

THE RISE AND FALL OF GRUIT

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Introduction

This is the story of *gruit*, typically thought of as a type of beer brewed in the medieval Low Countries of the Netherlands, Flanders, and western Germany, as well as an important factor in genesis of excise taxation. The word *gruit*'s meaning has evolved over time and been applied to various articles and processes within the context of brewing; referring to a grain product deemed necessary for brewing beer, to a specific tax paid at each time of brewing, a mixture of herbs added to the ale, and even the beer itself. *Gruit* itself seems to have changed throughout its history. From a beer¹ additive revered for its fermenting powers, it morphed into a beer with a reputation, among some, for headache inducing powers. By piecing together the many different fragments an interesting picture emerges: one of *gruit* not as just a handful of brewing herbs, but as a powerful and an indispensable wort fortifier.

The intertwined history of *gruit*'s many meanings became confused over time and by the 17th century knowledge of *gruit* as a beer had passed from living memory. This study is an attempt to put together the many pieces, spanning multiple countries, languages and centuries, to create a clearer picture of *gruit* - its modern definition, as a generic herbal ale, in contrast to hopped beer, is not considered.

In the beginning

One of the earliest references to the brewing of beer as an independent, specialized craft, instead of a household chore, appears in Charlemagne's *Capitulare de villis* (c.771-800).² During the Carolingian Empire large

domains or estates existed which were more or less self sufficient and independent, characterized by a rigid organizational structure. Each estate was regulated to employ a specified number of tradesmen which included *siceratores*; brewers who were charged with brewing beer (*cervisia*) and other alcoholic drinks.

That every censor in the service of your good workmen, that is, to produce ... brewers, which is the beer, or cider, or perry, or else whatsoever beverage is suitable to drink for the lords, know how to make.³

In *Capitulare de villis* Charlemagne made the right to brew for more than one's needs a royal prerogative, limiting brewing to royal manors and imperial homesteads, and so changing brewing from a common law to a privilege linked to a place.⁴ When centralized law collapsed following the death of Charlemagne succeeding rulers were in a much weaker position. Counts, and later bishops, used this to their advantage, to the point where the sovereign believed it necessary to lease or gift many royal rights, including *gruit*. In later times the counts and bishops were able to elevate *gruitrecht*, the right to *gruit*, to a hereditary monopoly throughout much of their territories.⁵

The spread of the Carolingian Empire went hand in hand with the growth of Christianity and one way in which this religion was promoted was by the founding of monasteries. These in turn were responsible for improvements in the quality of beer as the scale of production increased and brewing became more specialized.⁶ In early medieval monasteries there was not a clear division between brewers and bakers, monks changed tasks on a weekly basis. Not until the 9th-century Synod of Aachen were monks assigned to either

the brewery or the bakery for an entire year.⁷ This is reflected in the distinction between, in the southern Low Countries, the monastic features *camba* and *bratsina*, which in later sources are translated as *bachus* (bakehouse) *et bruhus* (and brewhouse); small buildings available to rent by the villagers to aid in the production of beer and bread.⁸

One of the improvements likely introduced by these early monasteries was the inclusion of hops in brewing. The earliest written evidence of hop cultivation comes from the 8th century and refers to hop gardens in the Hallertau region of Germany.⁹ The monastery Corvey, south of Hannover, exempted millers in 822 from gathering hops and firewood. The text later mentions that wild hops were intended for the brewing of beer. Half a century later the cultivation of hops is found in charters dated between 859 and 883 which mention the *humularia* or hopgardens in Bavaria in southern Germany. In this context, the Graveney find of one or more bales of hops on a boat that had sunk in the 10th century near Graveney, Kent,¹⁰ is often cited as yet another indication that hops were used for brewing. It should be noted, however, that hop plants were also consumed as a food and employed for making fiber. Spring growth would be eaten like asparagus and the plant is of the same family as nettle, a known fiber plant. Therefore, with a complete absence of a hopped brewing tradition in England, one wonders if these bales were indeed intended for beer production.

***Gruit* beer and hopped beer existed in the same time frame but in different geographical areas**

Initially the use of hops did not catch on in the Low Countries of Flanders, the Netherlands and western Germany. These regions used a different technique to brew beer. The first mention of *gruit* appears to come from Bommel, when Emperor Otto III gifted the Saint Martinus Church, apart from toll and currency, also the '*negocium (...) fermentatae cervisiae, quod vulgo grutt nuncupatur*',¹¹ that is the trade in brewed beer, usually called *gruit*. From later sources it becomes clear that what is meant is not the actual trade of brewed beer, but rather the trade in an ingredient deemed necessary for the production of beer. The sale and distribution of this ingredient became a monopoly of the local sovereign, known as *gruitrecht*. Subsequently, this right was often

gifted to counts, bishops and other dignitaries, who in turn could grant or lease the right to others. As commercial beer production became more prevalent, the returns from *gruit* gradually increased.¹²

By the 12th and 13th centuries the development of cities in northwestern Europe created a growing market for the sale of foodstuffs, including beer, their populations became dependent on bakers, brewers, and other producers. Due to the development of cities, beer brewing became a specialized trade outside of monasteries. As a result production increased, and the quality of beer had to improve in order to keep up with demand.¹³

Brewing as a trade

As towns and cities expanded, and a more organized form of brewing became prevalent, rural areas which were covered by *gruitrecht* could import beer from the nearest city. These regions were exempt from *gruitgeld*, or money for *gruit*.¹⁴ Initially, *gruitrecht* was not meant to interfere with beer trade; only where the right had fallen into the hands of city governments did it evolve into an excise tax covering brewing and the import and export of all beer types.¹⁵ Where it survived in cities, especially cities connected to a Carolingian domain (a *hof*), it became an increasingly important stream of revenue as populations, markets, and opportunities for trade expanded. However, not all cities arose in localities where the lord held the *gruitrecht* from earlier times and neither did all medieval cities end up owning *gruitrecht*. Sometimes *gruitrecht* had already perished,¹⁶ sometimes it was reinstated (as was the case in Ameyde before 1433),¹⁷ and sometimes a city, which had never experienced *gruitrecht*, had the local lord instate it.¹⁸ In its oldest form *gruitrecht* was a *hofrecht* but over time it absorbed characteristics of a royal right, creating much debate on the origin of this fascinating aspect of medieval law.¹⁹

By the end of the 13th century, when cities acquired access to *gruit*, they established *gruithuizen*, buildings where *gruit* was made and sold. Dutch cities were able to take over *gruit* taxation during the 12th and 13th centuries as counts and bishops owning the right often needed to capitalize their asset, by leasing or selling the excise right in exchange for monetary loans.²⁰ Many of the local nobility were unable to pay off the loans, and

consequently the *gruitrecht* was transferred permanently to the city. For instance, in 1404, Zwolle acquired the *gruitrecht* when the Bishop of Utrecht, who had leased it to the city in 1341, could not repay the loan.²¹ The first town to receive *gruitrecht* was Delft in 1274 and the last was Amsterdam, which purchased *gruitrecht* from Philip II of Spain in 1559.²² *Gruitrecht* evolved into the taxation of wine and beer, becoming the largest stream of revenue for many city governments.²³

In most rural areas the common man was exempt from paying *gruitgeld*, a tax on brewed beer. Public brewers would need to abide by brewing regulations and pay tax, but homebrewers were mostly exempt from paying *gruitgeld*,²⁴ which included beer brewed for fairs and for pregnant women.²⁵ As Dirck Stevens, 90 years old in 1632, said: 'which beer was not sold for money, because for that gruitgeld has never been paid'.²⁶

The etymology behind the word *gruit*

According to the *Dutch Etymological Dictionary* the word *gruit* (*gruyte*, *gruut*, *gruyt*, *gruet*) means (hulled) gort, or groats. The Middle Dutch word *grut* also refers to gort. The Germanic base is *grutja*, derived from *gruta*.²⁷ The Indo-Germanic root is *ghreu*, or rubbed/broken, derived from *gher*, or pebble sand.²⁸ Derivations of the word *gruit* also link it to grains, in the sense of grains of sand and grain kernels, as well as to different types of porridge. *Gruit* shares its origins with *griez* and *griet* which mean sand kernel, silica sand, and, again, that of coarsely ground grain. The base of both words *gruit* and *griez*, lies in *griezen*; to mill into coarse kernels. The base definition could have been coarsely ground, from which all other interpretations developed. First and foremost, with each derivation the notion coarsely ground is prevalent, as opposed to ground into flour. The meanings of *griet* and *gruut* diverged in Middle Dutch, with *griet* meaning grains of sand, while *gruut* meant grain kernels.²⁹

Gruit also relates to the German term *grausz*, of which the base term has the same coarse grain kernel meaning³⁰ and *gruit* beer is spelled either *grauszing* or *greuszing*,³¹ and to the English terms *graut* and *grout*. The *English Dialect Dictionary* describes *grout* as 'wort of the last running, ale before it is wrought with barm; new ale'. It describes grout-ale as follows:

A kind of ale, ... made of malt mixed with some of the barm, which rises on the first working in the keeve, and almost burnt [condensed] in an iron pot - a very small quantity of which invigorates the whole mass and makes it very heady.³²

This description brings to mind the 1064 charter where *gruit* is described as '*materiam unde leventur cerevisie*' - 'the material to leaven / raise beer'.³³

The early Latin sources

Many of the early sources which refer to *gruit* are written in Latin. In Medieval Latin *gruit* is signified with *fermentum*³⁴ and *materia*,³⁵ as well as the Roman variants of *maiera*,³⁶ *maheria*, *maderia*, *maeria*, *macheria*, *majera*, *macera* and *maceria*.³⁷ The Roman variants mostly appear in the southern Dutch and northern French sources. For instance, one of the rights the Count of Namen in the Belgian city of Dinant held was the *gruitrecht*, which the records from 1047 to 1064 described as '*maire; polenta cerevisie, quo vulgo maire, in omni villa sua est*' - 'Beer porridge, commonly named maire, in all the country'.³⁸ In 1367 the word *polenta* was used instead of porridge, and in England in 1668 the word *polentarium* was used to indicate a brewery.³⁹ Du Cange describes '*polenta as puls ex farina et lacte*' - 'a porridge of flour and milk',⁴⁰ but *polentarii* as the '*Qui brasium curant, molunt, et conficiunt ad cerevisiam componendam*' - 'Those who care for malt, grind, and to prepare the compound of beer'.⁴¹

Other words found to describe *gruit* are *leventur* and *pigmentum*. In 1046 the Church of Saint Marten in Utrecht was gifted the right that the 'gruiter of the town of St. Trond, hereby [had] the ability to maintain or lower it, the matter of who is to do it, the rising (*leventur*) of the ale'.⁴² The same word is present in a charter from 1064, where a gift dating back 16 years is confirmed by Bishop Adalberd; again *gruit* is described as the material to leaven/raise (*leventur*) ale.⁴³ Furthermore, the charter from 1068 of the town of Huy describes *gruit* as 'the proper pigment for the making of ale'.⁴⁴

Archbishop Anno II of Cologne, in 1074, divided the property endowed by count Eberhard of Kleef for the construction of the Saint-Quirinus cloister in Neuss, including the *gruitrecht* in Neuss.⁴⁵ The details of this

law indicated *gruit* as *frumentum*, which in Latin dictionaries generally means grain or, specifically, wheat. The *Medieval Latin Word-List* defines *frumentum* as wheat porridge.⁴⁶ In Middle Dutch the word *formenteit* is explained as flour mush, derived from the French *fromentée*, *froment* and the Latin *fromenteia*, *frumentum*.⁴⁷

When in 1098 Bishop Radbod of Doornink wanted to make sure that the church of Saint-Martini did not want for the lack of *fermentum*, with which beer was brewed, he gave two monks, Radulfus and Letbertus, the hereditary right of the '*fermenti cervisiarum, quod maiera vulgo dicitur*' - 'ferment of beer, commonly known as maiera' over the city of Doornink. The monks would give the church enough *maiera*, a *fermentum*, each week for the preparation of the beverages and at Christmas not one but two or three or as many as necessary.⁴⁸

The words *macera*, *maceria* and *maiera* are likely derived from the verb *macerare*, which the *Oxford Latin Dictionary* defines as to make wet, soak, steep, to soften, as opposed to *materia*, which is a general Latin term for matter or substance. The *Medieval Latin Word-List* mentions the term *macetum* in connection with malt two times, in 1223 and 1475.⁴⁹ A generic search on *macerate* gives the definition 'soften or become softened' by soaking in a liquid.⁵⁰ *Macerer* translates from Latin to *maceration*⁵¹ and from the French to *macerate* and *steep*.⁵² The French word *macerateur* is a piece of equipment used to soak malt: '*Macerateur: recipient, appareil utilise pour faire macerer une substance*' - 'container, device used to macerate a substance; like a malting tub'.⁵³ The variant *maderia* is likely derived from the classic Latin word *maderare* which also means being wet, damp, liquid and even being drunk.⁵⁴

Vocabularies and dictionaries

Other early descriptions and explanations of *gruit* are given by vocabularies and dictionaries. Compilers of medieval dictionaries used multiple Latin terms to signify wort in general and *gruit* specifically. *Agromellum*, *idromellum*, *ciromellum*, *acromellum* and *granomellum* are all used to signify *gruit*, wort and mead. The term *mellum* in all likelihood means sweetness, as opposed to *mel* and *mella* which indicates honey. This would mean *idromellum* (hydromel) signified mead, *ciromellum* most likely meant wort, and *acro*, or *agromellum*

and *granomellum* represented *gruit* as the ferment used in brewing.⁵⁵

For instance the *Promptorium Parvulorum* (c.1440) translates *growte for ale* as *granomellum*.⁵⁶ The c.14th - century *Metrical Vocabulary* (Harl. MSS. 1002) states '*worte siromellum, sed growte dicas agromellum*'. Three other 15th-century manuscripts, the *English Vocabulary* (MS. in Mus. Brit.), the *Nominale*, and the *Pictorial Vocabulary* (MS. in collection of Lord Londesborough) provide similar explanations.⁵⁷ In Spelman's *Glossary* (1664) *grutum*, a Latinized form of *gruit* and *grout*, is given as an equivalent for *granamelum*, or *growt*.⁵⁸ Du Gange (1678) lists under *grutum* '*Leguminis species, alias Granamelum: Anglis Grout, a Saxonico Grut, Far; condimentum cerevisiae*' - 'plant species, also *granamelum*: in English grout, in Saxon grut, grain [*farina*], a condiment [additive] of beer', under *grutt* and *gruit* '*appellant tributum, quod pro cerevisia pensatur*' - 'called a tax, the beer depends on it', and '*Teloneum vero et negotium generale fermentatae cervisiae, quod vulgo Grutt nuncupatur*' - 'the general business of the ferment of beer, which is commonly called *gruit*'.⁵⁹ Manning's dictionary *Saxonica and Gothica Lat.* (1772) translates grout or grut as '*granomellum, condimentum cerevisiae*' - 'the additive to make beer'.⁶⁰ The *Mittelniederdeutsches Wörterbuch* (1876) lists under the *grüt* entry: '*Maltae (s. polentae) species est gruta, fermenti genus madefacti, quo in potu conficiendo coctoribus vulgo opus*' - 'Malt (s. porridge) to form *gruit*, a steeped grain type, the trouble [is] dispatching [what] the brewers generally needed' and '*Gruyt vel grutgeld, quod praestitum pro licentia coquendi eam aut lupis aut gruta, nam alterultra iis opus*' - 'Gruit or gruitmoney that the license granted it for cooking lupis [possibly the plant Lupine] or gruit, for as well to work'.⁶¹ For a list providing descriptions of *gruit* found in historical charters see Appendix I.

Speculations from the past

Before 1955, when Doorman published his dissertation *De Middeleeuwse Brouwerij en de Gruit* (*The Mediaeval Brewery and the Gruit*), in which he argued that *gruit* was exclusively a composite of dried herbs, it was generally thought that *gruit* meant one or more of several options. For instance, Jan van Hout (1602) thought *gruyte* originally must have been a substance to prevent spoilage of

brewed beer.⁶² Mattheus (1783) concluded that it must be wetted malt and van der Wall (1790) believed it to be yeast. Beckmann (1817), after alluding to the various meanings attributed to *gruit*, says 'it almost appears that *gruit* was a fermenting substance indispensably necessary to beer'.⁶³ Ackersdyck (1819) thinks of herbs, postulating the theory of a switch between the first letters of *gruyt* and *cruyt* (herb).⁶⁴ Uitterdijck (1883) kept it at groats and barley.⁶⁵ Baron Jules de Saint Genois (1843) explained *gruit* with '*La grute était un droit établi sur le grain qui servait à fabriquer la bière*' - 'Gruit was an established right on the grain used to make beer'.⁶⁶ Noordewier (1853) describes the right of a *gruiter*, the *fermetarii* or brewer, to make malt out of gort from barley or rye for the brewing of beer.⁶⁷ And van Summeren (1948) came to the conclusion it first meant malt and then changed meaning to signify only herbs.⁶⁸ My personal favourite: *gruit* meaning duckweed, for which the brewers had to pay *gruitgeld* to have it and other pond scum removed from their brewing water.⁶⁹

Confusion around the nature of *gruit*

Much of the confusion concerning the nature of *gruit* happened because of its Latin synonym: *fermentum*. In classic Latin this generally means yeast, or that which causes fermentation. The connection between yeast and *fermentum* is not immediately apparent from a medieval point of view. In the middle ages, *fermentum* had a much broader meaning, which is not all that surprising as yeast as an organism was unknown. The Spanish alchemist Arnaldo de Villa Nova (died 1313) described *fermentum* as such: '*Fermentum transmutat in sua naturam*' or a ferment transforms one substance into another. Due to this generally accepted perception, the Philosopher's Stone for instance was considered to be a ferment,⁷⁰ as would be the transformation that happens when yeast converts sugars into alcohol and carbon dioxide; or when amylase enzymes (amylase A and amylase B) are added to a mostly unmalted grain wort whereby the enzymes break down the starches into sugars for the yeast to then convert;⁷¹ or when a malt extract is added to boost the amount of fermentable sugars so the yeast has a quicker and more vigorous start.⁷² Even if the reasons behind these processes were unknown to medieval brewers, the results would be clearly visible and all these transformations could be called *fermentum* under the medieval definition of the word.

