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“**The Coffee Machine**
Potent Mercantile Metaphors of the
Programming Language JAVA”

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The Coffee Machine Potent Mercantile Metaphors of the Programming Language JAVA

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»The best Java is a very excellent coffee«
(Ralph Holt Cheney, 1925)

1. Prologue The Program of History

In the beginning was Green, and Green was with Sun. »And the light shines on in the darkness, but the darkness has not mastered it« (NET Bible, John 1:5). Our beginning took place on an 8th of April in the solar year of 1991, the location was a satellite of Sun Microsystems Inc. in Palo Alto, California. The offices on 2180 Sand Hill Road were decoupled from the Sun intranet so that developers could work without intrusions for the duration of a new project dubbed »Green« (O’Connell 1995).¹ The aim was to create network-capable software able to run in mass-produced consumer appliances (such as toasters or television set-top boxes) simply, reliably, cheaply, and without high performance requirements.²

Green denoted an operating system that had already provided fertile ground for a programming language James Gosling had begun creating in June 1991: a C++-family language with the codename »Oak.« Under this moniker—a specimen of

1. The project was initiated by Patrick Naughton (graphic systems), James Gosling (programming language design) and Mike Sheridan (business development), who were soon joined by Ed Frank, Craig Forrest and others (hardware and chip design).

2. Vgl. zum neuesten Baustein dieser Technologie das am 25. Januar 1999 von *Sun Microsystems* der Öffentlichkeit präsentierte *JINI*-Konzept, <http://www.sun.com/jini/>.

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which stood, perhaps apocryphally, in front of Gosling's office window, bringing forth green leaves and bitter fruits only to lose them again (see Datamation 1995)—the Green operating system was developed for Sun's own SPARCstation-inspired hardware with the name of *7 (star seven) in 1992-93, along with the platform-independent programming language Oak and the first set-top boxes for interactive televisions. Despite the uncontested technological advance of the Sun systems, Time Warner, at the time leader in interactive cable TV, decided against the Sun systems in favor of Silicon Graphics Inc. This was a blow to the further development of Oak, which only recovered in July 1994, when Sun coupled further research on the software concept with work on the World Wide Web that had been begun in Geneva, Switzerland (O'Connell 1995).

But before Sun Microsystems's new internet-specific programming language and web browser was launched on May 23, 1995, it underwent a remarkable change of name. The young tender American oak, with its light green leaves, metamorphosed into the roasted fruit of a coffee shrub from the Indonesian capital, Java. The official reason given for the change of project and language name was given by Patrick Naughton as a possible copyright infringement due to a supposedly pre-existing programming language of the same name. The team of developers was, it is said, unable to find a new name until they one day visited a local coffee shop (O'Connell 1995). There again it was Gosling's vision that saved the day when his eye singled out the high-quality Java from a long list of coffee varieties, filling the distressing gap.³

However, there are good reasons to doubt the truth of this widespread textbook and internet legend of how the language came to coffee. Hand-in-hand with the simple and compulsory change of name goes a paradigm shift that is anything but random. How did an oak tree mutate into a coffee shrub, of all things? It can hardly be due to lack of alternatives, considering everything observable through office windows and on café blackboards. What is the impact of shifting from the metaphor of a tree (of knowledge ... of life) to a quotidian product such as coffee? What made the oak tree a less than perfect symbol?

An initial difference can be found in the botanical implications of each. While the oak is subject to the changes of the season, bearing forth leaves and fruit half the year at best, coffee shrubs sport green leaves year-round (Ellis 1774, 14). Some varieties—for example Liberia or, of course, Robusta, can even be harvested throughout

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3. For a window into the coffee culture of California in 1995, and the many products and flavors that might have caught Gosling's eye see Roseberry 1996.

the solar year (Hanssen 1902, 328). This figurative perennial fertility and availability has a further implication of some significance: the number of acorn consumers is limited; and although »coffee« can be made from the fruit of the oak tree, the coffee bean adds an economic, dimension—namely, the global market and its possible domination.⁴ »The browser equals something that creates a market for tools, servers, development environments, Gosling says. ›And Java plays a key role in those tools« (O’Connell 1995).

The metaphor inherent in the name of the object-oriented software development technology JAVA was by no means chosen randomly during a midday caffeine boost. Rather, it was chosen with great care to imbue the programming language with a specific programmatic agenda.

