

Introduction: the taste for sweetness

Human beings enjoy sweet food and drink. Whether or not our appetite for sweet things is innate or acquired, it seems to have been with us in all parts of the world, at all times. Sugar brings out flavors, intensifies colors, and these qualities in themselves may explain why we like it so much, but it also has other virtues. At some time in the past, people learnt that sugar was also both a preservative and a fermenting agent, while in our own day we know it is a source of calories. It is an extraordinarily useful commodity. Throughout most of human history, sugar remained a luxury. Only after 1700, when Europeans had founded colonies in tropical America to produce sugar, did it appear on the world market in large enough quantities and at low enough prices for it to become a commonplace article of everyday use. In England, the annual per capita consumption increased twenty times during the years 1663 to 1775 (Sheridan 1974: 21) and a further five times between 1835 and 1935 (Burnett 1966: 274). The rise in prosperity over these three centuries had permitted more people to buy more sugar while the popularity of tea and coffee gave them new opportunities to use it, but the full explanation for the vast increase in the consumption of sugar in England must include the growing importance of the industrial processing of food and, even if the exact cause and effect relationships are not always clear, the changes in society brought about by the industrial revolution. We, in the western world, who are the largest per capita consumers of sugar, associate sugar with sugar cane (*Saccharum officinarum* L.), and rightly so, because for several hundred years we made our sugar from this plant, but cane sugar is not now and has never been the only source of sweetness.

Sugar – sucrose – occurs naturally in plants, and fruit juices and fruit syrups have been useful sweeteners and preservatives. Fig and date syrup were important in the Middle East and unfermented grape juice, or must, was available wherever grapes were grown. The Romans boiled must to concentrate the sweetness. When the must was reduced by half, it was

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)

2 *The sugar cane industry*

known as *defrutum* and as *sapa* when reduced by two-thirds. *Passum*, or raisin wine, was even sweeter than the must concentrates. Maltose, a malt sugar made from germinating grains, was another ancient sweetener. The sap of trees may once have been a source of sugar in many parts of the world but, with two exceptions, it appears to have been abandoned early. The Chinese used the sap of the sagwire or sugar palm (*Arenga saccharifera*) as a sweetener well into historic times (Brothwell and Brothwell 1969: 73–84; Schafer 1977: 92–3, 109). In North America, the maple yields a particularly rich and abundant sap that continues to support a rural industry. The “sugaring-off” party in the first warm days of spring has achieved the status of an annual folkloric ritual in southern Quebec and northern New England; pictures of horse-drawn sleighs loaded with children and buckets of sap, and of primitive boiling houses set in the woods decorate many a greeting card and calendar in nostalgic remembrance of supposedly simpler days. The industry survives despite the high costs of production because of the distinctive, attractive maple taste of the sugar and syrup. Other sweet exudations of trees fall into the category of manna.

Manna does not have a precise definition, but according to Donkin (1980: 1) the word is chiefly, but not exclusively, applied to two composite categories of saccharine substances; (1) exudations from the branches or leaves of plants or trees, occasioned by unusually high atmospheric temperatures, or by the punctures of insects or artificial incisions, and (2) excretions of insects, either in the form of honeydew or, exceptionally, of protective cocoons. Most reports of manna have come from the desert areas of the Old World. The ecology of production is not clearly understood, and the occurrence of manna has often seemed a fortuitous or miraculous event. As types of manna differ, so do the methods of harvesting. Manna on the leaves or branches of trees can be collected by beating or shaking the trees so that the manna falls onto cloths spread on the ground. Collectors can tap the manna on the bark of trees by making small incisions to encourage the flow (Plate 1). In some parts of the world – Tibet, Southwest Asia, southern Italy – manna exudes with sufficient frequency and in sufficient quantities for it to have been marketed. Manna was valued as a medicine and appeared in the *materia medica* of societies from China to Spain. Calabrian manna was still in demand as a medicine even in the mid-years of the nineteenth century and was an important export of the region. In Southwest Asia, manna was used in the preparation of sweetmeats (Donkin 1980).

