



## The History of Food Canning

### **1790s Frenchman Nicolas Appert pioneered the process of food canning**

The canning process dates back to the late 18th century in France when the Emperor Napoleon Bonaparte, concerned about keeping his armies fed, offered a cash prize to whoever could develop a reliable method of food preservation. French confectioner, Nicolas Appert, discovered that the application of heat to food in sealed glass bottles preserved the food from deterioration like wine. After 15 years of experimentation, he realized if food is sufficiently heated and sealed in an airtight container, it will not spoil.

In about 1806 Appert's principles were successfully trialed by the French Navy on a wide range of foods including meat, vegetables, fruit and even milk.



### **Whence It Came: The History of Food Canning**

An Englishman, Peter Durand, took the process one step further and developed a method of sealing food into unbreakable tin containers, which was perfected by Bryan Dorkin and John Hall, who set up the first commercial canning factory in England in 1813. They had the advantage over glass bottles of being lighter, easier to seal and less prone to damage during transportation and storage - and so the food can was born. The iron was coated with a fine layer of tin to stop it from rusting.



*Can of roast veal taken on Parry's voyage to the Arctic in 1824.*

Parry's tin of roasted veal contained instructions to open the can - "Cut round on the top near to the outer edge with a chisel and hammer".\*

No one knew at first why Nicolas Appert's process preserved food, but it meant that soldiers fighting a long way from home could be fed properly and that sailors too could have a healthier diet on long voyages. More than 50 years later, Louis Pasteur provided the explanation for canning's effectiveness when he was able to demonstrate that the growth of microorganisms is the cause of food spoilage.

Canned foods were greatly favoured by early explorers. Beginning in 1814 canned foods were sent to distant British colonies.



*19th century can of soup c.1856.*

Cans continued to be used mainly by the army and navy until the 1920s. The first cans were expensive, because they were made by hand and a good tinsmith could only manufacture 6-10 a day. They were large, heavy and a hammer and chisel were needed to open them! But in spite of these drawbacks, their convenience was invaluable and unprecedented.

Gradually, the production of cans became mechanised. A machine was developed to stamp out the can bodies, then to solder the can ends. It was discovered that if the food was heated under pressure, the heating and cooling times necessary became significantly shorter. This improved the flavour, texture and nutritional value of the food. After the 1920s, canned food lost its military image and became fully accepted as part of the national diet. The industry continued steadily to progress and increase in efficiency.

The first automated production lines produced around 6 cans an hour. Today's sophisticated production lines can produce in excess of 1,500 cans a minute.

The development of cans continues today. Research has led to the production of cans in all sorts of different shapes and sizes, cans with different coatings, cans with ring-pull easy-open-ends which don't require a tin opener, self-heating cans, and so on. Today cans weigh less, take fewer raw materials to produce, but are stronger and safer than ever. The processing of food in cans also continues to develop. The food and canning industries continually experiment with new recipes and a new process, called aseptic canning, has recently led to the canning of custard, ice cream and savoury dips.



Food canning is a long established and well-understood technique, which has served consumers well for nearly 200 years. It produces shelf stable products that can be stored at ambient temperatures.

Did you know that canned food is packed full of nutrition? In most instances, canned food is equally or even more nutritious than its fresh and frozen counterparts. Plus it's available year-round so it can easily be added to your favourite recipes for a convenient meal solution.

### **The Natural Option: Contemporary Canning**

The basic principles of canning have not changed dramatically since Nicholas Appert and Peter Durand developed the process. Heat sufficient to destroy microorganisms is applied to foods packed into sealed, or "airtight" containers. The canned foods are then heated under steam pressure at temperatures of 240-250°F (116-121°C). The amount of time needed for processing is different for each food, depending on the food's acidity, density and ability to transfer heat. For example, tomatoes require less time than green beans, while corn and beef require far more time.

