

## A BRIEF HISTORY OF SUGAR by Françoise Sergy

Of all the plants, one species of sugar cane, *Saccharum officinarum*, contains the most sugars. Originally from the tropics of South or South East Asia, it was domesticated in New Guinea and widely disseminated in Asia by 8,000 years ago. To start with, it was harvested for its sweet juice which had to be consumed quickly before fermentation took hold. The crystallisation and preservation of sugar is a complicated chemical process and this industry most likely began in eastern India about 2,500 years ago. From Asia and China, sugar cane cultivation spread to the Middle East in Roman times, particularly in Persia, then around the Mediterranean during the Arab Empires, reaching southern Spain and Italy. Sugar cane is a tropical plant and needs both a lot of warmth and water, which explains why Upper Egypt became an important cultivation centre, thanks to the Nile delta. From the 10th century and for the next 500 years, Venice dominated the sugar trade, cultivating and importing it from the Mediterranean and exporting it into Europe. Sugar was a very expensive product then, only available to the wealthy. However, in the countries which produced it, such as in India, sugar became an important ingredient in the culinary culture of those who could afford it.

Sugar production is very labour intensive, even more so in the past. In the Middle Ages, wars and the Black Death led to labour shortages and the use of slaves in the plantations around the Mediterranean became common practice. The industry was causing local deforestation because of its need for fuel to operate its boilers. Together with the unsuitable Mediterranean climate, this led to a decline of the sugar plantations in the Mediterranean. The rise of the Ottoman Empire was also disrupting the supply of sugar into Europe. As a result, European powers started to search for new lands to grow sugar.

The Portuguese and Spanish Empires were the first to establish new sugar plantations on islands off the west coast of Africa. Then the Portuguese found the perfect place: the uninhabited islands of São Tomé and Príncipe in the Gulf of Guinea, off the coast of tropical Africa. These islands had an ideal climate, easy access to slaves in Africa, lots of water and fuel. Many of the cultivation and production methods which became standard practice in the West Indies later on were developed on these islands.

The sugar cane was introduced in the West Indies by Christopher Columbus from Spain in 1493. The Portuguese then colonised Brazil and established a thriving sugar industry there using indigenous slave labour and the technological improvements they had learned from their plantations in São Tomé. Whilst diseases introduced from Europe decimated the Brazilian population, the Portuguese decided to establish a slave trade from Africa, using ships crisscrossing the Atlantic. By the late 16th century, Brazil was dominating the world sugar production. Then other Europeans joined the bonanza. British, French and Dutch colonists emulated the Portuguese and Spanish, and established a flourishing, if not volatile, Atlantic sugar trade. Plantations and raw sugar processing mills took over the West Indies, parts of South America and later the southern colonies of North America. But the production of the refined sugars took place in Europe, with the cities of Antwerp, London, Bristol, Bordeaux, as well as New York replacing Venice as centres of the trade.

Throughout the sugar slave trade history, 10 to 12 million Africans were enslaved and shipped across the Atlantic, as part of what is known as the Triangular Trade between Europe, Africa and the Americas. Manufactured goods (arms, textiles, wines) were sent to Africa from Europe, slaves were shipped from Africa to the New World plantations, commodities (mainly raw sugar and coffee) were sent from the colonies to refineries and commercial centres in Europe and North America. The colonies were made to rely on the mother countries for most of their supplies and all the profits from the plantations were exported to Europe.

The 16th and 17th centuries are viewed by economists as a transitional period between feudalism and capitalism. The development of trades such as the Atlantic sugar trade is sometimes called the Commercial Revolution, a necessary precursor to the Industrial Revolution of 18th century Britain. The transfer of all the profits to the homeland, the total exploitation of the slave labour, the relentless appropriation of the colonial land and its natural resources, the economic subjugation of the colonies, all were important factors in creating the vast wealth needed for the new capitalist industries to later emerge in Britain.

The early 19th century's Napoleonic wars brought in a new player in the sugar story: the sugar beet. The plant *Beta vulgaris* originates from the Mediterranean. It is a very hardy root vegetable naturally rich in sugars, widely grown in Europe at the time because it made great fodder for cattle and horses. Previous attempts in Prussia at the commercial extraction of sugar from beet had not been a success. During the wars, a revolution in the French colony of Saint-Domingue (Haiti) and a British blockade of French ports led to a shortage of cane sugar in France. Napoleon's government financed the study and cultivation of sugar beet and rapid progress was made in the manufacturing process. Gradually, sugar beet became a competitor to sugar cane and its cultivation greatly contributed to the price of sugar plummeting over time.