Sorghum is an Old World grass grown for grain and forage, but one variety, sweet sorghum (*Sorghum saccharatum*), is a source of syrup. The farmers of the Appalachian Mountains of the United States who still cultivate sweet sorghum in a minor way often refer to it erroneously as sugar cane. The original home of sweet sorghum is Africa, probably in the Sudan

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)*Introduction: the taste for sweetness* 3

Plate 1 Collecting manna: eighteenth-century Sicily

Source: Houel 1782–7: vol. 1, plate 32.

or Chad, from where it first spread down the east coast to Natal. It was grown around the villages for cattle feed, and the people chewed the canes to get at the sweet juice. It was taken to India, China and other parts of southern Asia, but only in the eighteenth century did Europeans become interested in its potential as a sweetener. The French were the most persistent but lost their enthusiasm over the great difficulty in converting the juice into sugar. Sweet sorghum was brought to the United States in the

4 *The sugar cane industry*

early 1850s from China via France and, in 1859, directly from Africa. The seeds were widely distributed by the government through the Middle West and South where it was thought the climate was most suitable. The farmers adopted the crop, and for about 100 years there was a sorghum syrup industry in the United States which at its peak produced 30 million gallons a year.

The industry took hold first in the Middle West, but since the 1870s has gradually retreated into the South. It has remained an artisanal activity, with the syrup being made on the farm with simple equipment, and much of it being consumed on the farm. It is not as versatile in its uses as cane sugar and is unable to compete in price. Its success in the South can perhaps be explained in terms of diet and poverty: the syrup accompanied well the traditional pork and sweet potato dishes of the region and it could be made at home without even the modest cash outlay that store-bought cane sugar required. In the hills of Appalachia sorghum syrup is made with astonishingly primitive equipment, and its survival now perhaps has something to do with the current interest in maintaining folk culture. A small amount enters commerce to please those who like its taste (Wigginton 1975: 424–36; Winberry 1980: 343–52).

Honey is a nutritious sweetener containing calcium, phosphates, iron, sulfur, vitamins C and B as well as sugar, and is a very good natural source of energy. It was, along with milk, a food of the gods, and most societies of mortals have recognized its value. Masai warriors lived on it during campaigns and in South America it was a staple in the diet of some Indian tribes. It can be gathered wild throughout much of the world, but bee-keeping greatly improves its availability. Apiculture does have a long history, going back at least as far as fifth dynasty Egypt (2560–2420 B.C.). Honey had an important place in the cuisine of the Graeco-Roman world where it enriched cakes, sauces and dressings, and glazed hams – uses which even today sound very familiar. In the Middle Ages, honey preserved meat and fruit, and sweetened drinks. In northern Europe, it was the flavoring and fermenting agent in mead. Honey is now a sweetener of only minor importance but its flavor and the fact that it is a “natural food” ensures for it a continuing demand (Brothwell and Brothwell 1969: 74–80; Vellard 1939).

Given the lack of statistical data, it would be difficult to determine when cane sugar became the principal sweetener in any given part of the Old World but some reasonably accurate surmises can be made: in India where cane sugar was first made it may have achieved dominant status 2,000 or more years ago, but among the rural populations of western Europe its use may not have become widespread until the early eighteenth century, after, that is, Caribbean sugar had begun to arrive in appreciable quantities. In the New World, cane sugar was unknown until Columbus introduced

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)*Introduction: the taste for sweetness* 5

it on his second voyage in 1493. When and wherever cane sugar became cheaply available, it easily eased its way into the local cuisine. Well-refined cane sugar is a more powerful sweetener than the ancient alternatives and being virtually pure it sweetens without imparting to food and drink any unwanted taste of honey, maple, fruit or wine. It is a better preservative than honey and, like honey, can be used to make alcoholic drinks. It is easy to store, easy to transport. Cane sugar remained unchallenged until beet sugar first came onto the market in the early nineteenth century. Sugar beet yields a refined pure sugar that is indistinguishable from refined cane sugar, and has proved to be a formidable rival. Boosted by subsidies from continental European governments, beet sugar by 1900 accounted for 65% of world sugar production but cane sugar has since recovered, and in the late 1980s beet contributed approximately 37%, cane 63%, to their combined total. Jointly, they still dominate the sweetener market although in recent years some new sweeteners have appeared on the scene that may give a good deal of competition in the future. Modern chemistry has produced the artificial substitutes for sugar such as *aspartame* that satisfy a specialized demand for calorie-free sweeteners. In some parts of Asia, saccharin is used as a cheap substitute for sugar which helps account for the low levels of sugar consumption there. High fructose corn syrup (HFCS), a maize derivative, is an interesting arrival. It is an expensive sweetener, and can be manufactured profitably only when protected by high tariffs on sugar, as in the United States. There, HFCS now substitutes for beet and cane sugar in some industrial processing of food, particularly in the manufacture of soft drinks. Crystalline fructose is now on the market, but industry analysts expect sales of only a few tens of tons by 1990 (Fry 1987: 17). Despite these inroads from the non-sucrose competition, production of both beet and cane sugar continues to increase.