Another reason for confusion could have been the slowly changing meaning of the Dutch word *gruit* itself. First meaning a *fermentum*, it then became synonymous with the right to purchase a ferment to brew beer. The income from this *gruitrecht*, a proto-tax, became for many cities their main income to pay for public works. The *gruiter*s themselves transitioned from brewers, to managers of brewers, to being the city officials overseeing brewing taxation. The office of *gruiter* evolved into a powerful political position, with substantial financial benefits, as can be seen from influential families carrying the name DeGruyter and van Gruuthuse.⁷³ When the right to *gruit* evolved specifically into a taxation on brewing, the purpose of *gruit*, and thus the product, was forgotten.⁷⁴ As Daniel van Linden testified under oath the 11th of the Harvest month of 1519:

that he and his father leased the *gruit* within the city of Den Bosch and the villages Vlucht, Rosmalen and Nieuwland, and had never heard that those who had the *gruit* in lease had to deliver any stuff or material for brewing.⁷⁵

This shift of definition seems to have happened both in the Netherlands and Germany. The French did not have a *gruit* beer tradition, but did have a clear definition of what the word *gruit* meant: '*On appelle ainsi à Paris, en Anjou, au Maine, en Normandie, et en plusieurs autres lieux de France, la farine d'avoine, avec laquelle on fait une forte de bouillie délicieuse, appelée aussi Gruau, de Grutellum, diminutif de Grutum. Granamellum; Groute*' - 'In Paris, in Anjou, in Maine, in Normandy, and in several other places in France, we call oatmeal, with which we make a strong delicious porridge, also called Gruau, derived from Grutellum, diminutive of Grutum'.⁷⁶ The old French word for malt is *gru*.⁷⁷ The English also had a long-standing *gruit* malt tradition without reference to herbs and grout-ale survived well past the 16th century, in part because of initial resistance to hopped beer.⁷⁸

Graut and naerbier

An example of English grout ale was Devon White Ale,⁷⁹ a drink initially shrouded in mystery. In the words of local historian Paul Karkeek, in a paper presented to the Devonshire Association in 1877:

If the natives are questioned about its origin or nature, they smile, look wise, and hint at mysterious secrets. On further

enquiry one finds out that the secret in the composition of this beverage lies in the nature of the ferment employed, called grout, or ripening. [He was of the opinion] that at one time it was produced over a much more extended district than at present, and that it is of very great antiquity.⁸⁰

The first reference to white ale is found in Andrew Boorde's *Dyetary of Health*, published in 1542. Boorde's description of Cornwall and its ale borders on being rude: 'There ale is starke nought, lokinge whyte and thycke, as pygges had wresteled in it'.⁸¹ Interestingly, while there are neither herbs nor a taxation system like the Dutch *gruitrecht* connected to English grout, at times a tithe would have to be paid on the production or retail of grout, which was deemed peculiar at the time of writing. Karkeek found that grout seemed to have had two meanings: a coarse meal as used in porridge, and as a ferment used in brewing.⁸²

Brew instructions as shared with Karkeek, dated to the 19th century.

The mode of making White Ale is as follows:

The ale is always prepared in small quantities, and three bushels of malt to be used at one time is found a suitable quantity. From these three bushels from 30 to 36 gallons of worts are taken, just as the brewer wishes to give a more or less fair quality. About the same quantities or 'lengths' of worts are then taken as for sixpenny ordinary or common beer; but instead of using one pound of hops to the worts for each bushel of malt mashed, only about two ounces are used for white ale, and the hops are boiled with the worts in the copper in the usual way. After the worts are cooled down in the cooler they are run into a tun to ferment, and at the time of turning, 14 lbs of wheaten flour, a number of eggs at discretion, and the ferment called grout (half a pint) are added. Ordinary white ale can be used four days from the brewing, and will keep a month in winter, but not more than a week in summer, and the good or bad quality of the grout appears to very much affect the keeping properties of the liquor. Hundreds of hogsheads are drawn on the third day of brewing, but the fourth day is usually the first of perfection. Many successful brewings occupy a period as follows - the quality of the grout again appearing to materially regulate the time after it has been added: Mash on Mondays at seven; brewing over and worts cooled down by six pm., when the grout, flour, and eggs are added. On Tuesday morning, about eight, the ale can be turned into small open wooden vessels,

called ale cans, and at any time in the following day (Wednesday) the ale can be sent into consumption in any vessel and used. The fermentation still goes on in the ale cans.⁸³

The several recipes available do not detail how to make grout, only how to use it for making white ale. William Ellis gives a little more detail in his *London & Country Brewer* (1736):

Their white ale is a clear wort made from pale malt, and fermented with what they call ripening, which is a composition, they say, of the flower of malt, yeast, and whites of eggs, a nostrum made and sold only by two or three in those parts, but the wort is brewed and the ale vended by many of the publicans.⁸⁴

A better clue is this recipe published by Samuel Gray in *The Operative Chemist* (1828):

Pale ale wort 25 gall, hops 2 handfuls, yeast 3lb, grouts 6 or 8lb. When the fermentation is at its height, bottle in strong stone half pints, well corked and wired; it effervesces when opened. The grouts here mentioned are made by infusing 6 or 8lb of malt in a gallon and a half of water, covering it warm by the fire side, stirring it often: when in full fermentation it is to be boiled down to a thick paste.

He then goes on to say

This is a singular instance of a supposed secret which has been published upwards of a hundred and fifty years. The natives of Kingsbury [sic], in Devonshire, pretend that they alone can make white ale, and there is one family that pretends to the exclusive possession for the secret of making grouts. Now the method of making grouts, and from it white ale, was published in Bauhin's *Historia Plantarum*, being then the common English ale.⁸⁵

As the language of Bauhin's 1650 publication title suggests, this three volume tome is written in Latin and, by the 19th century, might not be as accessible to the general public as Samuel Gray would assume.

Coincidentally, the best clue for the substance of *gruit* comes via a Dutch source, an extensive herbal first published in 1551 by Matthias l'Obel (Latinized as Lobelius) called the '*Kruydtboeck oft beschrijvinghe van allerley ghewassen, kruyderen, hesteren ende ghe-*

boomten - 'Book of Herbs, or descriptions of all kinds of plants, herbs, shrubs and trees'. In it he describes the making of *graut* (old spelling) which in Dutch is called *naerbier*. The latter is interesting in and of itself: while *grout* retained its original English definition of concentrated malt, by the 16th century the Dutch *gruit* seems to have lost this definition. Apparently, the practice of using concentrated malt did not disappear completely and instead became associated with the new term of *naerbier*, or *nabier*. *Gruit* as concentrated malt is not found after the 14th century, and *naerbier* in the meaning of concentrated malt is not found before. Literally, *naerbier* means after beer and indicates small beer, or wort of a second running. Medieval *naerbier* could very well be the origin of the the modern word near beer; light beer or small beer with little or no alcohol content.⁸⁶ Often, to make concentrated malt, or malt extract, this wort of a second running would then be evaporated, or condensed, into a thick syrupy paste.

Graut or naerbier is made thus, said Lobel: Take 6 or 8 pounds of crushed malt, 12 or 15 pounds boiling hot water. Stir this together well together, 6 times a day. Cover it well with cloths and straw, and let it sit together thus long in a clean barrel until it becomes thick as syrup. After that shall it be boiled up with fire, only stir very well, to keep it from burning, until it becomes thick as porridge.⁸⁷

Similar information is republished by Rembert Dodoens (Rembertus Dodoaeus) in 1618 in his *Herbarius, of Cruyt-boeck*:

But the thickly cooked naerbier has strong resemblance with polenta: because it is leached from barley malt, of flour from soaked, and then dried and fried or roasted barley. That is why in our language in the books of Dioscosides Lobel used most often naerbier or malt for the word polenta, especially if the polenta was described as a soft porridge. Of course the naerbier resembles polenta much better than the groats of the Lower Germans, said Lobel himself.⁸⁸

English Ale is made thus: One takes 200 pounds soaked malt, which is wort, 2 handfuls of hops: as that has boiled together well and has filtered through so shall one next mix it together, with yeast of beer or ale 3 pounds, and English graut, which we call Naerbier, 6 to 8 pounds.⁸⁹

Concentrated malt syrup

Early *gruit* defined as concentrated malt fits well within the framework given by the etymological background of the word and the surviving historic records. Concentrated malt is very high in fermentable sugars, which, when added in the right amount, provides yeast in a fresh brew a welcome boost to promote quick and rigorous fermentation. The faster the desired yeast ferments, the less chance other wild yeasts have of taking hold. Yeast is special in that, given the chance, it will create an alcohol-rich and therefore anti-microbial environment which is detrimental to its competitors but is beneficial to itself, right up until it reaches its limit and becomes dormant. Combined with the preservative herbs and resin, this concentrate would be very effective in giving possible mediocre wort a quick start. This would result in higher alcohol levels than straight wort, an appreciated side benefit and making for a heady brew indeed.

Dutch brewer Adriaen Mels, who lived in Dordrecht during the 17th century, wrote down about two dozen beer recipes made in his brewery, 'den Witten Anker' (Fig. 1), including one for *Nimweegse Mol*. This beer 'used to be' made with white barley, he noted, and no other grains. *Nimweegse Mol* is first encountered as *geremol*⁹⁰ in 1519 and quickly became a successful export product of the 16th-century city of Nijmegen, particularly to Antwerp, where most other beers were banned. What makes *Mol* interesting to the story of *gruit* is the use of malt concentrate: the brewer would slowly



Figure 1. Brewery 'den Witten Anker,' second house on the left, c.1680.

boil down part of the wort which was kept separate while the bulk of the wort was fermenting. After the main fermentation slowed down, the thickly concentrated malt would be mixed in just before barreling. This malt concentrate would promote a secondary fermentation in the barrel so helping preserve the beer until it reached its destination. For about ten days the beer would be a carbonated, sweet and sour beer, until fermentation ended after which it would turn sour and flat.⁹¹ The recipe for *Nijmeegse Mol* is described thus:

Nijmeegse Mol: Is brewed of light barley malt, without anything else. For each ton *Mol* take 50 lb barley malt, also 39 and 40 lb. *Hoppert* [first run wort with hops] cooks for $\frac{3}{4}$ hour or 1 hour. With the *hoppert*, take as much hops as fits in an *achtendeel* (eightpart), of which one measures grain. The malt used to make mol has to be hard dried. Of the mol only two runs are made. The first run is pumped in the *backen* until the second is hot. Then pump the first run in the kettle, except of 15 or 16 ton which one should keep in the vat, until the first and second run are cooked: the first run, or *hoppert*, should cook 1 hour or $\frac{3}{4}$ hour, with the eightparts of hops. When it is cooked, it should be dumped in the *klaarkuip*; emptied, then pump the *nabier* or second run in the kettle and let it cook a little, or break apart (Note, in *nabier* one does not add hops). Dump with the *hoppert* in the *klaarkuip*, and let it sour well, it should stand 1 hour or 10, but in the summer not as sour as in winter (Note in winter, let it become as sour as one can get it). Being sour pump it in the *backen* and let it get very cold, then add the yeast to it (Note the yeast is added in the way of sweet beer). The second run or *nabier* being emptied from the kettle, pump in 15 ton one had kept separate from the *hoppert* in the vat, into the kettle, and let that very slowly evaporate until 5 ton, until it is thick as syrup, and store this until $\frac{1}{2}$ hour before one goes barreling up, then add the thick beer as a syrup and barrel up $\frac{1}{2}$ an hour after this. Note. The thick syrupy beer sometimes cooks for 2 days. The softer and slower it cooks, the better. The third day the wort is barreled. For 1 ton mol 5 guilders is paid. The first run has to use $\frac{2}{3}$ of the liquid one uses, and the 2nd $\frac{1}{3}$ [of the total amount of water]. Note. Dump the *hoppert* and the *nabier* in the *klaarkuip*. It should stand [from] an hour to 10, until it is settled a bit and declared pale enough. When this is pumped in the vat, and the yeast is set with it, it should be strong yeast, before one barrels. Note. One should let it get very old on the *backen*.⁹²

***Gruit* houses and city *gruit* accounts**

By the 14th century many cities had received *gruitrecht* and were actively taxing beer brewing.⁹³ Detailed notes were kept and some of this bookkeeping survives, giving us a tantalizing glimpse behind the scenes of medieval beer brewing.

In 1339 the city of Deventer leased *gruitrecht* from Bishop Johan van Diest for 100 pennies a year, and between 1339 and 1348 all income and expenses regarding the business of *gruit* were accounted for in detail, often in Latin.⁹⁴ With the change of ownership of *gruitrecht*, the old *gruiter*s turned over the inventory to the new *gruiter*s.⁹⁵ Immediately after the transfer of *gruitrecht*, construction on a new *gruithuis* was started. *Gruit* was made and sold from a specific establishment called the *gruithuis*, the *domus fermenti*, which often included a mill, called a *stampus* or *stamphus* (crusher or crush house).

The construction of a new *gruithuis* in Deventer in 1339-40 included a *stampus* and the purchases of a kettle suspension and a copper kettle together with a wash basin, tub, shoes, boots and clothing. More articles were bought and a certain amount of firewood.⁹⁶ The *gruit* accounts for 1395/96 of Zutphen noted the following: '*ontfangen van enen olden ketel die vercoft wet 9 pond 19 schelling*' - 'received from the sale of one old kettle 9 pounds and 19 schelling'. When the *gruithuis* of the Earl in Ouddorp underwent a thorough refurbishment it apparently not only needed repairs to the building, but also part of the stock had to be replaced and Dieric, the kettle maker, received the order to make a *gruuetketel*, or *gruit* kettle.⁹⁷ When the *gruitrecht* was leased in Kampen in 1440, it had ceased to generate much income. The lease included a note that '*ketel noch stamte*' - 'kettle nor crusher' was included in the lease.⁹⁸

Long after the era of *gruit*, a curious new word shows up in connection with brewing and taxation: *ketelgruit*. This word is used to indicate a brewing tax similar to *gruitgeld* and is assumed to originate from the brewing kettle in which *gruit* was cooked.⁹⁹ *Gruit* cooked in kettles also appears in a much earlier context, as seen in the 12th and 13th-century records of medieval Coventry, England: Alice daughter of Robert Oselot fell into a cauldron full of boiling *gruit* (*in quodam plumbo pleno grut'bullientis*) and was scalded, so that a fortnight later she died.



Figure 2. 'De Nieuwe Haagse Grutmoolen' of the Lakenhal in Leiden. On either side of the rosmolen are stone mills to grind or hull the grains. (By permission Collectie Erfgoed Leiden en Omstreken.)

The function of the *stamphus* was to coarsely crush the ingredients for *gruit*, often facilitated by horse-power.¹⁰¹ A *grutmolen*,¹⁰² was a horse powered mill specifically for the coarse grinding of buckwheat, or grains in general.^{103,104} Two gable stones in Maastricht make mention of a *gruutmolen*; one bears the quote 'In de Reyp Gruidmolen 1746' and the other 'In de gruidmeulen 1740', beautifully illustrating the transition from *stamphus*, to *gruutmolen*, to *grutmolen*.¹⁰⁵

The 1401/02 accounts of Zutphen note that eight pounds was paid for the rental of a *gruetpeert*, a *gruit* horse. The use of a horse is noted again in a more clear context: 'Vor haver ten peerde als men 't kruet stiet 14 schelling' - 'For barley for the horse when one crushes the herbs'. Apparently Zutphens' *gruithuis* was large enough to house a *rosmolen*, a horse powered mill, and this was probably also the case in Deventer.¹⁰⁷ This reference indicates herbs were crushed as well as (malted) grains. This processing shows up in the Zwolle inventory transfer of 1411 where laserwort and laurel berries were transferred 'ghestoten ende onghestoten als 't up den boene licht' - 'crushed and uncrushed as it lays up in the attic'.¹⁰⁸

Gruit grains

The 1340 *gruit* accounts of Deventer show a separate receipt labeled *medulla bracci*, 'the kernel of the malt', and lists purchases of wort, a boat load of peat, firewood, filterbags and a tripod of unknown function. Because of its separate entry, Doorman concluded it was not part of the process of making *gruit* and instead thought it was intended for a side business of making wort to sell so smaller households did not need to own and heat a kettle.¹⁰⁹ However, an account from 1344

shows the purchases are not separate as initially suggested. Here the *gruit* expenses show the purchase of malt and firewood specifically for *gruit* (*ad fermentum*). Another account from the same year lists the purchase of malt together with the purchases of *duræ species*, resin and peat.¹¹⁰ In 1401, in Zwolle, the *gruiter*s paid 16 plak 'voir een vat daer men die grute inne sett' - 'for a tub to make *gruit* with', and 12 plak 'voir oeren ketel daer men die grute mede sett' - 'for a kettle to make *gruit* with'.¹¹¹ All indicate that the brewing equipment was used directly for the production of *gruit*.

