Raising a Coffin:
Recreating High Medieval English Pastry

A dining scene in the Luttrell Psalter, first half of the 14th century, England

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Overview

This documentation includes several distinct sections. First, I have given a project overview that includes a description of this project, my overall conclusions, and areas for further research. Next, I have included two sections on my background research for this project; the first gives analysis and discussion of extant recipes, with the second detailing evidence for available ingredients. Finally, I have included an account of the different explorations I did in recreating pastry and what my findings were. I have also included works cited and six appendices: a complete list of my modernized pastry recipes, excerpts from 13th and 14th century English recipes pertaining to pastry, a discussion of wheat varieties, a meta-analysis of 13th and 14th century English culinary manuscripts and menus, a selection of 16th century English recipes, and a note on medieval ovens.

Rationale:

Pies were a common and important food in medieval England, and seem to have been consumed by all classes of people. Pie and tart recipes are common in period culinary manuscripts, yet prior to the 15th and 16th centuries there is little information on how exactly the pastry used to enclose these pies was made. My aim with this research was to explore plausible methods of pastry making and pie baking appropriate for the High Middle Ages, namely the 13th and 14th centuries, in England. This project is a synthesis of many research strands: I analyzed extant recipes, examined archeological evidence, and performed direct experimentation to determine which of the possible methods and ingredients actually work. My hope is that what I have learned through this process will be of practical value to other reenactors aiming to bake more historically correct pies, and that the standing-crust pie might once again have a prominent place on tables.

Description of Entry:

For this entry I have tested multiple ingredients and methods for making self-supporting pastry to see how well various options perform in terms of ease of making,

appearance, longevity, etc. I have brought the various "test pies" I made for comparison and discussion plus a few different pies and tarts for tasting. As described above, I analyzed both written and archeological evidence related to pastry and its ingredients; none of the evidence I found yielded one single "right" answer for how pastry was made, so generating the recipes I tested required a high degree of interpretation and synthesis. I found in the course of this research that there are many commonly held assumptions about pastry and pies, the kind of "everybody knows" truisms that get repeated so often that it is impossible to track down their original source. Examples include the idea that pastry was thick considered inedible and that it was made only from flour and water. I tend to be suspicious of claims not backed by evidence, so I wanted to either find evidence to either support or refute these commonly held beliefs.

When, Where, and Who:

My persona is a female baker living and working in York during the reign of King Edward, called Longshanks[1], and like many of my A&S projects this initially grew out of a desire to gain a deeper understanding of Eulalia's world. How exactly would she have baked pies? Given the availability of research materials, I broadened the scope of my research to encompass the 13th and 14th centuries and all of England. In a few cases I have tried to note regional differences between the north and south of England. Additionally, I found that there was some information that I simply could not find for this time period, and have used in some occasions records from the 15th and 16th centuries to at least provide some hints at earlier practices.

One of my major areas of interest is the intersection of food and social status; what you ate was determined not only by when and where you lived, but by your station in life. I have done ongoing research into the diets of both the rural peasantry and the urban poor, the latter of which relied heavily on prepared food made in cookshops and by professional bakers. However, for this project I chose to look higher on the social ladder, and have focused my research and recreations on the kinds of pies that would have graced the tables

[1] His reign spanned the years 1272 to 1307.

of high-status individuals such as wealthy landowners and even royalty. I have still peppered this document with references to conclusions I have drawn about pies eaten either servants in elite households or other lower-status individuals.

Research Approach and Challenges:

I initially approached this project as an exercise in recipe analysis. I had easy access to transcribed culinary manuscripts from my time period of interest and I thought that I could do a side-by-side comparison of the various ingredients and methods implied by the recipes. I knew that most recipes were fairly vague before I started delving more deeply, but I was quickly stymied by just *how* vague the written record is on how pastry was made; out of 40 pie recipes I analyzed, only 5 gave any kind of explicit directions and even within that small set none were complete. I chose a novel way to approach this: given that most recipes give no instructions for pastry, it is very likely that the directions we do have represent exceptions rather than the norm. I chose to focus on testing various possibilities for this non-described standard pastry, specifically aiming at self-supporting pastry (or coffins).

This gave me a starting point, which I then built on by examining archeological evidence for available foods in 13th and 14th century England. I looked at patterns of grain cultivation and use and ran into my second major challenge: getting bogged down in wheat genetics. Wheat is a ridiculously diverse crop; there are not only different species of wheat but also multiple varieties and landraces within the species. It was extremely difficult for me to correlate the data I was able to find on historical wheat with the types of wheat flour available modernly; I've presented my evidence and conclusions in a separate appendix to this document, but this is the area in which I invite the most feedback and commentary from others as I remain unconvinced that there is a single best answer for what type of wheat flour to use when recreating medieval recipes. In addition to researching cereal grains, I researched the various animals that would have provided fat for use in pies. This is reported in the section of this document dealing with archeological data.

General Conclusions:

The evidence I analyzed suggests that a raised-crust coffin made in a high-status kitchen was most likely made from sifted wheat flour mixed with lard that had been heated with water. In some cases, pastry may have been prepared using different flours or fats. Additionally, it is possible that pastry was prepared using only boiling water and not with added fat, or made with room temperature fat and water worked into flour. Once prepared, the dough could have been formed into a coffin by rolling it out and sealing pieces together, shaping it by hand like a pinch pot, or raising it using a form.

I tested all of these various possibilities to see how easy each was to do, how well the crust held together in baking, and what the finished crust looked like. My complete results are reported later in this document. I found that the hot water and fat crusts had the best overall performance regardless of fat type used (at least for the size of pie I made), and white flour, whole wheat flour, maslin (a mix of wheat and rye) flour, and rye flour all performed well. Barley and oat flours did not perform well regardless of method. Crusts made from room temperature ingredients did not maintain upright sides during baking. For smaller pies, I did not see a significant difference between coffins formed by rolling and joining pieces, raising on a mold, or shaping by hand. Once I scaled up and tried to make a large pie, though, the only method I was able to use successfully was to roll out and join together pieces, which was very surprising tome.

I also tested some of what I believe to be the non-standard coffin-forming methods described in the recipes I analyzed. For the most part these methods worked (one performed better with modification) but overall I stand by my conviction that they do not represent the usual way of making pastry. These results are included with my general findings.

Areas for Further Research:

Unfortunately, I am gluten intolerant and so I was not actually able to taste most of my experiments. Although modern preferences are likely to deviate from medieval norms, I would be curious as to how these different pastry methods stack up against each other

taste-wise. Additionally, since I found such a small sample size of actual recipes I have not gone into any great depth in looking at what types of pastry went with what types of filling, which could be another area to explore.

I am singularly fixated on England, but recipes dating to this approximate time period from other areas (especially France) would be informative for comparison; it is possible that continental cookbook authors gave greater detail on the making of pastry, although my perfunctory examination of *Le Menagier de Paris*[2] and *Enseignements qui enseingnent a apareillier toutes manieres de viandes*[3] has so far not turned up anything particularly compelling.

Although this started out as a persona-development project, I have not significantly mined sources related to professional pie makers. It is possible that, just as we have records of some of the tools and practices of bread bakers, pie bakers may have left behind some clues as well in the form of guild records, etc. Although I focused more on elite private kitchens in this project, I would like to see what I can turn up about urban pie sellers[4]. Finally, it would be interesting to compile as many possible pastry and pie recipes across both places and time periods to see if any regional or temporal trends emerge. Were English pies significantly different from German pies? How did pastry change over time? Do different types of pies predominate in different areas or times? An encyclopedia of pie could be very interesting to compile and informative to read.

