14<sup>th</sup> centuries, along with simpler circle or pit kilns.<sup>130</sup>

Unlike with modern malting methods, where the source of heat for drying would not cause a smoky flavour unless specifically wanted, it is possible for this more direct traditional method to be affected by the fuel used to help dry the malt.<sup>131</sup> Even if the fire was not just below the grains, they were immediately inside or outside the entrance of the kiln and had only a very limited space between the fire and where the hot air was funnelled.<sup>132</sup> Whether or not this feature was seen as a flaw or simply a feature is unknown, but later brewers did view the smoke as undesirable. An 18<sup>th</sup> century brewing guide, *TBB*, specifically mentions smokiness as a sign that the material used to fuel the malting process was not dry enough to be used cleanly, and implied a contrast to well-prepared malt being made with properly dried fuel.<sup>133</sup> Another

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<sup>129</sup> Derek Alexander, "Excavation of a grain-drying kiln and mill lade at Kettlestoun Mains, Linlithgow, West Lothian," *Glasgow Archaeological Journal* 20 (1996): 83, 91.

<sup>130</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 62-64, 66.

<sup>131</sup> Briggs, *Barley*, 543; Hornsey, *Brewing*, 28.

<sup>132</sup> Alexander, "Excavation of a grain-drying kiln and mill lade at Kettlestoun Mains, Linlithgow, West Lothian," 84.

<sup>133</sup> *TBB*, section malt drying. "Malt is dried with coke, coal, wood, furze, and straw. The best and sweetest malt is dried with coke, or welch coal; because the coke, or coal, gives a regular and gradual heat. Malt dried with coke, or coal, will be of a bright, clean colour, because the fire is free from smoak. It is also to be observed that malt dried with coal, or coke, is generally well cured, that is, sound dried, because the coke or coal fire is fierce and strong.

If malt is dried with a wood fire it greatly depends on the wood being housed in a dry season; for if the wood is dry it will produce a clear fire, free from smoak, and the malt will be of a bright colour; but if the wood is wet and sugged, the fire will not be fierce, but will be smoaky, and will certainly cause the malt to be of a dull colour; and the beer brewed from such malt will consequently have a smoaky taste: therefore it depends on the attention of the maltster, in housing his wood in good order, for without that attention he cannot serve his customers with good, bright, well cured malt.

I have seen very fine malt dried with straw, it being less subject to smoak than malt dried with wood; but this mode of drying is very tedious, because a person must always attend the fire. In those countries where it is straw-dried, wood and coal is dear, therefore straw is used as a substitute for coal, &c. However, if care be taken, malt may be well cured with a

similarly dated document says that the strong and smoky taste of improperly dried malt is one that few can bear and is associated with lower quality drinks.<sup>134</sup> These, however, are sources from England. How smoky Scottish malt would be depended on the type of fuel used. It is difficult to find remains of the fuel, in part because kiln-bases were cleaned out frequently.<sup>135</sup>

When peat is used, one cannot avoid a smoky product, due to the very nature of how peat burns. It is of course impossible to be certain which fuels were always most common, but maltsters would likely use what was available locally, rather than what might be preferable. A discussion of fuels in Scotland from the mid-15<sup>th</sup> century to 1850 looked primarily at peat and coal.<sup>136</sup> They were not examined strictly in their use for either malting or brewing, so cannot be assumed to be the most common fuels for either.

The type of fuel used can be determined by looking at traits of it. To start, coal burns at such a high temperature and with such high level of gaseous pollutants that it would not work for the open heating systems used at the time. Coal may have been mined before 1200, although

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straw or wood fire, but not to equal welch coal, or coke, because the fire may always be kept up so as to produce a regular heat.”

<sup>134</sup> *London and County Brewer.*, chapter 4. “*Brown Malts are dried with Straw, Wood and Fern, &c. the Straw-dryed is not the best, but the Wood sort has a most unnatural Taste, that few can bear with, but the necessitous, and those that are accustomed to its strong smoaky tang; yet is it much used in some of the Western Parts of England, and many thousand Quarters of this Malt has been formerly used in London for brewing the Butt-keeping-beers with, and that because it sold for two Shillings per Quarter cheaper than the Straw-dryed Malt, nor was this Quality of the Wood-dryed Malt much regarded by some of its Brewers, for that its ill Taste is lost in nine or twelve Months, by the Age of the Beer, and the strength of the great Quantity of Hops that were used in its Preservation.*”

The Fern-dryed Malt is also attended with a rank disagreeable Taste from the smoak of this Vegetable, with which many Quarters of Malt are dryed, as appears by the great Quantities annually cut by Malsters on our Commons, for the two prevalent Reasons of cheapness and plenty.”

<sup>135</sup> Alexander, "Excavation of a grain-drying kiln and mill lade at Kettlestoun Mains, Linlithgow, West Lothian," 84.

<sup>136</sup> Richard Oram, "Arrested Development? Energy Crises, Fuel Supplies, and the Slow March to Modernity in Scotland, 1450-1850," in *RCC Perspectives, No. 2, Energy Transitions in History: Global Cases of Continuity and Change*, ed. R. W. Unger (Munich: Rachel Carson Centre, 2013).

generally only used locally to the mines, except where Scottish burghs were importing coal from England, starting mostly in the 14<sup>th</sup> century.<sup>137</sup>

Conversely, peat burned at a lower temperature and, while it was not the cleanest burner, it was better suited to open malting systems. Peat rights were part of the privileges of power within royal burghs, and legislation was put into place from the 1500s to control extraction, both of which suggest peat as a primary fuel, with later pressures on supplies causing it to be more conserved.<sup>138</sup>

Even without as many direct sources for the fuel, some are known or presumed. Fenton argued that peat was the traditional fuel for drying kilns, because it had less of a chance of leading to the overall kiln catching fire, but that it left a distinct taste of peat-smoke.<sup>139</sup> Overall, coal, coak (coke), straw, fern, peat, and hardwoods could be used.<sup>140</sup> Preference played a part in what was actually used, and when in 1837 the first complete Scottish guide on malting and brewing which listed preferred fuels specified varying types of coal or charcoal or wood.<sup>141</sup> This is in contrast to *The English housewife's guide* a century earlier, which put straw as the most preferred type of fuel, with different sources being ranked above each other, followed by coal, turf, and peat only when the smoke would not touch the malt.<sup>142</sup> This preference was not shared in Scotland, as a 17<sup>th</sup> century guide written on the topic "Malting in Scotland" put peat at the top, followed by charcoal, pit-coal, heath, broom and ferns.<sup>143</sup>

The colour of malt is even more challenging to pinpoint without physical descriptions of the actual malt of the era. The only certain truths are that completely even-coloured malt is improbable without an indirect modern malting technique and that the darker you attempt to make a malt the more likely you are to end up with burnt malt grains, along with simply

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<sup>137</sup> Ibid., 19.

<sup>138</sup> Ibid., 18.

<sup>139</sup> "Charred plant remains," Lockerbie Academy: Neolithic and Early Historic timber halls, a Bronze Age cemetery, and undated enclosure and a post-medieval corn-drying kiln in south-west Scotland, Society of Antiquaries of Scotland, 2011, 46.

<sup>140</sup> Hornsey, *Brewing*, 28; Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 200.

<sup>141</sup> Roberts, *The Scottish Ale-Brewer and Practical Maltster*, 200. 200

<sup>142</sup> Markham and Best, *The english housewife*, 189-190. 189-190

<sup>143</sup> Moray, "An Account of the Manner of Making Malt in Scotland," 1071.

darker ones. Stirring would be done to attempt to even out the colouration, but it would still allow for some variation. This inability to produce dark malt without burning, as well as being unable to create evenly light malt, would lead to a medium light malt made of varieties of different shades.

Fuel is not always needed as malting could be completed by sunlight, instead of the addition of external heat, but sun-dried malting is also traditionally done during the winter to help control the temperature during germination.<sup>144</sup> The extremely short days and traditionally wet winters, however, would not allow an open sun operated malting process to take place in Scotland. The lack of viable naturally dried malt only leaves direct methods of heat as a method of drying and that would mean at least some smoke, which was unavoidable, although how much was present in the malt would depend on the skill of the maltster and what fuel they had available.<sup>145</sup>

## Making Malt

No description of the malt-making process is included in any surviving medieval Scottish documents. However, the science remains consistent and early modern traditional methods do not require devices that would have been inaccessible to a medieval maltster. It was a detailed process and very early medieval malt took fifteen days to produce.<sup>146</sup> Understanding of how malting worked and what it chemically did was absent. Malting equipment changed over time, but the steps have remained the same. The basic steps for making malt are steeping, sprouting, and drying, but the whole process is divided into five stages: cleaning/grading, steeping, germination, kilning, and malt blending/cleaning.<sup>147</sup> Because the two extra stages involved sorting, which would apply to many grains, only the other three steps will be focused on here.

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<sup>144</sup> Briggs, *Barley*, 538.

<sup>145</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 69.

<sup>146</sup> *Ibid.*,

<sup>147</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 187; Schwarz and Li, "Malting and Brewing Uses of Barley," 480. The more detailed step method includes sorting necessary for all types of grain processing, which are not unique enough to malt production to be discussed in detail.



The first step - steeping - simply increases the moisture level of the grain to a point where it can germinate later. The modern method has limited soaking periods, followed by drying, before being soaked again. Traditionally the grain was continually soaked, a method which ended up taking longer than modern methods, despite having more time in direct contact with water.<sup>148</sup> How long soaking took varied, as the speed of germination would vary, based on time of year and size of each grain of barley.<sup>149</sup> This stage took at least several days, but was divided into one to three days of soaking, followed by a day and a half of draining excess water, followed by several days under cover.<sup>150</sup>

The second step for malting was called sprouting (also called germination). It was traditionally done by spreading the soaked barley on a floor in a layer 10-20cm deep and allowing it to rest for several days. It was thinned out or piled by raking, to maintain a temperature range.<sup>151</sup> Knowing when it was ready required an experienced maltster, who could test it by squeezing a few individual grains in their hand to see how readily it would be compressed.<sup>152</sup>

The third step is drying (or kilning). The drying takes the malt to a low enough level of moisture to stop germination and associated changes in the carbohydrate structure.<sup>153</sup> The lower moisture level also enables longer storage without spoiling. This stage can still take anywhere from 16 to 60 hours, with the first ten hours being the most productive for evaporation; it slows after that while the overall temperature rises.<sup>154</sup> The goal was to reach 4% moisture.<sup>155</sup>

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<sup>148</sup> Bamforth, *Beer*, 92-93, 96; Hornsey, *Brewing*, 22.

<sup>149</sup> Bamforth, *Beer*, 96.

<sup>150</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 69; Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 50.

<sup>151</sup> Bamforth, *Beer*; Hornsey, *Brewing*, 22; Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 67.

<sup>152</sup> Bamforth, *Beer*, 99.

<sup>153</sup> *Ibid.*, 100.

<sup>154</sup> Hornsey, *Brewing*, 27-28.

<sup>155</sup> Bamforth, *Beer*, 102.

A complete and contemporary picture can be seen in the form of a 13<sup>th</sup> century verse by Walter de Bibbesworth, which explains the method from barley to ale in England.<sup>156</sup>

*In steep your barley in a vat, [‘cuwe’ or ‘kive’]  
 Large and broad, take care of that,  
 When you have steeped your grain,  
 And the water let out-drain,  
 If you’ve swept it clear before.  
 There couch, and let your barley dwell  
 Till it germinates full well.  
 Malt you know shall call the grain,  
 Corn it ne’er shall be again.  
 Stir the malt then with your hand  
 In heaps or rows now let it stand,  
 On a tray then you shall take it  
 To a kiln or dry and bake it,  
 The tray and eke a basket light  
 Will serve to spread the malt alright.  
 When your malt is ground in mill  
 And of hot water has drank its fill,  
 And skill has changed the malt to ale  
 Then to see you shall not fail.*

The process of making malt results in a finished product with less moisture than the original grain, leading to a lighter product. But medieval records do not take this into account, as both barley and malt are measured by volume, rather than weight. No volume is lost in the process

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<sup>156</sup> Brears, *Cooking and Dining*, 89.

and a boll of barley is used to make one boll of malt.<sup>157</sup> When weight is instead used, the loss is somewhere between 7% to almost 20% of the starting barley.<sup>158</sup>

## Wheat

Wheat (*Triticum*) was the most valuable grain grown and processed in medieval Scotland, both in its perceived use and in the prices paid for it. While wheat was generally regarded as a less common grain in medieval Scotland than barley, it regularly appeared in rental payments and when they did their expected payments were generally met, with fewer accounts of failed payments than there had been for barley or malt. While it was generally less common than other types of grain, it was occasionally the dominant grain, such as in the case of at least one location in East Lothian.<sup>159</sup> It does not mean it was all grown nearby but wheat was not a grain that could only be accessed at the best of times.

### *Wheat growth*

As with other grains, wheat follows a specific growth cycle, starting with sprouting and ending with the mature wheat. All wheat follows the same growth pattern, but it is not always at the same time of year; the wheat can either be sown in winter or in spring. This seasonality both influences the weather the growing crop will experience and the time in which the growing season will end.

To grow wheat, no matter the season, requires specific conditions. To start, germination of wheat can only occur between 4 ° and 37 ° C. While this range looks forgiving, wheat has a higher requirement for heat than other grains. It is not simply a matter of more heat being better for wheat as winter wheat handles cold better than winter barley or winter oats. At a

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<sup>157</sup> *ER* xiv.41

<sup>158</sup> Hornsey, *Brewing*, 28; Mallett, *Malt: A Practical Guide from Field to Brewhouse*, 85.

<sup>159</sup> Erland Hindmarch and Richard Oram, "Eldbotle; the archaeology and environmental history of a medieval rural settlement in East Lothian," *Proceedings of the Society of Antiquaries of Scotland* 142 (2012): 269.

minimum, wheat can grow at 3-4 ° C, but grows optimally at around 25 ° C and can handle up to 30-32 ° C.<sup>160</sup>

As with barley, the correct amount of moisture is required. High rainfall in spring hinders winter wheat growth.<sup>161</sup> Wheat benefits from hot dry summers and has a general increase of five percent for every single degree Celsius rise in temperature during the summer.<sup>162</sup> Also as with barley, the effectiveness of the growth of wheat can be examined in its required ratio of grown grain to sown grain. The estates of the bishops of Winchester in 13<sup>th</sup> century England expected a range of 3:1 or 4:1.<sup>163</sup> In comparison, the late 15<sup>th</sup> century expected ratios were only 2:1 or even as low as 1.23:1.<sup>164</sup> While it was still during the same time as the barley ratios, it being even lower than the values expected for barley reflects the generally higher difficulty in effectively growing wheat in Scotland.

### *Types of wheat*

The first distinction to make with wheat is based on whether early-stage growth occurs in winter or in spring. Both winter and spring varieties are grown in Scotland, but the winter varieties carry greater risk of failure as they are more likely to struggle with cycles of freezing and thawing.<sup>165</sup> These cycles are dangerous because winter wheats generally have a resistance to frost towards the very early part of their growth cycle, but this is lost during active growth during the spring, meaning they're vulnerable to late March and April frost.<sup>166</sup>

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<sup>160</sup> Leonard and Martin, *Cereal Crops*, 284-285.

<sup>161</sup> *Ibid.*, 286.

<sup>162</sup> Bruce Campbell, "Physical shocks, biological hazards, and human impacts: the crisis of the fourteenth century revisited," in *Le interazioni fra economia e ambiente biologico nell'Europa preindustriale. Secc. XIII-XVIII (Economic and biological interactions in pre-industrial Europe from the 13th to the 18th centuries)*, ed. S. Cavaciocchi (Prato, Italy: Istituto Internazionale di Storia Economica "F. Datini, 2010), 19.

<sup>163</sup> Jordan, *The Great Famine: Northern Europe in the Early Fourteenth Century*, 25.

<sup>164</sup> *RPS* 1489/1/11, 1490/2/64

<sup>165</sup> Peterson, *Wheat*, 136.

<sup>166</sup> "Crop Water Information: Wheat," 2015, accessed 28 11, 2016, [http://www.fao.org/nr/water/cropinfo\\_wheat.html](http://www.fao.org/nr/water/cropinfo_wheat.html).

There are three broad classifications used to separate types of wheat. They are growing season, protein content and quality, and grain colour. Because the varieties of wheat produced in medieval Scotland are even less well understood than those of barley, not much detail will be put into these designations. It is possible, however, to demonstrate the variability in wheat and that can be used to make informed guesses about the types of wheat most likely produced in 15<sup>th</sup> century Scotland.

Wheat varieties are defined by more than the season in which they are planted. As with barley, both winter-sown and spring-sown varieties exist. Spring wheat has been traditionally preferred in places with severe winters and cold winds that also lacked severe snowfall.<sup>167</sup> It is a variety that does not need any periods of cold but was also sensitive to frost.<sup>168</sup> The next factor is the level of protein. Wheat could vary anywhere from 8-15% protein, although modern commercial classes (as of 1963) tend to be between 11.2% and 16.8%.<sup>169</sup> The quality of the protein in wheat, namely the gluten, affected how it would work in baking. It was unlikely that the quality of the gluten was not a deciding factor for medieval wheat, but that quality did affect its ability to produce high quality bread. The last singular factor is the seed colour. The kernels can be either red or white, but red is a dominant trait and later generations will tend toward red when repeatedly bred.<sup>170</sup> These traits combine and sometimes affect each other. One example is how the seasons of the wheat also impact the protein levels, namely spring wheat generally has more protein than winter wheat.<sup>171</sup>

With this knowledge of wheat established, we can look at what wheat was grown in Scotland. Documentary evidence about wheat does not specify what type would have been grown. This lack of documentary evidence, along with many changes through enhancement of specific genetic traits in wheat over the last few hundred years, mean the medieval varieties grown can never be truly known, but it is important to offer some informed speculation about what the

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<sup>167</sup> Ibid.,

<sup>168</sup> Ibid.,

<sup>169</sup> Leonard and Martin, *Cereal Crops*, 366-367.

<sup>170</sup> Ibid., 432.

<sup>171</sup> William Jago and William C. Jago, *The Technology of Bread-Making* (Liverpool: The Northern Publishing Co., 1921), 384.

wheat would have been like. DNA analysis would be ideal for understanding the differences between medieval and modern varieties, but such reports are lacking.<sup>172</sup> Factors that helped create weather tolerance also affected the wheat's suitability for different uses. Despite the cultural importance of wheat in bread-making it is still a minor crop in Scotland and varieties being grown were bred elsewhere and later brought into Scotland. Given the relatively similar climates, these wheats likely came up through England, which would mean red and white-grained winter wheats, and red-grained spring wheats from the standard wheat species and cone wheat.<sup>173</sup>

This is not to say Scottish varieties were identical to the wheat grown in England, as it was more likely to have local wheats developed with the needs of the Scottish climate in mind. Rather, the tendency for both cold and windy winters in Scotland give credence to the idea that spring wheat was the more common variant in Scotland, although they would need to be sure that the frost risk had passed or risk losing the crop early in the season.

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<sup>172</sup> Such research may be possible in the future and would lead to new knowledge that cannot be asserted now.

<sup>173</sup> Peterson, *Wheat*, 206.



*Illustration 3 - Wheat stalk, green <https://www.pexels.com/photo/grass-weeds-nature-grain-8189/>*



*Illustration 4 - Wheat stalk, dried <https://pixabay.com/en/wheat-grain-cereals-close-ear-1541336/>*



*Illustration 5 - Wheat grain [https://commons.wikimedia.org/wiki/File:Wheat\\_grain.jpg](https://commons.wikimedia.org/wiki/File:Wheat_grain.jpg)*

## *Flour*

Unlike with barley, where the more refined form is seen as malt, the more 'complete' use of wheat is flour. This comparison is not entirely equal as processing wheat into flour simply requires milling but converting barley into malt is a more complicated process, which leads to a whole grain product which requires later milling. Grains generally were not traded when already milled and so flour did not appear as a part of accounts in nearly the same quantities as malt did. It was so rare that no medieval records can be found in the NRS with the keyword flour, only expanding to three if the range is extended to the end of the 16<sup>th</sup> century.<sup>174</sup> This is perhaps because flour was not often traded in large quantities as part of rents or tithes. It was instead milled as required.<sup>175</sup>

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<sup>174</sup> Flour was not completely missing from medieval Scottish documents as 35 documents in the People of Medieval Scotland site mentioned flour and flour also appeared in both the RPS and ER.

<sup>175</sup> Brears, *Cooking and Dining*, 109.



The reasons for not milling until close to the planned time of use are unknown, but it was at the expense of the benefits that come with storing the flour for a few months.<sup>176</sup> This work also states that the bread made with aged flour has better volume, texture, and colour to that made with freshly milled-flour.<sup>177</sup> Despite flour appearing so infrequently in the record, it is part of the discussion of wheat because it is as clearly associated with wheat as malt is to barley. Wheat is given in accounts, with the goal of being milled for later usage in a product (in this case, usually bread) the way barley is given to be made into malt to be later used in ale. As with the wheat that made it, flour could contain various levels of protein, which affected the end products it was used in. Jago and Jago claim that bakers in Scotland preferred strong flours (meaning with higher protein contents).<sup>178</sup>

## Other Grains

Barley, malt, and wheat were put at the beginning of this discussion because of their importance, but they were not the only grains people produced and consumed in 15<sup>th</sup> century Scotland. Oats, rye, and a variety of legumes were part of the 15<sup>th</sup> century Scottish diet. They were generally less present in the overall production of ale and bread than wheat and barley but are still worth exploring in detail to understand their role. Oat especially was common enough in the baking process to be worthy of mention, with details of such to be covered in Chapter 4: Establishing background on grains.

## Oats

If the only reasoning for the order of ‘other grains’ was quantity of grain produced per year, oats would start this chapter. Oats have often been regarded as the prime grain of Scotland; its production dominating arable agriculture into the modern era. There is no denying their importance in the medieval Scottish diet, for both human food and as animal fodder. The dual uses of oats for both humans and animals are why they are being discussed along with assorted

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<sup>176</sup> Peterson, *Wheat*, 312.

<sup>177</sup> Ibid.,

<sup>178</sup> Jago and Jago, *The Technology of Bread-Making*, 317.

other grains rather than on their own. However, this dual use also shows how the climate encourages reliance on oats as an easily produced and reliable grain, to be used for flour, malt, bran/chaff fodder, and seed corn.

Both unprocessed oats and the processed form of oatmeal frequently appeared in the accounts of the exchequer, as well as in rentals.<sup>179</sup> Outside their appearance in official documents, oats played a large part in the general narrative of Scotland and Scottish society. Not only were oats defined by connection to feeding Scotland in the 1755 Dictionary of the English Language by Dr. Samuel Johnson, but Jean Froissart's single mention of Scottish soldiers preparing food was their preparation of oatcakes on a metal plate.<sup>180</sup> While the latter may only reflect the experiences of soldiers, it was part of a trend toward associations of oats and the Scottish diet.

One could argue that the cultural connection is inseparable from the issue of climate. Oats thrive in climates and conditions that are unsuitable for other types of grains. They both require more water than other grains and their growth suffers from both excessive sunlight and from dry heat, i.e. they thrive in colder, darker and wetter conditions, making oats ideal for growing in Scotland.<sup>181</sup> It was perhaps because of this ease in growth that oats were grown in such large numbers. Despite their frequency, or maybe because of it, oats were the cheapest of all grains, during the 15<sup>th</sup> century. It was also low prestige and when found in places where the

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<sup>179</sup> Oats are such a frequently mentioned grain in the written evidence that to make charts, such as those done in the chapters for barley and for wheat, could be an entire chapter. The discussion of oats being purposely left shorter is not meant to deny the importance of oats and oatmeal but is instead because oats and oatmeal are so multi-purpose that they can't always be easily connected to either baking or brewing. Also, unlike with wheat, which rarely in accounts as milled flour, oatmeal (sometimes simply referred to as meal) makes frequent appearances in accounts and does often warrant its own section in those accounts.

<sup>180</sup>"Oats - A Dictionary of the English Language: A Digital Edition of the 1755 Classic by Samuel Johnson," 2012, accessed 02 11, 2017, <https://johnsonsdictionaryonline.com/oats/>; Jean Froissart, *The Chronicles of Froissart*, trans. John Bouchier, ed. G. C. Macaulay (London: MacMillan and Co., Ltd., 1895), 17.

<sup>181</sup> Leonard and Martin, *Cereal Crops*, 548.

occupants could afford better it was assumed to be for animal feed rather than for the people, such as when discovered in the drains of Paisley Abbey.<sup>182</sup>

## Varieties

But even with knowledge that oats were grown widely in Scotland, more can be said about the specific varieties. In most of the accounts, oats were simply referred to as oats, rather than by type, but assumptions can be made based on the information presented, as well as what is known about modern strains.

Firstly, the records can specify black, grey, and white oats without ever clarifying what those terms meant, and there is no surviving definition of these three categories or varieties in post-medieval contexts. While these distinctions could be referring to different qualities of grain, it most likely refers to the colour, as even relatively recently oats were commercially separated into five separate classes: white, red, grey, black, and mixed.<sup>183</sup> The colour may refer to quality as well, as staining on the hull is still seen as a sign of environmental problems during growth or infection and is used as a reason for a mill not to process a specific batch of oats.<sup>184</sup> But quality is not the only reason for different colours. Black oats may refer to a completely different variety of oats, *Avena strigosa*, which is an earlier strain used before the common/grey oats, *Avena sativa*, became common in Europe.<sup>185</sup> They have different origins and different tolerances to temperature and moisture. The relatively early references to black oats would support the idea of them being an earlier strain that was grown less frequently as more hardy varieties become common. The disbursement of different types of oats being widespread demonstrates that black oats were instead grown alongside newer varieties rather than replaced by them. Black oats were found in excavated kilns at Lockerbie which were

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<sup>182</sup> Russel Coleman and Catherine Smith, "The archaeology of burgage plots in Scottish medieval towns: a review," *The Society of Antiquaries of Scotland*, no. 134 (2004): 309.

<sup>183</sup> Leonard and Martin, *Cereal Crops*, 576.

<sup>184</sup> Nancy Ames, Camille Rhymer, and Joanne Storsley, "Food Oat Quality Throughout the Value Chain," in *Oats: Nutrition and Technology*, ed. YiFang Chu (Chichester: Wiley-Blackwell, 2013), 37.