The history of the use of cane sugar in the western world since the Middle Ages is well documented in trade statistics, in inventories of the possessions of the well-to-do and in cookery books. Returning Crusaders brought news of cane sugar to the nobility of northern Europe and they began to import it to use both as a medicine and as a rare costly additive to food and drink. For some time, sugar was sufficiently expensive as to be considered a suitable gift for princes to send each other, and even as late as 1513 the King of Portugal, in a rather extravagant and ostentatious mood, had his confectioners make life-size sugar effigies of the Pope and twelve cardinals that he then sent to Rome as a token of his royal esteem. Gradually, sugar moved from the medicine cabinet and guarded store-house to the kitchen and into the recipe books. A notable step in this progress occurred during the 1440s when sugar replaced honey in the making of chardequynce, a spiced quince and pear preserve and antecedent of marmalade that was served at the end of banquets (Wilson 1985: 27). Sugar was sold in loaves

6 *The sugar cane industry*

weighing up to 40 pounds, and citizens of comparatively modest means could buy portions of a loaf, a few pieces at a time. "I pray that you will vouch safe to send me another sugar loaf, for my old is done," wrote a prosperous fifteenth-century Norfolk lady to her husband in London (David 1977: 139). In Germany, by 1544, according to Braudel (1982: 191), the saying that "sugar spoils no dish" was already well-known. Sugar came in various qualities, reflecting the degree of refining. The whiter the sugar, the more refined or pure it was, and at its best it could be "exceeding white and sweet, glistening like snow" to quote the Elizabethan doctor, Thomas Muffett (1655), who moved in court circles where no doubt he had the opportunity to see a good deal of it. White sugar, especially when served from a silver caster, was in the sixteenth century a new way of conspicuously displaying wealth. Icing a cake was another. Sir Kenelm Digby (1669) was one of the first to describe how to do this, insisting of course on white sugar for the best results. The less well-refined, browner qualities of sugar were more widely used and Sir Hugh Plat made do with molasses in the recipe for an alcoholic drink he recommended in his *Delightes for ladies* (1609).

During the seventeenth and eighteenth centuries, the consumption of sugar in Europe continued to increase as the price fell. A very significant boost to the consumption of sugar came with the introduction of the new drinks. Lemonade was invented in Paris in 1630 (McPhee 1967: 71). Chocolate made from cocoa, an American plant, and tea and coffee from the East were all normally taken with sugar. In London, a Turkish merchant opened the first coffee house in 1652 (Drummond and Wilbraham 1939: 140), while tradition holds that the capture of huge quantities of coffee in the baggage-trains of the Turkish armies besieging Vienna in 1683 began the taste for coffee in central Europe. Despite the fashion for coffee and coffee houses, it did not become a truly popular drink in part because the making of a decent pot of coffee took more trouble than the making of a pot of tea, in part because coffee more than tea required sugar and/or milk to make it palatable (Burnett 1966: 124), but also because of expense. During the eighteenth century, the decline in the price of tea made it cheaper than either coffee or chocolate and readily accessible even to the poor. In England, tea became the drink of the masses, replacing gin which taxes and the rising cost of grain were making into a luxury, and even threatening that most traditional of drinks, beer. Home-brewing had once been widespread but by 1800 was becoming rare, and even commercial brewers had to look to their profits. In England, tea was promoted by the East India Company; elsewhere in Europe tea-drinking did not pervade society to the same extent, and in the south wine maintained its hold on habits and pocket-books. Towards the end of the eighteenth century, sugar approached the status of a staple in the English diet and was in the opinion

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J. H. Galloway

Excerpt

[More information](#)*Introduction: the taste for sweetness* 7

of one authority, Mrs. Glasse, writing in *The complete confectioner* (1760), an “essential ingredient of cookery.” So great in fact had the increase in consumption been that a controversy began over the effects of sugar on health. There were those who warned about the damage it did to teeth, but there were also soothers to argue that “That which preserves apples and plums, will also preserve livers and lungs” (Drummond and Wilbraham 1939: 281–2).

