

Chapter 1

The History of Chocolate

Chocolate is almost unique as a food in that it is solid at normal room temperatures yet melts easily within the mouth. This is because the fat in it, which is called cocoa butter, is mainly solid at temperatures below 25 °C when it holds all the solid sugar and cocoa particles together. The fat is, however, almost entirely liquid at body temperature, enabling the particles to flow past one another, so the chocolate becomes a smooth liquid when it is heated in the mouth. Chocolate also has a sweet taste that is attractive to most people.

Strangely chocolate began as a rather astringent, fatty and unpleasant tasting drink and the fact that it was developed at all is one of the mysteries of history.

CHOCOLATE AS A DRINK

The first known cocoa plantations were established by the Maya in the lowlands of south Yucatan about 600 AD. Cocoa trees were being grown by the Aztecs of Mexico and the Incas of Peru when the Europeans discovered central America . The beans were highly prized and used as money as well as to produce a drink known as chocolatl. The beans were roasted in earthenware pots and crushed between stones, sometimes using decorated heated tables and mill stones, similar to the one illustrated in Figure 1.1. They could then be kneaded into cakes, which could be mixed with cold water to make a drink. Vanilla, spices or honey were often added and the drink whipped to make it frothy.¹ The Aztec Emperor Montezuma was said to have drunk 50 jars of this beverage per day.

Christopher Columbus bought back some cocoa beans to Europe as a curiosity, but it was only after the Spaniards conquered Mexico that Don Cortez introduced the drink to Spain in the 1520s. Here sugar was added to overcome some of the bitter, astringent flavours, but the drink remained virtually unknown in the rest of Europe for almost a hundred

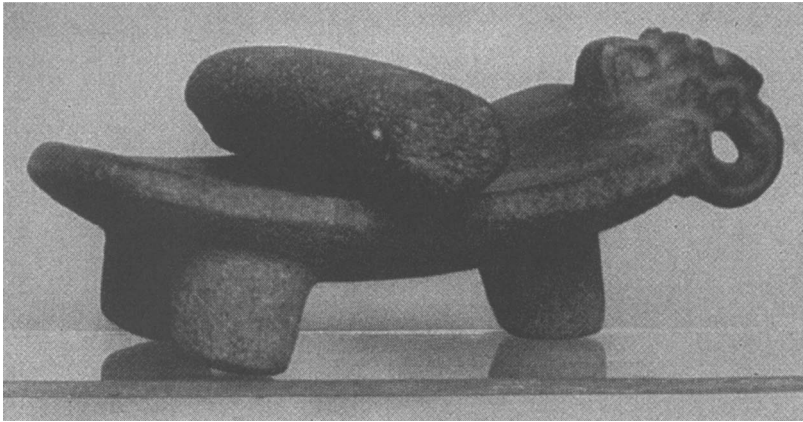


Figure 1.1 Ancient decorated mill stone with a hand grinder from the Yucatan

years, coming to Italy in 1606 and France in 1657. It was very expensive and, being a drink for the aristocracy, its spread was often connected to connections between powerful families. For example the Spanish princess, Anna of Austria, introduced it to her husband King Louis XIII of France and the French court in about 1615. Here Cardinal Richelieu enjoyed it both as a drink and to aid his digestion. Its flavour was not liked by everyone and one Pope in fact declared that it could be drunk during a fast, because its taste was so bad.

The first chocolate drinking houses were established in London in 1657 and it was mentioned in Pepys's *Diary* of 1664 where he wrote that 'jocolatte' was 'very good'. In 1727 milk was being added to the drink. This invention is generally attributed to Nicholas Sanders.² During the 18th century White's Chocolate House became the fashionable place for young Londoners, while politicians of the day went to the Cocoa Tree Chocolate House. These were much less rowdy than the taverns of the period. It remained however, very much a drink for the wealthy.

