

The (Im)possibility of the Intellectual Worker Inside the Neoliberal University¹

Dr Grant Banfield, Flinders University (Australia)

Dr Alpesh Maisuria, University of East London (UK)

Dr Helen Raduntz, University of South Australia (Australia)

Introduction

Universities ... do not educate at all. Their mission is to turn us into ignorants so that we may be treated as ignorants in conscience. At most, they teach us how to choose between two evils. We educate ourselves by learning how not to choose between either. When some day we enter the university – that is to say we occupy and decolonise it – we will not merely open the doors and redecorate the walls. We will destroy both so that we may all fit in. [Santos 2014: 12 & 14]

... the inherent tendency of capital is to produce people who think that there is no alternative. Marx was clear that capital tends to produce the working class it needs, workers who treat capitalism as common sense. [Lebowitz 2012:15]

The provocation and point of this paper is that universities of the North during the era of neoliberalism of have been sucked of their human life-giving capacities. What remains are closed doors and bare walls. Lest we give the impression of a hopelessly romantic view of the university (and embark upon a lament for some paradise lost), let us be clear from the outset: there is no such place – and there never has been. As will be outlined below, a consideration of the history of the university reveals it was born and has persistently drawn its life breath from oxygen formed in the tension ridden mix of an impulse to human freedom and

¹ This paper was presented at the *International Colloquium Epistemologies of the South* (10 – 12 July 2014, Coimbra, Portugal) as part of a panel session 'Deepening Ways of Knowing and Doing: Critique, Democracy and Praxis Across the North-South Divide in the Social Sciences and Political Economy' organised by Prof Joyce Cannan (Birmingham City University, UK) and Dr Sandra Maria Gadelha (Universidade Estadual do Ceará, Brazil). It is part of an ongoing program of international research involving the three researchers entitled *The Changing Nature of University Academic Work* (see below).

accommodation to powers of church, state and capital. But, we contend, history is now the witness to the almost complete dissolution of that tension: to the exhaustion of emancipatory impulses in the service of indoctrination, regulation and accumulation. In the church-state-capital triad, it is the latter that has emerged hegemonic. Importantly, we argue, its dominance has emerged with the rise of what Paul Baran and Paul Sweezy describe as monopoly capital: the move from competitive (small entrepreneurial business) forms to monopolistic (large corporate business) regimes of accumulation (Baran & Sweezy 1966). A central feature of monopoly capitalism is its need for significant financial support of national states and the harnessing of public resources such as universities to feed accumulation. It is no surprise that neoliberalism, despite its neoclassical economic pronouncements, is a 'big state' advocate (Harvey 2005). Our argument is that neoliberalism, as the political workhorse of monopoly capitalism, has overseen a makeover of universities so they might behave like a monopoly capitalist corporation. Our time is the time of the near global domination of capital. The university has succumbed. In its colonisation – its capitalisation – the university has not only reinvented itself as a willing ally of capital but has also set about remaking itself in its image.

In opening conversation around this provocation, this paper draws explicitly on work from a research project entitled *The Changing Nature of University Academic Work*². The project is a qualitative study employing in-depth interviews with Australian and English academics. It aims to shed light on how academics interpret changes over time to universities and the impacts these have had on their own day-to-day work. The analysis of interview data has revealed three dominant but inter-related themes: the rise of managerialism, the push to anti-intellectualism and the subservience of academic work to economic imperatives. While this paper does not intend to provide a detailed discussion of its empirical data, it will be instructive on occasions to draw on academic voices from the study. In opening a provocation around the (im)possibility of intellectual work in the neoliberal university, this is one such occasion. The account is provided by a senior academic who recalled the time when a young Indigenous woman academic came to his door in considerable distress:

I can remember it as if it was yesterday. After a gentle knock on the door, Alima came in. I could see that she had been crying. She stood as if she did not know what to do. I asked her if she'd like to sit down. She did. She told me she had just been for her Performance Review with the Head of School. Now, the Head of School was an

² This is a pilot project that is intended to provide the methodological and conceptual bases for a wider study of the changing nature of university academic work.