<sup>185</sup> H. L. Dial, *Plant guide for black oats (Avena strigosa Schreb)* (Tuscon, AZ: USDA - Natural Resources Conversation Service, 2014).

dated broadly between the mid-15<sup>th</sup> and the early 19<sup>th</sup> centuries.<sup>186</sup> And to support there not being a switch away from black oats, earlier finds from 13<sup>th</sup> century contexts in Dunbar were either white or grey.<sup>187</sup> Black oats sometimes appeared in early contexts, such as the 12<sup>th</sup> century kiln excavated at Lhanbryde, Moray, which had remains of predominately black oats.<sup>188</sup> Sometimes both black and white appeared at the same locations, such as in Leith, where both appeared across many time periods, and in the *C. A. Rent*, in which both white and black oats were specified in the Register of Tacks 1539-52, but there were more mentions of black than white.<sup>189</sup> Black oats may have been the most common in a few locations, but this was not universal as they were overall less common than both white oats and grey oats, with grey oats being the most common grain of the poor.<sup>190</sup>

While modern oats are divided into hulled and naked (hulless) oats, it seems most likely that most, if not all, medieval oats were of the hulled variety. Not only are naked oats generally newer varieties, but the yield is lower than with hulled oats and they deteriorate in storage much more quickly than those which have been hulled.<sup>191</sup> Beyond the hulled variety being more stable, they also appear in more archaeological sites. One cannot always tell whether oats were hulled or naked in the archaeological remains, but it was aided by oats normally being stored in their hulls.<sup>192</sup> It leads to the difficulty of not being sure if the remains were hulled because those stored without hulls would have more likely not survived, but given that removing the hull was only done close to consumption, it is likely they knew of the disadvantages of storing naked oat grain. Assuming that the records reflect the reality, and not

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<sup>186</sup> Hastie, *Charred plant remains*, 58.

<sup>187</sup> Fairweather, "The Environmental Samples," 281.

<sup>188</sup> Derek Alexander and Timothy G. Holden, "A medieval grain-drying kiln and earlier mill-lade at Lhanbryde, Moray," *Proceedings of the Society of Antiquaries of Scotland* 127 (1997): 678-679, 681.

<sup>189</sup> *Rental book of the Cistercian Abbey of Cupar-Angus*, ed. Charles Rogers, 2 vols., vol. 1-2 (London: Printed for the Grampian Club, 1879-80), 18, 47, 48, 50, 61, 62, 85, 90, 92, 112, 113, 117, 127, 177, 202, 203; Simon Stronach et al., "The medieval development of South Leith and the creation of Rotten Row," *Proceedings of the Society of Antiquaries of Scotland* 132 (2002): 414-415.

<sup>190</sup> Coleman and Smith, "Archaeology of Burgage Plots," 309.

<sup>191</sup> T. R. Stanton, "Naked Oats," *Journal of Heredity* 14, no. 4 (01 07 1923): 177, 182.

<sup>192</sup> Alexander and Holden, "A medieval grain-drying kiln and earlier mill-lade at Lhanbryde, Moray," 684.

just what was able to survive, this trend toward hulled oats started early, with much of the grain in the 12<sup>th</sup> century Lhanbryde kiln still retaining their hulls.<sup>193</sup> More often than not the oats were not found whole enough to tell whether they were hulled or not, but their remaining numbers suggest they were able to last over the centuries due to having their hulls.<sup>194</sup>

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<sup>193</sup> Ibid., 678-679, 681. The oats found in the 12th and 13th century remains of Inverness were either naked or stored after being hulled, but they are an outlier; Clare Ellis et al., "Excavation of two ditches and a medieval grain-drying kiln, Inverness, Highland," *Proceedings of the Society of Antiquaries of Scotland* 132 (2002): 431.

<sup>194</sup> Alexander, "Excavation of a grain-drying kiln and mill lade at Kettlestoun Mains, Linlithgow, West Lothian," 90; Sheila Boardman and Susan Ramsay, "5.2 The Charred Plant Remains from Mills Mount," in *Excavations within Edinburgh Castle in 1988-91*, ed. Stephen T. Driscoll and Peter A. Yeoman (Edinburgh: Society of the Antiquaries of Scotland, 1997), 191; John Lewis et al., "Excavations at the former Lauder Technical College," *Proceedings of the Society of Antiquaries of Scotland* 125 (1995): 1038; Colin Martin et al., "Medieval Roxburgh: a preliminary assessment of the burgh and locality," *Proceedings of the Society of Antiquaries of Scotland* 137 (2007); Stronach et al., "The medieval development of South Leith and the creation of Rotten Row," 414-415.



*Illustration 6 - Black Oats*



*Illustration 7 - Common Oats*



*Illustration 8 - Naked Oats*

In addition to oats being grown and processed alone, they could be grown along with other grains, such as in the form of dredge, which was a mixture of barley and oats.<sup>195</sup>

## Oatmeal

As with wheat, the processed form of oats' only difference from the original grain is that it has been milled. But this is where comparison to flour ends. Oats were frequently converted into oatmeal before being included in written accounts of bulk commodities. Oatmeal is also commonly referenced in payments, laws, and pricing.

This pricing for oatmeal was higher than that of oats, closer to the same level as barley and malt (but priced below wheat).<sup>196</sup> This price differential was because of costs associated with the processing done to mill oats into meal. It was not due to the price of milling *per se*, but rather because oatmeal was more densely packed and one measure of oatmeal required twice that measure in oats. *Changing Values* give the example of both an English manual of husbandry requiring two quarters of oats for one of oatmeal, and the Scottish chamberlain needing seventeen chalders of oats for eight and a half chalders of oatmeal in 1328.<sup>197</sup> There would be expected variations, depending on the level of coarseness in the grind, but the two to one ratio is an average against which to view the general price trends. Given that oatmeal was generally twice the price of the oats, it means the gained value was simply from having more grain in the same volume, rather than from the processing itself adding any value.<sup>198</sup> Of course this value fluctuated but it was often more from the differences in prices within regions, rather than oatmeal being valued at significantly more than oats. Gemmill and Mayhew argue that the relatively low prices for oatmeal compared to oats reflects the reality that oatmeal was more a staple food, that was sold to meet the needs of a single household, rather than in wholesale, and with prices regulated to keep within reach of the poor who would need it in their diets.<sup>199</sup> They additionally argue that oats were purchased by, for example, the royal household to feed its riding and pack horses, while oatmeal was being purchased as a dietary staple by those who could not afford more expensive grains, such as wheat.<sup>200</sup> Those who could pay the higher prices for oats, as well as those who likely had an immediate need, paid more than the average

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<sup>196</sup> The details of these prices will be discussed later.

<sup>197</sup> *Changing Values*, 200-201.

<sup>198</sup> The ratio on the prices can fluctuate drastically but it is in part due to the prices representing accounts from a wide variety of locations, individuals, and roles.

<sup>199</sup> *Changing Values*, 202.

<sup>200</sup> *Ibid.*, 201.



person. Not enough is written about the quality of the oats or oatmeal to know if the average oats being sold were of higher quality or if the price was based on market demand.

## Rye

Much of what is known about rye would suggest it should be a frequently grown product in Scotland and it grows well in the typical Scottish climate. It thrives in cooler temperatures than wheat and handles all weather conditions other than extreme heat.<sup>201</sup> Rye was also important elsewhere in Europe; indeed, Leonard and Martin argue that it was more important than wheat throughout the medieval period in Europe.<sup>202</sup>

Despite the reasons that would make rye an obvious choice for growing in Scotland in large quantities, there is no evidence to suggest that it was common and much more to prove that it was not. Rye only infrequently appears in Scottish rentals and legislation, to the extent that it seems to have never risen to a point of importance in Scotland and is instead generally seen as a secondary grain to the more common wheat, barley, and oats. The secondary role of rye is emphasised by it only being grown on its own about half the time, with it being just as likely to be instead grown with another type of grain. Growing grain in tandem was not unique to rye but rye can be generally seen as the secondary grain in these combinations. These combinations were common enough to warrant their own terminology, such as with rye and wheat which had the name of *maslin*, *mashlum*, or *masloche*, depending on context, the reason of which can only be speculated on and will be explored in more detail as they arise in the later discussions of brewing and baking.<sup>203</sup>

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<sup>201</sup> Leonard and Martin, *Cereal Crops*, 452.

<sup>202</sup> *Ibid.*, 284.

<sup>203</sup> These terms also refer to the combination of grains when grown separately and simply used together in products. The most notable reference to rye are in sixteenth century accounts for the victualling of ships. Not all of the accounts specify which type of bread they are sending, but a few mention using sour bread, which is said to be a mix of half rye and half wheat. *Treasurer Accts.*, IV.487, 488, 491, 493; Stone, "The Consumption of Field Crops in Late Medieval England," 13; Fenton, *The Food of the Scots*, 5, 258. As with other combinations of grains it will be discussed in more detail later.

## Growth

While rye was not a major crop in Scottish documents, it was clearly grown in Scotland. Rye may not have been a major part of the Medieval Scottish diet, but it was introduced as a crop into Scotland very early. Round-houses near Falkirk, dating from 1000-750 BCE, have remains of rye, along with the more expected wheat and barley.<sup>204</sup>

It is also important to acknowledge the flaws of relying on documentary evidence when trying to assert dietary trends. Use is not always best reflected in documentation. Without a comprehensive look at archaeological data, the best way to determine if the rye was perhaps more common is to look at land use. While no such estimate has been done for Scotland, an estimate of the grain output in England for 1300 suggests that rye and rye mixtures were grown on 19.1% of the national grain area. This number places it above the 16.7% for wheat and 16.2% for oats, but below the 48% for barley and barley mixes.<sup>205</sup> This data relates to a single 'snapshot' of English grain preferences, but it suggests that while rye was not a particularly popular grain in England, nevertheless it was grown on par with grains that are considered traditionally to be far more common. While these percentages would differ for Scotland, the climate is even better suited for rye and less suited for wheat. On that factor alone, it seems unlikely for rye to be grown less frequently in Scotland than in England. This study will not attempt to make any more detailed estimates here; it is an area worthy of further study in the future. The most important thing to gain from this is simply recognition that while rye has only been thought of as a very small portion of annual crops, it possibly had been grown on more land than grains being otherwise treated as more common.

Even if rye was grown more often than documentary evidence suggests, the lack of appearance in documents can be said to show that rye lacks prestige in the Scottish diet.<sup>206</sup> Also, without any physical evidence to contradict the documentary evidence, it is best to assume that rye was likely only as common as it seems from the limited recorded evidence, and to structure the

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<sup>204</sup> Fenton, *The Food of the Scots*, 5, 29.

<sup>205</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 21.

<sup>206</sup> The lack of prestige is in many ways not reflected in the price, which is not lower than other types of grains. However, the prices are infrequent enough for trends to not be reliable.

discussion around why it was not grown in larger quantities, without focusing too much on the alternative idea of it being more prevalent than assumed. It is easiest to argue the reason rye was not common arises from simply a cultural or even taste aversion to it. Rye requires no more processing than oats. Even now British consumers do not generally enjoy rye bread.<sup>207</sup> Food preference is complicated and is decided hugely by early exposure and social factors, none of which explain why a preference for rye over, say, oats, never developed in Scotland. This preference would also have manifested elsewhere in Britain and, as mentioned above, rye was grown over much of England. Cultural demand can be a single factor, but it is not enough to prevent the consumption of what could have been a very successful grain. Even if it was not immediate, times of dearth should have made rye more common; but it did not.

If you put aside the issues of preference, there were still viable reasons for people in medieval Scotland not to have made rye a main cereal. The first of these reasons is rye may have been more difficult to grow, or to harvest. Rye seems to have been a tougher plant than either oats or barley and required a stronger cutting implement.<sup>208</sup> This characteristic means it requires better equipment for harvesting, making rye a poor choice for farmers who were not used to traditionally growing it.

The next two reasons are related to each other. Firstly, rye is unique in that it is wind-pollinated rather than self-pollinating.<sup>209</sup> One side-effect of this is that farmers could not select seed-grains for a specific trait. This characteristic renders it more challenging, compared to other grains, to be guaranteed that any future plant would have the favourable traits being sought, since the wind-carried pollen could introduce less desirable genetic traits from outside your own fields. The widespread pollen enables wider growth because it allows for pollination of rye seeds that contaminated which grain was intended to be grown, or if some grains

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<sup>207</sup> *The Science of Bakery Products*, ed. W. P. Edwards (Cambridge: The Royal Society of Chemistry, 2007), 186.

<sup>208</sup> Bjørn Poulson, "Agricultural production and technology in the Netherlands, c. 1000-1500," in *Medieval Farming and Technology: The Impact of Agricultural Change in Northwest Europe*, ed. Grenville Astill and John Langdon (Leiden: Brill, 1997), 136.

<sup>209</sup> L. Moffett, "The Archaeology of Medieval Plant Foods," in *Food in Medieval England: Diet and Nutrition*, ed. C. M. Woolgar, D. Serjeantson, and T. Waldron (Oxford: Oxford University Press, 2006), 48.

remained from a previous rye harvest. This tendency for rye to spread may in part explain its presence in grain combinations, with it only playing a part because they simply could not prevent its growth. For the sake of transparency, the grain had to be marked as the mixed types of grain but was perhaps not intentionally grown that way.

The last reason for limits on producing rye rest in its connection to the fungus ergot and the disease of the same name that comes from it. One can also not ignore the idea of negative impact of the disease in the view of rye in Scotland. While the first written description of ergot was not until 1582 and its life cycle was not understood until 1853, this late identification does not mean ergot did not infect rye earlier.<sup>210</sup> Scotland's damp climate is well suited for the spread of ergot, a position observed as early as the late 16<sup>th</sup> century and the connection to a rainy spring followed by a warm summer was identified in the 17<sup>th</sup> century.<sup>211</sup> In both instances the ergot was simply seen as part of the grain that went bad due to water and was not understood as a separate organism. It was not seen as something that could affect rye (an infestation or contamination) but rather something that could happen to it (a condition). And it could also affect other grains around it. While the specific species of fungus (*Claviceps purpurea*) that infects rye can infect a variety of grains and grasses, including barley, oats, and wheat, its main association is with rye.<sup>212</sup> It was such a common part of a rye crop that it was thought to be a part of the rye plant itself until the 1850s.<sup>213</sup> The way in which ergot grows almost guarantees that it will be passed on to the next crop, as well as to the plants around it. The spores are spread by insects, wind, and rain early in their life cycle, and towards the end the mature fungus will both fall to the soil to rest before the next spring and end up being grown, along with the next year's crop.<sup>214</sup> Ergot poisoning was a major problem for centuries.

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<sup>210</sup> Frank James Bové, *The Story of Ergot* (Basel: Karger, 1970), 15, 26.

<sup>211</sup> W. E. Boyd, "Rye and ergot in the ancient history of Scotland," *Antiquity* 60 (01 03 1986): 46; Bové, *The Story of Ergot*.;

<sup>212</sup> Richard A. Shelby, "Toxicology of Ergot Alkaloids in Agriculture," in *Ergot: The Genus Claviceps*, ed. Vladimír Křen and Ladislav Cvak (Amsterdam: Harwood Academic Publishers, 2003), 478; Clyde M. Christensen, *Molds, Mushrooms, and Mycotoxins* (Minneapolis: University of Minnesota Press, 1975), 35.;

<sup>213</sup> "Ergot of Rye - I: Introduction and History," Syllabus: Botany 135: Magical Mushrooms and Mystical Molds, 2003, accessed 01 01, 2018, <http://www.botany.hawaii.edu/faculty/wong/BOT135/LECT12.HTM>.

<sup>214</sup> Leonard and Martin, *Cereal Crops*, 465.

Even into the 20<sup>th</sup> century, ergot was enough of a problem in rye that one U.S. market grades for rye included 'ergoty' as the lowest grade and defined it as having .3% ergot or higher.<sup>215</sup>

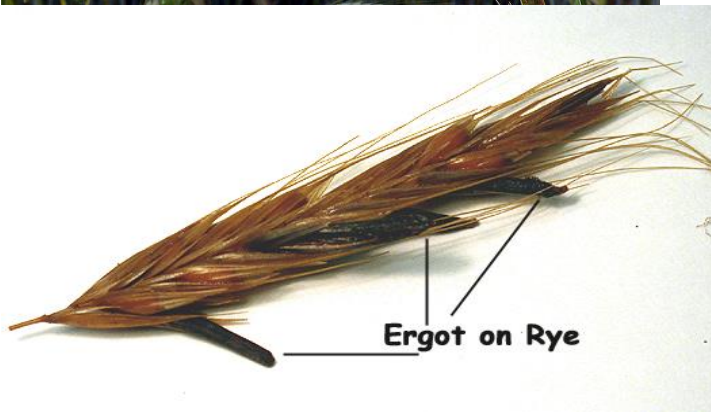
None of these factors can explain the lack of preference for rye, but when looked within the context of other factors they render it more understandable as to why the choice was made to not grow more of a simply unpopular food during famine. Rye being more prevalent elsewhere in Europe proves that the problems associated with rye were not always enough to deter its growth and consumption. Instead, it is meant to give alternative ideas from the narrative of preference.

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<sup>215</sup> Ibid., 463



*Illustration 9 - Rye*



*Illustration 10 - Ergot on Rye - <http://www.botany.hawaii.edu/faculty/wong/BOT135/LECT12.HTM>*



*Illustration 11 - Rye grains with ergot*

## *Peas/Beans*

While neither peas nor beans are grains, their use in breads in Scotland require them to be included in a discussion on baking in Scotland in the 15<sup>th</sup> century. Both peas and beans can be

grouped as either vegetables or grain, but early writings on agriculture sort both beans and peas under the heading of 'grain crops', along with items such as wheat and barley, rather than with 'green crops'.<sup>216</sup> While peas were grown by being sown directly on broken ground, beans required being pressed into the soil to grow, they were both spring sown.<sup>217</sup>

Both peas and beans were infrequent in accounts rendered at the exchequer, but it does not mean they were not vital enough to encourage their growth. This importance is highlighted in two 15<sup>th</sup> century enactments (1426, 1458) which required barons with land above a certain extent to grow at least a set amount of both peas and beans, along with an amount of wheat.<sup>218</sup> Given that traditionally easier to grow grains such as barley, oats, and rye were not included in the same legislations, the law was to promote grains that were needed but were not being grown. Wheat was an obvious choice for this type of legislation, as it was both challenging to grow and highly sought after, but neither peas nor beans have this same reputation.

Physical evidence for the growth of either peas or beans sparse. It is most likely due to something as simple as them not being common, but it is also important to remember that remains of both beans and peas were generally found infrequently, even when they otherwise would be present. It was because both the peas and beans were reportedly exposed to fire less frequently than other grains, thus leading to fewer charred remains to be found in excavations.<sup>219</sup> They were also generally grown on a small-scale, leading to less chance for the already not hardy remains to be found and identified<sup>220</sup>

## Peas

Peas were often divided by colour into green, white, black, and grey.<sup>221</sup> The physical evidence of which type was being cultivated does not survive so the only mentions of the colour comes from when it was specified in documents. While peas were effectively treated as grain, this

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<sup>216</sup> Fenton, *The Food of the Scots*, 5, 200.

<sup>217</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 13.

<sup>218</sup> *The Records of the Parliaments of Scotland to 1707*, 1426/39, 1458/3/29.

<sup>219</sup> Moffett, "The Archaeology of Medieval Plant Foods," 53.

<sup>220</sup> Coleman and Smith, "Archaeology of Burgage Plots," 311.

<sup>221</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 12.

status could also depend on the time of year they were harvested. The goal was to harvest in August or September, when they had dried in the pod.<sup>222</sup> Peas could also be harvested early in the season while still green, to be consumed fresh, but at least parts of England had rules limiting this so that most of the crop would be left to dry.<sup>223</sup> During especially challenging times there was always the option to eat the peas green, it was not seen as ideal. Green peas could be consumed in when in season but overall dried peas were preferred because they were easier to store for longer periods than would be viable when fresh and they could be used as needed.

## Beans

Even compared to peas, beans were an infrequently grown pulse, and were best suited for very clay-heavy soil.<sup>224</sup> This infrequency of sowing is paired with beans usually appearing along with other grains in lists of produce, rather than being present as a commodity. Beans were sometimes used in bread but were viewed as a poor substitute for other types of grain.<sup>225</sup>

From the discussion of the rest of the cereals and legumes of 15<sup>th</sup> century Scotland, it is clear that barley and wheat were not the only grains being consumed or used in brewing and baking. Oats, oatmeal, rye, peas, and beans all featured in the Scottish diet and understanding their roles is required to truly understand the brewing and baking of the time.

## Conclusion

At the start of this section it was said barley was an important cereal in 15<sup>th</sup> century Scotland, and after examining this claim more closely it has become even more of a true statement. Barley was available in several varieties, although which type was being grown could not

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<sup>222</sup> Christopher Dyer, "Garden and Garden Produce in the Later Middle Ages," in *Food in Medieval England: Diet and Nutrition*, ed. C. M. Woolgar, D. Serjeantson, and T. Waldron (Oxford: Oxford University Press, 2006), 36.

<sup>223</sup> Dyer, "Seasonal Patterns of Food Consumption in the Later Middle Ages," 214.

<sup>224</sup> Fenton, *The Food of the Scots*, 5, 201.

<sup>225</sup> Albala, *Eating Right in the Renaissance*, 198s.



always be told by physical evidence and the written records did not specify. It can just be said that all of the major varieties (two- and six-row, autumn- and spring-sown) were produced in Scotland, along with *bere* and the rest was decided by what was available. Malt's pairing with barley was justified as the closer one looked the more the two items became connected. The presence of oat malt in both the early 14<sup>th</sup> century and in the early sixteenth helped to emphasise how less valued they were, compared to barley malt. These occurrences of oat malt were both during times or at places in which the barley crop was both lacking and they were unable to obtain barley malt from elsewhere.

Wheat may not have been as common as barley in medieval Scotland, but it was still important enough to be worthy of study, especially when the overall research includes baking. It was more challenging to grow in the climate in Scotland, but attempts had been made to require its growth via legislation, such as a 1426 Parliamentary legislation which required that all agriculturalists tilling land over a certain extent should grow at least a firlot of wheat, as well as a set quantity of peas and beans or pay a fine of ten shillings for their failure to do so.<sup>226</sup> These fines were not to be taken lightly as taxes on a boll of wheat were set at two shillings or a variant law allowed for one boll of wheat to be taken in exchange for twelve pence of tax debt if not paid within fifteen days.<sup>227</sup> When these types of punishments were not enough incentive to meet obligations, there was enough demand to procure it from where it was produced.

While there were varieties of wheat based on seasonality (autumn/spring), protein content (both on variety and quality of gluten) and colour (red and white), the details of which were produced are even less certain than they were with barley. Instead, the varieties can still be discussed but only with the acknowledgement of basing the presumptions on limited knowledge. Scotland would have tended toward spring wheat as the cold winds during the winter would make spring sowing more likely.

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<sup>226</sup> *The Records of the Parliaments of Scotland to 1707*, 1426/39.

<sup>227</sup> *Ibid.*, 1424/25, 1424/29. The main version has a tax of two shilling per boll, but the variant law allowed for one boll of wheat to be taken in exchange for twelve pence of tax debt if paid within fifteen days.

Flour did not appear often in the records of bulk commodities as it was processed closer to the time of use rather than before it was used in payments. It put it more on a par with ground malt, which only appeared infrequently. Oats were the most prevalent grain in 15<sup>th</sup> century Scotland, but their dual use as both human food and animal feed best places it later in a discussion of grains meant to support work on the topics of brewing and baking.

Even with both low prestige and low pricing, oats were a common grain. Based on their high level of appearances in the documentary evidence compared to the other grains, oats were the most important of those discussed in this chapter, if not all of those being grown in general. Oats did not always feature in brewing and baking, but they were too important to neglect mentioning, even when they were not always used for the studied final products.<sup>228</sup> The changing prices and laws regarding both oats and oatmeal reflected both the changing value of the currency and the importance of oats that was also expressed in their presence in the documents. They generally thrive in Scotland, even with the changing climate of the 15<sup>th</sup> century. As with other grains, varieties of oats were common. For oats that means a variety of colours, as well as if the individual grains were 'hulled' or 'naked'. With the establishment of how essential oats were in medieval Scotland, the variety which had been grown in the forms of those of different colours of hull vs if they were hulled or naked helps emphasise how oats were able to cope by having different features which worked well in different environments.

Rye was an infrequent grain in the documentation of medieval Scotland but was possibly grown more than it was reported. It was hardy and, if grown in greater quantities, would have done well within the climate of Scotland, but it was not held in high enough esteem to be popular. The reason may have been simply preference, but ergot could have played a role in why people were wary of consuming rye, although not enough to prevent its use entirely.

The legumes that played a dual role as a cereal product were very infrequent in the pricing of medieval Scotland, even compared to rye. Peas were not necessarily desirable in baking but still important enough to mention. They had often been paired together in accounts, which is why

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<sup>228</sup> Their use in brewing and baking will be discussed as needed in the chapters on brewing and baking.

they were examined together. The main advantage of these plants was that they could be more easily consumed green if they were needed earlier in the season, although it had been discouraged as it would only postpone the dearth to later in the season.<sup>229</sup>

Having now covered the foundations about both the established academic oeuvre around similar topics to this work as well as the basics of the grains produced in Scotland, the focus will move onto the primary discussion around 15<sup>th</sup> century Scottish brewing and baking. The main unique findings within these topics require the background information but only serve to put the later chapters within a context.

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<sup>229</sup> This is never stated but consuming food stuffs meant for long term storage only delays the timing of a lack of food, rather than solving it.

## Chapter 3: Ale is the Wor(s)t: Brewing in Medieval Scotland

All the work thus far has been to establish background knowledge that allows for better context of the more specialised discussions around 15<sup>th</sup> century brewing and baking. This is not the only information required to best understand the political and environmental setting, but this work will not include that type of detailed narrative. It is already well-tread enough to not be able to add new insight into the discussion without spending more space than would be viable for this work. Instead, refer to Chapter 1: Introduction for an overview of the main studies done by others and their overall positioning in the established academic oeuvre.