One problem with the chocolate drink was that it was very fatty. Over half of the cocoa bean is made up of cocoa butter. This will melt in hot water making the cocoa particles hard to disperse as well as looking unpleasant because of fat coming to the surface. The Dutch, however, found a way of improving the drink by removing part of this fat. In 1828 Van Houten developed the cocoa press. This was quite remarkable, as his entire factory was manually operated at the time. The cocoa bean cotyledons (known as cocoa nibs) were pressed to produce a hard 'cake' with about half the fat removed. This was milled into a powder, which could be used to produce a much less fatty drink. In order to make this powder disperse better in the hot water or milk, the Dutch treated the cocoa beans during the roasting process with an alkali liquid. This has subsequently become known as the Dutching process. By changing the

type of alkalisising agent, it also became possible to adjust the colour of the cocoa powder.

EATING CHOCOLATE

Having used the presses to remove some of the cocoa butter, the cocoa powder producers were left trying to find a market for this fat. This was solved by confectioners finding that eating chocolate could be produced by adding it to a milled mixture of sugar and cocoa nibs. (The ingredients used to make dark chocolate are shown in Figure 1.2.) If only the sugar and cocoa nibs were milled and mixed together they would produce a hard crumbly material. Adding the extra fat enabled all the solid particles to be coated with fat and thus form the hard uniform bar that we know today, which will melt smoothly in the mouth.

Almost twenty years after the invention of the press, in 1847, the first British factory to produce a plain eating chocolate was established in Bristol in the UK by Joseph Fry.

Unlike Van Houten, Fry used the recently developed steam engines to power his factory. It is interesting to note that many of the early chocolate companies, including Cadbury, Rowntree and Hershey (in the USA) were founded by Quakers or people of similar religious beliefs. This may have been because their pacifist and teetotal beliefs prevented them working in many industries. The chocolate industry was, however, regarded as being beneficial to people. Both Cadbury and Rowntree moved to the outside of their cities at the end of the 1890s, where they built 'garden' villages for some of their workers. Fry remained in the middle of Bristol and did not expand as quickly as the other two companies. It eventually became part of Cadbury.

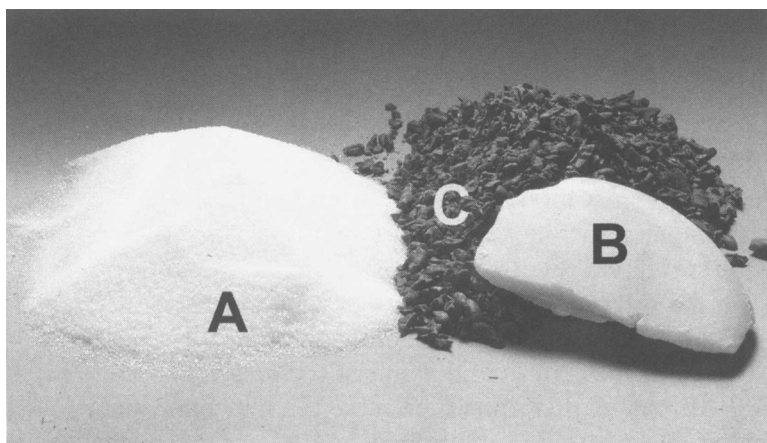


Figure 1.2 *A picture of the unmilled ingredients used to make dark chocolate: A, sugar; B, cocoa butter; C, cocoa nibs (Beckett³)*

With the development of eating chocolate the demand for cocoa greatly increased. Initially much of the cocoa came from the Americas. The first cocoa plantation in Bahia in Brazil was established in 1746. Even before this, the Spaniards had taken cocoa trees to Fernando Po (Biyogo), off the coast of Africa, and this soon became an important growing area. In 1879 a West African blacksmith took some plants home to the Gold Coast (now Ghana). The British Governor realised its potential and encouraged the planting of trees, with the result that Ghana has become a major source of quality cocoa. Other European powers also encouraged the growing of cocoa in their tropical colonies, *e.g.* France in the Ivory Coast (Côte D'Ivoire), which is now the world's largest producer of cocoa.

The chocolate made by Fry was initially a plain block and it was only in 1876 that the first milk chocolate was made by Daniel Peter in Switzerland. Chocolate can not contain much moisture, because water reacts with the sugar and turns melted chocolate into a paste rather than a smoothly flowing liquid (see Project 5 in Chapter 10). As little as 2% of moisture can give a product a poor shelf-life as well as an inferior texture. This meant that Daniel Peter had to find some way of drying the plentiful supply of liquid milk that he found in his own country. He was helped in this by the recent development of a condensed milk formula by Henri Nestlé. This meant that he had much less water to evaporate. Also he was able to remove the remaining moisture using relatively cheap water-powered machines. In most countries milk chocolate products are now much more popular than plain chocolate ones.

