THE CONTEST FOR GENERAL INTELLECT: CYCLES AND CIRCUITS OF STRUGGLE IN HIGH-TECHNOLOGY CAPITALISM

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ABSTRACT

This work proposes a Marxist interpretation of the so-called information revolution. It argues that, contrary to the widely-held belief that Marxism is obsolete in a world of computers, telecommunications, and genetic engineering, the advent and deployment of such high technologies can only be adequately understood in terms of the conflict between capital and labour Marx described.

After reviewing the claims of contemporary theorists of the information revolution, we examine Marxist replies to such ideas, showing how these have developed in a variety of directions. Our own position derives from the tradition of autonomist Marxism, which emphasizes the persistence and scope of contestation between labour and capital. We propose a historical account of high-technology innovation which locates it within a cycle of struggles, and then proceed around the circuit of capital, analyzing the conflicts that attend the introduction of information technologies in the spheres of production, consumption, social and ecological reproduction, and cyberspatial circulation. The scope of our study, so far limited to advanced capitalist societies, then expands as it goes on to examine how these conflicts play out in the context of globalization.

We next examine debates between Marxist and postmodern theorists as arguments about the cultural conditions of high-technology capitalism, and propose a concept of postmodern class struggle. Our penultimate chapter suggests how computers and other information technologies might play a part in the constitution of a post-capitalist commonwealth. We conclude with a discussion of recent analysis that revives and reexamines Marx's category of "general intellect," and apply this to a consideration of the role of universities and academics in high-technology capitalism.

Our underlying contention is that new information technologies--and in particular technologies of communication--must be understood both as instruments of capitalist domination, and also, simultaneously, as potential resources of anti-capitalist struggle.

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Chapter 1
DIFFERENCES

The Difference Engine

In William Gibson and Bruce Sterling's novel The Difference Engine, the year is 1855, the place is England, and the information age has arrived a century-and-a-bit ahead of schedule.[1] Charles Babbage's attempts to develop a mechanical computer, rather than petering out in an expensive failure, have triumphantly succeeded. The Industrial Radical Party, headed by Lord Byron, has forged an alliance between bourgeois commerce and scientific "savantry." Ruthlessly repressing Luddite insurgency, it is now applying the phenomenal powers of steam driven cybernetic Engines to a convulsive transformation of society--automating factories, extending surveillance, and perfecting weapons in a global consolidation of imperial power. Across this digitalized Victorian landscape bizarre intrigues unwind, as nefarious "clackers," the adepts of the new mechanical computing, governmental security forces, and criminal subversives all pursue a secret accidentally discovered by Babbage's co-inventor, Lady Ada Byron, "Queen of Engines," while attempting to meet her gambling debts--the secret of self-conscious artificial intelligence. Meanwhile, societal catastrophes pile up around the conspirators: ecological disasters, Gulf-War style carnage in the Crimea, mass unemployment and dispossession all converge on chaos--yet the alliance of science and capital seems irresistible, even as it drives towards unthinkable transformations in the fate of the human species.

What interests us in this steampunk fantasy--at once historical novel and science fiction, yet so manifestly about neither past nor future, but rather a defamiliarized portrait of our own verge-of-the-21st-century present--is one little detail, tangential to the main plot, a mere corner of the canvas. For in the world of The Difference Engine, Karl Marx is alive and well. His employment by the New York Daily Tribune (for whom the actual Marx worked during the 1850s as a foreign correspondent in the biggest 'information industry' of his day) has clearly resulted in migration to the United States--a visit yielding momentous consequence. For, in a North America wracked by regional separatism and civil war, revolutionaries have seized the "means of information and production" of the largest city of the New World.[2] And the Manhattan Communards now provide a nucleus for an international ferment of dissidence which, combining re-emerged Luddites, renegade clackers, anarcho-feminists, Blakean-situationist artists and immiserated proletarians, boils beneath the surface of the bourgeois universe, waiting for the next calamity to burst into revolt.

This Dissertation proposes a Marxism for the Marx of The Difference Engine. That is to say, it analyses how the information age, far from transcending the historic conflict between capital and its labouring subjects, constitutes the latest battleground in their encounter ; how the new high technologies--computers, telecommunications, and genetic engineering--are shaped and deployed as instruments of an unprecedented, world wide order of general commodification; and how, paradoxically, arising out of this process appear forces which could produce a different future based on the common sharing of wealth--a twenty-first century communism.

Marx and Babbage

To establish some of the issues and conflicts central to this study it may be useful for a moment to look back in the past, to the 'actual' Babbage and Marx. In fact, the opposition between Babbage--capitalist-computer-savant--and Marx--insurrectionary revolutionary--which Gibson and Sterling propose is well founded in the historical archive. Although Babbage's pioneer attempts to develop machine intelligence collapsed, partly because of the limits of 19th century engineering, partly because of his managerial conflicts with the craft-workers crucial to the production of the "engines," his influence was far in excess of that which we normally associate with a failed inventor. As Simon Schaffer has recently shown, Babbage was an eminent member of a coterie of radical utilitarian thinkers, including such figures as the political economist Andre Ure, the philosopher Jeremy Bentham and his brother Samuel, and industrialists such as Marc Brunel and Henry Maudsley, all dedicated to the scientific organization of a nascent industrial capitalism.[3]

Indeed, Babbage himself wrote a book in this tradition of Ricardian political economy --- On The Economy of Machinery and Manufactures--which in its argument for the deskilling and fragmentation of labour is now recognized as anticipating Frederick Taylor's system of "scientific management."[4] Babbage's search for mechanical means to automate labour--both manual and mental--were the logical extension of the desire to reduce and eventually eliminate from production a human factor whose presence could only appear to the new industrialists as a source of constant indiscipline, error and menace. And this in turn was only part of wider project of industrial planning which foresaw the society-wide mobilization of theoretical knowledge in the service of manufacture, overseen by a "new class of managerial analysts," such as Babbage himself,who would become "the supreme legislators of social welfare" and be rewarded with "newfangled life peerages and political power."[5] In such schemes, the mechanical maximization of capitalist profit mercifully coincided with the highest theological aspirations, for Babbage believed, "machine intelligence was all that was needed to understand and model the rule of God, whether

based on the miraculous works of the Supreme Intelligence or on his promise of an afterlife."[6]

Marx, Babbage's contemporary, read his work. And what he found in its pages was not evidence of the ineluctable march of progress, or an approach to divine wisdom, but a strategy of class war. Writing in London, within living memory of the Luddite revolts that had seen hundreds hanged or transported and vast sections of England subject to martial law, Marx analyzed the introduction of machinofacture as a means by which the bourgeoisie strove to subjugate a recalcitrant proletariat. He alludes to Babbage's writings in the great chapter of Capital --"Machinery and Large Scale Industry"--where he describes how the factory owners' relentless transfer of workers' skills into technological systems gives class conflict the form of a "struggle between worker and machine."[7] He cites, as evidence of the political economist's technological strategy, the work of Babbage's colleague, Ure, who in the conclusion to his 1835 The Philosophy of Manufactures declared "when capital enlists science into her service, the refractory hand of labour will always be taught docility."[8] "It would be possible" Marx observes, "to write a whole history of the inventions made since 1830 for the sole purpose of providing capital with weapons against working class revolt."[9]

Later, in a section of volume three of Capital entitled "Economy Through Inventions," Marx again footnotes Babbage. Commenting on capital's ever increasing use of machines, he notes that "mechanical and chemical discoveries" are actually the result of a social cooperative process which he calls "universal labour":

> Universal labour is all scientific work, all discovery and invention. It is brought about partly by the cooperation of men now living, but partly also by building on earlier work.[10]

The fruits of this collective project are, Marx argues, generally appropriated by the "most worthless and wretched kind of money-capitalists."[11] But the ultimate source of their profit is the "new developments of the universal labour of the human spirit and their social applications by combined labour."[12]

Marx had already discussed this tension between the social nature of technoscientific development and its private expropriation by capital--in the final pages of the notebooks for Capital, the Grundrisse. Here, he again makes passing reference to Babbage as, in some of the most volcanically brilliant of all Marx's writing, he foretells the future technological trajectory of capitalism.[13] At a certain point, Marx predicts, capital's drive to dominate living labour through machinery will mean that "the creation of real wealth comes to depend less on labour time and on the amount of labour employed" than on "the general state of science and on the progress of technology."[14] The key factor in

production will become the social knowledge necessary for technoscientific innovation--"general intellect."[15]

Marx points in particular to two technological systems whose full development will mark the era of "general intellect"--automatic machinery,which, he predicts, will all but eliminate workers from the factory floor, and the global networks of transport and consolidation binding together the world market. With these innovations, Marx says, capital will appear to attain an unassailable pinnacle of technoscientific power. However--and this is the whole point of Marx's analysis--inside this bourgeois dream lie the seeds of a bourgeois nightmare. For by setting in motion the powers of scientific knowledge and social cooperation capital undermines the the basis of its own rule. Automation, by massively reducing the need for labour, will subvert the wage relations--the basic institution of capitalist society. And the profoundly social qualities of the new technoscientific systems--so dependent for their invention and operation on forms of collective, communicative, cooperation--will overflow the parameters of private property. The more technoscience is applied to production, the less sustainable will become the attachment of income to labour and the containment of creativity within the commodity form. In the era of general intellect "capital thus works towards its own dissolution as the form dominating production."[16]

Babbage and Marx were alike prophets of today's information society. But their prophecies are radically opposed--one promising the technoscientific consolidation of market relations, the other the dissolution of that rule. Both spoke, as befits nineteenth century men of science, in tones of confident certainty. After the catastrophes and surprises of the twentieth century, such teleological certainty should no longer be available to any one. In our opinion, both the predictions of Babbage and Marx are alive and well today, present as vectors of struggle, antagonistic potentialities meeting in a collision that we term 'the contest for general intellect.'

But surely this must be a joke? Marx and Marxism, we imagine the reader by now protesting, are now so thoroughly discredited, so fatally consigned to the dustbin of a history which has itself been dispatched to postmodernist on-screen trash-cans, that any attempt to re-invoke their memory can only be speculative dreaming or historical nostalgia. And indeed we recognize that today Marxism, assailed from all quarters, is generally deemed to have died the death of a thousand cuts. It therefore seems important, at the very outset, to declare our differences with some of the prevailing anti-Marxisms.

In the eyes of many, the fate of Marxism has been sealed by the collapse of state socialism--by the disintegration of the ex-USSR and its East European bloc and the absorption of China into the world market. Unfolding through a progression of scenes--intensifying economic crisis, the people in the streets, confrontation with security forces, bloody repression or flight of demoralized leaders--which seemed in every respect to fulfill the revolutionary anticipations of the left, only with the diabolic twist that it all culminated not in the collapse of capital but in the fall of socialism, these events--have shattered the long-flagging confidence of Marxist militants and intellectuals everywhere.

In the many jubilant postmortems conducted by neoliberal intellectuals over the corpse of Marxism a wide variety of reasons have been invoked for its demise: the inherent imperfectibility of humanity, the innate superiority of markets over state planning, the inevitable transformation of revolutionary aspiration into despotic tyranny, and so on. Not the least important of these is the alleged incapacity of Marxism to comprehend the 'information revolution.' As we will see later in this dissertation, many analysts suggest that the evident failure of the Soviet regime to deal successfully with new technoscientific conditions of production--computerization, telecommunication, mass media--is traceable to intrinsic flaws and anachronisms in the legacy of Marxian theory. This argument is, for example, fundamental to that most pompous of neoliberal self-congratulations--the "end of history" announced by Francis Fukuyama, for whom the innate superiority of liberal capitalism in developing the "mechanism" of modern technoscience determines its role as the *summum bonum* of human development.[17]

In a scathing critique of Fukuyama, a somewhat surprising champion of Marx, Jacques Derrida, has recently questioned this fashionable assumption that the end of state socialism has exorcised the revolutionary "specter" which has haunted capital for so long.[18] Reviving the recognition--long standing in some quarters--that Marxism is not a monolithic body of thought but comprises a multiplicity of intertwined and indeed radically contradictory strands, Derrida challenges any belief that the Bolshevik tradition exhausts this legacy. He further argues that, rather than Marxism being rendered obsolete by the information age, it is only in the light of certain 'informational' developments--globalization, the preeminence of the media, tele-work--that we can see the full importance of certain themes within the texts of Marx--for example, their emphasis on the internationalization and automation of production. Marxism, Derrida insists, will manifest a continuing "spectrality," an uncanny refusal to stay dead and buried, that is profoundly

linked to the increasingly "spectral," immaterial, virtual nature of contemporary techno-capitalism.

We agree with these points. Marxism is a diversity--so much so that we could, in exemplary postmodern fashion, speak not so much of Marxism as of 'the Marxisms.' This heterogeneity goes right back to the *oeuvre* of Marx himself. For Marx said and wrote different things at different times, not all of which are consistent, or--more importantly--all of which can be arranged to form different consistencies. In the historical development of Marxism these statements have been selected, permutated, mutated and refracted into an array of very different, and sometimes fiercely antagonistic forms.

The Leninist strand was only one of these. Its historical preeminence over the last century has to be seen as resulting from a mutational process inherent in the relation of communist movements to the capitalism they struggle against . For in the war between capital and anti-capital the combatants are each constantly transforming themselves in order to answer or preempt the strategies of their opponent, spiralling in a 'bad infinity' of reciprocal reshaping that can only be broken if one finally extinguishes the other. Inherent in this process is an evident problem, for both sides, of mirroring and introjection--of becoming that which is opposed. Seen in this light, Leninism should be understood as a Marxism highly adapted--indeed, fatally over-adapted--to a particular moment of capitalist development--namely that of Fordist capitalism, with its characteristic Taylorist division of labour, industrial mechanization and emphasis on 'mass organization.'

As Karl Heinz Roth has argued, the Leninist party in its division of party managers from proletarian masses uncannily emulated the Taylorist division of labour.[19] The Soviet state carried this mirroring yet further in its concept of socialism as 'soviets plus electrification,' its embrace of scientific management, the adoption of the stopwatch, the assembly line, its gigantism of industrial factories and standardization of social life.[20] Ultimately, this led to a path of modernization and forced industrialization which under Stalin constituted nothing so much as a version--hideously enlarged to Russian, rather than English, and 20th, rather than 18th century, scale--of capitalism's era of so-called "primitive accumulation."[21]

As several commentators have pointed out, this process was, by capitalist standards, a great success--producing the fears, so current in the 1950s and now so long forgotten, that Russia and China would overtake the West in economic growth.[22] The other side of the coin,which we would rather emphasize, is that this introjection of capitalist norms of efficiency, labour discipline, industrialism and accumulation was, in communist terms, a catastrophic defeat--entailing as it did the total suppression of any attempt at workers' self-organization and bloody annihilation of every different form of Marxism

which remembered this aspiration. State socialism in this vital respect came to constitute, perhaps a competitor with, but not an alternative to, capitalism.

The eventual collapse of this regime (as opposed to its much earlier abnegation of revolutionary goals) was, as neoliberals claim, intimately related to the new information technologies and post-Fordist production techniques. For these reduced to global irrelevance the industrial, Fordist methods to which Bolshevism had so tightly bound itself. In this respect, the arms race in fact resulted in a victory for the West, not in the anticipated apocalyptic form of a nuclear exchange, but rather because military expenditures provided a super-stimulus to the development of the high technologies that formed the basis for a whole new stage of capitalist restructuring. Blinded by a deeply embedded 'factoryism,' unable to adjust an authoritarian regime of labour discipline--eminently suitable for digging canals or running assembly lines--to what was needed for making computer software, and vainly trying to impose central state command on ever-proliferating international and domestic media channels--the Soviet state could not adapt to these new conditions, and disintegrated under the pressure of movements which, in their dissident use of *samizdat* and computer networks, manifested a quintessentially 'informational' subjectivity.

The reader will find no apologies or laments for 'actually existing socialism' here, no debate as to whether Stalin, Trotsky, Lenin, or Engels should be blamed for its failures, nor even any attempt to absolutely exonerate Marx from all the stain of its catastrophe. The question is rather whether there is anything *else* in the Marxist legacy with which to confront our own informational commissars. For rather than identifying this disintegration of Bolshevism with the end of Marxism, it can be seen as opening a space within which other, repressed branches of the Marxist genealogy can emerge and blossom.

What makes this probable is that post-Fordist, informational capital exhibits tendencies to catastrophe and conflict perhaps even wider and deeper than those of the Fordist, industrial predecessor which beckoned Bolshevism into being. The unleashing of computerization, telecommunications, and genetic engineering within a context of general commodification is bringing massive crises of technological unemployment, corporate monopolization of culture, privatization of knowledges vital for human well-being and survival, and, ultimately, market driven transformations of humanity's very species-being. In response to these developments are emerging new forms of resistance and counter-initiative. And insofar as the force which these movements find themselves in collision with is capitalism--perhaps a post-Fordist, postmodern, informational capitalism, but capitalism nonetheless, and not some post-industrial society that has transcended commodification--Marx's work can continue to provide participants in these struggles a vital source of insights. As Frederic Jameson has said in a slightly different context, "whatever its other

vicissitudes, a postmodern capitalism necessarily calls a postmodern Marxism over against itself."[23]

Indeed, we argue that in the last twenty-five years, over the very period of the post-Fordist, postmodern restructuring of capitalism, the theoretical elements of such a metamorphasized Marxism have, slowly, painfully, out of the experience of defeat and disintegration, been recomposing themselves. It is a Marxism that, with the incomparable historical advantage of learning from the failure of the Bolshevik experiment, draws from the multiplicity of Marx's writings textual threads different from those out of which the Leninist flag was woven; and it will transform what it takes in the light of the new 'informational' conditions of exploitation and revolt. But this Marxism will mark, nonetheless, a reappearance of the very spectre that capital has fled so fast into the future to avoid.