appointment from outside the university. Up until this appointment we had always filled the Head of School internally, from within the School. We had a history of collaborative governance. But the Faculty of the University had decided that we needed 'fresh ideas from outside'. It determined that times had changed and we had to be more 'outward looking'. The arguments seemed reasonable and from what I remember most of the staff thought it made sense. But we did not foresee the kind of person we were to get. I suppose we were a bit naive. We thought collaborative governance would continue. Nothing could have been further from the truth. He was dictatorial, authoritarian and verbally aggressive. I recall at one of the first staff meetings he held he said: 'I have come to change the culture of this place and you are either with me or against me'. I remember this because it was the time of the First Gulf War and these were the words of Bush Senior when he was putting together the 'Coalition of the Willing'. Anyway, Alima was in my office. She told me how she had been told by the Head of School that she was incompetent and she was in line to be 'performance managed'. This, I have to say, was outrageous. Alima was a bright young academic. She brought her commitment to social justice to her classes and she was developing a healthy publications record. She was a serious and hard working young academic. Alima told him she thought she was performing well above expectations and also reminded him of a significant national Indigenous award she had recently received. Alima told me, and I couldn't believe what I was hearing, 'I asked him to tell me where I had to improve, he didn't do this, he just told me that being Indigenous and a woman I get advantages that others do not'.

The Intellectual Worker and the Management of Academic Labour

In the continuing makeover of the university in the image of a monopoly capitalist corporation, it has been the imposition of 'New Managerialist' mode of governance that has been at the forefront. As one retiring academic informed us:

In the old days we used to fear the God Professors. They held the power. But today we have the God Managers. At least the God Professors had respect for intellectual work. They might disagree with your position but they encouraged you to put it forward. It was what the university was about. The God Managers have no interest, and for some around here, no capacity for intellectual work.

We argue that the rise of the 'God Manager' – the New Managerialist – is to be seen in the context of Taylorist 'scientific management' so well outlined by Harry Braverman (1974) forty years ago. It is interesting that Braverman's labour process theory has faded from the eye of critical educators over the past ten years or so. Part of the significance of our research, as we see it, is to bring Braverman's work back into critical light and demonstrate its explanatory power for contemporary times.

We can only describe our contemporary time as a blitzkrieg attack by powerful corporate interests on not only the governance of universities but also the regulation of academics and students (Bousquet 2008; Hill 2012; Noble 2001; Soley 1998; Tuchman 2009; and Washburn 2005). But amongst many critical educators and

progressive academics it seems impossible to conceive of a future in which the university - and human existence more generally - can transcend the rule of capital (Marginson 2000; Blackmore et al 2010; and Barr 2010). This is a limited and limiting vision. It offers no future beyond the ruins of the present. In these times of limited imaginings, where history has been taken from the hands of humanity, it is far too easy, as Stuart Hall has noted, “to imagine the end of the world than to imagine the end of capitalism” (2003: 76). But this is not where Hall left matters. He continued by adding that, in this world where radical imaginings are absent, they can be drawn to appear by witnessing the world. If we look closely, at the deep and gritty realities, we will be able to see and “to imagine capitalism by way of imaging the end of the world” (Hall 2003: 76).

It is by what we will call here ‘looking deep to look beyond’ that together, North and South, can reinvent the university as a real and positive force in the transcendence of capital. But this requires knowing the university and knowing the world – or as Freire (1993) put it ‘reading the word and reading the world’. It calls to grasping the radical transformative possibilities of the university while understanding the power and dynamism of the capitalist forms within which it operates. In this dialectical relation, the real possibility – the necessity – exists for the university to burst free of its current confines and visions of itself to emerge in new, anti-capitalist and post-capitalist, forms. But this requires an understanding of the transformative potential of human labour and, in relation to the task of this paper, the efforts of the agents of capital to tame the radical capacities of academic labour. These presuppositions shine a spotlight on labour and the labour process – both inside and outside the university (i.e. looking deep to look beyond). It places emphasis on human productive activity as the source of historical change. Given that the university and academic labour are not separate from this history, our first task must be to provide an explication of the historical relationship between the university, the state and the inner dynamics of capitalism.