### *Introduction*

The origins of settled agricultural communities can be said to be built on ale and bread. Alcoholic beverages are seen primarily as a treat now but were commonly paired with bread as a necessary part of daily diet in premodern society. Studies outside Scotland suggest that up to half of the households in a medieval urban community could have been involved in the production of ale, both for their own use and to sell to augment household income; a similar trend was almost certainly common in Scotland as well.<sup>230</sup> Brewing was a large source of demand on the grain supplies of a town, with 25-45% of consumption being through brewing needs; more rural areas likely had similar levels.<sup>231</sup> Much was done to facilitate brewing to meet demand, including quasi-legal encouragement for women to brew year-round rather than only occasionally.<sup>232</sup> The assize (fee) associated with ale was set low to encourage people to brew, although these prices are specific to Aberdeen and other burghs were able to set theirs at

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<sup>230</sup> Ewan, "For Whatever Ales Ye," 129.

<sup>231</sup> Franz G. Meussdoerffer, "A Comprehensive History of Beer Brewing," in *Handbook of Brewing: Process, Technology, Markets*, ed. Hans Michael Eßlinger (Weinheim: Wiley, 2009), 14-15.

<sup>232</sup> Ewan, "Mons Meg and Merchant Megs," 137.

higher rates.<sup>233</sup>

Many things make brewing unique in society. It was a domestic 'industry' and accessible to those from a variety of backgrounds, while still being heavily regulated to maintain standards. It was produced at home but sold and traded within a market system. Even in the later middle ages, when there was a tendency toward more formal charters or incorporation of crafts, brewing remained a business accessible to almost all (making it referred to as an 'unfree craft'), and was so widespread as to be the one in respect of which most convictions were made.<sup>234</sup>

When women, especially widows, were not traditionally in paid work, it was a way for them to make money and be a productive part of the economy. It was a flexible occupation which allowed women to brew for profit when they needed to, without being forced into it as their only craft.<sup>235</sup>

Brewing was also an easy market to enter as even in the 18<sup>th</sup> and early 19<sup>th</sup> centuries the cost of entry was low compared to other sectors, with half of the Scottish brewing industry being funded at that time with an original investment of less than £250, which was a lot compared to the income of a household but low for the creation of a new business.<sup>236</sup> Despite this relatively low cost of entry, it was a market that was available even in the worst of times.<sup>237</sup> Most of the expenses of brewing were related to stock, which could be purchased on credit, while the resulting material would usually be sold for cash.<sup>238</sup> When brewers had to accept credit they only had to extend it once and could deny further credit to a person if they defaulted on their

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<sup>233</sup> Gemmill and Mayhew, *Changing Values*, 53.

<sup>234</sup> Harold Booton, "The Craftsmen of Aberdeen Between 1400 and 1550," *Northern Scotland* 13 (First Series) (1993): 8.

<sup>235</sup> Ewan, "For Whatever Ales Ye," 128-129.

<sup>236</sup> Ian Donnachie, "Sources of Capital and Capitalization in the Scottish Brewing Industry, C 1750-1830," *The Economic History Review* 30 (New Series) (2) (1977): 282.

<sup>237</sup> *Ibid.*, 270.

<sup>238</sup> *Ibid.*, 282-283; Ewan, "For Whatever Ales Ye," 127.,

payments.<sup>239</sup>

## *The Differences between Ale and Beer: a history*

It is important to clarify the medieval difference between beer and ale, as the meanings of these terms have changed over time. 20<sup>th</sup> and 21<sup>st</sup> century craft beer uses 'beer' as a catch-all term for any brewed product made from malted barley with hops, with 'ale' defined as a specific type of beer that is distinguished by the type of yeast used during fermentation. In the 18<sup>th</sup> century, however, ale seems simply to contain fewer hops than beer and was perhaps a generally weaker beverage.<sup>240</sup> Neither of these definitions match the medieval terms, which instead define ale as a fermented beverage made from malted grain, and further define beer as the same thing but with the addition of hops.<sup>241</sup>

With these terms defined as a medieval person would understand them, both can be discussed in detail. Ale was very old. It varied in style over time but the earliest provable sources referring to it were in ancient Mesopotamia and Egypt.<sup>242</sup> With variations, ale was being produced everywhere in Europe well before the 13<sup>th</sup> century.<sup>243</sup> The spread of beer into

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<sup>239</sup> Donnachie, "Sources of Capital and Capitalization in the Scottish Brewing Industry, C 1750-1830," 282-283; Ewan, "For Whatever Ales Ye," 127.

<sup>240</sup> Anonymous, *London and County Brewer*, 103.

<sup>241</sup> \_ "Was It Ever Gruit Britain? The Herb Ale Tradition," 2014, accessed 03/01, 2014,

[http://zythophile.co.uk/2014/02/28/was-it-ever-gruit-britain-the-](http://zythophile.co.uk/2014/02/28/was-it-ever-gruit-britain-the-herb-ale-tradition/)

[herb-ale-tradition/](http://zythophile.co.uk/2014/02/28/was-it-ever-gruit-britain-the-herb-ale-tradition/).Quote: In Britain, on the other hand, there is a great deal to suggest that much, if not most medieval ale (using the word in its original sense of "unhopped malt liquor") was brewed without herbs, as well as without hops: to give just one piece of evidence, in 1483 (the year Richard III seized the throne), London's ale brewers, who were trying to maintain the difference between (unhopped) ale and (hopped) beer, persuaded the authorities to state that for ale to be brewed in "the good and wholesome manner of bruying of ale of old tyme used", no one should "put in any ale or licour [water] whereof ale shal be made or in the wirkyng and bruying of any maner of ale any hoppes, herbes or other like thing but only licour, malt and yeste." So: London ale in the Middle Ages – no hops, no herbs.

<sup>242</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 15.

<sup>243</sup> Beer was a far more modern invention. Brewers in northern Germany started regularly to make hopped beer in the early thirteenth century. By the 1320s and 1330s beer had become preferred over ale in Germany. The reason Germany, in particular, adopted hops so readily is unclear but the practice had started in monasteries, where they wanted to make a product in bulk quantities with a longer shelf-life, to reduce the frequency with which brewing needed to

Scotland came with the extension of a beer-brewing industry from central Europe. Beer may have reached the British Isles in general by the 10<sup>th</sup> century but the earliest surviving records of it in Scotland were in the *ER* for 1374-5, when it was recorded as being imported from Germany. It is, though, likely that it had been introduced in the 13<sup>th</sup> century, with demand for it in Scotland's newly-founded royal burghs being met from England and the near continent.<sup>244</sup> The beer in the 14<sup>th</sup> century was referred to as being from Hamburg, although it did not guarantee it was brewed there, as at some point before that date 'Hamburg beer' had become the generic name for any hopped beer.<sup>245</sup> Imports apart, the later 14<sup>th</sup> and 15<sup>th</sup> centuries were still within the era of ale's prevalence in Scotland. Even in the 17<sup>th</sup> century, a French visitor to Scotland noted that ale was far more common than beer, as well as being cheaper.<sup>246</sup>

## Brew(st)ers

Legislation, both local burgh laws and parliamentary acts, regulated who could sell ale, as well

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be done. Hop use also spread to Flanders, and both the Flemish and Germans were able to prosper, with the help of selling hopped beer. John R Edwardson, "Hops: Their Botany, Production and Utilization," *Economic Biology* 6, no. 2 (1952); Rod Phillips, *Alcohol: A History* (Chapel Hill, NC: University of North Carolina Press, 2014); Unger, *Beer in the Middle Ages and the Renaissance*, 57.

<sup>244</sup> *ER*, IV-XIII, II.cii; McNeill, *The Scots Cellar*, 1; "People of Medieval Scotland: 1093–1371", 2019, 2021, [www.poms.ac.uk](http://www.poms.ac.uk). H5/3/0, H1/52/5

<sup>245</sup> *ER*, IV-XIII, I.451; Unger, *A History of Brewing in Holland, 900-1900*, 27.

<sup>246</sup> Evidence exists for beer production in medieval Scotland, but it is very limited. The 1370s was a time in which the beer industry in areas with an established beer tradition was starting to expand, but it was clear it had not become common in Scotland. Even in the fifteenth century beer in Scotland was generally either imported from Germany or had been brewed by foreigners. It is never specified where foreigners were obtaining the hops, although they may have carried them with them or personally paid for them to be imported. There were sporadic references to beer in the *ER* from this point on, but still far less frequently than references to ale. While the adoption of beer in England slowly rose through the fifteenth century, with more native-born beer-brewers by the 1520s, beer, by contrast, did not seem to have become popular in Scotland before the mid-sixteenth century. There is no evidence of outright hostility toward hops and beer, but an absence of overt negativity did not mean fast adoption. In many ways, the backlash against hops elsewhere shows the popularity more than examples of beer-brewers. Reactionary movements against change reflect a tipping point in mentality, where those responding are afraid that change will be inevitable if they do not stop it. The reason for the slow transformation was likely in the additional processing and ingredients, rather than anything cultural. Hops simply were not adopted in Scotland as quickly as elsewhere and were not mentioned in the Records of the Parliaments of Scotland until 1661. One potential factor

as where it could be sold. Those in some positions of authority, such as aldermen, bailies, or beadles (inferior officer at court) were prohibited from brewing as early as the 12<sup>th</sup> century.<sup>247</sup> It was perhaps their duties as judges and policers of brewers that was the main reason for preventing bailies brewing, as they could not be expected to judge themselves fairly. If they did sell despite these rules, they were to have their indiscretions reported to the royal chamberlain, whose itinerant court would have dealt with reported transgressors.<sup>248</sup> These same regulations were restated in the 14<sup>th</sup> century, showing their continued importance in keeping access to the brewing industry fair.<sup>249</sup> Other than the unfair advantage of selling when one was in a position of power, the judgement on failed brewers and bakers was also done by bailies.<sup>250</sup> The bailies were also to set the assize on ale, as well as how often brewsters were to be fined if they broke any regulations.<sup>251</sup>

These rules were not just to keep those in positions of authority out of brewing. Slightly after the period under examination here, in 1530 in Edinburgh, it was ordained that no servant woman was to leave her position to become a brewer without the permission of the provost.<sup>252</sup> Another slightly later ruling declared further that only freemen, a wife of a freeman, widows, and honest persons approved by the provost and bailies should brew or serve ale.<sup>253</sup> Yet another council enactment prohibited those who were not registered as a brewer from brewing or

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was that hops do not grow well in Scotland. If the hops would not grow domestically, it meant they would need to be imported, thereby adding to costs. *Early Travellers in Scotland*, ed. Peter Hume Brown (Edinburgh: David Douglas, 1891), 228; Scotland Treasurer, *Accounts of the Lord High Treasurer*, ed. Thomas Dickson and James Balfour Paul, vol. I-VI (Edinburgh: H. M. General Register House, 1877-1903), I.ccxii; Unger, *A History of Brewing in Holland, 900-1900*, 28; Mavis E Mate, *Trade and Economic Developments, 1450-1550: The Experience of Kent, Surrey and Sussex* (Woodbridge: The Boydell Press, 2006); Albalá, *Eating Right in the Renaissance; The Records of the Parliaments of Scotland to 1707*.

<sup>247</sup> *Ancient Burgh Laws*, 28.; Elizabeth L. Ewan, *Townlife in Fourteenth-Century Scotland* (Edinburgh: Edinburgh University Press, 1990), 43.

<sup>248</sup> *Ancient Burgh Laws*, 117.

<sup>249</sup> *Ibid.*, 136-137; Ewan, *Townlife in Fourteenth-Century Scotland*, 43.

<sup>250</sup> *Ancient Burgh Laws*, 115, 117.

<sup>251</sup> *Ibid.*, 115, 158.

<sup>252</sup> *Edinburgh Burgh Recs.*, 1, vII 27.

<sup>253</sup> *Ibid.*, vII 40.



selling ale.<sup>254</sup>

But then who was brewing? The simplest answer was women, but not all women and not under all circumstances. Sanderson asserted that brewing was the work of married women and widows.<sup>255</sup> While brewers were often referred to as “she”, there were times when brewsters were simply referred to by the title “brewster” and other times they got the title of brewster-wives, brewer wives, or ale wives.<sup>256</sup> Not all women were allowed to brew equally and only free brewsters were allowed to brew the best, while unfree women were expected to sell for a lower price.<sup>257</sup> In this context, free refers to having all of the rights and freedoms of the burgh and one of these was considered the more unrestricted access to the brewing craft.<sup>258</sup> While the term ‘wives’ may not have been intended to exclude them, single women, or as Sanderson clarifies, unmarried women, do not frequently appear in the work of historians or in the original source documents.<sup>259</sup> In lists of brewers in Aberdeen in 1474 and 1509, Dundee in the early 1520s, and Dunfermline 1490-1521, only Dunfermline listed more women as either single or of indeterminate status rather than married.<sup>260</sup>

One did not need to be married to brew and sell ale, but it clearly helped enough to make them more present in records. Many reasons are assumed for this preponderance towards the married, falling under three main headings: financial, lack of legal rights, and the need for general help when brewing. The first of the reasons unmarried women did not brew was because unmarried women tended to be poorer, both in cash terms and in their ability to obtain credit.<sup>261</sup> Secondly, burgh authorities preferred it when the brewers were married women who were brewing as a part time addition to household income rather than single

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<sup>254</sup> Ibid., vII 117.

<sup>255</sup> Sanderson, *A Kindly Place?*, 110.

<sup>256</sup> Ewan, "For Whatever Ales Ye," 125.

<sup>257</sup> Mayhew, "The Brewsters of Aberdeen in 1509," 79.

<sup>258</sup> Cathryn Spence, *Women, Credit, and Debt in Early Modern Scotland* (Manchester: Manchester University Press, 2016).

<sup>259</sup> Sanderson, *A Kindly Place?*, 124.

<sup>260</sup> Ewan, "For Whatever Ales Ye," 129; Fenton, *The Food of the Scots*, 5, 82; Spence, *Women, Credit, and Debt in Early Modern Scotland*.

<sup>261</sup> Bennett, *Ale, Beer and Brewsters*, 53.

women living on their own.<sup>262</sup> They encouraged women to join households, even as servants, rather than to live alone.<sup>263</sup> Women from all walks of life did still seem to brew, but Edinburgh tried to impose restrictions such as in trying to reserve the brewing and selling of ale to freemen, their wives and their widows, unless they had a license and then changing this in 1546 to requiring brewsters be married or widowed.<sup>264</sup> The preponderance towards married women may also have been due to requiring several members of a household to deliver easily all of the tasks required for brewing.<sup>265</sup>

Women were expected to be able to brew (presumably whether they ever sold any ale or not).<sup>266</sup> And those who brewed did not do so consistently, instead having other activities to take up the rest of their year.<sup>267</sup> This sporadic brewing was emphasised with laws separating brewers into those who regularly brewed, brewed for half the year, or brewed three times per year or fewer.<sup>268</sup> Ale-brewing was not entirely dominated by women, but it was still largely so through the 15<sup>th</sup> century and into the sixteenth. Brewing became a way for women to participate actively in the economy and make money for their households. It was also a way to own and pass property to their heirs in their own right. Women could pass down equipment to other women, such as Isobel Strachan in Edinburgh in 1590, who left her brewing cauldron to another female brewster.<sup>269</sup>

The links between ale and women and of beer and men were related to each other. In England the rise of hopped beer rose concurrently with both the increased production in larger brew-houses and the rise of men in the business of brewing.<sup>270</sup> The switch to brewing being more male-dominated was because it required additional capital for more equipment. The increase of commercial production in most of mainland Europe and in England came with a switch to beer

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<sup>262</sup> Ewan, "For Whatever Ales Ye," 130.

<sup>263</sup> Ewan, "Mons Meg and Merchant Megs," 132.

<sup>264</sup> Ewan, "For Whatever Ales Ye," 130.

<sup>265</sup> *Ibid.*, 129.

<sup>266</sup> *Ibid.*, 128.

<sup>267</sup> *Ibid.*, 129.

<sup>268</sup> *Ibid.*,

<sup>269</sup> Sanderson, *A Kindly Place?*, 59. via Edinburgh testaments CC8/8/1, fo 370v

<sup>270</sup> Ewan, "For Whatever Ales Ye," 131; Mate, *Trade and Economic Developments, 1450-1550: The Experience of Kent, Surrey and Sussex*.

from ale, which allowed for a longer lasting product that could be made less frequently.<sup>271</sup> Scotland did not seem to have experienced this increase in beer making, leading to a craft that was run by women far longer than in England.<sup>272</sup> The absence of a switch to beer and the gender change that accompanies it is also marked by an absence of references to hops in contemporary Scottish written records and that beer was almost always being imported into Scotland when it is mentioned.<sup>273</sup> Despite this, it was quite clear that the brewing industry in Scotland was changing in the late medieval period. James I required that inns provide access to both bread and ale at a reasonable price.<sup>274</sup> Later, alehouses and brewhouses, which indicated specialised brewing places rather than the products of at-home brewing being sold at market, started to appear in the Exchequer Rolls at the beginning of the 16<sup>th</sup> century. It was still not until the creation of the Society of Brewers in Edinburgh in 1596 that the beer industry in Scotland became professional, and even then, it probably did not make huge changes to women's role in brewing.<sup>275</sup> It was not until 1655, outside the range of this study, that records in Aberdeen show male-domination in the brewing industry.<sup>276</sup>

## Quantity<sup>277</sup>

The scale of production was small compared to modern levels, but it still varied greatly

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<sup>271</sup> Ewan, "For Whatever Ales Ye," 132.

<sup>272</sup> Elizabeth L. Ewan, "A New Trumpet? The History of Women in Scotland 1300-1700.," *History Compass* 7, no. 2 (2009): 434.

<sup>273</sup> Ewan, "For Whatever Ales Ye," 132.

<sup>274</sup> *The Records of the Parliaments of Scotland to 1707*, 1424/23.

<sup>275</sup> Ewan, "For Whatever Ales Ye," 132.

<sup>276</sup> Mayhew, "The Brewsters of Aberdeen in 1509," 78.

<sup>277</sup> When amounts were not always stated, it was possible to determine ale production through use of the price of ale and total expenses. While prices changed with time, averages can be looked at in relation to contemporary works to gauge production. A fragment of laws remaining from 1295 stated that ale sold from Michaelmas (29 September) to Easter was to be sold at up to one penny per gallon, while that sold from Easter to Michaelmas was set at up to two pennies. The exact reasoning is unstated, but the first pricing was closer to harvest time than the latter, meaning grain was generally more abundant and therefore more affordable. Prices were a thing of contention, both because of the attempts to get around legislation regarding the prices (the laws will be discussed below) and because the prices set by law may not have been fair to brewers. There were so many instances of individual brewers being punished for selling ale at too high a price that it shows inflation, likely in the cost of materials

between individual brewers and households. There were various levels of product, which included professionals and those who worked on 'brewland' in return for brewing for an estate's lord, as well as domestic brewers who would brew in addition to other household jobs.<sup>278</sup> The split between these two kinds of brewers makes accurate reports on ale production difficult, especially in respect of domestic brewers.

Both the *ER* and *TA* contained mentions of quantities of ale and beer.<sup>279</sup> The figure below included a comprehensive list of references to ale and beer in both series of documents.

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but not in the allowed selling price. Instances in which brewers and bakers set the prices especially high were in October 1482 and 1483, which was when there was especially bad inflation. The implication is that the allowed prices were not changed to keep pace with the extreme debasement of the currency that was happening at this time. Despite the records of punishment for not following the required prices, the prices were difficult to enforce as ale was sold all over the town and not just in markets.<sup>277</sup> As prices were set by law, it is important to note the difference between the prices people were meant to be charging and what they were caught charging.

Even without the short shelf life of ale, transportation options were limited as the high water-content made it far more challenging to ship than the grains used to make it. For each 100 kilometres travelled, it was estimated that another 25-75% of the price was added in transportation costs. *Ancient Burgh Laws*, 181; Booton, "The Craftsmen of Aberdeen Between 1400 and 1550," 8, 14; Ewan, "For Whatever Ales Ye," 131; Unger, *A History of Brewing in Holland, 900-1900*, 27.

<sup>278</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>279</sup> A few terms were used for the measurements of ale and beer. As with many historical methods of measurement, the definitions can never be certain as the various sources deliver different numbers, but general comparisons can be made. It is important to ensure neither to mistake English definitions nor more modern ones for those used in medieval Scotland because many of them are still in use. This included puncheons, which are described as 500-600 litres (110-132 gallons) in a modern context but are closer to 16 or 18 gallons in medieval sources such as the *Treasurer's Accounts*. For this study the gallon will be considered the base measurement from which the other measures should be based. Starting from smallest and ending at largest, the order was pint (1/8g), can (1/4g), gallon, rubbour (1.67g), barrel (10-12g), puncheon (16-18g), pipe (36-38g), tun (72g), and last (120-144g). Casks did not seem to have enough consistency in size to be estimated in terms of gallons. Also, despite viewing these in terms of gallons, the pint was declared to be the standard in Scotland in 1458. Gemmill and Mayhew, *Changing Values*, 9, 67, 387, 394, 396-397, 400, 402, 409; Connor and Simpson, *Weights and Measures in Scotland*, 289; Henry H. Work, *Wood, Whiskey and Wine: A History of Barrels* (London: Reaktion Books, Ltd., 2014), 9, 67; *The Records of the Parliaments of Scotland to 1707*, 1458/3/19.

Without specific knowledge of the number of people being provided for by these amounts, and for how long, the numbers do not indicate much other than how much ale or beer could be provided and moved at one time. The amounts do not regularly go up over time. The only trend matches that within the documents in general, in that they become more regular in the 15<sup>th</sup> and 16<sup>th</sup> centuries compared to earlier records.

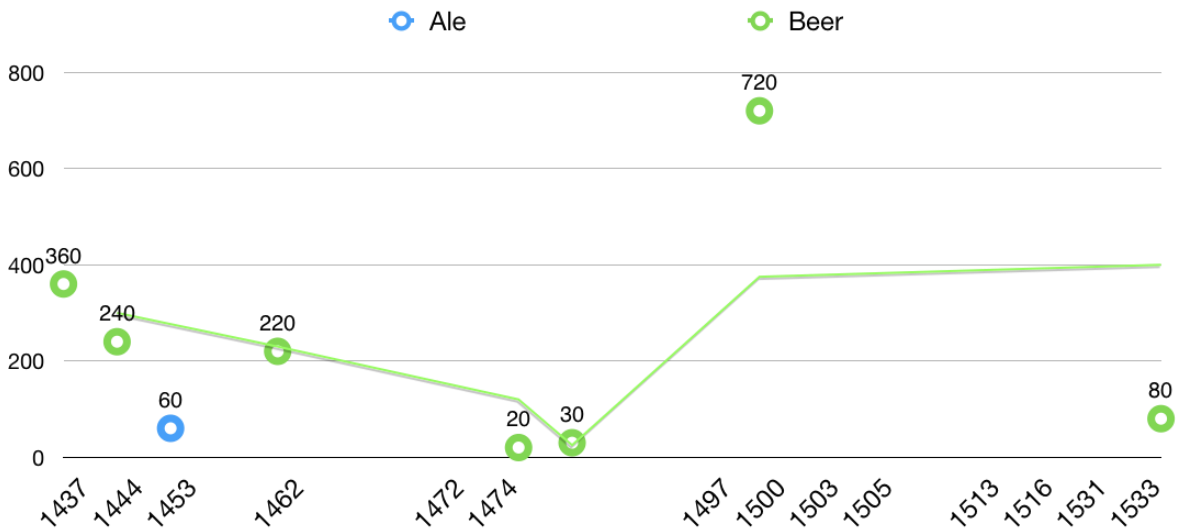


Chart 1 – Ale and beer in accounts of Customars of Edinburgh, gallons, by year

Source: ER

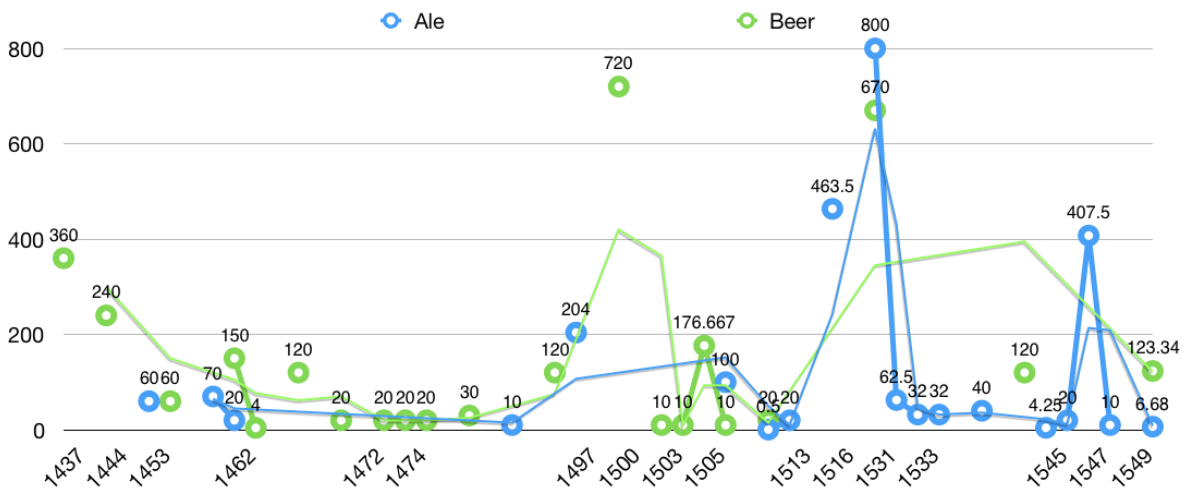


Chart 2 – Ale and beer in accounts (minus the Clerk of Liverance), annual average, gallons, by

year

Sources: ER, TA

Table 2 – Ale and Beer Quantities.

Sources: ER, TA. Conversion row computed at .25 gallons per can, 1.67 gallons per rubbour, 10 gallons per barrel, 16 gallons per puncheon, 36 gallons per pipe, 72 gallons per tun, and 120 gallons per last.

<i>Year</i>	<i>Person</i>	<i>Type</i>	<i>Amount</i>	<i>Converted Amount</i>	<i>Source</i>
1437	Custumars of Edinburgh	beer - German	3 lasts	360 gallons	ER V.36
1444	Custumars of Edinburgh	beer	2 lasts	240 gallons	ER V.613
1453	Custumars of Edinburgh	ale	6 barrels	60 gallons	ER V.551
1454	Simn Huddoune	beer	6 barrels	60 gallons	ER V.613
1456	Custumars of Edinburgh	beer - German			ER VI.114
1456	Custumars of Edinburgh	beer - Prussian			ER VI.117
1456	Custumars of Edinburgh	beer - German			ER VI.118
1456	Custumars of Edinburgh	beer - German			ER V.118
1461	Methven	ale	7 barrels	70 gallons	ER VII.3
1461	Custumars of Dundee	ale	7 barrels	70 gallons	ER VII.29

Table 2 – Ale and Beer Quantities.