Deaths of Marxism II: The Post -Marxist Critique

Still, any such reconstruction of Marxism has to confront another line of criticism, coming not so much from the free-market neoliberals but from the so-called new social movements--feminism, green movements, anti-racist groups, gay and lesbian rights activists, and others. It is generally claimed that since at least the 1960s, these 'new' movements have displaced the 'old' working class struggles--with which Marxism was so closely identified--as the major source of social dissent in advanced capitalist societies.

This phenomenon, too, is often related to the new informational conditions of automation, computerization and media-saturation. For many 'social movement theorists,' from Alain Touraine through Alberto Melucci to Timothy Luke, the new forms of social upheaval are specifically linked to the advent of a postindustrial order, in which industrial labour plays a diminishing role, and the emergence of unprecedented forms of technocratic power elicits novel forms of struggle beyond the ken of conventional class analysis.[24] Such 'anti-technocratic' interpretations may not reflect the self-understanding of many feminist, anti-racist, environmental or peace activists. But what is certain is that from these movements, and their academic interpreters, has come a devastating indictment of Marxism's claims to be in forefront of social struggle.

In Marxism, these critics say, people are understood *reductively*, solely in terms of class-identity--that is, their position within an economic system of production. But this view strips them of gender, race, culture, or significant relation to nature. This reductionism is reinforced by the *totalizing* nature of Marxist theory--its claim to map and account for the entirety of social relations. Taken together, this totalizing, reductive

perspective generates a series of disastrous theoretical omissions and repressions: blindness to patriarchy and racism, denial of cultural diversity, scientific triumphalism. From these theoretical flaws flow the often catastrophic record of actual Marxist regimes and parties in terms of sexism, ecological despoliation, and totalitarian repression.

The result of this critique has been the increasing fashionability amongst the left of a "post-Marxist" position of the sort most famously theorized by Ernesto Laclau and Chantal Mouffe.[25] This decisively rejects the centrality Marx ascribes to issues of capital and class, now dismissed as the result of a crude, mechanistic economic determinism. In its place is proposed a new lexicon of difference and discourse. Class relations are no longer 'privileged,'but rather seen as only one amongst a diversity of semiotically constructed identities. The extraction of surplus value is simply included within a range of dominations and oppressions (sexism, racism, homophobia, industrialism) none of which can be accorded any priority over the other. Progressive politics has to be rethought on a more plural and populist basis, as a series of variegated struggles against numerous distinct relations of subordination, but all of which may be related in a project not of revolution but of "radical democracy."[26]

Although our differences with theorists such as Laclau and Mouffe will rapidly become evident, it should be said at once that we find many of the criticisms levelled by social movement activists against Marxism telling. In the pages of Marx himself there are major blindspots to issues of gender, ethnicity and the destruction of nature. That these are characteristic of his age does not diminish the seriousness of their consequences.Indeed, in many respects such problems have been magnified, rather than corrected, in the later development of the Marxist tradition. Why not then just say 'goodbye to all that?' Or, at the very least, adopt the sort of post-Marxist position in which analysis of class and exploitation, rather than occupying a crucial position, are deployed eclectically alongside other approaches?

To this the short answer is: because of capitalism. This is unfinished business of a serious magnitude. Indeed, it is in post-Marxists' general unwillingness to face its scope and implication that we find their analysis astoundingly deficient. For they have seriously mistaken the target of their attack. The major source of practical, brutally-effective reductionism and totalization at work on the planet today is not Marxism, but global capital: the world market, now enabled by computer networks, satellite broadcasts, just-in-time production and high-tech weaponry.

This is a system based on the imposition of universal commodification, including, centrally, the buying and selling of human life-time. Its tendency is to subordinate all activity to the law of value--the socially imposed law of exchange. It relates a monological

master-narrative in which only money talks. Such a system operates by process of massive reduction--Marx called it "abstraction"--which perceives and processes the world solely as an array of economic factors. Under this classificatory grid--this 'classing' of the world--human subjects figure only as so much labour power and consumption capacity, and their natural surroundings as so much raw material. This reductionism--the reductionism of capital--has today a totalizing grip on the planet unlike any other. Other dominations, too, are reductive--sexism reduces women to objects for men, racism negates the humanity of people of colour. But neither patriarchy nor racism have succeeded in knitting the planet together into an integrated, coordinated system of interdependencies. This is what capital is doing today, as, with the aid of new technologies, it globally maps the availability of female labour, ethno-markets, migrancy flows, human gene pools, and entire animal, plant and insect species onto its coordinates of value.

In doing so, it is subsuming every other form of oppression to its logic. Contrary to the post-Marxist belief that different kinds of domination politely arrange themselves in a non-hierarchical, pluralistic way the better not to offend anyone's political sensibilities, we believe that capitalism is a domination that really dominates. This is not to say--as Marx and many later Marxists sometimes suggest--that the corrosive power of commodification necessarily abolishes patriarchy or sexism (although it can sometimes work in that direction). Indeed, we can now see much better than Marx how the capitalist international division of labour often incorporates, and largely depends on discrimination by gender or ethnicity to establish its hierarchies of control.

Nevertheless, sexism and racism do not in-and-of themselves act as the main organizing principle for the world wide production and distribution of goods. Patriarchal and racist logics are older than capital, mobilise fears and hatreds beyond its utilitarian economic understanding, and are virulently active today. But they are now compelled to manifest themselves within and mediated through capital's larger, overarching structure of domination: as market-racism, commodity-sexism. Class--by which we understand capital's classification of its human resources---*does* tend to assert itself as definitive of social power. It is indeed 'privileged' in all senses of the world--not because of any essential, ontological priority of economics over gender, ethnic, or ecological relations, but because of society's subordination to a system that compels key issues of sexuality, race and nature to revolve around a hub of profit.

Looked at in this way, the conventional division between 'old' class politics and 'new' social movements seems to us profoundly mistaken. Capital is a system inimical not only to movements for higher wages, more free time or better working conditions--classic labour objectives--but also to movements for equality-in-difference, peace and the

preservation of nature. This is not because it creates racism, sexism, militarism or ecological despoliation, phenomena whose existence handsomely predates its appearance, but rather because it treats them only as opportunities for or impediments to accumulation. Because capital's *a priori* is profit (its own expanded replication), its logic in regard to the emancipation of women, racial justice or the preservation of the environment is purely instrumental. The prevention of male violence toward women, the saving of rain forests, or the eradication of racism is a matter of bottom line calculus: tolerated or even benignly supported when costless, enthusiastically promoted when profitable, but ruthlessly opposed as soon as they demand any substantial diversion of social surplus. Hence capitalism is antithetical to any movements for whom these goals are affirmed as fundamental, indispensable values.

In this respect, the 1980s and early 1990s have been perversely illuminating. Any belief that the advent of the new social movements marked a transition from the 'old' struggle over social surplus must crumble away in the face of neoliberalism's doctrinaire reaffirmation of the market, attack on the welfare state, and unconstrained expansions of commodity exchange. Over this period virtually every objective of social movements--wilderness preservation, equal pay for women, funding for daycare, battered women's shelters, or AIDS education--has had to be fought for, often lost, in the teeth of governmental and corporate insistence on the primacy of austerity, restraint, cutbacks required by global competition and an economic restructuring that serves no other purpose than the reestablishment of wavering profit rates. Insofar as there have been victories, cracks in the reductive logic of capital, it is usually only because movements have been prepared to challenge the overriding priorities of corporate growth in the name of other, differing visions of societal good.

In a bold metaphor, John McMurtry has recently referred to this era as "the cancer stage of capitalism."[27] Previously restricted by the 'communist threat' and workers' movements, capital has now, he argues, entered into phase of uncontrolled expansion marked by global mobility and the explosion of financial speculation divorced from any productive function. This process is attacking the social institutions which maintain public health and life in a way analogous to the metastasizing encroachments of tumorous cells on a human body. Capital, McMurtry says, is engaged in a systematic subversion of the "social immune system."[28] Environmental despoliation, unemployment, the redistribution of income from poor to rich and the dismantling of public forms of life -provision are the symptoms of a malignancy which diverts more and more social resources to fuel its own growth:

> Indicative of the classic pattern of cancer mutation and spread are the synergistic effects of money capital's cumulative destruction of the planet's basic conditions of life (air, sunlight, water, soil, and biodiversity), its increasingly aggressive invasions and assaults on social infrastructures and self-protective systems of life sustenance and circulation, its systemic intolerance of bearing the costs of maintaining social and environmental carrying and defense capacities, and its rapidly escalating, autonomous self-multiplication that is no longer subordinated to any requirement of life-organization.[29]

McMurtry remarks that the essential problem of such a cancerous form of growth is that "the host body's immune system does not effectively recognize or respond to the cancer's challenge and advance."[30] In the case of capitalism, this occurs because the surveillance and communication systems of host-social bodies across the world--i.e. their mass communication and education systems--are themselves subordinate to transnational capital, and largely reject and refuse to disseminate messages that identify the source of the disease.

The academic fashionability of post-Marxism is an aspect of this failure of recognition and response. In its refusal to acknowledge the full depth of capitalism's subsumption of the planet, and in its dismissal of the very political and intellectual tradition which has consistently applied itself to this issue, it is part of a problem of globally life-threatening dimensions. But a reinvented Marxism, one that learns from the new social movements without forgoing its focus on the contradictions specific to capitalism, could be part of the solution.

What Comes Next

The remainder of this work proceeds as follows. The second chapter reviews the work of the heirs of Babbage--today's information revolutionaries. Looking at a line of thought that runs from Daniel Bell to Nicholas Negroponte, it shows how these thinkers conceive of informatics as a high-technological 'fix' for the conflicts and crises of capitalism--and how their theories have developed in an antagonistic dialogue with the spectre of Marxism.

In the third chapter, we turn to the Marxist reply to such theories. Starting with an examination of the various tensions and contradictions around the technology issue within the work of Marx himself, we examine how these have been developed in very different directions by various Marxian schools and tendencies--'scientific socialists,' 'neo-Luddites,' and 'post-Fordists'--and suggest why none of these represent an adequate answer to the challenge of the information revolutionaries.

Chapter four introduces a perspective which we find particularly interesting, that of 'autonomist Marxism.' Using the autonomist concept of 'cycles of struggle,' it gives an

historical analysis that locates the origins of the information society in the conflict between labour and capital, and discusses current debates about anti-capitalist agency in a computerized, telecommunicational world.

Chapter five adopts a more synchronic approach: it proceeds around the 'circuit of capital,' examining the conflicts that attend the informationalization of production, consumption, social and ecological reproduction, finishing with a look at the cyberspatial realm which increasingly provides a medium both for capitalist control and for the 'circulation of struggles.'

Chapter six expands the territorial scope of the study, so far focussed principally on conflicts within the so-called advanced or developed world and takes up the international dimensions of resistance to high technology capital: it examines 'globalization' and argues that this process, in which new communication technologies obviously play a central role, can only be understood in terms of two conflicting vectors: the expansion of the world-market and countervailing, oppositional movements increasingly linked in what we term "the other globalization."

In chapter seven, we shift register somewhat, from the technological to the cultural, looking at the issue of 'the postmodern.' Building on the analysis of others who suggest that postmodernist thought can be seen as response to world radically restructured by high-technology capital, we suggest that a new critical analysis of the "postmodern proletariat" opens horizons beyond the traditional theoretical polemics between postmodernists and Marxists.

Chapter eight raises the issue of how computers and other information technologies might play a part in the constitution of a post-capitalist society. We make some self-avowedly utopian proposals about the possible form of an information-age commonwealth.

Finally, in chapter nine, we return to Marx's category of "general intellect." We examine more closely his original enunciation of the concept, and look at some recent revivals and reworkings of it. After offering two brief illustrative case studies of what we have called the contest for general intellect, we conclude with some observations about the implications of this analysis for contemporary academic practice.

NOTES

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Chapter 2
REVOLUTIONS

Introduction: Two Revolutions

On the eve of the twenty-first century the only revolution spoken of in the societies of advanced capitalism is the information revolution. Few other ideas have proven so compelling for people experiencing incessant and accelerating technological change in their daily lives. Indeed, along with a number of synonymous or associated terms--'postindustrialism,' 'super-industrialism,' 'the technetronic society,' 'the wired society,' 'the control revolution,' 'high technology society,' 'the second industrial divide,' 'post-Fordism,' 'the globalization of technology'--the phrase 'information revolution' has come to profoundly define contemporary anxieties and hopes about the future. For, according to the theorists of this revolution, the technoscientific knowledge crystalized in computers, telecommunications, and biotechnologies is now unleashing an ongoing and irresistible transformation of civilization, dramatic in its consequences, unavoidably traumatic in the short term, but opening onto horizons nothing short of utopian.

The development and content of the doctrine of information revolution have already been given extensive critical analysis.[1] But we want here to relate it to a different body of revolutionary theory--one whose star has fallen, even as that of the information revolution has risen: Marxism. Marxists have shared information revolutionaries' belief in the profound social consequences of technoscientific change. But they have differed from them in relating the dominative and liberatory potential of machines to the struggle between labour and capital, and to another kind of revolution--communist revolution. No propositions could today appear more fatally archaic. In the age of cyberspace, Lenin lies in ruins. And many would say that the inverse trajectories of Marxism and the information revolution--one ascending as the other declines--are causally connected. Marxism, information revolutionaries claim, was unfit for the information age, doomed by allegiance to a labour theory of value in an era of intelligent machines; by a base/superstructure model of society blind to the significance of symbolic data; by a despotic statism that tried in vain to repress irresistibly proliferating channels of communications; and by a concept of revolution made obsolete by technological progress.

But if information revolutionaries have polemicized against Marxism, they have also themselves claimed many characteristically Marxist themes--notions of 'progress,' of 'materialism,' of 'liberation' and, of course, of 'revolution' itself. This common vocabulary in part goes back to the Enlightenment heritage that the insurrectionary Marx

shared with technocratic utopians such as Babbage and Saint Simon, men whose schemes for a perfected industrialism overseen by scientific experts are the forerunners of information society theory.[2] But it also has a more recent basis. Some of today's most prominent information revolutionaries are themselves one-time Marxists, apostates who have drawn heavily on their former beliefs even while developing a new creed. In this chapter we will examine the information revolutionaries' hostile annexation of Marxism, showing how they turn Marx against Marx in pursuit of a technologically altered world where communism is neither possible nor necessary.

From the End of Ideology to Postindustrialism

Although it is only recently that the the idea of 'information revolution' has become widely current, it is the immediate descendant of a concept of the late 1960s--post-industrial society. But to understand the relation of both these theories to Marxism it is necessary to look yet further back and glimpse behind the shoulder of postindustrialism the shape of a yet earlier concept--that of the "end of ideology."[3]

In the late 1950s and early 1960s a number of intellectuals, surveying the apparently calm and prosperous conditions of North American and European 'industrial' societies, suggested that these had reached a plateau of more or less permanent stabilization. Postwar affluence, the institutionalization of collective bargaining, and the welfare state had banished the class conflicts of an earlier era from the scene. Such societies presented *the* successful socioeconomic model, toward which other experiments, including those in the 'underdeveloped' and 'socialist' world, would gradually converge. This was the condition of the "end of ideology"--which meant, in general, an end of alternatives to liberal capitalism, and, more specifically and pointedly, an end to Marxism as a revolutionary force. Amongst the most eloquent spokesmen for this thesis was one Daniel Bell, a rising young intellectual rapidly departing early Trotskyite flirtations on a rightward trajectory which would eventually deliver him as a founding figure of American neoconservatism.[4]

Few social theories have, however, had the misfortune to be as swiftly discredited as the "end of ideology" thesis. Within a matter of years the appearance of peaceful, passionless capitalist stability was spectacularly contradicted by the the upsurge of domestic and international dissent in the late 1960s and early 1970s. Industrial society--the unsurpassable pinnacle of modernity, prosperity and technological advance--went into paroxysm, its military machine stalled in the jungles of Vietnam; its urban ghettoes burning through successive summers; its huge automobile factories paralyzed by labour conflict; its

university campuses in rebellion; its culture subverted by the music, drugs and politics of youth revolt; its domestic arrangements and relation to nature shaken by nascent feminist and ecological movements.

It is as a reaction to these events that we can understand Bell's "second coming" as a prophet of postindustrialism.[5] Faced with the the unexpected convulsions of 'industrial society,' many intellectuals sought explanations in the possibility that these tumults marked nothing less than the growing pains associated with the emergence of a radically new social order.Such notions were variously inflected, embracing both right and left variants. But the most influential version, the one from which a direct line to today's concept of the information revolution can be traced, arose amongst the think-tanks and sponsored research projects offering futurological guidance for US state policy and corporate strategy.

