Chapter II

History of Food Processing

Food processing is the preparation and preservation of man’s food supply. It is probably reasonable to assert that food processing was one of the first industries known to man (besides hunting and the simplest cultivation). In his primitive existence in a purely rural and agricultural society, man processed his own food. A simple pestel and a mortar was enough to grind grain crops, a brazier to cook meat and vegetables and so on. Even today food processing is not wanting in traditional home based and craft technologies and in this respect it differs from other manufacturing industries especially the so called “heavy industries” most distant from basic human needs such as iron and steel and chemicals.

Food processing is seldom given the credit it deserves for its role as a catalyst to mankind in making this progress possible. Pre-historic man was almost totally occupied with protecting and

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2 K.L. Nanjappan, *Development of Food Industries in India*, 1985, Development Commissioner Ministry of Industrial Development, Govt. of India, New Delhi.
feeding his family and himself. He had little time for anything but to daily search for food. Since he had no way either to grow or to preserve his food, he was at the mercy of the vagaries of nature.

For thousands of years, man’s cooking was limited to searing or roasting with fire, for he had no containers to hold his food other than a flat rock or a seashell. Then processing achieved another milestone in exerting its catalytic influence.

The identity of the inventor of pottery is lost in time, but his contribution speeded the development of cooking and processing. We owe a great deal to the lovely cooking pot. It extended man’s method of cooking to include boiling, steaming and eventually the blending of foods. The pot and other containers that came along later aided men in the discovery of nature’s secrets of preserving food, fermentation of wine and vinegar, cheese making, brine-salting of meat and sugar preserving of jam and jellies.

Progress in processing was slow until 1809 when Nicolas Appert a French confectioner showed the food industry and the world how to preserve foods almost indefinitely without appreciable loss of appearance, flavour or nutritional value.

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Competing for a prize of 12000 Francs offered by Napolean for a dependable source of food for his armies, Appert successfully procured food in a sealed container through the application of heat.

By 1900 approximately one half of the people in the United States lived on farm and received their entire income from the foods they harvested. The other half of the people lived in towns and cities and spent an average of 40% of their wages for food. Little more than 60 years later the farm population had dropped to less than 10% of the total and the average American family was spending approximately 20% of its take home pay for a vastly better diet than was available in 1900.

Since the past is prologue to the future, processing and the food industry can be expected to continue their great contribution. Those who are a part of processing and the food industry share the opportunity to influence a future that has an infinitely brighter potential than the past.

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2.1 Primitive Methods of Processing

Man is a product of what he eats and the amount of time required to provide his food. The food that man eats is a product of his intellect and his inventiveness. Due to better processing our food today is more varied in taste, nutritious and plentiful than at any other time in the history of man. Moreover we spend less time in preparing and providing it.\footnote{Edward C. Hamper Jr. and Merle Wittenberg, n.1, p. 103.}

The path to today's plenty has been long and hard. The tracing of that pathway will cover the origin of processing, the development of the major methods in use today, the contribution of scientific research and the important role of the salesmen in widening the influence of processing. The beginning of this chronology goes back a long way.\footnote{Ibid.}

The exact details of how and when man learned to adopt nature's ways of processing is a secret still locked in the vault of the ages. There are evidences which permit us to draw a fairly accurate picture of what happened. The important primitive methods identified are the following.
a. Drying

Nature's drying of food was observed and adapted by man before the discovery of fire. The first step towards a food supply came when early man noticed that nuts and grains dried by the rays of the sun, would last through the winter if kept dry. Legends, of the stone-age man tell of great buffalo hunts among the Indians of North America in which thousands, of buffaloes were stampeded over cliffs to their death. The buffalo hides were used in making clothes and tepees, the meat was cut into thin strips and dried in the sun on window frames. Our modern methods of drying are adaptation of and great improvement on this most basic nature's ways of processing food.8

b. Fermentation

Fermentation the natural process of chemical change in foods was observed and adapted by man in many ways for several thousands of years before the fermentation of yeast was adapted to the making of leavened bread.

Early men noticed that fruit juices left to stand for periods of time 'soured'. Experimentation proved that souring transformed

8 Ibid., p. 104.
the juice into something quite different both in taste and effect. In areas of uncertain water supply wines provided a safe beverage. One of the earliest references to wines is in the book of Genesis in the *Old Testament*, where it stated that Noah became a husbandman and drank wine⁹.