The accounts of 1345 and 1347 include another couple of references which are less straightforward to interpret. For instance, in 1345 with the income for *medulla brasii* a small amount is recorded for the sale of *feces fermenti*, in Middle Dutch, *gruetsoppe*.¹¹² The *gruiter*s bought 57 *mud* (a unit of measurement) of barley to make into malt and paid the miller twelve schellingen to be able to mill their malt in the *gruithuis*.¹¹³ In 1347 again income is noted from *gruetsoppe*, this time appearing in the account as *soppa fermenti*, and in the same year the miller was paid for milling malt.¹¹⁴ Next to the normal expenses for malt and herbs, the *gruiter*s also ordered a new kettle and the servant made a stove for this large kettle. Also that year Herbord van Rechtem, the city's bookkeeper, received from Johan Groeten and Johan Vryeherten six marks 'de grute dimissa in stampa' - 'for *gruit* which they send to the *stamphus*'.¹¹⁵

Deventer *gruithuis* was not alone in purchasing and processing substantial amounts of malt, the Zutphen accounts show a similar trend.¹¹⁶ In 1395/96, 88.5 *molder* (a unit of measurement) wort brought to the *gruithuis* was sold for 120 pounds, and in 1406 the *gruithuis* purchased for 12 pounds 17 *molder* of oats of which malt is made.¹¹⁷ Interestingly, the grains were bought and processed on the *gruiter*s' own account. The account of the Zutphen under-rentmaster of 1409 shows that the populace could come to the *gruithuis* for services as well. Probably people had their malt undergo some sort of process: 'ontfangen van den molte dat aver jaer in 't gruethuis comen is' - 'received of the malt which came throughout the year to the *gruithuis*'.¹¹⁸ Malt needs to be crushed sufficiently for the hot water to make contact with the grain kernel to help dissolve the starch before it can be made into wort. The horse-powered mill or *stamphus* would work very well to process malted grains as well as crush

herbs. It is interesting to note that while the city *gruithuizen* did purchase and process grain and malt, the ratio of wort to herbs is not correct for making beer.¹¹⁹ In general, *gruit* houses purchased significantly more herbs in ratio to malt, another indication that something beside bulk wort meant for brewing was produced.

As mentioned previously, Deventer produced something called *medulla brasii* which was made of ground malt. Having gleaned from the city accounts the types of equipment present in a typical *gruit* house, it is likely that malted grains would be heated together in water in a kettle until the starches and enzymes of the malted grains were leached out of the kernels. Then the liquid, which consists of grain starches converted to sugars by enzymes, would be filtered off the grain solids. The spent grains of the *medulla brasii*, the *soppa fermenti* or *gruetsoppe*, would be sold for a small amount, likely as livestock feed and to bakers.¹²⁰ As the term indicates, this *soppa fermenti*, or *gruetsoppe*, is the sodden residue of a substance called *fermentum*, the *gruet* or *gruit*. This explanation is confirmed by the account of 1344, where the *gruiter* bought malt and wood for the *gruit*; *ad fermentum*.¹²¹

Storage of *gruit*

Several accounts mention the existence of barrels. For instance, in 1322 in Dordrecht Willem III leased his *gruit*, *gruithuis* and the barrels belonging to it to Janne Gillijs sone, and Ghisebrecht Maleghijs for four years: '*Ende hier bi zullen wi hem doen levren onse gruythuys en die alamen die ten gruythuse horen zonder horen coste*' - 'and hereby we shall deliver him the *gruithuis* and the barrels belonging to the *gruithuis* without extra cost'.¹²² Apparently this did not work out as, in 1324, Willem III leased his *gruithuis* and its barrels directly to the city.¹²³ In 1401 the under-rentmaster of the city of Zutphen sold seven barrels for 346 pounds, and again in 1411 eight barrels for 316 pounds.¹²⁴ The barrels are listed as an essential part of the *gruit* business, not a side enterprise of selling wort, as illustrated by the lease of Willem III, which was important enough to warrant mention in close connection to the *gruit* house itself: '*onse Gruythuys ende die vate die daer toe behoren*' - 'our *gruit* house and the barrels which belong to it'.¹²⁵

If the main business in the *gruithuis* was the production and sale of dried herbs as is the current view, then perhaps the crushed herbs were packaged in these barrels. Barrels can be made for both liquid and dry goods, for instance nails and gun powder were stored this way, but storing dried organic goods in closed wood barrels would seem to invite mustiness if not mold. Dried organic goods were most often packaged and transported in bags made of fabric, as flour and coffee are still packaged today. Another herb used in later production of beer, hops, would also be packaged and traded in bags, or bales.

Interestingly, the city of Deventer *gruithuis* does not only have a *stampus* at its disposal, two accounts of 1414 and 1421 mention improvements and repairs for a press, indicating something was compacted here as well.¹²⁶ By the 15th century hops had become prevalent and for a while were sold alongside *gruit* from the *gruithuis*, therefore it is possible that this press was used to bale hops. It is unclear if by this time hops were baled, as there is mention of both hops and bog myrtle being measured by volume, to be pressed down '*mytter platter Hand*' - 'with a flat hand'. The numbers in the *Tresoir*, a customs manifest, also indicate a light specific weight for the Amsterdam units for hops and bog myrtle.¹²⁷

The implication, therefore, is that the barrels listed as part of the *gruit* house inventory were used to store and sell something wet. With the etymological background of the word *gruit* indicating a grain component, with the early charter descriptions pointing towards a grain product, and with the indication of the production of a grain product in the city *gruithuizen*, all this combined suggests the barrels stored a type of wet malt. This also aligns with the theory that *gruit* ingredients could be stored, as *gruit* was available and sold year round:¹²⁸ the herbal content was shredded and infused in a concentrated malt syrup or similar which deters spoilage through its high sugar content.

The appearance of hopped beer in the *gruit* regions

As early as the 12th century, northern Germany had dedicated hop gardens and by the 13th century hops had become the primary additive in the brewing process in that region. In large part due to its durability, hopped

beer quickly became successful and hop use spread to the Low Countries, Scandinavia and other parts of Europe. At this time beer brewing was mostly a domestic and monastic occupation which occurred on a small scale.¹²⁹ A reason for such small-scale brewing was that early beer did not keep well and needed to be consumed within a few days to a few weeks,¹³⁰ limiting transportation and thus commerce. Hopped beer, brewed correctly, keeps much longer than unhopped beers, making it possible for the production of beer to become a professional occupation and the scale of brewing to increase.¹³¹ Of course, the success of hopped beer did not happen overnight and was sometimes met with resistance. Saint Hildegard von Bingen was of the opinion that hops dried up the body and increased melancholy, but also praised its property of preserving liquors from corruption.¹³²

The use of hops in brewing must have been a gradual process of trial and error, as incorrect proportions and wrong boiling times would destroy their useful properties.¹³³ In the right amounts with the correct method of preparation, however, hopped beer surpassed *gruit* beer in several respects. Economically, as *gruit* beer had to have a high alcohol content to preserve it for a reasonable amount of time it therefore needed a larger amount of expensive malted grain, or concentrated malt, to boost the level of fermentable sugars. Throughout the middle Ages, grain shortages were common in the Low Countries and the scarcity of grain had to be overcome by increased imports.¹³⁴ As hops are a natural preservative, the alcohol and thus grain content could be lower, making hopped beer more cost-effective to brew. As hop farmer Reginald Scot claimed in his *A Perfite Platform of a Hoppe Garden* (1576): 'And in the favor of the Hoppe thus much more I say that whereas you cannot make above eyght or nyne gallons of indifferent Ale, out of one bushell of Mault, you may draw XVIII or XX gallons of very good Beere'.¹³⁵ Bitter hopped beer would have been a novelty in the heavy and rather sweet *gruit* beer market. Most important of all, however, would have been durability - hopped beer became one of the few foodstuffs of the middle Ages that could be stored for months.¹³⁶ This would change the world of brewing forever, the longevity of hopped beer allowed it to be transported and traded.¹³⁷

Hopped beer was an important commodity, becoming one of the major sources of income for northern

European towns. For instance in 1376, 43% of the craftsmen in Hamburg were brewers,¹³⁸ while in 1407 Lübeck housed 174 breweries and most of the production was designated for export. Most of Hamburg's exports went to the Low Countries, especially Amsterdam.¹³⁹ Exported beer from northern Germany, while embraced by the people, did not always go down so well with local governments, especially in the Low Countries. As noted above, here beer was taxed via the monopoly on *gruit* and this tax provided a good income for the authorities. At first, to protect their interest, both imported hops and hopped beer were banned, but when that proved difficult, taxes were placed on imported beer.¹⁴⁰

When Count Willem III in 1326 had to judge a dispute between the Lord and the Sheriff of Leiden, it was '*omme thoppene bier dat men dair brouwede, daer him dochte dat hi vermindert was van zire gruyte*' - 'about the hopped beer one brewed there, which he thought diminished his *gruit* income'. He judged '*Dat zoe wie voorwaerd meer die grute te Leiden housen zel, die zel houden beyde hoppe ende gruyte*' - 'whom shall from here on own the *gruit* of Leiden, shall own both hop and *gruit* [tax]'.¹⁴¹ That same year the Count received a similar complaint from the Lady of Voirne about Delft: '*an hore grute mitten hopenenbier*' - 'damage to her *gruit* with hopped beer'. He again ordered the brewers of Delft if they wanted to brew hopped beer: '*also vele gelts senden int gruythuys om hoppe als si gelts souden sendem om grute van evenveel biers*' - 'send as much money to the *gruithuis* as otherwise would be sent for *gruit* for the same amount of beer' and that the *gruithuis* would provide as much hops as the brewers needed.¹⁴² In 1364 Bishop John of Utrecht complained that for 30 or 40 years a new method of brewing, that is to say, with the addition of a certain plant called *humulus* or *hoppa*, had been introduced and that his income from *gruitgeld* had declined significantly:

But now, these past 30 or 40 years, a new method of fermenting beer has been found. By the addition of certain plants or the *humulus* or hop as called by the natives, [the beer] is much stronger and it diminishes [the income] of the bishop of Utrecht, a big recipient of the benefit and distributor of *gruit*, and the result conserves [the beer] and diminishes things [i.e. *gruit*].¹⁴³

That year the Emperor granted him the right to demand a *groschen* for each unit of hops to make up for this

loss.¹⁴⁴ In 1404 when Bishop Frederik of Blankenheim renewed the *gruit* lease of Zwolle, the city complained ‘*hopenbyer, dat men gemeenlike drynket in onssen lande, daer onse gruyten ... seer mede afgegaen, ende vernyelt syn*’ - ‘hopped beer, which one usually drinks in our country, has diminished and damaged our *gruit* so much’.¹⁴⁵ And in 1429 the monastery of Huize Bethlehem asked of the city of Roermond to pay *gruitgeld* in coin instead of brewing *gruit*, as the nuns ‘now prefer to drink beer brewed with hop’.¹⁴⁶ The Dutch production of hopped beer was permitted from 1321 and by 1322 Dordrecht brewed hopped beer called *ael*.¹⁴⁷ Delft was brewing hopped beer by 1326¹⁴⁸ and Haarlem by 1327,¹⁴⁹ all three northern cities went on to have great brewing and trading traditions.

The gradual transition from a monopoly on the sale of an ingredient to an excise on brewing diminished the concept of *gruitrecht*. In the records, especially by the 15th century, the excise on brewing hopped beer is often entered under *gruit*. The term *hoppengruit* is sometimes used, as if the people were not aware what *gruit* signified,¹⁵⁰ and *gruit* was sometimes used as a verb to indicate the act of generally adding an ingredient.¹⁵¹

Thus in 1266 in Leiden: ‘And who wants to brew hop beer, shall send as much money to have hop to *gruit* his beer with. And with that shall they deliver the hop, the same as they would deliver the *gruit*’.¹⁵² In 1340 Delft: ‘The *gruiters* did not deliver good hops, which was well stored, and as they were contracted to deliver’.¹⁵³ That same year the old *gruiters* also transferred ‘also many bog myrtle herbs of which a year or longer you have enough to *gruit*’.¹⁵⁴ And in 1401 in Dordrecht: ‘Also who want to brew hopped beer or ale within Dordrecht, they shall bring to the *gruithuis* of every *hoede* malt which he brews eight pennies Hollands and hereby one shall not give him *grute*. And who does not do this, will forfeit ten pounds’.¹⁵⁵

The northern parts of the Netherlands, North and South Holland, quickly grasped the economic benefits of producing Hamburg beer locally, kickstarting Dutch brewing commerce and a lively tradition of plagiarized beer types. *Gruit* beer quickly became supplanted by hopped beer, even though *gruit* beer continued to be produced until the beginning of the 15th century,¹⁵⁶ especially in the southern Low Countries. It took a few more centuries for the English to follow suit, where the

introduction of hops met with vehement resistance. Hopped beer came to England via the Low Countries and the preference for domestic drink at times had a nationalistic tinge.¹⁵⁷ According to one author, hopped beer made men fat, as is evident from the fat faces and bellies of the Dutch.¹⁵⁸ This point of view changed swiftly and within a century their own ale was seen as an unmanly drink, fit only for women and the sick.¹⁵⁹

At the end of the *gruit* era, *gruit* beer transitioned into the medicinal realm. In 1544 Dortmund stopped the making of *gruit* beer altogether, but after nobles, pregnant women, burghers and the monks from the Monastery Kappenberg complained, the city reinstated production.¹⁶⁰ Around the same time Gheeraert Vorselman, a doctor of medicine, wrote his *Eenen Nyeuwen Coock Boeck* (1511) to prove ‘*den wech der ghesondheyt*’, the road to good health, by providing all sorts of healthy kitchen recipes. One of these is *Om Gruyt, ende Gruytbier te maken*, the first printed recipe for *gruit* beer. This recipe falls nicely in line with the ingredients listed in the city *gruit* accounts, but more importantly, it is indicative that by this time herbal *gruit* beer is seen as a medicine rather than an everyday beverage. *Gruit* beer is on the decline.

*Om Gruyt, ende Gruytbier te maken. Neemt tegen eenen pot een koren bakelaer, ende alsoo veel aipoy, ende wat haveren doppen, ende twee saykens van gage. Ende maeckt dit bier alleen van gherstenmoute, ende set dit dan met ghiste. - To make *gruit* and *gruit* beer. Take against one pot (half a gallon) a laurel berry, and also much resin, and some oat bran, and two seeds of bog myrtle. And make this beer only of barley malt, and set it with yeast.*¹⁶¹

Into the medicinal realm

Concentrated malt paste had made the shift into medicinal use as well. One of the myths surrounding English grout is that a malt and flour mixture was made for a sick cow, some was left out and it fermented; so originated Devon White Ale.¹⁶² Malt had a reputation for healing and soothing and many recipes survive to this day using malt and malt paste, called *grout* (*graut, naerbier, naebier*). For instance, in the sixth edition of *A Briefe Treatise touching the preservation of the eyesight, consisting partly in good order of diet, and partly in vse of medicines* from 1602, Walter Baley advises to

consume beer for better sight (vitamin B12 is both beneficial to eyesight¹⁶³ and present in beer), especially ‘which ale I thinke better to be made with grout according to the olde order of brewing’.¹⁶⁴ Doctor Christopher Wirsung mentions grout 24 times in his *The general practise of physicke conteyning all inward and outward parts of the body* (1602) and it is also mentioned by the Dutch herbalist, Rembertus Dodoaeus, who is quoting from l’Obel’s (1551) *Kruydtboeck*, as a concentrated malt medicine - and as bread topping - in his *Herbarius* (1608):

The thickly cooked naerbier one prepares in Delft in Holland, said Lobel, not only as food in the fasten for on bread, similar to syrup and cooked [evaporated] wine, but also to mix in several plasters, similar to soap and evaporated wort: because it is of the same force to strengthen hurt bodyparts, and to digest griefs.¹⁶⁵

Elizabeth Grey, Countess of Kent, included her recipe for grout, next to a recipe for making jelly from marmalade, in her *A true gentlewomans delight, wherein is contained all manner of cookery: together with preserving, conserving, drying and candying* as well as in her collection *A choice manual of rare and select secrets in physick and chyrurgery* (1653):

To make grout.

