# The Software Factory*

**Mordechai Ben-Ari**
Department of Science Teaching
Weizmann Institute of Science
Rehovot 76100 Israel
ntbenari@wis.weizmann.ac.il

Hello. My name is Camilla and I will be your guide for this tour of the 'Software Factory'.

As you may know, three hundred years ago at the end of the twentieth century, a monstrous earthquake shook the west coast of California. The island on which we are standing used to be part of a mountain range leading to a city that was called San Francisco. The sea between us and the mainland was a valley, called Silicon Valley in the days when silicon was used as a raw material in building computers. The repercussions of the catastrophe for US industry were so great that economic historians trace the decline of the US as a great power to this event.

While most of the industrial area was flooded when the valley floor sank, the building we are in was situated high up on a slope and was sealed off by a landslide set off by the quake. Ten years ago, during excavations for a new resort on this lovely island, the building was discovered almost intact. Archaeologists say that this is the only well-preserved such site in the world, and it has been invaluable in reconstructing the work environment of those pre-modern days.

Before we enter, just a note on the name 'Software Factory'. In those pioneering days of the computer industry, there was apparently a strict division between professional engineers who knew how to design and build a computer, and another class of workers who adapted these computers to specific applications, often without an in-depth understanding of how the computer worked. They were called 'programmers' or 'software developers'. Only much later did computer engineering mature to the point where it integrated theory, practice and a systems approach as do other engineering disciplines.

Please follow me down these stairs and don't forget to wear your face-masks. The level of toxic materials is not dangerous anymore, but they can be irritating if you are not protected.

We are now in the main entrance hall. The metal bars you see are the remains of a security device. The installation was heavily guarded, not so much against terrorism as we do today, but against theft of data by employees. Archaeologists claim that this artifact supports the theory that intellectual property laws were either weak or not seriously enforced in those days. The situation has been compared to earlier historical periods where production was monopolized by oligarchies, corporations or the state, and individuals felt compelled to engage in piracy or poaching to subsist. Furthermore, forensic psychologists believe that many people attracted to this discipline had infantile personalities, and resisted

---

*With apologies to Falu Koppargruva—the Copper Mine at Falun, Sweden!

efforts to place it on a sound economic footing.

We will now proceed to the main work area. The mountains of paper that must have been here have rotted away, but you can still see the steel desks and the metal boxes that held the computers. The circuitry has been removed to prevent further emission of toxic fumes; a few examples are displayed in sealed glass cases on the walls. Paradoxically, pioneering advocates of ecological responsibility came from the same class of people who encouraged the enforced obsolescence of computers that led to well-known 'computer dump' genetic mutation.

Please note the grooves on the floor. While you may be impressed by the size of the work area, these grooves indicate that it was divided up into very small cells where the workers labored. From the absence of corresponding grooves on the ceiling, we infer that these cells were partially open, denying privacy to the workers and exposing them to incessant commotion. Industrial psychologists now know that this would have seriously effected their ability to concentrate, leading to loss of productivity and undermining their mental stability.

The walls of the building are mostly original, but the windows you see were added during the restoration. Please try to imagine yourself working in an enclosed space for hours on end with no fresh air, no natural light, and no sense of space. The physical and psychological importance of these factors was, of course, only proven in the past century.

Take a couple of minutes to look around but don't touch anything.

As we continue down this hallway, note the small room on the right. It has been restored with replicas of cooking utensils that we know were used in the twentieth century such as microwave ovens. However, we do not know if such utensils were actually used in the factory. I'm sure that you will be surprised at the small size of the kitchen in such a large factory. While no archaeological artifacts remain, documentary evidence suggests that fresh food was not actually cooked on site! Instead, the workers subsisted on a meagre diet delivered by outside firms, consisting primarily of a yellow-tinted congealed milk product baked on a slab of dough, and fried globs of beef and fat served on round slices of bleached bread. It has been proven that the US in general, and California in particular, produced large quantities of high-quality food in that era, but the factory owners apparently insisted on feeding their workers these harmful foods.