The following takes this metaphor seriously, and explores the early distribution structure and market power of coffee using a most suitable example—the island of Java. An often close analogy between the beans from Java and JavaBeans is drawn from these results history to elucidate the intentions and implications—beyond botanical characteristics—that this cultural-historical context brings to the fruits of this structure or the harvest of this codified language. Our trajectory begins with the introduction of coffee on the Indonesian island in the seventeenth century by the United East India Company (VOC or Verenigde Oost-Indische Compagnie), which liberated the bean from an Arabian trade monopoly to bring coffee to a prospering European market. This allows us to better view mercantile tactics and underlying distribution structures, which necessitated skillful fine-tuning of market mechanisms and were always guided by the premise of massive profits to be made from the domination of the global coffee market. After a sidelong glance (à la Gosling) at an object by the name of bean and its characteristics, our analogy shall end with the consumer and the consumption process, aided by a coffee machine.

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4. Franke (1920, 153–156, 205) describes the preparation of coffee from acorns: Water from a river or well is poured over the fresh, ripe acorns in a suitable receptacle, occasionally mixing well, and then left to rest. After twenty-four hours the shells, bad acorns, etc. are removed and the water poured off. New water is poured over the acorns and the process is repeated until the water no longer becomes cloudy. The water is poured off, the acorns drained and dried in artificial warmth or in the sun and then shaken in a sack or a suitable contraption to get rid of the outer skin, which comes off easily. The acorns are then cut into four or eight pieces, depending on their size, dried well again, and then brought to be roasted.

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2. East Indian Transmission: Land appropriation by the ruler of canals

The hills are alive with the green of coffee ... Before 1696, the year the coffee shrub arrived in Java, the island's main crops were rice, pepper, nutmeg, and cloves, all of which were increasingly traded abroad. Before 1511, when the sails and flags of Catholic Portugal arrived under the command of Antonio d'Abreu, Hindus and Indians, Chinese and Muslims had fought over the fruits of the fields and the harvests of the indigenous population. Then, following in the wake of Vasco da Gama along the African and Indian coasts, Portuguese fleets entered the Malaccan Strait—the Capture of Malacca in 1511 was the turning point of and the gateway to the conquest of the Indian archipelago⁵—and successively subjugated Eastern trading posts. Very soon, commodity routes went only from East to West, and the heavily armed Portuguese galleons secured a monopoly on East Indian spices, while also trading Brahman transcendentalism against Catholicism (Voigt 1931, 25ff; Jacob 1965 149ff).

By 1522, the Portuguese had total control of the archipelago's economy. The Arabian Sea, the Bay of Bengal, and the Java Sea—and their former trade routes—were ruled by the Portuguese, who sailed those routes without competitors. Thanks to internecine feuds among Javanese nobility and the argument of the better weapons, the new potentates were able to take the monopoly on the spice trade out of the hands of the Javanese, immediately gaining incredible profits both from inner-Asian trade with China as well as trade on the European market, which was suddenly possible without the help of Arabian middlemen (Voigt 1931, 26).

But while the Portuguese were missionizing in the East Indian Archipelago by means of muskets and God's praise alone, in Europe an adversary was arising who—after the Low Countries broke away from Spain—was turning experience with inner-European trade into pragmatic economic strategies that aimed at increasingly distant harbors, with their sights always also on profits close to home. The United Provinces of the Netherlands, thanks to their advantageous position between the North Sea and the Atlantic, was becoming Europe's trading capital as early as the sixteenth century and its citizens, owners of the world's most powerful fleet, became Europe's maritime traders (Schmitt [1942] 1993, 37). In the bellies of their ships, grain from Poland was stored in Amsterdam before continuing on to Spain and Italy, from whence bricks and cloth were brought back to the Baltic (Wittmann 1975, 161f). The profits from this business were reinvested in expanding the fleets that

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5. On the Dutch conquest of the city see in 1641 see Marx [1867] 1990, 916-7 and in more detail Dunn 1984.

turned Holland into Europe's uncontested maritime power—bolstered by Calvinism and a prospering weapons trade that often knew no morals—and lay the seeds for a protocapitalist economy (Dunn 1984, 143-7; Vries and van der Woude 1997).

As the Dutch fleet grew, the North and Baltic Seas and Atlantic Ocean were no longer big enough. In 1594, The Compagnie van Verre (Company for Faraway lands) was founded with the express goal of using the nautical superiority of the Low Countries to undermine Portugal's hegemony in the East Indian Archipelago and put an end to the endless flow of spice profits into the tills of Lisbon's counting houses (Wittmann 1975, 164). The Dutch advantage lay not only in the quantitative superiority of the maritime republic's fleet, but also and above all in technological innovations that had led to paradigmatic changes in shipbuilding, navigation, and naval wars.⁶ Supplanting the traditional square rig with a new type of ship that needed only three masts, called a *fluyt* from the Dutch verb for to flow, opened the channels for previously unknown nautical tactics. No longer dependent on catching a tailwind in one large sail, multiple adjustable sails made it possible to sail closer to the wind (Hagedorn 1914, 102-118, esp. 107-8). At the same time, retourships were being built, a kind of cross between a fluyt and a full-rigged pinnace. These merchant ships, made for round-trip travel as their name suggests, had small elongated hulls, and carried the same amount of cargo as their predecessors with less tonnage and less draft (Hagedorn 1914, 104ff).