From this context emerged ideas such as that of the "technological society" fostered in Harvard's IBM-sponsored Program on Science and Technology (1971), the "knowledge society" predicted by management guru Peter Drucker (1968), the "technetronic era" described by soon-to-be US National Security advisor Zbigniew Brzezinski (1970), the "year 2000" scenarios elaborated by Herman Kahn and Anthony Wiener out of the RAND Corporation and the Hudson Institute (1967), and, most famously, the work of Bell, whose The Coming of Post-Industrial Society, published in 1973 but expressing ideas which its author had been developing since at least 1968, was to prove definitive of the entire genre.[6]

Taking the US as the exemplar of future global developments, Bell argued that out of the crises of his day was appearing a new type of "postindustrial" society, to be fully visible "in the next thirty to fifty years."[7] The principal motor of this postindustrial transition was the increasingly systematized relationship between scientific discovery and technological application, which was making theoretical knowledge society's central wealth producing resource. Around this central axis of change were grouped a set of loosely associated transformations: a shift from a goods producing to a service economy; a move in occupational distribution away from manual labour to the preeminence of professional and technical work; increasing capacities of assessment and forecasting; and a new "intellectual technology" of games-theory and systems-analysis, materially embedded in computer systems.[8]

The result would be a a society "organized around knowledge for the purpose of social control and the directing of innovation and change."[9] The most important agents in this postindustrial society would be scientists, engineers and administrators, a new "knowledge class" lodged primarily within government and academia, bearers of the rationalist skills and virtues required by increasing organizational and technological

complexity.[10] Bell argued that the endeavours of this new class could create an epoch of rationalized integration and prosperity-which, while not without its own problems, would finally escape from the material want, economic crisis and class conflict of the industrial era.

As he advanced this new position, Bell had firmly in mind the adversarial presence of Marx. For although the upheavals of the late 60s challenged socialist parties and governments as well as capitalist ones, they were undeniably shot through with the spirit of the very revolutionary tradition that the "end of ideology" thesis had pronounced defunct: Marx was present in the wide support for Vietnamese and Cuban guerrillas, in the theories of the New Left, and in the slogans of workers and students in Paris, Turin and Detroit. The Coming of Post-Industrial Society in fact opens with the image of Marx in the British Museum hearing "in every faint sound of riot or each creaking downturn of the business cycle the rumblings of revolution and the abrupt transformation of society."[11] Saluting Marx's work, Bell situates his own efforts in the same tradition of "social forecasting"--and then launches into a sustained attack on Marxist claims that capitalist societies must violently succumb to their internal contradictions.[12]

This rebuttal proceeds not by a simple rejection of Marx, but by an ingenious recuperation.[13] Bell proposes that there are actually two contradictory "schemas" in Marx's analysis of capitalism. The first, best-known, is the "revolutionary" prediction of sharpening class contradictions, market anarchy and deepening crisis contained in volume one of Capital. The second, Bell claims, is suggested in the later volumes, and envisages a quite different "rationalizing" tendency, glimpsed by Marx but better understood by theorists such as Max Weber, a tendency apparent in the separation of professional management from capitalist ownership, the rise of a 'middle' class, the bureaucratization of enterprise, and the spread of stockholding.This latter trend, Bell says, blurs and softens class conflict. The history of the twentieth century is the story of the cancellation of the former revolutionary prediction by the latter rationalizing one---culminating in the advent of post-industrial society.

Knowledge, says Bell in one of his most widely repeated formulations, will replace both labour and capital as the main factor of production. Between the opposition of capitalist and worker emerges a new class--"a professional class, based on knowledge rather property."[14] The rise of this new class follows a quasi-Marxian logic that relates the emergence of new historical subjects to new forces of production, but effectively negates its revolutionary force.[15] Capital will be transformed by technical and administrative experts, abandoning fixation with profit, becoming more socially responsible, giving "moral issues" equal priority with balance sheets[16] Labour too will be transfigured.

Technological development will raise living standards, automate manual toil and thereby liquidate Marx's subject of history--the immiserated industrial proletariat. "If there is an erosion of the working class in post-industrial society," Bell asks, posing the question all information society theorists will subsequently hurl at Marxism, "how can Marx's vision of social change be maintained?"[17]

Ultimately, in an ambivalence which persists throughout information society theory, Bell equivocates as to whether this regime of scientific expertise peacefully *transcends* capitalism or simply *elevates* it to a new level of stability and organization.[18] He toys with the idea that the "knowledge class" will become a new ruling class, only to regretfully retreat from this suggestion. But in any case its appearance is sufficient to nullify Marx's prediction of war between capital and labour, smoothing the sharp edges of bipolar class antagonism so as to make the idea of communist revolution a quaint anachronism.

The postindustrial prophecy thus projects into an imminent future the very conditions of stabilization which the "end of ideology" thesis had mistakenly declared already achieved. As Krishan Kumar has pointed out, Bell and his colleagues, faced by the revelation that contemporary society was not in fact fully pacified, responded by proposing an extra stage to the march of progress.[19] With the suitable application of expertise and technology, the lingering problems would be cleared up once and for all around the year 2000.

Often, Bell speaks of this outcome with oracular certainty. Yet this tone is at odds with another more urgent and combative element in his writings--condemnation, polemic, warning. Rational progress--embodied in the technocratic state and its knowledge elite--is under siege by the irrational protest by the New Left, student revolt, affirmative action groups, and an "adversary culture."[20] Only if the pilotage of society is entrusted to the cadres of technical experts, scientists, engineers and administrators will chaos be avoided, and the dawning era safely ushered in. No mere extrapolation from predetermined trends, but a determined assertion of what those trends will be, postindustrial futurology foresees the future it intends to make.

From Postindustrialism to the Information Society

In the late 1960s and early 70s such postindustrial theory enjoyed wide popularity amongst academics, government experts and corporate managers. Nowhere was it more avidly received than in Japan. There, translated texts by North American futurists were reworked by authors such as Tadeo Umesao, Kenichi Kohyama, Yujiro Hayashi, and

Yoneji Masuda to produce the concepts of *johoka shakai* or *joho shakai* --'informational society' or 'information society.'[21] According to Tessa Morris-Suzuki's study of Japanese information society theory, *joho shakai* gave particular emphasis to computers' potential for changing industrial production methods by introducing unprecedented levels of automation and of integration between office, factory and consumer.[22] At the same time, the content of production was envisaged as becoming more 'information intensive,' in the sense that innovation, planning, design and marketing would represent an integral and increasing share in the value of goods and services.

In the work of futurists such as Masuda these transformations were linked to an idealistic vision of an emergent society in which increased availability of information and free time resulted in declining materialism, improved self-actualization, voluntary civic participation, enhanced global and ecological consciousness, and, ultimately a revival of spirituality--in short "computopia."[23] But this concept of extensive computerization also entered the domain of public policy, sponsored by the powerful Ministry of International Trade and Industry, as a hardheaded development strategy aimed at overcoming shortages in labour and natural resources, securing international markets and remedying the widespread social disaffection of the 1960s. The creation of an "information society" became a centerpiece of Japanese economic planning.

In North America and Europe, interest in these ideas was accelerated by economic recession, whose first tremors had appeared in the late 60s. Bell and his colleagues had assumed an uninterrupted continuation of post-war rates of economic growth. But by the mid-1970s this prediction was abruptly confounded as social disorder was met by austerity, recession and economic crisis. However, as the West's leaders searched for solutions to social economic malaise, their eyes turned to the 'Japanese miracle'--only to discover *joho shakai* as a strategy for computerization, robotization, workplace reorganization and systematic 'softening' of the economy. Under this guise, postindustrialism earned a new lease of life. In 1978, a conference of Japanese and US communications scholars resulted in the publication of the first North American book to use the term 'information society' in its title.[24]

At the same time, related ideas were independently gaining currency on both sides of the Atlantic. In 1977, the US Government's Office of Telecommunication published Marc Porat's influential study of the "information economy" which suggested that an increasing portion of GNP depended on "information activity" and a growing proportion of jobs on "information work."[25] In Europe, a broadly similar effect was produced by the publication in 1978 of a French governmental report on computerization, L'Informatisation de la Societie, by Simon Nora and Alain Minc.[26] This argued that the convergence of

computers and telecommunications--which they termed "telematics"--would alter "the entire nervous system of social organization."[27] In the light of this transformation, national well-being depended on the fostering of domestically based high-technology industries,and the computerization of the operations of government.

Thus by the late 1970s, the 'information revolution' was emerging as a central category in government and corporate planning. In 1979 Bell recast his original postindustrial thesis in the new, fashionable terms, emphasizing the importance of computer and telecommunication networks and speaking of an "information explosion" constituted by:

> . . . a set of reciprocal relations between the expansion of science, the hitching of that science to a new technology, and the growing demand for news, entertainments and instrumental knowledge, all in the context of rapidly increasing population, more literate and more educated, living in a vastly enlarged world that is now tied together, almost in real time, by cable, telephone and international satellite, whose inhabitants are made aware of each other by the vivid pictorial imagery of television, and that has at its disposal large data banks of computerized information.[28]

This statement was simultaneous with and succeeded by a spate of similar academic studies; by best selling popularizations such as Alvin Toffler's The Third Wave and John Naisbett's Megatrends ; by a burgeoning business literature devoted to managing in the information age; and by journalistic coverage of the type which made the microcomputer Time's "Person of the Year" for 1982.[29] All of this translated theories of the information revolution into a popular idiom of the 1980s.

These theories revamped the post-industrial vision of epochal transition, giving it glossier sheen, leaner design, and enhanced computing power. Post-industrialism had primarily defined the new era in terms of its departure from the crises of industrialism. Information society theory gives this shift a more substantial content: industry is succeeded by information. The borderline between eras is that dividing mechanical from digital machines, steel mills from silicon chips, railroads from communication networks. Postindustrialist technocracy, moreover, had worn the mark of an attachment to governmental bureaucracy. Information revolution, more attuned to the climate of Thatcherism and Reaganism, dispenses with this. Technocracy is replaced by high-tech, organization men by intelligent machines, experts by expert systems, intelligentsia by artificial intelligences, mainframes by microcomputers, pyramidal hierarchies by distributed systems, central office by cyberspace.[30]

In this form, the idea of an information revolution--a revolution simultaneously inevitable and desireable--became a crucial intellectual and rhetorical component in a project of high-technology restructuring pursued collaboratively by state and corporate sectors

throughout the advanced capitalist world.[31] For corporations, the image of an approaching information age provided a slogan to accompany the robotizing of factories, automating of offices, selling of cable television, and marketing of microcomputers, new media and on-line services. For government, the approach of the information society was invoked to justify public subsidization of corporate high-technology research, the forging of academic-business partnerships, the deregulation of phone companies, and the privatization of telecommunications and other information utilities in the public domain.

Those who propounded its doctrine--political leaders, corporate executives, state bureaucrats, research scientists, academic theorists, journalistic popularizers--did not merely describe the future. They prescribed it. Although the arrival of the new epoch was declared inevitable, definite steps were demanded to adjust to its realities, hurry its benefits, preempt its problems, and secure positional advantage within it. These included massive investment in new machines, vast restructurings of work and unemployment, the stimulation of new markets, the inculcation of unfamiliar leisure habits and cultural forms, the reorganization of research, education and training, the treatment of technophobia and the crushing of 'Luddism.' The proffered choice was adaptation or obsolescence. And insofar as such exhortation did indeed result in a deepening social commitment to, and dependence on, information technologies, it secured for itself the virtuous circularity of self-fulfilling prophecy--generating the reality it predicted.[32]

Revolutionary Doctrine

Theories of the information revolution are not all the same. At each stage in the unfolding of the doctrine advocates of the most recent version urge the novelty of their position and distance it from the preceding one. There are also substantial differences within each generation of the argument, as well as significant variations of tone between its various academic, popular and official registers.[33] Nonetheless, the principle claims of the information revolutionaries can be summarized in seven points of 'revolutionary doctrine.'[34]

1. The world is in the midst of a transition to a new stage of civilization, a transition comparable to the earlier shift from agrarian to industrial society. In this transition computers and telecommunications play a role equivalent to the steam engine and railroad in the 19th century. Underlying this idea is a powerful technological determinism. Masuda writes:

> When epoch-making technological innovation occurs, changes take place in the existing society and a new society emerges. The steam engine precipitated the industrial revolution, bringing about the changes that lead to

> a new economic and political system . . . The information epoch resulting from computer-communication technology will bring about a societal transformation just as great or even greater than the industrial revolution.[35]

Other accounts acknowledge that the effects of technology on society are not immediate, nor the interaction entirely unidirectional. But the overall tenor of the argument is usually that machines are the real makers of social change. The transformative effects of information technologies are usually conceived of as becoming visible in the 1960s, although originating earlier, starting in 'developed' economies--Japan, the US, and other OECD countries--and proceeding at an accelerating rate and with expanding scope as we approach the millennium, moving on a trajectory that is basically benign, eventually universal, and certainly unavoidable--the latest phase in the 'march of progress.'

2. *The crucial resource of the new society is technoscientific knowledge*. While technological innovation is understood to have always been the critical factor in societal transformation, the distinguishing mark of the current epoch is generally held to be the direct harnessing of scientific research to this process. Whereas previously scientific discovery and technological application proceeded with relative independence and only sporadic intersection, now the pure knowledge of science can no longer be sharply distinguished from its practical realization in technology. Science and technology are so institutionally integrated as to fuse in a single operation, which Bell designated by the phrase "research and development " and is more recently signified as "technoscience."[36] The result is what Drucker calls a "knowledge society," or what Alvin and Heidi Toffler term a "powershift" whereby "both force and wealth themselves have come to depend on knowledge."[37]

3. *The principle manifestation and prime mover of the new era is the invention and diffusion of information technologies* --that is, technologies which transfer, process, store and disseminate digitalized data: computers, telecommunications, and, by some accounts, biotechnology. Information revolutionaries point to the extraordinarily swift and broad development each of these fields of informatics has undergone since 1945--computers passing through successive 'generations', each of smaller size, larger capacity and higher speed; telecommunications moving from analogue to digital signals, and adopting new switching and transmission methods which dramatically improve performance, reliability, and costs; biotechnology advancing from the initial discoveries of DNA and RNA to everyday in-vitro fertilization and transgenic species creation. Information revolutionaries anticipate that this pace of innovation will not only continue, but accelerate at an exponential rate.

Moreover, they point out, the real power of information technologies lies not so much in their independent capacities, but rather in the fact that their common digital

language permit the convergence of their discrete capabilities into increasingly powerful, combined, synergistic technological systems. Thus the full potential of communications and computer technologies only emerges at their confluence into a single stream of 'compunications,' 'telematics,' 'computer mediated communication,' or 'intelligent networks,' enabling the creation of on-line data bank, email services and global computer connectivity. There are signs of similar fusions between biotechnology and microelectronics.[38] This process of convergence is seen as eventually culminating in the creation of a generalized digital medium within whose networks an enormous range of transactions and operations--from manufacturing through messaging to medicine--will be conducted. Information technologies are thus perceived as a technological change which does not just alter individual products but pervade the fundamental processes of an entire culture.[39]

4. The generation of wealth increasingly depends on an 'information economy' in which the exchange and manipulation of symbolic data matches, exceeds or subsumes the importance of material processing. Since Porat's study of the "information economy" the idea that information technologies are provoking a qualitative change in the nature of employment and the sources of wealth has been variously interpreted but widely accepted.[40] The prevailing view now declares that information is a central "economic resource" of the 21st century.[41] Jorge Schement has aptly characterized this creed as "informational materialism."[42] Its main tenets are summarized in the Tofflers' account of the contemporary "super-symbolic economy"--a "new system of accelerated wealth creation" increasingly dependent on "the exchange of data, information and knowledge," where land, labour, financing and raw materials become less important than the symbolic knowledge which can increasingly discover substitutes for them; where technological and organizational innovation are at a premium; where faster decision-making and better internal communication are a central commercial objective; where mass production is replaced with flexible production systems synchronized to detailed customer feedback about market conditions and preferences; where electronic transfers replace metal or paper money as the major medium of exchange; where goods and services are modularized and configured into systems requiring a constant multiplication and revision of standards; where new abstract and intellectual skills demanding high levels of education and training become the crucial attributes of the labour force; where computerized monitoring governs the profitable recycling of wastes; and where global news and data flows are an essential strategic asset.[43] Although other information revolutionaries might dispute the details of this portrait, it embodies most of the conventional wisdom about the economic importance of technological knowledge.

5. These techno-economic changes are accompanied by far-reaching and fundamentally positive social transformations. Here information revolutionaries display their most enthusiastic optimism. The undesirable features of 'industrial' society--meaningless work, huge impersonal organizations, rigid routines and hierarchies, anonymous and alienating urban existences are seen dissolving. In their place, the information age holds out the hope of diversification, localism, flexibility, creativity, and equality. Promises include the computer-aided recovery of craft skills and artisanal traditions; the convenience of universal teleshopping, telebanking, and interactive entertainment; the assistance of expert systems for education, health care, psychotherapy and home security; the revivification of domestic life in an electronic cottage; the participatory democracy of electronic town halls; and an historically unprecedented diffusion every sort of knowledge--'all information in all places at all times.' A brilliant culture of individual and collective self-actualization is seen arising from the matrix of the networks.