[2] See http://www.daviddfriedman.com/Medieval/Cookbooks/Menagier/Menagier.html
[3] See http://www.medievalcookery.com/notes/lessons.html
[4] Some research I have done on street food during this period can be found at http://briwaf.blogspot.com/2014/01/old-stuff-street-food-in-medieval.html

Glossary

For clarity, I have endeavored to standardize my use of the following terms:

- Coffin: A self-supporting pastry which is "raised" to contain some manner of filling. This has been the main focus of my pastry research.
- Farce: A general term for filling (related to "force-meat") often applied to pies.
- Pastry: The dough used to enclose a pie or tart, or occasionally baked into shapes and used to augment other dishes. Medieval terms include paste, paest, past, and other spelling variants. During this time period, there is not a clear lexical distinction between pastry and pasta, with both being referred to as "paste" (with various spellings). This has complicated this research, and may indicate that there was not a significant difference between pasta and pie crust either in ingredients or method; further study is needed.
- Pie: General term for a food where some manner of filling is baked inside a dough (the pastry, see above). Pies can be free-standing or baked in a dish, sweet or savory, and made from a wide variety of ingredients. Although I have not 100% confirmed this, from my examination of recipes it does appear that pies may differ from tarts by consistently having a top crust (see below).
- Tart: Typically tarts seem to be more likely to be baked in a container than pies (which may imply the crust is more tender and thus not self-supporting), be based on more luxury ingredients, and (typically, I am still looking to confirm there are no exceptions) do not have a top crust.
- Trap: A container (presumably of clay) used to bake a pie or tart; the pastry / crust is used to line the trap, and is then filled with the farce.

Recipe Analysis

A total of seven English (and Anglo-Norman) culinary manuscripts are readily available as published transcriptions. Five of these, all in English and all dating to the 14th century, are compiled in *Curye on Inglysch* (Hieatt and Butler) and two, both in Anglo-Norman French, are transcribed and translated in "Two Anglo-Norman Culinary Collections" (Hieatt and Jones). While a number of 15th century English culinary manuscripts exist, these seven works contain the only readily available recipes from my time period of interest (see Hieatt, Nutter, and Halloway)[5]. I started this research with quite a bit of analysis on all of these manuscripts, as well as some extant 14th century feast menus; my results are detailed in Appendix 4.

Between all of these sources, I found a total of 40 recipes for pies, tarts, and related foods. These include sweet and savory pies and tarts of incredible variety. However, within these 40 recipes not one includes clear instructions for making pastry. I believe that this lack can be explained by the context in which these manuscripts were produced and their intended audience. All of these recipe collections are from high-status contexts (Forme of Cury was prepared by Richard II's head cook, for example); for one thing, literacy was restricted during this period, and the production and consumption of books even more so. The earliest of these recipes are written in Norman French rather than the language of commoners (English) and even the cookbooks in English contain a large number of French terms.

Although modern recreationists use medieval recipes as a basis for preparing medieval foods, I do not know that their authors really intended them for this use. At best, medieval culinary manuscripts were produced by head cooks in elite households to use either as a personal reference or as a teaching tool to be shared with other cooks of similar status. The head cook in a high-status kitchen was a supervisor with a massive team of highly trained specialists working under him. Thus when we read a medieval recipe, we

[5] Recently a 12th century culinary manuscript was found and while much was made of it the work has yet to be made available as far as I have been able to determine. I am very interested in examining this work for further references to pies and pastry when it becomes available.

should not think of James Beard writing down recipes so that the home cook might recreate them, but of David Chang calling out an order to his kitchen staff. This would explain why these recipes often lack specific details such as times and quantities; the pastry cook knew how to make a dough and raise a coffin, so a recipe need only specify that this is to be done, not how to do it.

Additionally, I have recently begun to wonder if there is another possibility. Food and feasting in medieval society served an important performative role -- Kings and Lords displayed their wealth through their tables. I believe it is possible that culinary manuscripts were created within this context as a way for an individual landowner to display his status by creating a record of both the diversity and expense of the foods he consumed and also of the creativity and prowess of his kitchen staff. This bears further study and consideration, but could explain the lack of specificity in medieval recipes.

The parts of recipes that reference pastry in these various manuscripts are compiled in Appendix 2. Looking at them as a whole, they mention the following ingredients: flour (good flour, flour of corn, white flour/ flur demeyne), chestnut flour, sugar, almond milk, water (by omission), eggs, and egg yolks. Since most recipes simply specify to raise a coffin or bake a crust in a trap[6] without detailing the ingredients or method, it is possible that the ingredients or methods that *are* mentioned are unusual and therefore noteworthy. Thus, one could potentially take from this that eggs were *not* a standard ingredient in medieval pastry, neither was almond milk, sugar, or chestnut flour, or even perhaps "good" or wheat flour.

In fact, what I noticed most prominently is that the majority of recipes that explain how to make pastry are not actually pie or tart recipes. The only recipes that specify how to make pastry and are for actual pies are those for tardpolane, pynite, flaumpeyns, and pety peruaunt. None of these recipes are for a standard pie in a coffin. Tardpolane is a sweet tart made with fresh cheese, eggs, and dried fruits. Pynite is also a sweet dish, this one filled with honey, sugar, wine, gingerbread, and pine nuts. Flaumpeyns is a meat pie, but part of

[6] Brears notes that "Looking at the ceramic record, such vessels [wide shallow dishes] have been made in England from the late ninth century onwards, those of the thirteenth to early sixteenth centuries being around 7 to 19 inches in diameter. Some were probably used as dishes, but the fact that a number had their rims pinched in the same manner as pastry suggests that they were traps for baking."

the pastry is to be fried before the remainder is made into a coffin; the other recipes for pastry that is fried (or boiled) also tend to specify that eggs are to be used, which makes me suspect that eggs are specific to fried pastry recipes (perhaps as a leavening agent). Pety peruaunt is tart of egg, marrow, raisin, and spices, all very rich ingredients; it's possible that the egg yolks in place of water are to yield a richer and more tender pastry.

Multiple modern sources on medieval cooking contend that medieval paste was simply a flour and water dough[7] and that pastry was not actually eaten. I personally have yet to be fully convinced that either was the case. By the 15th century, recipes begin to emerge for Lenten pie crusts that are specified as being made with almond milk[8]. If pastry was typically made only from flour and water there would be no need to make a distinct Lenten crust. The early 16th century *Boke of Keruynge* specifies that "All bake metes that ben hote, open them a-boue the coffyn; & all that ben colde, open theym in the mydwaye" and for "doucettes [a type of pork pie], pare awaye the sydes & the bottom" which some use as evidence that the pastry itself was not eaten. However, I would argue that instead these directions are merely concerned with making pies into smaller pieces along the same lines as the rest of this text.

Certainly the pastry recipes I analyzed did seem to concern themselves with edibility and some include costly ingredients such as sugar and saffron. Wheat flour was itself a relatively expensive food, so aside from deliberate waste as a way of displaying wealth there seems no reason to construct inedible pastry when other methods would yield a more palatable finished product. In looking at the quantity of animals consumed in a large household (see next section), it does not appear to me that fat would have been in short supply. That said, I do think it's possible that pies made for servants or those sold in street shops might have been made with flour and water if they were made from the less desirable grains or mixed flours used in period.

