

Did You Know? – History of Food Preservation

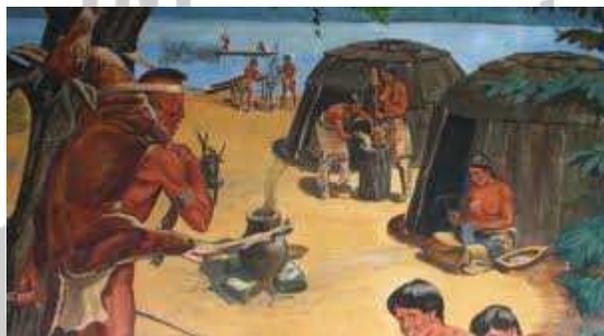
*“If you want to understand today,
you have to search yesterday.”*

Pearl Buck

I love history, it is chock full of information and gives many insights into how and why we do things the way we do. Take food preservation. Today we have a multitude of methods, most of which are new technology based techniques of eons ago to make them quick and easy.



According to Brian A. Nummer, Ph.D. of the National Center for Home Food Preservation; *“food preservation has permeated every culture at nearly every moment in time”* and in order for ancient man to survive he had to conquer nature and that included having food when and where we needed it. In the frozen climates humans froze the fish and seal meat on the ice; In the tropics humans dried foods in the sun.



We probably learned by accident what worked and what didn't or what nourished and what poisoned. Then using oral and by example, we taught the next generation what we learned. As human's matured and collective knowledge grew we devised other ways to pass information along to the next generation from wampum belts, drawings on animal hides and cliffs to symbolic writing to mechanical printing and movies.



Food by its nature begins to spoil the moment it is harvested. The accumulative knowledge of humans helped our ancestors to make roots, stay and live in one place and form communities. We no longer had to consume the kill or eat

History of Food Preservation - continued

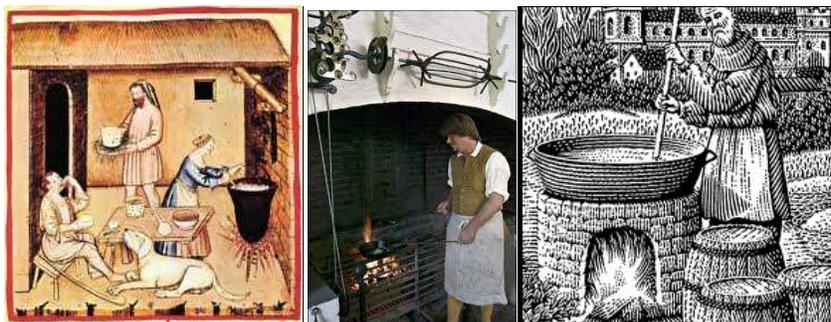
the harvest immediately but could save it for later use. Various methods to preserve food were dictated by environmental regions and relied on what nature could do to assist. Ancient humans were smart enough to see this, learn from it, take advantage of it and pass the knowledge on.



Some preserved foods probably became cultural, religious and or ceremonial “traditions” and not just for sustenance. Today more and more humans live in cities and procure foods commercially. We have been removed from the rural self-sufficient way and knowledge of life. Humans have shifted from preserving food because we have to, to the commercially preserved foods because we can. Since gardens seem to be almost everywhere, even in small city apartments, I have often wondered if some instinctual knowledge keeps us tied to plants and things that grow and if this is why we still have the passed on skills of preserving foods the old fashioned way.



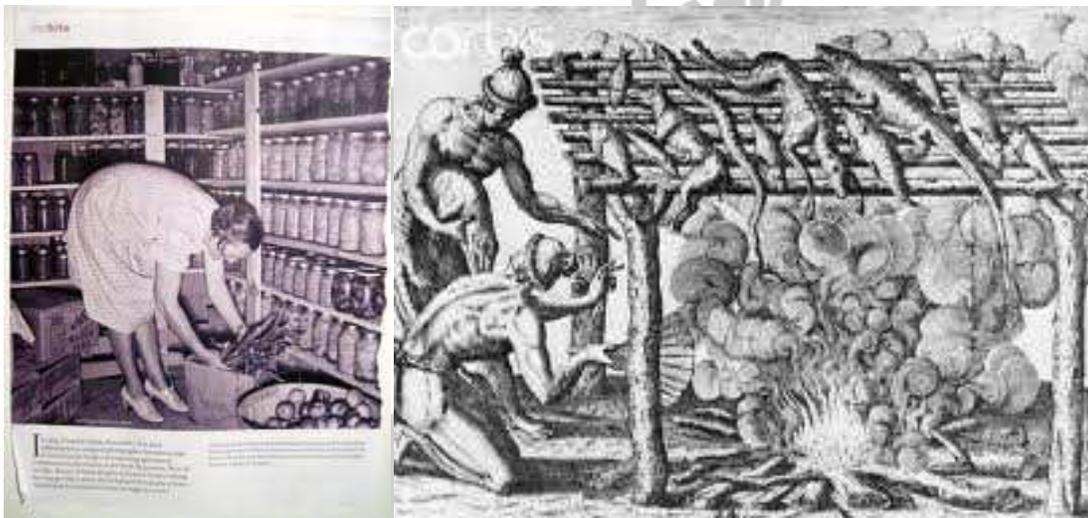
The earliest technique of food preparation or preservation was probably **cooking**, which not only extended the range of edible matter but also increased the usable lifetime of the food item itself.