Recently discovered historical documents show that the workers were forced to labor for fourteen to sixteen hours a day, six or seven days a week. Not only was this extremely detrimental to their physical health, but therapists have shown that this leads to a complete breakdown of family and community life. Divorce was rampant and children of these workers showed high levels of psychological trauma resulting from parental neglect.

Historians have not been able to develop a satisfactory explanation for the horrendous working environment in software factories of this era. It is known that at the beginning of the twentieth century, labor organizations had succeeded in passing laws limiting working hours and mandating safe, healthy environments. Though relatively weak by modern standards, enforcement of these laws would have made a significant improvement in the lot of the workers. One theory holds that a psychological technique called 'brainwashing' was used to convince software factory workers that labor under these conditions was spiritually rewarding and that selective admission to this prestigious profession was a mark of su-

periority. The theory is plausible, because the alternative—that workers voluntarily accepted these conditions—is outrageous.

Please follow me to the end of this hallway and go into the corner room. This large room shows no sign of being divided into cells. You will note also that the window frames include some ancient fragments, indicating that the room originally had three windows. Archaeologists infer that this room belonged to the coordinator of the factory, though this modern term is misleading. This person was usually called 'president' or 'manager', which were euphemistic terms applied to someone who functioned as an authoritarian dictator of the factory.

By the way, does anyone know what the average life expectancy was at the end of the twentieth century?

No... 85 was not achieved for another century.

Try to imagine what it must have been like for people facing a life expectancy of only 70-75 years. With our longer life expectancy, we have been able to develop a much more humane social system. Child labor laws require compulsory education until age 25, and in scientific professions apprenticeship continues until age 40. Scientific competence is reached in young workers aged 40-50 and major contributions are made by middle-aged people aged 50-70. Modern medicine enables most people to remain active until mandatory retirement at age 100.

Apparently these factory lords believed only in short-term productivity and exploited extremely young workers—even children under our current legal age of 25—who were able to work long hours on a subsistence diet. This is supported by an analysis of the bones of the only five victims who were found here— all mere children in their early twenties. As you may know, the earthquake took place on Christmas Day, which was the only day on which the factory was actually closed; this accounts for the low number of human remains discovered. The few victims that were found were probably forced to work on Christmas Day for disciplinary reasons.

The victims were all found in one cell, from which we can infer that work was done in teams that were punished as a group if they did not meet their production quotas. By the way, all the victims were male, though industrial psychologists now know that females are more suited for working with computers.

I ask you to devote a moment of silence to the memory of all the victims of the earthquake, as well as of those who died prematurely from diseases contracted while working the factory.

The result of using mass child labor was that the factory output was extremely high, but since it was produced by half-educated, inexperienced—even reckless—young workers, it was of such low quality that large numbers of workers were employed fixing flaws in the products. It is well documented that the quality of software products was very low until late in the twenty-first century. Strange as it may seem, the same documentary evidence seems to indicate that recklessness was rewarded rather than punished, though even twentieth-century psychologists knew that this would encourage low-quality work.

A conspiratorial theory of social history holds that this labor-intensive, low-quality industry was deliberately created to supply artificial employment to the explosively growing population characteristic of that era and not curbed until after the catastrophes at the end of the twenty-first century.

We're now back at the entrance hall. Please leave your face-masks on the hooks on the wall before you leave. You will certainly want to visit our gift shop, where you can buy repli-

cas of ancient computers and models of the factory, as well as frozen samples of the food eaten at the factory. The samples are small, because we don't want you to get sick!

Thank you very much for being with us today at the Software Factory. I hope you come away with some empathy for the people who lived in that bygone era, and with a greater appreciation for the social system of the modern world that resulted from centuries of dedicated work by industrial and social psychologists.