## **Sugar in the last two centuries**

Slavery was gradually abolished during the 19th century. Plantation owners responded to labour shortages by using a more modern form of slavery: indentured labour. Poor people, mainly from India but also China and other countries, were recruited (often tricked) to work for a period of 5 years on plantations across the oceans. Wages were very low and conditions harsh. Worldwide, sugar markets were expanding. New sugar cane plantations were established in Mauritius, South Africa, Fiji, Hawaii, Australia, whilst sugar beet production increased and became the main type of sugar used in Europe by the mid 19th Century. "Free Trade" principles began replacing protectionism but on the whole governments continued to impose import duties on sugar, such as to encourage the local sugar beet production. For centuries before then, they had relied on handsome tax revenues from the trade and this was not about to stop. Globally, the price of sugar as a commodity fluctuated widely, overall following a downwards trend as more was produced more cheaply.

Throughout its history, sugar has been a highly political commodity. Its trade played a part in many conflicts between European empires. In America, anger caused by heavy import tariffs on rum, a by-product of the sugar cane industry, was influential in starting the war of independence against Britain and the American Civil War was caused by southern states refusing to abolish slavery in their cotton and sugar plantations. By the beginning of the 20th century, Cuba had become the world's largest sugar producer and was heavily dependent on US capital and trade for its industry. After the Cuban Revolution, wealthy plantation owners emigrated to Florida and they had much influence on US policy during the Cold War.

By the turn of the 20th century, the world population had doubled. In response to this growing market, a new economic phenomenon took place, first in the USA: the industrialisation of food production and the creation of business monopolies. Not only was more food being produced but it became cheaper to buy. Food manufacturing was revolutionised thanks to the mechanisation of agriculture and the use of artificial fertilisers, the invention of new preserving and processing methods, economies made by large-scale production, the construction of new transport infrastructure and the development of modern marketing techniques. Most of the old American sugar refineries disappeared and were replaced by a few large and increasingly powerful corporations, with vast amounts of capital to invest and crucially an increased ability to lobby and influence governments. This trend for cheaper foods and a global business model has continued to this day. All the major brands of foods and drinks that we buy, and quite a few of the smaller brands too, are owned by a handful of global corporations.

The rise of global capitalism did not stop governments from regulating the availability and price of sugar - a regular supply of the commodity was too important to be left purely to the markets. When the First World War broke out, Britain was dependent on German beet sugar for most of its supply. Immediately, sugar stopped coming to Britain and within days, the government had established a Royal Commission for Sugar Supplies (later to become the "Sugar Board") to try and remedy the problem. Sugar rationing followed, with much anger and complaints from the local population, and British farmers were subsidised to grow sugar beet. The same issues resurfaced during the Second World War. The industry was then dominated by the company Tate & Lyle and after the war, the new Labour government considered nationalising the company, so important did they think that sugar was in the British diet. Tate & Lyle vigorously fought off the nationalisation with its campaign "Tate Not State" and won!

In Britain, as well as many other parts of the world, the sugar industry has been shored up by governments for most of the last century through state protection, guaranteed prices and subsidies. This is in contrast to earlier times, when governments received substantial revenues from import duties on sugar: In the 19th century, the US Government made two thirds of its income from import duties, with sugar duties representing 20 percent of this amount. In modern times however, sugar has become so important in everyone's diet that governments have felt compelled to subsidise the market. Lobbying by powerful sugar producers has no doubt played an important part in influencing government minds.

Two thirds of British sugar now comes from sugar beet. This industry is mainly based in East Anglia and one company, British Sugar plc, processes all the local beet harvest. It is a subsidiary of Associated British Foods plc (ABF), a large multinational originally founded by Garfield Weston. The company owns several famous brands, such as Silver Spoon, Ryvita, Twinings, Jordans and Primark. In turns, 54.5% of ABF is owned by Wittington Investments Ltd, a privately owned British holding company. This company is owned by the Garfield Weston Foundation, a UK Trust, and by the Weston family, one of Canada's wealthiest families.