The multitude of traditional preservation techniques can be classified into the categories of chemical treatments, biological processes and the use of physical barriers.



- Chemical treatments include salting, smoking, and adding sugar, vinegar, or saltpeter, together with drying.
- Biological processes include fermentation or related techniques (used in making beer, wine, cheese, butter, yogurt, sauerkraut, and other products), and application of spices, many of which not only disguise spoilage but actually retard it.
- Physical barriers include storage of the food in oil, fat, wax, brine, or vinegar, or in a tightly sealed pot.
- Another effective technique, used since time immemorial (and not just by humans), is burial in soil. Food kept cool in a cellar, well, or stream lasts longer as well.



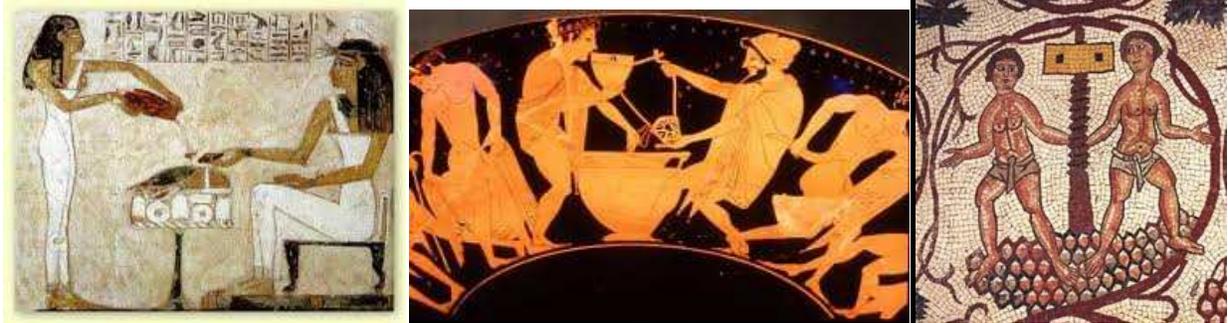
Some preservation techniques have become so intimately connected with culinary arts that their former purposes have been concealed by the latter.



- The sharpest (and most actively antibacterial) spices have been used preferentially in warm climates from earliest times.
- Bacon and ham are still consumed with their smoky, salty, nitrated flavors, independent of any fear of spoilage.
- Did you know that carbonation was introduced into soft drinks principally for its preservative action on the sweet syrup that otherwise would rapidly sour or ferment?
- Yeast, alcohol, carbonation and flavorings such as hops preserve the sweet solution of malted grain that becomes beer.

History of Food Preservation - continued

- Even bread making can be considered a technique that extends the palatable lifetime of the grain pastes and porridges consumed in most traditional cultures.



Industrialization offered both new opportunities and new requirements for food technologies.



- On the one hand, the greater efficiency of food distribution offered some insurance against the cycles of feast and famine that characterize traditional agricultural societies.
- On the other hand, urbanization and faster means of transportation also meant that distances between the producers and consumers of foodstuffs gradually increased; foods had to survive the trip, as well as subsequent temporary storage in food shops.



In 1810, the French confectioner Nicolas Appert published a technique for sealing heated food in containers; his glass jars, soon replaced by handmade tinned-steel canisters, started the canning industry.

In 1869 Appert's countryman Hippolyte Mège Mouriès developed a manufacturing process for a butter substitute with good keeping properties, made from animal products and named "margarine."

Both Appert and Mège Mouriès knew of the French army's interest in such inventions; Napoleon I promoted canning and Napoleon III margarine, explicitly for military purposes.

History of Food Preservation - continued



In the mid-nineteenth century, efforts to maximize profits from the large-scale agriculture of the Americas exercised the ingenuity of inventors.

