

Afterword

The early outsourcing of the electronics industry and its feeders

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1. If computers could speak out

In an interdependent world with more than seven billion neighbours, each and every work situation is relevant to our lives. The sympathy for and even participation in the plight of people who happen to be employed in the electronics industry have been evident in this volume produced on the basis of research work carried out in several countries. We hope that, besides the results we reap here, the seeds that we have planted will bear fruit in the future.

Once the wage stage is set, first enter human beings working for a pittance or for a living, later enter machines. As a case in point, people crunching numbers for a wage were called ‘computers’ early in the twentieth century, and everywhere they have been replaced by machines. Still, computers are among the first machines in history that can listen to their producers, talk to their users and incorporate the results of their use. They can gather stories about how they were made, who their producers were, how these producers were feeling while designing, programming, mining, and manufacturing digital devices, from early operations to assembly-lines, down to final box-sealing, and beyond. In other words, these are machines that could speak out and tell consumers about the lives of producers, their working conditions and wages in research and development, in the extraction of so-called raw materials as components, in production, in transport. Briefly, they could tell us a lot about the segments of the lives that have been consumed in these processes.

However, those who are interested in knowing the conditions in which computers, telephones and other electronic machines are developed have had to look over and above a twofold smokescreen. One has been the endemic invisibility of the workers in the industry, who are isolated from

1. I am grateful to professor Steven Colatrella for his comments on this paper.

the public debate, which in these times pays little attention to working conditions. The other smokescreen is the hermetic corporate atmosphere in electronics, a secretive industry, as has been rightly remarked here. Electronics has become a reticent industry, thus joining the industrial-military complexes and the oil industry.

My initial question is: contrary to what happened in auto and other industries in the Atlantic world that was already unionised by the 1940s, why has any attempt at self-organisation by workers met such formidable obstacles in electronics in the past 40 years? Three obstacles spring to mind: the harsh discipline on the assembly lines and adjoining residential quarters, the exacting times of delivery to a demanding global market and the solid agreements among industrial power elites and public institutions both to keep manufacturing for North Atlantic demand in other continents away from Western research and design for digital products and to grab necessary minerals at knockdown prices, regardless of the social and political consequences, particularly in Africa. So far, a tacit and barely readable postulate in these agreements is that no self-organisation from below (and sometimes not even a timid and patronising unionisation) shall see the light of day. How long this state of affairs can last is a matter of speculation for some, of concern for others.

2. Harsh discipline

Worldwide, the campaigns against the race to the bottom in working conditions, now more than three decades old, are far from being won. Indisputably some of the worst versions of that race have been checked. However, within the dire framework of global environmental risks, unprejudiced observers still have to insist on the fact that long work schedules, poor working conditions and harsh regimentation are part of a larger drama involving the health and even survival of human beings.

More generally, in modern times industry has been at the core not only of large-scale production but also of pollution of organic life for almost three centuries. Suffice it to quote here two well-known historians of science:

By 2012, more than 365 billion tons of carbon had been emitted in the atmosphere since 1751. Staggeringly, more than half of these emissions occurred *after* the mid-1970s – that is, after scientists

had built computer models demonstrating that greenhouse gases would cause warming. (Oreskes and Conway 2013: 45)

Industry has often developed with little interest in working people's well-being. To take this point a little further, I insist on what I believe to be the contemporary cornerstone of the process of accumulation, namely the drive to extract as much labour-power as possible from living human beings, in lockstep with the maximum extraction of the riches of the natural world, regardless of present and future devastation. The immediate consequence of such a drive is work acceleration with all its appendices, work hazards and heightened aggression against nature in vastly different regimes of exploitation. These trends will not go away in the natural course of things, nor thanks to a miracle worked by some saviour.

It is appropriate that a visible thread in the contributions to this volume is the attention being paid to working conditions in the global electronics industry. The peculiar relationship that links Foxconn with Apple is just a case in point. Its study has shed some light on living labour in the industry, in China as elsewhere. Neither Apple nor Foxconn were pioneers in being at the giving and receiving end of subcontracting large production orders. Other firms preceded them in establishing outsourcing at intercontinental distances in the early 1990s. However, the scale and the duration of the relationship between Apple and Foxconn are remarkable. They characterise an almost twenty-year series of collaborative deals in which Apple has collected rich rewards, while Foxconn has tried – often successfully – to make its own gains, despite its weaker position. Both have agreed on how they treat industrial workers in China: workers under tight control, long hours on the lines, overtime at management's will and more than 60 per cent of the workers living at work, where some amenities on so-called campuses are no more than cosmetic attempts to mitigate the squalor of dorm rooms where double-bunk beds for six to twelve workers and locked gates for all at night are the norm.