Dutch men of affairs sent young merchants on secret missions to the Indian and Iberian trading centers and ports.⁷ Officially, they went to learn overseas trade; in fact, their mission was to spy and collect as much information as possible on East Indian trade. Told to find out about an expedition to the East Indian archipelago, Cornelis De Houtman returned from Lisbon in 1594 with valuable top-secret navigation data. This information, together with the innovative maps, navigation tables, and instruments made by Mercator's student Petrus Plancius as well as the nautical knowledge compiled by Lucas Janszoon Waghenaer two years earlier under the title *Tresoor der Zeevaart* (Seafaring Treasures, see Schmitt et al. 1988, 4) provided the necessary resources for an initial expedition. In the spring of 1595, exactly 400 years before Sun officially launched JAVA, a fleet comprised of four armed ships under the command of economic espionage veteran Cornelis De Houtman set sail at the behest of the Compagnie van Verre, founded expressly for this journey. The Dutch

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6. On naval war and changes in the positioning of cannons see Schmitt [1942] 1993, 37.

7. One of these men was Jan Huyghen van Linshoen, who published a popular compilation about his adventures in Indian Goa under the title *Itinerario*, see Granzow 1986, 130-1.

government endowed them with extensive privileges, while also entreating them not to act too aggressively in order to forge prosperous trade relations with the inhabitants of the archipelago (Klerck 1938, 196f; Voigt 1931, 31). Scurvy, Portuguese manipulation of the natives, and cannon fire conspired to make the mission a failure. The three remaining ships returned in 1597 with less than half of their original crew and a cargo that barely covered the costs of the journey.⁸ But the lure of generous profits from the Far East spice trade remained, and in the very same year a second fleet was sent on its way. Arriving in Java in November 1598, it returned triumphantly in September 1600. The ships' holds were filled to the brim with cloves and 400% net profits—and their captains arrived home with good contacts to local princes as well as trade treaties with the Sultan of Malacca. They had even set up a factory in the archipelago and founded a first trading post on the Moluccan Island of Ternate (Klerck 1938, 198-9). Spurred by the sensational success of the trip, several new societies were founded in Amsterdam, all hoping to follow suit. Bitter competition between the trading companies ensued, ending in a race for Java, Sumatra, and the Moluccas that continued until the Dutch East India Company was founded in 1602 (Voigt 1931, 32-3). Not only did the profit margin of each new company sink due to the increased competition, the Indonesian sellers also reacted to the sudden rise in European demand with a sharp increase in prices. Seeing the impediment caused by fifteen private fleets acting independently, all vying for the East Indian market, Johan van Oldenbarnevelt, the adversary of Maurice, Prince of Orange, pushed against the express interests of Amsterdam and Zeeland to unite the private trading companies under government aegis. His efforts culminated in the founding of the Generale Nederlandsche Geoctroyeerde Oost-Indische Compagnie (VOC for short, the Verenigde Oostindische Compagnie). To alleviate the pressure of competition—simultaneously generating more income for the state—the government of the United Low Countries in turn endowed the United East India Company with extensive privileges. While the company's initial aim was to bolster peaceful trade, they later proved quite flexible in turning to conquest by war. At first, the VOC was given a twenty-one-year monopoly on sailing east of the Cape of Good Hope, as well as the sole privilege of rounding the Strait of Magellan. The new company was also granted the right to act as sovereign beyond the Atlantic—meaning it could appoint governors, recruit soldiers, and enter or nullify treaties in the name of the Netherlands. At home, the company's duty was to regulate the market. That also meant employing shipbuilders and auctioneers and, not least, ensuring that owners of overseas

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8. On the fleet's exact route see Granzow 1986, 128-9.

plantations met demand. The aim was to enlarge the capital of the shareholders, including the individual Low Countries, and pay them high dividends on their various investments. The statutes of the company, and this was a novelty, allowed *every* citizen of the Low Countries to buy shares, making the VOC, founded on March 20, 1602, the first publicly-traded company in the world (Jacob 1935 158).