Wine making led to the development of various types of vinegar that were used in pickling meat, fish, vegetables and fruits. Sauerkraut (fermented cabbage) was an early Chinese contribution that was later adopted by the German and other Europeans as a basic item in the diet.

Fermentation of milk led to the development of cheese in about 3000BC. Arabian horsemen found that during their travels milk in their goatskin bags was churned into a sort of cheese we know today as yeast. And of course the Egyptian development of raised sourdough bread owes its unique quality to the fermentation of yeast. ¹⁰

**c. Salting**

How early men began to use salt to preserve food is not clearly indicated but salting was done at about the time leavened
bread was introduced. Salt had been used as a flavouring for a long time before it was discovered that meat rubbed with salt, or soaked in a salt brine, could be kept for weeks or months. Combining salting and smoking made it possible to keep meat edible for longer periods.

Vegetables and fruits soaked in a brine solution (later called pickling) could be preserved for use during the long winter months. Salting became one of the main methods of preserving foods. In the ancient world, salt was as valuable as gold. It established monetary standards and served as the basis for world trade.

Records of the ancient Sumerian empire (later Babylon) reveal that it was a highly developed civilization with cities and governments. Among the refreshments a favourite dish made from salted pork and tertiles - the first known pork and beans in history.

Early American pioneers moving westward centered their camps and countries around natural deposits of salt called “salt
licks”. Animals could be hunted or trapped easily as they came to the salt licks and the salt was used to preserve the meat.\textsuperscript{11}

d. Sugar

In ancient Persia, the preserving power of the natural sugar on fruits was known but not understood. Marmalade made by cooking fruits until most of the liquid had boiled away was a favourite spread for breads. The people of the ancient civilization in the Indus River Valley traded their fruit jams or spices with the passing Arab caravans. Sugar however remained as scarce and expensive for thousands of years. Not until the settlement of the great sugar cane areas of the new world, did the supply of sugar become abundant enough for wide spread use as a preservative.\textsuperscript{12}

e. Spices

Spices have long played an important role in food processing. One can imagine that ancient man having suffered long in eating foods that were tainted, literally followed his nose to the sources of pepper, ginger, curry, cinnamon, mustard and other spices. While the spices in themselves did not preserve

\textsuperscript{11} Ibid.
\textsuperscript{12} Ibid., p. 105.
foods, they added flavour and more importantly they covered up the unpleasant flavour of slightly spoiled meat or meat that had been preserved with salt.

Spices were highly prized and great caravan traveled thousands, of miles overland to reach the spice centers of the East. The crusaders in the 1200's and 1300's brought back large quantities of spices. Many of the early explorations of the world were made in an effort to find shorter routes to the sources of spices. The most famous of all explorers, Columbus was searching for a shorter route to the spice-rich orient when he discovered the much more valuable prize of America.\textsuperscript{13}

f. Freezing

Natural freezing in the northern area of the world was known for as long as men inhabited those areas. Fish found frozen in the ice were preserved. Man took advantage of nature's icebox and deep freeze facilities but thousands of years were to pass before technology opened the way for him to adopt the principle of preservation by freezing through man made refrigeration process.

\textsuperscript{13} Ibid.
These methods of preserving foods were outgrowths of natural process. Evidence from written records indicates that all were known and practiced at least as early as 3000 BC and probably earlier. All remained virtually unchanged for thousands of years. Each family processed for its own needs—salting and smoking meat, pickling fruits and vegetables, making cheese, baking bread, preparing wine and processing other foods available to them, many preserving recipes were family or community secrets. Knowledge of food preservation was passed from generation to generation. For many centuries the lack of transportation and communication curtailed the wide spread exchange of processing methods, not until the time of the Romans any appreciable commercial processing exist. The start was small but it was a start.14

2.2 The Beginnings of Commercial Processing

Some commercial processing existed very early in history. Wherever people settled together in communities, villages, or the ancient cities, there was the need for some kind of processing. Most of the early commercial processing ventures were family

14 Ibid., p. 106.
operated, but they were the beginnings from which our present day processing developed.

As early as 3000 BC, Egyptian outdoor bakeries provided a reliable supply of bread for the masses of slaves laboring on the great temples and pyramids. Grain collected from the farmers as taxes was ground in the Pharaoh's mills. Bread was prepared in what was perhaps the first large scale baking operation in history.15