This is not to say that information revolutionaries deny potential problems. Technological unemployment, intrusive surveillance, electronic crime and 'future shock' are all duly acknowledged. But they are represented as problems of adjustment--temporary setbacks or avoidable hazards on what remains in essence an ascending path. Bell, no facile utopian, recognizes anxieties about technological domination and dehumanization, especially in the cultural realm, but nevertheless insists that the tendency of information systems is toward "the freeing of technology from its 'imperative' nature," and the creation of "alternative modes of achieving individuality and variety within a vastly increased output of goods."[44] Others have been less restrained: Dizard, for example, speaks of the information society as one where the "the search for a new Eden through the melding of nature and machine" eventually yields "social salvation through better communication and information."[45]

6. The information revolution is planetary in scale. Although early post-industrialists focused on changes in the developed world, they quickly identified a tendency toward a unified world economy as one major consequence of enhanced communication technologies.[46] Recognizing the disparity between advanced economies and the Third World, they nevertheless believed in the overall trajectory of 'development' by which Western societies pioneered advances that would eventually, given suitable aid, expert direction and trading connections, be adopted and emulated by other regions. Later information society theorists followed this logic. Some, strongly influenced by Marshall McLuhan's notion of an electronic "global village," amplified on this one-world theme in a very optimistic manner.[47] Some have argued that rapid computerization would enable Third

World countries to leap right from a preindustrial to a postindustrial society--leapfrogging over the industrial stage. Others suggest that computer and telecommunications would open up possibilities for decentralized, de-urbanized, village-based industry bringing material prosperity to the Third World without destroying cultural autonomy and tradition--what Toffler calls "Gandhi with satellites."[48] Even those who don't share these high hopes tend to see global disparities being rectified by a trickle-down economics in which huge technologically-generated increases in productivity, although at first concentrated in the developed world, will eventually be disseminated across the planet.

7. The information revolution marks not only a new phase in human civilization but also a new stage in the development of life itself. At the extreme limits of their prediction, many information revolutionaries see the augmenting powers of intelligent machines tending logically toward the creation of "synthetic life."[49] The steady transfer of human abilities to machines will, it is argued, lead to the production of technologies whose capacities exceed those of their creator. This view is typified by roboticist Hans Moravec. Sooner or later," Moravec asserts, "our machines will become knowledgeable enough to handle their own maintenance, reproduction and self improvement without help."[50] When this happens, humanity will pass away, "having lost the evolutionary race to a new kind of competition," superseded by its own "mind children."[51] Computers are thus not merely viewed as servants for humankind but also as a potential successor species--the next stage in evolution.

Tofflerism: Marx Against Marx

As the thesis of postindustrial society transformed into the theory of information revolution, its anti-Marxism simply remodulated itself. There was perhaps less talk of a new technocratic class mediating the tensions between capital and labour. But increasingly the direction of technological development itself was claimed to contradict Marx's analysis.The computer was discovered as the nemesis of socialism, a machine whose astounding capacities confounded class struggle.

Again these arguments appeared particularly telling because their proponents often claimed to be not so much repudiating Marx as simply updating him--following his own logic through to unanticipated conclusions. Pointing to Marxism's customary emphasis on the development of the means of production--and interpreting it as referring entirely to innovations in machinery--information society theorists said, in effect, that if "the handmill gives you society with the feudal lord; the steam-mill with the industrial capitalist," then what arrived with the microcomputer was the information society.[52] The real 'historical

materialists' are those who recognize the arrival of this new order rather than clinging to outdated notions of capital and class.

No one has pursued this line more energetically than the indefatigable popularizer of information revolution, Alvin Toffler. Toffler is himself a former Marxist convinced by Stalinism and American affluence that:

> Marxism was a misleading, obsolete tool for understanding reality in the high technology world. Using Marxism to diagnose the inner structures of high technology societies today is like limiting ones self to a magnifying glass in the age of the electron microscope.[53]

But although Toffler, and his co-author and wife Heidi, are relentless polemicisers against "antique Marxist ideas, applicable at best to yesterday's industrialism," their own concept of history owes an obvious debt to Marx.[54]

The Tofflers' work hinges on a narrative, adapted from Bell's schema of preindustrial, industrial and postindustrial societies, of civilization propelled forward by a series of "waves"--the First agrarian, the Second industrial, the Third, current, wave, informational.[55] As Hendrick Hertzberg has recently pointed out, there is an eerie, if superficial similarity between this and Marx's story of how feudalism (the equivalent of Toffler's agrarian First wave) gives way to capitalism (the equivalent of the Toffler's Second Wave), and capitalism, in turn, is replaced by communism (the equivalent of Toffler's cybernetic Third Wave). As Hertzberg observes,

> Each stage, in its time, constitutes a tremendous advance in human progress; each eventually becomes obsolete (the "contradictions," as the Marxists say, begin to get out of hand); and the next emerges from the collapsing ruin of its predecessor.[56]

Moreover, Hertzberg notes, Toffler even sounds like Marx: the first sentence of his most recent book, Creating a New Civilization, reads "A new civilization is emerging in our lives, and blind men everywhere are trying to suppress it,"--an obvious plagiarism of the famous opening of The Communist Manifesto: "A spectre is haunting Europe--the spectre of Communism. All the powers of old Europe have entered into a holy alliance to exorcise this spectre."[57]

The crucial difference is, of course, that in Toffler's account the advent of the new civilization has nothing to do with class war, and everything to do with computers. Exploitation of labor, alienation, dehumanizing mechanization, centralization and concentration of wealth, immiseration--all are characteristics, not of capitalism *per se*, but rather of the fading Second Wave of industrial civilization--a civilization to whose premises Marxism is itself profoundly tied. The advent of the information-driven Third Wave will overcome such ills. Struggle against capital is irrelevant, because everything once (and so

deceptively) signified by the red flag--the classless society, non-alienated work, the dissolution of property--will be achieved simply by the operation of the technology which capital is itself so frenetically developing. "Archaeo-Marxists" who "nurse dreams of revolution drawn from the yellow pages of yesterday's political tracts" are left standing as we "speed into a new historical zone."[58]

The inability of Marxism to respond to the realities of the new era is, the Tofflers argue, deeply inscribed in its theoretical tenets. Forged in reaction against the Hegelian idealist philosophy, Marx's materialism is predicated on an opposition between the physical, sensuous world of objects--the site of production--and the ethereal, abstract realm of ideas. This binary contrast underpins Marx's notorious 'base/superstructure' metaphor, by which:

> . . . information, art, culture, law, theories and other intangible products of the mind were merely part of a 'superstructure' which hovered, as it were, over the economic base of society. While there was, admittedly, a certain feedback between the two, it was the base that determined the superstructure, rather than the reverse.[59]

Such dualism renders Marxism inherently blind to the productive power of data-exchange, symbolic manipulation, and the expansion of knowledge--the very activities central to the modern economy. For Marxists,"hardware was always more important than software"; now, however, the computer revolution teaches us that the opposite is true. Today, say the Tofflers, "it is knowledge that drives the economy, not the economy that drives knowledge":

> Marx, in arguing the primacy of the material base, stood Hegel on his head. The great irony of history today is that the new system of wealth creation, in turn, is standing Marx on his.[60]

In a classic dialectical trope, historical materialism has been dematerialized.

Where the Tofflers find the anachronism of Marxism most obvious is in its concept of the industrial proletariat as the agent of revolutionary change. It was, they say, not so much capitalist ownership of the means of production but rather the crude technology of the "smokestack era" that generated the drudgery against which revolutionary socialism fought. "Marxism," remark the Tofflers in typical style,"glorified beefy workers straining muscles in steel mills and factories."[61] Now the legions of mass labour are vanishing: the information economy is eliminating the factory--and with it, Marxism's historical protagonist.

This farewell to the working class--an *adieu* bidden not only by the Tofflers and their colleagues but by many left intellectuals during the 1980s--takes two forms in information revolution theory. The first, most straightforward, simply argues that

automation will progressively liquidate labour. There will be less and less work--hence less and less of a 'working' class. Early versions of postindustrialism were often linked to the idea of an emergent 'leisure society' in which the most pressing social problem would be the overcoming of boredom. This vision has never entirely faded from information society theory. However, an obvious problem diminishes its appeal--namely, that in the context of a wage economy such a liberation from work manifests as unemployment. Anxious to refute any idea that they merely aim to replace the tedium of the assembly line with misery of the welfare queue, information revolutionaries like the Tofflers have in fact often tended *not* to focus on the labour saving consequences of automation, and instead pursue a quite different argument.

In this second version work, instead of being terminated, is transformed. Emphasis falls not on the quantitative reduction of labour but on its qualitative improvement. Automation, it is conceded, will eliminate jobs, primarily in manufacturing. But this will be compensated for by new work, appearing in high technology, information-intensive industries. However, the new jobs will be different from the ones they replace; they will be *better* jobs. Here information society theory elaborates an argument first influentially stated by the sociologist Robert Blauner during the 1960s in a critique of Marx's theory of alienation--namely, that advanced technology reverses the inhuman, estranging effects of industrial machinery on workers[62]

Computers, it is claimed, are fundamentally different from earlier forms of mechanization. Transmuting manual drudgery into mental labour, manipulating symbols rather than objects, informatics not only frees workers from routine drudgery but places a new premium on critical and diagnostic capacities, cooperative problem solving and the reintegration of previously fragmented tasks. These potentials tend to reverse the Taylorist simplification and fragmentation of work. It either *permits*, in the weak form of the argument, or, in its more determinist version, *requires* dissolution of traditional hierarchies and command structures, and the introduction of new dimensions of autonomy and job-satisfaction.

Thus a crucial part of Toffler's description of the Third Wave production depends on the intellect and skills of the workforce. Industrial workers owned few of the tools of production; today however "the most powerful wealth-amplifying tools are the symbols inside workers' heads"[63] Workers, therefore, "own a critical, often irreplaceable, share of the 'means of production.'[64]The foundation for Marx's theory of class conflict thus drops away. The consequence of the high-technology, post-Taylorist workplace is the evaporation not only of the hostility, but even of the distinction, between management and labour; in its place emerges a shared ethos of participation and professionalism, reinforced

by profit sharing, stock options and workplace quality circles. While there will still be work, there will be no working 'class,' because class as a collective identity based on adversarial relations of production will have been dissolved.

At some points the Tofflers go even further, and suggests that the Third Wave will transform not only work, but property. This is often represented as a necessary consequence of the economic peculiarities of information intensive goods and services. Because information is not exhausted by use, can be reproduced easily and cheaply, and often multiplies in value the more widely it is distributed, such goods and services are--supposedly--immune from ownership or commodification. Since information constitutes the central resource of the new age these property-transcendant features herald the advent of an increasingly sharing, cooperative, equalitarian society. According to the Tofflers, Marxists have an "obsession with ownership" that is anachronistic in an era of "info-property"--"non-material, non-tangible, and "potentially infinite."[65] In the unfolding of this transformation revolutionary, overthrow of the ruling class is crudely beside the point. What will occur is rather a gentle auto-dissolution of ownership.

At this point there is an interesting bifurcation in the work of information information revolutionaries. Some theorists, at some moments, look to a future 'beyond capitalism.' This perspective is exemplified by the early work of Toffler, and by the "computopia" prophecies of Japan's most famous futurist, Masuda. It sees information technology bringing a gradual, spontaneous and non-antagonistic relaxation of capitalist relations--with corporate ownership eventually assumed by technologically-participatory workers and citizens and the abundance of information generated resources dissolving commodity exchange. What results is in fact, nothing less than an electronically-created classless society.

Other information revolutionaries--or sometimes the same theorists at other moments--look only to a 'better capitalism.' This is the view implicit in all the governmental and corporate descriptions of the information society. It is also the perspective of Toffler's more recent work, clearly adapted to the free-market climate of the 1980s and 90s. In this perspective, information technologies still produce incredible economic and societal benefits. But these result mainly from an improved position in an ever more-intensely competitive market society. Electronics yield, not post-capitalism, but new investment possibilities, more efficient management techniques, better marketing opportunities--faster, swifter, more efficient commodification..[66]

Yet despite their apparent divergence, both the 'beyond capital' and the 'better capital' versions of the information revolution can be seen pointing in the same direction: to a future in which the capitalist development of technology leads to social salvation, whether

through the perfection of the market or its transcendance. And in practice, information revolutionaries straddle both positions without apparent embarrassment. Masuda, who writes about the dissolution of the commodity form even while serving the Ministries of the world's most dynamic capitalist power, speaks of his "computopia" not only as a "classless society" but also as the fulfillment of Adam Smith's vision in The Wealth of Nations of a "universal opulent society."[67] Toffler hopped with ease from talking about post-capitalism to advising ultra-right wing free marketeer, Newt Gingrich.

Indeed, in many moments of information society theory both visions merge in the synthesis of a capital without contradictions, conflict or competition. In a typically nebulous but heartfelt panegyric, William Halal asserts that "the relentless advance of technology has become the driving force for social change," and celebrates the emergence of a "hi-tech/hi-touch" business organization that unites enterprise and democracy. "Rising like a phoenix from the ashes of a dying epoch" the resulting "New Capitalism" will be so transformed that "it is really no longer capitalism at all" because "it is governed democratically to serve a full range of human goals rather than profit alone--yet it is still free enterprise."[68]

Both the 'beyond capitalism' and the 'better capitalism' version of the information revolution see high-technology reshaping society, and both see this as a good thing. Their shared technological determinism means that the radical possibilities announced by the visionaries of the 'beyond capital' school are conceived of as a direct, linear consequence of the innovation directed by the pragmatists of the 'better capitalism' tendency. For this reason the positions are complementary rather than antagonistic: the one is is the perfect idealist counterpoint to the utilitarianism of the other. In both cases the prognosis is the same--more technology. And in both cases, what is decisively off the agenda of the future is Marx's concept of revolution as class struggle.

Deja Vu: The End of History

The ultimate vindication of this information-age anti-Marxism was of course the end of 'actually existing socialism.' In the 1970s some postindustrialists had prophesied a certain convergence of capitalist and socialist systems as each resigned 'ideological' attachment to notions of either the free market or world revolution in favour of a common resort to technocratic planning. But in the 1980s, the era of the Second Cold War, this argument gave way to a more aggressive line. Totalitarianism was the inevitable outcome of Marxism, but computers and telecommunications were "technologies of freedom" with an intrinsic antipathy to such statism.[69] In arguments strongly marked by the influence of

Frederick Hayek, it was widely argued that the creation of a knowledge economy was inherently related to the play of the open market.[70] High technology innovation depended on levels of enterprise and initiative antithetical to rigid state control. Moreover, application of such innovation would produce a complex and accelerated economy, dependent on data flows elusive of centralized control. Any regime which attempted to restrict these flows would inevitably fall victim to the populist technological empowerment brought by the multiplication of microcomputers, video and fax systems.

It would seem hard to imagine a more convincing vindication of such arguments than the ignominious disintegration of the Soviet bloc in 1989. As the statues of Lenin toppled across Europe, Brzezinski, one of the originators of postindustrial theory, ascribed the Soviet state's degeneration to a failure to grasp the "technetronic revolution" which made its relative achievements in the field of heavy industrialization and mass education obsolete.[71] Kenichi Ohmae, theorist of business in a "borderless world," enunciated a common verdict when he declared that information "never respected the Berlin Wall":

> . . . in an age of instant information, a wired-for-pictures world . . . any government that cannot offer Western style choices of material goods, services and travel will arouse the enmity of its citizens.[72]

The Tofflers, of course, knew how to truly twist the knife in the wounds of old comrades. Declaring that "the central failure of the great socialist experiment of the 20th century lay in its obsolete ideas about knowledge" they observed that;

> Marx himself had given the classic definition of a revolutionary moment. It came, he said, when the 'social relations of production' (meaning the nature of ownership and control) prevent further development of the 'means of production' (roughly speaking, the technology). That formula perfectly described the socialist world crisis. Just as feudal 'social relations' once hindered industrial development, now socialist 'social relations' made it all but impossible for socialist countries to take advantage of the new wealth-creation system based on computers, communication, and, above all, on open information.[73]

The most ambitious statement of such ideas was, however, that of Francis Fukuyama, a former deputy director in the US State Department and consultant with the RAND corporation, who in a widely acclaimed article announced "the end of history."[74] This, he hastened to point out, did not mean a cessation of empirical events, but rather that we had reached the terminus of history "understood as a single, coherent evolutionary process" which would culminate when "mankind had achieved a form of society that satisfied its deepest and most fundamental longings."[75] Beyond such a point no further progress in the development of underlying principles and institutions could occur, because "all the really big questions had been settled."[76] This idea of history had, Fukuyama observes, been enunciated by Hegel, but "made part of our daily intellectual atmosphere by

Karl Marx," who, he claims, believed that the "end of history" would be marked by the advent of communism. Now, in the aftermath of the collapse of the USSR, it was clear that, on the contrary, the "end of history" was achieved by the triumph of capitalist liberal democracy.

Fukuyama is not a conventional information society theorist. But what is important in the context of our present discussion is that he finds the "mechanism" which explains the directionality and coherence of history in the "logic of modern science."[77] This, he claims "would seem to dictate a universal evolution in the direction of capitalism."[78] Because the unfolding of applied science makes possible the limitless accumulation of wealth to satisfy ever-expanding human desires, and also confers inestimable military advantages, it dictates an homogenization toward the form of society best able to reap its benefits. This form is capitalist democracy, whose competitive enterprise, decentralized market decisions and work-ethic favours technological innovation. While this superiority had seemed in doubt when the centrally planned economies of USSR and China were able to rival the capitalist bloc in industrial production, the inevitability of evolution in the direction of "decentralized decision making and markets" had become apparent with the transition to a "post-industrial order" placing a premium on invention and information:

> One might say in fact that it was in the highly complex and dynamic "post-industrial" economic world that Marxism-Leninism as an economic system met its Waterloo.[79]

With this sorry example of the failure of alternatives, the global adoption of capitalism by the countries of the developing world--Fukuyama calls it "the victory of the VCR" --is inevitable.[80] Whatever problems the future might hold will arise primarily from the boredom arising from the universal "peace and prosperity" created by the technoscientific achievement of capitalism.[81]

This announcement may provoke an uncanny sense of *deja vu*. For we have come full circle. The "end of history" Fukuyama presents is a massively enlarged version of the "end of ideology" thesis, now global in scope and engineered not by industrialism but by postindustrialism. At last, aided by the "mechanism" of information technology, the spectre of Marxism has finally been laid to rest.