Sources: ER, TA. Conversion row computed at .25 gallons per can, 1.67 gallons per rubbour, 10 gallons per barrel, 16 gallons per puncheon, 36 gallons per pipe, 72 gallons per tun, and 120 gallons per last.

<i>Year</i>	<i>Person</i>	<i>Type</i>	<i>Amount</i>	<i>Converted Amount</i>	<i>Source</i>
1462	Queen's Chamberlain	beer - German	8 barrels	80 gallons	ER VII.60
1462	Custumars of Aberdeen	ale	20 gallons	20 gallons	ER VII.143
1462	Custumars of Edinburgh	beer	22 barrels	220 gallons	ER VII.150
1463	Queen's Stewart	beer	4 gallons	4 gallons	ER VII.228
1468	Custumars of Cupar	beer	12 barrels	120 gallons	ER VII.586
1471	Custumars of English goods at Leith	beer	2 barrels	20 gallons	ER VIII.137
1473	Custumars of English goods and others exported and imported	beer	2 barrels	20 gallons	ER VIII.199
1474	Custumars of English goods and others exported and imported	beer	2 barrels	20 gallons	ER VIII.255
1475	Custumars of Edinburgh	beer	2 barrels	20 gallons	ER VIII.313
1478	Custumars of North Berwick	beer - English			ER VIII.542

Table 2 – Ale and Beer Quantities.

Sources: ER, TA. Conversion row computed at .25 gallons per can, 1.67 gallons per rubbour, 10 gallons per barrel, 16 gallons per puncheon, 36 gallons per pipe, 72 gallons per tun, and 120 gallons per last.

<i>Year</i>	<i>Person</i>	<i>Type</i>	<i>Amount</i>	<i>Converted Amount</i>	<i>Source</i>
1483	Custumars of Edinburgh	beer	3 barrels	30 gallons	ER IX.221
1488	Sir William Knolls	ale	1 barrel	10 gallons	TA I.88
1496	George Schaw	beer	1 last	120 gallons	TA I.284
1497	Chamberlain of Fife	ale - for ships	8 pipes	288 gallons	ER XI.43
1497	George Schaw	ale	9 casks, 1/3 tun		TA I.343
1497	George Schaw	ale	1 cask		TA I.344
1497	George Schaw	ale	12 barrels	120 gallons	TA I.382
1500	Custumars of Edinburgh	beer	6 barrels	60 gallons	ER XI.233
1500	Custumars of Edinburgh	beer	1 last	120 gallons	ER XI.234
1500	Custumars of Edinburgh	beer			ER XI.235
1500	Custumars of Edinburgh	beer - German			ER XI.235
1500	Custumars of Edinburgh	beer	7 barrels	70 gallons	ER XI.235
1500	Custumars of Edinburgh	beer	3 lasts, 11 barrels	470 gallons	ER XI.235
1503	David Beaton	beer	1 barrel	10 gallons	TA II.256



Table 2 – Ale and Beer Quantities.

Sources: ER, TA. Conversion row computed at .25 gallons per can, 1.67 gallons per rubbour, 10 gallons per barrel, 16 gallons per puncheon, 36 gallons per pipe, 72 gallons per tun, and 120 gallons per last.

<i>Year</i>	<i>Person</i>	<i>Type</i>	<i>Amount</i>	<i>Converted Amount</i>	<i>Source</i>
1504	David Beaton	beer	1 barrel	10 gallons	TA II.261
1505	Chamberlain of Fife	beer	4 barrels	40 gallons	ER XII.280
1505	Chamberlain of Stirling	beer	4 lasts	480 gallons	ER XII.335
1505	Customars of Edinburgh	beer	1 last, 2 lastarum		ER XII.372
1505	David Beaton	beer	1 barrel	10 gallons	TA II.268
1506	Chamberlain of Moray	ale	100 gallons	100 gallons	ER XII.396
1506	James Beaton	beer	1 barrel	10 gallons	TA III.58
1507	Customars of Aberdeen	beer			ER XII.600
1507	James Beaton	beer			TA III.280
1508	Comptroller	beer - Einisbeir	1 large vessel		ER XIII.123
1512	Andrew Stewart	beer - for ships	2 barrels	20 gallons	TA IV.304

Table 2 – Ale and Beer Quantities.

Sources: ER, TA. Conversion row computed at .25 gallons per can, 1.67 gallons per rubbour, 10 gallons per barrel, 16 gallons per puncheon, 36 gallons per pipe, 72 gallons per tun, and 120 gallons per last.

Year	Person	Type	Amount	Converted Amount	Source
1512	Andrew Stewart	ale	2 cans	.5 gallons	TA IV.326
1513	Chamberlain of Ross	ale - for ships	2 barrels	20 gallons	ER XIII.512

To put this in perspective against more modern craft beer production, the Brewer's Association defines a modern small brewery as one that makes 6,000,000 barrels or fewer per year and a microbrewery as one that produces 15,000 barrels (1,760,000 litres, or around 396,000 imperial gallons) or fewer per year.<sup>280</sup> In comparison, the largest volume of either ale or beer in a single account in medieval Scotland is under 10,000 gallons.<sup>281</sup> Even that quantity was significantly larger than the average amount in any account. In many ways this placed medieval Scottish brewers' batch sizes more on a par with modern homebrewers. The exact size of each batch would have depended on the scale of the individual brewing place. Fenton notes the existence of one seventeen-gallon brewing vat in 1491 and a twenty-gallon brewing vat in 1529.<sup>282</sup>

There were places where the amount of ale produced/consumed per day was known. It is important to note that getting more ale per day does not always mean that someone was getting more of the same ale, and that it can be thought generally that when ale quantities were highest they may have been the weakest type of ale.<sup>283</sup> Many of the existing totals are for England but these appear to match with known trends in Scotland. To start, the records of a

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<sup>280</sup> "Insights and Analysis," 2018, accessed 15/5, 2018, <https://www.brewersassociation.org/category/insights/>.

<sup>281</sup> ER, IV-XIII, II.451.

<sup>282</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>283</sup> *Ibid.*,

few great households in England can be used to estimate household size based on quantity of ale, as eight pints (one gallon) per day was generally allotted per person, although it was noted that two different qualities were listed.<sup>284</sup> Monks in Westminster Abbey were allowed the same eight pints (one gallon) per day.<sup>285</sup> In 1341 workers received five pints of strong ale per day, which rose by the early 15<sup>th</sup> century to get six pints of the best ale or one gallon (eight pints) of weaker ale.<sup>286</sup> The difference in consumption was noted by class as ale consumption differs for workers. Daily allotments of ale were not unique to England, and several examples exist for Scotland. In 1485 at the College of Our Good Lord in Glasgow the standard was four pints (one half gallon), of “good ale” per day.<sup>287</sup> This allotment of ale was shared over many classes, including each brother in Coupar Angus Abbey being granted two quarts of ale per day in 1553.<sup>288</sup> The trend towards being granted high amounts of ale continued as through the 1560s and 1570s stewards could get anywhere between 1 and 1½ pints per day.<sup>289</sup> Even in the 18<sup>th</sup> century people were getting as much as 2.1 imperial pints per day as part of their wages.<sup>290</sup>

This ale made up a very vital part of people’s diets. A professed priest in Coldingham in 1540 could gain 25% of his daily calories from ale, but a daily rural labourer at the same date only obtained 4% of his calories per day from ale.<sup>291</sup> Even after 1550 the patterns of calories derived from consuming ale were high. Accounts from 1739 at Gordon Castle indicate that ale made up 19% of calories consumed. Lady Grisell Baillie’s record book from 1743 indicated that 12% of a daily dietary intake was in ale.<sup>292</sup> At any of these numbers, ale was clearly an important part of

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<sup>284</sup> C. M. Woolgar, *The Great Household in Late Medieval England* (London: Yale University Press, 1999), 11.

<sup>285</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 11.

<sup>286</sup> Christopher Dyer, *Everyday Life in Medieval England* (Cambridge: Cambridge University Press, 1994), 85.

<sup>287</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>288</sup> *Coupar Angus Rental*, 1-2, vII 110.

<sup>289</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>290</sup> T. C. Smout and A. J. S. Gibson, *Prices, Food and Wages in Scotland, 1550–1780* (London: Cambridge University Press, 1994), 76.

<sup>291</sup> Fenton, *The Food of the Scots*, 5, 82. The 4% figure stands out as being abnormally low, perhaps because the ale they immediately received for their labours was not the only ale they consumed.

<sup>292</sup> Smout and Gibson, *Prices, Food and Wages in Scotland, 1550–1780*, 76.

the diet.

## Victualling of royal ships in the 16<sup>th</sup> century

Even though it cannot be seen as representative of any time or place outside those on the ships, the records of the victualling of ships in King James IV's navy are unique for being detailed in price for goods and allotment for individuals. These accounts, found in *TA*, record supplies to those working on the ships and give very clear amounts specified per person.<sup>293</sup> As with their role in discussing bread, they show how barrels of ale were a part of each of the ship's accounts, whether large or small. It is important to note that the people being victualled in these accounts could be receiving above what might be regarded as the average amount for an ordinary layman. The victualling of ships reported in the *TA* was perhaps unusual in that military rations might have been higher than those which would be granted to other people.<sup>294</sup>

At the same time ships would have had more limited space available for storage, which was why the ships were loaded frequently with more ale. In the example of the *James*, it was restocked almost every day from 20 January to 13 February 1513. The vessel was said to have about 40 mariners aboard, and, during this time, each day averages either ten or twenty gallons on board. That gave every sailor between two and four pints per day (.25-.5 gallons). This amount was repeated more clearly in accounts of the *Bark of Abbeyfield*, *John Barton's Bark*, the *Spanish Bark*, and the *Chalmers Bark*, all of which specified that each person had a grant of one quart (i.e. two pints) per day.<sup>295</sup> This allowance seems low compared to other sources but supports the idea of increased strength in the brewed product towards the end of the Middle Ages, although it would have still been watered down compared to the ales consumed on land.

## The Law

While brewing was primarily a domestic activity, it was not without regulatory legislation. In

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<sup>293</sup> *Treasurer Accts.*, IV.451-507.

<sup>294</sup> Smout and Gibson, *Prices, Food and Wages in Scotland, 1550-1780*, 62.

<sup>295</sup> *Treasurer Accts.*, IV.495, 497, 498, 499.

fact, such brewing-related legislation made up a prominent part of laws, such as in the 13<sup>th</sup> century gild laws in Berwick, in which almost 25% of the trade and marketing laws were concerned with brewing.<sup>296</sup> Much of the motivation for these enactments rested in the importance of ale as a standard foodstuff and had the intention to allow it to be available in the markets and to have a sufficient supply for the local area.<sup>297</sup> The most basic laws in regard to ale rested in the requirement to make the product accessible. If someone sold ale, bread or other food publicly, they must agree to sell to anyone.<sup>298</sup> Such laws were enacted sufficiently frequently through the 14<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup> centuries to suggest that travellers were being denied access to ale or were being overcharged.<sup>299</sup> If people were being unhospitable or overcharging strangers, they also needed to be reminded not to neglect their neighbours. Ale had also to be sold to their neighbours on credit, if necessary, but with the assumption that the neighbour would pay back what they owed.<sup>300</sup>

Quantity was also an issue. There were set measurements and ale had to be sold fairly by those measures.<sup>301</sup> Ale was required to be sold by open pots and not in sealed containers.<sup>302</sup> These measures were clearly both to make sure that full measures were always served and to prevent people from hiding partly empty containers by having them sealed.

Burghs attempted to maintain control over brewing locations as well. At one point, brewers were forbidden to take ale from one burgh to another to sell.<sup>303</sup> During other times ale was simply not allowed to be moved out of certain areas, such as from Leith for two months during 1529.<sup>304</sup> Rather than an attempt to avoid shortages in Leith, it was to protect the brewsters of

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<sup>296</sup> Ewan, "For Whatever Ales Ye," 125.

<sup>297</sup> *Ibid.*,

<sup>298</sup> *Ancient Burgh Laws*, 33.

<sup>299</sup> *The Records of the Parliaments of Scotland to 1707*, 1357/11/18, 1424/23, 1535/32.

<sup>300</sup> *Ancient Burgh Laws*, 160.

<sup>301</sup> *Ibid.*, 115.

<sup>302</sup> *Ibid.*, 116.

<sup>303</sup> *Ibid.*, 162.

<sup>304</sup> *Edinburgh Burgh Recs.*, 1, viI 15.

Edinburgh from needing to compete with ale produced in Leith.<sup>305</sup>

It was also legislated that brewhouses could only be set beyond burgh limits in places where the landlord had a jurisdictional franchise and expressed that “he there have a pit and gallows”, but even in such cases they only had one brewhouse.<sup>306</sup> Having the jurisdictional freedom to enforce laws locally was a status that brought with it the ability to have a brewhouse. The holder of such a privilege therefore benefited from the ability to regulate production and levy the fines for any breaches in those regulations.

Other than the previously discussed laws about who may brew, the rest of the laws concerned the quality of the ale and the assize (fees) associated with ale making and selling. Burgh law codes survive from well before 1406 and covered issues related to quality of production and to those that arose from the selling of ale. Even this early, ale was required to meet a certain quality and punishments were listed for failing to meet that level. In one code, both brewers and bakers were warned that if they failed to maintain quality they would be punished, with increased severity with each infraction.<sup>307</sup> In another, a woman who was unable to meet standards for the ale she sold could be prohibited from selling ale for a year and a day, and if caught selling poor quality ale again she might be fined and have her ale confiscated and given to the poor.<sup>308</sup>

In addition to deciding the price, the standards of maintaining ale quality were important, as demonstrated by the close regulation of the role of ale-taster, as they must perform their duties as required and fairly.<sup>309</sup> This role came with an oath, with requirements to set the price in relation to that of malt, as well as to “spare no one for fear or favour!”<sup>310</sup> They were to maintain a specific quality and punish those who did not meet it by having their cauldron taken and

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<sup>305</sup> Ewan, "Mons Meg and Merchant Megs." 137

<sup>306</sup> *Ancient Burgh Laws*, 97.

<sup>307</sup> *Ibid.*, 10.

<sup>308</sup> *Ibid.*, 30-31.

<sup>309</sup> *Ibid.*, 117.

<sup>310</sup> *Ibid.*, 129.

having its bottom removed.<sup>311</sup> Not all brewers were happy about their products being checked for quality, and the number of prosecutions for unsanctioned sales and purchase of ale show that many people were selling their products to their neighbours without being quality-tested or sold in legal measures.<sup>312</sup>

Later, brewers were given duties by the Chamberlain to pay assize on ale based on the inspection of their product by ale-tasters. They could be punished if they did not let their ale be tasted.<sup>313</sup> Maintaining quality was in part done by the tasters, who would both determine quality and then the price brewers could set based on that. Brewers were legally required to sell the ale at the price set by the tasters.<sup>314</sup>

Quality issues arose in other ways, as an early law prohibited dyers, shoemakers, and fishermen from brewing, assuming only if they planned to sell it, unless they had two vats. One vat was to be reserved to brew in and the other was to be kept separate for their other main household occupation.<sup>315</sup> This law was put into place to guarantee quality by preventing foul tastes and smells from tainting the brewing process.

The right to sell ale came with fees. Early laws already stated the rent associated with brewing.<sup>316</sup> These fees did not always start right away, as brewers could brew three times before they were forced to pay rent.<sup>317</sup> The selling of ale was a public affair, with requirements on an ale-wife to display her *alewande* in the window and expose her ale to the air or she must

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<sup>311</sup> The High Chamberlain defined five callings to accounts for ale-tasters as to allow for a standardised and fair form of testing. The first was for not being ready to taste ale. Second was not being ready each time the brewers put ale in casks. Third was detail of the methods by which the sample was chosen for testing. Fourth was a probation against putting anyone into default until after the next court. Fifth, they were not to set the ale but simply say whether it was good or bad. Ewan, "Mons Meg and Merchant Megs."; *Ancient Burgh Laws*, 139.137

<sup>312</sup> Ewan, "For Whatever Ales Ye," 127.

<sup>313</sup> *Ancient Burgh Laws*, 141-142.

<sup>314</sup> *Ibid.*, 116.

<sup>315</sup> *Ibid.*, 46.

<sup>316</sup> *Ibid.*, 18. In the case of the Burgh Laws of the twelfth century, this rent was two pence for every six months to give to the alderman.

<sup>317</sup> *Ibid.*, 181.

pay a fine.<sup>318</sup>

As briefly mentioned above, despite the quantity of laws in relation to brewing, there was evidently widespread breaking of the assize of ale. The average ale was closer to the price that people were punished for charging rather than the price they were meant to charge.<sup>319</sup> The price level in Edinburgh in 1529 must have been a problem as several people were punished for breaking the 16d per gallon price a few months after the limit was set and then this was emphasised through public proclamation. Given that the threat of banishment was used for some, and actual banishment for others, it was clearly not their first offence.<sup>320</sup>

While ale was important, those brewing it were not allowed to get preferential treatment in the purchasing of materials. One such example is brewsters in 1554 being required to buy malt only at the burgh market and at the standard town price.<sup>321</sup> It was perhaps to prevent them from negotiating other prices outside standard market times and prices. Grain was one commodity that continued to be sold openly in market to ensure that a fair agreed price was met and paid publicly and to ensure that the quality was of an agreed standard.<sup>322</sup> This was partly to prevent hoarding, seen as a cause of dearth and price inflation, partly to enable availability to be seen, and partly to ensure that direct trade in a staple remained accessible to everyone.<sup>323</sup>

## *Brewing – Equipment, Ingredients, and Process*

Basic ale making did not require a large array of equipment, which was in part the reason why it could be a domestic venture. The brewing equipment was the sort of thing most urban

<sup>318</sup> Ibid., 30-31.

<sup>319</sup> *Changing Values*, 53.

<sup>320</sup> *Edinburgh Burgh Recs.*, 1, vii 20-21, 22, 25, 26, 44, 45, 46, 51. There are so many examples of people being charged with this particular set of crimes that the Extracts simply skip over them. For those on page 44 it lists one crime, then says that 104 similar follow, then a one fine with sixty similar entries following, then another fine with thirty-nine similar entries, and one last fine with thirty three similar entries.

<sup>321</sup> Ibid., vii 187.

<sup>322</sup> Gemmill and Mayhew, *Changing Values*, 57-58.

<sup>323</sup> Ibid.,



households would have.<sup>324</sup> Some physical remains of the brewing process can be found, such as the steeping vat could be used for brewing being recovered in the 1970s excavations in Perth.<sup>325</sup> The lack of specialised equipment was one reason it was challenging to know exactly what people were brewing with. The basic equipment of a brewer could be shared with other home tasks, except of course the above-mentioned exceptions relating to specific trade occupations. Ale had a short shelf life and was purchased in small quantities as needed rather than in bulk, because it would go sour.<sup>326</sup>

The basic parts were a *leyd* (brewing utensil), a *mask fat* (brewing or mash vat), and a *gyl fat* (fermenting vat).<sup>327</sup> Each of these was not needed in equal parts, as even very early reference to an equipment list referred to more fermenting vats than other equipment.<sup>328</sup> It was because, in comparison to the time needed for brewing, the fermenting stage was longer. Further explanation for this difference in time is discussed later.

A large pottery jar could be used as a mask fat, but a specialised vat would have a spigot or tap close to the bottom to allow dreges of grains to be left behind.<sup>329</sup> Fenton listed a slightly more comprehensive list of tools, which included brewing cauldrons, middlewort cauldrons, *mask fatts*, *gyll fatts*, wort stands “and other paraphernalia that went with brewing”.<sup>330</sup> These brewing utensils changed very little over the studied period as they appeared in the accounts of the *ER*, even if infrequently. These references started as early as the 1260s, with the same brewing utensils also being mentioned in much later records.<sup>331</sup> Mask fatts (mash-tuns) may have been free-standing wooden vessels as it was how they were portrayed in early modern depictions.<sup>332</sup> Being made of wood, they have rarely survived, but the lack of remains does not

<sup>324</sup> Ewan, "For Whatever Ales Ye," 128.

<sup>325</sup> Ewan, *Townlife in Fourteenth-Century Scotland*, 31.

<sup>326</sup> Ewan, "For Whatever Ales Ye," 131.

<sup>327</sup> Ewan, *Townlife in Fourteenth-Century Scotland*, 31.

<sup>328</sup> *ER*, IV-XIII, I.15. In reference to brewing utensils, there are two plumba and two maskfattis, but two gynefattis.

<sup>329</sup> Brears, *Cooking and Dining*, 98.

<sup>330</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>331</sup> *ER*, IV-XIII, I.15. Beer can be made in the same sets of equipment as ale but it was far easier if one had more equipment. The exact details as to why will be discussed later.

<sup>332</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 15.



health. By the Renaissance, water was just seen as bad, cold, and putrescent. It was not nourishing but rather draining. In *Eating Right in the Renaissance*, Albala goes as far as to say the fear of unsafe drinking water was where this fear of the cold and moist originates.<sup>336</sup> But that was probably not quite right, as medieval people certainly drank un-processed water. The upper class may have shunned the consumption of water and drinking water had a connection with poverty and to fasting, but it was still done all over Europe.<sup>337</sup> Stories of those drinking water tend to be linked to poverty such as in *The Governance of England*:

*“They drink water, they eat apples, with breadbrown made of rye; they eat no flesh but if it be right seldom a little lard, or if the entrails and heads of the beasts slain for the nobles and merchants... They wear no woollen... Their wives and children go bare foot...”*<sup>338</sup>

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et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Peter Vinten-Johansen et al., *Cholera, Chloroform, and the Science of Medicine: A Life of John Snow* (Oxford: Oxford University Press, 2003). Taste may have been a factor in keeping water supplies separate but any belief that they were concerned with sickness is simply modern understanding of bio-contaminants in water being retroactively applied to medieval people.

<sup>336</sup> Albala, *Eating Right in the Renaissance*, 120-121.

<sup>337</sup> Adamson, *Food in Medieval Times*, 48.

<sup>338</sup> The association between poverty and drinking water, rather than ale, occurred throughout medieval Europe. During times of low wages in 13<sup>th</sup> century England, a diet of bread and water would have taken all of the wages of a labourer, with only craftsmen and more skilled workers having enough excess income for ale. Because it was a time of reduced buying-power for the poor, it would not have been affordable to get enough calories to survive if they were consumed in the relatively inefficient form of ale. The Great Famine of 1315-1322 also contributed to limitations on ale production compared with pre-famine times. It may not have

The presence of rules which dictate which water was preferred show that people understood that some water was better than others. Those sources of water seen as best (rain water, spring water, lake water) tended to be moving or were exposed to direct sunlight, while those seen less favourably (stagnant water) were unmoving and not exposed to light.<sup>339</sup> Water was not always associated with illness, as hospitals recognised the need for a fresh water supply as part of a healthy environment and it was away from industrial work and food processing.<sup>340</sup> While water was included in ship expenses, it was presumed that it was used for cooking rather than drinking.<sup>341</sup> This assumption, however, was just that of those commenting on the accounts in the later 19<sup>th</sup> century and is not an observation contemporary to the original documents. Just as importantly, water in a medieval Christian context was seen as the greatest purifier or cleanser – think of baptism and its sin-cleansing power. The main users of fresh, running water were the major monasteries, where there was a ritualised use of water in the routines of the cloister, including the washing of hands in the lavabo before entering the refectory.<sup>342</sup>

With so many instances of water being consumed without worry, especially by the sick, the motivation for consuming ale rather than water was unrelated to fear of it causing sickness. Ale was tested for taste and prices were based on the results of these assessments. If ale was treated like a water replacement for health reasons, the taste would be far less important in terms of judgement rather than its suitability for sustaining health. Because it was instead rated

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changed back until after the first outbreak of the Black Death in the late 1340s and with the increased standards of living that came afterwards for survivors.

During times of poverty nuns were forced to drink water because they could not afford ale. Servants in thirteenth century Sedgeford were given milk, ale, and water to drink.<sup>338</sup> As standards of living for fourteenth-century live-in servants in England rose, they demanded good ale instead of water.

Dyer, *Everyday Life in Medieval England*, 226, 272. Quoted from C. Plummer (ed.) *The governance of England by Sir John Fortescue* (Oxford, 1885), p. 114; Dyer, *Standards of Living in the Later Middle Ages*, 93, 221, 226; Stone, "The Consumption of Field Crops in Late Medieval England," 18, 22; Cameron et al., *Aberdeen: An In-Depth View of the City's Past*, 22.

<sup>339</sup> Adamson, *Food in Medieval Times*, 48.

<sup>340</sup> Dyer, *Standards of Living in the Later Middle Ages*, 243.

<sup>341</sup> *Treasurer Accts.*, IV.lxiii.

<sup>342</sup> Michael Kucher, "The Use of Water and its Regulation in Medieval Siena," *Journal of Urban History* 31, no. 4 (2005); John S. Lee, "Piped Water Supplies Managed by Civic Bodies in Medieval English Towns," *Urban History* 41, no. 3 (2014), <https://www.jstor.org/stable/26398298>.

on taste, the water used was clearly not seen as a problem.

## *Malt*

Malt will only be touched on briefly here, as it has been discussed in detail in Chapter 2: Establishing background on grains. While the two fields – malting and brewing - would seem to be connected, they were regulated as separate industries, at least by the 15<sup>th</sup> century.<sup>343</sup> Brewers tended to buy malt rather than make it themselves. This purchase of malt was a large part of the credit extended to women, to the degree that 25% of the recorded credit transactions for women in Dundee in the 1520s were related to malt and indicated that malt was purchased and sold as needed rather than to store and use over a longer period.<sup>344</sup> Malt was a large part of the ongoing cost of brewing. One way to limit the risk in keeping stock and to limit immediate costs was for brewers, even those producing larger amounts of ale, to receive the malt only immediately before brewing.<sup>345</sup> This was despite malt being able to be stored for up to a year.