Modern pie crust is usually a short-crust pastry, where the ingredients are kept cold and a fat is cut into flour. It is very unlikely that this method was used by medieval cooks,

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[7] See for example Brears' *Cooking and Dining in Medieval England*, in which he gives a suggested method for recreating medieval pastry with white flour and boiling water.

[8] An example can be found here: http://www.coquinaria.nl/english/recipes/03.2histrecept.htm

as keeping ingredients cold would have been more difficult historically than today, and these types of crusts cannot support themselves. Fat and water (or egg yolks, or whole eggs instead of both fat and water) could have been worked into flour at room temperature, however.

I personally believe the most likely method used by period pie bakers was a hot water method: fat is heated with water and both are stirred into the flour. Pastry recipes found in sixteenth century English cookbooks (see Appendix 5) are made using this method; late-period recipes often simply seem to clarify what was already standard practice, as they were much more like a modern cookbook in that they were intended to be used by regular home cooks rather than professionals, so I have taken this as tentative evidence for High Medieval practice.

The only recipe that gives any indication of how the actual coffins were formed is number 197 in Forme of Cury, which is a recipe for an elaborate subtlety of pastry in the form of a castle with various fillings. The recipe specifies to roll out a large sheet of the pastry and also to form coffins on the roller. This suggests two plausible coffin-raising methods: first, pastry could be rolled out and pieces sealed together to form a coffin; second, the coffins could have been raised using a form (in this case the roller). It seems likely to me that rolling out and hand-building coffins would only be used in cases of very large pastry as using a mold would be unwieldy. It's also possible that a mold was only used when the coffin would have been particularly tall, as in this case. In most cases, medieval cooks may have simply used their hands to form coffins much the way a potter forms a pinch-pot. Additional evidence for this practice could come from the recipe for flaumpeyns that specifies to raise a "long" coffin, which could not have been formed without a specific mold (which seems unlikely).

At least within the high-status context I have chosen to focus on, based on these various strands of evidence I think the most likely method for preparing pastry coffins was to make a dough using hot water, fat, and flour, and to form this into free-standing pie shells using the hands to mold and shape the dough. It is also possible that wooden forms or other objects were used to physically "raise" the coffin, or that the dough was rolled out

and joined into the final shape. I have brought examples of all these different methods for comparison. The next question I tackled was the specific types of flour and fat likely to be used by 13th and 14th century English cooks.

Available Ingredients

Since the recipes I examined gave very little detail about ingredients, I went looking for archeological (and other) evidence. Foods significant in pastry are flour, which can be produced from various grains, and fats (including eggs), which are typically sourced from animals.

Grains:

Field crops such as cereals and legumes were of preeminent importance to the medieval English diet and form the basis of any pastry. Crops grown medievally include winter crops of wheat, rye, winter barley, maslin (wheat and rye mixed), and mixtil (wheat and winter barley mixed) and spring crops of oats, spring barley, legumes such as field peas and broad beans, dredge (barley and oats mixed), and bulmong (oats, beans, and peas mixed).

Pure wheat flour was considered the most desirable flour, and was often sifted to remove the bran to produce a white flour used for the most expensive loaves of bread (wastel, manchet, and pandemayne) for reserved for those in the upper strata of society. D.J. Stone notes that the texture of these white loaves would have been "biscuit-like," which suggests to me that the wheat used was lower in gluten than modern hard wheat flour preferred for bread baking. By contrast, servants, serfs, and the poor were more likely to consume either wholemeal wheat bread, maslin bread, or bread produced from mixtures of other available flours[9]. (ibid) It is possible that a similar stratification of flour was found in pastry, with high-status individuals consuming pies with sifted wheat flour crusts and

[9] For more on bread and social class, see an entry I presented at Kingdom A&S several years ago, which is detailed here: http://briwaf.blogspot.com/2014/01/old-stuff-three-types-of-bread

lower-status individuals (such as servants, serfs, and the urban poor) consuming mixed grain pie crusts.

I was able to find additional information about grain use in high medieval York (see Hall in works cited). Wheat and barley are the most frequently recorded cereal remains across time periods, with rye being of "little significance after the Norman Conquest." During the Roman period, spelt-type wheat predominated, while bread wheat dominated from the Anglo-Scandinavian period onward. Some of the wheat found could have been rivet wheat instead of bread wheat (these species are difficult to tell apart), and specific varieties of bread wheat were not identified. Oats were common and apparently had a greater importance in the York diet than in other parts of England.

The flours I chose to test to see how they performed for self-supporting pastry were wheat, maslin, rye, barley, and oats. Regardless of the grain selected, medieval flour was stone-ground in large water- or wind-powered mills and was typically milled on demand as whole grain keeps better than flour. I have used locally produced stone-ground flour from Bob's Red Mill.

Since wheat is so variable and I had not come across evidence for bread wheat varieties during this time period, I pursued some additional research into wheat history and genetics. My findings and thoughts are detailed in Appendix 3. I did not find one definite answer to the question of what type of modernly available wheat flour is most similar to medieval wheat flour, however it does appear that medieval wheat generally was less well-suited for bread baking than modern wheat flour. For the sake of simplicity and lacking definitive evidence, I chose to use soft white wheat flour due to its lower gluten content and higher starch content (which are broadly similar to the trends I found for medieval wheat) and its general suitability for pie crust.

Further complicating matters is the question of bolting or sifting flour to remove the bran. I have experimented with this on several occasions but have found that modern tools are ill-suited to the job. Additionally, it is very likely that modern milling methods (even stone-ground flour) yields a finer grind of flour, making it harder to separate the bran. Having failed in my attempts to actually bolt flour, to replicate medieval white flour I have

chosen to mix a portion of whole grain flour in with modern (unbleached) all-purpose white flour, varying the proportion of whole grain to replicate different grades of bolted flour.

Fats:

The fats readily available to medieval pie bakers would all have been animal derived, such as lard from pigs, suet or tallow from cows or sheep, and butter derived from dairy cows. The relative abundance and use of these different types of animals in this time period can give some clues as to which fats might be most likely to have been used in making pies.

Cattle remains are the most common of all vertebrates found in mixed assemblages from the mid-12th to mid-14th century (Sykes). Cows and sheep predominate at rural and urban sites, while a greater variety of remains can be found at high-status sites (ibid); again, note that this is for *all vertebrate remains*, implying that even at this date the English were defined by their penchant for beef. Pigs are usually the third most common animal found in archeological sites, but given the relative sizes of pigs and sheep pork was probably the second most commonly consumed meat after beef (Albarella). However, the pastured animals medieval farmers had would have been significantly leaner than modern commercially-fattened cows and sheep, while heritage pig breeds typically contain more lard than their more "improved" counterparts. It is very likely that pigs were the main source of dietary fat in this time period (ibid).

For high-status kitchens, written evidence can supplement the archeological record. In a South Pool household in 1341, a total of 45 and a half beef carcasses, two calves, 64 sheep, three lambs, 51 pigs, one boar, and 32 piglets were consumed over the year, or approximately one cow and one or two pigs per week outside of Lent (Woolgar). This suggests that fat for use in pastry could have been sourced from any of these animals. While the muscle fat may have been trimmed off of these animals and rendered during the butchery process, it is much more likely that this was left in place and the visceral fat was what was used for cooking fat. When I've looked at medieval images of butchery, they show

no evidence of fat trimming, instead large sections of the carcass appear to have been left intact for salting and other preservative processes.