One of the first evidences of well-organised commercial ventures appeared among the Greeks about 600 BC. Athens was producing olive oil and wine commercially, thanks to the development of the oil and wine presses. The Athenian family of those early days could plan its menus by selecting such commercially processed foods as bread rolls, salted fish, ham sausage and wine.16

By 100 BC a flourishing trade in processed foods, was carried on among the nations surrounding the Mediterranean Sea. Egyptian wheat products were exchanged for dried fish from the Bosphorus, cheese from Bithynia (in Asia minor) prunes from

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15 Ibid., p. 106.
16 Ibid.
Damascus or raisins from Berytus (Ancient Lebanon) Egyptians enjoyed a variety of processed foods; dried fruits and wine, smoked or brine-cured meats and bread with sesame seeds sprinkled on the top crust. The first real impetus toward large scale processing came from the Roman Empire.\(^17\)

M. Gabinus Apicius, a Roman who lived about the time of Christ, gave the world its first known cookbook. European chefs used his recipes for centuries as a basic primer for cooking, and some of its procedures for processing and preserving foods are still in use in parts of Europe and America. His formula for liver sausage, for example was essentially the same as the one in use today. Apicius created a preparation of pickle of mustard, vinegar salt and honey to preserve cooked sides of beef and pork that is still in use in some parts of Europe.\(^18\)

This interest in the preparation of foods and the needs of travelers and city dwellers prompted the Romans to establish food processing on a commercial scale. Improvements in agriculture helped to assure increased quantities of food for the processing activity.

\(^17\) Ibid.
\(^18\) Ibid.
The tradesmen of Rome formed in to guilds to organise production and transportation of foods to the major cities. The government built production facilities and furnished wagons for transportation. The guilds in turn managed the imperial food storage warehouses.\textsuperscript{19}

The Roman government regulated the guilds and held tight controls over food production and distribution. Inspector checked both processing and retail operations to ensure that no tainted food was sold. Government grading was introduced for bread. The Roman also made an unsuccessful attempt to control the price of foods. Despite the threat of the death penalty price controls did not work.\textsuperscript{20}

The invention of the printing press in the mid-1400's popularized cookbooks, which resulted in a widespread exchange of recipes and processing methods. Within a hundred years cookbooks became rather common in the city book stores throughout Europe as people sought ways to make their limited menus more appetizing.

\textsuperscript{20} Ibid.
The limited variety of processed foods available about AD1500 and the limited menu on the long ocean voyages can be seen in a table which compares the foods carried by Columbus in the USS Skate one of America's first atomic-powered submarines, on its pioneer voyage under the North pole.21 See Appendix 8.

Food is a much more significant proportion of total household expenditure in developing countries than in developed ones. An analysis of consumption data by FAO gives data on this proportion (in percentage terms) in certain countries, as shown in table 2.1.

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21 Edward C. Hampe, Jr. and Merle Wittenberg, n.f., p. 112.
Table 2.1

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<th>Developed countries</th>
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<td>Belgium (191-62) 26</td>
<td>Somalia (1966) 56</td>
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<td>Italy (1963-64) 37</td>
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<td>Average (27%)</td>
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<td>Indonesia (1963-64) 56</td>
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<td>Average 49%</td>
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Source: Christopher G. Baron. "Technology, employment and basic needs in Food Processing in "Developing Countries" (New York: Pergamon Press) p. 18.

The average (unweighted) for the developed countries in the left-hand column is 27% and for the developing countries on the right is 49%. The latter percentage probably understates the proportion in the households of developing countries since most of the figures in the right hand column refer only to urban areas. The three highest figures for Sri Lanka, India, and Thailand (average 60%) are also the most representative having been based
on nation wide surveys. Another notable feature of the FAO data is the importance of basic cereal food stuffs in low income countries and the relative unimportance of meat which takes to 20 to 30% of food expenditures in the developed countries. Thus there are significant differences among the rich and poor countries with regard to the practice and pattern of food consumption.\textsuperscript{22}

Some further data shown with the following figure illustrates the changing relationship as economic development proceeds between (a) the share of processed foods in total food consumption and (b) gross domestic product per capita. Only for a few developing countries could such figures be calculated from the data available. But even from these few figures a pattern emerges; as average incomes increase a higher share of the food consumed is processed by the food industries rather than in homes and in the farms.\textsuperscript{23}