The University in History

In examining the historical relationship between the university and capitalism, three moves are made. The first considers the origins of the modern European university and its 12th century incarnation as an institution rooted in the conflicts of monarchy and church. The second turns to 16th century Europe where the university was exposed to the newly emergent and economically expansionary dynamism of the capitalist mode of production. Finally, the university is considered in its contemporary

form contextualised within neoliberal era (1970s to the present) characterised as capitalism in perpetual crisis (Giroux 2004; Harvey 2005).

Genesis of the Modern European University

In the broad sweep of history, the university can be regarded as a modern secular incarnation of an institution that first appeared within the temple precinct of antiquity. It was the priests' role not only to divine the future among other scholarly endeavours, but also to legitimate and serve the existing social order under the ruling authority. The inherent tension in the two roles meant that politically, relations between the priestly caste and the ruling authority were not always amicable. Yet, both needed each other in order to maintain the compliance of a largely antagonistic population (Mumford, 1961, p. 48). While the power base of the ruling authority derived from his command of the forces of coercion, the priestly caste drew its ultimate power from its monopoly over knowledge. But with the invention of the printing press, things were to change. The introduction of this new technology into the workings of the university saw the erosion of the power and independence the priests had over the control of knowledge. For the sake of brevity, we can say that university in its earliest formations resided in serving (at least potentially) the contradictory ends of utilitarianism and scholastic idealism.

Indeed, it was in this tension that Berlin's Humboldt University was established in 1810. It was to become a model for the development of universities across the globe. Generously funded by the Prussian state in the service of advancing its alignment with an emergent capitalist class, it prepared the ground for the scientific and technical revolution that occurred in the last decades of the 19th century when scientific research and development as well as engineering became important aspects of the role of the university (Braverman, 1974, pp. 154, 164). While the Humboldt model emphasised an essential unity between teaching and research and granted a high level of autonomy to academics it was strictly controlled by a state intent on welding it to economic ends (Martin, 2012: p. 550). In the Humboldt model we see the beginnings of the capitalisation of the university. Its neoliberalisation was to come much later.

The Capitalisation of the University

Since its emergence in the 16th century in England capitalism has proved itself to be a highly dynamic and expansionary economic system ruthlessly overcoming any barriers and employing any means in its insatiable drive to accumulate and expand

capital for its own sake (Harvey, 2006, p. 156). The source of its dynamism can be found in the relationship between a competitive market place and the sphere of commodity production. Competition forces individual capitalists to produce commodities as cheaply as possible in order to maximise their chances of acquiring a greater share of the market than that of their competitors. They are therefore driven to maximise the efficiency of their production systems and processes by introducing labour saving work practices, technologies and management techniques designed to reduce the proportion of labour power used up to pay for wages while maximising the proportion of surplus value that is to be realised as capital on the sale of the commodities produced.

In this scenario there is therefore a tendency for capitalist entrepreneurs to focus on producing and supplying cheap commodities without reference to market demand. Ever present in the enterprise therefore is the spectre of overproduction, a consequent fall in profits, a crash in the market and an economic crisis. These dynamics account for the rollercoaster cycles of economic 'boom and slumps' that have been an enduring feature of capitalism's evolution since the first of the crises in the 1830s. Paradoxically, however, by clearing away what has now become obsolete in terms of labour's know-how and skills, machine technology and systems of production a crisis prepares the way for a new cycle of 'boom and slump' assisted by an injection of investment capital hitherto rendered valueless by the slowdown in production.

The actual process, of course, is much more complex, but the account is meant to explain why there is a continual restructuring of the organisation of work and the labour process as new technology is introduced all in the interests of cheapening labour and maximising the ratio of surplus labour and why as the cycle progresses there is an attendant deskilling process and a degradation of working conditions.

In the late 19th century these cyclical dynamics led to an enormous growth in production capacity and the appearance of monopoly capitalist corporations that had the power to influence market conditions. However the pattern of unbridled growth could not be sustained with the competition necessary to equalise commodity values in the market place. In this instance it is one of capitalism's paradoxes that while competition breeds monopoly practices its absence in the process of exchange is counter productive.