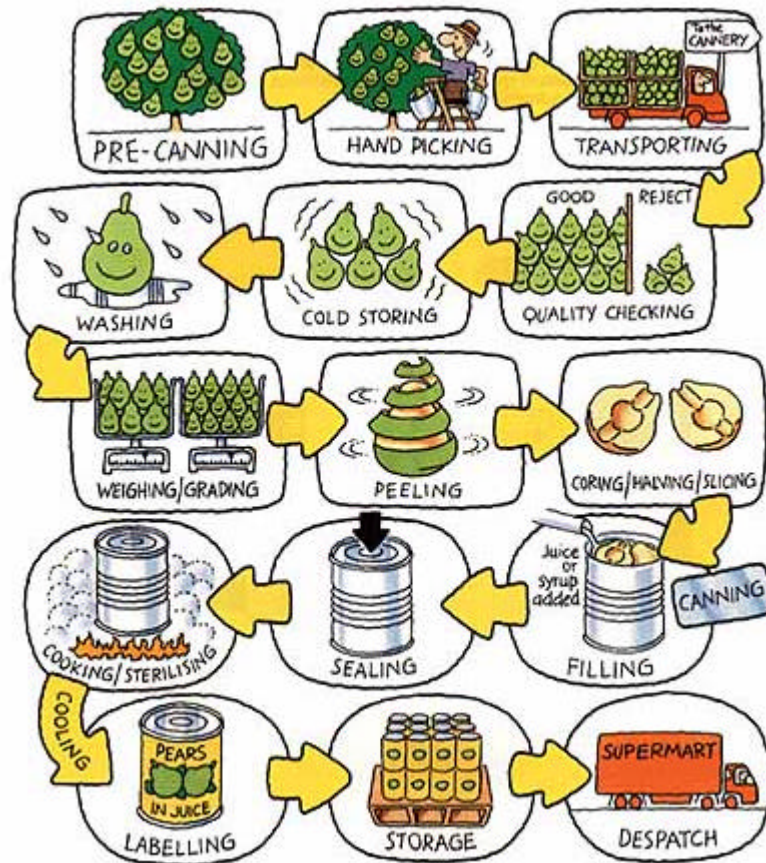
One significant difference in the modern canning process is that today's cans are made of 100% recyclable steel.

The processing is rapid and highly mechanised.

Produce is harvested at its optimum maturity and nutritive value. While some fruits and vegetables are hand picked much produce, including peas and tomatoes, is mechanically harvested. All produce is then carefully inspected for quality at the food canning plants.

The product is prepared with minimal, careful handling. Computer controls increase efficiency and product quality.

Various stages include:



In the aseptic canning process, food is cooked in sterile conditions outside, rather than inside, the can, at up to 150 degrees centigrade for seconds only. The can is then filled and closed in a sterile environment. Shorter cooking times make the food crisper and help it retain more natural flavour, vitamins and minerals than ever before.

### Soups and complete meals canning

A wide range of soups and snacks and prepared meals are canned. Canned soup preparation is similar to preparing homemade soup. Meat is cooked in water and stock and vegetables are added along with herbs, spices and flavouring. The soup may be thickened with starch or flour.

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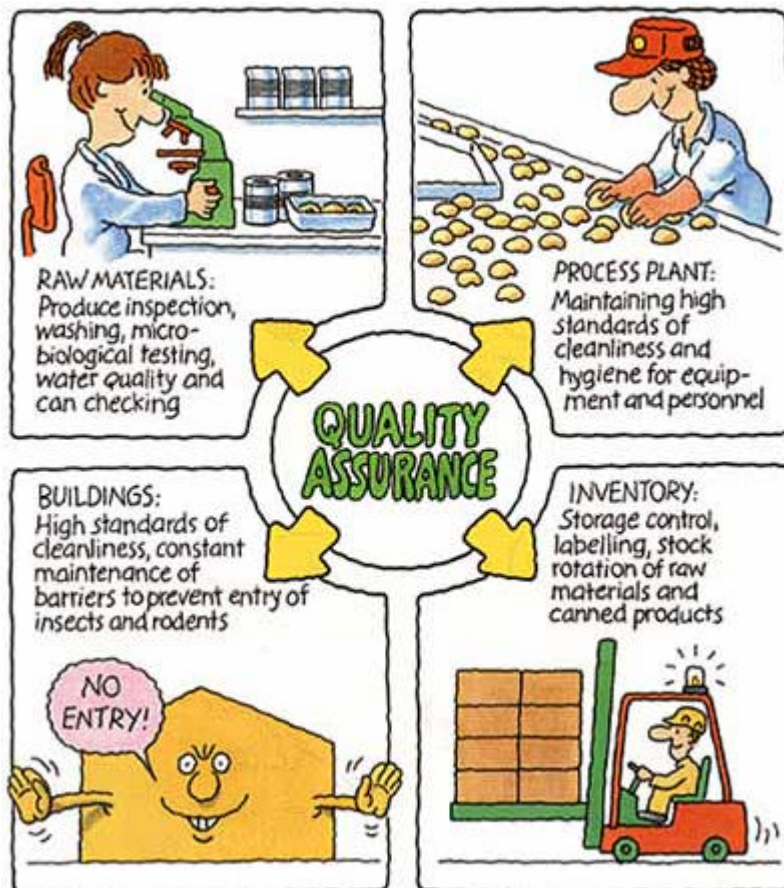