\textsuperscript{22} Christopher G. Baron. Technology, Employment and basic needs in Food Processing in Developing Countries" 1989 New York: Pergamon Press. p. 18.
\textsuperscript{23} Ibid.
Figure 2.1
Percentage of Processed Food in Total Food Consumption

Source: The percentage of processed food products in overall food consumption were derived from the private consumption component of final demand in various input output tables, except in the case of the Philippines (1971) for which data from a household budgets survey was used. G.D.P. figures come from the UN Year Book of National Accounts Statistics Vol.3, 1973, United Nation New York.
2.3 Historical Analysis of the Development of Food Processing Industry in India

The earliest factory-processed products in India were traditional ones like chutneys, Murabbas and pickles. Western style preserved food products were introduced in India about 1930. Both these and traditional products were produced side by side, sometimes in the same factories.

In the 1930's a few Indians who had studied in the United States started making sweet squashes and sharbats which did well leading to the setting up of a few manufacturing units specially in Panjab.24

The first cannery in India, the Bengal Preserving company was started in Muzarpur in the first years of the 20th century by A.B. Sircar after he returned following the training in the USA. His financial backer was the eminent lawyer B. Sinha. In 1910 Sreekissen Dutt and company Calcutta started their cannery section and were soon operating under the able guidance of R.K. Dutt, who had returned to India after 10 years of study and practical training in the USA. This firm was established as early

as in 1841 and a century later styled itself as Government contractors and Purvegors to kings, princes and other notables and manufactures and exporters of the celebrated mango brand canned products and condiments etc. Some 25 categories of products were offered with numerous items under each. There were, for example no less than 15 items under canned fruits 25 under canned vegetables 4 canned soups 19 varieties of canned fish, 20 of crystallized fruits peels and vegetables, 15 pickles, several preserves of both fruit and vegetables 7 sauces and 16 chutneys.

Two firms that came up in Calcutta during the first world war, the Bengal canning and condiment works Ltd and the Pioneer condiment company Limited used modern canning machinery but closed down later.

Production during the Second World War had increased dramatically when a sudden new demand arose and had to be met. In 1945 an estimated 105.6 lakh tonnes of fruits and 45.9 lakh tonnes of vegetables were produced in India. The fruit basket consisted of 55% of mango and 38% of banana and all other fruits being individually almost significant. The vegetable basket

\[25\] Ibid.
consisted of 34% of onion 8% of radish and 5% each of cauliflower and tomatoes with many other vegetables making up the remainder. These constituted the raw materials available for preservation but only a fraction of the total product was preserved.26

The war raised the demand not only for all the preserved foods in tins and bottles, but also for such items as dehydrated potatoes and onions. In 1945 there were some 134 factories producing processed food items for the defense forces. Of these 19 factories were selected prior to February 1945 for dehydration of fruits and vegetables exclusively devoted to defense supplies27

During the 1920, chutney was supplied from Bombay, Calcutta and Madras ports to England at first in glass bottles and later in bulk cases. During the second world war 2000-2500 gallon casks, mostly of mango chutney were exported, which would mean about 400 tonnes over the five year war period. In 1949-50 the export figure for pickles and chutneys taken together was 1300 tonnes valued at Rs.20 lakhs.28

26 ibid.  
27 ibid.  
28 N.K. Nair & A.K. Borman - NPC research section - Productivity in Indian Food Processing Industries, p.469
2.4 The Development of Food Processing Industry in Kerala

In Kerala, as early as the Vedic times, salt, vinegar, jaggery, honey, asafoetida and tamarind were used for preserving and blending taste to foods as the accent was always on the preservation of good health through a well adjusted diet. In the medical treaties of Susrutha and Charaka the use of these spices and condiments are widely referred. 29

In Kerala, the art of pickling is raised to such a high level of sophistication that it has acquired almost a legendary reputation. One aspect of pickling is the great variety and range it offers for all seasons and occasions. This is made possible because of the tremendous variety of fruits and vegetables to choose from30.

Pickle making is thoroughly a continuous process of discovery. The available spices span a spell binding range from aniseeds, asafoetida, cummin seeds, cardamom, cinnamon, cloves to fenugreek seeds, flower essence, mace, mango powder and mustard seed. Most of these are in abundant supply in Kerala.