The pattern of unbridled growth came to a grinding halt in the 1930s with the onset of the deepest depression that capitalism had so far experienced. The Great

Depression, as socially and economically devastating as it was, set in motion a response from government particularly in the US that was designed to curb the excess of the monopoly corporations and to stabilise the economy. With the crisis resolved by the onset of World War II the stage was set for renewed economic growth that lasted until the late 1960s. In the interim the higher education system including the universities had been expanded, funded by government, to accommodate the large numbers of students required to fill the rising numbers of managerial and technical jobs that had opened up in the 1950s boom economy. The situation heralded a new era in the provision of a university education that required considerable changes in the way the institution operated.

By the 1960s, Post WWII state regulated stability was proving to be as damaging in the pursuit of profitability as the previous deregulated economy prior to the 1930s had been. Furthermore, global competition had intensified resulting in overproduction. Coupled with the fact that Fordist assembly line technology had reached the extent of its development profits were falling. The looming crisis sent capital in search of ways of restoring not only profitability but also its upper hand in class struggle with labour it had enjoyed in the 1920s. In general, the strategy for pursuit of power and profit was three fold. First was an attack on workers and their unions that involved the restructuring of the labour process to accommodate the new 'lean and mean' production regime. This saw: the intensification (or speed up) of work; the institution of flexible working conditions involving the elimination of full-time jobs and the hiring of part-time and casual workers; the outsourcing of work; and the use of electronic technology (much of it developed at public expense) that not only reduced the need for skilled workers but also enhanced the ability of management to monitor and control every facet of the labour process.

The second element of capital's class strategy was to seek out new avenues of profitability. This particularly involved the new knowledge-based industries incorporating telecommunications, computers, biotechnology, and electronics. Here, ideas and knowledge could be commodified as intellectual property and exploited for profit. The third element involved lobbying and pressuring governments to drastically cut public expenditure except for areas directly related to the protection of capital and private property such as defence and law enforcement (Yates, 2000, pp. 2-3). These economic changes were to have a profound effect on higher education in general and the university in particular.

The justification and legitimation of these strategies was to be found in the neoliberal project known as the 'shock doctrine' by virtue of the speed with which it was implemented without due democratic debate (Klein, 2007). It had the effect of breaking down determined resistance if there had been any; of making strong representations in government policy making, and of discrediting criticisms academics might venture to make that would challenge the premises on which the project was based.

The Neoliberalisation of the University

The neoliberalism is a political project of class struggle waged by capital against labour and humanity (Harvey 2005). Against mounting crises of capitalist accumulation (Harvey 2014) and the associated falling rate of profit since the 1970s (Kliman 2012) the market was to be the sole arbiter of economic and social affairs. The ideological underpinnings of the neoliberal project are secured in a distinctive economic theory associated with Frederick Hayek. It departs from classical economic theories, such as those of Adam Smith and Karl Marx. Where the latter analysed value in objective terms as derived from the labour embodied in commodities Hayek saw value conferred on commodities by the subject i.e. value was a consequence of subjective choices made by purchasers (Olssen & Peters, 2005, pp. 316-7).

On the other hand, neoliberalism constitutes a revival of significant aspects of classical liberalism. For instance it follows the lead of Adam Smith in emphasising the self-interested individual, free market economics, free trade and self-regulating free markets. The role of the state within neoliberal logic is twofold. Not only is the state to create the legal and institutional conditions for the operation of the (self-regulating) market but also to facilitate (through education for example) the cultivation of the entrepreneurial and competitive self-seeking individual. Despite rhetoric of small government, neoliberalism requires a strong state that is an active player in the maintenance of the necessary conditions for capital accumulation along with the formation of the neoliberal utopian subject.

The reforming of institutions like universities and subjects like academics to accord with neoliberal demands has required a new kind of management: the New Managerialism.

Key features of the neoliberal project and the New Managerialism are:

1. Large scale privatisation, corporatisation and commercialisation.

2. Introduction of business sector management principles.
3. Management as change agent
4. Cutting costs, maximising usefulness with least resources.
5. Resources allocated on the basis of results.
6. Creation of quasi markets with greater competition, outsourcing etc.
7. Organisational devolution, decentralisation, core-periphery.
8. Disaggregation, separation of policy making from execution.
9. Tighter performance specification manifested in the employment of contracts.