In pigs, the visceral fat of greatest value is called leaf lard and comes from under the loin and around the kidneys. This same fat in sheep and cows is known as suet; this is a hard and crumbly fat that can be used raw or rendered. Suet is mentioned by name in medieval recipes, which suggests to me that it was either a very common or very desirable fat. In modern parlance, tallow is used for rendered beef fat (either suet or muscle fat) and suet only refers to unrendered fat; I am not certain whether or not this semantic distinction was made medievally. Unspecified grease is referenced in recipes from this time period for frying, mixing into farces, etc. This could refer to dripping from roasts or other remnants from other cooking processes or it could mean purpose-rendered lard. Overall, it appears that both lard and suet would have been easily available to cooks in high-status High Medieval English kitchens.

In the 16th century pastry recipes I examined, butter was the standard fat mentioned. During the 13th and 14th centuries, however, the amount of dairy consumed by the nobility was "comparatively limited" (Woolgar). In the same household described above, about one pound of butter was consumed per week (ibid); in my experience there is significantly more than one pound of readily available fat on a pig or cow carcass. This suggests to me that at least during this time period butter was not the most likely fat used in pastry. Additionally, I think one could argue that the almond milk pastry described in the tardpolane recipe (given in the Recipe Analysis section) represented a way to prepare a pastry that could be consumed on fish days when dairy and eggs were consumed but meat (or lard or suet) would not have been permissible if butter were not commonly available.

Eggs are explicitly mentioned in several of the pastry recipes given above, although see my notes in the Recipe Analysis section about the significance of eggs in pastry. These are almost certainly chicken eggs, as chicken husbandry was extremely common in this time period across England while other domesticated fowl were only kept in limited circumstances (such as geese) or there is almost no evidence for any significant populations of them (as is the case with domesticated ducks) (Serjeantson). Modern

chicken breeds differ from those found in period in the number of eggs laid per year and may also differ in the size of their individual eggs. During this time period chickens most likely fed on a mix of grains/legumes (there's an image in the Luttrell Psalter of a woman scattering "scratch" for a hen and chicks) supplemented with foraging for bugs and plants (ibid). Typically eggs from hens fed in this way are significantly different in flavor, color, and fat profile from typical modern industrially farmed eggs.

One of the 16th century recipes I looked at mentioned "salad oil" as a pastry ingredient (during Lent). It's my contention that Lenten or Fish Day pies were made just with almond milk, but both almond and olive oil are mentioned in 14th century recipes. I chose not to test these vegetable-derived fats as I do not think it likely that they were regularly, if ever, used.

In summary, pies prepared in high-status English kitchens during the 13th and 14th centuries were most likely enclosed in pastry composed of sifted wheat flour turned into dough with hot water and lard. That said, other ingredients are plausible and so were included in my testing process.

Summary of Pastry Experiments and Results

Flour	Fat	Method	Notes
Whole wheat pastry	Suet (rendered)	Boiling water, crust molded on a form while warm	Held shape better than either lard or butter versions of same but sides still bowed out
WW pastry	Suet (rendered)	Boiling water, crust molded on a form when cold	I personally couldn't get this to work, and so switched to rolling out and piecing; the dough just kept cracking
WW pastry	Suet (rendered)	Boiling water, crust rolled out and pieced together when cold	This made a very pretty pie
WW pastry	Lard	Boiling water, crust molded on a form while warm	Held shape better than butter version of same but still did not show straight sides
WW pastry	Lard	Boiling water, crust molded on a form when cold	As the suet version, I couldn't get this to work
WW pastry	Lard	Boiling water, crust rolled out and pieced together when cold	Produced one of the prettiest pies
WW pastry	Butter	Boiling water, crust molded on a form while warm	Dough did not support itself well. Final pie does not have the straight sides we see in (later) period illustrations
WW pastry	Butter	Boiling water, crust molded on a form when cold	As with the suet and lard versions, I couldn't make this work
WW pastry	Butter	Boiling water, crust rolled out and pieced together when cold	Less sturdy than either suet or lard versions of same
White mix (modern white plus WW pastry)	Lard	Boiling water, crust formed by hand (pinch pot) while warm	Made a smaller pie than the same volume of just whole wheat pastry flour but worked well
White mix	Lard	Boiling water, crust raised on a form while warm	Worked well while raising but I had some trouble with covering the coffin. This method might work better for single crust pies
White mix	Lard	Boiling water, crust raised on a	Did not work as well as working the dough while war

		form after letting rest	

Flour	**Fat**	**Method**	**Notes**
White mix	Lard	Boiling water, crust rolled out and pieced together when cold	This pie had the most upright sides of all the ones in this batch, however, I am skeptical that the seal between the bottom and side pieces will really hold
White mix	Lard	Much larger pie; boiling water, pinch pot method while warm	This didn't work at all, I couldn't get the sides to stay up
White mix	Lard	Much larger pie; boiling water, raised on a form while warm	Same as above – the sides kept collapsing in on themselves
White mix	Lard	Much larger pie; boiling water, raised on a form after resting	Also the same story – the sides kept falling
White mix	Lard	Much larger pie; boiling water, rolled and pieced together after resting	This was the only method I had any success with for the larger pie; in addition to probably needing more practice with other methods, it occurs to me that raising a large pie on a form may have been impractical in a medieval kitchen as this would have necessitated multiple forms. By contrast, the rolling and piecing method can yield a pie of any size with relatively little equipment.
WW Pastry	Lard	Room temperature fat and water worked into flour by hand; coffin formed on a mold	Sides bowed out significantly
WW Pastry	Lard	Room temperature fat and water worked into flour by hand; coffin formed by rolling and piecing	This was the most successful of the room temperature trials, although I was unable to get the sides very straight compared to the hot water coffins
WW Pastry	Suet	Room temperature fat and water worked into flour	Sides bowed out significantly

		by hand, formed on a mold	

Flour	**Fat**	**Method**	**Notes**
WW Pastry	Suet	Room temperature fat and water worked into flour by hand, formed via pinch pot	Sides bowed out significantly and showed some surface wrinkling
WW Pastry	Butter	Room temperature fat and water worked into flour by hand	This dough was hard to work with and this pie looked sad
Maslin	Lard	Boiling water, crust rolled and pieced once cold	A little less sturdy than the all wheat version
WW Pastry	None	Just boiling water and flour, formed on a mold when warm	Not as pretty or with as good of a texture as the versions with fat, but it was easy enough to work and it survived baking
White mix	None	Just boiling water and flour, formed on a mold when warm	I didn't think this worked as well as the whole grain versions of the flour and water crusts; it wasn't quite robust enough to hold its shape nicely.
White mix	None	Just boiling water and flour, pinch pot method (while warm)	I didn't think this worked as well as the whole grain versions of the flour and water crusts; it wasn't quite robust enough to hold its shape nicely.
Maslin	None	Just boiling water and flour, pie formed free-hand (pinch pot)	Cracked slightly in baking – might not survive a wet filling – but otherwise fine
Maslin	None	Just boiling water and flour, formed on a mold when warm	Turned out beautiful and easy to work with
Rye	Lard	Boiling water method, crust rolled and pieced once cold	Fell apart during baking.
Rye	None	Just boiling water and flour, formed	Cracked slightly in baking – might not survive a wet filling – but otherwise fine

		on a mold when warm	
Oat	Lard	Boiling water method, see note	This did not work at all, it was too crumbly to form

