

# The Little Green All-About-Caffeine

by Alan Whykes and Zachary Nowak

## Introduction

Though most of us see coffee as an incredibly banal and therefore uninteresting subject, it is exactly this indifference which breeds ignorance about one of the world's most popular drinks. Christians, Moslems, Buddhists, men and women, old and young, bums and businesspeople all want their coffee in the morning, and we thought we just might try to find out why. Our little treatise is a look into coffee's past, as well as its elaborate present, especially here in Italy.

## History and History in Italy

The origins of coffee as a drink are obscure but legends abound. One involves an Abissinean shepherd who noticed that, having eaten the red berries of a certain bush, his goats were active (even hyperactive) all night. Another legend relates that Mohammed, wounded in battle, succoured himself with coffee, then returned to the fray and killed forty men and afterwards satisfied as many women. It is likely, however, that the berries of *Coffea arabica* were first domesticated in Ethiopia (in the province known as Kaffa) and up until the year 1000 A.D. were used as a food. Gradually the use of the beans spread, but it was more like the current use of the chocolate bean: the roasted beans were pulverized and whipped in hot water, not strained out. In any event, the use of the drink spread, first to Yemen in the fourteenth century. Here the coffee plant was first cultivated on a large scale, and the drink (exported from the Yemeni port of Mokka) spread up the Arabian peninsula, reaching Mecca around 1450 and Constantinople around 1554. The diffusion of coffee was then rapid throughout the rest of the Ottoman Empire. In fact, coffee seems to be the perfect drink for such a rational, mathematical culture; coffee has been called "the wine of the Arabs."

Once again it is not clear when coffee arrived in Europe, but the entrêpont was definitely Venice. Though the Italian maritime republic was already past the apogee of her power, Venice was still the link between Europe and the eastern Mediterranean. Coffee arrived around 1570 and was initially sold in pharmacies as a medicine; between 1640 and 1654 the first Venetian coffee house opens, and from here coffee as a drink spread rapidly through Italy; by 1763 Venice alone had 218 cafés. Some Christians considered it a drink of the infidel and tried to have Pope Clement VII ban it, but he too liked the hot, inky beverage and declared it fit for Christians.

While it took a bit longer to reach northern Europe, it was here that coffee's popularity exploded. London in 1700 had around three thousand coffee houses, extraordinary for a city with a population of 600,000. Coffee houses, or cafés as they later became known, were not simply places where one could buy coffee, they were centers of intellectual ferment and business. A marvellous illustration of this is Edward Lloyd's coffee house, opened in 1677 or 1678 in London. In addition to all the other clients, Lloyd's had, by virtue of its nearness to the wharves of the Thames, a clientele of ship insurers, who backed the mercantile expeditions of the day. Gradually these insurers began to receive clients at Lloyd's coffee house, and finally Lloyd, like any other owner of a café, got sick of these "clients" who came to drink one coffee and occupied the table the whole day. He began to charge rent for the use of the tables as an improvised office, and even published a little gazette with maritime news. The coffee house became a center for maritime insurers and finally, in 1771, the clientele incorporated and became Lloyd's of London, still one of the largest insurers in the world (the café, Lloyd's, lived on for decades afterwards). Coffee houses were the gathering grounds of men of ideas, though not all ideas were so innocuous. England's Charles II decided the coffee houses were seditious and banned them, a ban that lasted all of six weeks. Cafés were literary magnets and became the place to both write and present new work; at least the first part of this literary equation still exists in our imagination of the Parisian café.

The explosive rise of coffee in the late seventeenth and early eighteenth centuries is not simply the result of the fact that everyone likes a bitter, inky beverage. There are also socio-political reasons that can help us explain coffee's ascent. The premier beverage of Europe (especially northern Europe) during the Middle Ages was beer. It was consumed not only as an intoxicant but as a source of calories, both cold and hot; a favorite recipe of northern Germany in the 1500s was beer soup. It seems hard to imagine but estimates agree that every adult and child consumed around three liters of beer a day. Several events changed

this. The first was the discovery of the potato in the Americas and its immediate and widespread introduction in Europe. The potato plant provided an easy source of calories not previously available. Another was the intellectual and technological shift from the primarily agrarian Middle Ages to the increasingly industrial early modern age. Workers needed to be more attentive to their work in factories, they needed to be alert and not drunk, and so beer was increasingly attacked as the beverage of the indolent. Coffee was the perfect drink of the Enlightenment and the Protestant spirit: a drink that woke you up and cleared your head for work. It is in this era that we find endless pamphlets demonizing the beer that a century before had provided Europe's peasantry with its calories and praising coffee, attributing to the coffee cup a slew of positive medicinal effects (often contradictory).