The historical background and the account of the neoliberal project provides some indication of the depth of the changes that have been occurring in the university that goes to the heart of academic work. For example, in the restructuring the university along market capitalist lines academics are exposed to labour processes more traditionally associated with of proletarian labour i.e. processes that see a loss of autonomous judgement over work processes, deskilling with increasing standardisation of work requirements, and the general degradation of working conditions.

Within the theoretical orbit of Marx's labour process theory, such degradation of human labour and constraint on human creativity it is to be expected in any labour process that is either geared to the accumulation and expansion of capital or is framed to mimic such dynamics. It will be instructive at this point then to revisit labour process theory.

Labour Process Theory

Making sense of the changes in academic work in what can be called the neoliberal university calls for a review of labour process theory first theorised by Marx in *Capital I* and extended by Braverman in his highly regarded 1974 work *Labor and Monopoly Capitalism*. Immediately following Braverman's publication both theories were subjected to debate and criticism. Some critics considered their analysis to be technologically deterministic, but the most potentially damaging critique for labour process theory's ongoing development was the accusation from post-structuralists that labour process theory provided a grand narrative account in which workers were

portrayed as objects. There were, they pointed out, few references to workers' subjective experiences.

On these accounts labour process theory could be said to fall out of favour with mainstream analysts of work. While Burawoy (1979) sought to address this apparent omission by providing a very useful account of workers' subjective experience in the actual workshop, most of the criticisms can be discounted on the grounds that they were unaware, or chose to ignore the intentions of Marx and Braverman in choosing the so-called grand narrative and objective approaches to their critical analysis.

With regard to the omission of workers' subjectivity Harvey (2006:113) provides a valid defence. In the first place, he argues, it was Marx's point that workers' subjective experiences alone could not reveal to them why they were subjected to the erosion of their working conditions in the labour process. Which, of course, is not to discount those experiences as worthy of study. In the second place, because the *subject* of their critical analysis is capital, not the workers, it will of course reflect the fact that capital does treat workers as objects.

In terms of Marx's method of inquiry his aim was to reveal capitalism's inner dynamics, the core of which is located in the actual labour process and the social relations associated with it in the sphere of capitalist production. These inner dynamics are not amenable to empirical investigation if they are to be grasped and understood. It is therefore a necessary abstraction to divest the core relations under study of any extrinsic variables, as if under a microscope. As Harvey explains:

The theory holds up to the workers, as in a mirror, the objective conditions of their own alienation, and exposes the forces that dominate their social existence and their history (2006:113).

The whole purpose of labour process theory is to provide workers with an understanding of the dynamics that shape their work so that their struggle for change can be effectively targeted. In Marx's critique of capital, after establishing in his theory of surplus value that the source of capital is to be found in the surplus value workers' labour power produces above the cost of their wages, his labour process theory is key in setting out how capitalists deploy workers and organise the labour process in order to achieve their aim of maximising worker productivity in terms of surplus value | the socially necessary labour time available.

The theory, however, is not just a description of the mechanics of the capitalist labour process. Its focus is on a set of symbiotic, or dialectical relationships that relate to the

division of labour in the organisation of work; to the installation of technology and its operation; and to scientific management control techniques designed to garner complete control of the labour process by capitalists. This means that any changes in one of these relations, in technology for instance, will effect change in the others. Inevitably, within these relations as a whole there is therefore a continuous process of change and adjustments to change giving rise to a dynamic force that makes its appearance in the contradictions, tensions, and antagonisms in workplace relations.

For Marx the perpetual struggle to overcome these tensions is a phenomenon in all modes of production and on that account they are the motor of history (Harvey (2006:103). But in the specific case of capitalism what accounts for these tensions is, of course, the imperative to accumulate and expand capital in a competitive market place. Competition then drives capitalists to exert control in the sphere of production to make the labour process productively effective and efficient in maximising surplus value. However, while they are able to exercise a greater or lesser degree they always have to contend with the possibility of worker resistance in one form or another.