In order for the chocolate to feel smooth on the tongue, when it melts in the mouth, the solid non-fat particles must be smaller than 30 microns (μm ; 1000 microns = 1 mm). The chocolates made by Fry and Peter were ground using granite rollers, which could not mill as fine as this, so they still had a gritty texture. Groups of particles also joined together to form agglomerates, and some of the fat did not coat the particles very well owing to poor mixing. All these effects gave the chocolate a poor texture. In addition the chocolate tended to taste bitter because of the presence of some acidic chemicals (see Chapter 4).

In 1880 Rodolphe Lindt, in his factory in Berne in Switzerland, invented a machine which produced a smoother, better tasting chocolate. This was known as a *conche*, because its shape was similar to that of the shell with that name (Figure 1.3). It consisted of a granite trough, with a roller, normally constructed of the same material, which pushed the warm liquid chocolate backwards and forwards for several days. This broke up the agglomerates and some of the larger particles and coated them all with fat. At the same time moisture and some acidic chemicals were evaporated into the air, producing a smoother, less astringent tasting chocolate. A schematic diagram of the chocolate making processes is shown in Figure 1.4.

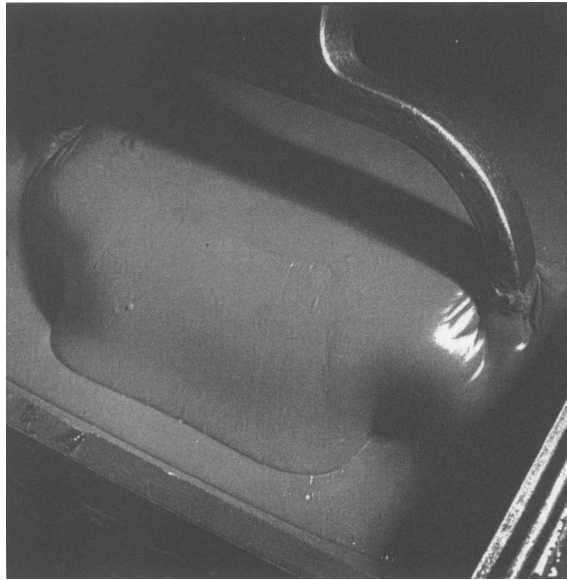


Figure 1.3 Picture of chocolate being processed in a long conche

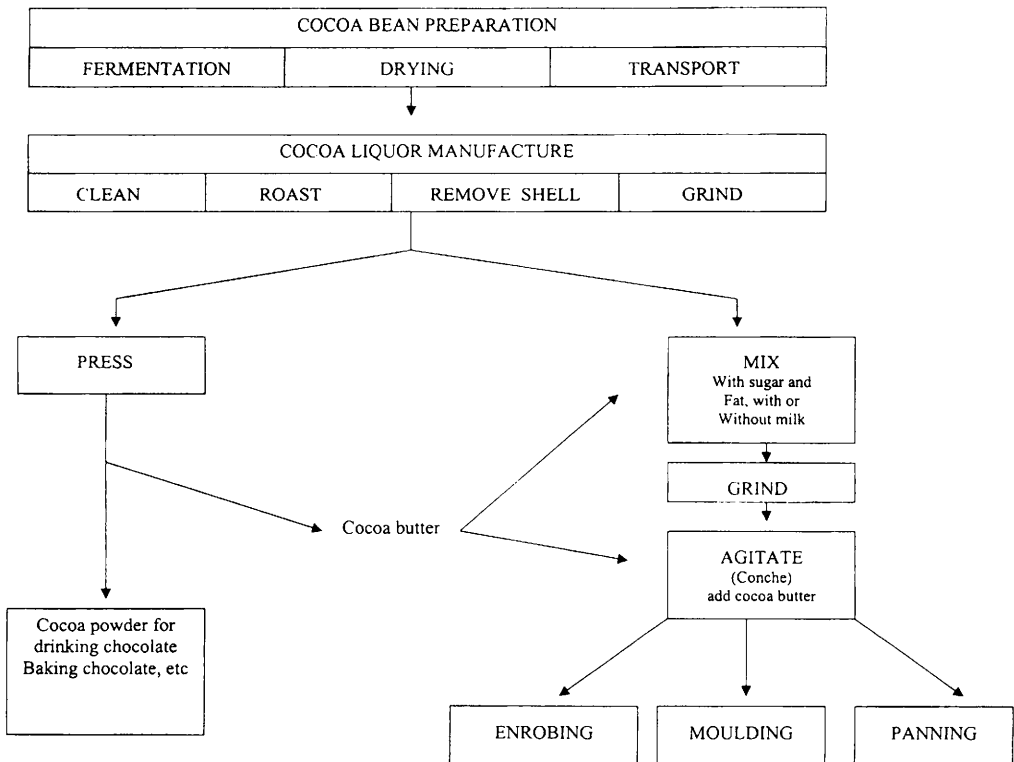


Figure 1.4 Schematic diagram of the chocolate manufacturing process

Chocolate Crumb

In the early part of the 20th century the milk used to make chocolate had poor keeping qualities. This caused problems for the chocolate industry, whose major sales were at Christmas, a time of the year when there was a very limited supply of fresh milk. In the UK and some other countries this led to the development of an intermediate ingredient called chocolate crumb.

The cocoa nibs contain substances known as antioxidants. These restrict the breaking up of the fats, which would normally make the milk fat turn sour. In addition sugar was known to extend the shelf-life of foods (it is used in jams *etc.*). The chocolate manufacturers therefore added sugar and cocoa to the milk and dried them together. This produced chocolate crumb, which had a shelf-life of at least a year. Milk produced during the spring peak could then be used to make chocolate the following Christmas. The drying process, however, introduced some cooked flavours into the chocolate and it is for this reason that many UK chocolates taste different from some continental European ones, which are made from milk powder.