But at the very beginning of the race, the VOC, founded for commerce rather than conflict, found itself faced by unwelcome resistance. The Portuguese, in their armed fortresses, met them with open enmity. The plan to conquer the archipelago with fair trade quickly changed tacks. Resorting instead to a naval battle, the Dutch met with immediate success. A fleet of five ships faced twenty-eight Portuguese warships in the winter of 1601. Despite being vastly outnumbered, they won the battle decisively after only three days (Klerck 1938, 201). Holland beat Portuguese commercial interests and Catholicism, and immediately presented the entire archipelago with the bill for the conquest. The government's initial prohibition on acting as aggressor and conqueror was increasingly thrown to the winds. On the one hand, the Dutch won the favor of the natives by failing to missionize (Wittmann 1975, 166), on the other hand, their organization was more structured—meaning also more repressive—than that of the Portuguese and they consistently seeded intrigue between the Malaysian palaces. In 1605, the hand of influential VOC board member Cornelis Matlief de Jonge could be felt in a number of directives in which the company's originally peaceful goal of profit maximization gave way to calls for trade and action that aimed at founding an empire. In the succinct words of the Lieut.-Governor of Java, cited by a prominent economic historian, the Dutch occupation and subsequent cultivation of the island was »one of the most extraordinary relations of treachery, bribery, massacre, and meanness« (Marx [1867] 1990, 916).

After their naval victory over and subsequent usurpation of Portugal in 1601 until around 1680—the period later known as the golden age of the Netherlands—the Dutch were able to cancel the noise caused by the bow waves of Catholic Portuguese ships on the channel connecting the North Sea to the Strait of Malacca. They then set up and controlled a sender on Java, with secondary senders on Sumatra and the Moluccas. After the conquest by Jan Pieterszoon Coen in 1619, the former town of Jacatra was rebuilt as a fortified seat of government and trade center and renamed Batavia.⁹ Dutch superiority at sea enabled the Netherlands to set up a stable and many-branched bidirectional channel that connected the East Indian

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9. Since that time, the »r« in Jacatra has shifted.

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Archipelago with the fatherland.¹⁰ Stores of, at first, pepper, nutmeg, and indigo travelled to Amsterdam and European marketplaces and in the other direction went weapons, occupiers, and beer able to withstand tropical climates.¹¹ This trade (infra)structure developed over the course of the seventeenth century to become a semi-global network that was the basis for the Vereinigten Ostindischen Compagnie's monopoly on power, and for enormous capital gains and, consequently, the ability to create markets as well as a prospering shipbuilding industry. A wide-ranging structure of communication went hand in hand with this trade network, which allowed the VOC to become the first (almost) global player in the history of economics. The company profited from price differences in trade stations that were far apart from one another. No non-Dutch trade company was able to compare the price of Indigo in China, the Malabar Coast, and at home—and correlate it with the state of the market in Surat, Mocha, and Middelburg (Schmitt et al. 1988, 41). The information was carried from A(msterdam) to B(atavia) by the ships of the company's fleet, at a transmission rate of eight to nine months in one direction and seven months in the other. Usually, three fleets were sent out on the established routes each fiscal year: at Kirmess, Christmas, and Easter. That meant if you wanted to be sure to have pepper and nutmegs on Christmas eve, you needed to put in an order about two years in advance (see Schmitt et al. 1988, 41; and for a more in-depth discussion Granzow 1986, 161–166).

»He who commands the sea commands the trade routes of the world. He who commands the trade routes, commands the trade. He who commands the trade commands the riches of the world and hence the world itself.«¹² Sir Walter Raleigh's dictum can most certainly be applied to the expansion of the Dutch network, in an analogy with English noise in Spanish transmissions in the West Indies, especially considering the amount of traffic and the burgeoning economic system. After the physical layer (transmission by ship) and the protocol layer (securing the cargo, protection from loss and interception) of the trade network were laid down, the size and capacity of the network allowed the Dutch merchants to use the net for other applications than just pepper, nutmeg, cinnamon, and textiles.¹³

In 1616, Pieter van den Broecke, a merchant/soldier for the Dutch East India

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10. Not only were Batavia's sidewalks built of red Dutch brick, the city was also given a network of canals. Here one urban intranet was linked to another via an active inter(im) net: the Batavian canals became breeding grounds for malaria-carrying mosquitos.