Take some Wheat and Beans and when you have made it into Malt, then rittle it, then take some Water, or some small Wort, and heat it scalding hot, and put it into a pail, then stir in the Malt, then take a piece of sour leaven, then stir it about and cover it, and let it stand till it will cream, then put in some orange pills, then put it over the fire and boil it, keeping it stirring till all the white be gone.¹⁶⁶

Four theories supporting the grain aspect of *gruit*

i) While the 16th-century recipe *Om Gruyt ende Gruytbier te maken* includes the usual *gruit* herbs of bog myrtle and laurel berries, it also lists *haveren doppen* (oat bran) as an ingredient. Oat bran does not make concentrated malt as it is only the husk or chaf of the oat seed, but is a grain product and what it can do is provide yeast. Archaeologist Carl Pause postulates the hulls of grains harbor endemic yeast and when added to *gruit* would help the wort ferment more vigorously. He bases

this theory on the Cologne city *gruit* accounts which list purchases of the ingredient *sprijen*, or the chaff of spelt (*Triticum spelta*). As spelt grains can not be released by threshing, like those of other cereals, spelt is ground between two millstones with a wide grinding gap (similar to a *grutmolen*). This milling process produces *sprijen* as a by product, a combination of flour dust and husks. The outside of the husks have yeast cultures similar to grapes and when the husks are moistened they will start to ferment. This added to *gruit* would provide a yeast culture and promote fermentation, explaining both the grain and the yeast connection with *gruit*. Pause thinks it possible the term *gruit* derived from this spelt *sprij*. According to the *Etymologicum Linguae Teutonicae* (1599) *gruys-bier* or *gruysen bier* was a drink called *ex furfuribus cocta*, it was cooked from bran, semolina or chaff.¹⁶⁷

ii) In the middle ages not all grain used in brewing would have undergone the malting process of sprouting, drying, and/or roasting. The process of malting grains is labour intensive: it needs attention because the sprouts need to be regularly turned to prevent binding and mold developing; it needs floor space to germinate, and then to be dried, and it needs some source of heat to facilitate its kilning. The act of germination activates enzymes which then convert the grains starches into sugars which will be converted into alcohol by the yeast. Not all grain used in medieval brewing had undergone this process, thus, the brewer relied on a careful balance of mixing enough malted grain (with enzymes) with unmalted grain to convert all the starches. One theory put forward by historian Hans Ebbing (1994) is that *gruit* was made from active-enzyme-containing malt which, when added to an enzyme-deficient malt, would accelerate starch-to-sugar conversion, and thus cause yeast activity sufficient enough to enable a noticeable increase in fermentation.¹⁶⁸

iii) A third theory views *gruit* as a malt concentrate, one based on the technique of concentrating a select amount of wort into a concentrated grain-sugar syrup, or malt extract,¹⁶⁹ which then gets added to fortify or strengthen the main wort (decoction mashing) in order to promote fermentation.¹⁷⁰ This extra sugar would significantly increase yeast activity and generate a noticeable increase in fermentation, and result in heavier ale. The practice of adding malt extract is used by brewers to this day to get a stronger beer or help a stalled ferment. Leen

Alberts (2017) wrote in his *Brouwen aan de Eem*, which details the Dutch medieval Amersfoort brewing industry, that:

gruit ale was named after the concentrated malt porridge or syrup with which the beer was made and called gruit. This sweet malt porridge possibly had a fermenting function. A mixture of herbs was added to give gruitbeer taste and some preservative qualities.¹⁷¹

The Devon White Ale¹⁷² process indicated a refinement to this technique by first letting the selected wort ferment, then in the middle of heavy fermentation the wort is evaporated to produce a concentrated paste. As evaporation is most often done with high heat it is unlikely any yeast cells survived the process to then aid fermentation, although according to some research this did happen.¹⁷³ In addition to the sugar-rich syrup, yeast remnants could also give new colonies quick access to nutrients needed for a rigorous fermentation. This would make malt concentrate not only a fermentable-sugars boost, but also a yeast nutrient.

iii) Finally, there is the notion that *gruit* was a form of yeast cake. Pliny mentioned yeast for wine as being preserved by mixing flour and must at harvest time and baking them into little cakes. The Latin term *fermentum* originally indicated the piece of Eucharistic bread sent by the Bishop of Rome to the bishops of the other churches as a symbol of unity and intercommunion, until the Council of Laodicea forbade the custom.¹⁷⁴ Franz Meußdoerffer theorizes that as *gruit* is also identified with the Latin term *fermentum*, it is conceivable that *gruit* was a bread-like substance containing viable yeast. Because it had been common to add herbs like bog myrtle, ficaria and iris to the yeast to protect the culture against contamination, this would fit the grain/herb mixture view as well.¹⁷⁵

The herbal aspect of *gruit*

It is unlikely *gruit* consisted solely of either grains or herbs. The historic sources seem to indicate *gruit* was first known primarily for its fermenting abilities, while also containing some herbs, whereas later it was primarily known for its herbal content and having some grain element. A quote from 1444 reprinted in the *Mittelniederdeutsches Wörterbuch* is interesting in this

regard: ‘*umme dure tidt willen, des men and den crude hadde, dat to der grut horde*’ - ‘the times are expensive, what one had of the herbs, which belonged to the gruit’.¹⁷⁶ Not only does this indicate herbs are part of *gruit* in mid-15th-century Germany; it suggests there are more ingredients in *gruit* than just herbs. The following quotes from Arnhem ‘*Die Gruyt of Cruyt anderswaer haelde of dede haelen dan in der Stat Gruythuis*’ - ‘Get gruit or herb elsewhere than the city gruit house’,¹⁷⁷ and the lease agreement of Frau Walburg from 1593 ‘*enig grudt noch kraudt im bier zu thun*’ - ‘do neither gruit nor herb into the beer’ also distinguish between *gruit* and herb.¹⁷⁸

The below quote from the *Mittelniederdeutsches Wörterbuch* (1876) is often used as proof that *gruit* only consisted of herbs: ‘*Im J. 1447 ist hieselbst (Dortmund) nur von gruit (which in den Heiden wechset, auch porsse genandt) Bier gebrawet. In 1477 wordt hieselbst erst mit Hopffen Bier gebrawen*’ - ‘In the year of 1447 is here (in Dortmund) only from gruit (which grows in the heather, also named porsse) beer brewed. In 1477 here is first beer brewed with hops’.¹⁷⁹ The problem with the statement ‘this therefore proves gruit is an herbal additive’ is that literally, this quote only states that in 1447 Dortmund *gruit* equals marsh rosemary. Dutch and German city *gruit* accounts invariably list multiple herbs used in *gruit*, not just one. What may be the case is that this 15th-century quote is an example of how *gruit* lost its diversity of ingredients and by this time only marsh rosemary remained as an ingredient in this specific area.

The surviving city accounts describing the expenses and income of the city *gruithuizen* not only kept track of the grain and malt purchased and spent grain sold, they provide details of which herbs were purchased when and for how much. In each of the *gruit* city accounts, the herbal contents used to produce *gruit* were noted and identified by their common names. Not only do they show precisely what went into *gruit*, unless the accounts were kept secret, anyone with access to the city’s bookkeeping could access the information. Earlier 10th and 11th-century scribes did not elaborate on the herbal content of *gruit* and this led to the notion that its formula was kept secret.¹⁸⁰ However, 14th and 15th-century city *gruit* accounts mention the herbal content of *gruit* plainly and consistently.

Most of the information coming from city accounts relate to the southern parts of the Netherlands and

City	Dates	Bog Myrtle	Marsh Rosemary	Laurel Berries	Laserpitium siler	Resin	Hops	Anise	Caraway	Juniper
Deventer	1339-1348	X		X	X	X	X			
Wesel	1342-1381	X		X	X	X				
Dortmund	1390-1399		X	X	X		X			
Cologne	1391-1393	X		X	(X)	(X)	X	X	X	X
Zwolle	1398-1411	X		X	X	X				
Duisburg	1417	X			X	X				
Munster	1481?		X	X	X					
Osnabruck	?		X	X	X	X				
Tecklenburg	17 th C		X	X	X					

Table 1. Herbs found in Dutch and German city accounts.¹⁸¹

Germany. Brewers in Holland switch to using hops early and in large numbers, in most cases their city accounts were only passed down from the 15th century, long after the business of *gruit* had disappeared.¹⁸²

From the accounts of nine Dutch and German city *gruit* houses, an interesting picture emerges. The 14th and 15th-century sources recorded purchases of either bog myrtle or marsh rosemary, of laurel berries and laserwort, and often in combination with (pine) resin. Deventer, Dortmund, and Cologne noted hops, which could have been used as part of *gruit* as the Cologne account of 1408 seems to indicate: ‘*Item vur hoppe ind gruis*’,¹⁸³ or could have been sold separately under the umbrella of *gruitrecht* taxation. The Cologne *gruiter* seemed to be a bit of an experimentalist and also recorded anise,¹⁸⁴ caraway,¹⁸⁵ juniper berries, and an unknown herb¹⁸⁶ for use in *gruit*. Laserwort is noted, but as a non-purchase: ‘*Item sermenteye neyt*’ - ‘Also sermentangen not[hing]’.¹⁸⁷ This would seem to indicate it was normally purchased, but was not currently available. In the same account resin was noted as a non-purchase as well,¹⁸⁸ and these absences could be a good reason for the addition of unusual herbal alternatives - to experiment to try and emulate the normally available traditional ingredients.

Many other herbs mentioned in connection with *gruit* beer, like yarrow (*Achillea millefolium*),¹⁸⁹ sage (*Salvia*

officinalis),¹⁹⁰ and ground ivy (*Glechoma hederacea*),¹⁹¹ can be traced back to other non-*gruit* herbal beers. Yarrow, for instance, has a long history in Scandinavian beer brewing.¹⁹² Another possibility is that their association with *gruit* came about via earlier attempts to translate the obscure Latin and middle Dutch and German names found in the city *gruit* records.¹⁹³ While *gruit* included herbs, brewing with herbs did not make a *gruit*. The inclusion of the well known *gruit* herb bog myrtle did not automatically make a beer a *gruit* beer either, as show by the following Dutch beer recipe from the *Middelnederlandsche geneeskundige recepten en tractaten, zegeningen en tooverformules*, or the *Middle Dutch medical recipes and tracts, blessings and magical formulas* (undated MS. transcription):

385. To make good beer, take barley and white leaven, after one wants good beer brewed with; and as you wish, add wheat, well ground, then add water to a kettle over the fire and add one’s flour of the grains in the water and stir well. Let it cook until 2 parts [have evaporated], then let it cool down until bloodwarm. Then add to a barrel, then take good leaven and bottom fermenting yeast, take it together. And then take [some] of the same wort and temper the leaven and the bottom fermenting yeast together and stir well together. Then add to the barrel and let it rise; it shall rise above and becomes good beer to drink the third day. And know that you should add to your wort also hops, and bog myrtle, and bread, and let it cook all together, with the rest.¹⁹⁴

The trinity of gruit herbs: bog myrtle / marsh rosemary, laurel berries and laserwort

The herbs most often mentioned in connection with gruit seem to have something in common: not only do they have bittering agents which makes them more or less reliably antiseptic, they also contain substances that are mildly narcotic, psychotropic, or inebriating, resulting in enhanced intoxication, (and hangovers). It is conceivable that initially the herbs were specifically chosen for this reason, as part of religious ceremonies and important feasts.

i) *Bog Myrtle* (*Myrica gale* L.)¹⁹⁷ and *Marsh Rosemary* (*Ledum palustre* L.)¹⁹⁸

The main herbal ingredient of gruit was bog myrtle (*Myrica gale*), also described as *mirtus* and *gagel*. In those areas where it did not grow, marsh rosemary (*Ledum palustre*) would be used instead. In Western Germany *gagel* also referred to marsh rosemary,¹⁹⁹ and in Germany and Scandinavia the name *pors* had been used for bog myrtle.²⁰⁰ This made identification rather confusing, until their habitats are checked: the two plants do not grow in the same regions.²⁰¹ Bog myrtle grew in

the Dutch province of Gelderland, in northern Münsterland and near Tecklenburg; marsh rosemary, however, is found mainly in the northeast German bogs, in Silesia, Bohemia, and Moravia. This meant that western Germany and the Netherlands would use bog myrtle in the *gruit*, and further northeast marsh rosemary would be used.²⁰²

This fluidity of the names *gagel/pors* is illustrated by Schook, who wrote an early book on beer called *Libre de cervisiæ* (1661), and included a description of *gruit* beer:

It ought not to be passed over in silence either, beer made in Tecklenburg and commonly called Gruising; considered to have the merits of a partially medicinal beer, with a little lupine,²⁰³ but comes from the place of the myrtle *Sylvestris* (Brabanticae is not unlike), by the inhabitants called *porsse*, *gagel* by the Low Countries, to which smells musky, well mixed with special seeds; and also laurel berries and leaves, [and a herb] I call Scharpe tonge: these are pounded up together, and [added] at the same time as fermentation is being managed. But he, having not had scent and taste [before] of this beverage, especially of the *myrtus sylvestris*, then [only] quickly soak it [the herbs], [for those] who are not habituated to it.²⁰⁴



Figure 3. Bog myrtle as illustrated by Dodonaeus (1644). (With permission of www.biolib.de)



Figure 4. Marsh rosemary as illustrated by Dodonaeus (1644). (With permission of www.biolib.de)

The bog myrtle (Fig. 3) is a deciduous shrub with a preference for wet, acidic swamps such as the heather fields and bogs in northwestern Europe and North America. The shrub grows between 0.6 and 1.5 m tall, has leaves between 2.5 - 4 cm long, with resin glands on the underside and taste bitter. Bog myrtle flowers in April and May and the catkins appear before the leaves on the twigs which then stop growing. The male catkins are tapered; the female catkins closely set and resinous - the flower petals do not fall off but grow in as part of the fruit.²⁰⁵ The fruit is about 3mm in diameter and contains a single large seed. Surprisingly, considering their small size, it seems that in medieval brewing quite often only the fruits would be used.²⁰⁶ As recounted by Matthias l'Obel in his *Kruydtboeck* (1581) 'The same flower also sometimes, for lack of hops, is added to beer [...]: sometimes also to make the drunkards happy, because bog myrtle makes one dim in the head and makes people happy of spirit.'²⁰⁷

In modern brewing most often the leaves are used: about 1 - 4 grams per 10 liters of beer is a good rule of thumb.²⁰⁸ Bog myrtle is bitter and astringent which presumably gave gruit a distinctive taste; sharp, potent, and slightly sweet.²⁰⁹ Bog myrtle and the beer brewed with it had a reputation for causing headaches²¹⁰ though recent brewing experiments recounted no such ill effects.²¹¹ Dutch herbalist Dodonaeus (1644) explained this result: 'The fruit taken with some drink goes to the head, and hurts the brain. Therefore if it is cooked with beer or brewed with it (which happens in several places) then the beer damages the head, it makes the head hurt, and makes people quite easily drunk'.²¹²

Similar to bog myrtle, pors or marsh rosemary (*Ledum palustre*) (Fig. 4) grows in swamps and wet places of northern Europe, Asia, and America. Reputedly, the leaves are more powerful than Labrador tea (*Ledum latifolium*) and have some narcotic properties. Dodonaeus recounts in his *Herbarius oft Cruydt-Boeck* (1644): 'In Pomeran, as one says, this rosemary is cooked in the beer; from which it receives a lovely taste, and preserves it well'.²¹³

ii) *Laurel berries* (*Laurus nobilis* L.)²¹⁴

The other two herbal ingredients to make regular appearances in the city *gruit* accounts were less straightforward. First collected under one term, *dura species* (Latin) and *zwaercruyt* (Middle Dutch) - literally mean-



Figure 5. The Laurel tree as illustrated by Dodonaeus (1644). (With permission of www.biolib.de)

ing heavy herbs²¹⁵ - in later accounts the term was separated into *serpentijn* and *bakelaar*.²¹⁶ The term *bakelaar* specifically indicates the berry of the bay laurel, not the tree (bark) or leaves. The word *bekeler* is a variant of the word *bakelaar*, which can be traced back to the Latin *baca lauri*, the berries of the laurel. A quote from 1621 illustrates this separation 'Al de deelen van Laurieren, Schorse, bladt en bakelaar' - 'all the parts of the laurels, bark, leaves, and berries'.

The German *bekeler* has a resemblance to Beckbereren, which are various types of blueberry²¹⁷ and cranberries, and to *Beckholder*, the juniper²¹⁸ (other variants are *Wacholder*, *Weckholterbeeren*, *Kromerbeeren*, *Graines de Genure*, *genever* and *jenever bessen*).²¹⁹ But as the Dutch *gruit* records specifically account for purchases of *baccæ lauri* and not *baccæ iuniperi*, clearly the laurel berry is indicated with both the Dutch *bakelaar* and *bekeler* and the German *bacheller* and *bekeler*.

The laurel (Fig. 5) is a small tree originating from the eastern Mediterranean, including Turkey, Georgia and Greece. There it can reach as much as 18 meters, but when transplanted to colder climates does not grow over a height of about 7.5 meters. It is grown as a container plant in colder climates and, unless a greenhouse is

available, usually does not fruit. The shrub has been cultivated in England since the 16th century.²²⁰ It is the source of the ancients' crowns and wreaths for heroes and poets, and the modern term of 'bachelor,' given for degrees, is probably derived from *bacca-laureus*, or laurel-berry. The flowers are small, yellow and unisexual, and grow in small clusters.²²¹ The leaves are sometimes used in modern brewing: recommended is no more than 1 leaf per 10 l. and to boil for a long time to let the taste come into its own.²²²

iii) *Laserwort* (*Laserpitium siler* L.)²²³

Serpentien is likely the herb to have generated the most alternate identifications. Literally translating to snake weed, only a few plants with similar names are found in Dutch herbals and none of them have any family resemblance to laserwort. For instance, Mattias l'Obel described a plant called *alderminste* (lesser) *serpentine* or *Serpentina omnium minima*, which is part of the plantain family.²²⁴ Another misidentification might have come by way of the variant *Rosskümmel* for laserwort. *Kümmel* means caraway (*Carum carvi*; fam. *Apiaceae*). Caraway is derived from the Latin *cuminum* and is native to northern Europe. Cumin (*Cuminum cyminum*; fam. *Apiaceae*)

is visually similar to *Laserpitium siler* (fam. *Apiaceae*) and caraway but native to the Mediterranean.