These imperatives in the relationship between production and the market place account for capitalism's volatility and its expansionary tendencies that, in pursuit of capital growth regardless of the consequences, makes it a relentless force in seeking to exploit every avenue where there is the potential for making a profit.

Having identified what drives capitalist to raise the productivity of labour power it is now possible to investigate how this is achieved in the labour process. The characteristics common to all modes of production but which take on a specific character in the capitalist mode of production include the following: a purpose that not only serves social ends, but also reflects a particular vision of the world; a mental image of the object to be materialised; access to the means of production in terms of a social knowledge system, materials and tools and instruments appropriate to the task; a plan or design specifying how the work is to be carried out; a level of skill; and co-operation among producers. It was on account of the growing competition in the early stages of the industrial capitalism in the 18th century that in order to gain a measure of control over craft workers capitalists established manufacturing in a factory setting where workers could be supervised more closely and tasks assigned while leaving them actually to determine how the work was to be carried out. In other words as this stage in capitalism's development workers, mainly craft workers but

also including unskilled labourers, were able to maintain a degree of autonomy over how they exercise their knowledge and skill.

However, as always under competitive pressure capitalists sought to improve the productivity of this arrangement by instituting what is called a detail division of labour. Instead of being carried out by a team of self-organising workers a job was broken down into its constituent operations, each of which were assigned to a different worker according to the level of skill required. It was a revolutionary measure that brought huge savings in the cost of labour because it created a detail worker who would be paid according to the amount of skill required (Braverman 1974:69-83).

Known as the Babbage principle what was specifically capitalist about the innovation was not the segmentation of the job that was a universal practice, but the creation of the detail workers forced to work only on that operation to which they were assigned and paid exactly according to the degree of skill required. For example, children, women and men could be hired to perform tasks in an ascending order of difficulty and paid accordingly: children the least and women always at a lower rate than men. This was much cheaper than paying one skilled crafts person.

As Braverman (1974:82-83) points out, the detail division of work became 'the underlying force governing all forms of work in capitalist society' and normalised to the extent that we no longer recognise it in today's workplaces. The introduction of the Babbage principle constituted an initial step in the transfer of control of the labour process from workers to their capitalist employers. From then onwards the inexorable tendency was to divorce specialised knowledge from workers and reduce their skills to the simplest, while at the same time delegating to a favoured few the privilege of retaining their expertise and therefore a measure of autonomy.

What is called the process of deskilling is a necessity for capital because the ability to monopolise the knowledge and expertise workers possess poses a threat not only to capital, but also to the possibility of subordinating workers to the emerging work patterns with the introduction of technology and mechanisation. Nevertheless, certain knowledge and expertise, even though they were open to monopolisation, needed to be retained, for instance, that of engineers, scientists, managers and designers (Harvey (2006:109). The trend towards deskilling for most workers (and as it subsequently turned out for managers and professionals) was only a stage in a process towards the reduction of skills to the exercise of mere simple abstract labour. These measures as always were only temporary in the drive for control.

Furthermore, the introduction of machine technology revolutionised the labour process as well as its social relations. Fewer workers were required thus causing redundancies, while those who remained became mere appendages of a mechanised operation. The introduction of technology, however, has its problems. For while on the one hand, mechanisation raises labour's productivity dramatically, on the other, in saving on labour and employing fewer workers it reduces the possibility of raising surplus value. Furthermore, the introduction of new technology may initially achieve for capitalists a competitive advantage, it is difficult to maintain that advantage as other entrepreneurs adopt the same technology and so becomes generalised throughout an industry.

Accompanying the huge productive capacity was a corresponding growth in the size of capitalist enterprises as well as increasing complexity in their operations as marketing became almost as important as production. The result was the emergence in Europe and the US towards the latter part of the 19th century of huge monopoly corporations with an escalating interest in scientific and technological innovation and in the scientific management techniques developed by Frederick Taylor. The incorporation of science into the operations of these corporations as a consequence of a scientific and engineering revolution coincided with the introduction of Taylor's management techniques that gained for them almost complete control of the labour process towards which the developing capitalist mode of production had been tending.

