Adulterated Food during the 18th, 19th, and Early 20th Centuries

With the rise of industrialization in Britain and, later, the United States, the commercial manufacture of food became more centralized and took place on a much larger scale than ever before. As populations shifted into urban centers, an increasing number of individuals lacked the time and space needed to produce their own food, instead relying on mass-produced staples. Although the ready availability of such items was touted as a shining example of the prosperity of the times, a large proportion of commercially produced food and drink contained misleading or even harmful ingredients. The struggle to expose and prevent such food adulteration became one of the most significant milestones in public health during the late 19th and early 20th centuries.

An adulterant is any substance added, either accidentally or—more commonly—intentionally, to a food or beverage that is unwanted by or hazardous to the consumer. Adulterants were used to increase quantity (by bulking up or watering down), cut costs (by replacing more expensive ingredients with cheaper substitutes), or improve an item's aesthetic appeal (by changing its appearance, taste, smell, or texture). Water, for example, was used to dilute milk and gin, while sawdust helped enlarge loaves of bread. Cheap rye or potato flour was often substituted for more expensive wheat flour, and ground tapioca took the place of cocoa powder in chocolate. Coffee (which often contained a large percentage of ground chicory) was made darker in color through the addition of burnt sugar. Although such adulteration was unscrupulous, other instances posed serious health risks. Bread was artificially whitened with chalk, and spent tea leaves and coffee grounds were reprocessed using animal dung. Brewers used a plant source of strychnine to increase the bitterness of their beer and added opium to make it more addictive. Red dyes commonly used in cheeses, cayenne pepper, and candy were made with lead and mercury, while green dyes were made from copper salts. Manufacturers added sulfuric acid to vinegar to increase its acidity.

Although a number of laws had been passed in the late 1700s and early 1800s forbidding the inclusion of certain harmful substances in foodstuffs, there was no reliable way to test for adulterants, and so the laws were difficult to enforce. Consumers were forced to rely on the honesty of the merchant. Scientific advances during the early and mid-1800s, however, made it possible for the first time to definitively determine the composition of food and drink. Microscopes could clearly illustrate the differences between ingredients that might appear the same to the naked eye, and chemical reactions could detect the presence of certain toxic substances. For example, hydrogen sulfide, when added to a sample of food colored with lead or copper, produced a black precipitate. Similarly, adding a solution of barium chloride to a liquid such as vinegar containing sulfuric acid would result in a white precipitate.

In Britain, Frederick Accum (1769–1838) was the first to raise the alarm about the rampant adulteration of food. A German-born chemist working in London (and also well-known for his work in gas lighting), Accum developed many of the chemical tests used for identifying adulterants. In 1820, he published *A Treatise on Adulteration of Food and Culinary Processes*, which highlighted the many forms of adulteration and argued that such practices should be considered criminal acts. The treatise also featured the names and addresses of the few manufacturers who had already been convicted under the existing laws of producing or selling

adulterated items, which won Accum a number of enemies. Although the book sold out quickly in Britain and the United States and a German edition published in 1822 also did well, Accum's career was cut short by a lawsuit related to his alleged mutilation of books at the Royal Institution (the members of which included many prominent businessmen). Amid public scandal, he returned to Germany and his work was quickly discredited and forgotten.

Coca-Cola and the Criminalization of Cocaine

Although today an illegal recreational drug, cocaine—a central nervous system stimulant derived from the leaves of the coca plant—was a popular ingredient in many patent medicines during the late 19th and early 20th centuries. European physicians such as Vassili von Anrep and Carl Koller had noted cocaine's usefulness as an analgesic, but less reputable sources claimed it could cure everything from flatulence to cowardice.

Whether in cigarette, powdered, or injectable form, cocaine was readily available from a wide variety of companies, including Parke-Davis (once the largest pharmaceutical company in the United States) and Sears & Roebuck. Cocaine was also mixed with wine; one brand, Vin Mariani, had as much as 7.2 milligrams of cocaine per ounce of wine.