Initially the identification of the Dutch *serpentijn* is confusing, until the German *gruit* accounts are taken into account. What in Deventer was written down as *serpentien* was called *Scherpentangen* and *Sermentangen* in Münster, and *Siler montanum* in the accounts of Wesel.²²⁵ *Siler montanum* is the old name for *Laserpitium siler*, which is still called *sermontano* in Italian. The later German accounts of Wesel also mentioned *Kleinkraut*,²²⁶ a variant of *Laserkraut*, and yet another variant of *Laserpitium siler*.

Laserpitium siler, commonly called laserwort (Fig. 6), is an herbaceous perennial plant belonging to the family *Apiacea*. It can reach a height of about 30-100 cm and has a resemblance to Queen Anne's Lace (*Daucus carota*). It has alternate leaves and from June to August produces compound clusters of white, five-stellate flowers. Laserwort occurs in central and southern Europe; in the Alps, Balkan, Apennine Mountains, and the Iberian Peninsula and grows in gorges and rocky slopes at an elevation of 800-2,250 m above sea level.²²⁷ Its seeds are spicy though somewhat buggy smelling; it is at the same time a slightly spicy and bitter tasting fruit. The city *gruit* accounts indicated *sermentangen* as the most expensive ingredient.²²⁸



Figure 6. *Laserwort* as illustrated by Dodonaeus (1554). (With permission of www.biolib.de)

Resin

Several of the city *gruit* accounts mention the purchase of *resina* (Latin), *hersen* (Middle Dutch) and *haesch* (middle German), or pine resin. Initially it was not clear what the resin what meant for: was it an ingredient,²²⁹ or was it used to treat equipment? For instance, wood barrels were often internally coated with resin to make the barrel less permeable to liquids, while at the same time releasing preservative qualities, and infusing a slight resin-y flavor to the liquor.²³⁰ But as the previously mentioned recipe *Om Gruyt, ende Gruytbier te maken* by Vorselman²³¹ lists resin as part of the additives, included with the herbs, it is more likely that it was used as an ingredient.

This early 16th-century recipe indicates resin with the word *appoys* (*arpoy*s), a variant of *harpuis* or clarified pine resin. In Dutch, pitch is called *hars* and the term for

refined *hars* is *harpoys* (the silent ‘h’ gives *arpoys*) and *harpuis*. Pitch is refined by melting it to distill the volatile turpentine, leaving a clear resin, called *spiegelhars* (‘mirror resin’), with many uses such as glue and varnishes. The term *harpuis* was often used for a resin mix, for instance a mixture of resin and linseed oil would be painted on ships’ masts and other exposed woodwork. But it did not always mean the same; there is also note of *harpuis* as a mixture of resin and sulphur used to treat woodwork against woodworm.²³² It is of interest to note that the second kind of *harpuis* mix, of sulphured resin, could act as a preservative.

Lesser known *gruit* herbs

Most of the alternate ingredients seem to come from the German city of Cologne from the 1390s: *haesch*, *gegirde Sprye*, *kroun / karoun* and *koem / koemps* were used, and *genveren*.²³³ Some of the ingredients are fairly simple to identify: for instance *haesch* is a known variant of the Dutch *hars*, or resin, and *gegirde sprije* is thought to be hulled spelt.²³⁴ Only *kroun*, *karoun* and *karoens* (possible alternate spellings of the same product) are still unknown. Schubert (1880) theorizes these words could be variants of *carbones*, or coal meant for heating.²³⁵ He also wonders if it is possible that the words derived from *Kariofel* (*Caryophyllum*), which would indicate gillyflower or carnation (*Dianthus caryophyllus*),²³⁶ a plant known to have been used in brewing. Until more research is done into the etymology of the words, these two theories, while interesting, seem far fetched.

Schulte (1908) mentioned that Duisburg recorded the purchase of *kersen*, or cherries, insinuating a Belgium Kriek like fruit beer.²³⁷ Unfortunately for the Belgium Kriek lovers the word *kersen* appears again at the bottom of the page in a clearer context (as part of scribal equipment)²³⁸ and means candles, not cherries.

Hops: There are accounts of hops used for *gruit* in Deventer, Dortmund and Cologne. Hops could have been used as part of *gruit* if the Cologne account of 1408 is to be taken literally: ‘Item vur hoppe ind gruiss’,²³⁹ or could have been brought and sold separately under the umbrella of *gruitrecht* taxation.

Juniper: In 1391 and 1393 juniper makes an appearance on the Cologne city *gruit* account as *genveren*, a proba-

ble misspelling of *genever*.²⁴⁰ Ennen (1779) and Scheben (1880) both translate *genveren* to *Ingwer*, or ginger (other variants are *ingever*, *engever* and *gengever* - note the consistent ‘g’ at the end of the first consonant, absent in *genveren*) and *bachellers* to *Wacholderbeeren*, or juniper berries. *Genveren* is more plausibly juniper rather than ginger, by way of the Dutch word *genever*, a common ingredient in the brewing of beer (and the making of *jenever* or Dutch gin).

Caraway: The likely translation of *koem* or *kuemps* seems to be either caraway²⁴¹ or cumin.²⁴² The etymology of the word *koem* indicates caraway and states *koem* derives from the Latin *cuminum*, as does the modern word caraway. The Middle Low German is *komen*, with variants *kamen*, *komin*, *kämen*. *Koem* and *Koellen* are found in 16th-century recipe sources, with other variants *gartenkoehm* and *gartenkoellen*. The Middle High German is *kumin* and modern is *Kümmel*. It grows locally and is still used to make a liquor called *Köhm* in Low German and *Kümmelschnaps* in High German. The similarity of caraway and cumin as a spice makes it sometimes problematic to distinguish between one and the other, especially as they can be used as substitutes for each other. Caraway is twice as strong as cumin.²⁴³

Hofsten, in his Swedish book on *Pors* (1960), also mentions the use of caraway and cumin in *gruit*, and one account of nutmeg,²⁴⁴ but does not specify his sources. He does go on to say: ‘Arnold mentions yarrow, but this statement is very questionable’,²⁴⁵ Doorman (1955) also mentions yarrow, as well as sage, but gives no explanation as to why, and also offers no references.²⁴⁶ Yarrow is mentioned in Scandinavian and Anglo-Saxon cultures as an ale ingredient, but as *gruit* ale is essentially a regional beer style limited to the Low Countries, it is not surprising none of the *gruit* city accounts mention it as an ingredient.

Similarly, many of the other herbs associated nowadays with *gruit* beer are known from brewing, but often by way of England or Scandinavia - both areas with long traditions of herbal beers but not directly associated with the Dutch and German tradition of *gruit* ale. In Scandinavia there is no separate term for *gruit* and while it has been postulated the term *pors* might have meant a herbal mixture akin to *gruit*, there is neither proof for this nor for the medieval tradition of *gruit* in Scandinavia.²⁴⁷

By the 16th century in Germany, after the decline of *gruit*, flavored beers came into vogue. These German beers were mostly hopped and flavored with one or several spices and herbs. In 1543 Placotomus published a book describing beer in detail which, for the following 200 years, was the basis for German beer culture. He mentions many plants, including those seen in the context of modern *gruit*, that are used for medicinal beer and these and many other plants were recommended by numerous authors of brewing, housekeeping, and botany books in the decades and centuries following.²⁴⁸ As Dodonaeus wrote in his *Cruytboek* of the High and Low Country brewing of beer:

[brewed] with sometimes hops, gentian, laurel berries, zedoar (*Curcuma zedoaria*), bog myrtle, *Inula* sp. root, lavender, sage, flowers of *Horminum* or scharley, *Cocculus indicus* [?] or some of the species of dimming nightshade, *Physalis* sp., veldtcypres (*Ajuga chamaepitys*) and other similar herbs cooked with it: and from this the beers become so diverse of force, that they should be called mixed drinks, and not beers.²⁴⁹

Regional differences in the herbal content of *gruit*

The idea that there could have been many types of *gruit* herb mixtures through regional differences in the contents²⁵⁰ is not supported by the detailed city *gruit* accounts available to us. The city *gruit* accounts are consistent with each other in the type of herbs purchased. The accounts indicate the herbs were regularly purchased by the *gruiter*s from traders and often sourced from afar. Laserwort and laurel berries are known to have been sourced from southern trade centers, Deventer purchased from Arnhem, Wesel from Cologne, and in later times Munster bought laurel berries from the great market of Antwerp, paying additional shipping costs. Deventer and Duisburg also bought their resin from Cologne.²⁵¹

Grainbills

By the 14th century barley had become the most important brewing grain in England and large parts of Germany.²⁵² But this was not the case in the Dutch provinces where up until the 16th century more than half of the brewing grains consisted of cheap and locally grown oats.²⁵³ As oats are not the best grain to brew

with in regard to starch-to-sugar conversion, other grains would be added to raise the quality of oat beer, especially wheat. From the 14th century on, barley began to be added as the third grain to oat beers, but would only very slowly gain popularity. Rye was sometimes allowed as an additive to commercial beer, as in Gouda, but in other cities such as Amersfoort, Groningen, and Haarlem the use of rye in brewing was forbidden and reserved instead for the baking of bread. Buckwheat and spelt were only very occasionally found in beer.²⁵⁴

Table 2 shows medieval grainbills used for making beer. These 15th and 16th-century central and northern Dutch grainbills are a century or more after the *gruit* beer era, but as they are as close as we can get to medieval beer grainbills, they do provide a good starting point to develop our own *gruit* beer recipe. For each city the oldest surviving grain bill is noted (for other grain bills, please check the references).²⁵⁵

As modern brewing is more efficient than medieval brewing practices, the pounds of grain per gallon of water (# per G) ratio are cut in half for a modern recreation, as suggested by Alberts' studies in *Bier drinken met maten*.²⁵⁶ For entries without complete data his mathematical formula was used to calculate the alcohol percentage by volume.

The theory malt was to be brought to the *gruithuis* to have *gruit* added under supervision is found quoted in modern literature. The 1322 ordinance states brewers brought their malt to the *gruithuis* to be inspected, and seems to indicate they would then have *gruit* added directly into the malt.²⁵⁷ Doorman, therefore, uses this interpretation as proof *gruit* can not be a yeast based ferment as it would then be cooked with the mash, so killing the yeast.²⁵⁸ Even though adding a malt concentrate to the mash would work before and after brewing as all it does is strengthen the wort, this interpretation is also questionable, as in the ordinance of 16 May 1322, the words '*dair binnen*' mean 'there inside', as in, inside a building like a *gruit* house, and does not mean 'therein' or into the malted grains.²⁵⁹

Another reason postulated for this malt transport is that this practice would keep the *gruit* herbs secret, as the *gruiter* would add it to the malt personally. The unnecessary transportation back and forth of malt seems

City and year	Beer type and grain bill	Grains	Ratio	# per G Historic	Equivalent # per G Modern	Gravity	Vol % alcohol	Source
Amersfoort 1475	10 mud haver 3 bud gerst 2 mud tarwe	Oats Barley Wheat	57.8% 22.6% 19.6%	4.70	2.35	28.2	8.8%	A, 158
Amsterdam 1484	36 schepel haver 27 schepel gerst 16 schepel tarwe	Oats Barley Wheat	36.6% 35.8% 27.6%	3.26	1.63	19.5	6.1%	A, 161
Delft 1340	Hopped beer or peatbeer 72 achtendeel haver 24 achtendeel tarwe	Oats Wheat	64.2% 35.8%	3.95	1.97	18.9	7.4%	D, 96
Gouda 1366	45 schepel havermout 9 schepel tarwemout	Oats Wheat	77.1% 22.9%	4.44	2.22	26.6	8.3%	A, 161
Haarlem 1407	Hopped beer 36 achtendeel haver 10 achtendeel	Oats Wheat	68.2% 31.8%	3.47	1.74	20.5	6.5%	D, 96
1407	36 achtendeel oats 9 achtendeel wheat 2 achtendeel barley	Oats Wheat Barley	67.9% 26.7% 5.4%	3.19	1.6	19.13	6.0%	D, 97
Leiden 1497	14 bags oats, rye or mix 5 bags tarwe 9 bags barley	Oats, rye, mix Wheat Barley	40.3% 37.0% 22.7%	1.29	0.65	8.5	2.7%	D, 98
Naarden 1475	10 mud oats 2 mud wheat 3 mud barley	Oats Wheat Barley	57.3% 18.0% 24.6%	2.82	1.41	16.88	5.3%	D, 97
Utrecht 1404	12 3/4 mud oats 4 1/4 mud wheat	Oats Wheat	63.9% 36.1%	3.24	1.62	13.2	6.1%	D, 96
Wijk-bij-Duurstede 1500	Utrecht's Koyt (kuit) 10 mud oats 4 mud wheat 6 mud barley	Oats Wheat Barley	40.6% 31.8% 27.5%	2.74	1.37	23.8	5.1%	D, 98
Zutphen 1515	Koyten (kuit) 9 mud oats 3 mud wheat 6 mud barley	Oats Wheat Barley	40.3% 38.5% 21.2%	1.45	0.72	8.68	2.7%	D, 98

Table 2. 15th and 16th-century Dutch grainbills used for making beer.

impractical and unwieldy.²⁶⁰ Found in several ordinances from Dordrecht one wonders what could actually be the point of this extra effort.

16 May 1322: 'and his malt which belongs thereto and there inside shall the gruter give him his gruit, if he has not done this and would it be that the gruter does not believe him and had he brewed more than he showed then the gruter shall keep him to his oath'.²⁶¹

1401: 'who did not bring his money and malt to the gruthuis, as is custom, forfeited ten pounds according to this ordinance'.²⁶²

Undated: 'Also if the *gruter* said a brewer, he had not brought his money and his malt to the *gruthuis*, or that he had brewed more than his money had bought, then the brewer and his head apprentice would have to swear, that they are not guilty, if the *gruter* asks that of them. And if the brewer and head apprentice do not want to do this, then the brewer is lost. And if the head apprentice would not follow the master and breaks his oath, so shall the brewer deposit the apprentice at the judge; and with that the brewer would lose, if the apprentice turns on him, everything without argument'.²⁶³

When looked at from a medieval point of view, the transport of grain for taxation makes sense. From a time when taxes were collected in kind, one of the ways to prevent serfs from keeping back some of the harvest was to mandate all grain had to be milled at a local government-owned communal mill where the taxed grain would have to be surrendered on site.²⁶⁴ It is possible a similar system was still in use in Dordrecht, where the brewer would show his malt first to then receive the proper amount of gruit in order to ferment wort made from it. As noted in the ordinance, if the brewer made more beer with the allocated amount of gruit than was paid for, then he would have to pay a fine. This illustrates the showing of malt probably had more to do with preventing tax fraud than to promoting the quality of beer.²⁶⁵

Another practical reason malted grains would be transported to the *gruthuis* was because the *gruthuis* often had a *stampus*, a horse-powered mill. It is logical the brewer would bring his malted grains to the *gruthuis* to have them crushed, and to then take the crushed malt home to make his mash.²⁶⁶

The end of *gruit*

The superior preservation qualities of hops initiated the decline of gruit beer. When, during the 14th century, *gruit* beer was replaced by hopped beer, *gruitrecht* developed into an excise tax as it was no longer bringing in revenue. The *gruthuizen* were replaced by small offices and mostly disappeared altogether during the 15th century.²⁶⁷ The political climate of the Renaissance caused the end of *gruit* altogether. Taxation through gruit as part of the hereditary rights of nobles and churches became outdated. First the cities took ownership of *gruitrecht* as a way to generate income through taxation on the local production on beer. With the expansion of towns into thriving cities and trades centres this limited type of taxation evolved into a more inclusive - and much more lucrative - production, export, and import-taxation system.