With regard to science, its systematic integration into the operations of the monopoly corporation represented for Braverman (1974:156), 'the last—and after labor the most important—social property to be turned into an adjunct of capital'. Its importance as a means of advancing capital accumulation was recognised with the development of electricity, steel, coal-petroleum, and the internal combustion engine, all entirely products of scientific research that were to revolutionise the capitalist mode of production from the 19th century.

It prompted the corporations particularly in the US to invest in scientific education, research and in research laboratories following in the footsteps of Germany. One of the first corporation research laboratories established in the US for the specific purpose of systematically producing inventions was that established by Thomas Edison. It was, as Noble describes it, the epitome of efficiency:

With a well-equipped laboratory and a permanent staff working full time in creating new inventions Edison expected to make 'a minor invention' every ten days, and a big one every six months or so. (Noble, 1977:8)

Scientific research had become an industry and big business alongside a corporation's other industrial activities and like other products became a commodity particularly in the form of patents and on that account 'a balance-sheet item'. For this reason, Braverman (1974:166-7) declares, the scientific-technical revolution cannot be understood in terms of any specific innovations, such as electronics or aeronautics, but rather as the transformation of science itself into capital and as the prime mover of the age as the steam engine had been.

The emergence of a mechanised labour process together with the advent of the scientific and technical revolution placed enormous pressure on the management of monopoly corporations. A new system had to be devised that in conjunction with the new science and mechanisation would deliver as far as possible the absolute control of the labour process sought by corporate capitalists. Taylor's scientific management techniques appeared to fulfil this promise in the process raising the concept to an unprecedented new level.

A major feature of scientific management is the separation of conception and execution in the labour process. In practice this meant the separation of the work of gathering data and the developing knowledge from the workers in the workshop concentrating it exclusively in the hands of management which can use the power of its monopoly over the knowledge 'to control each step of the labour process and its mode of execution' (Braverman (1974:119). It afforded the ability of a corporation to arrange the labour process at will to pursue its goals.

In a division of labour reminiscent of the Babbage principle, the work on the shop floor was reduced to the mere simple abstract labour, in other words, to the exertion of simply labour power that could be adaptable to a large range of simple tasks, while the work of mentally planning and supervising the work was concentrated in the hands of management and performed by specialised professionals and an army of clerical workers engaged in replicating on paper the activities on the shopfloor. As Braverman (1974: 125) comments, it is as though workers operate like a hand, 'watched, corrected and controlled by a distant brain'.

In the following decades the separation of head and hand became systematically institutionalised not only in industries but also other areas such as services. The separation gave rise to a working class composed of what may be called blue-collar

and white-collar workers, and an elite who by virtue of their professionalism were able to maintain a degree of autonomy over their work. The latter's aspirations, however, may be short lived for in the end "no part of capitalist employment is exempt from the methods which were first applied on the shop floor" (Braverman, 1974:131).

There is therefore no immunity from what is called the proletarianisation process that involves deskilling and the degradation of work. The process can be illustrated in the case of computer programming. In the initial stages the institution of computer technology required the professional expertise in the shape of computer programmers. As the technology was refined their work was replaced by pre-programmed packages that could be installed by anyone with a modicum of knowledge of how to use a computer.

Underlying what appears to be the inevitable and continuous transformation of the labour process is the antagonism of the workers not only against their exploitation, but also against their subjection to the dehumanising conditions imposed on them by the scientific management regime. The antagonism which is inherent in the labour-capital relation can become a threat to capital if steps are not taken to habituate workers to the capitalist mode of production. Hence we have witnessed all kinds of programs on the part of capital to gain worker cooperation.

However, as Harvey (2006:171) points out, there is never a resolution that eliminates worker resistance altogether so that there is a constant ebb and flow between worker militancy and managerial counter pressure, even that worker resistance can work in capital's favour putting a brake on the pace of technological change which if it gets out of hand can threaten the capitalist system. There is therefore room for compromise. However, it is to be stressed that worker resistance in and of itself cannot transform the capitalist system as a whole. That requires the combined efforts of workers as a class.