Malted barley is the preferred malt in modern brewing, to the extent that modern brewing malts sold are assumed to be barley, unless explicitly described otherwise. The reason for why it became this way is possibly based on a few factors. Barley, oats, and wheat could all be pressed into service as malt and then used in brewing, but the quality of the resulting product differed. Barley malt was needed to produce the best, and wheat was said to make a “far superior brew”, but oats made something that was best described as an acquired taste.<sup>346</sup> Wheat malt was of note because of the excellent head retention properties it gave to the resulting product.<sup>347</sup> Grains which are normally processed into malt can also work in brewing in an unmalted state, but only in small amounts as chemical changes made during the malting

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<sup>343</sup> Ewan, "For Whatever Ales Ye," 128.

<sup>344</sup> Ibid., 127-8.

<sup>345</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 70.

<sup>346</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 13.

<sup>347</sup> Briggs et al., *Brewing*, 164.

process allow for easier brewing.<sup>348</sup>

Even with the variety of options for producing beer, the trend leans toward malted barley. In one example, the Reinheitsgebot, or "German Beer Purity Law" of 1516 supported this interpretation as it specified that only water, barley, and hops may be used for beer, which was designed to help tax beer and only have it produced in beer houses.<sup>349</sup> A similar law did not exist in Scotland, but the impact on the German beer industry of this law could have influenced the later perception of the requirements of beer, even as other places have beers that broke these rules. It may have helped also that Scotland was able to regulate the brewing industry without needing to limit the production so closely, and had no desire during this time to remove the production away from the home.

The strength of ale was determined principally by the amount of malt in the mash. The maximum strength was directly related to the quantity of fermentable sugars in the fermenting ale and can be calculated. Estimating strength based on the amount of malt used in each batch size is fraught with its own problems when dealing with medieval brewing. It was noted that in *Piers Plowman*, a narrative poem dating from the late 14<sup>th</sup> century, Glutton collapsed drunk after one gallon of ale. This was seen as a sign that later medieval ale was as strong as modern beer.<sup>350</sup> One can calculate exactly the strength of medieval ale based on modern methods and the amount of malt used, but the techniques employed and technology available to medieval brewers would have affected the outcome. Firstly, because they would have brewed multiple batches from the same mash, the gravity of each successive batch would be lower. Secondly, the batches were fermented for far shorter times. Thirdly, the efficiency of each batch would have been lower as the temperature control methods would have been less effective.

With those flaws in mind, the recipe Brears used as his basis for how he sees medieval brewing used 2.7kg (6lbs) of malt in a recipe that made five-gallon batches of three strengths. He stated the first ended up at about 10%, the second ended up at 3%, and the last was a little under 1%.

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<sup>348</sup> Matthew Farber and Roger Barth, *Mastering Brewing Science: Quality and Production* (New Jersey: John Wiley & Sons, Inc, 2019).

<sup>349</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 185.

<sup>350</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 16.

The life of each ale was influenced by the strength, with the strongest lasting a few months if cellared and the last turning sour after a few days.<sup>351</sup> The souring could be due to the ale not being sufficiently strong to keep out other microbial action and the absence of the preserving factor of hops.

In the expenses of James Hepburn in 1516, it was stated that ten gallons of ale were made with each boll of malt, the same amount allowed per gallon in the expenses for the household of the Lord Governor, John, Duke of Albany, at Glasgow in the same year.<sup>352</sup> Computing this from the amount made to what could be made with a full chalder equates to 160 gallons per chalder. That number is similar to that cited elsewhere, where the range for brewers was 192-240 gallons in one chalder.<sup>353</sup>

Comparing these numbers to batches made in England at the same time is challenging because while Scotland was measuring in bolls and chalders, England was using bushels and quarters. While an exact comparison between the two cannot be easily made, it appears that a quarter was slightly over one third of a chalder (.375).<sup>354</sup> If this was true, English ales were similar in strength to Scottish ones. The brewhouse at Caerphilly Castle was built to prepare ale batches that amounted to 255 gallons per chalder (converted from 430 gallons of ale of differing strength prepared with 12 bushels of malt), which appears to be on the weak side but not unbelievably so.<sup>355</sup> The overall range in England was said to lie between 133.5 to 200 gallons per chalder (converted from 50-75 gallons per quarter), with a note that ale strength increased towards the end of the middle ages.<sup>356</sup> Such an increase in strength seemingly did not happen in

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<sup>351</sup> Brears, *Cooking and Dining*, 102-103.

<sup>352</sup> *Treasurer Accts.*, V.20; *ER*, IV-XIII, XIV.178.;

<sup>353</sup> Fenton, *The Food of the Scots*, 5, 82.

<sup>354</sup> Christopher Dyer states in *Standards of living in the later Middle Ages* that a quarter is defined as 290 litres, which works out to 510 pints. *Weights and Measures in Scotland* then lists the changing value of a boll as 77 pints, 85 pints, or 90 pints depending on the year. For simplicity, the 85 pint was chosen. This leads to a chalder of 1360 pints. It ultimately means 1 quarter is .375 chalder and 1 chalder is 2.67 pints.

<sup>355</sup> Brears, *Cooking and Dining*, 101. This even assumes that the malt per gallon only applies to the first ale made off each batch, because if the total amount made of all three strengths were counted it would be closer to 767 gallons per chalder.

<sup>356</sup> Stone, "The Consumption of Field Crops in Late Medieval England," 16. In the 1330s two household produced a range of ale using 160-200 gallons per chalder (60-75 gallons per

Scotland, which could have been a consequence of the lack of the innovations that came with a move towards producing beer rather than ale, or because the climate in Scotland in the late Middle Ages led to a grain dearth that made the brewing of stronger ale unjustifiable, if not unsustainable.

## Yeast

Yeast is an interesting topic because, even more so than with other brewing ingredients, the exact nature of yeast was not understood by the medieval brewer. The existence or even the concept of microbes was not yet understood. Yeast is referred to in 18<sup>th</sup> century guides to brewing, well before the scientific discovery of microbes, but it was understood differently. In *LCB* yeast is described as a strong acid whose activities bring motion which then makes the wort into ale.<sup>357</sup> The 1755 English dictionary defined it as “the ferment to put into drink to make it work and into bread to lighten and well it” and it was not seen as a living organism.<sup>358</sup>

The simplest way to get yeast into your wort was through spontaneous fermentation; basically, in exposing the wort to the air in the hope of picking up enough wild yeast to make a batch.<sup>359</sup> Doing so would not be that unusual, as it was also the common practice for fermenting wine, cider, and mead.<sup>360</sup> While it was an option, however, it was inconsistent as it was challenging to get the exact mix of microorganisms you would want, and the batch might not ferment at a reliable strength.

To add consistency, yeast was instead transferred from batch to batch. This method can be

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quarter), while two households in the 1380s produced their ale with a range of 141.5-150 gallons per chalder (53-56 gallons per quarter). The monks of Westminster Abbey in 1500 went even stronger with ale that only made 120-133.5 gallons per chalder (45-50 gallons per chalder).

<sup>357</sup> *London and County Brewer*, 115-117.

<sup>358</sup> James Barnett and Linda Barnett, *Yeast Research: A Historical Approach* (Washington, DC: ASM Press, 2011), 1.

<sup>359</sup> Billy Quinn and Declan Moore, "Ale, brewing, and fulachta fiadh," *Archaeology Ireland* 21, no. 3 (2007): 10.

<sup>360</sup> Unger, *A History of Brewing in Holland, 900-1900*, 111.



done directly, by simply adding a little bit of an old batch of ale into a new batch.<sup>361</sup> The yeast itself may be removed from an actively fermenting batch and put into a later one. The earliest mention of skimming yeast from the top of fermenting beer was in a mid-14<sup>th</sup> century Flemish recipe book, and this practice may have already been done by the 1300s.<sup>362</sup>

None of this information answers the question of what happened if a yeast batch died or for any reason someone was not able to get to an active batch. Longer storage allowed for access to yeast if one had larger gaps between batches or when something goes awry without needing to resort to wild fermentation again. By the 15<sup>th</sup> century yeast was kept and cultivated on its own to add to later batches. Yeast was kept in separate containers and held separately, as recorded in an English inventory in 1486, which included twenty small vials of yeast.<sup>363</sup>

Modern brewers can obtain yeast for further batches in similar ways, but each time the same source is used increases the risk of contamination. With a lack of sanitation, as was the prevalent position in the Middle Ages, minor infections could happen. For an ale to naturally become tart, even after infection, generally requires time. As medieval ales were consumed fresh, it can be easily assumed that they were not stored long enough to allow a proper sour ale to arise. Even ales made intentionally sour now tend to be aged for long periods of time to allow for the development of bacteria such as lactobacillus.<sup>364</sup> Medieval ales still may have been sour as even adding a small quantity of hops can greatly slow the growth of these souring bacteria.<sup>365</sup> As ales were made without hops, it would allow for much faster souring than you would generally see with brewers now.

### *Hops and hop alternatives*

As just mentioned, having hops allowed for longer storage of ale. Before they were cultivated ales brewed with the addition of wild hops, whether it was the only additive or in addition to

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<sup>361</sup> Ibid.,

<sup>362</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 152.

<sup>363</sup> Ibid., 147.

<sup>364</sup> They can be made more quickly with the method of sour kettling where batches are infected earlier to allow to become sour before the boil but this requires careful temperature control.

<sup>365</sup> Edwardson, "Hops: Their Botany, Production and Utilization," 168.

other herbs, allowing for a product which kept longer than the version without.<sup>366</sup> The resins extracted from hops were effective at preventing infection of the beer at lower alcohol percentages than did an unhopped product.<sup>367</sup> These benefits were not without cost as they not only required more equipment, but also more overall processing, as hops themselves did require processing in the form of drying. This process could be done with cooler air, but the best success was achieved through kiln-drying them the same way that grains were dried.<sup>368</sup>

Although hops played a very key role in preventing the accidental souring of beer, their use was introduced relatively late to Scotland, in part due to challenges specific to their history and growing requirements. Visitors to Scotland in the late 17<sup>th</sup> century even noted that Scots generally consumed unhopped ale.<sup>369</sup> Having hops so rare so late was uncommon across Europe, but hops were generally still a late addition into the brewing process. Like other crops, hops originated in a wild form. While hops have a history of also being seen as medicinal, it is most likely that hops were first cultivated for use in brewing rather than for any of their reported health qualities.<sup>370</sup> Furthermore, the exact period by which hops began to be cultivated in bulk is difficult to pinpoint because it was likely originally a small scale crop and unrecorded for experimentation before it was officially accepted as worth growing on a more widespread scale.<sup>371</sup>

Hops in their wild form may have originated in China.<sup>372</sup> Before cultivation, hops were present in a wild form which naturally grew in a range of about 35-55 degrees north.<sup>373</sup> If this range is accurate, it puts all but the southernmost parts of Scotland out of this range. Hops, thus, can theoretically be grown in Scotland, but they do not thrive, at least not well enough for it to be listed as a top hop-producing country in the mid-20<sup>th</sup> century.<sup>374</sup> Even with modern growing

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<sup>366</sup> D. Y. DeLyser and W. J. Kasper, "Hopped Beer: The Case for Cultivation," *Economic Botany* 48, no. 2 (1994): 167.

<sup>367</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 55.

<sup>368</sup> Edwardson, "Hops: Their Botany, Production and Utilization," 166.

<sup>369</sup> *Early Travellers*, 228, 263.

<sup>370</sup> DeLyser and Kasper, "Hopped Beer: The Case for Cultivation," 167.

<sup>371</sup> *Ibid.*, 169.

<sup>372</sup> Meussdoerffer, "A Comprehensive History of Beer Brewing," 10.

<sup>373</sup> DeLyser and Kasper, "Hopped Beer: The Case for Cultivation," 166.

<sup>374</sup> Edwardson, "Hops: Their Botany, Production and Utilization," 161.

methods and the increased demand for hops from the craft beer movement, hops are not commercially grown in Scotland. Attempts to produce hops in Scotland have been so rare as to warrant being news, such as the 2015 crop of hops grown at the James Hutton Institute in Dundee.<sup>375</sup> While it is possible for hops to have been grown in small quantities by individuals, the levels of challenges hit by even those with the benefit of greater knowledge and a generally warmer climate would make it very unlikely. Hops probably always needed to be imported to Scotland, either from England or from the main hop growing areas in Europe, like Germany or Holland. The lack of locally grown crops was due to the physical needs of hops not being well-matched by the general climate tendencies of Scotland. The main problems hops face in Scotland is their poor resilience when presented with cold spring rains, rainy summers, and excessive rainfall during the harvest months (for the northern hemisphere) of August and September.<sup>376</sup>

The significance of neither locally producing nor importing hops in large enough quantities to be used in most brewing was that the markets for ale continued to be smaller scale and more localised than they were elsewhere in Europe. It maintained women as the main producers of ale, as well as delaying more formal brewing guilds, and prevented the development of large-scale beer production, which required preparation in a separate space. The hops may only be a small portion of the total ingredients, but their introduction caused such significant changes to the brewing market that their slow adoption in Scotland is worthy of note.

As the slow introduction of hops into the process of brewing had not fully reached Scotland by 1513, it leaves the question of whether other flavourings were added to ale or it was simply left with just malt, water, and yeast. It has been debated if herbs of any kind were used at all.<sup>377</sup> The challenge with determining any flavourings for certain is that there were no mentions of herbs being used in any of the larger suites of documentary records, such as the Exchequer

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<sup>375</sup> "Hoppy days! Experimental beer made from Hutton hops," 2015, accessed 8/8, 2018, <https://www.hutton.ac.uk/news/hoppy-days-experimental-beer-made-hutton-hops>.

<sup>376</sup> Edwardson, "Hops: Their Botany, Production and Utilization," 163.

<sup>377</sup> Cornell, *Was It Ever Gruit Britain? The Herb Ale Tradition*.

Rolls or Treasurer Accounts.

To determine any likely sources of flavouring required looking at traditions related to brewing and deciding if they align with herbs known to have been used in medieval Scotland. This causes challenges, as ingredients reported to be traditional may in fact be later additions to a traditional recipe. This is in contrast to elsewhere in Europe where there was a tradition of *gruit*, which was a very specific collection of herbs used to flavour ales. Even then Richard Unger, who has written extensively on brewing in areas which produced a lot of *gruit*, does not know what it was made of for certain. Example herbs suggested that may have been in the mix include wild rosemary, bog myrtle, sweet laurel leaves, and a plant which he can only identify by the name *serpentien*.<sup>378</sup>

## Process

### Introduction to Brewing

Defining the process of medieval brewing is challenging because, like most tasks done on a domestic level, specific recipes were generally not written down and the knowledge was passed down orally and through practice between individuals. It mostly means that other sources must be used to inform on the likely technique instead. Peter Brears based a technique for brewing on a combination of archival and archaeological evidence, along with later farmhouse techniques. This, along with Unger's *Beer in the Middle Ages and the Renaissance* and a few 18<sup>th</sup> century brewing guides, form the basis for the following discussion of the brewing process.

The technical details of brewing did go beyond what a medieval brewer would understand, but the science of how malt becomes ale was the same, whether it was understood by the brewer or not. By examining what we can glean from traditional brewing processes and comparing it to what we know of the science of brewing, we can better tell what product they were making.

For most of the stages of medieval brewing, it was entirely the same for both ale and beer. They

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<sup>378</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 31.

both started off with the basics. Brewing required malted grain, whether it was barley, oats, wheat, or something else, and this malt must be milled. The milling broke down the hard, outer shell of the grain and allowed for the extraction of sugars that were used for the later stages of brewing. The exact coarseness of the grind mattered, as a finer grind allowed for easier extraction but led to particles that were harder to filter out.<sup>379</sup>

## Malt mash

The first stage once you have milled malt was to make a mash. For this, water at 65 °c was put into a vessel with the milled grain. As thermometers were not invented until the 18<sup>th</sup> century, medieval brewers were unable to know when the mash reached this specific temperature but there were methods to reach the temperature that they believed was ideal. To do so, the water was first boiled, during which time any scum that rose to the top was skimmed off. Once boiled, the water was moved into the brewing vat and left to cool.<sup>380</sup> One way to tell when it was ready was to leave it to cool until almost all of the steam was gone and you could see your face in it, or for about fifteen minutes in cold weather.<sup>381</sup> When the water reached the proper temperature, the malt was added slowly while the mixture was stirred to prevent it from clumping. The now full mash vat was then covered, moved to rest in a draught-free area, and allowed to sit for two hours or longer.<sup>382</sup> The goal during this time was to extract proteins and sugars from the malted grain.<sup>383</sup>

Both the temperature and the water content affected the product of this mashing process. The lack of accurate temperature readings and ability to control those temperatures reliably affected the ability to reproduce the same product each time. Without modern devices designed to regulate temperature, the best one could do was to use a very heavy vat for the mash, as well as a heavy lid, to help keep a steady temperature and to also keep it in a place

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<sup>379</sup> *London and County Brewer*, 54.

<sup>380</sup> Brears, *Cooking and Dining*, 98.

<sup>381</sup> *London and County Brewer*, 72-73. "...lade both water and that into the mash Vat, where it is to remain till the steam is near spent, and you can see your Face in it, which will be in about a quarter of an Hour in cold weather;"

<sup>382</sup> *TBB*, 16.

<sup>383</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 5.

away from wind or very warm or hot spots in a home.

It was understood that the quality of the water would affect the quality of the ale but brewers were not always sure exactly why this was. Spring or river water was preferred over well water as it was seen as softer, which allows for better grain drainage, faster fermentation, and a more refined ale.<sup>384</sup> Water softness could also be determined by only brewing with water in which it is easy to obtain a lather when it is mixed with soap.<sup>385</sup> Incidentally, soft water can better extract vegetable compounds than hard water, giving a minor boost to those using it instead of harder water.<sup>386</sup> Additionally, almost all water in Scotland is soft, in contrast to the hard water in most of England, perhaps leading to a higher quality product.

The liquid made of the steeped grains, now called a wort, was strained out of the mash tun and into another container. The remaining grains, called either spent grain or draff, could be re-used as before to brew a further batch.<sup>387</sup> When reused for further mashes like this, each batch was progressively less saturated with sugars and made weaker ale. When the grain was truly and fully spent and could no longer be used for any brewing related purposes, it was used for animal feed.<sup>388</sup>

The names varied between sources, but the consensus was that three batches of ale could be made with the same malt, a modern term for which is to say it is a parti-gyle brew. Reusing the malt in multiple mashes indicated that the grains were not being sparged; that is that the liquid was drained while the grains were rinsed with hot water to extract as much of the sugar as possible.<sup>389</sup> The terms for each strength varied enough to make a comprehensive list. Other words were used beyond these, with no clear specific designation of strength. Those living near Coupar Angus Abbey were given half a gallon of 'convent ale', but that may be a reference to a specific source, i.e. from the abbey's brew-house, or quality, i.e. what would otherwise have

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<sup>384</sup> *TBB*, 11.

<sup>385</sup> *London and County Brewer*, 15.

<sup>386</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 5.

<sup>387</sup> *Ibid.*,

<sup>388</sup> *Ibid.*,

<sup>389</sup> Duffy, Cobain, and Kavanagh, "From skill to skill," 70.

been served to the monks themselves, rather than strength.<sup>390</sup>

The preparation for ale and beer differ after the mash. While beer was not a common product in medieval Scotland, seeing the difference in preparation can help to illuminate some of the reasons why beer was not made in Scotland as early as it was made elsewhere in Britain and Europe. Ale was simply left to cool after the mash, before moving onto fermentation. Beer required another step in the form of a prolonged boil. The difference between the two was minor but had a great impact on the amount of equipment, fuel and time required to make it, all of which added to the cost of preparation. The boil required an extra pot, either as space to temporarily store the wort when using the combination pot as mash tun and boiler, or a separate vat for boiling. This boil could last one to two hours.<sup>391</sup> Later, times of up to three hours were used in this boiling stage.<sup>392</sup> If a separate container was used for boiling beer, it required a boiling kettle which was slightly larger than the container used for mashing, because unlike the mash stage, boil-overs were a potential problem during this stage of the process.<sup>393</sup> If one planned on instead using a shared pot, it would lead to needing a larger mashing vat than one would otherwise require, to account for its need when being used for a boil. This larger vat would cost more. In addition, this relatively prolonged boil time was done in a vessel where boil off was intentionally part of the goal. It needed to reach a boil as quickly as possible and be kept at that boil.<sup>394</sup> Another issue with the boil was whether it should be done at a faster boil or slower. The faster boil caused it to clear out sooner. During times of high prices of malt this step was especially important because less of the water was lost to evaporation and more beer overall could be made.<sup>395</sup> Reaching this rapid boil could require a lot of fuel, which would be an additional challenge on resources on an already environmentally

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<sup>390</sup> Smout and Gibson, *Prices, Food and Wages in Scotland, 1550–1780*, 62.

<sup>391</sup> *TBB*, 16.

<sup>392</sup> Unger, *A History of Brewing in Holland, 900-1900*, 151.

<sup>393</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 5.

<sup>394</sup> *TBB*, 17.

<sup>395</sup> *Ibid.*,

strained century.<sup>396</sup>

The boil stage associated with beer did come with advantages, and in examining them one discovers more about the status of ale. Boiling helped clarify and concentrate the wort, sterilised it, and stopped the enzymes made active in the mash.<sup>397</sup> While 18<sup>th</sup> century brewing guides acknowledge it was possible to make a wort without boiling, a lack of sufficient boiling was said to lead to a product that was “raw, mawkish, and be unwholsome in the Stomach, where, instead of helping to dilute and digest our Food, it will cause Obstructions, Colicks, Head-achs, and other misfortunes”, as well as being faster to spoil and go sour.<sup>398</sup>

The clarification that came with the boil was because the proteins coagulated and interacted with carbohydrates and other parts to cause a break between the solids in the wort and the remaining more translucent liquid.<sup>399</sup> While later stages of the process of making ale, specifically the chilling and any ageing, helped with clarity, the fact that it was listed as a benefit of beer probably indicated that ale at this point was more opaque than beer.

The boil also concentrated the wort, as a longer boil was said to be needed for a stronger beer.<sup>400</sup> Strong beers and ales were possible without the boil, but it made obtaining a higher strength easier, especially with the lower efficiency associated with the mashes of this era. Without records of people commenting on the strength of ale compared to beer it is impossible to tell which was stronger.

It was during the boil that hops were added to the brew.<sup>401</sup> The longer the hops were in the boil, the stronger their bittering properties became in the final beer. Conversely, the shorter

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<sup>396</sup> Unless you had access to coal, which was available in bulk by the early 14<sup>th</sup> century in most burghs around the Firth of Forth – dominated by Edinburgh.

<sup>397</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 5.

<sup>398</sup> *London and County Brewer*, 15, 102. The Preface of the book refers to a second refers to a second book which the author had almost finished and had plans to publish which includes how to brew without boiling water or wort but this book cannot be found and may not have been completed or still exist.

<sup>399</sup> Briggs, *Barley*, 350.

<sup>400</sup> *TBB*, 17.

<sup>401</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 5.



the time they were in in the boil the subtler properties of an individual hop strain would be brought out. Traditional brewing books did not make this distinction and the hops were added toward the beginning of the boil.<sup>402</sup> If hops were added during the boil, it raises questions over when other flavouring agents might have been added. *Gruit*, the herbal mixture used in the Low Countries before the use of hops, may have been added either as part of the mash or boiled separately and added in with the wort.<sup>403</sup>

## Fermentation

The next step was fermentation, and this stage was where wort changed into ale or beer. Without yeast you had no alcohol. As with other steps, this one was understood differently through a medieval lens than a modern one. It was not until the time of Louis Pasteur in the later 19<sup>th</sup> century that the exact nature of yeast began really to be understood as a microorganism, but the need for yeast was understood before then. Brewing guides before then referred to yeast but did not view it with the same perspective as was discovered later, such as the *LCB* which states:

*“First, I shall observe that Yeast is a very strong acid, that abounds with subtil spirituous Qualities, whose Particles being wrapped up in those that are viscid, are by a mixture with them in the Wort, brought into an intestine Motion, occasion'd by Particles of different Gravities for as the spirituous Parts of the Wort will be continually striving to get up to the Surface, the glutinous adhesive ones of the Yeast will be as constant in retarding their ascent, and so prevent their Escape; Secondly, They alledge for beating the Yeast into Wort, that it gives it a fine tang or relish, or as they call it at London, it makes the Ale bite of the Yeast; but this flourish indeed is for no other reason than to further its Sale, and tho' it may be agreeable to some Bigots, to me it proves a discovery of the infection by its nauseous taste;”<sup>404</sup>*

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<sup>402</sup> *London and County Brewer*, 23.

<sup>403</sup> Unger, *A History of Brewing in Holland, 900-1900*, 30-31.

<sup>404</sup> *London and County Brewer*, 115-119.

Ale was simply left to cool after the mash, before dreges from a previous batch were added to provide the yeast for the new batch of ale. Beer was treated the same, but after the boil, instead of immediately after the mash.

From a modern perspective the medieval brewers must have allowed their ale or beer to cool, because we understand that the yeast cannot survive in temperatures over 40 °c. The wort, a highly saturated mixture of sugars and proteins, was a prime environment for yeast to reproduce, which had the effect of producing both alcohol and carbon dioxide. The combination of sugars and proteins, however, made it particularly appealing to other types of unwanted microorganisms, including bacteria. While not all these bacteria were harmful, they could negatively affect the taste of the ale. To prevent any unwelcome microorganisms required a few steps. The first step was to chill the wort quickly with minimal access to air, before adding your own yeast. Modern brewers have access to chillers, but medieval brewers did not. Instead, they would put it in a shallow vessel to allow it to cool in the air, which increases the risk of contamination.<sup>405</sup>

Traditional brewers understood the need to chill their wort quickly. Some would divide the wort into several smaller vessels to attempt to chill it faster, but it is noted that liquid is lost in this way, as all the containers end up with sediment. Instead, having only two coolers is recommended and their size must correspond to the quantity of malt, with the goal being to have the cooling wort no deeper than two inches, especially in warmer weather.<sup>406</sup>

Even once fermentation starts access to air is seen as negative, especially during early stages, where the wanted yeast has not had time to reproduce and start changing sugar into alcohol. Modern brewers will use one-way valves to allow air to escape the fermenting vessels without allowing more air in, but a medieval brewer did not have such a device. The goal is to get the yeast you want to establish a colony before any wild strains have a chance to take over.