Beyond the End? Virtual Capitalism

Since 1989 history has, of course, refused to lie down and die. Nothing, however, has subtracted from the prevailing view that the information revolution represents the destiny of humankind. In the context of a unified capitalist world economy, its discussion is now inseparable from that of 'globalization.' Rhapsodies about the "global village" have

been replaced by a harder, more anxious note. For it is now the pressure of a communicationally integrated and increasingly competitive world market which enforces adaptation to the information age, Techno-idealism falls to computer-age *realpolitik*. Rhetoric urging the rapid adoption of new technologies now relies not only on the utopian promises of such technologies, but, even more, on the costs--in terms of lost jobs and declining living standards- of refusing them. However, if this introduces a newly anxious note to the approach of the information revolution, it in no way diminishes its inexorability. While in an era of mounting technological unemployment and global corporate mobility there may be some qualms about the universal benevolence of the information age, there is even less doubt about its inevitability.

The world-wide collapse of socialist regimes, or their clear subordination to market discipline, has meant that anti-Marxist diatribes now seem beyond the point for contemporary high-tech futurists, such as George Gilder, Nicholas Negroponte, Michael Rothschild or Kevin Kelly and the editors of Wired magazine. Rather, they focus on the necessary identification of technological progress and the market economy. Many commentaries endorse the views put frankly by Rothschild, whose recent "bionomic" analysis of an "economy derived from technical information" asserts that "capitalism is simply the way technology evolves" and is the "inevitable, natural state of human affairs"--a phenomena which it is a "waste of time and mental energy" to oppose, because "Like it or not, the sun rises in the east."[82]

In North America, the embrace of the information revolution by corporate and state institutions reached a new level of intensity with the United States government's planning of the "information superhighway." The Clinton administration's announcement of a high-bandwith, omnipurpose, digital network interconnecting the nation's computers, phones, and televisions by fibre optic strands, coaxial cables, satellites and radio waves has been widely hailed as the realizing of the 'wired world' long urged by information society theorists. In 1994, the National Information Infrastructure (NII) bill proposed that the 'highway' be constructed as a governmentally subsidized but privately built, owned and operated network. This incited a frenzy of mergers by telephone, cable and entertainment corporations positioning themselves to reap astronomically lucrative profits from video-on demand, teleshopping, telegambling and on-line advertising.

In this climate, the formulas of information society theorists have spouted in an unquenchable flow from the mouths of governmental and corporate leaders of all complexions. Democratic Vice-President Al Gore describes the NII as "the next information revolution" and has made a stock in trade of promising a cornucopia of possibilities for virtual education, democratization and self-improvement.[83] However,

Gore's technophilia is if anything exceeded by that of his opponent, Newt Gingritch, Republican speaker in the House of Representatives, who synthesizes futurist revolutionary rhetoric with the most reactionary of right wing politics. An aficionado of the works of the Toffler's--for whose latest book he wrote an introduction--Gingritch rhapsodizes freely on the need to wire every child into cyberspace while simultaneously slashing at the welfare programs that enable many American children to eat.

Gingritch's Progress and Freedom Foundation hosts major conferences on the confluence of capitalism with the information age.[84] In 1994 it published a document, "Cyberspace and the American Dream: A Magna Carta for the Knowledge Age," co-authored by information age luminaries such as Toffler, George Gilder and Esther Dyson.[85] Beginning with a grandiloquent declaration that "The central event of the 20th century is the overthrow of matter . . . The powers of mind are everywhere ascendant over the brute force of things," the document is built around a Toffleresque contrast between the Second 'industrial' age and the Third 'informational' age, now elaborated with reflections about cyberspace as a "bioelectronic frontier," a "land of knowledge" whose "exploration can be civilization's truest, highest calling."

Larded with ruminations on "the nature of freedom" and "the essence of community" in this new cyber-world, and spiced with a rich rhetoric of empowerment and liberation from "smokestack barons and bureaucrats from the past," the "Magna Carta" finally gets down to brass tacks with some policy recommendations. These are remarkably to the point: strong intellectual property rights to protect private ownership of information; a 'highway' infrastructure to be owned by an unregulated private monopoly; tax breaks for information-oriented companies; and the widespread dismantling of federal government regulations.[86] These proposals for the consolidation of information age capitalism are far from airy dreaming; much of the spirit of the "Magna Carta" proposals moves in the 1996 US Telecommunications Bill, a legislative testament of faith in the power of deregulated, concentrated capital to manage the new informational environment.[87]

The corporate sector itself is almost as fulsome as its government clients about the prospects for virtual capitalism. Bill Gates, chairman of the mighty Microsoft corporation, looks forward to what he calls "Friction Free Capitalism"--in which perfect information becomes the basis for the perfection of the market. Gates, who has the frankness to acknowledge that the driving force behind the information highway is "the race for the gold," nonetheless introduces a utopianism of his own when he suggests that the movement of business into cyberspace will produce Adam Smith's dream of a world of "perfect knowledge" or "perfect information," a prerequisite for "perfect competition." Unabashedly ignoring the ironies that such words invite coming from the mouth of one of

the information age's most aggressive monopolists, Gates promises us "a new world of low-friction, low-overhead capitalism, in which market information will be plentiful and transaction costs low. It will be a shopper's heaven."[88] Freed by technology from its rigidities and imperfections, the market passes into a veritable paradise of exchange, in which the global digital grids and lattices connect the whole planet in the limitless transaction of prosperity and freedom.

Most of the celebrations of virtual capitalism remain at this level. It would, however, be foolish to underestimate the messianic sense of mission which underlies the thinking of some of capitalism's information revolutionaries. For a reminder, we can glance briefly at some recent predictions by the roboticist, Moravec. Envisaging the emergence within the foreseeable future of highly advanced artificial intelligences, he asks us further to imagine that "most of the human universe has been converted to a computer network--a cyberspace--where such programs live, side by side, with downloaded human minds and accompanying simulated human minds."[89] Moravec then outlines the political economy of this world. The cyberspatial entities will all make their living "in something of a free market way," trading the products of their labor for the essentials of life in the networks--memory space and computing time. Some will convert undeveloped parts of the universe into cyberspace or improve the performance of existing patches, thus creating new wealth. Others will act as banks, storing and redistributing resources, buying and selling computing space, time and information:

> Some entities in the cyberspace will fail to produce enough value to support their requirements for existence--these eventually shrink and disappear, or merge with other ventures. Others will succeed and grow.[90]

Moravec says that the closest present day parallel to the existence of these virtual creatures would be "the growth, evolution, fragmentation, and consolidation of corporations, whose options are shaped primarily by their economic performance.[91] Noting that "a human would likely fare poorly " in such a cyberspatial market, he looks, without regret, to the necessary conclusion--our species merger with or supersession by these corporatized synthetic entities.[92] Reading such apocalyptic visions, one cannot but hear the echoes of some lines of Marx's of which McKenzie Wark has recently reminded us in his brilliant discussion of computerized stock markets--lines in which the young Marx speaks of the ultimate destination of capital: "finally--and this goes for the capitalists too--an inhuman power rules over everything."[93]

Conclusions

The doctrine of the information revolution, as it has unfolded over the last half century, has proven to be much more than just futurist speculation or even sociological description. Rather, it has become an indispensable ingredient in a massive reorganization of advanced capitalist societies, centred around the introduction of new technologies. Formulated and promoted within the think-tanks, policy institutes, laboratories, government offices and consultancy circuits of the most powerful and prosperous centres of the capitalist world economy, the theory of an inevitable information revolution has provided the rationale for this restructuring, a legitimation for social dislocation and an exhortation toward a radiant future.

In its development, this idea has been been propelled forward by competition with another revolutionary theory which aimed to become a "material force": Marxism. This was the foe that was meant to have been defeated by the "end of ideology" in the affluence of post-war industrial societies. As we have seen, it was in response to an unforeseen crisis of these societies, a crisis of international and domestic insurgencies permeated by the spirit of supposedly dead and buried Marxism, that Bell and his colleagues produced the concept of postindustrialism. Their annunciation of a new age was not merely a prediction, but a project, an effort both of prophecy and partisanship aimed at setting in motion the social and technological measures necessary to restore the stability of an order threatened by what they saw as chaotic and subversive forces. This is the idea which has subsequently flowered into theories of the information revolution and virtual capitalism.

The relation of these theories to Marxism is, however, not just one of antagonism, but of appropriation. Produced by intellectuals who were often familiar with or had actually espoused Marxist ideas, the concept of the information society derives much of its analytic force and imaginative power from a rewriting of Marxism that retains the notion of historical progress towards a classless society, but reinscribes technological advance rather than class conflict as the driving force in this transformation and promises communism without the need to get rid of capitalism. It thus annexes the idea of 'revolution.' The collapse of actually existing socialism in popular uprisings intimately linked to the capacities of new media to carry messages across the walls and curtains behind which Marxian regimes had sheltered from the world market is, in the eyes of information revolutionaries, the vindication of this project, the final, technologically-aided exorcism of the ghost of Marx. In what follows we will argue that this exorcism has failed. But first we must see what other Marxists have made of 'the information revolution.'

NOTES

1 For a recent discussion see Frank Webster, Theories of the Information Society (London: Routledge, 1995). Also useful, though a little dated, is David. Lyon, The Information Society: Issues and Illusions (Cambridge: Polity, 1988).

2 See Chapter 1., and also the discussion of the Saint Simonian tradition in Krishan Kumar, Prophecy and Progress (Harmondsworth: Penguin, 1978).

3 Daniel Bell, The End of Ideology (New York: Collier, 1961).

4 On Bell's early interest in Marxism see his account in "First Love and Early Sorrow," Times Higher Education Supplement 16 Jan. 1981, 9-11.

5 G. Ross, "The Second Coming of Daniel Bell," Socialist Register 1974, ed. Ralph Miliband and John Saville (London: Merlin, 1974) 56-84.

6 E.G. Mesthene, ed., Technological Change (Cambridge: Harvard University Press, 1970); Peter Drucker, The Age of Discontinuity (New York: Harper Row, 1968); Zbignew Brzezinski, Between Two Ages: America's Role in the Technotronic Era (New York: Viking, 1970); Herman Kahn and Anthony J. Weiner, The Year 2000: A Framework for Speculation on the Next Thirty Three Years (New York: Macmillan, 1967); Daniel Bell The Coming of Postindustrial Society (New York: Basic, 1973). Although the The Coming of Post-Industrial Society appeared in 1973, Bell published "Notes on the Post-Industrial Society" in The Public Interest 6/ 7 (1967). He competes with Alain Touraine as the first to introduce the term "post-industrial" in its contemporary sense.

7 Bell, The Coming of Post-Industrial Society x.

8 Bell, The Coming of Post-Industrial Society 27-30.

9 Bell, The Coming of Post-Industrial Society 20.

10 Bell, The Coming of Post-Industrial Society 374.

11 Bell, The Coming of Post-Industrial Society 49.

12 Bell, The Coming of Post-Industrial Society x.

13 On this point see Kevin Robins and Frank Webster, "Information as Capital: A Critique of Daniel Bell," The Ideology of the Information Age, ed. Jennifer D. Slack and Fred Fejes (New Jersey: Ablex., 1987) 95-117.

14 Bell, The Coming of Post-Industrial Society 374.

15 Bell's technocratic vision retains a connection to his early brushes with Trotskyism. His idea of the "new class" is adapted from the analysis of bureaucratized socialism offered by maverick Trotskyite, James Burnham in The Managerial Revolution. (Bloomington: Indiana University Press, orig. 1940, rpt. 1966) Burnham's thesis of a "managerial revolution" establishing bureaucrats and administrators as the dominant class in capitalist and socialist countries alike was in turn inspired by Trotsky's critique of the "bureaucratic

degeneration" of the USSR.

16 Bell, The Coming of Post-Industrial Society 288, 291.

17 Bell, The Coming of Post-Industrial Society 40.

18 At one point Bell speaks of corporate power being "subordinated" to the new class.(The Coming of Post-Industrial Society 270); elsewhere he says it remains "predominant" (270).If at times Bell suggests that the role of organized knowledge supersedes the logic of the market--allowing economic planing--at others he sees such knowledge as itself subject to commodification, defined and priorized by its marketability

19 Kumar 190-192.

20 Bell, The Coming of Post-Industrial Society 480. For his later elaboration on the topic of the "adversary culture" see The Cultural Contradictions of Capitalism (New York: Basic, 1976).

21 Only Masuda's work is generally available in English. On the other authors, see Tessa Morris-Suzuki, Beyond Computopia: Information, Automation and Democracy in Japan, (London: Kegan Paul, 1988).

22 Morris-Suzuki n.p.

23 Yoneji Masuda, The Information Society as Post-Industrial Society (Washington, DC: World Future Society, 1981).

24 Alex S. Edelstein, John E. Bass, Sheldon M. Hasel, eds., Information Societies: Comparing the Japanese and American Experiences (Seattle: University of Washington, 1978).

25 Marc Uri Porat, The Information Economy: Definition and Measurement vol. 1, (Washington DC: US Department of Commerce, 1977).

26 Published in English, with an introduction by Daniel Bell, as Simon Nora and Alain Minc The Computerization of Society. (Cambridge: MIT Press, 1981)

27 Nora and Minc 3.

28 Daniel Bell "The Social Framework of the Information Society," The Computer Age: A Twenty Year View, ed. Michael L. Dertouzous and Joel Moses (Cambridge: MIT Press, 1979), 526.

29 Representative titles include James Martin, The Wired Society (New Jersey: Prentice Hall, 1978); Kimon Valaskakis, The Information Society (Montreal: Gamma, 1979); Anthony Oettinger, "Information Resources: Knowledge and Power in the 21st Century" Science 209 (1980) : 191-198; Barry Jones, Sleepers Awake (Melbourne: Oxford University Press, 1982); W.P. Dizard, The Coming Information Age (New York: Longman, 1982); Tom Stonier The Wealth of Information (London: Methuen, 1983); James Beniger The Control Revolution (Cambridge: Harvard University Press, 1986); John Naisbitt, Megatrends (New York: Warner, 1982); Alvin Toffler, The Third Wave (New York: Morrow, 1980).

30 It is symptomatic of this new tone that when Bell recast his earlier arguments in terms of the information society theory he retained three of his original five descriptors of postindustrialism, but dropped two--those dealing with the the professional and technical class and the future orientation which he had previously related to the enlarged scope of governmental planning and public policy. He does not explain

this change. It can be speculated that it reflects not only the heightened prominence automated information systems had gained since the early 1970s, but also a rightward political shift, creating a 'free-enterprise' climate hostile to planning and bureaucracy in which computerization was frequently hailed as means of eliminating professional and technical jobs--technology turned against technocracy.

31 For a useful account see Kees Brants, "The Social Construction of the Information Revolution," European Journal Of Communication 4 (1989): 79-87.

32 See William Leiss, "The Myth of the Information Society," Cultural Politics in Contemporary America, ed. Ian Angus and Sut Jhally (New York: Routledge, 1989) 282-299.

33 See, for example, Kevin Robins and Frank Websters' distinction between "administrative" and "apocalyptic" versions of informational futurism in their "Athens Without Slaves . . . Or Slaves Without Athens? The Neurosis of Technology," Science as Culture 3 (1988) 19.

34 In making this summary we have found very useful the broadly similar synopses by Manuel Castells, The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process, (Oxford: Blackwell, 1989) and Jorge Reina Schement and Leah A. Lievrouw, "Introduction: The Fundamental Assumptions of Information Society Research," Competing Visions, Complex Realities: Social Aspects of the Information Society, ed. J. Schement and L. Lievrow (Norwood: Ablex, 1987) 1-10.

35 Masuda 46.

36 Bell, The Coming of Post-Industrial Society.

37 Drucker, 271; Alvin & Heidi Toffler, Powershift (New York: Bantam, 1990) 17.

38 For example, the use of computers in genetic analysis, the search for the 'biochip,' the modelling of electronic automata on cellular phenomena, and research into molecular robotics or 'nanotechnologies.'

39 See Castells on this point.

40 In his post-industrial thesis Bell drew on the economic model of the "march through the sectors" developed by Colin Clark in The Conditions of Economic Progress (London: Macmillan, 1940). Dividing the economy into three sectors--primary (agricultural), secondary (manufacturing), and tertiary (services)--Clark had posited a historical process in which, as productivity rose successively in each sector, the bulk of the labour force migrated to the next. Postindustrial society, Bell claimed, marked the point where the majority of the labour force moved into the service sector--a proposition whose definitional clarity and historical accuracy has since been the subject of hot debate. Subsequently, some information society theorists have built on this contested foundation to posit a distinct, delimited 'quaternary' information sector constituted by high-technology industry and succeeding agriculture, manufacture and services at the leading edge of economic growth. However, such models have been strongly criticized for obscuring the actual interconnection and overlap of allegedly discrete sectors. And in fact what studies such as Porat's show is the ubiquity of symbol-manipulating tasks across a wide range of occupations. Many theorists have therefore abandoned the notion of a distinct information "sector," and now favour an analysis which stresses the increased importance of informational activity as a component within *all* aspects of the economy. Information processing is seen not so much as a successor to manufacturing, services, or agriculture, but rather as a "superordinate" function whose productivity-improving powers span each of these areas.