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29 Primary Data
30 Ibid.
Pickling is to put it simply nothing more than preserving fruits, vegetables, meat or fish in salt alone with or without the addition of oil and spices. Spices are aromatic leaves, buds, fruits, seeds, or barks of plants. One has to observe certain cannons regarding cleanliness as for example, the use of clean, dry and quality fruits and vegetables, sterile jars and dry ladles, which is disregarded makes the pickle venture a disaster, with the formation of mold and fungus. For the traditional way of pickling in Kerala, artificial preservatives were never used. 31

There is an amazing range of pickles available in Kerala. The same mango pickle prepared in the north differs in taste from those prepared in the central Kerala and south Kerala. The same raw material is used in a variety of ways. For example, Mango is preserved as Uppumanga, Kannimanga, Vellamanga etc. 32

As interesting and tasty as pickles may be, one should be careful not to overdo or underplay any particular spice. Equally difficult is harmonising the various flavours to compliment the basic ingredients without swamping it. Though spices enhance

31 Ibid.

32 Ibid.
the taste, they will not disguise ingredients and hence quality fruits and vegetables should be pickled and preserved. It would be better to have less of a fine ingredient than a large quantity of an inferior one.\textsuperscript{33}

Pickle making is little tricky because much of the ingredients which go into the making of a pickle cannot be accurately stated. It depends a lot on experience and the taste preferences and leniency of the maker’s tongue. The pickle in general, turns out right but to make a great pickle one requires dedication and commitment.

Pickles cover a broad range from fermented pickles, fresh pack pickles, fruit pickles to relishes which are primarily vinegar based. The vinegar which is traditionally used in Kerala for pickle making is made from toddy. Most pickles keep for a few months, but some for years too.\textsuperscript{34}

Pickles have, as traditionally believed, a curative and medicinal effect too. Ginger, asafoetida, turmeric are all considered digestives. Asafoetida is considered as a nerve tonic too. Cummin and green cardamom are cooling, clove and

\textsuperscript{33} Ibid.

\textsuperscript{34} Ibid.
cinnamon are warming, ginger is used for colds, while raw garlic is good for circulatory ailments and jangled nerves. Red chillies have an antiseptic effect. Black pepper livens the appetite and also acts as tonic for new mothers.\textsuperscript{35}

Traditionally in Kerala, weighing or measuring pickling ingredients was not followed. They relied solely upon what they had learned by trial and error by what they had been taught or what is passed down from generation to generation. There were no hard and fast rules for the preparation of any particular recipe because the ingredients remain the same, only the quantities vary.\textsuperscript{36}

There had been unique ways of preserving fruits also. People had found out unique ways of preserving the abundant fruits such as jackfruits and mango. They used to make ‘thira’ with these fruits. On freshly made mats, these fruits used to be pressed into making a kind of paste and then it is put in the sun for drying. Successive layers were added upon the previous ones thus making a series of layers. This is dried well and preserved in big ‘Bharanies’ in airtight condition.\textsuperscript{37}

\textsuperscript{35} Ibid.
\textsuperscript{36} Ibid.
\textsuperscript{37} Ibid.
There were different kinds of ‘Bharanies’ or big vats for preserving these processed fruits and vegetables. Different kinds of ‘urulies’ and ‘varps’ were used for preparing these pickles.

Thus Kerala had a long history in food processing. It has evolved over a long span of time to well-established customs and traditions.

2.5 Conclusion

History of food processing can be traced back to the early phases of human development. Man adopted nature’s processing techniques like drying and fermentation to suit his needs and tastes. Salting and the use of salt as preservative, added developmental dimensions to the concept of processing. Discovery of various kinds of spices furthered different techniques of processing. Outset of community life in the natural course of the human history paved the way for commercial processing. Egyptians, Greeks and Romans were pioneers in the art of processing. Renaissance and navigations undertaken for the purpose of exploration necessitated this further. Industrialisation and technological advancement infused new researches and developments in food processing. Profit motive also was introduced into it. India too had her own indigenous ways of
food preservation. Advent of Europeans brought her familiarity with the western produced foods and processes. Food processing in Kerala can be traced back to the ancient Vedic periods. The art of pickling has reduced enormous developments. Kerala has her own ways of preservation of fruits like making ‘thira’. Thus food processing has developed and perfected it over the years.