Flour	**Fat**	**Method**	**Notes**
Oat	None	Just boiling water, see note	This did not work at all, it was too crumbly to form
Oat	Lard plus eggs	Boiling water method with extra flour and an egg, crust rolled and pieced once cold	This is not really likely for historical pastry but I wanted to try it so I could make a coffin I could actually eat. It leaked a little during baking (I later baked one in a small earthenware dish) but it was very tasty.
Barley	Lard	Boiling water method, see note	Crust was really crumbly even after adding additional water. I was not able to raise it on a form while warm or roll it out while cold, but this one sort of held together when raised on a very small form while cold. Then, however, it fell apart in the oven.
Barley	None	Just boiling water, see note	This did not work at all, it was too crumbly to form
White mix	Eggs	Eggs worked into flour with sugar at room temperature; raised the coffin by hand	The eggs made this puff enough that it broke itself apart during baking. I think the original recipe is missing something.
White mix	Lard plus eggs	Hot water method, but used more flour and added whole egg after kneading in the hot water and fat; pinch pot	This worked quite nicely. As directed, I raised it to a height of “2 fingers” and it held up reasonably well. This also included sugar.
White mix	Lard plus egg yolk	Worked ingredients at room temperature	I was able to raise this on a form, but did find that it was prone to cracking; I sealed the cracks with egg white. I did not give this a lid. Browned a lot during baking. Did have a more crumbly texture than others.

White mix	Almond milk	Hot water method, raised the coffin as a pinch pot	Worked beautifully; did not have a lid (as specified in recipe)
Chestnut flour	None, Lard	Boiling water only, or boiling water plus lard; pinch pot	Both cracked during baking
Chestnut flour	Butter and egg	Supposedly "traditional" in France and Italy, fat and egg worked into the flour at room temperature.	Significantly easier to work with than the other chestnut flour crusts I tried, it too cracked during baking. I was able to get egg-cup sized coffins to stay together.

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Appendix 1: Ingredients and Recipes for Pastry

These are the ingredients and recipes I used for testing. Since no specific quantities were available in historical sources, I examined modern cookbooks and several websites geared toward historical reenactors as a starting point, which I've referenced where appropriate.

INGREDIENTS

Flours:

- Whole wheat pastry flour: stoneground white wheat
- "White mix" flour: a mixture of unbleached white all purpose flour (stoneground) and whole wheat pastry flour to simulate medieval bolted flour; I use a 2:1 white:whole ratio, but this could be adjusted to simulate different grades of white flour.
- Maslin: a 50/50 mix[10] of stoneground rye and wheat flours (again, I used the stoneground white wheat flour)
- Rye flour
- Oat flour: this does not work on its own; however, I was able to make a self-supporting oat flour crust by adding egg
- Barley flour: this was not successful in any of my tests, however I did not experiment with adding egg, which could have made a difference

Fats:

- Lard: rendered leaf lard from Tamworth hogs raised on a combination of grain feed and table scraps, which is very similar to how urban pigs would have been fed in period, see Albarella
- Tallow: rendered beef suet; I had wanted to use fat from grass fed cows as this is more historically accurate but none of my usual sources for it came through
- Butter: butter from grass fed cows is more similar to period butter; I tried both grain fed and grass fed butters and did not see a significant difference in performance during testing so I switched over to grain fed for cost reasons

Other:

- Eggs: from my backyard chickens, which are modern breeds eating a combination of grain-based scratch, kitchen scraps, and grass/bugs/etc. from around the yard; this is broadly similar to the diet of medieval chickens (see Serjeantson)
- Almond milk: I prepare this from 1 part finely ground blanched almonds steeped in 2 parts boiling water for 10-15 minutes and then strained.
- Sugar: I use minimally processed granulated cane sugar

[10] In contexts where evidence points definitively toward these crops being grown together deliberately as maslin, they appeared in roughly equal numbers (Moffett).

RECIPES

These recipes each yield enough pastry for one personal-sized pie; for testing purposes it was much easier to work in small quantities.

Hot Water and Fat Method

- 5/8 cup flour
- 3/2 tablespoons fat
- 3-4 tablespoons water (wheat flour required less, rye and blends required more)

1. In a large bowl, make a well in the flour.
2. In a small saucepan with the lid on heat the fat and water until the water just reaches the boiling point (and the fat is fully melted).
3. Pour the water and fat into the flour and stir vigorously with a spoon, then knead until the dough is smooth and easy to work.
4. Pinch off a piece of dough about the size of a walnut and set it aside. Pat the remainder out into a tall disc.
5. Poke both your thumbs into the middle of the disc. With your fingers on the outside of the disc, press your thumbs outward while rotating the dough. Continue until you have a straight-sided bowl with walls of your desired thickness (these need to be fairly thick to stand up, about ½ inch). I found it helpful to press on the inside of the base of the coffin with the pads of my fingers periodically to flatten and even it out.
6. Fill the coffin.
7. Pat or roll out the smaller reserved piece into a lid. Poke a hole in the center of it, place it on top of the filling, and pinch the edge where it meets the sides shut. You can finish this edge by using two fingers from one hand and one from the other to form a ruffled edge or you can simply cut off the excess.
8. Alternatively, from just after step 4:
    a. Wrap the dough in a damp cloth and let sit in a cool place for several hours or overnight. Roll out a bottom and sides of even thickness, and fasten together using water or egg wash. Fill and top as above.
    b. Or use a form (like a pie dolly or a glass jar) to mold the well-floured larger disc of dough into a straight-sided bowl, then fill and top as above. This can be done with the dough hot or after letting it rest in a damp cloth.
9. Bake at 350° for 60-90 minutes (seriously).

Adapted from
http://savoringthepast.net/2013/02/11/a-pork-pie-with-a-standing-crust/

Water and Flour Only

- 350 grams flour

- 270 mL of boiling water

1. In a large bowl, make a well in the flour and pour in the water. Mix vigorously with a spoon, then knead until dough is smooth.
2. Proceed as above.

Adapted from a recipe found at
http://recipewise.co.uk/medieval-flour-and-pastry-article/4

Room-Temperature Ingredients

- ¾ cup flour
- 2 tablespoons fat
- A small amount of water

1. Work the fat into the flour until the mixture looks crumbly, then add water a few drops at a time until the dough comes together.
2. Shape and bake as directed above.

A Plausibly Historical Gluten Free Crust

- 1 cup (GF) oat flour
- 2 tablespoons lard
- 4 tablespoons water
- 1 egg

1. In a large bowl, make a well in the flour.
2. Bring the lard and the water to a boil in a small saucepan and pour into the flour, stirring vigorously with a spoon.
3. Add the egg and knead thoroughly.
4. Shape and bake as directed above.

Almond Milk Coffins

- ¼ cup almond milk (hot)
- ¾ cup "white mix" flour
- 1 tablespoon sugar

1. Pour almond milk into a well in the flour and mix well, then knead until the dough is smooth and easy to work.
2. Shape dough into a thick disc.
3. Poke both your thumbs into the middle of the disc. With your fingers on the outside of the disc, press your thumbs outward while rotating the dough. Continue until you have a straight-sided bowl with walls of your desired thickness (these need to be

fairly thick to stand up, about ½ inch). I found it helpful to press on the inside of the base of the coffin with the pads of my fingers periodically to flatten and even it out.