The decline in the price of sugar permitted people to assuage their taste for sweetness, but it also had a somber side. The industrial revolution created a new working class and gave it a new sugar-laden diet. Industrialization drew people from the countryside, from their gardens and fields, woods and streams which had provided their food, to the tenements and back-to-back houses where they had to buy what they ate. The long hours spent tending looms, mills and other machinery, by women as well as men, meant that there was less time for preparing meals at home. Food had to be cheap, easily served and it was often insufficient. One response of the English working class to this situation was to incorporate into its daily diet many cups of sweet tea, a calorie-laden stimulant that warms the body, revives the spirits and blunts the pangs of hunger but does not nourish. A second response was to abandon the careful cooking of traditional dishes in favor of cold or quickly heated, store-bought, factory-processed food. The “jam-buttie,” nothing more than factory-made jam spread on a slice of factory-made bread, is a sugar-rich, high-calorie “convenience food,” quickly prepared and quickly eaten. Sidney Mintz (1985: 180) has seen a dark side to this transformation of the English diet and has offered the hypothesis “that sugar and other drug foods, by provisioning, sating – and, indeed, drugging – farm and factory workers, sharply reduced the overall cost of creating and reproducing the metropolitan proletariat.” To one exploited group long associated with sugar – the slaves who for so many centuries cultivated the cane – Mintz would now add another: the consumers.

Food manufacturers relied heavily on sugar both as a preservative as well as a means of bringing out flavors, and their new products that increasingly came onto the market during the nineteenth century – whether jams and marmalades, chocolate and confectionery, cake and biscuits, canned vegetables and fruits, sauces, soft drinks, relishes and ice cream – raised the sugar intake of all who consumed them. It even became the custom during the mid-years of the century to add sugar, as a yeast food, when baking bread although, according to Elizabeth David (1977: 111) this is unnecessary and “not a good practice.” Industrial bakeries did indeed succeed in reducing the nutritional value of bread while at the same time causing the consumption of yet more sugar. This came through a change in the technology of milling flour in the pursuit of a uniformly white flour

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)

8 *The sugar cane industry*

that would bake into white bread. The traditional method of grinding grain was between flat stones and in the milling the germ and bran was mixed with the flour. The wholemeal flour made dark “brown” or “black” bread. It was possible to separate the coarse particles of bran by “bolting” the flour through fine linen or woolen cloth and the resulting “white” flour did make an expensive “white” bread. For some years, millers had experimented with iron rollers to grind the flour, but good results only came when porcelain rollers were tried about 1870. The roller mills worked more quickly than stone mills, were easier to maintain, gave good control over milling and, perhaps most important of all, separated the germ along with the bran to give the white flour that had been so much sought after. But the germ and the bran contain mineral salts, vitamins and protein and once they are removed from flour, the resulting bread provides only starch and a small amount of protein (Drummond and Wilbraham 1939: 41, 348–53). Without sugar added in the baking and without a dollop of jam or syrup on each slice to provide calories, there was, and is, not very much point in eating this fashionable white bread. In England, after the 1870s, bread of any other kind was difficult to find. Given the changes in lifestyle brought about by the industrial revolution and given the products of the new food industry, which became affordable to more of the population as incomes rose, the huge increase in the consumption of sugar to about 50 kg. per capita in the twentieth century becomes easier to understand.

Similar forces were at work across the Atlantic. The eastern seaboard had long imported Caribbean sugar and the United States became a producer of cane sugar when it purchased Louisiana in 1804. Consumption of sugar increased in all parts of the vast country. By the 1850s sweet coffee – coffee from Brazil rather than tea from India and China – was the favorite hot drink in city parlors as in frontier homesteads, and the sweet fruit pie – that traditional component of the country cooking of honest, God-fearing settlers, the dessert that every American grandma baked – made its appearance in the Middle West, or Pie Belt, as Furnas (1969: 460–1) likes to call it. Certainly, Uncle Sam’s reputation for a sweet tooth developed very strongly during the second half of the nineteenth century. The evidence is there in the cookery books (Hess and Hess 1977). Eliza Leslie, of *Miss Leslie’s new cookery book* (1857), deplored the addition of sugar to recipes for breads and cakes that formerly had not called for it, but she could not stay the trend and by the end of the century sugar had found a formidable advocate in Fannie Farmer. She recommended the use of sugar in baking in the first edition of her classic, *The Boston cooking school cook book* (1896), but by the 1914 edition, the last for which she was personally responsible, she had increased the recommended amounts by 100%. She also favored the sweet salads that have become so popular in the United States and recipes for them appeared

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)*Introduction: the taste for sweetness* 9

in successive editions of her book. To judge from sales – 3 million copies in twelve editions – Fannie Farmer had a keen appreciation of her compatriots' craving for sugar and understood how to help them satisfy it (Hess and Hess 1977: 60, 113–30).