Perhaps cocaine's most famous application was as an ingredient in Coca-Cola (as the first part of the drink's name indicates). Lack of regulation at the time and the fact that the recipe was considered a trade secret make it impossible to determine the exact amount of cocaine used in Coke's production, but amounts likely ranged from 0.5 to 5 ounces of coca leaves per gallon of syrup, and there may have been as much as 1 milligram of cocaine in each glass of soda. In 1904, the company began using only "spent" leaves from which most of the cocaine had already been extracted. When the 1906 Pure Food and Drug Act required manufacturers to list habit-forming ingredients in their products, Coca-Cola stopped its use of cocaine. Coke does, however, still include a coca extract that contains no cocaine.

Although cocaine's addictive properties soon became clear, its gradual criminalization was due largely to the fact that it became linked with racial and class fears of the era. Sensationalist mass-media reports claimed that cocaine addiction was rife among poor blacks, laborers, and "unsavory" elements in society, who were responsible for rape, murder, and all manner of criminal activity. While the Pure Food and Drug Act simply required cocaine to be a listed ingredient, the Harrison Narcotics Tax Act (December 17, 1914) made it illegal for individuals to distribute and use cocaine. Pharmaceutical companies and doctors could still make and prescribe cocaine for medical purposes, but this would now be regulated and taxed. The ban on cocaine was not strictly enforced until the Controlled Substances Act. of 1970.

The issue of food adulteration was next taken up by Thomas Wakley (1795–1862), a surgeon, member of Parliament, and founding editor of *The Lancet*, a medical weekly newsletter established in 1823. In 1851, Wakley created the Analytical and Sanitary Commission, with physician Arthur Hill Hassall (1817–1894) as its head commissioner. Between 1851 and 1854, the commission obtained more than 2,500 samples of food and drink and analyzed them for adulterants. *The Lancet* published the findings in frequent reports. A Parliamentary Committee of

Inquiry was established to investigate the accuracy of the commission's reports, and Wakley and Hassall's work led directly to the passage of the Food Adulteration Act of 1860. Although this first act had little practical impact, it was soon replaced by the Food Adulteration Act of 1872, the Sale of Food and Drugs Act of 1875, and the Food Adulteration Act of 1899. Under the guidelines of the 1872 act, the Society of Public Analysts was created in 1874 (with Hassall serving as its first president) in order to monitor the safety of foods and beverages being sold in Britain.

The United States lagged several decades behind Britain in the movement to prevent food adulteration. Up until the early 1900s, state governments were responsible for overseeing food safety, resulting in a patchwork of regulations that could not be enforced across state lines. The Progressive Era's agenda of political and social reform and government regulation of business, however, primed the American citizenry for federal legislation governing food safety. The public had been alerted to the issue of food adulteration by events in Britain, as well as by the work of the United States Department of Agriculture's (USDA) Division of Chemistry, directed by Harvey Washington Wiley (1844–1930). From 1887 to 1902, the division published a 10-part series entitled *Foods and Food Adulteration* that examined the issue in great detail. But it was Upton Sinclair's 1906 exposé *The Jungle* that proved to be the most powerful catalyst for change. Sinclair's book, meant to highlight the corrupt and exploitative nature of the Chicago meatpacking industry, also revealed the horrible condition of the slaughterhouses and the animals killed there. Frightened by accounts of animals riddled with disease, carcasses contaminated with feces, and even workers accidentally falling into grinders, Americans demanded regulation. On June 30, 1906, Congress passed the Meat Inspection Act, which required the USDA to inspect all carcasses and slaughterhouses.

Passed on the same day as the Meat Inspection Act, the Pure Food and Drug Act had a much broader impact. It prohibited the production, sale, or interstate transport of adulterated food (although the law's definition of "adulterated" was somewhat vague). The act also prohibited the sale of dangerous patent medicines and required manufacturers to list all habit-forming substances used in their products. To enforce these new measures, the Division of Chemistry—later transformed into the Bureau of Chemistry and then the Food and Drug Administration (FDA)—was given sweeping regulatory powers. The Pure Food and Drug Act was superseded by the more comprehensive Food, Drug, and Cosmetic Act of 1938.

Today, the composition and production of food and drink is strictly regulated and monitored in the United States, Britain, and other highly developed nations in the West. Isolated incidents of food adulteration still occur, however—often in food imported from nations where regulation is more lax, such as the People's Republic of China (PRC). And, although disclosed to consumers and deemed safe by health officials, the wide array of food additives used in the 21st century may have as yet unforeseen consequences on public health.

Further Reading

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