Just Eggs and Flour

- 1 cup "white mix" flour
- 1 tablespoon sugar
- 2 eggs

1. Mix flour and sugar together, then knead in the eggs until you have a smooth dough. (Add more flour if needed.)
2. Set dough aside for at least 30 minutes.
3. Set aside a piece of dough for the lid, then form the remainder into a coffin using the "pinch pot" method described above. Fill and top.

   Note: the eggs caused this to rise during baking and break itself apart.

Eggs with Fat (Hot Method – this recipe makes a larger amount than the others)

- 1 ½ cups "white mix" flour
- 1 tablespoon sugar
- 2 tablespoons fat
- 5 tablespoons water
- 1 egg

1. Mix the sugar and flour together in a bowl and make a well in the middle.
2. Combine the water and fat in a small saucepan and bring to a boil. Pour into the flour mix and stir.
3. Add the egg, and knead thoroughly until dough is smooth.
4. Raise coffin and bake as described above; I used the "pinch pot" method and to match the original recipe made the coffin long (I interpreted this as an oval) and as tall as the width of my index and middle fingers.

Chestnut Flour Pastry (this only works if baked in a dish; none of the methods I tried for coffins actually held together)

- 5/8 cup chestnut flour
- 1 tablespoon butter, softened
- 1 medium egg

1. Rub the butter into the chestnut flour with your fingers until it's all the way mixed in. Add the egg, adding more flour if needed.
2. Knead well, roll out, and use to line a tiny pie dish.
3. Fill, bake for 60 minutes at 350 degrees.

Egg Yolk and Fat Crust (since this recipe specified not to let any water come into the dough, this one cannot be made using a hot method)

- 5/8 cup flour
- 1 tablespoon fat
- Yolks of 5 eggs (note: this may vary based on size of eggs)

1. Rub the fat into the flour until the texture resembles wet sand.
2. Add the egg yolks one at a time, massaging them into the flour and fat mixture, until dough comes together in a ball.
3. Knead the dough several strokes until smooth.
4. Proceed as previously described.

Appendix 2: Excerpts from 13th and 14th Century English Recipes which Pertain to Pastry

- "MS A" ("Two Anglo-Norman⋯")
    - 11: (My translation) "Here is another dish called tardpolane. Take flour and sugar and put them together, and the pastry is tempered with milk of almonds; then make of this pastry coffins the height of two fingers..."
    - 14: "⋯Pernez flur demeyne e des oefs e seffran, e festes past coloré dekes a la meyté del past, e l'autre meyté serra blanch⋯" or in English (my translation): "Take fine white flour and eggs and saffron, and make the pastry colored [taking?] a measure of the paste, and the other measure will be white⋯" (Not a pie recipe.)

- "MS B" (ibid)
    - 21: "⋯e serra adressé en cofynz de flur de chasteyns⋯" My translation: "And it will be made right (correctly) in coffins of flour of chestnuts⋯"

- "Diuersa Cibaria" (*Curye on Inglysch*)
    - 21: "Pynite. ⋯ & schal beon addressed in coffins of flour of chasteyns: þe coulour (gh)olou wyþ saffroun." This is the earliest English version of the recipe just given in French.
    - 27: "Test de Turt. Foille de pastee bon sarrays⋯" Or in English (my translation) "Foil of pastry well arranged(?)"
    - 34: "Anoþur mete þat hatte cresterole. Nim flour of corne and ayren & make past, icolored wyþ saffron þe halue dole þe past, & þ halue dole qwytt; & soþþe rolle on a bord ase þunne ase parchemin, & rolle rounde al aboutee as a kake; & make ase wel in leynteen ase in oþur tyme, wyþ alemauns in oile ifried." (Not a pie recipe.)
    - 43: (A fish day version of teste de Turt) "⋯ & make a coffin of past ⋯"

- "Diuersa Servicia" (*ibid*)
    - 82: "Tartys in applis ⋯ & do yt in a cofyn ⋯"
    - 86: "For to make flownys in lente, tak god flowr & make a god past ⋯"

- 88: “For to make a prey chapelyen ⋯ Tak & make a þynne paast of dow, & mak þerof as it were ryngis. ⋯” (Not a pie recipe)

- “Utilis Coquinario” (*ibid*)
  - 4: “Ruscheues. ⋯ & tak (z)elkes of eyren & floure & mak past þerof ⋯” (This is not quite a pie, the finished product is fried instead of baked.)
  - 24: “For to dy(z)te a fresch laumprey. ⋯ & mak a paste of dow⋯”

- “Forme of Cury” (*ibid*)
  - 116: “For to make flaumpeyns. ⋯ þenne take blank sugur, eyren & flour, & make a past with a rollere. þenne make þerof small pelletes & fry hem broun in clene grece, & set hem asyde. þenne make of þat ooþer deel of þat past long coffins, & do þat comade þerin, and close hem faire with a couertour, & pynche hem small aboutes.”
  - 158: “Raphioles. ⋯ Make a crust in a trape⋯”
  - 159: “Malaches. ⋯ Bake hyt in a trappe wyt wyte gres.”
  - 160: “Malaches whyte. ⋯ Make a foyle in a trap & bake it wel þerinne⋯”
  - 161: “Crustardes of flesh. ⋯ Make a crust in a trap, and pynche it, & cowche þe flesshe þerinne⋯ Couere it & bake it wel, and serue hit forth.”
  - 162: “Malaches of pork. ⋯ Make a crust in a trap; bake it wel þerinne, and serue it forth.”
  - 163: “Crustardes of fysshe. ⋯ Make a foyle and lay þe fish þerinne ⋯ and cast [the other ingredients] in the trape, & bake it and serue it forth.”
  - 164: “Crustardes of eerbis ⋯ Make a crust in a trap and do þe fyssh þerinee, vnstewed⋯”
  - 165: “Leche frys of fische day. ⋯ Make a cophyn of þe heghte of þi lyte fingur, and do þi fars þerin & bake hyt as tartes. ⋯”
  - 166: “Leche frys in lentoun. ⋯ Make a coffin as þou didest before [presumably the height of a little finger] & do þis fars þerin, & bake it wel, and serue it forth.”
  - 172: “Tartee. ⋯ and make a crust in a trap, & do þe fars þerin; & bake it wel & serue it forth.”

- 174: “Tart de Bry. Take a crust ynche depe in a trap. ⋯”
- 175: “Tart de brymlent [probably a scribal error for Tart de bry IN Lent]. ⋯Make a coffin an ynche depe & do þe fars þerin. ⋯ And couere the coffin ⋯”
- 176: “Tartes of flesh. ⋯ Make a coffin as tofore sayde ⋯”
- 177: “Tartlettes. ⋯ make a litell coffin ⋯”
- 178: “Tartes of fysshe. ⋯Make a crust in a trap as bifore ⋯”
- 179: “Sambocade. Take and make a crust in a trap ⋯”
- 190: “Daryols. ⋯ Do it in a coffyn of ii ynche depe ⋯”
- 192: “Flampoyntes. ⋯ Make a coffyn of an ynche depe and do þis fars þerin. Make a thynne foile of gode past & kerue out þeroff smale poyntes, freye hem & put hem in þe fars ⋯”
- 193: “Chewettes on flesshe day. ⋯ make a coffyn as to a pye smale and do þerinne ⋯ Couere it & fry it in grece, oþer bake it wel ⋯”
- 194: “Chewetes on fyssh day. ⋯ Make a coffyn as to fore said ⋯ frye it in oile, oþer stue it in sugur & in wyn, oþer bake it.”
- 197: “Chastletes. Take and make a foyle of gode past with a rollere of a foot brode, & lynger by cumpas. Make iiii coffins of þe self past vppon þe rollere þe gretnesse of þe smale of þyn arme of vi ynche dep; make þe gretust in þe myddell. Fasten þe foile in þe mouth vpwarde, & fasten þe oþere foure in euery side. ⋯” (There follow additional instructions for the filling of each part, with the whole to be baked.)
- 203: “The pety peruaunt. ⋯& loke þat þou make þy past with (y)olkes of ayren & þat no water come þerto; and fourme þy coffin and make vp þy past.”