# Quality assurance & food canning safety

No chemical preservatives are needed in the food canning process

What makes food canning so safe?

The simplicity of the canning process and the thoroughness of the heat sterilising process mean that incidences of inadequate processing are extremely rare in the production of a billions of cans of food a year for human consumption.



## **Canned Food Nutrition**

Because canned food is packed at the peak of harvest, it also is packed at its nutrient peak. As foods age, they begin to shed some of their essential nutrients. Fruits and vegetables especially have the highest nutrient content when they are ripest. The canning process actually may help to enhance the nutrient profile of certain foods. Other foods like canned beans have higher fibre content, and canned tomatoes contain significantly higher quantities of lycopene, an essential phytochemical, than fresh tomatoes.

## **Safety Benefits**

The canning process was developed to preserve food safely and for long periods of time. Once a food is packed into a can, the can is heated to a temperature extreme which kills all known microorganisms. In addition, most processed foods are closely monitored, using a system called Hazard Analysis and Critical Control Point, or HACCP. A HACCP system identifies areas of potential contamination within the food process and builds checkpoints to ensure that the highest possible safety standards are maintained at all times. Modern processors maintain close watch on the heating process, ensuring that the canned food that reaches the market is the safest possible product for the consumer.

## **Available Canned Foods**

Virtually any food that is harvested or processed can be found in a can. In fact, for decades, many foods were only available in cans. Today, the consumer has more options and can often find fresh and frozen alternatives to canned food, but canned food remains an essential part of the contemporary pantry.

## **Fascinating Facts**

**Baked beans were created especially for the can. When first introduced to Britain from the USA, at the turn of the century, they were a luxury item costing the equivalent of £1.50 a can in today's money! Today in Britain, nearly 200 billion baked beans are eaten each year, amounting to over 3,000 beans for each man, woman and child. In 1939 a can of roast veal and gravy dating from 1824 was opened by scientists and found to be still wholesome and nutritious.**

## NEW DISCOVERIES REVOLUTIONIZE FOOD PRESERVATION

Early in the 19th century, the process of hermetically sealed cooked food was developed in France. By 1809, the Frenchman François (Nicolas) Appert had the background to solve the problem, having been a pickler, an expert confectioner, a brewer, a distiller, and a chef. In 1810, Appert established the principles for the preservation of certain foods in hermetically sealed glass containers, which he himself designed for the procedure.

### FOOD IN A TIN CAN

Also in 1810, the Englishman Peter Durand patented the idea of airtight tin-plated iron cans, instead of glass jars, for food preservation. Cooked meat, fruit, and vegetables could now be hermetically sealed in tin containers. The first tin cans were patented in the United States in 1825, but it was not until around 1839 that tin cans were widespread in the United States, and about 10 years later were being mass produced.

### THE MASON JAR

Although hundreds of men and women obtained patents for fruit jars, probably the most well known in the industry has been the Mason jar. Many independent manufacturers included the name Mason with their logos on some jars. It became a common term for the fruit jar. The field of food microbiology made important breakthroughs by the mid-19th century. Previous jar sealing methods included waxed paper, leather, or skin, followed by cork stoppers and wax sealers. The breakthrough came with the development of the zinc cap for the shoulder-seal jar.