On a much smaller scale, living and working arrangements in central and eastern Europe and in Latin America leave a modest measure of individual choice to workers in the electronics industry who are looking for a place to live. Low-end hotels, condemned and cursorily refurbished buildings, pensions, private arrangements, with free entrance at all times at night are the norm for migrant workers. However, no matter how long the leash in living arrangements may be, the long work schedules and the

low wages are aimed at keeping workers available to operate within a 'looming syndrome of flexibility', as it has been aptly called, characterised by an availability for work at any time, and often with arrangements barring any legal claim to overtime pay. In these countries the flexibility syndrome in digital manufacturing has already lasted for more than a decade.

National differences in working conditions and in wages are critical, but an expanding trend towards international convergence towards some of the harsher traits of the Foxconn model is disquieting, particularly in the realm of casualisation, long work schedules, denial of paid overtime, a ban both on any attempt at self-activity by the rank and filers and even on paternalistic trade unions.

Working people in electronics manufacturing have been struggling with scarce resources to move towards a decent life despite adversities deriving from both public institutions and private business. We should take a long view of their current plight. Beginning in the mid-1980s North American and Western European electronics has become the most globalised industry, surpassing textiles and apparel. While textiles and apparel have been outsourced to selected industrial areas in Asia since the 1950s, and electrical appliances since the 1960s, manufacturing in electronics has been established predominantly in the People's Republic of China since the 1990s. The pool of labour there consists of cohorts of teenagers and young adults who have migrated as second-class citizens from the countryside to the industrial areas.

The subcontracting of electronic manufacturing to China is a system that promotes a high turnover of workers and that consequently needs a continuous supply of young people. When Foxconn and other electronic subcontractors cannot find enough recruits from close or remote pools of young migrants for their plants, they even recruit students at vocational and technical schools, particularly at peaks of demand (see Chan et al. in this volume). Recruitment of teenage students would be impossible without the active support of central and local institutions, from local authorities to teachers. Would this recruitment in school and public support be possible in electronic manufacturing elsewhere? There are early signs that the institutional space for study-work programmes within technical schools is expanding – in Europe, for example – while reducing the scope of long-established systems of apprenticeship.

As for workers in their twenties and early thirties in electronics, as well as in other sectors, two issues are noteworthy worldwide, although national differences remain important. The first concerns daily reproduction, which is an ordeal of routine compression to minimal economic costs for those who live and work in the factory-dormitory regime, a policy that corporations have derived from early Chinese industrialisation and that they have pursued since they moved industrial operations to China. The general deprivation that male and female workers have been subjected to has developed on a huge scale in industrial plants and adjoining dorms. Hundreds of thousands of individuals have been concentrated in each of the huge Foxconn plants. Such dimensions had never been reached in the previous five centuries of capitalism (Freeman 2013).

Even more striking is a particular characteristic of such places. In human history it had never happened, as far as we know, that not a single child has been allowed to sleep legally in a non-military perimeter containing from 200,000 to 400,000 people at any time. In other words, non-military areas where life cannot be legally transmitted from generation to generation are taking hold and expanding. Usually, even in the most trying situations adult people used to feel, if not the actual presence, at least a penumbral trace of children, of their voices and their play. The absence of signs of the transmission of life from one generation to the next around the industrial sites of factories has permeated Foxconn plants elsewhere, in Europe as well as in Mexico (Cecchi and Sacchetto 2014). Children must stay elsewhere, usually far away from their parents, who often are migrants. A silent exclusion of infants and children has been enforced not only in industrial areas but also in relation to the parents who are economically constrained to live at work.

A corollary of this state of affairs is the effacement of the notion of 'proletarian'. For more than two thousand years proletarians have been understood to be people of the lowest layer of the non-enslaved population belonging to a state, those who possess only the children (*proles*) under their authority. In recent decades, apart from the one-child policy in the People's Republic of China, the freedom to have children has been undermined in many industrial countries, not by law but through economic constraints that can be summed up in the categories of social instability and the precarious wage. In other words, to give birth to children is becoming indefinitely postponable to young adult people. This delay combines with other factors that cause couples to renounce having

children. Even in the lower depths of poverty in the nineteenth and twentieth centuries the drive to accumulate had not turned into a social predicament that would induce proletarians to be childless.