41 Oettinger 191.

42 Jorge Reina Schement, "The Origins of the Information Society in the United States: Competing

Visions," The Information Society: Economic, Social and Structural Issues, ed. Jerry Salvaggio (Hillsdale: Lawrence Erlbaum, 1989) 21.

43 Toffler, Powershift 232-234.

44 Bell The Social Framework of the Information Society 545.

45 Dizard 11, 23.

46 See Drucker, and also Marc Porat, "Global Implications of the Information Society," Journal of Communication 28.1 (1978) : 70-80.

47 Marshall McLuhan, Understanding Media: The Extensions of Man (New York: McGraw Hill,.1964) 87.

48 Toffler The Third Wave 328.

49 Beniger 104

50 Hans Moravec, Mind Children: The Future of Robot and Human Intelligence (Cambridge: Harvard University Press, 1988) 5.

51 Moravec, Mind Children 5-6.

52 Karl Marx , The Poverty of Philosophy (New York: International Publishers,.1971) 109.

53 Alvin Toffler, Previews and Premises (London: Pan, 1984) 195.

54 Toffler, Future Shock 361.

55 Toffler, The Third Wave. n.p.

56 Hendrick Hertzberg, "Marxism: The Sequel" New Yorker 13 Feb. 1995,.7.

57 Cited by Hertzberg 7.

58 Toffler, The Third Wave.440.

59 Toffler, Powershift 421.

60 Toffler, Powershift 421-422.

61 Toffler, Powershift 421.

62 Robert Blauner, Alienation and Freedom: The Factory Worker and His World (Chicago, 1964).

63 Toffler, Powershift 240.

64 Toffler, Powershift 240.

65 Toffler, Previews and Premises 103-105.

66 For a sophisticated version of this position, one can do no better than the account of the "control revolution" offered by James Beniger, a former official with the US Food and Drug Administration. Beniger argues that information technologies represent the consummation of a century long quest by capitalism to develop instruments of "technobureaucratic control" adequate to overcome the repeated crises in production, consumption and distribution of goods encountered during industrialization. As the culmination of this "control revolution", microelectronic methods of automation, coordination, inventory, and advertisement are revolutionary in a double sense. On the one hand, they mark a dramatic advance in human progress, offering means to overcome protracted tumults and disorder of industrialism. But they are also revolutionary in a "cyclical," "astronomical," sense, implying the "restoration of levels of economic and political control" exercised in pre-industrial era. The information revolution is thus both a progressive and a conservative revolution. Like so many information revolutionaries, Beniger tips his cap to Marx, citing the famous aphorism about the way "men make their own history, but not under circumstances of their own choosing," and observing that because these circumstances have shifted "from land and capital to information" social theory inherited from the nineteenth century is now challenged "much as the Industrial Revolution challenged Marx . . . to reconsider preindustrial theories." But the end to which Beniger's reconsideration of social theory looks is in fact precisely antithetic to Marx's, for what it envisages is a market society in which the development of cybernetic programming and and feedback techniques--including, Beniger believes, the eventual creation of synthetic life forms--enables the removal of all blockages and interruptions from the circuits of the commodity, creating a seamlessly integrated totality, a perfect structural-functionalist harmony in which every moment of social activity is organically connected with and responsive to the other in fulfillment of the needs of the capitalist whole.

67 Masuda, The Information Society as Post-Industrial Society.(1990 ed.), 130-131.

68 William E. Halal, The New Capitalism: Democratic Free Enterprise in Post-Industrial Society (New York: Wiley, 1986) 7

69 Ithiel de Sola Pool, Technologies of Freedom (Cambridge: Harvard University Press, 1983).

70 F.A..Hayek, "The Use of Knowledge in Society," American Economic Review, 35 (1945): 519-30.

71 Brzezinski The Grand Failure: The Birth and Death of Communism in the Twentieth Century (New York: Macmillan.1988).

72 Kenichi Ohmae, "Global Consumers Want Sony, Not Soil," New Perspectives Quarterly," 8.4 (1991): 72.

73 Toffler, Powershift 411.

74 Francis Fukuyama, The End of History and the Last Man (New York: Macmillan, 1992). Fukuyama first expressed his ideas in an article in The National Interest 16, 1989, 3-18. He subsequently developed them in book form. All the citations here are from the book.

75 Fukuyama xii.

76 Fukuyama xii .

77 Fukuyama xv.

78 Fukuyama xv.

79 Fukuyama 93.

80 Fukuyama 98.

81 Fukuyama xxiii.

82 Mark Rothschild, Bionomics: The Inevitability of Capitalism (New York: Henry Holt, 1990) xiii, xv.

83 Albert Gore, "Information Superhighways: The Next Information Revolution," The Futurist, Jan.-Feb. 1991. 21-23.

84 See Christopher Scheer, "The Pursuit of Techno-Happiness: Third Wavers & Tekkie Cults, " Nation. 8 May,1995 632-634: Thomas M. Disch, "Newt's Futurist Brain Trust."Nation, 27 Feb. 1985, 266-270. David Corn, "CyberNewt," Nation. 6 Feb. 1995 154-155.

85 Progress & Freedom Foundation, "Cyberspace and the American Dream: A Magna Carta for the Knowledge Age," online, Internet, 1994. Available by email from to PFF@AOL.COM.

86 Progress & Freedom Foundation.

87 On the Telecommunications Bill see Robert McChesney, "The Global Struggle for Democratic Communication." Monthly Review. 48.3 (1996).

88 Bill Gates, The Road Ahead (New York: Norton, 1995) 171, cited in Michael Dawson and John Bellamy Foster, "Virtual Capitalism: The Political Economy of the Information Society," Monthly Review. 48.3 (1995): 51.

89 Hans Moravec, "Pigs in Cyberspace," Thinking Robots, An Aware Internet and Cyberpunk Librarians., ed. R. Bruce Miller and Milton T. Wolf (Chicago: Library and Information Technology Association, 1992) 15-21.

90 Moravec, ""Pigs in Cyberspace" 17.

91 Moravec, "Pigs in Cyberspace" np.

92 Moravec, "Pigs in Cyberspace" np.

93 Karl Marx, "Economic and Philosophic Manuscripts," in Early Works (Harmondsworth: Penguin, 1973) 366, cited in McKenzie Wark, Virtual Geography: Living With Global Media Events (Bloomington: Indiana University Press, 1994) 175.

Chapter 3
MARXISMS

Introduction

It is perhaps too late in the day to become intensely vexed as to what Marx 'really said' about technology. For Marx was, like all of us, a multiple. He wrote variously about technology, making statements which cannot all be reconciled one with another--or at least, can be reconciled in very different, sometimes radically opposed, ways. In the historical development of Marxism this heterogeneity of utterances has yielded a volume of interpretation which now weighs considerably on the brain of the living, and whose influence powerfully refracts every re-reading of their source.

This chapter begins, therefore, with an intentionally inconclusive scan of the many representations of the machine in Marx's texts. We then move on to see what other Marxists have made of and from these representations as they respond to the 'information revolution.' Three positions are examined: scientific socialism, which sees technoscience as a central agent in a dialectical drama culminating in the inevitable defeat of capital; neo-Luddism, which focuses on technology as instruments of capitalist domination; and post-Fordism, which often looks to the possibility of a technologically mediated reconciliation between labour and capital. While this is by no means a complete inventory of Marxist, or Marxist-derived, thought on technological change, it does muster the major analyses with which we want to take issue. For in our view scientific socialists, neo-Luddites and post-Fordists all, though in very different ways, fall short of an adequate response to the challenge of the information revolutionaries.

Marx's Machines

As we have already seen, there is a certain Marx very close in spirit to the information revolutionaries--the Marx of "The handmill gives you society with the feudal lord; the steam-mill with the industrial capitalist."[1] This technologically determinist Marx is not a negligible figure.[2] His hand has been seen at work in the celebrated account in the Preface to the Contribution to a Critique of Political Economy of how "in the social production of their life men enter into definite relations that are independent of their will, relations of production which correspond to a definite stage of development of their material productive forces."[3] At a certain stage in their development, Marx says, "the material productive forces of society come into conflict with the existing relations of

production" and "from forms of development of the productive forces these relations turn into their fetters"--thereby initiating social revolution.[4]

What precisely constitutes the forces of production and what the relations of production, and the precise nature of the interaction between the two, are amongst the most controversial questions in Marxist theory.[5] But what is certain is that a view which sees the forces of production as technological, and only the relations of production as social, with the former having primacy over the latter seems to have taken root very close to Marx himself, in the work of his friend Frederick Engels, who wrote that with the advancement of modern machinery "the productive forces themselves press forward with increasing power towards . . . their deliverance from their character as capital."[6] From there extends a a line of Marxist thought, along whom are posted figures such as Nikolai Bukharin, J.D. Bernal and G.A. Cohen, which understands technological development as an autonomous force, a motor of history, whose ever expanding productive powers smash relentlessly through anachronistic forms of property ownership in a trajectory heading straight to the triumph of socialism.[7]

However, there are other passages in Marx which modify and indeed contradict this mechanistic view of history. For example, the major treatments of factory machinery in Capital tells a story in which capitalism, as it deepens its control of the workplace and society transforms methods of production. Marx describes this process in terms of successive degrees of "subsumption."[8] In "formal subsumption"--roughly the early stages of the industrial revolution--capital simply imposes the form of wage labour on pre-existing modes of artisanal production. But in the subsequent phase, "real subsumption," it undertakes a wholesale reorganization of work. Science is systematically applied to industry; technological innovation becomes perpetual; exploitation focuses on 'relative' intensification of productivity rather than 'absolute' extension of hours.[9]

Central to this process of subsumption is the replacement of manual methods of work by machinofacture. And the impetus for this develoment is, Marx says, the factory master's drive to enhance command over his labour force by deskilling craft workers and enlarging the reserve army of the unemployed. Such a narrative precisely reverses the technologically determinist account. For it is social relations--capital's requirement for total control over the valorization process--that shapes machines, not vice versa. From the reading of such passages flows a different line of analysis whose exponents run from Georg Lukacs through to Harry Braverman and David Noble, who insist that machinery is only a moment in forces of production whose constitution is itself a matter of social power.[10]

However, even if it could be agreed that Marx posits a complex interaction between 'social' and 'technological' factors--indeed, complex to the point where the two categories are understood as so inseparably bound up as to make him one of the first theorists of what today are termed 'socio-technical systems'--there would still be space for disagreement in his writing on machines. Many readers have been impressed by his nightmare portrayal of nineteenth century factory masters' use of technology. Throughout his work, Marx again and again tells us how machinery confronts the worker in production as the power of capital incarnate--or at least metallized. The steam engine serves as an "instrument of torture" in the hands of the factory owner. In a necrotic tyranny, the "dead labour" of automatic machinery becomes a "mechanical monster" with "demonic power" that "dominates, and pumps dry, living labour power," converting the worker into a "living appendage."[11] Or, as Marx put it in a speech to the Chartists in 1856,

> At the same pace that mankind masters nature, man seems to become enslaved to other men . . . All our invention and progress seem to result in endowing material forces with intellectual life, and stultifying human life into a material force.[12]

From this, and many other passages can be distilled a technophobic, dystopian, neo-Luddite Marx, a Marx who rages against the machine.

Yet the production of such a Marx depends on a considerable effort of edition and selection. For there are other moments where Marx speaks not just of the infernal effects of machines, but also of their emancipatory promise. For example, in one passage of Capital he discusses how "modern industry" continually transforms itself "by means of machinery, chemical processes and other methods" and in doing so "incessantly throws masses of capital and of workers from one branch of production to another," in a way that "necessitates variation of labour, fluidity of functions, and mobility of workers in all directions."[13] Under capital, Marx says, this incessant technological change is an apallingly destructive, immiserating force, which "does away with all repose, all fixity and all security as far as the worker's life situation is concerned."[14] However, he argues, such relentless innovation also has a potentially positive side. By annihilating the narrow specializations that previously characterized craft production it makes possible "the recognition of variation of labour and hence of the fitness of the worker for the maximum number of different kinds of labour."[15]

Modern industry thus opens the vision of an alternative--communist-- social order in which the "monstrosity" of technological unemployment is replaced by the "possibility of varying labour"--so that "the partially developed individual, who is merely the bearer of one specialized social function" will give way to "the totally developed individual, for whom the different social functions are different modes of activity he takes up in turn."[16]

Citing the experience of a French worker who claimed that constantly changing trades in California made him feel "less of a mollusc and more of a man," Marx recommends the development of technical, agricultural and vocational schools, in which "the children of the workers receive a certain amount of instruction in technology."[17] From such moments can be constructed another Marx, an enthusiast for the progressive possibilities of human-machine interaction.[18]

Although much of Marx's writing on machines concerns factory automation, a broadly similar ambivalence informs his observations about the other great technological innovations of his age--those in the sphere of communication and transport.[19] For Marx, the telegraph, the steamship and the railway were the inseparable concomitants to the development of factory production, instruments for the creation of the world market necessary to supply the raw materials and absorb the goods produced by industrial machinery, an extension of capital's ceaseless revolutionizing of the means of production. They were the manifestations of a relentless dynamic which "chases the bourgeoisie over the whole surface of the globe" compelling it to "nestle everywhere, settle everywhere, establish connections everywhere."[20]

As such, the new channels of travel and communication were tendrils for the extension of a system of domination. In a passage which strikingly anticipates the conditions of contemporary globalization Marx writes of how:

> Every development in the means of new productive forces is at the same time a weapon against the workers. All improvements in the means of communication, for example facilitate the competition of workers in different localities and turns local competition into national.[21]

Elsewhere, Marx analyses the new means of communication as as essential component in the "autonomization of the world market," elevating monetary exchanges into an force whose impersonal and relentless processes appear to stand over and against any possibility of human intervention or transformation.[22] These observations--especially when linked to Marx's remarks on ideology and commodity fetishism--have provided planks for a Marxist political economy focused almost entirely on the dominative effects of capitalist media and information industries.

Yet at the same time, and even more emphatically than in the case of industrial machinery, Marx also saw liberatory possibilities in the nineteenth century communications revolution. The telegraph, fast mails, and travel broke down parochialism, localism and narrow national interests. As such, they were potential catalysts for proletarian internationalism. Indeed, The Communist Manifesto's famous exhortation to the "workers of the world" is prefaced by a series of enthusiastic observations on how this "ever expanding union of workers" is "helped on by the improved means of communication that

are created by modern industry and that place the workers of different localities in contact with one another."[23] This is one vital aspect of a process by which "the bourgeoisie "forges the weapons that bring death to itself" and also calls into existence "the men who are to wield these weapons--the modern working class-the proletarians."[24]

In his own life, Marx was eager to take advantage of such possibilities. According to James Billington, Marx and Engels on one occasion planned to penetrate the international wire agencies in Brussels, through a leftist press agency, in order to distribute their messages more widely![25] As Peter Waterman notes, this may not be quite enough to make Marx a 'hacker' *avant la lettre*! Nevertheless, the enthusiasm for the revolutionary possibilities of mass communication so evident in his texts have resonated with theorists from Bertholt Brecht and Walter Benjamin to Hans Magnus Enzensburger onwards.[26]

These synoptic observations only skim the surface of Marx's machine-writings. But they are perhaps enough to establish that throughout these texts there runs an electric tension, an alternating current that oscillates between rival possibilities. At one pole, technology is an instrument of capitalist domination, a means for the intensification of exploitation and the enchaining of the world in commodity exchange. On the other, it is the basis for the freedom from want and the social intercourse that are prerequisites for a communist society. How much emphasis is given to each pole, and by what logic or narrative they are connected, is, however a matter of huge contention. Later, like all the other interpreters, we will select our own favoured points of reference, the passages where, for us, Marx's antinomies about the machine seem to fuse together at white heat into brilliant insight. But for the moment, we will see what others have made of Marx's ambiguous machines.

Scientific Socialism: Late Capitalism

We use the term 'scientific socialism' to designate that form of Marxism --also variously referred to as 'objectivist,' 'classical' or 'neo-orthodox' Marxism--which, taking its direction from Marx and Engel's observations about the contradictions between forces and relations of production, sees history driven by scientifically predictable laws of motion toward a socialist destination.[27] Perhaps the most sophisticated recent example of this school of thought is to be found in the work of Ernest Mandel, the eminent theoretician of the Fourth International.