The people of the western world have not only been able to satisfy their craving for sweetness but, whether through the manipulation of powerful forces in society as Mintz (1985) suggests or through their own volition, they have over-indulged. The alarms about the effects on health of this sugar-heavy diet already raised by the end of the eighteenth century have been repeated down to the present, and modern medical research has provided confirmation. Concerns about health, weight and appearance – fashion today is for the slim rather than the full-figure look – appear at last to have broken the two-century-long association between cheaper sugar and ever higher per capita consumption. Per capita consumption has begun to decline. In so far as the western world can be taken as a model, as the poorer countries of the world become more prosperous, so their populations can be expected to consume more sugar. The sweetness industry has a long future.

The key variable in accounting for differences in sugar consumption between societies is wealth, but culture, fashion and availability are also significant. The populations of richer industrial countries consume more sugar per capita than those of poorer rural countries; but within a rich country the influence of the other variables comes into play as the richer, better-educated, diet-conscious inhabitants consume less than the poorer and less well-educated. The greatest consumers of sugar, perhaps not surprisingly, are some of the producers, such as Barbados. In northern Europe, Australia and New Zealand, per capita consumption of sugar in the 1980s was above 40 kg. per annum. It was rather less than this in both North America where dietary concerns are to the fore and southern Europe, comparatively poor until recent years, and where wine has remained the popular drink. In parts of Africa and the Far East even today the annual per capita consumption of sugar is still only about 5 kg. (Table I.1).

This book is a study of the most important of the sweeteners so far used by mankind, sugar cane, which the demand for sugar has made into one of the major commercial crops of the world, one on which the prosperity of many countries depends. The scope of the book is, however, limited to one of the two basic aspects of the sugar cane industry, to production and not consumption, to the examination, that is, of the cultivation of sugar cane in the fields and the manufacture of sugar in the mills of the tropics, and not the refining and consumption of sugar in the markets of the world. The book begins with the origins of the industry in the East and traces its diffusion and evolution through the Mediterranean, where its long-lasting association with western imperialism began, to the Americas

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0521022193 - The Sugar Cane Industry: An Historical Geography from its Origins to 1914

J. H. Galloway

Excerpt

[More information](#)10 *The sugar cane industry*Table I.1 *Consumption (kg. per capita) of centrifugal sugar*

<i>Africa</i>		<i>Asia</i>	
Egypt	32	Bangladesh	2
Ivory Coast	11	China	4
Libya	43	India	10
Mauritius	41	Indonesia	13
Nigeria	8	Israel	48
South Africa	41	Japan	23
Zaire	2	Saudi Arabia	37
Zimbabwe	23	Thailand	11
<i>Americas</i>		<i>Europe</i>	
Argentina	36	Denmark	42
Barbados	64	Poland	48
Brazil	50	Spain	31
Canada	40	Switzerland	29
Colombia	35	U.K.	42
Costa Rica	60	U.S.S.R.	44
Cuba	56	<i>Oceania</i>	
Haiti	11	Australia	51
Mexico	42	Fiji	56
United States	35	New Zealand	51

Note: some countries – India, Nigeria, Colombia – consume significant amounts of non-centrifugal sugar. See pp. 139, 234.

Source: Chen 1985: 39.

and finally back to Asia, Africa and the Pacific, where new sugar colonies were founded in a final burst of western expansionism during the nineteenth century. The year 1914 provides a convenient ending point. By that date cane sugar had met the first challenge from its serious competitor, beet sugar, and had been reestablished as the primary source of sucrose; while the Brussels Convention of 1902 marked the beginning of the regulation of the international sugar market. After the First World War, the sugar cane industry entered a new phase. This industry has had such important consequences for the land use and societies of the countries where it has been introduced, and has been responsible for the migration of millions of workers both slave and free, that this book necessarily is not only a study of the production of a vitally important commodity over many centuries but also a contribution to the historical geography of the tropical world.