At the end of the gruit era, the right to gruit slowly disappeared. In 1272 the lord of Breda released the citizens of Oosterhout '*Quod hominis villæ de Oosterhout funt et case debent liberi per totam terram Brabantiae ab oni telonio, pedagio, grutsa cumba*' - 'the people in the town of Oosterhout are exempt in the whole of Brabant of tolls, road taxed and gruit-money'. The city of Rheden bought the *gruitrecht* in 1351 without reinstating it. In 1402 the count of Holland, Aalbrecht van Beijeren, leased for a loan from the city, amongst other rights, the *gruitrecht* to the city of Rotterdam. However, as the city had already forgone, by city ordinance, the position of *gruter*, this meant the end of *gruitrecht* in Rotterdam.²⁶⁸ The 1418 Arnhemse gruyt generated zero income as nobody wanted to lease it: '*nyet, want der nyemant hebben wolde in Pacht*'.²⁶⁹ In 1446 Jan, count of Nassau, gave the citizens of Breda the freedom to brew for themselves and their families, in their own brew buildings, without owing him or his descendants any *gruitgeld*.²⁷⁰ The tax collector for Gouda commented in his city account for 1468-69 that *gruyte* beer is no longer produced there.²⁷¹ In 1559 the city of Amsterdam bought off *gruitrecht* for 4500 pounds from Philip the Second. In that same year the mayors of Alkmaar also bought off *gruitrecht* for 525 pounds from the count of Alkmaar.²⁷² In the herbals of the 15th century there is hardly anything to be found on the herbs used in gruit, and by the 16th century even less, let alone about their role in brewing.²⁷³

At the end of the Middle Ages, little was left of *gruit* and *gruitrecht*. The right was officially lifted in what would become the Netherlands in 1798, with the constitution of the Batavian Republic.²⁷⁴ In it, *gruitrecht* was abolished without compensation to any previous owners²⁷⁵ and thus the last trace of *gruit* disappeared.

Summary

Gruit as a product changed throughout its history. From a beer additive revered for its fermenting powers, it evolved into a beer with a reputation for powerful side effects. The exact nature of *gruit* as a product was thought to be lost, but the many different sources reveal an interesting picture: one of *gruit* not as just a collection of brewing herbs, but as a potent wort fortifier. There are still aspects of *gruit* yet to be fully understood, but the following can be stated with some certainty:

Gruit was seen as an aid in fermentation (a *fermentum*).

Gruit was seen to be able to lift / invigorate fermentation (*levarentur*).

Gruit was able to color (darken) the wort (*pigmentum*).

Gruit needed to be crushed (the *stampus*).

Wood, peat and grains (malted, and bran) were purchased for the production of *gruit*.

Gruit preparation used a kettle.

The *gruithuis* used barrels to store and sell *gruit*.

In the making of *gruit*, spent grains (*soppa fermenti* or *gruet soppe*) were produced.

Gruit included specific herbs, and resin.

The theory which fits each of the points listed above, as well as the etymological history of the word *gruit* and the bits and pieces which survived of *gruit* in other cultures, is the theory of *gruit* as a malt concentrate. If the mill, kettle and malted grains were indeed only intended for a side business in processing malt, then the next best theory is that of *gruit* as a yeast additive through the addition of yeast-rich (wetted) grain hulls. The *gruit* mixture would include dried and crushed bog myrtle or marsh rosemary, laurel berries, laserwort, and resin and a portion would be added to the wort prior to fermentation.

My intention with this study is to provide the reader with as comprehensive a picture of *gruit* as possible. It

is my hope that the information presented here will pique the herbal ale enthusiast's interest and open their eyes to its lesser known, but just as interesting, early history.

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Appendix I

Historical charters provide us with early descriptions of the product *gruit*:

946: Emperor Otto I in regards of monastery Gemblours, confirmed by Otto II in 979, which mentions 'materia cervisæ' - 'matter for brewing'. This charter is seen as the earliest mention of *gruit* and while it is questionable as it seems to be faked, this happened at the end of the 10th century.²⁷⁶

974: Emperor Otto II gifts the bishop Notker of Luik the church of Fosses in Namen, including the right of tol, market, coin and of 'materia cervisæ' - 'matter for brewing'.²⁷⁷

998/999 & 1013: Emperor Otto III gifted the Church of Utrecht for the villa Bommele the: 'negotium generale fermentatæ cerevisiæ, quod vulgo *grutt nuncupateur*'²⁷⁸ - the general business of beer ferment, which is commonly called *gruit*.²⁷⁹

1046: The Church of Saint Marten in Utrecht was gifted: 'Grutum oppidi S. Trudonis, hoc est potestas ponere et deponere ilium, qui materiam faceret, ende levarentur cervisiæ, et de fingulis cervisiis, quae brassarentur in oppido, sex picanos suscipere' - 'Gruiter of the town of St. Trond, hereby [he has] the ability to maintain or lower it, the matter of who is to do it, the rising of the beer, and [for] each beer which the the town brewers [make], six picanos are taken'.²⁸⁰

1048: Theoderik, the bishop of Metz, gifted the abbey the *scrutum* of Saint-Truiden: 'scilicet omne ius grute, quod solum ad ipsum pertinebat, et libertatem grutarium constituendi, ac domum cum appendiciis suis, intra quam materia grute conficibatur, sitam in opposito aule abbatis nostri' - 'that is, every right to *gruit*, that it is only to him, it had been designed, and the liberty of the *gruithuis* must be

arranged, and about his house, with all its appurtenances, there the gruit matter is prepared, situated opposite the courtyard of our monastery'.²⁸¹

1064: The gift of 1048 was confirmed by Bishop Adalberd, and here gruit is described as '*materiam unde levarentur cerevisiæ*' - 'the material to leaven / raise beer'.²⁸²

1068: From the charter of the town of Huy '*le pigmentum propre à faire de la cervoise*' - the proper pigment for the making of beer'.²⁸³

1074: '*Item omne ius quod de fermento cervisie, quod frumentum vulgariter dicitur Gruyt debet vel potest accipi in opido Nuxiensi erit sepeditate Nuxiensis ecclesie, ita quod sine eius licentia nullus possit ibidem cervisiam fermentare*' - 'Also the right to ferment beer, with the grain commonly called gruit, should be collected from the said town Neuss at the St. Quirinus Church, so that no one can brew beer without his permission'.²⁸⁴

1098: The Bishop Radbod van Doornink proclaims: '*Duo etenim fratres, Radulfus et Letbertus nomine, in Tornacensibus non inferiores, fermenti cervisiarum, quod maiera vulgo dicitur, protestatum, in Tornacensi civitate, hereditario iure, a me obtinebant*' - 'In fact two monks, of the names Radulfus and Letbertus, not inferior in Doornink, ferment of beer, commonly called maiera (a southern variant of gruit), proclaimed, in the city of Doornink, to have hereditary rights, received from me'.²⁸⁵

1112: The Bishop of Cologne leases the '*cervisiale fermentum*' to the local monastery.²⁸⁶

1209: One of the many gift lists by Otto IV to the church is: '*maceria quæ alio nomine Grut appellatur*' - 'malt (matter) which by another name is called gruit'.²⁸⁷

1218: A gift from the count of Gerhard of Geldren to the Cisterian monastery of Roermond: '*fermentum cerevisiæ, quod vulgo grut nuncupatur*' - 'ferment of beer, commonly called gruit'.²⁸⁸

1224: The count of Gelre promises the Cisterian Order a monetary donation and as much fermentum as the cloister needed for brewing: '*fermentum cervisiæ, quod vulgo Grut nuncupatur*' - 'ferment of beer, commonly called gruit'.²⁸⁹

1226: The count of Flanders confirms the 1224 AD *jus grutæ* of Ghidolf von Gruthouse, *grutarius / grutarium* of Bruges. While no-one else is allowed to make gruit, the inhabitants of Rodenburg are exempted.²⁹⁰

1232: Count Otto returns to the city of Doesburg the '*fermentum quod vulgariter dicitur grut*', which his father had previously gifted.²⁹¹

1236: Henrik de Borculo sold the Count of Gelre the town of Groenlo including the *fermentum* of gruit, but keeps his household exempt from this tax.²⁹²

1265: '*cum civitate Monasteriensi fermentum, vulgariter grut dictum, acquisivimus*' - 'when the state monasteries brew, they purchase what is commonly called gruit'.²⁹³

1265: '*Twe borghermeystere, twe renthenmeysterem twee kemerlyncgle ... sollen ghaen in dat gruedhues, itlick zuen (2) molder krudes uyt to boren, dat men doe sal alle tijd, alz twee molder vergrutet zijn*'²⁹⁴ - 'Each time 2 molder is vergruit, then two burgermasters, two rentmasters, and two *camerlinge* should go to the gruihuis, to do something to/with two molder herbs. This could mean the gruitier only had access to two molder at a time, and that this amount had to be refilled under supervision of city officials'.²⁹⁵

1272, 1277: The city of Wesel received the gruitrecht and instated a *fermentarius*, or a city gruit official.²⁹⁶

1324: from the lease agreement of Count Willem de III with Dordrecht: '*men sal die Grute maken ende gheven in alsulker manieren als si voirmaels ghegeven es*' - 'one would make the gruit and give in the manner as it is previously given before'.²⁹⁷

1332: '*fermentum quod vulgariter dicitur grut, braxare*' - 'ferment commonly called grut, brewed'.²⁹⁸

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62. van Hout, J. (1602) *Der stadt Leyden Dienst-bouc*. Raedthuys, Leiden 1602. Republished dbnl, 2014. http://www.dbnl.org/tekst/hout001ders01_01/colofon.php, p.14.
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64. Ackersdyck, W.C. (1819) op. cit. p.184 and Doorman, G. (1955) op. cit. p.6. Doorman postulates that perhaps *scrutum* is a variant of *crutum* or *cruud*, herb.
65. Ebbing, H. (1994) op. cit. p.17.
66. de Saint-Genois, J.L.D.G. (1843-1846) *Inventaire analytique des chartes des comtes de Flandre*. Gent: De l'Imprimerie de Vanryckegen-Hovaere, https://books.google.com/books/about/Inventaire_analytique_des_chartes_des_co.html?id=rAa4mUCslToC, p.9.
67. Noordewier, M.J. (1853) op. cit. p.230.
68. van Summeren, P.N. (1948) 'Over gruit, gruitbier en daarmee samenhangende woorden', *Natuurhistorisch Maandblad*. Orgaan van het Natuurhistorisch Genootschap in Limburg. Jaargang 37, No.11-12. Maastricht: Natuurhistorisch Genootschap, p.87.
69. Ruis, F (1986) 'Gruit - Grutt - Gruijt - Grout - Graut - Grute - Gruut', <http://www.wk4.nl/us/historie/bronnen/367-gruit-grutt-gruijt-grout-graut>.
70. Doorman, G. (1955) op. cit. p.4 and Ebbing, H. (1994) op. cit. p.18.
71. Ebbing, H. (1994) op. cit. p.18.
72. The practice of adding an extract or syrup to the wort to boost the fermentable level. It is unlikely decoction mashing, the concentration of enzymes still resident in the wort by steeping, was used although this is a possibility.
73. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.26.
74. Ackersdyck, W.C. (1819) op. cit. p.197.
75. *ibid.*
76. *ibid.* p.383 and Ménage, G. & de Caseneuve, P. (1694) *Dictionnaire étymologique: ou origines de la langue françoise*. Paris: Jean Anisson, https://books.google.com/books?id=LclKAAAACAAJ&dq=M%C3%A9nage.+Dictionnaire+Etymologique&source=gbs_navlinks_s, p.498.
77. Way, A. (1843) op. cit. p.217.
78. Wubs-Mrozewicz, J. (2005) op. cit. p.156 and von Hofsten, N. (1960) op. cit. p.213.
79. Hornsey, I.S.(2003) op. cit. p.530.
80. Karkeel, P.Q. (1877) op.cit. p.188.
81. Wright, J. (ed.) (1900) op. cit. p.51.
82. Karkeel, P.Q. (1877) op.cit. p.192.
83. Swift, A. (2014) 'Devon White Ale', *Brewery History*. Vol.156, p.55.
84. Ellis, W. (Anon.) (1736) *The London and Country Brewer*. London: Printed for Messieurs Fox, at the Half-Moon and Seven Stars, in Westminster-Hall 1736. https://books.google.com/books?id=63FZAAAAYAAJ&dq=The+London+and+Country+Brewer.+1736.&source=gbs_navlinks_s, p.34.
85. Wright, J. (ed.) (1900) op. cit. p.53
86. https://en.wikipedia.org/wiki/Low-alcohol_beer
87. Dodonaeus, R. (Rembert Doedsz Joenckema) (1644) *Herbarius oft Cruydt-Boeck volgens sijne laetste verbeteringe: met biivoegsels achter elck capittel, uut verscheyden cruydtbeschrijvers: Item in 't laetste een beschrijvinge vande Indiaensche gewassen, meest getrokken wt de schriften van Carolus Clusius*. Leiden: Inde Plantijnsche Druckerije van Francoys van Ravelingen, 1554 & 1644 (1st ed. 1554). <http://www.leesmaar.nl/cruydtboek/deel4/boek16/capitel22.htm> (1644 ed.). https://books.google.com/books?id=SANfAAAACAAJ&dq=n+e+bier&source=gbs_navlinks_s, p.813. 'Graut of Naerbier wordt aldus ghemaect / seyde Lobel: Neemt sex of acht ponden gemalen Mouts / twaelf oft vijftien ponded siedende heet water: Roert dit tsamen wel onder een / zes mael daegs: Decket seer well met cleederen ende stroo: ende laetet tsamen soo lange in een schoon vat staen weycken tot dattet soo dick wort als eenen Stroop. Daer nae suldij dat voorts metten viere opsieden / alleen seer naerstich roerende / op dat niet aen een berne / to dattet soo dick als pap geworden is'.
88. Dodonaeus, R. (1608) p.885: <https://www.witteklavervier.nl/historie/bronnen/367-gruit-grutt-gruijt-grout-graut>: 'Maer het dick verzoden Naerbier heeft groote ghelijkenisse met de Polenta: want het is uwt Gerste Mout getrocken, dat tot meel van gheweycte, ende daer nae ghedroochde ende ghefrijtte oft gerooste Gerste. Daerom heeft den selven Lobel in de boecken van Dioscosides meestendeel voor het woord Polenta in onze tael Naerbier oft Mout gestelt, bijzonderlijk als de Polenta beschreven wordt als een zachte pappe. Immers het Naerbier ghelijct de Polenta veel beter dan het Gort van de Neder Duytchen, seydt den selven Lobel'.
89. Dodoaeus, R. (1644) p.815, 1st column, bottom; <http://www.leesmaar.nl/cruydtboek/deel4/boek16/capitel22.htm>: 'Engelschen Ael wordt aldus gemaect: Neemt twee hondert pondt Gesoden Mout, dat is worte: twee handtvollen Hoppe: Als dat tsamen wel gesoden heeft ende door gegoten

is, salment allen-grukens tsamen mengen, als boven geseyd is, te weten Gist van Bier oft Ael drij pont, ende Engels Graut, dat wij Naebier noemen, zes oft acht ponden’.

90. Ferro, R.N. (1994) Een verloren gewaand bierrecept herondekt. De berijdingswijze van de Nijmeegse Mol. Jaarboek Numaga 41, p.44. It is possible the name comes from a combination of *gerst* and *mollig* (chubby barley) or from *gären mol* (plumb yeast).

91. *ibid.* p.51 and Ruis, F. (2016) ‘A note on the essence of gruit’, *Brewery History*. No.166, p.52.

92. Ferro, R.N. (1994) op. cit. p.46. ‘*Nimweegse Mol: Wert van blanck gerste mout, sonder ietwes anders, gebrouwen. Tot ijder ton mol, neemt 50 lb gerstenmout, oock welmaer 39 and 40 lb. Hoppert koocht ¾ uurs of 1 uur. Onder den hoppert neemt men so veel hop als ontrent in een agtendeel, daer men kooren mede meet gaet. Het mout daer men mol van brouwt moet hart gedroogt weesen. Van de mol werden maar 2 roersels gedaen. Het eerste roersel wert op de backen gepompt totdat het 2de heet is. Dan laat men het eerste roersel in de ketel pompen, tot op 15 a 16 ton naar die men op den back moet houden totdat het 1ste en 2de roersel cort is. Het eerste roersel, of hoppert, moet 1 uur of ¾ uurs koocken, daeronder 1 agtendeel hop. Kort sijnde moet men het in de klaarkuij lossen, gelost sijnde, soo pompt het nabier of 2de roersel in de ketel, Laat dat maar even koocken ofte deurbreecken. (Nota. Onder ‘t nabier doet men geen hop.) Lost het dan onder den hoppert in de klaarkuij en laat dat heel rins omgaan, ‘t moet wel 1 uur of 10 staen, dog des soomers soo rins niet als des winters. (Nota. Des swinters laat met ‘t soo rins werden als met het can krijgen.) Rijns sijnde, soo pompt het op de backen, laat het daerop heel koudt werden. Set dat het gijl daarmede. (Nota. Het gijl wert op de manier van soet bier geset.) Het 2de roersel ofte nabier uijt de ketel gelost sijnde, soo pompt de 15 a 16 ton die gij van den hoppert op de backen gehouden hebt in de ketel, doet daer geen hop in en laat dat tot op 5 ton heel langhsaam verkoocken, totdat het soo dick als stroop is, en bewaart dit tot ½ uur tevoren eer gij aen ‘t vaten gaat. Laat dan het dicke bier als stroop bijschieten en vaat ½ uur daarnaer. Nota. Het dicke stroopachtige bier koocht somtijts wel 2 dagen. Hoe sagter en lancksamer het koocht, hoe beter. Den derden dagh wert de mot gevaet. Voor 1 ton mol wert 5 gl. Betaalt. Het eerste roersel moet 2/3 van het nat dat met van doen heeft groot wesen en het 2de 1/3. Nota. Men moet hoppert en nabier in de klaarkuij lossen. En moet in de klaarkuij staan een uur of 10, totdat het wat omgegaan is en geoordeelt wert blanck genoech te sijn. Wert die op de backen gepompt, en het gijl mede geset, het moet een sterk gijl wesen, er men vaat. Nota. Men moet het op de backen heel coudt laten worden’.*

93. Hallema, A. & Emmens, J.A. (1968) op. cit. pp.38-39

94. Ebbing, H. (1994) op. cit. p.17 and Doorman, G. (1955) op. cit. p.32.

95. Ebbing, H. (1994) op. cit. p.19.

96. *ibid.*, pp.19-20

97. *ibid.*, p.23.