11. On this beer, or »mumme,« see Jacob 1935, 163.

12. Sir Walter Raleigh as quoted by Eivinn Berg in Cafruny 1987, p.38

13. On the seven-layer OSI model of *the* net see for example Tanenbaum 1990, 44-5.

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Company, was in the port of Mocha, Yemen, when he came across »[a] kind of black bean that they put into boiling water, which then also becomes black, and which they drink.«¹⁴ Van der Broecke's stopover in Mocha, »to the great amazement of the natives, who had never before seen a European ship,« brought knowledge of the drink named qahwah to central Europe long before the Turks almost took Vienna.¹⁵ Around the same time Broecke had his first taste of coffee, Arab ships brought the first coffee beans to Venice and Marseille, but the news of coffee did not travel far inland.¹⁶ It also took another twenty years for VOC ships to again docked in Mocha, which they then began to use as an inner-Asian trading post for dealings with Persia, Surat, and Ceylon. Not until the fiscal year of 1661/1662 was Yemenite coffee traded on the Amsterdam market, where demand for the product began to grow slowly, but steadily (Glamann 1958, 183-4).¹⁷ Yet the occasionally large profits the Dutch East India Company was making from trade in coffee was dampened by losses due to payments to Arabian middlemen. In the final analysis, the Dutch were dependent on trade with the Levant. To change that, they needed to learn how to plant and cultivate coffee and emancipate themselves from Arabia Felix. In Mocha, the price for coffee rose steeply between 1693 and 1695, due to small high-quality harvests (Glamann 1958, 187). Not only was supply sometimes deliberately short, prices, as representatives of Dutch trading posts discovered by wandering incognito through the city dressed as Arabs, tended to rise as soon as a ship flying a European flag was sighted (Ibid., 2019).

Another oft-repeated and adequately supported story is that Dutch merchants brought *coffea arabica* plants to Amsterdam in 1690 to try growing them—like tomatoes today—in greenhouses:

Nicholas Witsen, burgomaster of Amsterdam and governor of the East India Company, by his letters often advised and desired Van Hoorn, governor of Batavia, to procure from Mocha, in Arabia Felix, some berries of the Coffee-tree, to be sown

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14. Broecke 1634 cited in Glamann 1958, 183.

15. Broecke 1634 cited in Schnyder-Waldkirch 1988, 160. On another »first person« in the European coffee monopoly see the story of Georg Kolschitzky who not only outwitted the Turks in 1683 in his border-crossing antics, but also opened the first Viennese coffeehouse (Jacob 1935, 63-74).

16. The first news of a new, dark drink to be imbibed while hot first reached central Europe in the 1582 travelogue by the Augsburg doctor Leonhard Rauwolf, followed by many more reports. For a detailed chronology of these reports and their dissemination see Schnyder-Waldkirch 1988.

17. On the sudden awakening of a thirst for coffee and usurpation of beer bellies in central Europe between 1650 and 1700 see Schivelbusch 1990, 25-90.

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at Batavia; which he having accordingly done, and by that means, about the year 1690, raised many plants from seeds, he sent one over to governor Witsen, who immediately presented it to the garden at Amsterdam, of which he was the founder and supporter: it there bore fruit, which in a short time produced many young plants from seeds. [In this way] the merit of introducing this rare tree into Europe, is due to the care and liberality of Witsen alone. (Ellis 1774, 16¹⁸)

Contemplating such nurseries, exactly 300 years before the Oak project was developed, Willem van Outborn had the idea of taking the knowledge about cultivating Arabian coffee thus garnered, along with some seedlings, to Java (Jacob 1935, 160). In 1696, the first coffee plants arrived. They were barely cultivated and had not yet reached fruit-bearing age when they were destroyed in a flood three years later. Three hundred years later, the economic growth of JAVA also had to recover from a setback. In 1994, First Person, the subsidiary that managed the project and to which all the developers belonged, went bankrupt and was again integrated into Sun (O'Connell 1995). A second attempt at implementation was crowned by success on Java: with no disturbance from national catastrophes or other pests, the plants brought from Malabar, India in 1700 by Hendrik Zwaardekron, governor of the island at the time, took root. In 1706, »the first samples of Java coffee were brought to the East India Company in Amsterdam for judging« (Braun 1884, 69). In the following year, the Heeren XVII or Gentlemen 17, as the directors of the company were known, released an edict mandating the cultivation of coffee on Java and all other colonies in the archipelago—by all means and in large amounts (Glamann 1958, 207). In keeping with the edict, the 1711 harvest already consisted of 894 pounds of coffee that could be shipped directly—without profit-reducing Arabian stopovers—to Amsterdam and Middelburg, where the company auctioned it off at a price slightly below mocha. Exports of Java coffee grew in the following years. By the fiscal year 1732/1733, they had reached 8,265,664 pounds. Between 1721 and 1726, Dutch trade in coffee is shifted almost completely from Arabia to Java. The VOC even considered abandoning its trading post in Mocha (Glamann 1958, 207-8). Their de facto monopoly on coffee and the lack of serious competition in the harbors of Venice, Trieste or Marseille allowed the VOC to dictate prices, optimizing their profits (1935, 161).