In 1858, John Landis Mason developed and patented a shoulder-seal jar with a zinc screw cap. The "Mason jar" had a threaded neck which fit with the threads in a metal cap to screw down to the shoulder of the jar and in this way form a seal. In 1869, a top seal above the threads and under a glass lid was introduced to the jar.

Home canning was not always that heavy-duty summer-time activity we visualize when we think of women's work in the past. Preserving? Yes, surely, but not canning. Foods were indeed put up in ceramic crocks—everything from meat (French confit or its English counterpart potted duck) to vinegared and salted vegetables. And those who could afford the sugar did some jellifying and candying. One prevented spoilage by use of salt, sugar,



vinegar and spices that did a marginal job of preventing spoilage-bacteria. In the case of potted meats, baked morsels were shielded from the contaminating air by complete immersion in melted fat and a tied-on cloth or leather covering. But this was not canning.

Familiar forms of canning jars were then called glass cans or fruit jars, probably because fruits were canned most often, and because the whole process was an extension of earlier preservation in heavy sugars. By the 1880s, American women, taking advantage of the lowering cost of sugar and the back-saving woodstove, had launched the annual summer routine of putting up the wealth of orchard fruit, along with garden vegetables and even meats.

Mrs. Rorer, in *Canning and Preserving* (1887) recommended regular inspection of the jars for bubbling—a sure sign of trouble—and immediate opening, in such cases, to prevent bursting. The terminal hot water bath—a final processing of the cooked and sealed jars which killed off any contaminants—was not to be instituted for several years to come.

During the 1960s and 1970s young women immersed in the back-to-the-land movement rediscovered home canning, now facing a serious competitor in quantity freezing. I would guess that the next generations of women are far too busy working out of the home, and are, in many cases, far too removed from domesticity to find home canning either interesting or a valuable use of time.

In 1884, the renamed Ball Brothers Glass Manufacturing Company began manufacturing yet another new product - the home canning jar, which would one day make Ball a household name. Our company is still probably best known by the public for its home canning jars, which we no longer make. In 1887, the five [Ball brothers](#) - Edmund, Frank, George, Lucius and William -

moved their business to Muncie, Indiana, to take advantage of a natural gas boom in the Midwest. Great quantities of natural gas were necessary to make glass. Ball acquired the first of several small glass companies in 1898, and printed the first Ball Blue Book - featuring home canning recipes and techniques - in 1909.

In 1810, Appert published his discovery in a book entitled *L'Arte de Conserver les Substances Animales et Vegetables*.



Despite a great need, however, home canning didn't become commonplace until the latter half of the nineteenth century. Until someone invented better containers, fifty years later, around the time of the civil war, homemakers used crude glass and earthenware vessels sealed with corks, plugs or parchment. This method didn't work well, but it was better than the alternative of the time -- using tin cans and soldering them closed!

The term fruit jar may predate the invention of what we know today as the modern mason or canning jar. Colonial bottle maker **Thomas Dyott** is credited with coining the term - possibly referring to the vessels sealed with corks and parchment mentioned above.

In 1861, **Louis Pasteur** wrote that microorganisms in un-sterilized food were responsible for food spoilage. Up until this time, even though people boiled the vessels in which they canned their food, few understood why it worked. The common belief was that air caused spoilage and hermetic sealing of food and removal of air from vessels prevented spoilage.

However, once Pasteur's discovery was understood, scientists, manufacturers and food preparers began developing more reliable means of food preservation by sterilizing the food as well as the container.

### ***THE INVENTORS***

In 1855, pioneer **Robert Arthur** had an idea for a better vessel in which to preserve food. Originally produced in metal, his patent called for a wax, (commonly called cement,) which the manufacturer poured around the mouth of the container. All the food preparer had to do was heat the lid and

The companies that produced the Mason jar between 1859 and 1910 are too numerous to mention.