The rapid rise of coffee began, however, to cause a drain on gold and silver, as the beans still had to be imported from the Arab world. This led to the major European powers' starting their own coffee plantations in their colonies. This had the dual effect of closing the trade circle and providing the classic colonial product, grown in the tropics and processed and refined in the home country. The Dutch were the first and most successful with their forced plantations on the Indonesian island of Java ("Java" is still a slang word in American English for "coffee"). The Javanese farmers were forced to give up their subsistence production to meet their quota of coffee and this rapidly led to widespread poverty and starvation - in Java, that is; the Dutch coffee merchants got rich. France quickly followed suit in Brazil and the Caribbean, and the English in India. In 1825 the English also introduced coffee to the island Ceylon (of the coast of southern India, now called Sri Lanka), and while the tree thrived the native Sinhalese were not particularly interested in cultivating it. To deal with this the British brought in cheap labor from the Indian province of Tamil Nadu, and here we have the roots of the current Tamil-Sinhalese civil war in Sri Lanka. Only Germany, not yet unified and with no colonies, was unable to get colonial coffee - predictably, this led to tirades against coffee as a weakening drink and the rise of roasted chicory (a blue flower native to northern Europe) as a substitute. In due time, however, Germany became a major coffee importer and Hamburg became (and remains) one of the main ports of entry for unprocessed coffee. Of course, cycles of overproduction began early, and prices could often jump up and down; during the global depression in 1930, coffee beans were used to drive steam locomotives in Brazil.

Coffee making differed but until the beginning of the twentieth century was mainly made by boiling the ground coffee in hot water. Later the drip process was introduced (it became popular in the United States), and in 1933 Dr. Ernest Illy made the first real espresso machine, which forced steam at high pressure through finely ground coffee. By 1945, Achilles Gaggia had perfected it for mass production. Now more than 400 billion cups of coffee are drunk every year.

## Botany and Harvesting

Coffee is part of the family *Rubiaceae*, a name that refers to the redness of all the species in this family (another member is the gardenia). The genus *Coffea* is found only in the tropics and more than sixty species grow spontaneously in Africa, Indonesia, Malaysia, and Madagascar. Of these sixty, only four are cultivated commercially and of these only two account for 99% of production. These two are *Coffea arabica*, native to Ethiopia, and *Coffea canephora* (more commonly known as *Coffea robusta*), native to Africa and only discovered in 1898. *Arabica*, because it is the preferred species, has many subspecies which differ as to taste and caffeine content: San Ramon, Columnaris, Bourbon, Maragogype, Caturra, Mondo Novo, Nacional, as well as the very rare (and very prized) Jamaican, Java, Mokka, and Kina (this last one from Hawaii). *Robusta* can be grown in lower elevations and warmer climates, is much hardier and more resistant to diseases and frosts, fruits faster, and has a higher caffeine content, but it has a "woodier" and less delicate flavour. It is often used as a "filler" in coffee mixtures, with *arabica* added to make the mix taste better.

Coffee is a demanding plant, requiring tropical temperatures and humidity, humus and mineral-rich soil, and lots of care. The coffee tree grows from 5-12 meters (*robusta* is usually larger) but one species, *Coffea liberica*, can reach 18 meters. The trees are normally trimmed to keep them under five meters to aid harvesting of the beans. The flowers are large and white and are said to have a scent like Spanish jasmine; they give way to large berries (each with two beans inside), though often flowers and berries will grow side-by-side on the same tree. The berries need eight to ten months to mature, going from green to red to an almost pur-

ple color; they are 8mm to 11mm in length. A coffee tree will begin to give berries after five years.

Coffee is cultivated primarily in the Third World because of the labor costs involved, and because it must be grown in the tropics. One half of the world's coffee production comes from Brazil, half of the rest from the rest of Latin America. In the Americas outside of Brazil, *arabica* is the main type cultivated, while in Brazil and Africa mainly *robusta* is grown; India's production is about half and half. The harvest is always threatened by the dreaded coffee rust, *Hemileia vastatrix*, which destroys the leaves and berries of the tree.