Although the demise of the Vereinigte Ostindische Compagnie was already predictable at the height of its power in 1684—due to money problems and inept leadership, visible in rampant corruption and exorbitant military and administration

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18. Citing in part from Herman Boerhaave's *Index of the Leyden Garden, part II*, p. 217.

costs (see Schmitt et al. 1988, 13-14 and 66)—thanks to the cheap cultivation on Java and the pre-existing distribution structure they were able to hold their quasi-monopoly until 1730. While perhaps not threatening the hallmark of excellence attached to Java coffee, beans from Malaysia that had not been shipped via VOC channels began to appear on the markets of competing trade companies, for example in France, making clear that holes had been cut in the company's fine-meshed net (Glamann 1958, 201-10). What is more, from 1740, France was able to grab the title of largest coffee producer, thanks to massive cultivation in its West Indian colonies, the fertile Antilles. Not until 1791 did Java regain this position—after the French plantations were destroyed by coffee rust and rebellions by natives, who burnt the crops (Jacob 1935, 217).

More threatening to the VOC, and the catalyst for its demise, was the rise of another seafaring nation in the 18th century: England. Consumers of tea, not coffee, they had no direct consumer relations with the producing countries, but strove all the more to hold a strong position as distributors, thanks to a prospering economy—as the Netherlands had earlier enjoyed—and the nautical innovations inspired by the 1714 Longitude Acts (see Sobel 1996). Finally, the high costs of the Fourth Anglo-Dutch War and the loss of their trade monopoly in the West Indies as a result of the ratification of the Treaty of Paris in 1784 brought the VOC to the edge of bankruptcy in 1795 (see Schmitt et al. 1988, 51 and 56).

After the demise of the *Vereinigten Ostindischen Compagnie*, England, as befit its dominance over the seas and its networks, held interim control over Java (from 1811 to 1814), which was still the world's leading coffee-producing country. Not until 1850 did Brazil become the global leader in coffee production, a title it holds to this day. Back in Dutch hands, Java's leading position in coffee production in the first half of the nineteenth century was due to an elaborate method of forced cultivation, known as *cultuurstelsel* or cultivation system. Dutch administrators, now working for the government itself, and not a quasi-sovereign trading company, controlled the cultivation and harvest by the native population, which, per dictatorial decree of Governor-General Johannes van den Bosch, was required to plant a certain amount of coffee. The profits went almost completely to the Dutch government, which was hoping to thereby balance its national budget (see Voigt 1931, 88-99). Every Javanese family was required to care for up to 1500 coffee bushes to guarantee a regular and plentiful harvest. One can even, like Jacob, refer to this production network—consisting of the blanket registration of cultivated areas—as »coffee looms« (1935, 308), establishing the actual value of the control loop of Javanese coffee metaphors.

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»At the beginning of every epoch is the land grab« (Schmitt [1942] 1993, 71). Why was the Dutch planting of themselves and coffee on Java just such an epochal caesura? The oppressive monopoly of a traditional power was brought to its downfall, replaced by a new power it did not have the means to fight. This paradigmatic usurpation took place thanks to innovative technologies and the deft coupling of different areas of knowledge, opening a dominance that allowed the extremely profitable cultivation of existing and newly-created markets. Just as the Dutch pushed aside what was once Arabia Felix by means of nautical innovations and a differentiated network of monopolized market power, Sun supplanted the (object oriented) programming language C/C++ by stabilizing the language structure and coupling it with the internet.

The counterpart to the 1590's merchant-explorers whose wild adventures in the Company for Faraway Lands ended in the Dutch East-India Company is Sun's 1990's Green development team who soon closed their company First Person to join Sun. Both movements broke the one-sided dependency on the previous market leaders/monopolists by means of technical innovations, wars, and an understanding of networks. Holland improved sailing techniques with precision cartography and instruments and new ships, won economic and military battles against Portuguese, Javanese, Arab, and English insurgents, and established a global trade network with superlative freight capacity and efficient means of transmission. Sun rid JAVA of error-prone pointer arithmetic and of explicit memory management, making it a language best characterized as robust.¹⁹ No wonder then that on Java *coffea arabica*—a residuum and reference to its model, C++—was replaced by the species *coffea robusta*.²⁰

Monopolists do not like to see their status challenged, and Sun met with expected resistance when its new development hit the market. In the early era, the enemy was Time Warner, who gave Silicon Graphics the contract for interactive technology. But just as Arabia's monopoly could be broken by new infrastructures,

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19. On the coincidence of, literally, pointers in C and minarets in Arabia, Heinrich Eduard Jacob remarked as early as 1934: »from the Alhambra to the mosques of Baghdad [architecture was] devised by coffee drinkers, and never by wine-bibbers; it talks the language of Moorish dialects and lifts minarets skyward like a pointing index-finger« (Jacob 1935, 31). There are hardly any mosques on Java

20. Around 1900, *coffea arabica*, which has one main blooming period, was supplanted on Java by *coffea robusta*, which alongside better immunity to pests also needs longer to develop—it takes seven years rather than arabica's four to bear fruit—but blooms and can be harvested year-round (Hanssen 1902, 328), making it easier to meet demand. By 1920, 90 percent of the island plantations were already robust (Kempski 1924, 16 and 29-30).