Any labour regime involving living at work is a peculiar variation on modern and contemporary total institutions (Goffman 1961). In comparison with the pattern of total institutions, a labour regime of living at work offers a peculiar threefold variant, two aspects leaving some spatial latitude, one seizing individuals at their roots. First, those who have relatives and friends or, alternatively, wages that allow them to avoid living at work are usually free to do so. Second, even those who live at work are free to get out of their rooms daily and experience a modicum of recreation in their lives, provided that they go back to their dwellings and to their work according to schedule before the gates of the dorms are locked. A third aspect concerns the fact that the disciplinary regime warps the intimacy of those who live at work. They are constantly invigilated by some authority so that they behave in accordance with rules that are dictated from above, in particular to avoid any promiscuity and observe strict temperance. In other words, the long chain of slave quarters, mining camps, workhouses, poorhouses, company towns, concentration camps and isolated compounds under surveillance is far from fading away.

Legally, living at work and availing oneself of the right of locomotion for some hours in the day would not bar a woman and a man lodging in separate dorms from marrying, but in fact it is impossible for couples to form a functioning family within a regimented compound under the shroud of a twelve-hour daily work schedule. This stifling lack of freedom to reproduce was applied only for short periods of time and against selected groups during early modern slavery in the Americas. In short, when the power to reproduce depends on the vagaries of corporate profits, that power vanishes. The separation of work from other human activities has morphed into the tyranny of work at the expense of any other human activity. The conflict between the reasons of accumulation and the reasons of life is bound to smoulder, at the very least, with long-term consequences.

3. The structures of consumer demand morphing into the strictures of acceleration

In general, as much as the production of electronic commodities is kept at a distance from public view, most consumers of electronic products

keep themselves at a distance from social relations in the industry. Undoubtedly, software tends to draw more attention than hardware, as research has concentrated on software to respond to the needs and feelings of potential buyers. By contrast, hardware has mainly looked dull. Later it has proved itself to be a decisive factor in the success of the personal computers of some big brands, first of all Apple. In software the list of innovations that have been presented as strokes of genius is long. That list would be shorter if non-profit-oriented pioneers and public expenditure on electronics were given their due for results that were appropriated by newly founded corporations (Mazzucato 2013).

As to hardware, the visual and tactile elements of electronic products have been and remain indispensable in the process of alluring potential customers. Since the 1990s Apple's care for the sensory effect of its products on the public has become obsessive. Paradoxically, the enticement of digital hardware that had been rated as irrelevant (much like the low quality of primal digital printing machines) in the early years of personal computers has taken on an unexpected importance since the 1990s. It has been accompanied by the growth of demand. In its turn, the growth of demand has catalysed the speeding-up of work to feed ever more demanding global assembly-lines on a much larger scale than its historical precedent, the United States automobile industry early in the twentieth century. Once again, the frenzy of new products has structured the regimented order both of speed-up for assemblers, and of volumes of output and sales for technicians, engineers and salespeople.

There is ample room for further research on these groups. In particular, salespeople in electronics are on the lower rungs of income in the United States, with approximately \$25,000 annual net salary at Apple stores in 2012. Salaries of engineers with at least a bachelors degree in global electronics have been kept in check by increasing the number of educational institutions and facilities in the field. In the United States a special immigration policy to attract electronic engineers and technicians, particularly from Asia, has combined with outsourcing some of the skilled operations there. German employers have complained of a looming scarcity of electronic engineers, possibly with the aim of controlling salaries by attracting young skilled people from abroad.

So-called employee loyalty has meant renunciation of any attempt at unionisation in most electronics firms, not only among salespeople, technicians and engineers, but also among assembly-line workers.

Business-provided prevention of unions has even led a corporation to plan a company town in California (Albergotti 2013).

Some of the current difficulties facing organisational efforts in working class self-activity derive from the early outsourcing of electronics. Counterfactually, if in 1913 Henry Ford had started a pattern-setting move towards outsourcing auto assembly lines to meet the surging demand for cars around 1910, would the social conflict in the United States leading to unionisation in the 1930s have happened? Among the infinite possible outcomes at home, let alone abroad, one may consider that such conflict would have been nipped in the bud, or procrastinated. Moreover, if the sit-ins in the Detroit and Flint auto plants had not taken place for everybody to see, how would the reorganisation of militant trade unions after the Second World War have fared internationally? We do not know. What is certain today is that nobody can legitimately put the blame on workers in Asia or in Central Europe or in the Atlantic area for the seemingly slow pace of self-organisation in electronics. Workers did not land on digital devices, the lords of digital devices landed on them. We should be grateful to these workers for what they have been doing to resist exploitation and to avoid the race to the bottom in a rugged landscape of extreme working conditions and frantic Asia and North Atlantic demand.