Mandel's *magnum opus*, Late Capitalism, was first published in 1968 and translated into English in 1975. It represents a magisterial attempt to reinsert many of the societal phenomena which were at that time being claimed by postindustrial theorists to

mark the definitive supersession of Marxism--cybernetics and other new technologies, the increasing importance of planning and education, and the increasingly 'knowledge based' nature of economic develpment--within the framework of historical materialism. For Mandel's fundamental claim is that the societies of contemporary Europe and North America, far from having transcended the features of capitalism described by Marx, in fact exhibited them in a singularly pure form.[28]

Mandel argues that there have been three fundamental moments in capitalism, each one marking a dialectical expansion over the previous stage: market capitalism, monopoly capitalism, and our own phase, "late capitalism." He links the appearance of these stages to Kondratieff's famous theory of "long waves"--successive, rhythmic episodes of economic growth and stagnation which supposedly dominate the last two centuries of Western history. In each wave, surges in technological innovation are precipitated by temporary increases in the rate of profit after a protracted period of under-investment. Corresponding to the three phases of capitalism are three "general revolutions in technology"-- steam driven machinery of the 1840s, electric and combustion motors of the 1890s, and, from the 1940s on, the "third technological revolution" of nuclear power and computerization.

The central feature of this latest phase is the increasing level of automation, and, in particular, the replacement of industrial workers by cybernetic systems and continuous flow processes based on automatic control. This brings with it a series of interrelated developments, which reverberate through the capitalist economy. These include a shift of living labour from the actual treatment of raw materials to preparatory or supervisory functions; new developments in organized research and university education; a speed up in production and a consequent pressure for more effective inventory control, market research and demand management; and increasingly large, and increasingly quickly obsolete, investments in large technological systems. These developments in turn generate a compulsion to introduce exact planning of production not only within each enterprise but also within the the economy as a whole--leading to more state intervention. All of these changes, however, relate back to the overwhelming imperative of capitalism, the maintenance of the rate of profit.[29]

This analysis brings Mandel into direct confrontation with the first expressions of post-industrial theory. Categorically rejecting any idea that the new economic centrality of science and technological knowledge mark some unprecedented historical epoch, Mandel argues that " Late capitalism, far from representing a 'post-industrial society,' . . .appears as the period in which all branches of the economy are fully industrialized for the first time."[30] Specifically citing Bell's work as an example of prevalent theories of

"technological rationalism," he declares that "Belief in the omnipotence of technology is the specific form of bourgeois ideology in late capitalism":

> This ideology proclaims the ability of the existing social order gradually to eliminate all chances of crises, to find a 'technical' solution to all its contradictions, to integrate rebellious social classes and to avoid political explosions.[31]

However, Mandel says, the idea that new technologies allow capitalism to transcend its perennial antagonisms and crises is spurious; on the contrary, such innovations only bring closer its inevitable collapse.

Although Mandel enumerates a wide array of factors, all of which he sees interacting to generate breakdown, the centrepiece of his argument is a traditional mainstay of 'objectivist ' Marxism: the falling rate of profit, consequent on the rising organic composition of capital. To understand this argument a brief technical exposition is necessary.[32]

The Marxist theory of value holds that the source of surplus value is the exploitation of living labour. Capitalist production can be represented in value by the formula C+V+S. C is "constant capital"--the part whose value is not increased in production but merely preserved by it--buildings, raw materials, and, especially important for our discussion, machines. V is "variable" capital, the part used by the capitalist to buy labour power, so termed because it is the only part of capital which lets the capitalist increase the value of his/her capital. S is the "surplus value" --the portion of the newly created value appropriated by the capitalist. The rate of profit is the ratio between surplus-value and total capital=S/(C+V). The ratio between constant capital and variable capital, C/V, is the 'organic composition of capital.'

The fundamental tendency of the capitalist system is to increase the ratio of constant capital (machines and raw materials) to variable capital (wages). For Mandel--and most other objectivist Marxists--the principal impetus in this direction comes from the "whip of competition" amongst capitals, which compels entrepreneurs to constantly automate in order to raise productivity.[33] But if the organic composition of capital, C/V increases, other things being equal, the profit rate S/(C+V) will decline.The more completely mechanization expels workers from production, the more the rate, and eventually the mass, of surplus value diminishes. This decline in profitability causes faltering investment, catalyses class conflict and drives irrevocably toward revolutionary crisis. Capital's profit-driven compulsion to expand the forces of production thus becomes the instrument of its self-destruction.

This formally elegant argument is a topic of immense controversy, even amongst Marxists. In his original account of the 'falling rate of profit,' Marx identified certain

countertendencies--intensified exploitation of labour; cheapening of the elements of constant capital (i.e. increased efficiency in the manufacture of machines, new sources of raw materials); the opening up of industries with low organic composition; increases in foreign trade; speed up in the turnover in capital--all of which might alter the inevitablity of the falling rate of profit.[34] But in neo-orthodox accounts these tend to be seen as subsidiary factors.[35] Certainly Mandel believes that "the fall in the average rate of profit is inescapable."[36]

Cybernetics, by bringing in sight the 'workerless factory' drives this process to a climax, placing on the horizon what Mandel terms "the absolute inner limit of the capitalist mode of production"--the point where fully automated production no longer allows the creation of surplus value.[37]

> The absolute limit . . . lies in the fact that the mass of surplus value itself necessarily diminishes as a result of the elimination of living labour from the production process in the course of the final stage of mechanization automation. Capitalism is incompatible with fully automated production in the whole of industry and agriculture, because this no longer allows for the creation of surplus value or valorization of capital.[38]

To secure this prediction Mandel makes certain theoretical assumptions which rule out capital discovering way of lowering the average organic composition by moving outside its traditional factory base. The development of the service sector is discounted on the grounds that most work in this area, because it does not change the "bodily form" of a commodity, is "unproductive."[39] A shift of labour power to spheres of research and design is similarly rejected because such a transformation "would imply a radical suppression of the social division between manual and intellectual labour" which would "undermine the entire hierarchical structure of factory."[40] Having blocked off these bolt holes, Mandel can be confident that the third technological revolution seals the fate of capital.

Mandel does not see capitalism straightforwardly automating itself into oblivion. Rather, he believes that declining profits will ultimately cause it to check automation. But the closure of this route to expansion will lead to crisis ridden stagnation and intensified conflict over the allocation of surplus. In fact, capitalism is caught in the historical trap foreseen by Marx, where its achievement in expanding the forces of production unleash conflicts that explode the social relations its continuance requires. While Mandel qualifies the finality of his verdict, admitting of reprieves and postponements, the teleology is inscribed in his master work's title--*Late* Capitalism.

In many ways, Mandel's work is a brilliant answer to Bell and the post-industrialists. By showing how so many of the allegedly 'new' features of contemporary society cited by these theorists relate to the very old logic of accumulation, he effectively

refutes the claim that the logic of capital has been replaced by some unprecedented and benign 'informational' principle. Moreover, at the time of its publication Mandel's prediction of renewed economic crisis showed remarkable prescience compared with the post-industrialists rosy forecasts of unimpeded economic growth.

However, what strikes us most strongly is the subterranean affinity between Mandel and his post-industrial opponents. For to a remarkable degree such "automatic Marxism" mirrors the assumptions of the very theories it opposes.[41] There is disagreement about the prospects for scientific-technological innovation yielding capital a smooth, evolutionary future. But there is a common view of the forces of production--seen primarily as machines--as central instruments of inevitable social transformations. In Late Capitalism the dance of machines and capitalists moves like clockwork towards a foreordained conclusion which uncannily echoes the linearity of postindustrial doctrine.

Unlike more vulgar scientific socialists, Mandel is not a technological determinist who reduces revolution to a consequence of autonomous scientific progress. On the contrary, he dialectically relates capital's mechanical self-destruction to its competitive drive for innovation. But he is a social determinist for whom technology relentlessly executes a predecided verdict. The distance between this position and the "bourgeois" faith in the "omnipotence of technology" is not as great as he would like to imagine. As interpreted by Mandel, the doctrine of the falling rate of profit in fact functions as a mirror image of the upward path of progress espoused by Bell and the postindustrialists, the one leading as surely to socialist victory as the other does to capitalist stability.[42]

There are theoretical reasons even for those who share Mandel's premises to doubt his conclusions. As we have noted, Marx himself noted the existence of countertendencies to the 'falling rate of profit,' and many Marxists see its supposed inevitablity as a special case obtaining only under specific conditions.[43] Capitalism's deployment of new technologies certainly drives living labour out of production (through automation), but it can also enhance the countertendencies against the falling rate of profit by increasing the rate of exploitation (through surveillance and monitoring), cheapening machine production (robots making robots), opening new areas of exploitation with a low organic composition (tertiarization), speeding circulation (through advertising, marketing and innovation) and integrating the world market (telecommunications). Mandel rejects such possibilities with arguments whose intricacy verges on the quasi-theological. But such possibilities seem to us significant enough to cast doubt on his teleological certainty. This is *not* to ratify the post-industrialists' dreams of unimpeded market expansion. But it is to see crisis as contingent on the outcome of series of social struggles over the scope, scale and velocity of commodification rather than guaranteed by capital's own internal logic.

What is remarkable about Mandel's account is the absence of any agency for such struggles. At the moment of crisis, of course, the working class is summoned to seize the revolutionary hour. But a striking feature in the pages of Late Capitalism is that this crucial protagonist, the ostensible *raison d'etre* of the whole drama, is in fact largely invisible--far less closely analyzed than capital and its machines. When, elsewhere, Mandel does discuss the modern proletariat, it is essentially to reaffirm the verity of Marx's description of the industrial worker, dismiss the significance of the "manipulations" of the mass media, and assert the guarantee of revolutionary commitment given by "the basic structural stability of the proletarian condition."[44] In such objectivist analysis there is little sense of labour as a living subject, animated by needs and desires; little sense that this subject might change, altering in complexity and capacity in ways at least as dynamic as that of the dead labour embodied in machines, or that capitalist development might itself be crucially shaped by its efforts to harness and contain the energies of this collective subject. Mandel's dialectic of productive forces and relations, in short, skips over class struggle. It is rhetorically prominent but analytically ancillary, the insurgency of the labouring subject merely the predestined reflex of capitalism's auto-destruction.

Moreover, this covert affinity between the determinism of Marxist scientific socialism and bourgeoisie theories of technological development extends further to touch the very concept of socialism. For if socialism is seen as a by-product of the advance of science and technology, rather than as a result of people's rebellion and self-organization, the revolutionary task easily becomes defined as the speeding of technoscientific advance at all costs--including the suppression of any resistance or alternative offered by the very workers in whose name the revolution is undertaken. Where the consequences of this concept appeared in truly grotesque form was of course in the late Soviet regime--in which the objectivism of scientific Marxism combined with a logic of vanguardism, substitutionism and technocratic expertise in a fatal mix.

As a student of Trotsky, Mandel necessarily maintained a highly ambiguous position toward the Soviet Union. But his notion of a "third technological revolution" has a strong similarity to the notion of a "scientific technological revolution" or "STR"embraced by Soviet officials and academicians in the 1960s and 70s.[45] Such theories, which foresaw a new historical epoch inaugurated by cybernetic automation, essentially recapitulated bourgeoisie theories of postindustrialism, with the caveat that the beneficiary of the "STR" would be not capitalism, but socialism. In the Soviet bloc the planned realization of the "STR" would be a vital lever for the achievement of a classless society, while in the West, the anarchy of the market would intensify contradictions, conflict and disintegration. But the essential terms of the analysis were little different from Bell's or Brezinski's--and the

accompanying injunctions about the necessity of 'adjusting' people's 'subjective' attitude to the new 'objective' realities were, if anything, even more chilling.

What links information society theory and scientific socialism is a a shared, though differently inflected, determinism that subordinates the wishes of human subjects to the necessity of technoscientific advance. Each duplicates the other's linearity, scientism, and technocratic tendencies. As such, both are doctrines suitable for regimes in which the means of production have been sequestered from collective control, whether by a corporate or a bureaucratic class. This is precisely why information revolutionaries have been able to borrow so much from scientific socialists, and *vice versa*-.[46] The former were of course, more successful than the latter: the Soviet advocates of STR failed to make the innovations the Western information revolutionaries are, with at least temporary success, effecting. But what divides the promulgators of such doctrines is the sort of distinction that differentiates carnivorous dinosaurs into tyrannosaurs--bulky but deadly--and velociraptors--fast, agile, and even more lethal. With the demise of the Bolshevik experiment, all the teleological certainties of scientific socialism have been thrown up in the air. The one thing that *is* sure, however, is the irrelevance to future struggles of a Marxism convinced of predestined triumph, fixated with the industrial factory, and carrying internally the seeds of the very dominative logic against which it contends.

Technology As Domination: The Road to Neo-Luddism

From the late 1960s--in the very period postindustrial theory emerged--attitudes amongst many European and North American Marxists toward technoscience moved in a direction notably different from that of scientific socialism. Confronting assembly lines, napalm manufacturers and nuclear power plants, growing numbers of theoreticians and activists rediscovered the dark, nightmarish aspects of Marx's writings on technology. Seen through the window of such writings, emergent technologies of automation and communication seemed more likely to strengthen capital than undermine it. The new forces of production appeared not as agencies automatically and autonomously bursting apart the old relations of production, but rather as themselves implacably shaped by those relations, designed and deployed at the behest of a ruling class to whose purposes they were almost entirely instrumental.

The groundwork for such an understanding had in fact previously been laid by the Frankfurt School. As is well known, the basic contention of 'critical theory' developed by Max Horkheimer, Theodor Adorno, Herbert Marcuse is that technological rationality, once a powerful lever for humanity's liberation from want and superstition, has now itself

become oppressive. In the "dialectic of the enlightenment," means have usurped ends, the domination of nature has become the domination of man (sic), and the forces of production have turned to forces of destruction.[47] Enabled by its technoscientific powers both to generate endless desires and also to fulfil them, capital exercises a control so comprehensive as to produce Marcuse's "one dimensional man"--a subject incapable of thinking, or even perceiving, beyond the limits of the system.[48]

Although the best work of the Frankfurt School and their colleagues predated the enunciation of postindustrial theory, their critique of science and technology both anticipated the developments Bell and his colleagues so enthusiastically embraced, and colored an entire line of postwar neo-Marxist response to computers and telecommunications. As the information revolution intensified in pace during the 1970s and 1980s, their analysis of technology-as-domination was extended by a variety of theorists, some following in the steps of Marcuse and his colleagues, others tracking back more directly to Marx. This project developed in two streams--one focussed on the labour process, the other exploring the mass media.

The seminal statement of the labor process stream is Harry Braverman's study of the "degradation of work"--- a direct reply to the postindustrial claims of progress toward a new and technologically improved era of labour relations.[49] Basing himself firmly in Marx's analysis of the labour process, Braverman argues that the 'scientific management' initiated by Frederick Winslow Taylor at the turn of the twentieth century, with its separation of conception from execution, managerial monopolization of knowledge and systematic destruction of skills, is a manifestation of the "great truth of capitalism," namely "that the worker must become the instrument of labour in the hands of the capitalist."[50] However cosmetically disguised, this remains the dominant philosophy of twentieth century management.

The rise of 'white collar' work cited by Bell as evidence of an enlightened postindustrial society is for Braverman simply a symptom of the enlarging managerial apparatus of administration, supervision and planning. Similarly, the new "intellectual technology" of computers and communications which postindustrialists expected to usher in an era of skilled and satisfying mental work, for Braverman signals a precisely contrary tendency. Whether in the movement of a factory worker following the pace of a preprogrammed tool or the monitored keystrokes of an office secretary, the power of the new technologies to record, store and reproduce activities previously dependent on embodied consciousness yields only another extension of Taylorist authority. In the hands of scientific management, machinery is seized upon as "the prime means whereby

production may be controlled not by the direct producer but by the owners and representatives of capital."[51]

This critique of the computerized labour process has subsequently been developed in a number of studies.[52] Perhaps the most influential is David Noble's work on numerically controlled machine tools--technology central to the vision of the 'workerless factory.'[53] Noble argues that the drive to automate machining cannot be explained solely by the requirements of a purely technical efficiency but is marked by the managerial imperative to gain total control over the shop floor, and in particular to break the power of skilled, unionized machinists. This is demonstrated by the suppression of technological options which would allow workers an element of control over the newly automated processes. Noble shows that even when this participation might have improved the operations of the system--by allowing for revision of programmed instructions according to circumstances -- the managerial desire to eliminate the human element prevailed. Indeed, the whole thrust of capital's use of information technology in the workplace is, Nobel argues, fundamentally anti-human, predicated on a model of "progress without people."[54]

The other strand of the technology-as-domination school is that devoted to the media and communication. In an enormously important move beyond the 'factory' focus so apparent in the work of 'classic' Marxists such as Mandel, Adorno and Horkheimer had argued that the subordination of society to capital is largely the work of the "culture industry"--the entertainments and advertisement conglomerates which create artificial needs, distract dissent, and endlessly endorse the facticity of the existing order.[55] Subsequently, broadly Marxian scholars such as Herbert Schiller, Vincent Mosco, Dallas Smythe and Nicholas Garnham have deepened this analysis with detailed research into the operations of the capitalist media.[56] In doing so, they have produced an analysis of capitalism's technological power just as sombre as that discovered on the shopfloor, but expanded over a vastly greater sphere.

Here the work of Schiller can be taken as exemplary.[57] Explicitly targeting theorists who claim we are witnessing the transcendence of capital in "an individualized, electronic global commune," he has consistently argued that what is occurring is rather a push toward a "corporate-controlled information society."[58] Focussing on the US situation, Schiller shows how in all areas of information technology--hardware, software, and transmission networks--the flux of innovation follows a path of relentless commodification. The new satellites, fibre optics and computer networks are deployed to create a media explosion whose apparent pluralism is belied by the near total absorption of thousands of newspapers, magazines, radio stations, TV channels and cable systems into a few giant media combines.