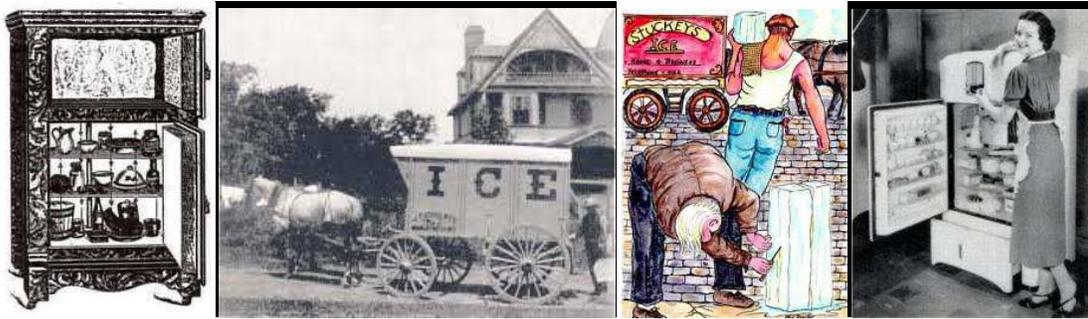


- Salt pork and whisky were regarded as complementary methods of “concentrating” the food value of American grain in a stably preserved fashion.
- The Texas dairyman Gail Borden developed techniques to prepare evaporated and sweetened condensed milk, and then (in the 1850s) a powdered skimmed milk that could keep almost indefinitely.
- The German chemist and entrepreneur Justus von Liebig invented a process for “extract of beef” that was industrialized in cities neighboring the Argentinian pampas.
- Meat packers in Cincinnati and later Chicago developed efficient methods to butcher hogs and then cattle by a sort of mass-production *dis*-assembly line.
- The huge yields of grain from the Great Plains increased still further under an aggressively inventive mechanization of plowing, planting, and harvesting and newly industrialized milling and distribution networks.
- Roller milling of wheat and bleaching of flour dramatically lowered the price of white bread, which not only had higher status but also better keeping properties than whole-wheat bread.



The Union army in the American Civil War exploited all of these advances in food technology. After the war, accelerating urbanization and industrialization and the spread of railroads and steamboats, promoted the same advances throughout the world.

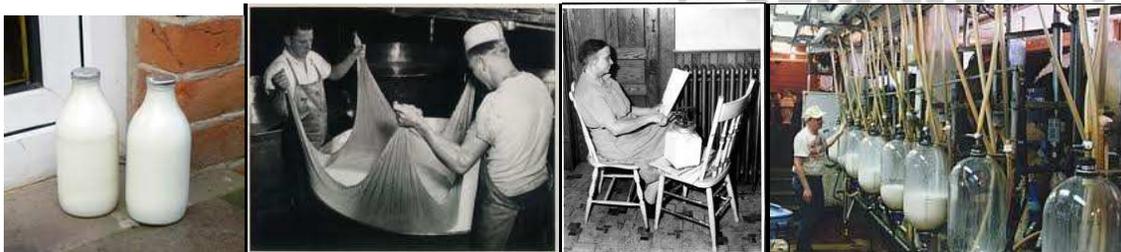
Refrigeration, first by use of natural ice and after about 1880 also by mechanical means, provided a means to expand further the distribution of fresh foodstuffs.



Food processors also increased their use of chemical additives, now supplied by a chemical industry developing rapidly in Europe.

Sulfites, borax, salicylic and benzoic acids all found application in nineteenth-century processing, increasingly from about 1870. Some of these chemical preservatives were suspected of being hazardous to human health. A controversy erupted over “embalmed meat” during the Spanish-American War—the highly poisonous formaldehyde had been used to stabilize military rations—and gave impetus to the movement to regulate additives and food adulteration.

The bacteriology of Louis Pasteur and others provided a rational basis for understanding food spoilage, previously dealt with on an empirical basis. It was now understood that most decay processes involved the action of microorganisms and that both traditional and later chemical techniques of preservation either destroyed these organisms or inhibited their growth. Pasteur's studies led to the heat treatment known as pasteurization, applied as early as the 1860s to beer and wine and by the turn of the century to milk as well.



Food can be preserved by low temperatures. There was a thriving frozen meat trade in the nineteenth century, but mass marketing of a broad range of frozen food awaited the innovations of Clarence Birdseye, who developed a quick-freezing system in the 1920s.



After home refrigerators became common in the following decade, consumers eagerly embraced frozen foods. Not all preservation techniques have been successful, however.

