The Evolution of Food Processing Techniques

From the earliest times to the 17th century

Hrafnir Fiachsman/Patrick Cauldwell
October 2003

What are “food processing techniques”?
Food processing techniques in the context of this paper means all the ways that food gets from wherever it grew or wandered around to being eaten by people. This includes how food is gathered / harvested, how it is stored, how it’s prepared to eating (things like milling) to how it is cooked. All of these techniques have undergone a radical evolution over time, not just in the modern era but in period as well. The ways in which the ancient Romans or the Vikings prepared and processed food differ greatly from the way 16th century English or French people prepared and processed food.

The focus of this paper
This paper is intended to be a survey, and certainly isn’t an exhaustive study of the topic. That would take volumes. While I’ll do my best to give a balanced account, I will tend to focus on ancient Roman and Viking periods, since those are the ones I’m personally most interested in. However, since many of the common food processing techniques changes between 1066 and 1625, I’ll try to cover those as well. My aim is to focus on how food was processed, rather than what was being eaten. I’m not going to cover what kinds of food various peoples were eating, or what their food was like, unless it illuminates some aspect of food processing.

Harvesting
The very first level of food processing is actually gathering the food, whether that means looking for wild foods, hunting, fishing or harvesting grain or vegetables.

Grain
Harvesting grain is one of the earliest activities that agricultural societies had to organize, and it’s one of those that changed the least over time. While the basic tools may have improved slightly, stone tools being replaced with copper, bronze or iron/steel, the process didn’t really change much until the advent of the reaping machine in 1831. Until then, either a simple sickle or “reaping hook”, are a larger scythe was used to cut down the grain stalks. After being cut down, they were tied into bundles by hand and left to dry.

Hunting
Hunting technology changed a bit more than that of grain harvesting, but not in ways that made a huge difference on man’s ability to kill animals for food. While in early period, hunting was done with slings, spears, and bows, the change to crossbows and then early

Copyright© Patrick Cauldwell 2003. Not to be reproduced without permission.
firearms for hunting probably didn’t do all that much to improve the odd in favor of the hunter.

**Fishing**
The evolution of fishing during period had mostly to do with scope. From fishing from shore or a small boat to fishing with larger nets from larger boats isn’t so much a change in technology as it is one of scale. Improvements in preservation techniques had a much greater impact on fishing than did changes in the way fish were caught.

**Vegetables**
Gathering vegetables, like harvesting grain, didn’t change much over the course of our period. Vegetables have to be planted, cared for and then harvested, and nothing about that process changed until the advent of mechanization.

**Storing and preservation**
The evolution of the ways in which food is preserved and stored has had a profound impact on the daily life of people throughout history. While gathering food is hard work, it is even harder to preserve the fruits of that labor, so that none of it is wasted. With the growth of agriculture, food tended to be produced in large quantities, all at the same time. Grain and vegetables become ripe at around the same time, which tends to produce more food than the growers can eat before it spoils. If that food is to be sold to people who need it, or preserved for leaner times when produce isn’t ready to eat it must be carefully prepared and stored. In period, that preparation consisted mainly of drying, salting, pickling, or potting.

**Drying**
Drying may be one of the easiest ways to preserve food for long storage. Many fruits can be preserved by drying alone. Plums, apricots, grapes, figs, apples and pears were all preserved by drying. When properly stored in a cool place, such dried fruits will keep for months or even years.
Grains and pulses (peas, beans and lentils) can also be dried for long storage. Dried peas were a staple food in the North where they were made into the legendary ‘pease porridge’ or ground and used in bread.
The Viking age Scandinavians discovered that, in their cold and windy climate, the codfish can be dried hard as a board into stockfish. Several authors have speculated that it was the stockfish that allowed the Vikings to make the long sea voyages necessary for the colonization of Iceland, Greenland and Vinland (Newfoundland). In southern climates it was too hot and humid to produce stockfish, since cod will rot before it dried under those conditions. However, because in Southern Europe and the Mediterranean there is plenty of sunshine to evaporate seawater, salt was much more plentiful than in the North, so saltfish was invented. When salt is added to the codfish before they are dried, they will keep long enough to dry properly even in southern countries. From the invention of saltfish it was discovered that oilier fish such as herring or salmon could also be preserved by drying, but they required smoking first.