Storage during fermentation is very important. How successful fermentation is depends on temperature and light. For ales that are allowed to age, time in fermentation would also help

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<sup>405</sup> Farber and Barth, *Mastering Brewing Science*.

<sup>406</sup> *TBB*, 18-19.

clarify the finished ale. Adding hops to a beer already in a cask was said to help with the clarifying, if added in a few days before the cask was set to be tapped. It did not matter if those hops had already been used in brewing.<sup>407</sup>

How long this resulting ale could last is open to debate. There is no doubt that it was brewed regularly and larger households in England were brewing from anywhere between 2.7 and 6.4 times per month.<sup>408</sup> From this, it is often seen as being a product that was produced regularly rather than in any way kept over long periods of time. It may not be as simple as this, as Brears suggests that ale made with traditional methods last far longer than the amount of time that written records imply and can actually last several months if stored properly in a cellar.<sup>409</sup> It is likely that the anticipated shelf-life of the ale was reliant on the alcohol percentage and that the conflicting ideas of how long ale could last are not as at odds with each other as would first appear.

## Conclusion

With the general method and ingredients for brewing established, the examination of brewing as a topic in this overview is complete. It has been established that the equipment was not the same as is now used, but the overall process involved is similar enough historically and at present for broad comparisons to be appropriate. A key point that has been identified is that ale and beer did not have equivalent meaning in the medieval period. This is an important factor to bear in mind, as confusion can arise if one sees ale as a product containing hops. As has been demonstrated, it was instead a more basic product without hops and with fewer preparation steps, which also meant that its production took less time, fuel, and equipment. As brewing during the long 15<sup>th</sup> century in Scotland was still a small-scale affair, doing so with the intention to sell was an ideal occupation for women to enter when they had a need to, and meant they could stop when they chose to. These traditions are shared with other countries in Europe, but the longevity of Scotland's continued production of ale as the primary brewed

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<sup>407</sup> *Ibid.*, 30.

<sup>408</sup> "The Consumption of Field Crops in Late Medieval England," 16.

<sup>409</sup> Brears, *Cooking and Dining*, 103.

drink reflects its less populous and more rural condition. The climate and economy worked in tandem to affect the overall production of ale. Hops were not grown in Scotland because the climate did not allow for their production. It was this lack of hops that encouraged the continued use of production of ale rather than beer, which meant it remained a smaller scale industry than elsewhere. However, it also remained a small-scale task because the population was not high enough to stimulate or generate the consumer demand to warrant importing hops to allow for greater specialisation and a switch to a system that would change the job of brewer to a male-dominated task. The cycle continued this way through the 15<sup>th</sup> century, and all together tells the story of a distinctly Scottish tradition.

The large quantity of information about medieval brewing shows the importance of ale in medieval Scotland. It also shows how unique brewing was as an activity in that ale was produced on a small scale and by individual households, rather than in large, commercialised enterprises. But, nevertheless, it was still a highly and well-regulated industry, both in urban and rural contexts. Indeed, there were many laws written around brewing, both at a parliamentary level and a local burgh level. These were aimed both to keep pricing within a reasonable range, as well as to keep the ale on the market at a certain quality. The punishments were set to prevent repeated misbehaviour from brewers, while still not immediately removing people from the field for one mistake. There were also regulations about who could become brewers, although they were still less strict than with more structured guilds, such as dominated other crafts and trades like weaving and metal-working. It must also be remembered that these abundant legal arrangements reflect the fact that people drank a lot of ale. This, however, was more a feature of their preferred form of daily calorific intake than a reflection of concerns over water-quality. Indeed, the frequently repeated assertion that it was due to anxieties over the safety of the water makes assumptions about water quality that apply more to concerns of industrialised societies and larger urban settings, rather than those of pre-industrial populations.

## Chapter 4: Bread: Grains on the Rise

### *Introduction*

As was common with the rest of medieval Europe, bread and ale were hugely important as dietary staples in Scotland.<sup>410</sup> As we have already seen with ale, legislation concerning commodities to be bought with coin (rather than through barter) included bread as an item to be paid for with the currency.<sup>411</sup> While bread was common across many different levels of society, it does not mean that the same types of bread were common to all people. The goal of this chapter is to present a comprehensive discussion of bread and what it meant at all levels of medieval society, but the nature of Scotland's surviving record evidence means this will not always be possible. The bread consumed by the well-off was well documented, at least in the sense of our being able to track price movements from surviving records as well as to identify the measures used to regulate price and the amount and type of grain being used recorded reliably. In comparison, neither the bread consumed by the rural peasantry, nor that of the urban population, was well recorded. To shed light on the types of bread available to the wider population, later records of discussions of the diets of common people can help explain what types of bread they consumed at earlier periods. This evidence is not as accurate as the contemporary evidence for the higher social classes, but it affords a reasonable basis upon which to build.

### Bread Composition

The first step in this discussion is to examine modern presumptions about bread, to compare them to the forms of medieval Scottish bread. This acknowledges that the medieval product might not resemble more modern forms of bread. It is easy to visualise the very specific idea of

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<sup>410</sup> Dyer, *Standards of Living in the Later Middle Ages*, 55.

<sup>411</sup> This importance was despite requiring both more expertise and equipment than making something else from the grains, such as a pottage. Bread fulfilled a specific need that could not be met with other grain preparations and was not just the food specifically for the rich or the poor; it was for everyone. *The Records of the Parliaments of Scotland to 1707*, 1466/41.

a domed yeast-risen wheat bread when talking about bread, but this image should not be assumed, especially when dealing with premodern Scottish breads. But then if you do not assume bread was a loaf of yeast-risen wheat bread, what do you assume? The answer is very little, as bread was and still is more than one thing. We must remember that the idea of bread encompasses a large variety of both oven cooked grain products, as well as those prepared on griddles, stones, or hearths. Next, while wheat has nowadays become the *de facto* standard for most European and North American bread, it was not always the case. Bread could be made of one or a few of a variety of grains or pulses. It is only by removing such presumptions about bread that a better understanding of 15<sup>th</sup> century bread in Scotland can be gained.

Even without the prejudices that come with modern understanding of what bread is, the sources themselves introduce their own bias. Compared to wheat, other types of grains are not frequently associated with bread-making. This emphasis on wheat as being a standard is more of a flaw in using documents which apply to the upper strata of society, rather than those living in relative poverty. Without other sources it leaves a very incomplete idea of bread options. In essence, it is important to note that a lack of written records about a type of bread does not always mean it did not exist. Even for those types which are recorded in medieval documents, the type of bread was not always specified and the most accurate guesses for it can be made by examining the status of the intended consumer. Later documents can be used to compensate for the lack of late medieval evidence of bread types consumed by the poor.<sup>412</sup>

## Grains

The first factor to examine when discussing bread is the type of grain or grains used to prepare it. Whether the choice of grain is made due to demand, availability or preference, which grain

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<sup>412</sup> While types of bread and their preparation likely change over the centuries, Scottish written accounts of bread which acknowledge different types originate well before the period under study in this thesis. As early as the reign of David I (1124-53), the assize of bread was detailed enough to differentiate between varieties of bread, including differences in size and quality.<sup>412</sup> From the fourteenth century the assize became detailed enough to differentiate between weights of the bread when raw (*pastus panis*), freshly baked (*coctus*), and then bread which has been baked and dried (*coctus et siccatus*).<sup>412</sup> Later records continue to differentiate between different types of bread but it is important to know it was an ongoing categorisation. Gemmill and Mayhew, *Changing Values*, 31.

or grains are used in baking affects the structure of the resulting bread. Different types of grains are better suited for different types of bread. Some grains also simply make higher quality bread, or at least bread that is viewed as more valuable from a cultural, as much as a financial, perspective. While single grain breads were common, combining grains was also hugely important, at least in part to extend the use of higher quality grain. Combinations continued to be used into the post-medieval period; in the 17<sup>th</sup> century, a guide for English housewives referred to use of wheat and rye as being called a simple meal. The term 'compound meal' was reserved for either a mixture of wheat and rye, or wheat, rye, barley, and other grains.<sup>413</sup>

## Wheat

The discussion of the grains used in bread starts here with the one most commonly used in modern breads and the first one to come to mind when most readers are presented with the idea of bread. Wheat is unique among grains for containing species-specific traits, such as gluten, which allowed it to make bread that cannot be made with other grains.<sup>414</sup> Because of these traits, wheat was arguably the most preferred grain for bread, and if only contemporary household records were to be looked at it would appear very common throughout Scotland from the 13<sup>th</sup> century onward. It was the most mentioned grain associated with bread, to the point where almost all mentions of baking in the *Exchequer Rolls* tend to connect wheat, flour, and bread as a continuous process from the ground to the product in the same way they tend to for barley to malt to ale.<sup>415</sup>

It would be incorrect, however, to assume that this means wheat flour bread was as common as barley malt ale. Unlike with barley malt, it seems most likely that outside specific social classes and locations, wheat flour was more uncommon. As discussed in **Error! Reference source not found. Error! Reference source not found.** the exploration of the common grain types, wheat was both generally more valuable and deemed of higher status than barley. Similarly, the

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<sup>413</sup> *The english housewife*, 209, 210.

<sup>414</sup> Jago and Jago, *The Technology of Bread-Making*, 362; Leonard and Martin, *Cereal Crops*, 367.

<sup>415</sup> As with examples of oat being turned to malt, the few examples of other types of grains being used for bread mostly highlights how unusual using anything else was in comparison to bread being made of wheat. The exceptions will also be discussed in the context of each grain.

likelihood of having access to wheat bread was connected to factors such as social status and wealth.

Beyond the connection to high social status, the two main factors for if wheat bread was generally available are connected to location and time. For location, the general European consensus is that those living in larger towns or cities were more likely to eat wheat bread rather than barley bread.<sup>416</sup> In general, those who lived in cities were financially better-off than the mass of the rural population, so even the urban poor were more likely to have access to preferred grains. Given the relative lack of larger urban centres in premodern Scotland, however, this European perception of an urban-rural divide in affordability of wheaten bread would suggest that there was not a particularly large constituent of Scottish town dwellers who frequently ate wheat bread.

Time also plays a factor, as wheat bread went from less common to more common over the centuries. Even in England bread was primarily barley-based, rather than wheat-based, until the mid-14<sup>th</sup> century and harvest food allowances for barley bread did not completely vanish until around 1387.<sup>417</sup> For Paris it was not until the mid-fourteenth that the main grain consumed in the city was wheat.<sup>418</sup> The two factors were intertwined but not causally linked; the rise of more populated areas developed over the centuries, but it was not necessary for the larger population centres to develop for wheat bread to become more common.

Even as wheat bread became common over much of the rest of Europe, Scotland continued to have traditions related to breads made of grains other than wheat. At the end of the 16<sup>th</sup> century Fynes Morrison declared that wheat bread was only consumed in the cities and by those of greater means.<sup>419</sup> Even as late as the 18<sup>th</sup> and 19<sup>th</sup> century, regularly eating white wheat bread in Scotland was a sign of high status and the daily staple for everyone else was a combination of barley, peas-meal, or bean meal.<sup>420</sup> It was not that the average Scot never

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<sup>416</sup> Dyer, *Standards of Living in the Later Middle Ages*, 197.

<sup>417</sup> Dyer, *Everyday Life in Medieval England*, 85-86.

<sup>418</sup> Crossley-Holland, *Living and Dining in Medieval Paris*, 65.

<sup>419</sup> Fenton, *The Food of the Scots*, 5, 122-123.

<sup>420</sup> *Ibid.*, 214.



consumed wheat bread, but it was not a standard part in the average person's diet until the 18<sup>th</sup> century, and the poor did not consume it until the mid-19<sup>th</sup> century.<sup>421</sup> While it is possible that wheat bread was being consumed by greater numbers of people before it was being well tracked in record sources, it is unlikely as wheat was a high value commodity and thus priced beyond the range of most consumers.

Without evidence to suggest otherwise, therefore, we can assume that the grains in Scottish bread did not suddenly switch in the late 16<sup>th</sup> century. This would support the idea that most people's diets consisted of breads made of barley, oats, or rye, with only the topmost social stratum having access to finer wheat bread.<sup>422</sup> However, that leaves it as essential to define who did have access to wheat bread. The list would have included merchants, nobles, and clergy.<sup>423</sup> The first two are immediately obvious as to why, because merchants would need to have access to grain to sell it and nobles would be able to afford the grain they would want. Bakers to the king and queen were granted money for wheat, which, it can be assumed, was for preparing bread for the royals and their household, but it was not specified.<sup>424</sup> The access of clergy to wheat bread is more unexpected at first glance, but it is a reminder that they generally came from the upper levels of medieval society and most had access to sufficient income to purchase wheat or had land to produce their own crops of it.<sup>425</sup>

Monasteries were also gifted supplies of wheat, with records of such gifts starting as early as the 13<sup>th</sup> century, but it is in the 14<sup>th</sup> century ER accounts that gifts of grain begin to appear regularly. For example, in 1329 the Abbot of Crossraguel received a gift of wheat from the king, and various houses of Dominican friars were noted as being granted both wheat and

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<sup>421</sup> Ibid., 216.

<sup>422</sup> Ewan, *Townlife in Fourteenth-Century Scotland*, 114.

<sup>423</sup> Peter Yeoman, *Medieval Scotland: an archaeological perspective* (Batsford: Historic Scotland, 1995), 82.

<sup>424</sup> "NRS Catalogue," 2018, accessed 1/9, 2018, <http://catalogue.nrscotland.gov.uk/nrsonlinecatalogue/welcome.aspx>. 25/3

<sup>425</sup> This assertion is not hypothetical, as the 1553 allotment of the monks of Coupar Angus included one pound of wheat bread per day. Even when grey oats were found on monastic sites, such as within the drains of Paisley Abbey, they were thought to be derived from animal feed, because the abbey could afford to import wheat for human consumption. *Coupar Angus Rental*, 1-2, vii 110; Coleman and Smith, "Archaeology of Burgage Plots," 309.

malt.<sup>426</sup> Gifts of wheat were also common within diocesan networks, as we have records of Bishop Brown of Dunkeld sending gifts of wheat to the friars of Haddington and Edinburgh in 1508-10 from his Lothian properties.<sup>427</sup>

Whether the wheat was grown on site or gifted, the consumption of wheat bread at monasteries seems to have been universal. Wheat was recorded as being grown on the abbey estates for the production of the monk's bread at Paisley.<sup>428</sup> The tendency for monasteries to consume wheat bread was not unique to Scotland, as the bread prepared for the Benedictines of Norwich Cathedral-Priory in England was almost all wheat, with only 8% of that being produced for all people who lived or worked on the priory property being of mixed or other sources.<sup>429</sup> Further evidence of the connection of wheat bread to status, rather than wealth, is in instances of prisoners being allotted wheat for bread in St. Andrews Castle in 1540.<sup>430</sup> Despite their imprisonment, the social standing of the detained men was high enough for them to be given wheat bread.

But even once acknowledging that wheat bread was only for a comparatively small part of the population, and which groups did get wheat bread, it is still important to recognise the quality of wheat bread could vary greatly. Defining these breads has challenges as terms can vary, as can their meaning. The goal here is not to be able to find and define all types of wheat bread in all instances but rather to make sense of the larger trends and to define when possible. To start, wheat breads were either seen as white or grey, depending on refinement.<sup>431</sup> For the purposes of these names, the refinement includes every quality, from the level of processing of the flour to the quality of the flour, and factors that came from the actual bread-making itself. Some examples of the name of white breads included *wastel*, *quachet*, and *simnel*. *Simnel* was the highest quality, followed by *wastel*. *Quachet* was made from the same quality of flour as the

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<sup>426</sup> *ER*, IV-XIII, I.153, 341.

<sup>427</sup> *Rentale Dunkeldense*, ed. and trans. Robert Kerr Hannay (Edinburgh: Scottish History Society, 1915), 250, 259.

<sup>428</sup> Yeoman, *Medieval Scotland*, 31.

<sup>429</sup> Slavin, *Bread and Ale for the Brethren*, 145-147.

<sup>430</sup> *Rentale Sancti Andree*, ed. and trans. Robert Kerr Hannay (Edinburgh: Scottish History Society, 1913), 113.

<sup>431</sup> Fenton, *The Food of the Scots*, 5, 78.

other two but was regarded as lesser quality due to being sour.<sup>432</sup> The terms seem to have been at least somewhat universal, as bread terms in England were similar, and sometimes even identical, with examples such as the most refined wheat bread being called *wastel* and the least refined wheat bread being referred to as *treat*.<sup>433</sup> Even these terms were not consistent, as *manchet* was referred to as the primary bread of the English housewife, with *cheat bread* being referred to as the best.<sup>434</sup>

Other terms also existed but were perhaps of more local idiom. Main bread was the highest quality option and was limited to being produced during either specific times of the year, and sometimes only with explicit permission.<sup>435</sup> Apparently technology was not the only thing limiting the ability to make quality bread, as these limits suggest that the need to produce enough to meet demand was above that of making high quality bread. The names of bread could also refer to the price per loaf. Both one-penny and two-penny breads were referred to in the *TA*.<sup>436</sup> There were certainly more names to be found for different breads at different times and it would be a study in itself to track them all down. The naming of commercially available breads by quality continued well past the 16<sup>th</sup> century, as a list in 1921 contained eight names given to wheat bread based on their quality.<sup>437</sup> The overall trends used for the naming of each bread type, as well as who was entitled to make, sell, buy and consume them appears to have been what mattered more.

All of this emphasis on wheat does not diminish the importance of oat-based and barley-based breads. If anything, it showed the sharp divide between the items consumed by those of different social strata and how this trend continued for centuries. Even knowing that wheat was not used in the most common medieval bread types, it is unsupportable to simply divide bread into wheat and non-wheat categories. Barley, oats, rye, and peas were all important for

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<sup>432</sup> Ibid.,

<sup>433</sup> Dyer, *Standards of Living in the Later Middle Ages*, 199.

<sup>434</sup> *The english housewife*, 209.

<sup>435</sup> Fenton, *The Food of the Scots*, 5, 78-79.

<sup>436</sup> *Treasurer Accts*. It did not specify in that context if the differences were due to the size or the quality, but other regulations defined these breads by sizes. These details will be further discussed with the role of law in baking.

<sup>437</sup> Jago and Jago, *The Technology of Bread-Making*, 377.

different reasons in bread making and consumption. Each grain, therefore, will be examined separately, to discuss their role in baking.

## Barley

While wheat bread was uncommon, barley bread was much more accessible. Barley was used in unleavened bread by the ancient Greeks and Romans, with its prestige changing from high with the Greeks to lower with the Romans.<sup>438</sup> The use of barley in bread continued despite being seen as not especially good for making high quality bread, especially risen loaf bread, for which it was poorly suited. Barley is such a poor ingredient for breadmaking that even modern discussions of baking go out of their way to discuss how unsuitable it is, such as the 2007 *The Science of Bakery Products*, which asserts that “Barley is not suitable as an ingredient for bread. It does, however, form a bakery ingredient as malt”, but perhaps this was only in reference to using solely barley as up to 30% barley flour is generally accepted, although it was also reported only to be acceptable at 15-20% of the total.<sup>439</sup>

Even if it was not preferred in earlier centuries, it did not mean barley could not be and was not used in bread. There is also no evidence to suggest that the barley used in medieval bread was malted, both in that malt is never connected to bread in written records and because traditional breads do not contain malted grain. It may have appeared in English records in the 17<sup>th</sup> century, but this does not indicate that it was used earlier in Scotland.<sup>440</sup>

Many traditional recipes exist that use barley meal, either alone or along with other grains. *Bere*-meal, either alone or mixed with peas-meal or bean meal, could be mixed (with or without an unnamed raising agent) along with salt and water to be cooked on an iron girdle or

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<sup>438</sup> Arendt and Zannini, *Cereal Grains for the Food and Beverage Industries*, 179.

<sup>439</sup> Even when barley was used in small percentages, the resulting bread was always darker, often ending up grey brown, and prevented the loaves from being as large, as well as being more dense, and having a less appealing flavour.<sup>439</sup> It could easily become darker, wetter, and sourer than wheat breads. *Ibid.*, 180; Baik, Newman, and Newman, "Food Uses of Barley."; *Science of Bakery Products*; Jago and Jago, *The Technology of Bread-Making*, 362.

<sup>440</sup> *The english housewife*, 210.

griddle.<sup>441</sup> This style of flat griddle bread was better suited for barley. Additionally, flat bannocks could be made from a combination of pea and barley meal.<sup>442</sup> Despite the emphasis that it was not well suited for this task, barley was also used in the loaf bread, especially brown bread aimed at servants, which also had additional grain in the form of peas, malt, and rye or wheat.<sup>443</sup> The peas could leave an especially undesirable taste as it was noted that hotter water should be used in preparing this dough, to limit the offensive smell the peas would impart into the final bread.<sup>444</sup>

## Oats

Even with the assertion that barley bread was the most common medieval bread in Scotland, oat bread was also common. Like barley, oats do not make very good loaf bread. Once again, however, it did not stop their use in breads. Oats played a very large role in the diet of medieval Scotland and so it is not surprising to see them in bread. The role of oats in the Scots diet was so large that oatcakes are the first food mentioned by outsiders when referring to Scottish diet. The 14<sup>th</sup> century *Chronicles* written by Jean Froissart, describe a basic oatcake cooked on a griddle or heated stone.<sup>445</sup> Oatcakes continue to be important, as the 16<sup>th</sup> century report by Fynes Morrison, mentioned above, said that the average person was still eating oat cakes (referred to as hearth cakes).<sup>446</sup> These reports continue through the late 17<sup>th</sup> century with Rev. Thomas Morer's visit to Scotland in 1689 including comments about how bread was generally made of oatmeal and cooked on iron plates or stones.<sup>447</sup> The extent to which oat-based bread was important within the Scots' diet was such that Fenton argues that both the

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<sup>441</sup> Fenton, *The Food of the Scots*, 5, 258.

<sup>442</sup> Brears, *Cooking and Dining*, 110.

<sup>443</sup> *The english housewife*, 210.

<sup>444</sup> *Ibid.*, 210-211.

<sup>445</sup> Fenton, *The Food of the Scots*, 5, 122. The quoted text from Froissart is as followed: When they have eaten too much of the sodden flesh, and their stomachs appears weak and empty, they place this plate over the fire and, mix with water their oatmeal and when the plate is heated, they put a little paste upon it, and make a thin cake, like a cracknel or biscuit, which they eat to warm their stomachs.

<sup>446</sup> *Ibid.*, 122-123.

<sup>447</sup> *Ibid.*, 124.

word *breid* and *cakes* refer to oatcakes rather than any other type of bread.<sup>448</sup> He then stated that it was not until the 18<sup>th</sup> century that the term *loaf-bread* started to be used, to differentiate it from the oat-based *breid*.<sup>449</sup> It does not seem to be the only use of the term though, as the *Treasurer's Accounts* all referred to breads being consumed by those more likely to have higher quality wheat breads rather than barley or oat bread. This would indicate that *breid* was a multi-purpose term that could mean oatcakes or could mean some other kind of bread product. Oat breads were eaten across the social classes and were not limited to lower classes. In 1553 the Cistercian monks at Coupar Angus each received one pound of oat bread per day. This was the same amount they were given in wheat bread.<sup>450</sup>

## Rye

Rye was unique as it was the only grain other than wheat which could be used to make a bread that could develop gluten sufficiently to make a domed yeast-risen loaf.<sup>451</sup> It does not convert into gluten as well as wheat but, as explained in Chapter 2: Establishing background on grains Wheat, it was a crop that will grow where wheat does not. It was a stronger grain that required hotter water for dough than did that made with wheat flour.<sup>452</sup> While rye has an advantage in that it can grow and produce harvestable yields in harsher climates than wheat, its more bitter taste tended to be regarded unfavourably in Scotland, as it was likewise over the rest of Britain.<sup>453</sup> It was a darker and more sodden bread than even that made with barley, peas, and other legumes used in bread-making, and was often even sourer.<sup>454</sup>

Even though rye was not seen as ideal, it was used in Scottish bread-making. As with barley and oats, rye was sometimes used in combination with other grains. Specifically, the victualling of the great ships in the 16<sup>th</sup> century had many references to sour bread, which was described

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<sup>448</sup> Ibid., 190.

<sup>449</sup> Ibid., 256.

<sup>450</sup> *Coupar Angus Rental*, 1-2, vii.110.

<sup>451</sup> *Science of Bakery Products*, 33.

<sup>452</sup> *The english housewife*, 210.

<sup>453</sup> *Science of Bakery Products*, 186.

<sup>454</sup>Jago and Jago, *The Technology of Bread-Making*, 362.

as half wheat and half rye.<sup>455</sup> This bread was not unique to Scotland, as 14<sup>th</sup> century Parisian bakers would use this mixture of wheat and rye as well.<sup>456</sup> The bread was coarser than that made entirely of wheat but would keep for longer.<sup>457</sup> This longer life would explain at least part of its use on ships.

Rye bread also appeared in the rental accounts of the Archbishopric of St Andrews in the reports of the granitar in his accounts for the years 1545-1546. It was during a time of war, highlighted by expenses of grain for bread for French troops who were aiding the Scots in the conflict, as well as some grain going to the main Scottish host that was fighting against the English.<sup>458</sup> Its lack of use at any other time shows it was not the preferred grain in any sense and was only used when wheat was less readily available. Rye was not always seen as the worst option. Meal was used for bread once for the household of Cardinal David Beaton at St Andrews but generally was only used for bread for horses.<sup>459</sup> Similarly, harvest workers in England were given rye as part of their bread allotment, until the price went up and it was switched entirely to barley.<sup>460</sup>

## Form

While it is arguable that the decision for grain type plays the largest role in the quality of the bread, establishing the shape and size of the bread is needed for knowing the impact of each grain. The first distinction to keep in mind is whether the bread was in the form of a loaf or if it was flat. The second is if the bread had been leavened or not. The third is the size of each loaf or unit of bread.

In respect of the first point about shape, it has been observed that “Scotland, with its tradition of the open hearth, lies in the flat bread zone of Europe.”<sup>461</sup> Flat breads simply require less

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<sup>455</sup> *Treasurer Accts.*, V.488, 491, 493.

<sup>456</sup> Crossley-Holland, *Living and Dining in Medieval Paris*, 66.

<sup>457</sup> *Ibid.*,

<sup>458</sup> *St Andrews Rentale*, 185, 195, 197.