Appendix 3: Additional Information about Medieval Grains, Including Wheat Varieties

One potential source of information on medieval cereal crops is blackened roof thatch from standing medieval buildings. Layers of soot-blackened thatch survive on some medieval English buildings dating from the medieval period (specifically the 14th and 15th centuries) and John Letts (see sources) has examined over 200 samples, all originating from the South of England and most coming from Devon. (Typically roofs in the north of England were thatched with water reed or sedge [Ambrose and Letch].) These samples have preserved not only grain-bearing plants (with both the ears and straw intact), but also crop weeds and other vegetables. These roof samples provide us with a glimpse into complete medieval fields, and allow us to see how crops changed over time. The most significant finding is the diversity of crops within a medieval field:

> Most samples contain 'land race' mixtures of bread wheat (*Triticum aestivum*), English rivet wheat (*Triticum turgidum*) and rye (*Secale cereale*) which grew to 6ft (1.8m) or more in height - far taller than modern varieties - as well as barley (*Hordeam vulgare*) and oats (*Avena spp*). Land races evolve over many centuries when crops are grown in heterogeneous conditions, year after year, from seed saved from the previous year's crop. The result is that every plant in a land race is slightly different from its neighbour, and medieval cereals were consequently very uneven in straw height, ripening time, grain yield and other agronomic traits. This diversity ensured that a portion of the crop almost always set seed irrespective of the many environmental stresses that can destroy a crop such as drought, waterlogging, frost or crop disease. (Letts)

The most abundant grain in these samples was bread wheat, although this study does not specify any specific recognizable varieties of bread wheat or characteristics such as grain color, etc. One significant difference between modern wheat crops and the evidence from roof thatching is the presence of rivet wheat among the medieval samples. Although rivet wheat is no longer grown commercially on any significant scale, 60% of the roof samples contained at least some rivet wheat. (ibid) Rivet wheat tends to produce high quality thatching straw, so it is possible that it was of greater importance historically for this reason. As many of the roof samples are composed of threshed straw and threshing waste, it is reasonable to conclude that these samples accurately reflect food crops.

Within this threshing waste additional plant taxa are found, including legumes such as broad beans and field peas (both important foods medievally and most likely left over or

introduced via other crop rotations) as well as numerous weed species, again indicating that medieval fields were significantly more diverse than modern fields. It is possible that seeds from some of these plants may have been milled along with the wheat grains, although the impact on the finished flour would presumably be negligible. (ibid)

Modern wheat (and other cereal grains) are grown as monocultures, vastly different from the diversity of medieval fields. The stark reality is modern wheat bears very little resemblance to its medieval ancestors (for discussion of genetic changes in wheat over time, see Haudry et al and Peleg et al in sources). The number of wheat varieties grown in the UK has dropped precipitously since World War II (Ambrose and Letch): in the 1830s, some 150 named wheat landrace varieties were described, and in the 1920s and -30s 63 wheats from across the UK were collected, classified, and catalogued. But by 2003, only three landraces were recorded (specifically as being grown for thatching). (ibid) Typically early landraces referenced place names, and it is highly likely that each region in England had a unique wheat variety historically.

Although medieval records differentiate between types of crops (e.g. wheat vs. rye), they do not differentiate between varieties within a crop. For example, wheat is universally referred to as *frumentum* in manorial records of the period (Stone). 16th century written accounts differentiate between different varieties of wheat, but I have found little evidence as to when these varieties appeared or whether medieval people used different wheat varieties for different purposes. Generally the evidence suggests that any single field would contain a mixture of genetically distinct wheat plants and different areas would have their own unique wheat variety, so it is unlikely that the universal term implies that wheat was a homogeneous crop. The lack of distinction between different wheat varieties could suggest that people simply used whatever wheat was available to them for any given purpose rather than using individual varieties purposefully.

This lack of information about medieval wheat varieties is frustrating for the modern cook, as different varieties of wheat have vastly different properties. Since wheat would have been the flour used for pies prepared in high status contexts, I felt I needed to find additional information about the qualities of medieval wheat flour. The major

distinction between modern wheat varieties is between hard red and soft white wheat. Hard red wheat is higher in gluten and preferred for bread baking, while soft white wheat is higher in starch and is preferred for, among other things, pie crusts. In his translation of Galen's *On the Properties of Foodstuffs*, Powell notes that the different varieties of wheat known to Galen were einkorn, emmer, durum, and bread wheat, but does not distinguish between different varieties of bread wheat (*T. aestivum*). By the very end of the 16th century, John Gerarde in his *Herball* mentions white wheat, red wheat, and flat wheat by name; from the description and its accompanying picture flat wheat may refer to rivet wheat. It is not clear if the white and red wheat of Gerarde correspond to the varieties of the same names of today, or if they do when these varieties appeared.

There are a few things we do know for certain: medieval wheat was a winter crop, and was bred from ancestral wheats such as einkorn, emmer, and spelt. Both hard red and soft white wheat are winter crops (although there is also a spring hard red wheat). In comparing different modern and historical wheat varieties, one can see how each varies in macronutrient composition, which can allow us to make some educated guesses about medieval wheat. All data are from the USDA unless otherwise specified:

All values are per 100g	**Einkorn***	**Emmer****	**Spelt**	**Soft White**	**Hard Red**
Water	*N.D.*	*N.D.*	11.02	10.42	13.10
kCal	347	362	338	340	327
Protein* (g)**	18.2	12.77	14.57	10.69	12.61
Total lipids (g)	2.48	2.13	2.43	1.99	1.54
Carbohydrate (g)	[65.5 g starch]	72.34	70.19	75.36	71.18
Fiber (g)	8.7	10.6	10.7	12.7	12.2
Sugars (g)	2.67	*N.D.*	6.82	0.41	0.41

*No USDA data available. Data given are from www.einkorn.com/wp-content/.../Grain-Nutrition-Comparison-Matrix.pdf.
**No USDA data available. Data given are from http://www.bluebirdgrainfarms.com/nutritional-information.html
***Total, so includes both gluten and other proteins.

It is interesting to note that all of the "ancient" wheat varieties (as they are grown today; these are not living fossils, but modern crops that have certainly undergone evolutionary changes from their ancestral forms) contain a greater amount of protein even than modern hard red wheat. However, the gluten content in historical grains is said to be

lower than the gluten content in modern wheat, as breeding wheat to contain more gluten (for better bread baking) has been a major aim of industrialized agriculture. Spelt in particular is generally considered poor for bread baking by modern bakers. This suggests to me that medieval bread wheat would have tended to have less gluten than modern hard bread wheat. I was unable to find macronutrient data on rivet wheat (*T. turgidum*), but I did find a reference to it being "better suited to biscuit- than to bread-baking" (Hamerow et al) which suggests a relatively low gluten to starch ratio.