Copyright© Patrick Cauldwell 2003. Not to be reproduced without permission.
Beef, pork and other game can also be dried, either simply as jerky, or in larger pieces
with salt and spices. Beef can be dried in large pieces if the climate is cool and dry
enough, to produce Alpine specialties such as Swiss bundnerfleisch or Italian bresoala.
Beef or pork can be made into sausages and dried into products like Italian salami or
Spanish chorizo. The Scotts, always ones to keep things simple, just pressed raw deer
meet between two planks until it was hard as a rock³.
Hungarian gulyás (goulash) was originally made in large quantities and cooked until it was
dried out, then stored for use by Magyar herdsman who could rehydrate it into “instant
soup”.
Bread can also be preserved by drying. In Scandinavia, large, flat, cracker-like breads
where baked until dry and hard, then hung by running a string through holes in their
centers. These breads could then be placed near the hearth, where the smoke would
further dry and preserve them. In southern countries, bread dough was fermented with
yogurt, made into small balls, and then dried hard for storage. In Turkey, the Balkans and
Hungary, these small dried dough pellets (called tarhana in Turkish)⁴ are used in soup. A
similar product called badi or warian is made in India from pulses and dried in the sun⁵.
Other classic dried breads include hardtack, Italian biscotti, and matzoh.
Cheese can also be dried, given enough salt, to produce hard keeping cheeses such as
parmesan or myzithra.

Salting
Salting is the best way to preserve meat for long storage. Ham, salt pork, and corned
beef, are all salted meat products that will keep well.
Many kinds of fish are also salted for storage, particularly oily fish such as salmon
(gravlaks, lox), herring, sardines, and anchovies. The Romans used whatever fish they
could find, combined in barrels with salt and left in the sun to produce the infamous
“garum” or Roman fish sauce⁶, which is quite similar to South East Asian fish sauces still
produced today.

Pickling
Pickling involves preserving food in a liquid using acid, salt and acid. Many traditional
pickling techniques rely on lactic acid fermentation, which involves using lactobacilli
bacterium to produce lactic acid. Sauerkraut, some kinds of pickled herring, and Korean
kimchi are all examples of fermented pickles.
Pickles can be made using just salt and water (and lactobacilli), or salt and acid in the form
of vinegar. Most modern cucumber pickles are made using salt and vinegar rather than
true fermentation, but in period, lactic acid fermentation was probably more common.
Other foods commonly pickled in vinegar are eggs, mushrooms, and apples.
Fermented pickles include many forms of pickled cabbage (sauerkraut, kimchi), and many
kinds of pickled fish, such as surstromming, a Swedish dish of fermented herring reputed
to smell truly terrible; apparently an acquired taste.
Potting
Another method of preserving food involves preventing bacteria from growing by excluding air. In modern times this is done using canning, but in period it was done by “potting”.
Potting involves preparing food, then covering it with something that will keep the air out, such as oil, butter, or honey.
Balls of soft cheese (a favorite of the Romans), mushrooms, olives, sundried tomatoes, and artichoke hearts are all commonly preserved in oil.
Another technique popular in Western Europe in the middle ages was to put cooked meat into a strong pie crust or “cofynn” and filling the remainder of the crust with melted butter or lard. This seals out the air, and will keep the meat from spoiling (though not indefinitely) and the hard crust keeps the contents safe until they can be eaten.

Other
Smoking is another method used to preserve foods for storage. Smoking not only hastens the drying of food, but also cooks it, and many of the chemicals produced by smoking inhibit both the growth of bacteria and the oxidation of fat. Many oil fish must be smoked before being dried, and pork products such as bacon and smoked ham also benefit from smoking as they tend to be fatty.

Preparing
Many foods must undergo intermediate processing steps before they are eaten. Some of these processes have changed but little over time, while others have changed radically.

Grain
Arguably no other changes in food processing have affected the average person as greatly as changes in grain processing. In the earliest times, grain was threshed by beating in against a rock, then burnt to remove the husks, then ground on a saddle quern. A saddle quern is a saddle shaped piece of stone on which grain is placed, and then rubbed with another piece of stone shaped like a tube, much like you would roll dough with a rolling pin. It is back-breaking work, and takes a great deal of effort for minimal returns.
By the Viking Age, people in Europe were using the rotary quern, which consists of two circular, flat stones, one placed atop the other. A whole is drilled in the upper stone, though which grain is poured. The top stone is then turned in circles, usually by means of an attached wooden handle, and flour falls out the sides as the upper stone is turned.
While a rotary quern is much more efficient and less difficult to use than the older saddle quern, yields are still low. In either case, the work of grinding grain was done by a member of the household, probably a slave or a younger girl.
In the middle ages, grain grinding was mechanized in a number of different ways. Mill stones became much bigger and heavier, although the basic principle is the same as that of the rotary quern. Power to turn the upper millstone was provided by either draft animals walking in a circle, or later by windmills or water wheels.
The advent of the mill, and of professional millers, had a profound affect on everyday life, and gave rise to a major change in people’s diets. It now became practical for common

Copyright© Patrick Cauldwell 2003. Not to be reproduced without permission.
people to become much more dependent on bread as their staple food, since flour was much cheaper and required much less time on the part of the eater.