Gamma-ray irradiation of foods using radioactive sources, introduced in the 1960s, has never enjoyed commercial success. The procedure kills microorganisms that cause decay, but consumers associate the process with dangers of radioactivity.

The food processing and additives industries expanded explosively after World War II, partly owing to wartime innovations and partly as the result of commercial and social developments.

Processed foods—TV dinners, frozen vegetables, ready-to-eat products and other “convenience foods”—became increasingly popular; many of these required the heavy use of chemical additives and other processing techniques.



Large corporations mass marketed much of the world's food supply in the second half of the century.

Many consumers live in environments in which automobiles, suburban communities, supermarkets, home refrigerators and freezers and personal habits (of weekly rather than daily food shopping, for example) indirectly dictate the sort of foods required. The food processing industry has become an integral part of these patterns.

All of this inventiveness has led us away from the basic, tried and true, methods of food preservation. Add to this the social/economic trials of civilizations today and many of us are returning to these more traditional methods of not only obtaining food stuffs but preserving them as well.

Types of Food Preservation

The drying of foods is seen in the Middle East and oriental cultures that were actively using dried foods as early as 12,000 B.C. in their hot, dry environments. As time passed each culture left a myriad of other evidence of their methods and materials as well as their food supplies of the time; usually fish, wild game, domestic animals and the like.



Herbs, fruits and vegetables were dried from the early Romans to the Middle Ages where peoples purposely built “still houses” for the drying of foods in areas where they did not have enough strong sunlight for drying. A fire was used in these houses to create the heat they needed to dry the foods and in some cases smoking them.

Freezing caught on real quick in the northernmost cold climates or areas that had freezing temperatures for at least part of the year. History shows us that in less than freezing temperatures people prolonged stored food items in caves and cool streams and the invention of the root cellar or cold room.

As technology advanced United States estates often had icehouses built to store food on ice, as well as the ice. These turned into the icebox and in the 1800's mechanical refrigeration was invented.

History of Food Preservation - continued

- In the late 1800s Clarence Birdseye discovered that quick freezing at very low temperatures made for better tasting meats and vegetables and once he perfected his quick freeze process he virtually revolutionized the frozen food industry.

Like many inventions, **fermentation** was discovered by accident. History shows that people used their skill to observe, harness and encourage fermentations that resulted in food and drink items. So much so that some anthropologists believe that humans went from nomadic peoples and settled down once they discovered farmers who grew barley to make beer. Beer making can roughly be traced back to 10,000 B.C. and was nutritious as well as the euphoria of the alcohol. The various microorganisms responsible for fermentations can produce vitamins as they ferment producing a more nutritious end product.



Pickling was probably “discovered” when food was placed in wine or beer to preserve it. The low pH and the taste of the food in the wine and beer once it soured was found to be rather appealing. Pickling is preserving foods in vinegar or other similar acid. Vinegar is produced from starches or sugars fermented first to alcohol and then when it oxidized or went sour by certain bacteria into an acetic acid. Wines, beers and ciders are routinely transformed into vinegars.



Our early ancestors used earthen, stoneware or glass pots for this. Metal was quickly discarded as a storage medium since the acid of the vinegar would dissolve the metal. Romans made a concentrated fish pickle sauce called garum. This was powerful stuff having a lot of fish taste to just a few drops.



The sixteenth century saw a great increase in food preservation as new foods entered Europe. Ketchup was an Oriental fish brine that traveled the spice route to Europe and on to America. It was here in the United States that someone finally added sugar to it to make the ketchup we know today.



People are inventive and soon started to add various spices to the pickling sauces and recipes. Resulting in chutneys, relishes, piccalillis, mustards and ketchups became common place.

- Worcester sauce was an accident from a forgotten barrel of special relish that was found in the basement of Lea and Perrins Chemist shop after aging for many years.

The earliest **curing** was a form of dehydration. Early peoples used salt to help desiccate foods as salting was common and considered culinary by choosing raw salts from different sources (rock salt, sea salt, spiced salt, etc). In the 1800s people “discovered” that certain sources of salt gave meat a red color instead of the usual grey. Even then consumers preferred the red colored meat to grey. When salt is used on meat they were the nitrites or saltpeter. In the 1920s the science of microbiology realized that nitrites inhibited Clostridium botulinum organism.



During Medieval times when it was not economical to keep and feed animals during the winter, the animals were slaughtered in the autumn and then preserved or cured with salt. There were two methods for salt preservation of meats; Dry-salting where the meat or fish is buried in salt and Brine-curing where the meat was soaked in salt water. Because this made everything taste of salt various methods to disguise this taste were developed with spices from the Orient. The most common of these spices included Pepper, Cinnamon, Cloves, Nutmeg, Ginger, Saffron, Cardamom, Coriander, Cumin, Garlic, Turmeric, Mace, Anise, Caraway and Mustard.