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moving traffic from the land to the sea, Sun attempted to move into the desktop computer market via, on the one hand, massive support of network technology as well as smaller and slimmer ships, I mean computers. »Perhaps the biggest revolution spawned by the platform-independent, easy-to-use, object-oriented Java language is its key role in the new Network Computer (NC), also called a ›thin client.«²¹

The desktop market is dominated by two companies, claimed a strategic white paper entitled *Java Computing Changes Everything. Revolutionary Concept Now Taking Root in the Enterprise*, which deliberately does not name the monopolists.

[T]wo unchangeable facts about Java have limited the options of the monopolists:

- Java has long since reached critical mass in terms of the sheer volume of individual programmers, users, software development firms, hardware vendors, corporations and other key groups included among its avid supporters.
- It's too late to stop the tide, which is why efforts at a Java Killer to date revolve around inferior, costly, single-vendor-controlled alternatives offering few of the key benefits of Java Computing.
- *Java time.* Those who would kill or control Java underestimate just how quickly this revolutionary open technology is taking root in the enterprise.
- The biggest mistake a critic could make about Java is to assume what exists today will be the same tomorrow. Literally. (Sun Microsystems 1996, 9)²²

But it wasn't only JAVA development dynamics and growing user acceptance that led the company to believe their future would remain sunny—profits were also growing. In Germany alone, Sun's profits increased enormously after the introduction of JAVA 1.0. While in the early 1990s, growth varied from 31 to 91 million marks annually, the power of coffee soon led to three-digit increases: 119 in 1996, 177 in 1997, and 226 in 1998 (million German marks per fiscal year, Sun Microsystems 1998). Like the VOC, which in 1671 paid shareholders up to 60% on dividends (Schmitt et al. 1988, 7-12), Sun founded its desire for dominance on a network. At the beginning of their project in February 1982, Andreas von Bechtolsheim and his three Silicon Valley colleagues introduced their first product, the Sun workstation, which already used a TCP/IP protocol. The trajectory of the company followed

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21. Microsystems 1996; note the retrospective perspective. For a more detailed look at the use of thin clients, including a calculation of operating costs, see Tribble 1996.

22. Most likely the supposed »Java killer« is Microsoft's ActiveX.

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Bechtolsheim's vision of »developing connectable, open interface systems based on industry standards, making them the foundation of a company« (Sun Microsystems 1999²³). Appropriately, the company's slogan, »the network is the computer,« includes both internet (Eurasian) and intranet (inner-Asian) transmissions (see Schmitt et al. 1988, 17 and 44ff).

Just as the VOC discovered neither seafaring nor economic networks—although they did understand and improve upon earlier Portuguese advances and use them cleverly to create an empire, enrich their fatherland, and eventually lead the European market (Klerck 1938, 205)—Sun had nothing to do with founding either the internet or the World Wide Web. At the same time, the »Java revolution« was perfectly and not accidentally suited to occupying those areas that the CERN developers thought were unimportant for the WWW. To connect the Swiss research center with its global counterparts, cryptography and interception of the data transferred were as negligible as methods of controlling and limiting access and, perhaps, charging for it. JAVA made it possible to easily add a standardized economic structure to the WWW, proving once again Raleigh's motto that the path to global control is through control of trade via control of trade routes.

Following the lessons of history, seizing new ground—after breaking quasi-monopolies—suitable to growing coffee, a product able to dominate the market called global demand, producers can reap enormous profits. But even golden and sunny epochs must end, and one day a new yet unknown power will set programmatic and programming paradigms. It is still unclear what will replace the sun, but it is more than probable that it will do so by controlling the standards of the channels. Like the trade with Java coffee, the only remaining question is who will be England in the economic game the United Low Countries played with Malaysian spices and luxury drinks.

3. The Object Value of the Bean: Acts of Transmission, Part Two

After concentrating on the main on distribution structure and the means of controlling the same, we shall take a short complementary look at the object of this act: the bean itself. This examination of the material characteristics of the coffee bean and habits of its consumption corroborates and cements the metaphoric link to the programming language JAVA and its inherent aim. After all, along the channels

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23. Translators note. Since Sun Microsystems was sold to Oracle in 2010, most of the original English brochures are no longer available and, with the exception of 1996, have been translated back into English. All Sun Microsystems publications are now the copyright of Oracle.