### ***OTHER POPULAR 19TH CENTURY CLOSURES***



Dating back to the time of the civil war, (patents related to this jar date from 1861,) manufacturers used a "thumb screw clamp" and glass-lid design on several different jars. The large yoke-shaped cast metal clamp holds down a glass lid which fits over a grooved mouth or into the jar neck. Around the lid the user laid an India rubber gasket which effected the seal. The Millville Atmospheric Fruit Jar, patented by **John M. Whitall**, Philadelphia, became popular after the Civil War. Again, this jar is significant in that metal never touches the food.

Patented in 1863, the Kline Stopper remained popular through the 1870s. A gasket sealed the jar between the solid glass stopper and the inside of the jar mouth. As the jar cooled a vacuum formed, pulling the stopper into the mouth of the jar. Needless to say, this system proved frustrating when it came to pulling out the stopper. **Adam R. Samuel**, at his Keystone Glass Works in Philadelphia, manufactured many of the jars employing the Kline patent.

On May 10, 1870, Mr. Mason was issued another patent (102,913) for a new kind of threaded-top jar. This time, the jar employed a glass lid and a screw band. As in the "thumb screw" jars above, the glass lid avoided the problem of food reacting with bare metal. Many of these jars were produced by the Consolidated Fruit Jar Company of New York and of New Brunswick, New Jersey.

press it into the cement. A few others patented similar techniques of sealing tin cans without soldering.

However, these metal cans didn't fare well with homemakers because one couldn't use the cans over and over again. They were big, heavy and bulky, and cost a lot of money. The acids in foods reacted with the metal, and the results were somewhat less than tasty. If you're lucky enough to find an original example of one of these containers today, however, it would be worth several hundred dollars.

Glass made the revolution in canning complete. Sealed with a tin lid and wax, the all-glass wax sealer, cement jar, or "standard" fruit jar remained popular throughout the remainder of the 19th century. The jar would seal fairly reliably when the user poured wax over a tin lid resting in a groove in the jar's lip. The "wax sealer" is a later variation of the first fruit jars which used corks covered with wax. Wax sealers were, of course, made of glass, (avoiding the problems with metal containers above) reusable and much more economical.



This jar was not without its drawbacks. Opening the wax sealer was difficult because you either had to chip the wax away or melt the wax off of the jar's top. The first wax sealers date back to the 1850s, and probably as early as the 1830s. Despite the imperfections, wax sealers enjoyed a long life - glassmakers produced the jars as late as 1912.

The familiar term mason jar came after its inventor Mr. John L. Mason, (26 years of age at the time he filed his famous patent,) a tin smith from New York city. Like the wax sealer, the mason jar is reusable. The improvement was in the sealing design, a glass container with a thread molded into its top and a zinc lid with a rubber ring, effecting a seal between the lid and the jar. This jar carries the familiar embossing:

"Mason's Patent Nov. 30th. 1858."

The mason jar is historically important because it freed farm families from reliance on inferior containers, and from using pickling, drying, and smoking food to prepare for the winter. The ease of use and affordability of Mason jars helped promote home canning across the nation. Urban families used Mason jars to put up garden food, especially tomatoes, fruits, relish, and pickles.