Food was also served with a variety of sauces which also disguised the salt taste. Salted meats and fish were generally rinsed in several changes of liquid before they were added to a dish and served.

Jam and Jelly with the use of honey or sugar and Gelatine for preservation was well known and common to the earliest cultures. Jelly or gelatine was used for preserving cooked meat or fresh fish.

Food may be preserved by cooking in a material, such as gelatine, that solidifies to form a gel. Some foods naturally form a protein gel when cooked such as eels. Ancient Greece mixed quince with honey, dried somewhat and packed tightly into jars. The Romans improved on this method by cooking the quince and honey producing a solid texture. Fruits & nuts could be **candied** with sugar or honey in order to prolong their life.



The same trading between India and the Orient which brought pickled foods to Europe also brought the sugar cane. Northern climates that did not have enough sunlight to dry fruits, learned to make preserves – the heating of fruit with sugar and jams and jellies were born.

One of the newer methods of food preservation is **canning**, which is the process of foods placed in jars or cans and then heated to a temperature that destroys the bad microorganisms and inactivates enzymes. This heating and subsequent cooling forms a vacuum seal which prevents other microorganisms from re-contaminating the food within the jar or can as long as the seal lasts.



French confectioner, Nicolas Appert discovered that the application of heat to food in sealed glass bottles preserved the food from deterioration. He theorized “if it works for wine, why not other foods?”

Appert thought that the exclusion of air was responsible for the preservations. Somewhere around 1806 Appert’s principles were successfully trialed by the French Navy on foods from meat, vegetables, fruit and even milk. In 1810 Englishman, Peter Durand used this method with tin cans.

In 1864 Louis Pasteur discovered the relationship between microorganisms, food spoilage and the resulting illnesses. Just prior to this discovery by Pasteur, Raymond Chevalier-Appert patented the pressure retort or canner in 1851 to can at temperatures higher than 212F. Yet it still took until the 1920s to completely understand the cause and effect relationship between the temperatures, air tightness and Clostridium botulinum prevention.

History of Food Preservation - continued

In 1800 Napoleon offered a prize for food preparation and awarded the prize in 1810 for Vacuum Packing. Initially peas in champagne bottles were used as they were the only items that could fit in the existing champagne small mouthed glass bottles that were both airtight and strong enough to handle the process.

Wide mouthed glass jars soon replaced the bottles in commercial canneries, followed by cylindrical tin or wrought-iron canisters or cans as we now call them.

The basic process of **freeze-drying** food was known to the ancient Peruvian Incas of the Andes. Freeze-drying, or lyophilization, is the sublimation/removal of water content from frozen food. The dehydration occurs under a vacuum, with the plant/animal product solidly frozen during the process. Shrinkage is eliminated or minimized, and a near-perfect preservation results.



Freeze-dried food lasts longer than other preserved food and is very light, which makes it perfect for space travel. The Incas stored their potatoes and other food crops on the mountain heights above Machu Picchu. The cold mountain temperatures froze the food and the water inside slowly vaporized under the low air pressure of the high altitudes.



Freeze Drying in the Andes

During World War II, the freeze-dried process was developed commercially when it was used to preserve blood plasma and penicillin. Freeze-drying requires the use of a special machine called a freeze-dryer, which has a large chamber for freezing and a vacuum pump for removing moisture. Over 400 different types of freeze-dried foods have been commercially produced since the 1960s. Freeze-dried coffee was first produced in 1938 and led to the development of powdered food products. Freeze-dried coffee is the best-known freeze-dried product along with MREs (Meals Ready to Eat) which replaced the military canned rations (C Ration) in the early 1980s.

Two bad candidates for freeze-drying are lettuce and watermelon because they have too high a water content and freeze-dry poorly.



The Time Is Now

Ok, now you have the whys and wherefores of food preservation. As a homesteader in tough times you have an idea of which processes you can use for your own food storage situation. You also have the knowledge and confidence that these processes have passed the tests of time.

To learn more, select a process that you are unfamiliar with to try out every other month or so, starting with small batches of food product.

There are many books and resources on the internet on the best practices and recipes for each of these processes.

Talk to a relative, friend or neighbor who knows how to do a process you do not.

Throw a canning or pickling party where the most experienced person in your group teaches the rest of you how to perform the process.

Dehydrate or jerk some meat or dry some of your herbs and spices.



Yes Virginia, learning can be fun as well as functional!

TNT a 50 Something Prepper.