98. Doorman, G. (1955) op. cit. p.36.

99. The word *ketelgruit* is found in several publications, including *Amsterdam, in zyne opkomst, aanwas, geschiedenissen, voorregten, koophandel, gebouwen, kerkenstaat, schoulen, schutterye, gilden en regeringe*, Boek I Deel II by Jan Wagenaar, 1760 (pp.99-100); *Vergelyking van de voornaamste imposten, welke ten behoeve van het gemene land geheven worden, in Holland en het Sticht van Utrecht*, 1782 (p.6) and *Besluiten van het Staats-bewind der Bataafsche Republiek*, Vol., 1804 (p.49).

100. Ruis, F. (1986) op. cit.

101. Ebbing, H. (1994) op. cit. p.22.

102. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.26.

103. https://nl.wikipedia.org/wiki/Boekweit#Verwerking_tot_meel

104. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.26.

105. van Summeren, P.N. (1948) op.cit. p.86.

106. https://nl.wikipedia.org/wiki/Rosmolen:ros_means_horse.

107. Ebbing, H. (1994) op. cit. p.22.

108. *ibid.*, p.22 and Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.24.

109. Doorman, G. (1955) op. cit. p.36 and Ebbing, H. (1994) op. cit. p.20.

110. Ebbing, H. (1994) op. cit. p.21.

111. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. pp.25 & 26.

112. Ebbing, H. (1994) op. cit. p.21.

113. *ibid.*

114. *ibid.*

115. *ibid.*, pp.20-21 and ; Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.27.

116. The city accounts for Duisburg also note the purchase and sale of malt (Anon (1883) *Beiträge zur Geschichte der Stadt Duisburg*. Veröffentlichte durch die historische Kommission der stadt. Heft 2. Duisburg: Druck von Joh. Ewich, pp.24-25), as does Dortmund (Rübel, K. (1892) *Dortmunder Finanz- und Steuerwesen*, Band 1 (*Das vierzehnte Jahrhundert*). Dortmund Finanz- und Steuerwesen: Bd. 1, Das vierzehnte Jahrhundert, Vol.1. Köppen. [https://books.google.com/books?id=4oAuAAAAYAAJ&dq=Dortmunder+Finanz-+und+Steuerwesen,+Band+1+\(Das+vierzehnte+Jahrhundert\)+Karl+R%C3%BCbel&source=gbs_navlinks_s](https://books.google.com/books?id=4oAuAAAAYAAJ&dq=Dortmunder+Finanz-+und+Steuerwesen,+Band+1+(Das+vierzehnte+Jahrhundert)+Karl+R%C3%BCbel&source=gbs_navlinks_s), pp.185-188)

- and Cologne (Scheben, W. (1880) *Die Zunft der Brauer in Köln in ihrem inneren Wesen und Wirken*. Cologne, <https://archive.org/details/diezunftderbraue00sche>, pp.109-110
- and Ennen, L. (1879) *Quellen zur Geschichte der Stadt Köln*, herausg. von L. Ennen und G. Eckertz, Vol.6, https://books.google.com/books?id=hEMOAAAAQAAJ&dq=was+ist+gegirden&source=gbs_navlinks_s, pp.55-57, 189-190.
117. Ebbing, H. (1994) op. cit. p.24.
118. *ibid.*
119. Schulte, A. (1908) *Vom Grutbiere. Eine Studie zur Wirtschafts- und Verfassungsgeschichte*. Annalen des Historischen Vereins für den Niederrhein 85. pp.118-146, https://de.wikisource.org/w/index.php?title=Datei%3AAnnalen_des_Historischen_Vereins_f%C3%BCr_den_Niederrhein_85_%281908%29.djvu&page=120, p.140.
120. Ebbing, H. (1994) op. cit. p.24 and Doorman, G. (1955) op. cit. p.36.
121. Ebbing, H. (1994) op. cit. p.25.
122. van de Wall, P.H. (1790) op. cit. p.150.
123. Ebbing, H. (1994) op. cit. p.23; van de Wall, P.H. (1790) op. cit. p.158 and Ackersdyck, W.C. (1819) op. cit. p.183.
124. Ebbing, H. (1994) op. cit. p.23.
125. van de Wall, P.H. (1790) op. cit. p.158.
126. *ibid.*
127. *ibid.*
128. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.25 and Doorman, G. (1955) op. cit. p.34.
129. Wubs-Mrozewicz, J. (2005) op. cit. p.153.
130. Alberts, L. (2016) op. cit. p.29.
131. Wubs-Mrozewicz, J. (2005) op. cit. p.154.
132. Beckmann, J. (1814) op. cit. p.338 and Berendes in Goslar, J. (1896 & 7) *Die Physica der heiligen Hildegard (von Bingen)*. Sonder-Abdruck aus 'Pharm. Post', Verlag der Wochenschrift 'Pharmaceutische Post', Wien: F. Brück & Söhne, Digitale Bibliothek Braunschweig: <http://www.digibib.tu-bs.de/?docid=00036485>, p.29.
133. Wubs-Mrozewicz, J. (2005) op. cit. pp.154-5.
134. *ibid.*, p.167.
135. Ruis, F. (2017) 'True Gruit' <https://www.witteklaverver.nl/us/history/myths-about-beer/true-gruitbeer>
136. Wubs-Mrozewicz, J. (2005) op. cit. p.155.
137. *ibid.*
138. *ibid.*
139. *ibid.*
140. *ibid.*
141. Hallema, A. & Emmens, J.A. (1968) op. cit. p.37.
142. *ibid.*, pp.37-38.
143. Ackersdyck, W.C. (1819) op. cit. p.194; Beckmann, J. (1814) op. cit. p.337; Schulte, A. (1908) op. cit. p.140. '*Nunc autem de novo triginta vel quadraginta annis nondum elapsis novus modus fermentandi cervisiam, videlicet per appositionem cujusdam herbæ, qua humulus vel hoppa vocatur, per incolas in tantum invaluit, ut episcopus Trajectensis in magna parte emolumentum, quod ex distributione fermenti sibi evenire consequeratur, diminutionem patiatur*'.
144. Beckmann, J. (1814) op. cit. p.337.
145. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. pp.20-21.
146. Gemeentearchief Roermond (Municipality archive Roermond) https://www.archieven.nl/nl/zoeken?miadt=103&mizig=210&miview=inv2&milang=nl&micols=1&mires=0&micode=1001&mizk_alle=1429%20october%201.
147. Ackersdyck, W.C. (1819) op. cit. p.194 and Schulte, A. (1908) op. cit. p.140.
148. Schulte, A. (1908) op. cit. p.140.
149. Ackersdyck, W.C. (1819) op. cit. p.194 and Schulte, A. (1908) op. cit. p.140.
150. van Vilsteren, V.T. (1996) op. cit. p.44 and Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.21.
151. Ackersdyck, W.C. (1819) op. cit. p.194; Doorman, G. (1955) op. cit. p.73 and Schiller, K. & Lübben, A. (1876) op. cit. p.160.
152. van Hout, J. (1602) op. cit. p.13. '*Ende zoe vvie hoppen bier brouvvet, die zel also vele ghelds zendem omme hoppe te hebben zijn bier mede te gruyten. Ende dair bi zelmen hun hoppe leueren, gelike datmen hun gruyte leueren zoude*'.
153. Ackersdyck, W.C. (1819) op. cit. p.194. '*The Gruiters alsoe goede hoppe niet en gaven, daar sij haer goet mede bewaren mogten, ende als sij hen schuldig waren te geven*'.
154. *ibid.* '*vele gaghelkrudes dair gij een yaer ende langer ghenoech an te vergruten hebben*'.
155. Fruin, J.A. (1882) *De Oudste Rechten der Stad Dordrecht van het Baljuwschap van Zuid Holland*. Oude Vaderlandse Rechtsbronnen. Deel I. 's Gravenhage: Martinus Nijhoff, https://books.google.com/books?id=aHIWAAAACAAJ&dq=Fruin,+J.A.+De+Oudste+Rechten+de+r+Stad+Dordrecht+van+het+Baljuwschap+van+Zuid+Holland&source=gbs_navlinks_s, pp.38-9. '*Item so wie binnen Dordrecht hoppenbier of ael brouwen wil, die sal brengen int gruuthuus van elken hoede mouts, dat hi verbrouet, VIII penningen Hollants, ende hierbi en salmen hem gheen grute gheven. Ende so wie des niet en dede, die verbuerde X pont*'.
156. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.23 and van Vilsteren, V.T. (1996) op. cit. p.44.
157. Wubs-Mrozewicz, J. (2005) op. cit. p.155.
158. *ibid.*, p.156 and von Hofsten, N. (1960) op. cit. p.213.
159. Wubs-Mrozewicz, J. (2005) op. cit. p.156.

160. Schulte, A. (1908) op. cit. p.141.
161. Cockx-Indestege, E. (ed.) (1971) *Eenen nyeuwen coock boeck*. Kookboek samengesteld door Gheeraert Vorselman en gedrukt te Antwerpen in 1560. Wiesbaden: Guido Pressler, p.225; Kruiskamp, C. (1971) *Woordenboek der Nederlandse Taal*, Vol 5. <http://ivdnt.org/onderzoek-a-onderwijs/lexicologie-a-lexicografie/wnt> [included in www.gtb.nl], p.1169 and Hallema, A. & Emmens, J.A. (1968) op. cit. pp.32-32.
162. Karkeel, P.Q. (1877) op.cit. p.189.
163. <https://www.livestrong.com/article/365797-vitamin-b-12-deficiency-vision/>
164. Baley, W. (1602) *A Briefe Treatise touching the preservation of the eie-sight, consisting partly in good order of diet, and partly in vse of medicines*. p.9.
165. Dodonaeus, R. (1608) op. cit. p.885. <https://www.witteklaavervier.nl/nl/historie/bronnen/367-gruit-grutt-gruijt-grout-graut>: ‘*Het dick versoden Naerbier pleegt men te Delft in Hollant / seyt Lobel / niet allenlijk te bereyden om t’eten inden vasten op’t broot / gelijk Syroopen ende versoden Wijn / maer oock in veelderley plaesters te mengen / gelijkmen de Sapa oft versoden Most placht: want het is van gelijcke cracht om de ghequetste leden te verstercken / ende de rouwicheden te verteeren*’.
166. Grey, E. (1653) *A choice manual of rare and select secrets in physick and chyrgery collected and practised by the Right Honorable, the Countesse of Kent, late deceased ; as also most exquisite ways of preserving, conserving, candying, &c.* London: printed by G.D., <http://name.umdl.umich.edu/A47264.0001.001>
167. Pause, C. (2013) *Das Grutbier: Biergenuss ohne Hopfen*. Neuss und das Altbier. Neuss. https://www.academia.edu/20439957/Carl_Pause_Das_Grutbier_Biergenuss_ohne_Hopfen_In_Carl_Pause_Hrsg_Neuss_und_das_Altbier_Neuss_2013_33-38?auto=download <https://bookeofsecretres.blogspot.com/2017/12/carl-pause-das-grutbier-biergenuss-ohne.html>, p.34.
168. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.19.
169. Dodonaeus, R. (1644) op. cit. p.813 (<http://www.leesmaar.nl/cruydtboeck/deel4/boek16/capitel22.htm>) ‘*Graut or naerbier is made althus, said Lobel: Take 6 or 8 pounds of crushed malt, 12 or 15 pounds boiling hot water. Stir this together well together, 6 times a day. Cover it well with cloths and straw, and let it sit together thus long in a clean barrel until it becomes thick as syrup. After that shall it be boiled up with fire, only stir very well, to keep it from burning, until it becomes thick as porridge*’.
170. Ruis, F. (2016) op.cit. p.52 and Ferro, R.N. (1994) op. cit. pp.46 and 51.
171. Alberts, L. (2016) op. cit. p.29; translated.
172. Hornsey, I.S.(2003) op. cit. p.530; Karkeel, P.Q. (1877) op.cit. pp.188-97 and Swift, A. (2014) op. cit. pp.51-61.
173. Karkeel, P.Q. (1877) op.cit. pp.194-195.
174. Meufdoerffer, F.G.A. (2009) op. cit. p.12.
175. *ibid.* The plant Lupine (*Lupinus sp. L.*) is mentioned in connection with gruit several times, ‘*Gruyt vel grutgeld, quod praestitum pro licentia coquendi eam aut lupis aut gruta, nam alterultra iis opus*’ (Schiller, K. & Lübben, A. (1876) op. cit. p.160) and ‘*parum lupuli eam ingreditur*’ (Schookius, M. (Schook) (1661) *Libre de cervisiae*. p.216). It is postulated hops (*Humulus lupulus L.*) could have been meant, but this is not confirmed. Beckmann mentions Lupines softened in water are still used to make dough (Beckmann, J. (1814) op. cit. p.336).
176. Schiller, K. & Lübben, A. (1876) op. cit. p.160.
177. van Hasselt, G. (1804) *Arnhemse oudheden*, Vol.2. J. H. Arnhem: Moeleman junior, https://books.google.nl/books?id=klZbAAAAQAAJ&vq=gruit&hl=nl&source=gbs_navlinks_s, p.23 and Ruis, F. (2016) op.cit. p.50.
178. Runde, J.F. (1788) *Ausführliche Darstellung der gerechten Ansprüche des Grafen zu Bentheim Tecklenburg auf die Herrschaft Bedbur, gegen den Grafen von SalmReiferscheid*. https://archive.org/details/bub_gb_9QIFAAAAcAAJ. pp.70-71
179. Schiller, K. & Lübben, A. (1876) op. cit. p.160.
180. Unger, R.W. (2011) op. cit. p.49.
181. Doorman, G. (1955) op. cit.; Ennen, L. (1879) op. cit. pp.55-7, 189-190; Anon. (1883) op. cit. pp.22-5, 65-66; Mulder, R. (2017a) ‘*Gruit, er is niets geheimzinnigs aan*’. <http://verlorenbieren.nl/gruit-er-is-niets-geheimzinnigs-aan/>; Rübél, K. (1892) op. cit. pp.185-189 and Scheben, W. (1880) op. cit. pp.106-112.
182. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.21. Holland refers to two provinces that are part of the country the Netherlands.
183. Ruis, F. (1986) op. cit.
184. Ennen, L. (1879) op. cit. p.189 and Scheben, W. (1880) op. cit. p.109. ‘*Item anys*’, ‘*Item 40 pont anyss*’.
185. Ennen, L. (1879) op. cit. p.190 and ; Scheben, W. (1880) op. cit. p.110.
186. Ennen, L. (1879) op. cit. pp.57, 189-90; Scheben, W. (1880) op. cit. p.109; <https://bookeofsecretres.blogspot.com/2016/08/garofani-is-it-cloves-gilliflower-or.html>
187. Ennen, L. (1879) op. cit. p.189 and Scheben, W. (1880) op. cit. p.109.
188. Scheben, W. (1880) op. cit. p.109.
189. von Hofsten, N. (1960) op. cit. p.211; Doorman, G. (1955) op. cit. p.30 and Wubs-Mrozewicz, J. (2005) op. cit. p.153.

190. Doorman, G. (1955) op. cit. p.30 and Wubs-Mrozewicz, J. (2005) op. cit. p.153.

191. <http://artisanalalchemy.weebly.com/blog/the-history-of-gruit>; von Hofsten, N. (1960) op. cit. p.214: ground ivy is mentioned as a brewing herb on the British Isles.

192. von Hofsten, N. (1960) op. cit. p.215.

193. For instance the ingredient ‘*kerse/kerssen*’ (candles) found in the Duisburg accounts (--- 1883, p.66) is translated to ‘cherries’ by an unknown author and found cited thereafter. Scheben, W. (1880) op. cit. p.110 translates *baschellers* (bekelaar, or laurel berries) to Wachholderbeeren (juniper) and *genveren* (juniper) to ginger; the likely origin of ginger in gruit.

194. de Vreese, W.L. (ed.) (2004) *Middelnedderlandsche geneeskundige recepten en tractaten, zegeningen en tooverformules*. Gent: A. Siffer, 1894; Bron, http://www.dbnl.org/tekst/_mid002midd01_01/colofon.php. ‘385. *Om te maken goet bier, neemt gherste ende witte evene, na dat ghi brauwen wilt goet bier; ende wildi, doeter terwe in. metten andren doet malen, dan doet water in een ketel te viere ende doet hu meel vanden grane vorseit int water ende roert al omme. laet zieden toten .ij. deele terdendeel in, dan doet of ende laet coelen ghelijc bloet laeu. dan doet in hu vat; dan neemt goeden heve ende ondergyst, ende doet te gader. ende dan neemt van der selver werse ende tempert de heve ende den onderghist te gader ende roert wel over oep. dan doet in hu vat ende laet ligghen heffen; het sal boven huut heffen ende werden goet bier ten derden daghe te drinken. ende weet dat ghi in hu werse oec moet [doen] alletel hoppen, ende ghaghel, ende broet, ende laet zieden al over oep, deen metten andren*’.