Tate & Lyle produces roughly one third of British sugar from imported sugar cane. The sugar production and brand name are now owned by American Sugar Refining, Inc., a large sugar cane refining US company.

## **The sugar spell**

Sugar has magical properties. Like salt, it preserves and gives taste to foods but it does a lot more besides. For one thing, sugar is pure energy. All the carbohydrates we consume are made up of a combination of simple sugars (monosaccharides) such as glucose, fructose and galactose (which is found in milk). Glucose is the basic molecule that all organisms use as an energy source. The other carbohydrates - sugars such as sucrose and complex carbohydrates (starches and fibres) - are broken down into simple sugars. Glucose is then used as fuel and the other simple sugars are either converted into glucose or stored as fat for future energy use.

Sugar has other properties besides being energy. It makes food taste sweet. It is a preserver. It adds texture and bulk, decorates recipes, tenderises meat, enhances salt and mitigates acidity (as in sweet and sour). Stored sugar lasts for years. It is also the medium used for yeast to grow when making wine and beer.

Sugar is used in myriads of ways to make sweets and desserts. It can be transformed into a hard, soft, stretchy, fluffy, moist or liquid substance and combines perfectly with fats to make some of our most desirable foods, such as cakes and chocolate. It is also added to many foods which don't taste sweet, because it actually improves their savoury taste, as well as helping to preserve them. So called "hidden sugars" are found in bread, meat, soups, sauces, frozen foods, baby foods, even pet foods. The list goes on.

So why do we like sugar so much? The taste buds in our mouth, all 10,000 of them, have receptors which are able to recognise five tastes: sweetness, saltiness, bitterness, sourness and savouriness or umami. However, unlike for the other tastes, every taste bud has receptors for sweetness. When we consume sweet foods or drinks, these receptors release neurotransmitters which activate the pleasure centres in our brain. Endocannabinoids are then released which stimulate appetite, amongst other effects. So sugar makes food pleasurable and encourages us to want to eat. Our taste for sugar starts early in life: breast milk is sweet, with roughly 40 percent of its calories coming from lactose, a sugar made up of glucose and galactose. Breast milk's sweetness provides calories and encourages the baby to eat more, which in evolutionary terms must have been a good thing when survival was tough, all those millennia ago. And our ancestors did have access to sugar: they ate fruits, root vegetables rich in sugars, sweet sap from trees and other plants, flower nectar and honey.

So we have a genetic predisposition to liking sugar, a source of pure energy which in evolutionary terms may have helped guarantee the survival of our species.

## **A more complex story**

Sugar has changed the course of history. It beats tea and coffee as a commodity that has changed the world. Its central role in colonial history and the triangular slave trade between Europe, Africa and the Americas has an impact on our society to this day. It can be studied through many different perspectives, whether economic, political, social, psychological and last but not least medical ones: Our desire for sweetness can make us overeat and a diet high in free sugars is one of the contributing factors to the obesity epidemic sweeping across the world, as more and more countries adopt our western lifestyle.

In the long gone past, people had access to all or most of the sugars but only by eating foods such as fruits (the exception was honey, which is practically pure sugar). Fresh fruits contain very important micronutrients, fibre and vitamins and crucially, they slow down sugar digestion in our gut when eaten whole. So they are important as part of a healthy diet. However, eating processed (or free) sugar is a different story. These sugars have been extracted from plants, then purified and preserved. Whilst their molecular composition is identical to that of fruit sugars, their detrimental effect has become magnified: Sweet foods such as cakes and biscuits contain much more sugar than most fresh fruits and we now also consume sugar added to an ever increasing range of foods and drinks.

What makes this even more fascinating is that we do not need to consume free sugars to stay alive. Starches, the more complex form of carbohydrates, are the only fuel we actually need to produce energy, alongside fats and to a certain degree proteins: Our body is highly efficient at processing starches into glucose. But, as we know, our brains are hardwired to desire sugar and who can resist eating it?

## **Sugar in society**

Sugar is loved. Producers love its profits. Food manufacturers love its products. Consumers love its taste. Retailers love its selling value. Advertisers love its power. Governments love its tax revenues. Most of us just love it, to get through the day. Even the slaves in the plantations loved its rum.