<sup>459</sup> *Ibid.*, 194.

<sup>460</sup> Dyer (2000) 91

<sup>461</sup> Fenton, *The Food of the Scots*, 5, 81.

equipment and less fuel. You need a flat surface formed out of a material that can be heated, a source of fuel for a fire, and a place to let the heat meet the cooking-surface. Loaf bread requires more equipment to prepare it, as an enclosed oven is needed. The term loaf does not appear in the *ER* and bread seems to be viewed as an object, recorded as a certain number of 'breads'. There was an implication of the form of bread due to the use of the term bread, rather than loaves, except that each loaf was seen as an individual unit, rather than being dealt with in terms of a specific set of units of multiple loaves.

The lack of chemical leavening agents before the 19<sup>th</sup> century means that all breads for pre-modern Scotland were either yeast-risen or entirely unleavened. Not having a leavening agent, however, does not mean that the bread was always thin, like Scandinavian flatbreads. A bread could be flat but not necessarily as thin as an oatcake. A yeast-risen loaf was airier than one without yeast, whether it was a flatbread or a loaf bread. Yeast, however, had requirements.<sup>462</sup> Firstly, yeast-risen bread required gluten.<sup>463</sup> Without the elasticity provided by gluten, the dough would be unable to contain the carbon dioxide that is the by-product of fermentation and expand. It means any bread made entirely of oats, barley, and/or peas would not be able to be made into light and airy loaves.

## Size

The largest collection of laws related to bread focused on the assize, which regulated the size, weight, and quality of bread, with size of each quality of loaves changing with the price of wheat.<sup>464</sup> Not only was pricing done this way all over Scotland, but this style of pricing was used in England and was widespread over the rest of Europe. The weight change was designed to allow for a stable bread price while still allowing for a certain amount of profit to the bakers

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<sup>462</sup> The exact role and source for bread yeast, as well as further needs, will be discussed later in the chapter.

<sup>463</sup> It should be clarified that while this is no longer true, it was the case until very recently. Without the elasticity that gluten brings a dough, yeast is unable to produce air bubbles that remain trapped in the dough.

<sup>464</sup> James Davis, "Baking for the common good: a reassessment of the assize of bread in Medieval England," *The Economic History Review* 57, no. 3 (2004); Sarah Peters Kernan, "From the Bakehouse to the Courthouse: Bakers, Baking, and the Assize of Bread in Late Medieval England," *Food & History* 12, no. 2 (2014).



when the wheat price increased.<sup>465</sup> This pricing method differs from ale, where the price of the ale itself would change, rather than getting different quantities based on the price of malt. The actual outcome for the assize is debated but it was used in Europe from the late 8<sup>th</sup> century until the 18<sup>th</sup>, meaning any flaws it created were not disruptive enough to stop the practice.<sup>466</sup>

The stability of price did not mean the product size rarely changed. The prices for wheat could fluctuate very quickly and even changed by season. This movement led to substantial changes in weight in only a year or so. The clearest examples come from just after the period on which this study is focused. For example, in Dundee, the weight of both two-penny and one-penny loaves changed three times between 1521 and 1523.

*Table 3 - Dundee loaf weights*

	<i>August 1521</i>	<i>April 1522</i>	<i>? 1522</i>	<i>August 1523</i>
Two-penny	22 ounces	16 ounces	18 ounces	16 ounces
One-penny	11 ounces	8 ounces	9 ounces	8 ounces

Edinburgh had also seen movement in the weight of loaves across a variety of prices, which changed depending on the prices of wheat and if they were producing it within the burgh or outside its limits. In February 1528 wheat being priced at 12s meant that one-penny loaves were meant to be 11.5 ounces.<sup>467</sup> The prices of wheat were not always listed in the legislation,

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<sup>465</sup> Kernan, "From the Bakehouse to the Courthouse," 141-142.

<sup>466</sup> Davis, "Baking for the common good," 466.

<sup>467</sup> *Edinburgh Burgh Recs.*, 1, vI 233.

but they changed several times between 1528 and 1552.

Table 4 – Edinburgh bread weights (1)

Source: Edin. Recs.

	1 <i>February</i> 1528	8 <i>October</i> 1529	16 <i>November</i> 1535	8 <i>January</i> 1536	9 <i>January</i> 1536	7 <i>October</i> 1536	9 <i>June</i> 1545	7 <i>October</i> 1547	20 <i>June</i> 1548
1d	11.5 oz								
2d – inside		18 oz	17 oz	17 oz	18 oz	21 oz			
2d – outside						24 oz	21 oz		
4d – inside						52 oz		20 oz	22 oz
4d – outside							42 oz	24 oz	
Brown bread			38 oz	38 oz					

Table 5 – Edinburgh bread weights (2)

Source: Edin. Recs.

	28 June 1548	7 December 1548	28 June 1550	11 September 1550	24 February 1551	10 April 1551	10 October 1551	8 April 1552
3d – inside	15 oz							
4d – inside		20 oz	12 oz	20 oz	13 oz	20 oz	20 oz	16 oz
4d – outside			16 oz		19 oz	24 oz	24 oz	20 oz

In the case of Aberdeen, the expected weight of a loaf changed with every 2d change in the price of wheat (per boll), and it is worth noting that the weight also applies for wheat prices 1d over and under the given price.<sup>468</sup> This range was likely given to prevent changes with every minor fluctuation of wheat prices, but it is noted that it leads to an overlap where a 17d price could be of the same weight as at 16d or 18d. The inconsistency in price was either due to the lack of clerks' familiarity with the law (as Gemmill and Mayhew argue) or it perhaps depended on if 17d was reached as a rise in price from 16d or a lowering of price from 18d. They do, however, note that the assize of rye bread sometimes had flexibility. The same flexibility may

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<sup>468</sup> *Aberdeen Registers Online: 1398-1511* vol 6 238.

also have been true for wheat bread prices.<sup>469</sup>

## Bakers

Unlike brewing, baking was a male-dominated industry.<sup>470</sup> Rather than being a second source of income for a household, it tended towards being an occupation performed at a different location where specialist facilities – including large, permanent ovens – existed. Baking had a level of specialisation in it. Beyond those just noted as being bakers, cake bakers in the 16<sup>th</sup> century were referred to by a special term (*pistori laganarum*).<sup>471</sup> Like most other jobs of the time, training was done at least partly by apprenticeship, although at least one baker in Perth, John Peblis, was paid 20s per year in 1506 and 1507 to train another, Gavin Blair, in how to be a baker.<sup>472</sup>

Not all bread was produced by professional baking. Breads not requiring an oven could be made in smaller homes rather than professional kitchens or the bakehouses of lordly or monastic estates. Accordingly, oatcakes were primarily a domestic item made by women.<sup>473</sup> It was also not always made for consumption in the household of those making it as it also made for market sale, with women selling oatcakes to earn extra income for the household.<sup>474</sup> Their service benefited the poorest in a town, especially those who could not afford the bread sold by guild baxters.<sup>475</sup> During times of famine, the selling of oatcakes was allowed, but it generally was not viewed well, and was occasionally banned.<sup>476</sup> This contrasts with elsewhere in Britain

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<sup>469</sup> Loaf weight also varied according to the quality of the bread being made. The basic rule was that higher quality bread was lighter than lower quality breads. The specifics of the size are heavily regulated by the assize and will be discussed in detail below along with the laws surrounding bread.

<sup>470</sup> Ewan, "Crime or Culture?," 122.

<sup>471</sup> *Dunkeld Rentale*, 37, 44, 117, 199, 212, 218, 233, 241.

<sup>472</sup> *Ibid.*, 199, 204.

<sup>473</sup> Elizabeth L. Ewan, "'Hamperit in ane hony came': Sights, Sounds, and Smells in the Medieval Town.," in *A History of Everyday Life in Medieval Scotland, 1000 to 1600*, ed. Edward J. Cowan and Lizanne Henderson (Edinburgh: Edinburgh University Press, 2011), 115.

<sup>474</sup> Ewan, "Crime or Culture?," 122. This baking of oatcakes was the most common reason for women being tried by town courts

<sup>475</sup> *Ibid.*, 122

<sup>476</sup> Ewan, "For Whatever Ales Ye," 122.

where even the most poor in urban settings could afford wheat bread. It is perhaps due to the difference in climate which made local wheat production less likely.

Oatcakes were not the only types of flat breads cooked on stones or griddles that would have been prepared by each household, which would generally also have meant being prepared by women. This individual preparation by women, paired with the general lack of documentation of the habits of the lower social classes, would explain why most of these breads were not well-documented. This strong dichotomy of domestic baking always being either fully domestic or fully professional contrasts strongly with brewing, which functions as both a domestic and professionally regulated market.

## Quantity

Bread was undoubtedly an important part of a medieval person's diet, but it is not always possible to know for certain exactly how much of it people ate on a daily basis. There are examples where allotments of bread per person are known, such as the 13<sup>th</sup> century English harvest workers in Sedgeford who would consume anywhere up to almost half of their daily calories (41-49%) in the form of bread. This level was lowered in the 14<sup>th</sup> and 15<sup>th</sup> centuries and many of the calories were replaced by ale.<sup>477</sup> Bread still remained a major source of calories and in 1553 the brothers in Coupar Angus Abbey were each granted sixteen ounces of wheat bread and sixteen ounces of oat bread per day.<sup>478</sup> This was at the higher end of consumption, as indicated by the household accounts of James V's wife, Marie de Guise, where everyone was given either half a loaf or a full loaf per day.<sup>479</sup> Even at the lower end of the social spectrum amounts of bread per person may seem very high but it is important to remember the centrality of bread as a calorie source in a medieval person's diet.

The victualling of ships is another good source as the records often specify how many people were aboard and how much bread they received per day. Bread allocations on ships perhaps

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<sup>477</sup> Dyer, *Everyday Life in Medieval England*, 82.

<sup>478</sup> *Coupar Angus Rental*, 1-2, vII 110.

<sup>479</sup> John Harrison, *Stirling Castle Palace 2004-2008: Ladies & Waiting - Mary de Guise at Stirling in the 1540s* (Edinburgh: Historic Scotland, 2008), 26.

signal that the bread brought on board was not the only bread available. Several allocations for ships in 1513 designate one loaf per day for each person on board, but then list a quantity of loaves that is insufficient for the number of people and days.<sup>480</sup> While the numbers reflect their role in feeding sailors, and do not represent people in other roles, they can give an idea for bread quantities for a set group of people.

Of those laws not linking directly to either the size of loaves or to who was able to bake, most were related to pricing bread by quality determined by examiners, because it was seen as an essential item that was too important for craftspeople to fairly judge on their own.<sup>481</sup> Later, when overcharging bakers were part of the problem, as reflected in the list of craftspeople who were overcharging to the point of causing dearth in Edinburgh, effort was put in to try to regulate the pricing more closely.<sup>482</sup>

The last set of laws written for bread focused on its role as a commodity. As with ale, this was first shown in surviving national legislation in 1357, which required bread to be sold to travellers at reasonable prices, although later versions were enacted in 1424 and 1535.<sup>483</sup> Such pricing concerns were not limited to travellers as when prices were generally seen as unfair, thus depriving people of necessary bread, other legislation was written to punish those who charged too much.<sup>484</sup>

While wheat bread seems to have been the focus of laws, regulations also affected breads of other varieties. Aberdeen specifically outlawed the selling of oatcakes, with the reasoning that oats, as well as the oatcakes made from them, were the staple food of the poor. They were viewed as being a domestic product to be produced at a domestic scale only and not to be sold at retail.<sup>485</sup> This notably contrasts with the trend in England toward even the poorest in urban

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<sup>480</sup> *Treasurer Accts.*, IV.495, 497, 498. Both John Bertson's Bark and the Bark of Abbeyfield have 1500 loaves allocated for sixty men for forty days while saying each man gets one loaf per day. In the same year the Spanish Bark has 1500 loaves for forty men for forty days at the same one loaf per man per day.

<sup>481</sup> *The Records of the Parliaments of Scotland to 1707*, A1496/6/6.

<sup>482</sup> *Ibid.*, 1535/55.

<sup>483</sup> *Ibid.*, 1357, 1424/23, 1535/32.

<sup>484</sup> *Ibid.*, A 1496/6/6.

<sup>485</sup> *Changing Values*, 40.

areas having access to wheat bread. Even more than elsewhere in Scotland, Aberdeen and surrounding areas would have produced wheat infrequently enough to disallow widespread wheat bread consumption.

## *Baking*

As with brewing, the exact details of how bread was baked was not written down any time during the period of this study. Due to a lack of contemporary sources containing recipes, methods and recipes need to be estimated based on a combination of early modern 18<sup>th</sup> and 19<sup>th</sup> century recipes and ingredients and equipment known to be used in medieval Scotland.

## Equipment

The preparation of bread could be scaled from small enough to provide for a single household, to large enough for a large household with servants or a royal or lordly castle, or to be sold at market. The location was a key matter, as placing things near each other indicates shared resources and a need for access between the locations. It was for these reasons that malt houses, brew houses, and bake houses were usually located close to each other, as can be seen in a number of surviving medieval examples in castles or monastic ruins. They have similar needs in relation to fuel requirements, access to grains, long hours, and ambient warmth for yeast in the cases of brew houses and bake houses.<sup>486</sup>

Making bread requires equipment on or in which to cook it. In its most basic preparation, a flat surface and a source of heat are needed. Cottages and small houses would do whatever baking was necessary in a central hearth, rather than having a separate bake house which would have an oven.<sup>487</sup> This central hearth could have been one of two basic designs. The earliest and most simple hearths were a brazier over a fire and would leave few archaeological remains.<sup>488</sup> The second style of hearth, which was essentially a floor-level or slightly raised platform, formed of

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<sup>486</sup> Brears, *Cooking and Dining*, 36.

<sup>487</sup> *Ibid.*, 109.

<sup>488</sup> Holdsworth et al., *Excavations in the Medieval Burgh of Perth 1979-1981*, 141.

stones, and sometimes encircled by a ring, was in the middle of the floor, and these are frequent finds in archaeological digs on medieval Scottish sites. At Perth all of the excavated buildings where the full width was revealed had these hearths located most centrally, where the roof would be highest.<sup>489</sup> In excavated buildings from the 12<sup>th</sup> to 14<sup>th</sup> century in particular, the presence of this type of hearth was so common that they appeared in all complete structure plans and are only missing in incomplete plans, suggesting they were in the unexcavated area, rather than not originally being part of the structure.<sup>490</sup> Most buildings had one hearth but one had two hearths, one in each of its two rooms.<sup>491</sup> The design had lasting appeal and the use of this style of hearth continued to be widespread in lower-class domestic contexts Scotland until the late 18<sup>th</sup> century.<sup>492</sup> It is important to note that cooking was not the only purposes of these hearths and they also served to heat and provide light.<sup>493</sup> Also, hearths were not always used for food preparation as several excavated in Perth were used for metalworking.<sup>494</sup>

Flatbreads or girdle cakes could be prepared entirely on a bakestone but to prepare any type of loaf bread required an oven. It does not necessarily mean a full-time oven as not everyone had enough space for such a structure. Creativity would have allowed the preparation of smaller loaves of bread, even without an oven. If someone without a permanent oven wanted to bake, a cooking pot turned upside down on a bakestone or hearth could suffice.<sup>495</sup> This did limit the size of the items which could be baked to that which could fit under the pot.

Even if one could have afforded the space, the ownership of an oven was sometimes limited by burgh laws to burgesses or for burgh families. Such limits on private ownership of ovens were

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<sup>489</sup> Ibid., 128.

<sup>490</sup> Ibid., 86.

<sup>491</sup> Ibid., 129.

<sup>492</sup> Fenton, *The Food of the Scots*, 5, 323.

<sup>493</sup> Holdsworth et al., *Excavations in the Medieval Burgh of Perth 1979-1981*, 65, 141, 142. 2

<sup>494</sup> But some hearths were used for food. With the hearth being established as a source of heat, bread could be prepared on a bakestone of either clay or iron, although soapstone was favoured in the Northern Isles. Bakestones alone could be used for simple flatbreads or for oatcakes. While iron versions of bakestones start to appear in the thirteenth century, it is not likely universal. Earlier ones are said to be likely mistaken for roofing slates by archaeologists, making the extent of their use harder to estimate *ibid.*, ; Brears, *Cooking and Dining*, 110-111, 112.

<sup>495</sup> Brears, *Cooking and Dining*, 113.



in part due to the dangers associated with ovens, because they were a fire risk and needed to be kept away from wooden buildings.<sup>496</sup> This fear of fire was valid, as fires were frequent and were recorded as having caused widespread destruction in several Scottish burghs.<sup>497</sup> Concern over fire was also reflected in legislation in 1427, which specified a list of flammable items which were not allowed to be placed near or above fires, with a fine of 40 shillings set as punishment for causing a fire through such careless actions.<sup>498</sup> This concern over fire did not completely disallow use of ovens, and individually-owned ovens were more likely in the latter parts of the 14<sup>th</sup> and 15<sup>th</sup> century than earlier.<sup>499</sup> It still did not make them common but they were in more widespread use than earlier centuries, although at least in Dundee owners of these ovens were not allowed to sell the bread they made from personal ovens, as the sale of bread was limited to professional bakers.<sup>500</sup>

The presence of an oven was usually a sign of a professional baker, either because it was owned by a professional, because it was a self-sustaining religious order such as a monastery, or because it was within a household that was large enough to employ a baker. Having an oven did not necessarily mean it was used very often, as the household of the 14<sup>th</sup> century 'Goodman of Paris' may have possessed a bread-oven but bought most of their bread in town; ownership of an oven simply reflected the relatively high status of that household.<sup>501</sup>

Ovens generally represented specialist usage, either because the bread was to be sold or because it was needed to feed a larger household. They also tended to be located outside of the normal bounds of housing. In part this would be to help keep the work in a separate space, but also because of the fire risk. In support of this latter view ovens did appear in the excavation in Perth but not with the same level of frequency as hearths. One building which contained an

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<sup>496</sup> Ewan, *Townlife in Fourteenth-Century Scotland*, 22.

<sup>497</sup> Despite fear of fire associated with ovens, the need to prepare bread was more of a priority. While bread was taken on ships as part of their victualling, baking was also done on board. In at least one instance clay was provided for the creation of an oven on board for use during travel. *Treasurer Accts.*, IV.488.

<sup>498</sup> *The Records of the Parliaments of Scotland to 1707*, 1427/3/7.

<sup>499</sup> Dyer, *Standards of Living in the Later Middle Ages*, 158.

<sup>500</sup> Elizabeth P. D. Torrie, *Medieval Dundee: A Town and its People* (Dundee: Stevenson Printers Ltd, 1990), 83.

<sup>501</sup> Crossley-Holland, *Living and Dining in Medieval Paris*, 32.

oven is referred to as a free-standing kitchen wing associated with a larger home.<sup>502</sup> There were a few other ovens found in the excavation, but the lack of detail in the published report makes it challenging to determine their physical relationship to other buildings, other than acknowledging that they were not noted for being located somewhere where an oven is not expected. Other towns had oven placements which follow this trend. A leper hospital in the 14<sup>th</sup> century outside St Andrews had ovens in stone buildings on the north part of the property and away from housing.<sup>503</sup> A stone oven built in the late 15<sup>th</sup> century at Smailholm Tower was similarly outside both main and secondary housing.<sup>504</sup>

While ovens were generally owned by only a few, there were exceptions. Bread ovens that have been excavated can be described best as small, domestic, and outdoors.<sup>505</sup> Such ovens were not large enough in scale to be used for commercial operations but were perhaps shared between several nearby domestic households. Shared ovens could have only been used for a variety of bread types, as Edinburgh burgh legislation stated that the furnace could be used for one-penny and two-penny bread.<sup>506</sup>

## Ingredients

### *Flour/Meal*

The first question to arise for bread flour was the type of grain used, the details of which have been covered earlier in this chapter. Generally speaking, the term flour may have only been used for the resulting product from milling wheat, while meal was used for other grains, but for this they still serve the same purpose. Later, the milling processes for wheat was more refined than those used for grinding barley and meal but this may have been the result of a more modern change in technologies.<sup>507</sup> The term flour will be used for simplicity but is being

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<sup>502</sup> Holdsworth et al., *Excavations in the Medieval Burgh of Perth 1979-1981*, 141.

<sup>503</sup> Yeoman, *Medieval Scotland*, 67.

<sup>504</sup> *Ibid.*, 106.

<sup>505</sup> *Ibid.*, 82.

<sup>506</sup> *Edinburgh Burgh Recs.*, 1, I.233.

<sup>507</sup> Jago and Jago, *The Technology of Bread-Making*, 362.

used to refer to any milled grain used in bread-making.

The next factor of importance is the level of milling, as well as the level of extraction. The level of milling was defined by what size each piece of the grain would have been broken down to. It was easier to either grind the grain into something that was a coarser or inconsistent type of a grind. Generally, the more even and small the grind, the higher the quality.

The size was not the only factor as the fineness of flour could also be determined by its extraction rate, meaning how much of the original material was left after all processing was done.<sup>508</sup> Wholemeal flour was 100% extraction.<sup>509</sup> From there the more that was removed, the finer the overall product. It is easy to assume that this was what medieval bakers would use but it was not the only grade of flour used. While wholemeal was probably the most common form of flour, medieval millers and bakers were able to produce a wide variety of levels of refinement in flour.<sup>510</sup> While his recipe for cheat bread was modified for modern bakers, Brears's recipe used wholemeal flour in which the coarsest bran is sieved out.<sup>511</sup> 100% wholemeal may have been the most efficient as it used all of the material from the wheat but it had disadvantages. Firstly, as the entire kernel was used, it also contained the fattier germ which led to a shorter shelf life as it would oxidise.<sup>512</sup> Containing more of the bran also means that any product made would be coarser.

If we accept that most people were not using 100% of the original grain, we need to establish how processed the flour was and how it was done. Scottish sources do not seem to talk about it very frequently, but English ones do. Beaulieu Abbey's account books suggested a 50% extraction flour was their standard.<sup>513</sup> Any higher extraction and it starts to be regarded as an inferior flour and given the term *farina*, instead of *simila*.<sup>514</sup> The quality of the flour also

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<sup>508</sup> *Science of Bakery Products*, 59.

<sup>509</sup> *Ibid.*, 65.

<sup>510</sup> Brears, *Cooking and Dining*, 15, 109.

<sup>511</sup> *Ibid.*, 118.

<sup>512</sup> *Science of Bakery Products*, 65.

<sup>513</sup> Dyer asserts a range of mill loss from 1/8<sup>th</sup> to 1/5<sup>th</sup>, to as high as one quarter or one third. This would give extraction of 87.5%, 80%, 75%, or 66.7%, which seems high. Slavin, *Bread and Ale for the Brethren*, 149; Dyer, *Standards of Living in the Later Middle Ages*, 111.

<sup>514</sup> Slavin, *Bread and Ale for the Brethren*, 154.

mattered, as while lower quality flours can be used the preparation methods would need to be adjusted to end up with the same quality of bread.<sup>515</sup>

Whether the grains were high or low quality, the few basic methods to extract grain from the remaining bran and germ were the same. With either, the goal was to separate out the larger pieces of bran from the smaller and finer bits of the grain. Less refined flour could be made via an open weave canvas spread over a hoop, but more finely refined grain would need a cloth bag which could be shaken to force the finer pieces through.<sup>516</sup> Either way, the process was labour-intensive, especially more so when the bolting cloth was finer. The extra labour, in addition to the loss of material, was the reason highly processed flours were so expensive as to price them beyond the means of most people.

Techniques to obtain higher quality flour more efficiently developed over the period under analysis. Early 14<sup>th</sup> century London had a dominance of those baking brown bread but it changed over the next century to being dominated by those baking white bread.<sup>517</sup> The switch was apparently the result of improved methods for securing the finer flours but at reduced labour costs, which made the product cheaper.

## Water

Water was what turns the flour into a viable dough. In the case of loaf bread, it allowed it to be kneaded to produce gluten and for bannocks it allows for the creation of the porridge used to form the dough. The hardness of water had an effect on the quality of the resulting bread, with softer water leading to breads which were not as light as those made with harder water common in England, but which were also softer and less dry than those made with harder water.<sup>518</sup> It was basically as if softer flour was being used than was actually in use, which is perhaps the reason for the preference for harder flour mentioned Chapter 2: Establishing

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<sup>515</sup> Jago and Jago, *The Technology of Bread-Making*, 353.

<sup>516</sup> Brears, *Cooking and Dining*, 115.

<sup>517</sup> Dyer, *Standards of Living in the Later Middle Ages*, 199.

<sup>518</sup> Jago and Jago, *The Technology of Bread-Making*, 309.

background on grains.<sup>519</sup>

Water is the weakness of bread in that it is what allows it to go bad. It is for this reason that medieval bread seems to have been drier than bread now, with an average moisture of 22%, compared to 35-40% in modern loaves.<sup>520</sup> At least part of that is due to bread having been dried. As mentioned earlier, there were different terms for bread when freshly baked and after drying. Adding in the extra step did extend shelf life but it also made the bread drier and less pleasant to eat.

## Yeast

While bread could be made simply with flour and water, yeast is what allowed for more than flatbreads. The species of yeast used in breadmaking, *Saccharomyces cerevisiae*, was the same variety used in the brewing of ale.<sup>521</sup> There were a few basic ways to obtain yeast for breadmaking. The simplest was to use some form of sourdough starter because the spontaneous fermentation that creates sourdough was the oldest form of leavening for bread.<sup>522</sup> A simple sourdough starter would be the most basic form of yeast propagation but not the only one in which yeast was shared between batches. Brears used a combination of descriptions of medieval breads and early post-medieval recipes to break the uses of these into two basic methods, the simplest of which was to keep using a kneading trough which had remainders of previous batches stuck to the sides and the more advanced of which required taking bits of previous dough batches to make a liquid (effectively creating a starter) which was then added to a later batch.<sup>523</sup> This would allow for the continual passing on of the yeast from batch to batch and is more similar to the method still used to create and maintain sourdough starters.

Because these methods for obtaining yeast use a slurry of grain and yeast in some form, the

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<sup>519</sup> Ibid., 309, 317.

<sup>520</sup> Slavin, *Bread and Ale for the Brethren*, 149.

<sup>521</sup> *Science of Bakery Products*, 68.