4. Layers of command

Electronics has evolved from the military-industrial complex in the 1950s and 1960s to become the leading industry early in the twenty-first century. Until the late 1970s the three-tier hierarchy in software was simple and martial: the managers at the top and in descending order the analysts, and the programmers who were experiencing a crisis of social identity, as Philip Kraft found when he studied their circumstances at work (Kraft 1977). The production of hardware was a task of electronic engineers, technicians and skilled workers, and was the turf of established oligopolies. On the West Coast of the United States, young hackers were active in the digital anti-oligopoly and anti-profit movement. Silicon Valley anti-establishment communities arose in the wake of 1968, some of them later turning up in the crucible into the new electronic oligopolies, while others regrouped as radical activists.

As the Asian electronics industry developed concurrently, and as global demand for digital items was rising exponentially, a new international

division of labour in US electronics was in the making. While research and development remained by and large in the United States, manufacturing moved tentatively to East Asia, and to a minor extent to central and eastern Europe. This move was no novelty. Since the 1950s US direct investments abroad have leaned on large pools of labour in East Asia, particularly in the four so-called Asian tigers, for apparel and electrical products. In the 1980s the novelty was that a new and rising industry such as electronics had hardly developed large plants at home before moving abroad. Textiles, the leading industry in the nineteenth century, and auto, the leading industry in the twentieth century had developed on native ground, had been unionised on native ground and had remained guarded when moving abroad (Gambino 1975).

In contrast, electronics corporations moved to outsourcing in East Asia in little more than a decade, the 1990s, regardless of proximity to consumer markets, thus increasingly depending both on international logistics and on the hosting governments' precautions against workers' possible attempts at self-organisation. The US President's question to Apple's CEO Steve Jobs in 2012: 'Why can't that work come back?' was a plea for an explanation and not a demand to bring the electronics industry back home. Steve Jobs' straightforward refusal: 'Those jobs aren't coming back', not only spoke volumes about current decision-making in investment and employment, but harked back to the critical edge of offshoring as described by the *New York Times* in immediate and unconditional support of that refusal: scale of overseas factories, cheaper workers, flexibility, diligence and industrial skills (Duhigg and Bradsher 2012). The Apple CEO's seemingly rude reply to his President enshrouded a resigned attitude to employment by the executive power and a staunch resolve to maintain global discipline by Apple, while avoiding workers' direct adversarial trajectories. In other words, if the price to be paid for industrial outsourcing is to lean on otherwise hostile regimes, the price seems to be fair as long as the *entente cordiale* between North Atlantic corporations and Asian governments moves on both high profits and a peculiar version of indirect rule.

However, when the issue is the extraction of primary materials for electronics, predatory policies prevail over indirect rule. These notes would be reprehensibly truncated if the least lit aspects of the electronics industry were ignored: the arenas in which the extraction of minerals, and in particular of tantalum, has taken place have been an essential part of the electronics industry and not a peripheral appendage to it. Tantalum

is a strategic component for the manufacturing of digital products. It is found in composite columbium-and-tantalum-bearing ores, or coltan for short. So far, these minerals have been mined predominantly in Australia and Africa, where the east of the Democratic Republic of Congo (Eastern Congo for short) has been the most important source of continental extraction for almost fifteen years, although part of its extraction of coltan has been attributed to other countries, especially Rwanda, so that its origins in war-torn eastern Congo could be denied. Uncertainties remain about the quantities of tantalum that some countries, particularly in Africa, have mined since the late 1990s (Jerven 2012). Other countries involved in mining coltan are Brazil, Canada, China, Kazakhstan and Russia (United States Geological Survey 2013). Potential future mines are currently being explored in every continent, possibly leading to a new scramble for raw materials.

Contrary to reports by campaigners who oppose the extraction and trade of conflict-charged minerals, eastern Congo does not hold 80 percent of known stocks of tantalum-bearing ores, at least after the first decade of the twenty-first century. Michael Nest has calculated that Congo and surrounding countries have about 10 per cent of the reserves of tantalum (Nest 2011). In his courageous and documented volume *The Looting Machine*, Tom Burgis writes:

The real figures might be much higher, given that reserves elsewhere have been much more comprehensively assessed ... Depending on the vagaries of supply chains, if you have a Playstation or a pacemaker, an iPod, a laptop, or a mobile phone, there is roughly a one-in-five chance that a tiny piece of Eastern Congo is pulsing within it. (Burgis 2015: 30)

Thanks to the boom in mobile phones at the beginning of the new millennium, prices for tantalum ores rose tenfold in the course of the year 2000. As eastern Congolese young men left farms and grabbed picks in their attempt to make a living in dire times, warlords that had organised their militias during the first years of the Congo war press-ganged others into mining. As much as the rising price of tantalum has not benefitted former farmers, it has sustained the warlords in their rush to make money quickly, while they were striking deals of co-belligerence with military officials and were bringing coltan to the *comptoirs* (trading houses) where international traders from all continents could easily buy it. United Nations investigators have documented how the implicated European

and Asian companies purchased or pillaged Congolese minerals (UN Security Council 2001, cited in Burgis, p. 32 and footnote 6, p. 254). The crucial moves have regularly consisted of quick smuggling of the minerals (and especially coltan) out of the country. Once coltan is abroad, it can be easily declared conflict-free and clean. Then to the predators go the spoils.