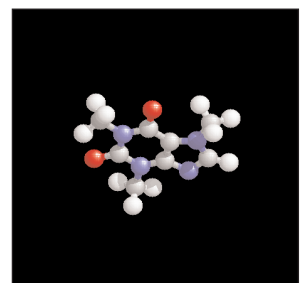
Harvesting time is variable, depending on the country, the variety, and the weather. The berries can be harvested by hand, with small rakes, or even by machine, the selection normally depending on how much labor costs. Each *arabica* tree will yield about 2-10kg of berries while *robusta* trees yield from 3-10kg. For 500g of beans one needs about 2.5 kilograms of berries. There are two processes used to separate the beans from the berries, the dry and the wet process. The dry process is used mainly in Brazil and West Africa and involves drying the beans in the sun for about fifteen days; they are then processed in a machine to remove the skin and pulp of the berry. The consistency is lower but so is the acidity, and there is more "body" to the beans. In the wet process, the beans are left in a tank overnight, then slightly fermented to make the pulp easier to remove. This results in slightly higher acidity but a more consistent quality than the dry process. Coffee growers usually have no direct link to exporters and must use intermediaries (called coyotes in Latin America) to sell their product; the coyotes often take advantage of the farmer but are then taken advantage of in turn by the exporter, who loads the coffee into 60k sacks for transport to the global North.

## Roasting and The Chemistry of Coffee

After processing and export, the beans are only potentially coffee – they now need to be roasted carefully to realize that potential. Before we discuss roasting, we need to know more about the chemistry of the coffee bean and of the drink coffee itself. The *arabica* bean contains between 0.8-1.3% caffeine, while the stronger *robusta* has between 2-2.5% caffeine by weight. In addition to caffeine, the coffee beans are made up of proteins, carbohydrates, fats and lipids, nicotine acids, sugar, tannins, bitter phenolic compounds, and minerals. Caffeine is an alkaloid, similar to those found in chocolate and tea, and caffeine has effects on the central nervous system. It can relieve headaches, is a diuretic, and a psychoanaleptic.

Roasting gives coffee beans their typical flavour, but it is a delicate process and must be done just before packaging as the beans begin to lose their aroma within 24 hours of the roasting. In the roasting of the beans, they are heated and begin to lose water and become more brittle and porous, which makes them easier to grind into coffee. The hotter and longer the beans are roasted, the more complex browning reactions occur and the more strongly flavoured they are. Lighter roasts are more delicate and distinctive but they are also more acidic because fewer acids are evaporated or decomposed by the heat. Roasted beans, in addition to caffeine, contain over one hundred aromatic molecules that give flavor. The roasted beans are then quickly ground, mixed in different quantities to make the different blends, and vacuum-packed, because contact with air causes oxidations and rancidity of the fat molecules and the evaporation of flavour molecules.

The coffee is now ready to be used; its ground form has a large surface area to give up flavour to the hot water. The finer the grind and the longer the grind is left in contact with the hot water, the more flavour the final beverage has, but the more acidic it is. Like tea, too long steeping in the hot water dissolves bitter, astringent molecules, which creates coffee where the desirable molecules are overwhelmed. Too little time in contact with the hot water, however, also leads to bitter, weak coffee because the acids are the first molecules to dissolve. Making the perfect cup of coffee is a tricky business, as we can see.



## Economics and Fair Trade

Coffee, in terms of dollars, is the second-most highly traded item in the world, coming after only crude oil. It is an enormous business and many of the producing countries are dependent on its export for their foreign exchange. While it is easy to find descriptions of the botany, chemistry, and history of this bitter little cup, it's difficult to find the bitter story of the exploitation of those who make it. We said before that coffee was the perfect colonial product; this could be written "Coffee is the perfect colonial product." The indus-

trialization of the global North and its continued economic preponderance depends in part on buying low-value, unrefined products from the global South (crude oil, coffee, cane sugar) and processing them in the global North for resale at a much higher price. A barrel of jet fuel, a pound of roasted coffee, and a bottle of rum will sell for many times more than the equivalent quantity of crude oil, raw coffee beans, and cane sugar, the raw materials used to make them.