195. <http://artisanalalchemy.weebly.com/blog/the-history-of-gruit>

196. Schulte, A. (1908) op. cit. p.122 and Meußdoerffer, F.G.A. (2009) op. cit. p.12.

197. Variants of bog myrtle: *custum*, *costus*, *Herba Myrti Rabanitini*, *Gale palustris*, *Myrtus communis*, *cruyt*, *gagel*, *gaghel*, *Chamelaeagnus*, *mirtus*, *Myrtus Brabantica*, *Brabantsche mirt*, *Drentsche thee*, *myrte*, *haide balsam*, *myrtenheide* (myrtle heather), *mirtedoor*, *steekpalm*, *post*, *possem*, *luiskruid* (liceherb), *vlooienkruid* (fleaherb), *gale*, *sweetgale*, *bog myrtle*, *dutch myrtle*, *English bog myrtle*, *sweet willow*, *bayberry*. Doorman, G. (1955) op. cit. p.27; Berendes in Goslar, J. (1896 & 7) p.62; Schulte, A. (1908) op. cit. p.124; de Vries, W. (1960) op. cit. p.60 and Dodonaeus, R. (1644) op. cit.

198. Variants of marsh rosemary: *pors*, *Porsch*, *porsse*, *porst*, *post*, *Sumpf-Post*, *Sumpfporsch*, *Finne Thê*, *alczem*, *brauerkraut*, *grântze*, *mirtenboum*, *moeras rozemarijn*, *marsh rose-*

mary, *wild rosemary*, *wild rosamarin*, *marsh tea*, *marsh cistus*, *Rosmarinus sylvestris*. Doorman, G. (1955) op. cit. p.30 <https://www.botanical.com/botanical/mgmh/l/labrad01.html>

199. *ibid.* p.30 and von Hofsten, N. (1960) op. cit. p.2111.

200. Eberhardt, I. (2002) *Die Grutamtsrechnungen der Stadt Münster von 1480 und 1533*. Quellen und Forschungen zur Geschichte der Stadt Münster. Münster: Aschendorff Verlag, <https://bookeofsecretes.blogspot.com/2017/11/die-grutamtsrechnungen-der-stadt.html>, p.16; von Hofsten, N. (1960) op. cit.; Schulte, A. (1908) op. cit. p.125 and Wubs-Mrozewicz, J. (2005) op. cit. p.153.

201. Schulte, A. (1908) op. cit. p.124.

202. Eberhardt, I. (2002) op. cit. p.16 and von Hofsten, N. (1960) op. cit. p.211.

203. Meußdoerffer, F.G.A. (2009) op. cit. p.12: this could refer back to the statement by Meußdoerffer that *Myrica*, *Ficaria* and *Iris* would be added to help preserve the yeast. Beckmann, J. (1814) op. cit. p.336: Lupines softened in water are still being used to make dough.

204. Schookius, M. (Schook) (1661) op. cit. P.216 and Schulte, A. (1908) op. cit. p.126: ‘*Silentio quoque praeteriri non debet cervisia, quae in comitatu Tecklenburgensi coquitur et vulgo Gruising dicitur, haberique meretur cervisia ex parte medicata: parum lupuli eam ingreditur, sed eius loco myrtus Sylvestris (Brabantica non absimilis) ab incolis porsse dicta, a Belgis gagel, cui, odoratae admodum, molis peculiaribus semen excutiunt: item baccæ lauri et herba, quam vocant Scharpe tonge: haec simul contunduntur et fermentationem procurant. Ipse vero potus potissimum refert et odore et sapore myrtum sylvestrem, atque cito inebriat illos, qui ei non assueverunt*’.

205. <http://www.brouw-bier.nl/theorie/grondstoffen/kruiden/gagel.aspx>;

<https://www.botanical.com/botanical/mgmh/g/galswe03.html>

206. von Hofsten, N. (1960) op. cit. p.201; Cockx-Indestege, E. (ed.) (1971) op. cit. p.225 and Konrad von Megenberg *Das Buch der Natur* (14th century) ‘man likes to lay this flower in beer, which one makes of water and of rye or barley’ (<https://www.wdl.org/en/item/3158/>); Hildegard von Bingen (ca. 1060 AD): ‘If you want to brew beer, cook the leaves and fruits, the drink will be all the healthier’ (Berendes in Goslar, J. (1896 & 7) op. cit. pp.62-63).

207. Lobelius (l’Obel), M. (1581) *Kruydtboeck oft beschrijvinghe van allerleye ghewassen, kruyderen, hesteren ende gheboomten*. Christoffel Plantijn, (1st ed. 1551). https://books.google.com/books?id=ZiFNAAAACAAJ&dq=inauthor:%22Matthias+Lobelius%22&source=gbs_navlinks_s

208. <http://www.brouw-bier.nl/theorie/grondstoffen/kruiden/gagel.aspx>

209. Hallema, A. & Emmens, J.A. (1968) op. cit. p.29 and Unger, R.W. (2011) op. cit. p.49.
210. Schulte, A. (1908) op. cit. p.122 and von Hofsten, N. (1960) op. cit. p.209.
211. von Hofsten, N. (1960) op. cit. p.210; personal experience.
212. Dodonaeus, R. (1644) op. cit.
213. *ibid.* pp.437-8
214. Variants: *Bacca laureus*, *bacca lauri*, *Lauri bacca*, *bakeleers*, *baekelaers*, *bakelare*, *Beckeler*, *laurus*, *laurusboom*, *lauwerbessie*, *bayes de Laurier*, *graines de Laurier*, *laurier*, *laurier d'Apollon*, *laurier sauce*, *daphne*, *sweet bay*, *bay*, *true laurel*, *roman laurel*, *noble laurel*, *Lorbeerbaum*, *Lorbeeren*. Dewes, G. (1578) *A Nievve Herball, Or Historie of Plantes: Wherin is Contayned the Vvhole Discourse and Perfect Description of All Sortes of Herbes and Plantes: Their Diuers &] Sundry Kindes: Their Straunge Figures, Fashions, and Shapes: Their Names, Natures, Operations, and Vertues: and that Not Onely of Those Whiche are Here Growyng in this Our Countrie of Englande, But of All Others Also of Forrayne Realmes, Commonly Vsed in Physicke, by Rembert Dodoens*. https://books.google.com/books?id=ifxNAAAacAAJ&dq=Dewes,+Gerard.+A+Nievve+Herball,+1578.&source=gbs_navlinks_s, p.719 and Dodonaeus, R. (1644) op. cit. p.1328.
215. Doorman, G. (1955) op. cit. p.29.
216. de Hullu, J. (1899) *Iets over de gruit*. Bijdragen voor Vaderlandsche Geschiedenis en Oudheidkunde. Derde Reeks. Tiende Deel. 's Gravenhage: Martinus Nijhoff, https://books.google.com/books?id=dZWTvQpQA04C&dq=de+Hullu,+J.+Iets+over+de+gruit&source=gbs_navlinks_s 117/363; Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.22: for instance in the Deventer 1347 account '*pro duris speciebus dictus serpentien et bekeler*'.
217. Eberhardt, I. (2002) op. cit. p.18; de Commer, P. (1982) *De Brouwindustrie te Gent, 1505-1622*. Handelingen N.R. XXXV. <https://ojs.ugent.be/hmgog/article/view/205>, p.85: cited as one of the ingredients for gruit; Doorman, G. (1955) op. cit. p.29: Doorman thinks the Latin name *Vaccinium myrtillus* might have lead to the misconception blueberries were used in the production of beer.
218. Eberhardt, I. (2002) op. cit. p.18.
219. Schulte, A. (1908) op. cit. p.129.
220. <https://www.botanical.com/botanical/mgmh/l/larbay10.html>
221. *ibid.*
222. <http://www.brouw-bier.nl/theorie/grondstoffen/kruiden/laurier.aspx>: Like cloves, when overdone it will take a long time for the taste to diminish.
223. Variants: *serpentijn*, *serpentien*, *serpentiin*, *scherpentangen*, *breede comijn*, *sermentangen*, *sermontandum*, *sermontano*, *sermountain*, *sirmendana*, *seselkraut*, *laserkraut*, *siler montanum*, *Seseli Massaleotico*, *Seseli MaBiliense*, *Rosskümmel*, *Waltdkümmel*, *weisser Enzian*, *falscher Enzian*, *laserkraut*, *laserwort*. Doorman, G. (1955) op. cit. pp.29-30; Schulte, A. (1908) op. cit. p.128; Dodonaeus, R. (1554) op. cit. p.311 and Eberhardt, I. (2002) op. cit. p.17.
224. Lobelius (l'Obel), M. (1581) op. cot. 520/526.
225. Schulte, A. (1908) op. cit. p.128.
226. *ibid.* p.129
227. https://en.wikipedia.org/wiki/Laserpitium_siler
228. Schulte, A. (1908) op. cit. p.129.
229. McGovern, P.E. (2003) *Ancient Wine: the search for the origins of viniculture*. New Jersey: Princeton University, p.72. In Ancient times resin was added to wine for its medicinal and/or preservative benefits. Resinated wine, *retsina*, is still produced in Greece.
230. *ibid.*
231. Cockx-Indestege, E. (ed.) (1971) op. cit. p.225.
232. <http://gtb.inl.nl/iWDB/search?actie=article&wdb=MNW&id=01810&lemma=arpoys>; <http://gtb.inl.nl/iWDB/search?actie=article&wdb=WNT&id=M024386&lemma=harpuis>
233. Ennen, L. (1879) op. cit. pp.63-65, 197-198; Scheben, W. (1880) op. cit. p.106-112 and Schulte, A. (1908) op. cit. p.130.
234. Pause, C. (2013) op. cit. p.34.
235. Scheben, W. (1880) op. cit. p.109.
236. *ibid.*, p.110.
237. Schulte, A. (1908) op. cit. p.130 and Mulder, R. (2017a) op. cit.
238. Anon (1883) op. cit. p..66; <http://woerterbuchnetz.de/cgi-bin/WBNetz/genFOplus.tcl?sigle=DWB&lemid=GK03882>: the middle German word for candles is *kersen* (variants *kerze*, *kersche*, *keersse*), as is the middle Dutch.
239. Ruis, F (1986) op. cit.
240. Ennen, L. (1879) op. cit. p.55; Scheben, W. (1880) op. cit. p.110 and Schulte, A. (1908) op. cit. p.130.
241. Pause, C. (2013) op. cit. p.34.
242. Schulte, A. (1908) op. cit. p.130.
243. <https://nl.wikipedia.org/wiki/Karwij>
244. von Hofsten, N. (1960) op. cit. p.211.
245. *ibid.*
246. Doorman, G. (1955) op. cit. p.30.
247. Wubs-Mrozewicz, J. (2005) op. cit. p.153 and von Hofsten, N. (1960) op. cit. pp.215-17: in his chapter on The Scandinavian Countries Hofsten does not mention gruit in association with Scandinavian brewing, he also does not

mention the term pors having alternate meanings other than either bog myrtle or marsh rosemary.

248. von Hofsten, N. (1960) op. cit. p.212.
249. de Hullu, J. (1899) op. cit. 118/364 and Dodonaeus, R. (1644) op. cit. p.815, 2nd column, top.
250. Unger, R.W. (2011) op. cit. p.49.
251. Schulte, A. (1908) op. cit. p.129.
252. Alberts, L. (2016) op. cit. p.28.
253. *ibid.*
254. *ibid.*
255. Alberts, L. (2010) *Bier drinken met maten. Dronkenschap en het alcoholgehalte van Stichtse and Hollandse bieren in de late middeleeuwen*. Jaarboek voor Middeleeuwse Geschiedenis 13, Stichting Bevordering Middeleeuwse Studies. Hilversum: Uitgeverij Verloren, https://www.researchgate.net/publication/260291330_%27Bier_drinken_met_maten_Dronkenschap_en_het_alcoholgehalte_van_Stichtse_en_Hollandse_bieren_in_de_late_middeleeuwen%27_Jaarboek_voor_middeleeuwse_geschiedenis_13_2010_113-166, pp.158-165 and Doorman, G. (1955) op. cit. pp.96-98.
256. Alberts, L. (2010) op. cit. pp.133-134.
257. Doorman, G. (1955) op. cit. p.4 and Ebbing, H. (1994) op. cit. p.18.
258. Doorman, G. (1955) op. cit. p.4: This theory is also less plausible if the wort was only heated.
259. *ibid.* p.18; de Vries, W. (1960) op. cit. p.59; personal opinion
260. Doorman, G. (1955) op. cit. p.37.
261. Ebbing, H. (1994) op. cit. p.18 ; Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.25 and van de Wall, P.H. (1790) op. cit. p.151: '*ende sijn mout dat dair toe behoirt ende dair binnen zal him die grueter sine grute gheven als hij tote noch gedaen hevet ende wairt dats him die gruter niet ghehoven en wilde hij en hadde meer ghebrouwen dan hi him anebrochte dat soude die gruter up him houden mit sinen ede*'.
262. Doorman, G. (1955) op. cit. p.82 and de Vries, W. (1960) op. cit. p.67: '*siin ghelt ende mout int gruuthuus niet en brocht, als zede ende ghewoonte is, die verbuerde X pont*'.
263. Fruin, J.A. (1882) op. cit. p.39: '*Item waert dat die gruter eenigen brouwer opzeide, dat hi zijn ghelt ende mout int gruuthuus niet ghebrocht en hadde , of dat hi meer ghebrouwen had dan hi ghelds ghebrocht en had, dat zal die brouwer met zynen meesterknaep waer maken ten heilighen, dat hijs ontschuldich is, tensi dats hem die gruter verdraghen wilde. Ende en wouts dan die brouwer met zinen meesterknaep niet waer maken, so waer die brouwer vervallen. Ende woude die meesterknaep hem dan verbozen*

ende niet houden met zinen eede, so sal die brouwer den knaep leveren den rechter; ende daarmede so is die brouwer quijt, ten ware of hem die knape o?liep, alle dingen sonder arghelist'.

264. van de Kieft, C. (1964) op. cit. p.159 and de Vries, W. (1960) op. cit. p.64.
265. de Vries, W. (1960) op. cit. p.68.
266. Ebbing, H. & van Vilsteren, V.T. (1994) op. cit. p.26.
267. *ibid.* p.23.
268. Ackersdyck, W.C. (1819) op. cit. p.198.
269. van Hasselt, G. (1804) op. cit. p.9.
270. Ackersdyck, W.C. (1819) op. cit. p.199.
271. Hornsey, I.S.(2003) op. cit. p.537.
272. Ackersdyck, W.C. (1819) op. cit. pp.199-200.
273. von Hofsten, N. (1960) op. cit. p.208.
274. Hallema, A. & Emmens, J.A. (1968) op. cit. p.38.
275. Ackersdyck, W.C. (1819) op. cit. p.201.
276. van de Kieft, C. (1964) op. cit. p.163-164.
277. von Hofsten, N. (1960) op. cit. p.211 and van de Kieft op. cit. p.163.
278. Ackersdyck, W.C. (1819) op. cit. p.185; van de Kieft op. cit. p.164; Noordewier, M.J. (1853) op. cit. p.230; van Spaen, W.A. (1804) op. cit. p.245 complete quote and van de Wall, P.H. (1790) op. cit. p.151.
279. Unger, R.W. (2011) op. cit. p.50: Unger translates this into 'the right to all trade in grut', meaning the right to harvest and trade grut grown on the lands of the villa Bommel.
280. Ackersdyck, W.C. (1819) op. cit. p.186.
281. *inid.*, p.188, only as 1046 and Ebbing, H. (1994) op. cit. p.26.
282. Ackersdyck, W.C. (1819) op. cit. p.184; Ebbing, H. (1994) op. cit. p.26; Noordewier, M.J. (1853) op. cit. p.230 and van de Wall, P.H. (1790) op. cit. p.152 complete quote.
283. Hornsey, I.S.(2003) op. cit. p.535; Unger, R.W. (2011) op. cit. p.49 and Ruis, F (1986) op. cit.
284. Doorman, G. (1955) op. cit. p.72 and Ebbing, H. (1994) op. cit. p.27.
285. Doorman, G. (1955) op. cit. p.72 and Ebbing, H. (1994) op. cit. p.28.
286. Doorman, G. (1955) op. cit. p.72.
287. *ibid.*
288. Ackersdyck, W.C. (1819) op. cit. p.135 and Noordewier, M.J. (1853) op. cit. p.230.
289. Doorman, G. (1955) op. cit. p.73.
290. Ackersdyck, W.C. (1819) op. cit. p.190; Doorman, G. (1955) op. cit. p.73 and de Saint-Genois, J.L.D.G. (1843-1846) op. cit. p.9.
291. Doorman, G. (1955) op. cit. p.73.

292. Ackersdyck, W.C. (1819) p.191 and Doorman, G. (1955) op. cit. p.73.
293. Schiller, K. & Lübben, A. (1876) op. cit. p.160.
294. Doorman, G. (1955) op. cit. p.73 and Schiller, K. & Lübben, A. (1876) op. cit. p.160.

295. Doorman, G. (1955) op. cit. p.73.
296. *ibid.*
297. van de Wall, P.H. (1790) op. cit. p.158.
298. Beckmann, J. (1814) op. cit. p.336.