Here are a few facts and figures.

UK's annual consumption of refined sugar, per person, per year:

In 1810: 18 pounds, in 1850: 30 pounds, in 1880: 68 pounds, in 1914: 91 pounds, in 1950: 110 pounds.

At the start of the 19th century in England, refined sugar represented an estimated 2 percent of a person's caloric intake. A century later, this figure was 14 percent. Nowadays it can be more.

In 1650, pure sugar was a rarity. In 1750, it was a luxury only the wealthy could afford. By 1850, it had become a necessity for everybody and by 1950, it was the enemy.

Prior to the 19th century, people the world over ate mostly local foods. Only the very wealthy could afford exotic foods such as spices and sugar. During the next two centuries, a social revolution slowly took place, with at its core a different type of class structure and new ways of controlling social mobility. Sugar was an important tool in bringing about this revolution: Some historians describe it as the age of sugar replacing the age of honey. Who knows but it's possible that our 21st century will bring in a new age, as yet undefined...

In Britain, tea was the reason for the popularisation of sugar. Trades in the colonies of Asia and America were bringing tea, coffee and chocolate to the home country, as well as sugar. All three beverages have a bitter taste, so sugar was soon added to the drinks to suit the local taste buds. For reasons not entirely known, sweetened tea became the favourite hot drink (nowadays coffee has become very popular in Britain). By the end of the 18th century, the price of sweet tea was cheaper than the traditional home-made beer, through a combination of reduced duties on imports and a local tax on the malt used to make beer. Poor people, whose caloric intake may actually have declined during that century, were relying on sweet tea to moisten their bread: This was their main diet. On the one hand, the privilege of eating foods which were considered a luxury was being enjoyed by everyone (i.e. sugar as the great social leveller). On the other hand, businesses were creating a demand for the product and making vast fortunes, with the support of the government (i.e. sugar as a source of wealth and power). Commodities originating from across the world were replacing local foods.

Soon, bread and porridge were made more palatable with treacle (molasses) and sweet puddings became the new normal. As an ingredient, sugar was central to most of the recipes being added to the British diet. Gradually, the commodity lost its luxury status and became an everyday item. Everyone had the freedom to enjoy sweet foods. By 1850, Britain's poorer classes were actually eating more sugar than the wealthier classes. At the same time, the rise and rise of sugar was also taking place in the rest of the world, thanks to its cheapness and availability, and the cultural impact of British imperialism.

Sugar had long been known as a food preserver. During the second half of the 19th century, new methods were invented and fruit preserves, jellies and jams became widely available. The Free Trade movement was gaining ground with its new economic approach. As a result of the opening up of the markets, the price of sugar plummeted and the now affordable preserves and other new products were quickly adopted by everyone. Bread and jam became the main diet of poor children from 1870 onwards (the tradition is often described as "jam and the working class"). As an aside, at the time, poorer people did not eat many fresh fruits, because in excessive amounts they can cause diarrhoea. Jam manufacturers had to work quite hard at the beginning to persuade people to eat preserves, despite the fact that cheap jam was actually mostly made of sugar with very little fruits (expensive, richly fruity and spicy preserves were reserved for the well off). Interestingly, this tradition has persisted: White bread and jam is still a common meal today for children in poorer families, together with eating sweet biscuits, because all are filling and cheap.

Before the Industrial Revolution, most meals had been eaten at home, prepared from scratch using local ingredients. The kitchen was women's domain. When women started working outside the home in textile mills, men weren't going to take up cooking, were they? Spending less time preparing food became a priority for the home makers and the new jams and preserves fitted in perfectly: The concept of convenience food was born. Bread and jam bought from a shop was a quick meal, it tasted good too and had plenty of calories. These "modern" foods represented progress: A new social order was emerging where for the first time individuals could aspire to and even acquire some of the privileges reserved for the better classes, even if these privileges amounted only to some jars of cheap jam. Everyone could move up in the world by becoming a consumer, even if this ended up costing them more, both in terms of their health and their purse.