White Chocolate

The first white chocolate was made in 1930. It was made from sugar, milk powder and cocoa butter. The preserving qualities of the cocoa antioxidants are mainly in the dark cocoa material. This means that white chocolate does not keep as well as milk chocolate, and also that it should be kept in a non-transparent wrapper, as light will speed up the decomposition of milk fat.

CHOCOLATE MARKETING IN THE UK

As technology improved, chocolate was used to coat other ingredients, or to be part of a product rather than just a bar. In the 1930s many of these were developed and have remained popular to this day. Good examples of this are KitKat, Mars Bar and Smarties. At this time products also became known under brand names rather than that of the manufacturer. Some companies, like Cadbury, tended to give both equal prominence.

During the war few cocoa beans were shipped from the plantations and strict rationing was introduced. Many leading brands were not produced at all. Rationing in the UK ended in April 1949, but the rush to buy was so great that, by June, 60% of confectionery shops had nothing left to sell. Rationing was reimposed until February 1953.

Consumption rose very quickly, but over the last ten years has been more constant with an average of about 8 kg/person per annum of chocolate confectionery being eaten in many Western European Countries (this does not include chocolate biscuits). Switzerland has the highest consumption at about 9.5 kg/person per annum. This makes the confectionery industry a very important one. The combined sales of sugar and chocolate confectionery in the UK are more than those of tea, newspapers and bread put together.⁴

CHOCOLATE IS GOOD FOR YOU

Antioxidants in food are known to protect the body against chemicals called free radicals that damage cells. Cocoa is a known source of antioxidants and in 1999 doctors from the National Institute of Public Health and the Environment in Bilthoven in the Netherlands examined chocolate for its catechins content. These are from the family of flavonoids, which are among the most powerful antioxidants. They found that dark chocolate contained 53.5 mg per 100 g, which is four times that in tea. Drinking a cup of tea a day is said to reduce the chance of a heart attack.⁵

Certain fats are said to cause an increase in cholesterol. Because of its triglyceride structure (see Chapter 6) cocoa butter has been found to be neutral in this respect. Studies by Prof. Kris-Etherton in the USA, where high risk individuals were fed large amounts of chocolate, showed that their cholesterol level remained unaffected.⁶

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