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of the sea and the internet, it is Javanese coffee beans/java beans that are weighed and packed in sacks or bundled in archives (with the ending .jar for java archive) and sent as wares. A bean in turn is comprised of numerous elements with the multivarious characteristics of all complex objects.

»A cup of coffee is a miracle.

A miracle like a musical harmony, a wonderfully compounded assemblage of relationships.

[...] It is the fats and the mineral substances which impinge upon the taste-bud, and those which, volatilised, assail the endings of our olfactory nerve, the ethers, phenols, furfurols, acetones, ammoniacal substances, and twenty lesser satellites, which combine to produce the enthralling aroma and taste of a well-made cup of coffee. [...] There is a perpetual dance of the various ingredients. »Dance is universal.« By this proposition of the romanticist physicists and natural philosophers, a proposition which recalls the teachings of Oken and Schelling, we are reminded of what happens when we analyse the little planetary system of the coffee bean. Attraction and repulsion, affinity and harmony of numbers!« (Jacob 1935, 47)

This perpetual dance, performed not only by conspiracy theorists, brings our attention back to the link between coffee, the solar system, and the harmony of the balance sheet of a globally operating company. It is therefore not particularly surprising that Sun gave its object named bean characteristics as complex as those Heinrich Eduard Jacob imparts upon his fetish in 1934. A bean can—true to its status as seed—pass on and inherit traits. Furthermore, it is encapsulated. Every object is given a bundle of characteristics which enable it to communicate with and pit itself against other objects. If an object named Bean.java is invigorating thanks to its caffeine, this trait can be passed on to other objects, for example in the digestive tract:

[S]ummoned into the fortress of the body as an ally; as soon as it has crossed the threshold it induces a remarkable condition which, in the true sense of the word, is an »ecstasy,« a »being put out of place,« a marvelous disturbance. Promptly it brings about dilation of the blood-vessels. The casemates are opened. The central nervous system, the brain, and the spinal cord, are invaded by its stimulant action; they are »occupied« by the intruder ... The great awakener, caffeine! (Jacob 1935, 43).

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Java coffee reaches the heights of its excellence when it first passes through the stomach of *Paradoxurus fasciatus seu hermaphroditus*, the wild civet that live on Java's streets, whose pre-digestion give the brew a smoother flavor (Kempski 1924, 46). Leaving out this interim step to speed up the process can be called »just-in-time compilation.«

What, we should ask, usually happens with goods when they reach the consumer? In traditional Levantine preparation (see for example Ellis 1774, 15 or Franke 1920), the roasted/pre-compiled (bytecode) beans are ground/unpacked to a fine powder and boiling water is poured on them so that they can be interpreted by the coffee machine/Java Virtual Machine. It makes no difference which operating system is used, as long as the result is a fragrant black liquid that achieves the standard named coffee.

Many further analogies could be made, for example the correspondence between instant coffee, discovered in 1901, and a JAVA program's *Native Code*, or between JAVA script and coffee surrogates, for example from chicory. But we shall look more closely only at the legendary continuous filming of the coffee machine in the Trojan Room of Cambridge University in Great Britain. This window to the world carries the name xcoffee and controls the essential source of inspiration with a steady cam, making an image of the level of the coffee pot accessible not only for computing center workers, but, since 1991, for everyone on the world wide web under <http://www.cl.cam.ac.uk/coffee/coffee.html> (see Stafford-Fraser 1995).²⁴ In this way, xcoffee fulfils the wish to be informed about the availability of an everyday ware, so that the cup in the consumer's hand is always full. This moment is the aim of the metaphor chosen by Sun. JAVA should not only be integrated into all kinds of household appliances, the programming language itself should become a necessary everyday object. The function of metaphor, seen not least in the iconography of steaming cup on the company's brochures and icons, is to suggest an economic victory for their programming language similar to that of its namesake's conquest of the global market. The president of Sun, Scott McNealy, leaves no doubt about it: »We are not exaggerating when we say Java is everywhere.« With which we come to the second part of the metaphoric control loop, the setpoint.

The trajectory from early green under the California sun to oak brown through an office window ends finally and not accidentally with a famous dark liquid that is ubiquitous and quotidian, connecting caffeinated coders with drugged

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24. Filmed for the last time on August 22, 2001. The final image was still available on February 22, 2018.

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poets, to whom we shall give the last word, in perhaps the most famous mention of the liquid in the German language:²⁵

»Black milk of daybreak we drink it at evening
we drink it at midday and morning we drink it at night
we drink and we drink.«

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25. Paul Celan. »Deathfuge« trans. Paul Felstiner in Paul Felstiner. *Paul Celan. Poet. Survivor. Jew.* (New Haven: Yale University Press, 1995), p. 35.



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