**Dairy**

There are a number of different ways to processes milk-based foods, including cooking, culturing, and churning. However, most of this technology probably didn’t change very much during period. Butter churns didn’t really change significantly until modern times, cheese production changed very little, except possibly with the introduction of the cheese press, and yogurt production hasn’t changed in a thousand years.

**Wild foods**

There is a whole category of what we now tend to refer to as “wild foods” which in period really meant “things you probably wouldn’t eat unless you were really, really hungry.”

One of the big reasons many of these foods are often overlooked on a day to day basis is the amount of specialized processing that they require. Today, foods such as fiddle head ferns, stinging nettles, and other “wild foods” are considered delicacies, but in period they were more than likely starvation food. Ferns must be treated with ashes and/or soda before they can be eaten, and nettles must be carefully washed and rinsed after cooking before they are safe to eat. None the less, nettles were a popular Viking Age Scandinavian food source. Acorns are another good example. Acorns were eaten in Europe, but probably not if there was anything else to eat.

**Weird foods (or, how to eat things your probably shouldn’t)**

If people get really hungry, they are likely to eat things that they probably weren’t meant to. Some of the most amazing examples come from Vikings living in Iceland and Greenland. Neither place was known for its great abundance of food, since resources are scarce, and life there was probably pretty hard. One of the favorite foods in Iceland in period (and still today) is sour milk, sometimes curdled into the sour custard like “skyr”. The frugal Vikings of Iceland discovered that if you took the bones leftover from codfish (including the heads) and soaked then in sour milk long enough, they became soft enough to eat.

Another traditional dish is fermented shark, eaten in both Iceland and Greenland. The meat of the Greenland shark contains cyanide, and is poisonous unless cured first. The dead sharks are buried in the ground near the shore, and left to ferment. Bacteria break down or alter the cyanide so that the meat is not toxic, but it comes out more like soft cheese than any kind of meat we are familiar with.

**Cooking and cookware**

**Roasting**

Roasting hasn’t really changed since it was invented by the cavemen. Meat or vegetables are rammed onto a stick, and then held over a fire. The only major improvement was the shift from wooden to metal sticks, and the formalization of fire dogs, so that you don’t have to actively hold the stick.

Copyright© Patrick Cauldwell 2003. Not to be reproduced without permission.
Boiling
Boiling techniques have changed over time. In earliest times, water would have been boiled by putting water and hot stones into a skin or leather back until you add enough stones to make the water boil. Later, the leather bag became a clay pot, which eventually was well enough fired to be placed directly in the fire. For large pieces of meat, however, the old stone method prevailed until the advent of the metal cauldron. As late as the migration era, the best method of cooking a large joint of meat was to wrap it in straw and drop it into a whole in the ground filled with water (and possibly lined with wood to keep out the dirt). The hot stones then go into the water until your whole in the ground starts to boil. With the advent of the metal cauldron, pit boiling was abandoned in favor of the less dirty method of boiling in an iron pot.

Baking
Baking also hasn’t changed much, although from region to region some different techniques were used depending on the materials and the resources available. Clay or stone ovens were in use in Ancient Egypt, and persisted mostly unchanged until the industrial revolution. However, in some areas other methods were used as well. In Viking Scandinavia, bread was often baked on a flat “griddle” on the end of a long wooden handle. We can imagine that such bread probably more closely resembled a pancake or johnny cake than a “loaf” as we think of them now. Also popular in Scandinavia, and still in use in Finland today, is baking on a hot stone. The Finns use a large flat stone set next to the hearth. Large flat breads, like crackers, are baked on the stone until they are hard, then tilted up, with the unbaked side turned toward the fire, until they are completely dry.

Conclusion
With a few notable exceptions, namely grain grinding and boiling techniques, food processing techniques didn’t change all that much during our period of study (if we stick to the strict interpretation as 600-1625). Possibly of greater influence were changes in social structure and trade that had a profound influence on the ways in which people processed food in specific regions. Most of the radical changes in food processing happened after our period, in fact, only comparatively recently. Techniques such as freezing, canning, and freeze drying all can into play within the last 200 years, and had a much more radical effect on how and what we eat than anything that happened in the 1500 years or so before that.

Bibliography
Devi, Yamuna The Art of Indian Vegetarian Cooking (New York: Bala Books, 1987)
Grant, Mark Roman Cookery (London: Serif, 1999)
Hansson, Ann-Marie On Plant Food in the Scandinavian Peninsula in Early Medieval Times (Stockholm: Stockholm University, 1997)

Copyright© Patrick Cauldwell 2003. Not to be reproduced without permission.
Kurlansky, Mark *Cod: a biography of the fish that changed the world* (New York: Penguin Books, 1997)
There is a possibility that mechanized mills were in use by the late Roman times, but that is in dispute. See http://www.waterhistory.org/histories/barbegal/barbegal.pdf.