<sup>522</sup> Pasquale Catzeddu, "Sourdough Breads," in *Flour and Breads and Their Fortification in Health and Disease Prevention*, ed. Victor R. Preedy, Ronald Ross Watson, and Vinood B. Patel (London: Elsevier, 2011), 38.

<sup>523</sup> Brears, *Cooking and Dining*, 117.

grain used in each batch of dough or starter played a role in the overall quality and traits of the bread, as did the amount of the starter as a percentage of the dough. It was actually from these roots that sourdough's main advantages drew. Not only was it simple to make but sourdough had advantages, such as changing the structure of bread made from entirely rye enough to allow it to rise, despite lacking the gluten found in wheat, which would also allow it to be more stable than if other forms of yeast were used.<sup>524</sup> It also improved bread that was a mixture of 60% rye and 40% wheat, with the improvement increasing when the dough was up to 20% starter, and the texture was negatively affected if the percentage was as high as 40%.<sup>525</sup> As with brewing, medieval sources did not discuss what would happen if there was a failure in a previous batch, although it is fair to assume that they would know how to get an active yeast sample again. The yeast grown by any of these methods could be created again, such as with the 17<sup>th</sup> century advice for housewives, which said if the kneading trough was not effective, the dough would need to be left in longer or would need the assistance of boiling water.<sup>526</sup>

The other method was to obtain yeast by skimming it off the top of actively fermenting ale, referred to as the ale barm, which was the prescribed method for housewives in the 17<sup>th</sup> century.<sup>527</sup> It was not an especially concentrated form of yeast and required three pints per bushel of meal.<sup>528</sup> Even as late as the early 20<sup>th</sup> century, brewer's yeast was noted for being weak, although it was also noted for producing a sweeter or more nutty bread than other varieties of yeast.<sup>529</sup> Beyond being diluted enough to require a lot to be used to actually make bread, brewer's yeast was also unreliable, especially during the summer months, and led to a

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<sup>524</sup> Catzeddu, "Sourdough Breads," 39.

<sup>525</sup> Elena Bartkiene et al., "Parameters of rye, wheat, barley, and oat sourdoughs fermented with *Lactobacillus plantarum* LUHS135 that influence the quality of mixed rye-wheat bread, including acrylamide formation," *International Journal of Food Science and Technology* 52 (2017): 1478, 1479.

<sup>526</sup> *The english housewife*, 210.

<sup>527</sup> Brears, *Cooking and Dining*, 118; *The english housewife*, 209.

<sup>528</sup> *The english housewife*, 209.

<sup>529</sup> Jago and Jago, *The Technology of Bread-Making*, 224, 322-323. They noted that if used alone brewer's yeast would leave a bitter taste but given that it was written far after the adoption of the hop in all beers, it does not suggest that medieval ale yeasts would lead to bitter ale.

darker loaf than breads made with other forms of yeast.<sup>530</sup> The continued use of yeast as part of the remains from brewing in baking reflected how closely placed brewing and baking facilities could be, even though the tasks were performed by completely different people when done professionally.

Scottish barm may have also been a product of its own, although not necessarily until after the mid-16<sup>th</sup> century. James Meikle described three forms of such in the 1818: compound barms, virgin barms, and Parisian barms.<sup>531</sup> All were made in similar methods to the mash used for brewing described in the previous chapter but with different ingredients, such as how virgin barm used water and flour (presumably wheat) and Parisian was a combination of water, malt, and flour (presumably barley and wheat, in that order).<sup>532</sup> Because the compound barm involved the use of hops, it was unlikely to be used in medieval Scotland.<sup>533</sup> Compound barm was described as the older method of the latter two, but even older techniques could have fallen out of favour, to the extent that they were forgotten.<sup>534</sup>

Through either source, yeast was not the pure distilled product you could now buy and often contained contamination. It was thought that too much yeast would spoil bread and make it sour.<sup>535</sup> It was unlikely the yeast *per se* that caused this, it more likely being the bacteria that frequently exist alongside yeast with long lasting starters. It is this combination of yeast and

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<sup>530</sup> Ibid., 224, 323. They suggest that potatoes were used extensively to help the ale yeast, but potatoes were not introduced in Scotland, or even Europe as a whole, before 1550 so was a later addition.

<sup>531</sup> Ibid., 237-239.

<sup>532</sup> Ibid., 238-239.

<sup>533</sup> Ibid., 238.

<sup>534</sup> Ibid., It can be seen as a bold claim to assume that earlier versions of these methods existed because they rest in a place where very little strong evidence exists to prove it, although neither do any other alternatives. It is due to this lack of certainty that the idea is possible enough to present but not as more than a possibility.

<sup>535</sup> Albala, *Eating Right in the Renaissance*, 160.

bacteria that makes sourdough sour.<sup>536</sup>

## *Air*

While not actually an added ingredient in bread, there were four main methods to aerate baked products. The first method involved mechanically mixing the dough into batter to create foam. The second was from steam, which was created when water in a dough heats and becomes vapour. The third method was using yeast to create air bubbles. The last method was to use chemical leavening using items such as sodium bicarbonate, but its baking properties were not discovered until long after 1550.<sup>537</sup>

## *Conclusion*

In this chapter the use of various grains has been discussed, along with the various means in which grains were combined to create bread products. Wheat is the most common grain in modern bread but in medieval Scotland seems to have been accessible mostly to those from the highest levels of society. Instead, most people consumed bread made of barley, oats, rye, legumes, or a mixture of grains. Unlike with brewing, baking was often considered more of a professional task. It does not mean that the quality was more guaranteed, as ale was also a highly regulated field. Instead, it meant it was a more full-time occupation that a person, almost always male, would decide on as a profession.

Part of the reason for this professional status was because while flatbreads could be prepared with equipment most people owned, loaf bread required an oven. Ovens were not only expensive, but the fire risk associated with possession of ovens in urban areas led to controls on where ovens could be located. This limitation helped maintain the exclusivity of the industry, although that exclusivity was also enforced through legislation about who could sell bread. Despite both the legislation to protect professional baxters and the lack of access to equipment by those who had not made it their profession, it was clear that women were still entering the

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<sup>536</sup> Jago and Jago, *The Technology of Bread-Making*, 343.

<sup>537</sup> *Science of Bakery Products*, 52.



field on a domestic scale to sell, with records of court punishments showing how common this practice was.

The law also helped regulate the growing baking industry, both by stabilising prices and by guaranteeing quality. For some types, bread prices were generally kept stable, and the regulation was instead based around the size of the loaves at a given price. For others, the regulations concerning quality were the reason why many of the names of bread types are known, as each type was set to be sold at specific prices.

As with brewing, the unique features of 15<sup>th</sup> century Scottish baking rested in a smaller and more rural population compared to elsewhere in Britain and mainland Europe. Baking was usually a more professional trade than brewing, but only in the context of preparing risen loaf breads. Most of the bread consumed by the average person in 15<sup>th</sup> century Scotland, however, was not risen loaf bread. Scotland was in the flatbread zone of Europe. Loaves were still produced but the guild-regulated baking trade was less developed as an industry than it was elsewhere with more of the bread-making being very domestic flatbread production that was less regulated than either other baking or brewing.

## Chapter 5: Discussion: Where the grain goes

### *Introduction*

The goal of this research has been to define and expand upon the history of baking and brewing in Scotland between 1406 and 1513. To do so, this thesis took as its starting point a review of the main sources of primary data concerning grain production and continued with a discussion of the needs and traits of the primary grains that were being produced in 15<sup>th</sup> century Scotland. Most of these grains were also widely present over the rest of Europe, which has allowed for broad comparisons to be made between the Scottish and European experiences. The one exception may have been *bere*, which was a variety of barley apparently unique to Scotland.

In addition to this one type of possibly unique grain, a significant variance from English or mainland European 'norms' in exploring Scottish cereal production was the ratio of each grain produced as part of the overall harvest. The ability to produce different types of grain was primarily a function of the climate, but there are also questions of cultural preference and tradition to consider in exploration of cropping ratios. The 15<sup>th</sup> century is too early to discuss any possible innovation in Scottish cropping techniques because we lack an adequate volume of estate records to enable us to identify experimental practices or innovatory methods. However, there is clear evidence that the ratios of the grains grown changed over time, which seems likely to have been a consequence, mainly – but not necessarily solely – of environmental conditions, as the already uncertain climate went through two periods of significant cooling and wetting in the 15<sup>th</sup> century. There were also varied ratios regionally within Scotland, as there are many types of physical environments within its borders, marked by geological differences, varied rainfall and sunshine patterns, but the most common grains across all of these zones were oats and barley.

This initial discussion of grains led into a narrative which combined environmental, political, and cultural sources, to create a multidisciplinary overview of the long 15<sup>th</sup> century. Much of the climate history and major political narrative of medieval Scotland is already well-researched, so the goal here was to construct a synthetic overview, to provide background that

connects different elements of the established views that are not traditionally drawn together, rather than to create a wholly new narrative. The narrative is, of necessity, high level, and is focussed on the major political and environmental trends rather than offering detailed historical accounts of brewing or baking or immersing itself in the minutiae of royal and baronial estate administration and accounting practices. It forms the context necessary to support the discussions of brewing and baking which followed. Only with this background knowledge established could the thesis move onto more topical discussions of brewing and baking.

The analyses of both brewing and baking also included descriptions of the general processes, which draw on a wider body of knowledge of how ale and bread are produced. Brewing, as a process, continues to be mostly understood by a restricted group of professional brewers and hobbyists, with broader audiences often only vaguely aware of how grains are eventually transformed into an alcoholic beverage. Where possible, the differences between medieval and modern equipment were highlighted, explaining how the technology was used, but identifying that the actual method has often not changed. The same level of method was not covered when discussing bread, because, while the home-preparation of bread is not necessarily common, it is a simpler product and better understood by a broader community. For this reason, that discussion focused on methods unique to the medieval period, as well as how the ingredients work on a more fundamental level.

Medieval ale-brewing is a fascinating topic. Its production required very little equipment, was a task that normally was done in the home, led to a product with a short shelf life, and brewers could enter and leave the field when they felt it best suited them.<sup>538</sup> All of these characteristics of the European ale-producing tradition were also present in medieval Scotland, although brewing remained at this largely domestic scale far longer in Scotland than it did elsewhere in Britain and mainland Europe, where the rise of large-scale beer-making brought increased production costs and a professionalization/commercialization of the business. Throughout the Middle Ages, it was also a craft run largely by women, at least in the sense of them producing

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<sup>538</sup> Assuming they had not broken any laws, which led to them being prohibited from brewing.

and selling brewed drink.<sup>539</sup> As identified and discussed in the thesis, not all women were allowed to brew, but in comparison to many other ways to make money it best featured traits that made it ideal for women, both as a short-term occupation for the married, and a longer-term one for widows.

In comparison, baking was a more professional industry, especially by the sixteenth century. It was not more regulated by legislation than brewing, as both had clear legal guidelines around pricing and quality, but it generally carried more prestige for those in baking roles, which led to the formation of protective trade associations. In Scotland, by the thirteenth century the bakers in the kingdom's various burghs had begun to form guilds, which became progressively more exclusive and protectionist and could be used by leading guild-members to gain positions of power within the burgh communities. This more formal aspect of baking as a profession was not unique to Scotland. Where the significant difference lay between Scotland and other parts of Great Britain, and the European mainland, was in the different types of bread produced. Not only was Scotland traditionally in the zone of flatbread production - in common with Scandinavia, for example - but we find that women were often brought before burgh courts for their breaking of rules that prevented them from baking and selling types of bread that have not been well-researched in past studies of British and European baking traditions. Breads made with barley and oats were also more common compared to elsewhere in Europe, with the reasons lying both in the climate-related (in)ability to produce wheat everywhere in Scotland and because it was a much more domestic task than elsewhere. It was in these factors that Scottish baking was unique. The high price of fuel meant it was better to both brew and bake on at bulk, when possible.

Another factor leading to a unique tradition with brewing Scotland's low population density affected baking in another way, as it perhaps delayed the growth of guilds until later than in the more populous English, Flemish, French or German cities. Without a major urban population, the type of specialisation and organising accomplished through a guild was not

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<sup>539</sup> They did not create the laws around brewing.

necessary and would instead be needless bureaucracy.

This present thesis stands out from previous studies through its emphasis on procedural descriptions of medieval Scottish brewing and baking rather than on its economic role. This methodological approach had been used in studies of baking traditions in other parts of the world, such as Peter Brears' practice- and performance-led research for *Cooking and Dining in Medieval England*, but never before for Scotland.<sup>540</sup> One goal in this thesis was to end this oversight and enable broader and more effective comparison with historic bread-making techniques and traditions elsewhere. As well as the goal of providing that comprehensive, innovative overview of brewing and baking in medieval Scotland, this thesis also sought to address specific questions about the factors, human and environmental, that drove technological and processual developments and shifts in cultural preferences for different types of bread, ale and beer. The original broad aim was to discern if the brewing and baking traditions of Scotland were unique, when compared to elsewhere in Europe, and if so, to what extent, how, and why? After reviewing the evidence for 15<sup>th</sup> century Scottish grain production, brewing, and baking, all of this knowledge needs to be put into the context of other European traditions. Only by doing this can it be determined if there was a unique 15<sup>th</sup>-century Scottish tradition for either product, which can be viewed through a cultural and culinary lens.

## Brewing

While the products of both brewing and baking were very important to all segments of medieval Scottish society across the distinct cultural traditions present in the 15<sup>th</sup>-century kingdom, the emphasis on producing barley and then converting this into malt, put the spotlight firmly on brewing traditions. The history of brewing ale in general was very old and widespread, with archaeological evidence highlighting its presence as a cultural phenomenon in the British Isles from at least the early Bronze Age. By the start of the chronological period covered in this study, it was a product that was carefully and closely regulated, even when it was being produced almost universally on a domestic scale and sold by those same home producers. This was not unique to Scotland; even having testers to decide pricing was a practice

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<sup>540</sup> Brears, *Cooking and Dining*.

known elsewhere in Europe. What was distinctive about Scottish brewing was its (non)relationship with hops, which has a domino effect influence on everything, from the fundamental brewing method employed, to the economic level and role of brewers and brewing, to who actually took on brewing as a vocation.

Brewing ale *per se*, therefore, was not uniquely Scottish, and neither was the later brewing of beer. Rather, it was the timing of the switch between ale and beer in Scotland that was the most distinctive aspect of the overall history of both. Quite simply, it was a development that took much more time to become established in Scotland than it did in other places in Europe. The very fast adoption of hops in places such as Holland and Germany – regions with which Scotland had strong trading connections throughout the medieval period – made the Scottish adoption of hops look very slow. But it is important to recognise that most places were slow to adopt the use of hops in comparison to those areas where their use originated and had become established firmly enough to be exported by the fourteenth century.<sup>541</sup>

A much more appropriate comparison for Scotland is the speed of the adoption of beer in England. Like in Scotland, beer was also a relatively late development in brewing in England and was not common until the fifteenth or sixteenth century.<sup>542</sup> Even when hop use did become widespread in England, it was not always favoured and was still often associated with foreigners, whereas indigenous brewers continued to favour ale-production. The establishment of hop use in England, however, was in part because beer-brewers there in the late fifteenth century were so often foreign as to inspire the creation of financial levies aimed entirely at foreign-born beer-brewers.<sup>543</sup> Beer was often viewed with a suspicion that created xenophobic stereotyping. For example, as Andrew Boorde wrote in the early sixteenth century, ale was the natural drink for the English and beer was only a proper drink for the Dutch, because it would make a man fat with a big belly like the Dutch.<sup>544</sup> Taste preference, especially when expressed

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<sup>541</sup> Unger, *A History of Brewing in Holland, 900-1900*, 53-73.

<sup>542</sup> DeLyser and Kasper, "Hopped Beer: The Case for Cultivation," 169; Duffy, Cobain, and Kavanagh, "From skill to skill," 72; Edwardson, "Hops: Their Botany, Production and Utilization," 161.

<sup>543</sup> Mate, *Trade and Economic Developments, 1450-1550: The Experience of Kent, Surrey and Sussex*, 62.

<sup>544</sup> Meussdoerffer, "A Comprehensive History of Beer Brewing," 22.

by fashion-drivers like the monarchy, also affected adoption of hop-use; both Henry VII and Henry VIII claimed they liked their ale without hops and so prohibited their use.<sup>545</sup> Hops were probably still being imported to England in the early 16<sup>th</sup> century, but this level of hostility did not help the industry grow. It was not until after the beginning of the reign of Henry VIII's daughter Queen Mary (1553-8) that an Act of Parliament in 1554 allowed hop growth in England.<sup>546</sup> From that point, beer was quickly adopted and became common. Here, the removal of legislative constraints triggered a rapid transition from predominantly ale to predominantly beer production on a large scale in England.

There was no similar tipping-point in sixteenth-century Scotland. Even though Scotland did not have similar examples of hostility toward hops and beer, expressed either popularly in literature or song or formally within legislation, their adoption was still slow in a European context, even compared to England. Beer might have been imported from European centres of production in the fourteenth century and sometimes created locally not long after; but it was still a niche product long after the period of this study. Not only was ale common in Scotland in the seventeenth century, while 'English beer' was specifically mentioned as a product available there, beer did not make it into the hands of those likely to have preferred beer elsewhere.<sup>547</sup> There is an often-voiced traditional view that the various Continental orders of monks, who were introduced into Scotland from the twelfth century both from England and directly from mainland Europe, had originally adopted the use of hops in beer-brewing because it would allow them to brew less frequently.<sup>548</sup> This might have been the case in the Netherlands and Germany, but it was not true for Scotland, as not all of the monasteries, nor major ecclesiastical establishments generally, seem to have adopted the hop. The early 16<sup>th</sup>-century records of the Bishopric of Dunkeld, for example, only report ale and not beer, and while the late 15<sup>th</sup> and 16<sup>th</sup> century accounts of nearby Coupar Angus Abbey have been said to have specified beer, this is the result of a modern translation into English from Latin *cervisia*, a noun normally used for ale.<sup>549</sup> Furthermore, neither the Coupar Angus material nor the

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<sup>545</sup> Edwardson, "Hops: Their Botany, Production and Utilization," 161.

<sup>546</sup> Meussdoerffer, "A Comprehensive History of Beer Brewing," 22.

<sup>547</sup> *Early Travellers*, 228.

<sup>548</sup> Unger, *Beer in the Middle Ages and the Renaissance*, 57.

<sup>549</sup> *Coupar Angus Rental*, 1-2, I.306, II.110; *Dunkeld Rentale*, 152, 168, 205, 358.

Archbishopric of St Andrews accounts included hops among the products purchased or grown.<sup>550</sup> Not growing hops locally was likely due to climatic conditions; even with contemporary climate change, Scottish climate is not well-suited for growing hops in the 21<sup>st</sup> century.<sup>551</sup>

Climate appears to have been a primary reason for the slow adoption of hops in Scotland but existed along with more cultural factors such as low population density meaning that the system of frequent brewing of fresh batches was viable to meet demand. The lack of hop usage in fifteenth century Scotland ultimately affected the way the craft was run and how it changed. Bennett viewed the switch from ale to beer in England as one that saw a practice that had been accessible to different women based on their marriage status to one that was inaccessible to all women.<sup>552</sup> She also argued that women's connection to ale-brewing had been reducing steadily in the fifteenth century. This trend is not evident in ale-preferring Scotland. There, women continued to be the main brewers, as exemplified in the burgh records of Aberdeen and Edinburgh in the sixteenth century.<sup>553</sup> It was the formation of the Company of Brewers in 1596 that presented the first major challenge to the female-dominance of the brewing industry, but given the continued preferential consumption of ale for at least almost another century, it was not the trigger for an abrupt change.<sup>554</sup> There was eventually a tipping point where the craft of brewing run mainly by women changed into an industry of brewing run by men, but that shift occurred so far after 1513 to place it beyond the scope of this work.

## Baking

While brewing was a craft dominated by women in 15<sup>th</sup>-century Scotland, the gender split in Scottish baking was more complicated. It has been described usually as a male industry, as the baxters who featured in records were usually men and in the later Middle Ages the burgh guilds only allowed men to join their association. At the same time, however, it must be noted

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<sup>550</sup> *St Andrews Rentale*.

<sup>551</sup> *Hops in Scotland: A Rough Guide for Growers*, (The James Hutton Institute, 2018).

<sup>552</sup> Bennett, *Ale, Beer and Brewsters*, 78. 78

<sup>553</sup> *Ibid.*, ; Mayhew, "The Brewsters of Aberdeen in 1509," 71-76.78; 71-6

<sup>554</sup> *Early Travellers*, 228; Ewan, "Mons Meg and Merchant Megs," 138. 228; 138



that this formal guild information only addresses registered baxters as the sole source for bread; it does not allow for what was produced at home. The idea of men being the primary bakers, moreover, was not universal; in Aberdeen women appeared before the burgh court for offences related to baking as often as they did for brewing, and in Peebles it was assumed that most bakers were women.<sup>555</sup>

Much of the baking by women enjoyed a lower level of prestige than for men but was still important. Even though the selling of oatcakes was regularly prohibited, it was a trade that was often a necessity for the poor or especially useful during times of dearth. The work of women in this trade has traditionally not been seen as a major part of medieval baking, but it needs to be examined more closely to determine if this assumption can be substantiated. Based on the information examined for this study, it is unclear if this tradition of a basic flatbread being prepared by women in domestic contexts and sold on the market was a practice only done in Scotland. If it was uniquely Scottish, it would show another task in which women in Scotland had an important economic role that has been previously overlooked. A question for future development is to see if any breads made by women elsewhere in Europe were also oat-based, as seems to have been the prevalent type baked by women in Scotland, or if they were based on other types of grain.

All grains discussed in this thesis were used in baking, sometimes on their own and sometimes in combinations. The hierarchy of bread was no different from elsewhere in Europe, as wheat was the most valued, followed by others in an order of preference that varied depending on the exact purpose. Thus, we see how rye was favoured over other grains in bread intended for provisioning Scottish ships, because rye's distinctive qualities helped the loaves last for longer.

The main difference between Scotland and other European countries was in the type of grains used in baking bread by and for people at different levels of society. The general medieval European trend was to give wheat bread to those in the higher classes. This included clergy, and while those in Scotland did still generally consume breads of higher prestige grains than did those from poorer classes, they were not ordinarily given the same quality of bread as they

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<sup>555</sup> Ewan, "For Whatever Ales Ye," 129. 129

would have been provided with elsewhere in Great Britain or mainland Europe. Almost all of the bread which had been made in Norwich Priory in England, for example, was made with wheat, and only very rarely were oats, rye, and legumes used in the bread-making mixture in accounts from Westminster and Canterbury Cathedral.<sup>556</sup> In comparison, monasteries in Scotland were more evenly split in types of bread, with the Cistercian monks of Coupar Angus receiving oat bread, and the later accounts of the household of the Archbishop of St Andrews recording some of its members having only rye bread.<sup>557</sup> The reason why could rest in differences of the soil or simply be preference, although the general trend away from rye over Scotland as a whole suggests the consumption of rye was not by choice. The use of what were widely perceived as inferior grains was perhaps a measure of the impact of Scotland's poor weather regime at the time compared to the earlier English references. But the important point is that those eating these 'inferior' breads were still members of a class and from communities that elsewhere would have been consuming wheat bread as a matter of course. The presence of other bread and its consumption across the social spectrum, therefore, is something unique to Scotland. The reliance on bread made of grain other than wheat is despite parliamentary attempts to enforce wheat cropping in both 1426 and 1457 along with complaints about the quality of grain used to fulfil payment obligations. These laws could suggest that wheat was possible to grow in larger quantities than normally accepted and that wheat was being withheld by farmers who wished to keep higher quality grains for themselves. It is, however, equally or more likely that these standards were set and enforced by those who wished to be paid in high quality wheat regardless of any challenges in providing said grain. Neither can be said with certainty at this point and it is worth deeper examination in later research.

As with brewing, climate limitations led to many of the features that defined 15<sup>th</sup> century Scottish baking. When wheat did not grow well, other types of grains had to be used for the bulk of the bread. Oats, in particular, made up increasingly more of the grain yields as climate

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<sup>556</sup> Slavin, *Bread and Ale for the Brethren*, 154. This was true even for those working at the priory but not in the clergy. The only difference was servants tended to receive lower quality wheat bread. The high use of wheat also laid in the climate of SW England being well suited for wheat. .

<sup>557</sup> *Coupar Angus Rental*, 1-2, VII.110; *St Andrews Rentale*, 195. vii, 110; 195. Both of these had been previously discussed in the baking chapter but help show unique traditions in Scotland.

deterioration and social unrest became defining features of the century. Parliament produced legislation regarding what type of grains had to be grown on land, most likely to maintain some access to grains desired by the elite, while they were a challenge to grow. When specified, the required grains included wheat, which was primarily the grain of the elite. These attempts were not well-reflected in accounts, suggesting they were not able to change the overall makeup of the yields

### *Limitations/Further questions*

A true appreciation of this data requires acknowledgement of significant regional variations in ratios and yield levels. In a thesis of this length, it is not possible to address such variation in any meaningful depth, even through sample comparisons, as there would be a concomitant requirement to address the internal and external factors locally that affected grain production and also the cultural nuances that are still evident in Scotland's distinct regional preferences for particular types of baked products.

Without contemporary Scottish documents containing recipes or known methods - the earliest date from after the span of this thesis - one can never be entirely sure of the medieval process for making either bread or ale. Knowing the exact recipes is not required to study brewing and baking as general processes, but it will always lead to an economic focus which limits the ability to delve into the cultural and procedural elements of the equation without a wider variety of sources. These aspects need to instead be examined in future interdisciplinary research, including through archaeology with a focus on evidence for grains and processes mapped across Scotland.

Production was also far easier to determine than consumption, although this could be done with a systematic examination of all medieval and early modern archaeological evidence, as well as materials on early modern agricultural improvements. Burgh records could be used to fill in gaps related to guild rules and disputes, with the most major of these being the digitised Aberdeen Burgh Records, although others also have survived.

A final topic that invites further study is that of women's role in preparing flatbreads (oatcakes) in domestic contexts, that were then sold rather than consumed in their own household.

Within this present thesis it is evident that this practice was widespread, but it remains unclear how important it was economically. There are unresolved questions of if it was a permanent feature of (flat)bread production or a phenomenon linked to times of social or environmental crisis, and how it compared to any similar traditions elsewhere in the British Isles or mainland Europe.

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