Even when late medieval or post-medieval texts describe particular varieties of different crops, it is essentially impossible to correlate these characteristics with modern varieties (Moffet). One potential way for modern cooks to attempt to replicate the non-specialized nature of medieval wheat flour could be to use a mix of flours from different modern wheat varieties (e.g. soft, hard, and even durum wheats, perhaps along with "ancient" wheats such as spelt, emmer, einkorn, etc.) Even simply mixing hard red and soft white wheat flours could replicate the higher overall protein but lower gluten content of medieval flours.

Appendix 4: Results of Cookbook and Menu Meta-Analysis

Curye on Inglysch lists several extant 14th century feast menus, all of which feature pies (and pie-like dishes). These give a sense of the importance of pies to the medieval English diner: within each menu, the percentage of listed foods that are pie-like ranges from 5-25%, suggesting that pies had a significant role within feasts in elite contexts. Additionally, these menus give a convenient list of all of the different types of pies, tarts, and their relatives commonly eaten during this time; the following are the pie-like foods mentioned in these menus:

- grete tartes
- grete crostude
- domedes in paste
- quynsys in past
- sartes (probably a transcription error for tartes)
- a mete called payne pufe
- cheuettes
- tartes bosewes [bosewes may be an alternate spelling of a different meat dish]
- flampoyntes
- daryol/dariol [appearing in both flesh day and fish day menus]
- lechefres
- dariol of crem & of refles togedere [might be two separate dishes, with the "of" a scribal error; refles could then = "raphioles" which is a pie of caul meatballs]
- flampoyntes of crem
- tartes [on both fish day and flesh day menus]
- lechefres of frut
- crustede
- dariol of almaund
- torte
- raphiol ibake
- malaches of pork

These same pies and tarts appear throughout the 13th and 14th century culinary manuscripts, as well. I was interested in the relative abundance of pies in these different recipe collections, and so I did some analysis on *Curye on Inglsych*. I counted all recipes for foods that were enclosed in pastry and baked. This includes pies and tarts as well as specific variants like chewettes (typically a small pie which I assume had a ruffled edge and a rounded top, making it resemble a small cabbage) and dariols (usually a sweet custard

tart). For this analysis, I have *not* included recipes for foods enclosed in dough and boiled or fried, although I believe that pasta and pastry may not have been well differentiated at this time. I also did not include in my analysis those foods which seemed to be pie-related (like erbolat) but which are not actually pies. The table below lists the total quantity and individual recipe numbers within each manuscript:

Manuscript	**Total Recipes**	**Pie-like Recipes**	**% Pie Recipes**
Diuersa Cibaria	63	5 (21, 24, 27, 34, 43)	7.9
Diuersa Servicia	92	4 (82, 84, 86, 88)	4.4
Utilis Coquinario	37	1 (24)	2.7
Forme of Cury	205	25 (51, 116, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 172, 173[11], 174, 175, 176, 177, 178, 179, 180[12], 191, 192, 193, 194, 197, 203, 204[13])	12.2
Goud Kokery	*Includes no pie-like recipes*		

I also examined the culinary manuscripts of "Two Anglo-Norman Culinary Collections"; the percentage of recipes in each of these was within the same range as the manuscripts listed above, as detailed in the table below:

Manuscript	**Total Recipes**	**Pie-like Recipes**	**% Pie Recipes**
MS A	29	2 (11, 23); related: #14[14]	6.9%
MS B	32	2 (21, 27); related: #24[15]	9.3%

[11] Although this is universally interpreted as a tart by SCAdians, the recipe does not actually mention pastry; although this could be an error I have chosen to omit it from my count.

[12] A recipe for eggs and herbs baked in a buttered but not pastry-lined trap (baking dish). Clearly related to pie recipes, but unique in that it includes no pastry (and thus omitted from further analysis).

[13] This is a recipe for "payn puff" and appears incomplete: "Eodem modo flat payn puf, but make it more tender þe past, and loke þe past be rounde of þe payn puf as a coffin & a pye." Omitted from count for percentage of pie recipes.

[14] Another recipe that is based on pastry and includes directions for making pastry but which is not in and of itself a pie recipe, instead being fried cakes made of pastry.

[15] Not a pie, but a sauce with baked pastry leaves set on top.

Appendix 5: Selected 16th Century Recipes

From *The good Huswifes Handmaide for the Kitchin,* anonymous; London 1594, 1597.
Digital text and notes by Sam Wallace; version 01-12-2006; notes updated 03/2011
http://www.uni-giessen.de/gloning/ghhk/

- "To make Paste, and to raise Coffins. Take fine flower, and lay it on a boord, and take a certaine of yolkes of Egges as your quantitie of flower is, then take a certaine of Butter and water, and boil them together, but ye must take heed ye put not too many yolks of Egges, for if you doe, it will make it drie and not pleasant in eating: and yee must take heed ye put not in too much Butter for if you doe, it will make it so fine and so short that you cannot raise. And this paste is good to raise all maner of Coffins: Likewise if ye bake Uenison, bake it in the paste above named."

- "To make fine Paste another way. Take Butter and Ale, and seeth them together: Then take your flower, and put thereinto three Egs, Sugar, Saffron, and salt."

- "To make short paste in Lent. Take thick Almond milke seething hot, and so wet your flower with it: and Sallet oyl fryed, and Saffron, and so mingle your past altogether, and that will make good paste."

From *A Proper newe Booke of Cokerye* (mid-16th c.)
Text: Frere, Catherine Frances (ed.): A proper newe booke of cokerye. With notes, introduction and glossary; together with some account of domestic life, cookery and feasts in Tudor days, and of the first owner of the book, Matthew Parker, Archbishop of Canterbury, and Margaret Parker his wife. Cambridge: W. Heffer & Sons Ltd. 1913.
Electronic version: Thomas Gloning, VII/2001;
http://www.uni-giessen.de/gloning/tx/bookecok.htm

- "To make short paest for tarte. Take fyne floure and a cursey of fayre water and a dysche of swete butter and a lyttel saffron, and the yolckes of two egges and make it thynne and as tender as ye maye."

Appendix 6: A Short Note on Medieval Ovens

Medieval ovens were obviously very different from modern ovens, being made of brick and wood-fired. The oven was filled with burning wood which heated the chamber, then when it reached the optimal temperature any remaining coals were scraped out using a metal shovel (one of which was found in an excavation of medieval bakehouse at York) and the food placed within the oven using a wooden peel. The oven door is then shut, and the food is baked using the heat stored in the oven's bricks. (I've included some pictures of medieval bakers and ovens with my display.) These ovens gradually cool off, and foods are baked in them in succession. Most likely, pies were baked after the oven was used for bread baking, so the heat in the oven would have been moderate.

I had an opportunity to bake pies in a temporary wood-fired oven last summer. At the time I was using a simple (gluten free) pastry made using room-temperature ingredients and baked in traps rather than as self-supporting coffins. I found that these pies took a very long time to bake (and the oven's maker had many issues with her baking projects, so we think we haven't really worked out all the kinks yet) but the finished pastry was delicious and held together well.

Since I am recreating these pies in a modern kitchen, I went ahead and used my electric oven set at 350°F. I did find that I needed to bake the coffins for a long period of time to reach doneness (as measured by relative spring of the pastry).

I am hoping to get to bake coffins in a wood-fired oven again this summer and see how my findings in a modern oven apply to a more historical set-up.