While states endowed with stable public institutions, such as Australia, have developed large-scale industrial mining operations of coltan, in eastern Congo most coltan mining is done by hand. Over the years, the warring militias have waged a myriad of conflicts to finance themselves by exploiting press-ganged miners digging at gun point.

In Africa, and particularly in eastern Congo and neighbouring countries, the resource curse has made lands rich in resources much poorer and exponentially more conflict-ridden than lands endowed with fewer resources, at a time when technocrats have been extolling the contributions of the new technologies to a more connected society, and when some self-satisfied moralists have concluded that the demise of forced labour worldwide is already in sight. No matter how the arrangements for the supply of minerals will change, the history of the first twenty years of frantic demand for tantalum to use in digital products has been written in letters of blood in Africa. It is the history of one of the cruellest scrambles for resources, in a so-called market where guns have regulated business, while many American, Asian and European corporations skirted round the subject, at the very least until Section 1502 of the Dodd-Frank Act was signed in 2010, if not later (Smith 2014: 6). Dire developments in Central Africa as well as elsewhere do not bode well for transparency in the extraction and trade of minerals

5. Acceleration as an invisible thread

I shall conclude with a plea. In the scenario of this research project the secret agent has been time, as in the cryptic title of Joseph Conrad's novel. The natural limits to acceleration in industrial work may be yet to be reached. New experiments in physical and psychological human endurance have been under way for a long time, particularly in the military as well as in sport, and probably will continue to expand into commodifying fields of animal reproduction.

It is plausible that the individual's psychic defence mechanism has not yet been corroded, thus putting limits to some forms of extreme acceleration of the pace of work, in electronics as in other industries. One cannot take the poor breaks in a twelve-hour work schedule as serious attempts to create islets of relief. Social movements like those of 1968, and the early green campaigns have tried to resist the compulsion to accelerate performance at work as well as elsewhere. In general, it would have taken much more than a 1968 to set new rules on the intensity of industrial production. The entire set of background assumptions of modernity, be it in the political sphere, or in the economy, or in education, or even in the biological rhythms of living organisms has depended on the undisputed dogma of acceleration. What appears to be increasing speed is in fact expansion of the forces of production in their seemingly inexorable and progressive march. While people in modern societies experience a general scarcity of time, the plight of exploited individuals in mass production has been much more specific and dramatic as they have been compelled to race against a tyrannical clock splitting seconds on regimented assembly lines, in transportation and on computers. They have been actively isolated, but they should not remain isolated.

Only at its best moments, for instance in newly unionised auto plants in Detroit and Flint in 1937, was the newly formed United Auto Workers Union solid enough to impose limits to the intensification of work. Only 1968 had the power to abolish work with constantly raised arms on auto assembly lines in continental Europe. Until the issues of industrial speed-up and acceleration in the rhythms of life become legitimate subjects of debate and campaigns in the political arena – like global warming and environmental pollution – there is no foreseeable end to underground or overground streams of unrest.

No open debate, no public arena can survive for long if people have to work very long hours – and for low wages – while vital decisions about their lives are taken in distant boardrooms, with all the phantom features of faceless oracles. Not even a system of political representation, let alone a vigorous democracy, will survive for long under such circumstances. This project will achieve its aim if it helps to encourage a debate by and for working people who are enclosed in their factories, dorms, compounds, ships, company towns and company cities in a seemingly solid, and in reality shaky industrial order.

At the cost of iteration, all work situations are relevant to lives, present and future. They are relevant in China as well as in central and eastern Europe; in Mexico as well as Brazil; in eastern Congo as well as Cupertino, California. Rates of profit and rates of exploitation may differ widely in electronics from country to country, and nonetheless they are the source of a long and invisible warp winding the globe.

Socially meaningful situations should be considered with unfettered analyses of power relations at workplaces as well as elsewhere. This is my final exhortation. As a corollary I observe that hardly any research on workers and work has been at safety distance from scholarly disaster if the researchers have been unsympathetic towards those who do the heavy lifting.

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