Coffee is no different. Though European powers no longer control their former foreign colonies, these poor countries are dependent on exports to pay their enormous debts to the North and to maintain a balance of payments. Coffee farmers do the backbreaking work and then, for lack of infrastructure and education, sell their coffee to a middleman at an extremely low price; the middleman sells it to the exporter, who then sells it to the multinational that does the roasting. The final seller gets 23.7% of the cost, the roaster 6.5%, the importer 7.6%, another 26.3% goes to pay coffee, VAT, and customs taxes, 1.4% is the shipping, another 17.% is export duties, the exporter gets 3.7%, the plantation owner 8.5%, and the lowly coffee farmer gets only 5.1%. This division of labor is even enshrined in the tariff system of the European Union: the more refined coffee is when it enters the EU, the higher the tariff on it is. Raw, unroasted coffee faces a 4% tariff, while if the hull is removed and the beans are roasted before importation, they face a 7% tariff. This scale goes on to 15% for roasted, decaffeinated beans. While before there was the ICO, the International Coffee Organization, which tried to maintain some price stability in the market, since 1989 there has been a “free market.” This free market means that the producing countries, now free of the ICO’s production quotas, can all produce flat-out. The resulting overproduction means an enormous fall in raw coffee prices; this hurts coffee producers but enriches the roasters in the North, as well as taking coins from the coffee farmers pocket and transferring them as savings to the Northern consumer.

In the 1980s, starting with the Max Havelaar brand in the Netherlands, there have been moves to promote what is known as “fair trade.” This links cooperatives of producers in the global South to a distribution network in the North, avoiding middlemen and directing more of the profits to the primary producers. The coffee cooperatives of the UCIRI organization in Mexico, for example, have joined together to buy their own trucks and processing equipment to prepare their beans for export, and the beans are roasted and distributed in Europe and North America by Fair Trade labels that don’t profit excessively.

## Italian Coffees

*Caffè or Espresso* – This is the default coffee in Italy, so when you say “caffè,” this is what you’ll get. It’s essentially water passed under pressure through very finely-ground coffee, served in a little coffee cup.

*Caffè lungo* – This is another version of the espresso where there is a bit more water, to “elongate” the coffee.

*Caffè macchiato* – “Stained coffee,” this is an espresso with a dollop of frothed milk, like a mini-cappuccino.

*Caffè corretto* – Some like it strong. Take your standard caffè and add a shot of liquor, usually grappa or whisky.

*Caffè freddo* – Perfect for the summer, this is a caffè shaken with a bit of ice and sugar, then poured into a cold glass. Sometimes Bailey’s is added (they’ll say “crema di whiskey”).

*Caffè latte or Latte macchiato* – These both refer to big glass of hot milk with a shot of espresso in it. The second name means “stained milk.”

*Caffè americano* – Americans, don’t expect an American coffee. This is a shot of espresso with a lot of hot water dumped in. Popular with (guess who?) Americans.

*Marocchino* – A caffè macchiato with a little bit of grated chocolate on top, a delight usually served in the winter in a small glass cup.

*Cappuccino* – The perennial favorite of foreigners in Italy, who order it at all hours. Italians titter about this, as they usually drink it before 11AM as an accompaniment to the *cornetto*. The name comes from the Capuchin friars (*I cappucci*) who have brown robes and white hoods. Hence the diminutive *-ino* added to *cappuccio* means little Capuchin (with the brown body and white foam on top).

*Caffè Mocha* – A perennial favorite in the United States, this would be a Marocchino here in Italy. The word “mokka” refers only to the coffee maker used at home.

## Further Reading

*Tastes of Paradise* by Wolfgang Schivelbusch. The subtitle of this book is “A Social History of Spices, Stimulants, and Intoxicants” and deals with the class meaning of coffee, as well as other stimulants and drugs.

*The No-Nonsense Guide to Fair Trade* by David Ransom. This is an excellent book on the Fair Trade aspects of coffee.

*On Food and Cooking* by Harold McGee. This book deals with the biochemistry of food and cooking and explains at the cellular level what happens when we drink coffee.

*Starbucks Passion for Coffee* by Dave Olsen. This American coffee giant put out this interesting book about coffee. It's much-hated, but Starbucks does sell Fair Trade coffee.



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