First tried in 1806

Nicolas Appert

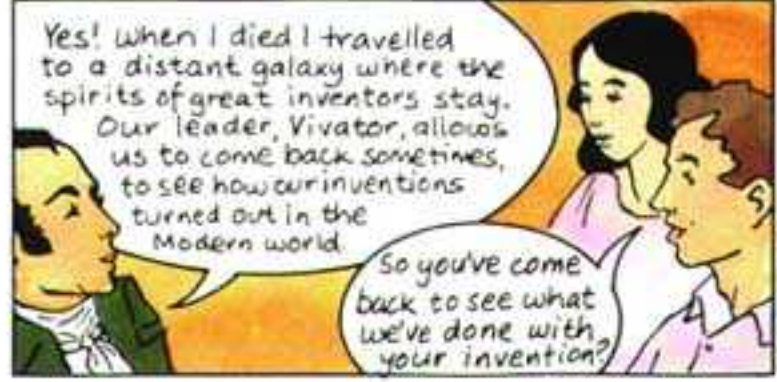
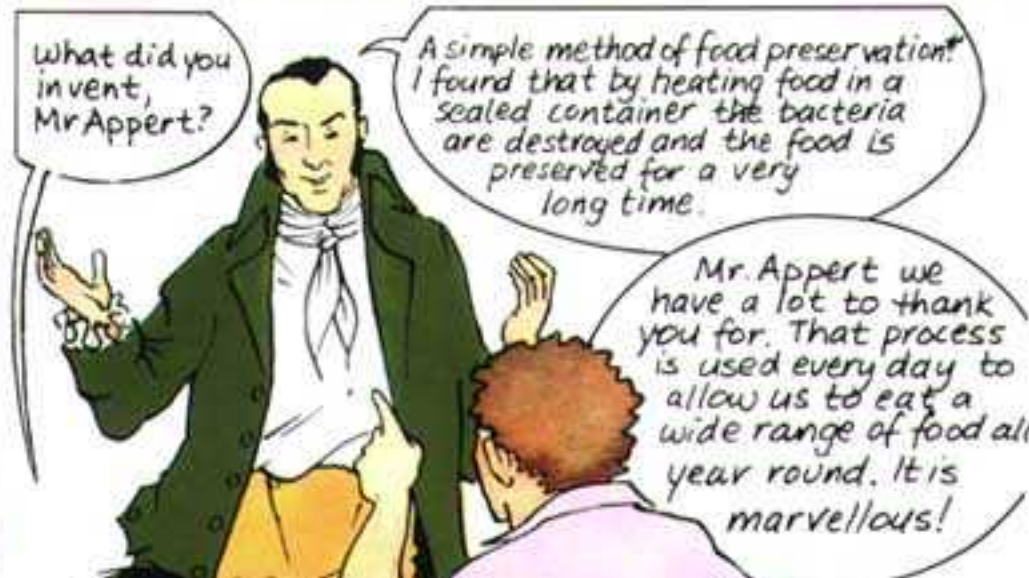
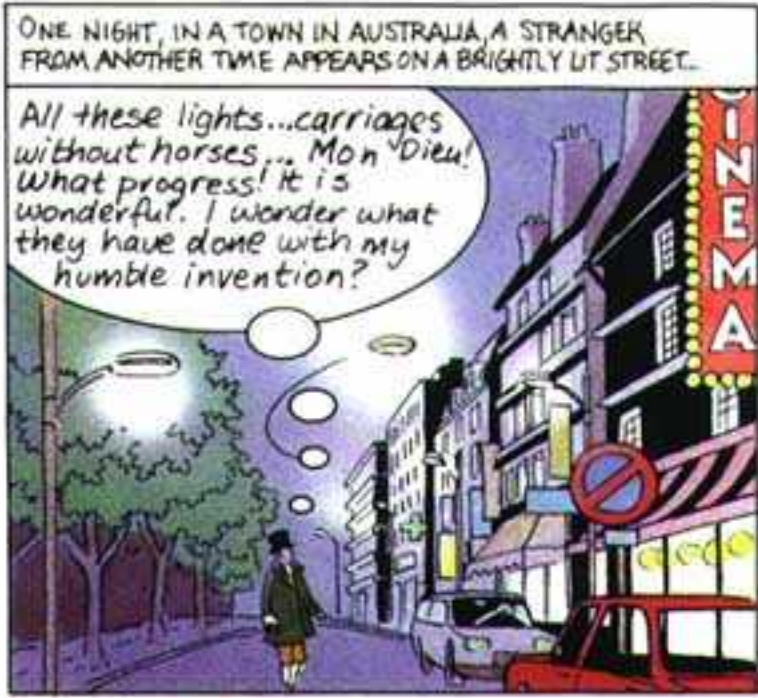
First Commercial Canning factory in 1813

After 1920 canned food became part of the national diet.

First commercial canning factory in England in 1813

By the 1880s American women launched the annual summer rutings of putting up orchard fruit and vegetables

# THE BRILLIANT INVENTION OF NICOLAS APPERT



\* We use this method widely today in the process of food canning. Simply by sealing the food in steel cans and gently heating the contents, the original qualities of the fruit, vegetables or meats etc., including their nutritional value, are preserved. A remarkably simple process, thanks to Mr Appert.