## Sugar in our times

In most parts of the world since the beginning of agriculture, the basic composition of the human diet has been remarkably consistent, in terms of nutrition, up to a century ago. The core diet was made up of mainly starch (a complex carbohydrate) which was supplemented by other foods to give it taste and variety. Proteins, fats and occasionally honey were used to complement the core starchy ingredient, alongside spices, fruits and vegetables, but they never replaced it. Just like with Spaghetti Bolognese, where pasta is the core starch ingredient, served with a tasty meat and vegetable sauce. Most nutritionists agree that this type of diet has served us well for a very long time. They say that a balanced diet should consist of about 50 percent complex carbohydrates, about 15 percent protein and no more than 35 percent fat.

The advent of refined sugar, together with an increased consumption of fatty meat, has fundamentally altered this traditionally balanced diet. In the UK, on average, 12 percent of our total energy intake now comes from free sugars (the recommended amount is less than 5 percent) and our consumption of saturated fats is also above the recommended levels. The term “empty calories” describes foods made up of pure sugars and fat, with few other nutrients. These foods have very limited nutritional value, despite containing many calories. Eating more calories than our body requires, combined with a sedentary lifestyle, are the main contributors to the current obesity epidemic sweeping across the world.

Wealthy and powerful people started this trend: They were the first at the time to be able to afford the new exotic luxuries. During the reign of Queen Elizabeth I, commoners were actually healthier than royalty, who ate a lot of sugar and fatty meat. The Queen herself had blackened teeth, ruined from eating so many sweets, and the same story goes for the French court at Versailles. But once it became a cheap commodity to buy, there was no stopping sugar from taking over the world, alongside fat, its perfect partner.

Producing sugar as a crop is an extremely high yielding business: In terms of the amount of available calories per acre of land, sugar cane grown in the tropics currently yields 17 million calories per acre. This compares to US corn and potatoes which yield 15 million per acre, wheat 4 million and soya 6 million per acre. Sugar from beet also produces high yields. The commodity has always been a very profitable crop, if managed well, even in the early days (remember slave labour). From the start, traders tirelessly worked at developing new markets to ensure maximum returns and greater profits. One well known strategy they used - and still do - is to find as many ways as possible of adding refined sugars into an ever increasing range of foods. This strategy has succeeded brilliantly: First there was sweet tea, then came jam, then afternoon cream teas, then breakfast cereals, then soft drinks, then sugar in savoury foods, bread, baby food and ready meals, then sports drinks, then smoothies, then sugar in pet food, then more cakes, doughnuts, ice creams, yoghurt desserts, chocolate, snack bars, toffee, candy, biscuits, even the old sweet pudding...

Let me introduce you to the “bliss point”. In the 1970s, a series of studies took place using rats and humans (separately of course), which confirmed that our taste and desire for sweetness is inborn and particularly strong in children. Manufacturers wanted to determine the optimal amount of sugar they should add to their products, to make them the most palatable possible and so ensure maximum sales. The studies showed that people’s preference for a particular food increased when sugar was added, up to a precisely defined point beyond which any more sugar added made the food less palatable. This “scientifically determined” point became known as the bliss point. Companies then adjusted the sugar levels for each of their products according to its own bliss point, in most cases adding more sugar than previously. This resulted in increased sales all over the world. This story clearly shows how much control food manufacturers exercise over our eating habits, whether we are aware of it or not.

Profound changes in the way we eat have taken place over the last century, and this is still happening, as witnessed across the generations. Terms such as fast food, junk food, takeaways, ready meals, all illustrate a common trend: We now often eat outside the home and when at home, we eat foods which have not been made by us but by a company somewhere else in the country: food preparation has gone from the kitchen to the factory. Taking this concept to its extreme, those of us who can afford it eat what they want, when, where and how they want it. The traditional social rituals of family meals, work canteens, school dinners, Sunday roasts, etc, have largely gone or are disappearing fast. Eating together is losing its importance as a social ritual. As humans, to be happy, we need to experience pleasures and if one is lost, we find another. And so, could it be that our once enjoyable times spent eating together are being replaced with the sugar highs of junk food and empty calories? Our innate appetite for sugar is being expertly woven into an economic system whose only aim is to make money. Junk food is cheap to produce, it is cheap to buy, it tastes good and it fills you up: just like poor people’s bread and jam of yesteryears! As one says in French, “Plus ça change, plus c’est la même chose” (the more things change, the more they stay the same)...

The above text was written by Françoise Sergy with references to these books:

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