From these structures of ownership flows ideological control. Implicitly following the classic Marxist logic by which economic base must determine ideational superstructure, and especially the argument that control of the means of material production gives the ability to shape the leading ideas of the age, Schiller insists that corporate domination of communications industries yields a prodigious power over the formation of popular consciousness. While information society theorists claim that a proliferation of technologies and channels democratizes and diversifies opinion formation, Schiller argues that the giant media corporations generate, filter and refine the flows of imagery, news and entertainment to exclude anything that might subvert the interest of owners or advertisers and to systematically intensify the commodification of social relations.

"The consequence," says Schiller, echoing Marcuse,"is a national discourse that is increasingly one dimensional."[59] Although he allows for contradictions produced by conflict within and amongst media industries or between such industries and other sectors of capital, the overwhelming weight of his analysis points to the "systematic envelopment of human consciousness by corporate speech."[60] And since information technologies are seen as a central instrument in this envelopment, the assessment of them is comprehensively negative:

> It is not a question of "either-or"... good technology or bad technology use. It is solely a matter of developing and using the new communication technology for holding on to the economic benefits derived from a world system of power... insistence on the potential and positive features of the current communication instrumentation is disingenuous at best.[61]

"Mind management" in the cultural sphere becomes thus the corollary of deskilling and in the workplace.[62]

These two streams of technology-as-domination analysis--one focussed on the labor process and the other on the media--are melded by Frank Webster and Kevin Robins in their relentlessly bleak account of "cybernetic capitalism."[63] This makes explicit the connection of Taylorism with media management. Taylorism, Webster and Robins point out, was in its original formulation not only a doctrine of shop floor control but also an overall social philosophy which pursued increasing productivity as "the key to future prosperity, harmony and progress."[64] The deployment of information technology represents the realization of this second phase of "generalized or social Taylorism," extending capitalist control of knowledge and information beyond the factory to society as a whole.[65]

Confronting this prospect, Webster and Robins articulate the deep foreboding characteristic of so much contemporary Marxian analysis of technology :

> This . . . is what we foresee in the future: a society in which corporate capital, using the most advanced forms of I.T. that have been designed to suit its requirements and constantly talking about the imperatives and promises of a technological revolution, extends and consolidates its hold in society, strengthening its control over employees (and shedding significant numbers) while intruding further into the everyday lives of consumers both groups of whom it observes, analyzes and schemes about what changes might be to the company's advantage and perceived as inevitable--by those likely to suffer from restructuring--or desirable--by those able to pay the going rate. Behind, often in front, and almost always in collusion with this centralized corporate capital, is arraigned a disciplinary state, equipped with the latest surveillance technologies, able to contain dissent from those minorities unwilling to accede to the market's control or unable, through unemployment and/or poverty, to participate in its technologies of abundance.[66]

The changes presented by information revolutionaries as liberatory increases in individual autonomy signify the very opposite--greater reach for the 'visible hand' of managerial control, now exercised through an arsenal of devices for broadcasting, monitoring and surveillance to allow the observation and shaping of social subjects as both workers and customers.

Although scientific socialists, like Mandel, had always condemned the uses to which capital puts technology, this critique of the technology-as-domination cut much deeper. For scientific socialists, machines are neutral, although capital's deployment of them is objectionable. For technology-as-domination theorists, however, this apparent neutrality is a lie. Technologies embody social choices made by those with power over their construction. Political intentions are present not only at the level of use, but of research and construction--not merely in what is done with machines, but in how they are designed, and, indeed, in whether potential innovations are realized at all or suppressed.

The thought that technology might, in its very core, incarnate the intentions of the capitalists who make them, while certainly present in Marx, was first enlarged on by the Frankfurt School theorists--who nevertheless clung, somewhat self-contradictorily to the hope that technological rationality might be rescued from capital's grasp. But in the subsequent development of this line of thought, the redemptive hope largely fades. In a flat contradiction of scientific socialism's technological optimism, machines are seen as buttressing rather than overturning established power. Noble says:

> Technology . . . is not an irreducible first cause; its social effects follow from social causes that brought it into being; behind the technology that affects social relations lie the very same social relations. Little wonder, then, that the technology usually tends to reinforce rather than subvert those relations.[67]

Increasingly technological development comes to be seen as so deeply tainted by drives toward domination and omnipotence as to constitute a social pathology--a madness to be resisted at all costs.[68]

From such a position, it is natural that many technology-as-domination theorists look for inspiration to the machine wreckers of the first Industrial Revolution--the Luddites. For Noble, Webster and Robins the pejorative use of this epithet by information revolutionaries slanders the real nature of a movement which represented a coherent protest against destructive industrialization advanced under the banner of technological necessity. And, just as in the first industrial revolution capital accumulated itself through popular immiseration, so the computerized 'second industrial revolution' will expand corporate wealth and control by massive dislocation, deskilling, and unemployment. What is required to confront this prospect is a revival of the resistant spirit of General Ludd--a neo-Luddism for the information age.[69]

Thus for Noble "the essence of technology question today" is that "there is a war on, but only one side is armed."[70] Notions of technological transcendence peddled by information society theorists are no more than legitimations for the corporate assault on workers. Given capital's control of research and innovation, the immediate possibility of shaping and humanizing the approaching wave of technological change is minimal. Rather, leftist energies should be directed toward an immediate effort at halting, or at least drastically slowing, its diffusion. Pointing to the actual incidence of sabotage amongst people replaced by computers, Noble declares that " if workers have begun to smash the physical machinery of domination <then> responsible intellectuals must begin to deliberately smash the mental machinery of domination.[71]

Of all the positions examined in this chapter, this neo-Luddite stance seems to us the most insightful. It is the one that most fully confronts the ambition of the information society project, not as as a foreordained ascent of civilization, but as a strategy of societal power. This theoretical perspective is backed with concrete studies of the shaping of new technologies to capitalist ends, both in the workplace and beyond it. And the consequent call for resistance has an integrity lacking in the obeisances paid by scientific socialists and social democrats alike to capitalist 'progress.'

However, such analysis also has serious and ultimately self-defeating limitations. At root this is because the technology-as-domination school overestimate capital's capacity to command living labour with dead labour. It restores the human subject which objective Marxism banishes, but it introduces this subject primarily as victim. In this respect, the reproach often levelled against Braverman's labour process analysis--that it sees workers only as the passive objects of capitalist designs, and ignores the consequences of their

counter-strategies and resistances--is justified. So too are the criticisms made of media analysts who acknowledge audiences only as the cultural dupes of advertisers. On both fronts, capitalism's intentions and its capacities are too easily equated--a conflation which Stewart Ewen has rightly criticized for its belief in "the self-generating potency of . . . technology and domination."[72]

The more persuasively such analysis demonstrates the complete instrumentality of technoscience to capital, the harder it becomes to credibly posit opposition or alternative. This of course is precisely where the Frankfort School encountered a fatal self-contradiction. For if technological dominance was in fact as total as Adorno or Horkheimer suggested, it became difficult to explain even the basis for their own critical viewpoint, let alone how it could possibly inform any political project. Critical theory relentlessly painted itself into a corner, where hope could only be sustained at the price of heroic inconsistency. This dilemma is repeated by many later theorists whose portrait of the inexorable weight of techno-capital tends toward a dystopianism in which the search for revolutionary possibility gives way to informatic nightmares of omnicompetent indoctrination, surveillance and robotization--a radical pessimism which, while certainly puncturing the euphoria of information society theory, also concedes its hegemony over the future.

The problem is only partially addressed by the neo-Luddite theorists. In reviving the figure of the machine-smasher their analyses vigorously reassert the active capacity of capital's subjects--but only in a reactive mode. Such defensiveness can end in the romanticization of forms of labour which are either *already* manifestly dehumanizing, or, alternatively, which represent islands of relative privilege (the tendency of labour process analysts to focus on the predicament of highly skilled male workers is a case in point.) Further, it can take little account of the possibility--particularly apparent in the field of media and communication technologies--that capital's labouring subjects may find real use-values, perhaps even subversive ones, for the new technologies.

Ultimately, this position suffers the deficiencies of all oppositional theories that conceive struggle only as resistance, and not as counter-initiative. Most neo-Luddite authors in fact admit the need to eventually develop perspectives not just of resistance, but of reappropriation.[73] But the theoretical optic they have so powerfully developed cannot really register such possibilities. For if capital does possess such entire, unilateral powers to implant its logic into technologies as neo-Luddites assert, then efforts to recapture these systems or turn them to alternative use are foredoomed.

It should be noted that although such critiques often begin with a rediscovery of Marx, they frequently end with a repudiation of him. For the more strongly Marx's writings on technology as domination are emphasized, the greater the inclination to dismiss

or regret his equally undeniable assertions about its liberatory potentials. Although Marx was clearly sympathetic to the Luddites, he was also critical of them --remarking that

> . . . it took time and experience before the workers learnt to distinguish between machinery and its employment by capital, and transfer their attacks from the material instruments of production to the form of society which utilizes these instruments.[74]

For many neo-Luddites, such comments only show how deeply Marxism was mortgaged to bourgeois ideas of progress, and its inadequacy to the current crisis. However, in their justified attacks on scientific socialism neo-Luddites have in fact discarded something critical in Marx's vision--his understanding of technological development as a contradictory process yielding countervailing possibilities for contending agencies.To affirm and extend this latter strand, we need theory which, without reverting to the automatism of scientific socialism, can find in technological knowledge empowerment not just for capital, but of those who fight against it.

Post-Fordism: From the Regulation School to New Times?

The discovery of such a perspective has, however, been complicated by the emergence of yet another line of Marxian analysis, one moving in an almost diametrically opposite direction from neo-Luddism. If this line also leads eventually to a departure from Marxism, it takes its exit by an opposite door: one marked not by despair at the oppressive power of capital's new technologies but by enchantment with their liberatory potentials. And if this tendency marks a return to a 'positive' Marxian attitude towards technology, it is one very different from the revolutionary teleology of scientific socialism. For what it looks forward to is not the inevitable victory of socialism, but the technological reconciliation of workers with capital.

Much of this analysis has marched under the banner of 'post-Fordism.' 'Post-Fordism' is, it should be emphasized, a phrase that has entered a diversity of sometimes very different theoretical positions. Not all analysis that uses the term shares the spirit of compromise that we are going to discuss here: for example,we would clearly exempt from our criticisms the work of David Harvey and several of the radical geographers who have followed in his footsteps.[75] Indeed, later in this work we will ourselves sometimes use the phrase as a handy label to designate certain important recent changes in the way capitalism operates. But nevertheless an invocation of 'post-Fordist 'realities *has* become widely associated with a perspective that brings neo-Marxian analysis surprisingly close to that of liberal academics, management consultants, and, indeed, to the positions of the information society theorists.

To understand this process, it is necessary to look at one of the roots of the post-Fordist concept, in the work of the French 'Regulation School' of political economy. In what seemed in origin a classic Marxian project, theorists such as Michel Aglietta and Alain Lipietz set out to investigate the conditions governing the surprisingly successful and ongoing reproduction of contemporary capitalist society. Capitalism, they proposed, is neither an historically invariant formation, nor one teleologically destined to collapse. Rather, it repeatedly overcomes internal contradictions by generating successive "regimes of accumulation"--intermeshed orderings of wage relations, consumption norms, and state intervention which synchronize the overall social prerequisites for the extraction and realization of surplus-value.[76] Consolidation of such a regime depends on the successful development of a "mode of regulation" based on "the institutional forms, procedures and habits which either coerce or persuade private agents to conform to its schema,"[77] and also, in some later versions of the theory, on its integration of a viable "industrial paradigm," or technological system of production.[78]

The principal application of this theoretical perspective has been to develop the category of 'Fordism.' Fordism of course takes its name from the integration of a Taylorist division of labour with intense mechanization pioneered in the auto-plant assembly lines of Henry Ford. Inspired by Antonio Gramsci's fragmentary but suggestive essay "Americanism and Fordism," Regulation School theorists expanded the meaning of the term to designate the regime of accumulation characteristic of industrial capitalism during the middle period of the twentieth century.[79] Fordism in this sense was a comprehensive system of social organization, coordinating factory-based assembly-line production, mass markets consuming standardized manufactured goods, and Keynesian stabilization of the business cycle. Under Fordism, capital enjoyed its post-World War II "Golden Age."

But in the late 1960s and early 1970s, the Regulation School argues, Fordism encountered a serious crisis. Their accounts of its causes vary in the writings of various theorists--ranging through a saturation of mass markets, shopfloor disaffection, the fiscal costs of the welfare state, and changing conditions of global competition. Often these factors are combined in an impeccably overdetermined account. But in any event, Regulation School theorists agree that, starting about twenty five years ago, capital's most successful regime of accumulation began to falter; sliding profit rates inaugurated a period of continuing flux and uncertainty, disintegration and restructuring in the global economy that continues to this day.

If Fordism is breaking up, the obvious issue is: what will succeed it ? This is the question theories of a 'post-' or 'neo-' Fordist regime attempt to answer. While accounts of the emergent regime vary in detail, it is generally agreed that it will centrally involve the

introduction of new technologies--a change in "industrial paradigm." Aglietta himself speculated that a "neo-Fordist" regime would replace the "mechanical principle" of the assembly line with computerized systems based on the "informational principle."[80] His view of such developments was far from rosy: while their arrival unleashed "the most shameless propaganda about the liberation of man in work," they actually meant intensified workplace deskilling and, at the level of society as a whole "a strong totalitarian tendency."[81] Some theorists drawing on his work retain this sceptical orientation. But others have elaborated the idea of post- Fordism far more optimistically.

Here the Regulation School's Marxism intersects in a remarkable way with non-, indeed anti-Marxist, perspectives. One of the most important of these is the work of Michael Piore and Charles Sabel on the "second industrial divide."[82] Piore and Sabel, far from being Marxists, are, if anything, Proudhonist in their orientation--fascinated by the prospects of escaping the alienation of modern capitalism by return to small-scale, cooperative, artisanal production.[83] For these theorists, the disintegration of Fordism amounts to a moment equivalent in importance to the first industrial revolution. On the other side of this divide lie bright prospects. Information technologies possess a reprogrammability that gives them a plasticity unknown to dedicated industrial machinery. This, Piore and Sabel argue, will allow the restoration to the workplace of the judgement, learning and variety lost to Taylorism.

New computerized systems of "flexible specialization" can both respond to the disaggregation of standardized Fordist mass consumption into more fluid, niched and customized markets and at the same time supersede the deadening routine of Fordist mass production.[84] The monotony of the industrial assembly line will give way to versatile high-tech craft work that requires the willing engagement of the operator's knowledge and attention and places a premium on cooperation between management and worker. The result Piore and Sabel claim, will be to dissolve the alienation and antagonism of the capitalist workplace and lay the basis for a new, artisanal, computerized post-Fordist "yeoman democracy."[85]

By the mid 1980s, the production of such optimistic post-Fordist prophecies had become a veritable academic industry.The concept of a new regime of accumulation was variously married with theories of flexible specialization, Japanese management or Swedish humanized workplaces to generate a series of predictive models of labour/ capital cooperation in the new epoch.[86] With their promise of a new era pivotally shaped by computers and telecommunications, these versions of post-Fordism triggered memories amongst both critics and supporters of post-industrialism and information society theory. Indeed, for its proponents on the left, one of the attractions of the concept was undoubtedly

that it represented a rejoinder to such theories. It seemed to offer a way of talking about computers that did not pretend capitalism had ceased to exist, yet did not box itself into the relentless pessimism of theories of technology-as-domination.[87] Yet in doing so, it often replicated the most problematic aspects of post-industrial theory. For, as Pelaez and Holloway point out in their scathing attack on theories of post-Fordism, in many of these accounts the complexity of Aglietta's original analysis of the crisis of Fordism is simplified into a blunt technological determinism whereby it is the sheer force of new technologies that produces the new era.[88]

A more sophisticated version of the argument--strongly advanced by Lipietz, a founder and foremost popularizer of Regulation School theory--is that the crisis of Fordism opens the way to a variety of alternative accumulation regimes. Some of these would be better for workers than others. One could have either neo-Fordist regimes--in which informatics duplicate and intensify traditional patterns of exploitation--or truly post-Fordist systems, which take advantage of the new technological opportunities for reskilling and responsibility. For Lipietz, the pursuit of this latter path, the search for a "a way out of the crisis" based on "responsible involvement," in which workers gain higher security, higher pay, and/or shorter hours in return for their cooperation in post-Taylorist high technology systems represents "the dream of a new deal for the 21st century."[89]

However, many critics have suggested that such dreams of a high-tech "new deal" rest on a very uncritical acceptance of management propaganda about new production systems. Post-Fordist analysis, they charge, de-emphasizes the way "flexible specialization" segments the workforce between a 'core' of permanent skilled workers and a 'periphery' of casualized and temporary employees.[90] It also often glosses over how, even within this 'core,' the new post-Taylorist work organization, with its 'autonomous work teams,' peer policing, and internalized competition have been developed as an attack on trades union strength.[91] Morover, its customary contrasts between dirty assembly lines and clean computers ignores the reality of stress, repetitive strain injuries, eye strain, and electronic sweatshops.

To this we would add that many theorists of post-Fordism are often silent about the way automation and global communication have been deployed to swell the reserve army of the unemployed, in a way that ferociously undercuts the strength of movements struggling for improved conditions of work and life. Even where these negative features of restructuring are recognized in 'post-Fordist' analysis, as they are in some of Lipietz's work, they are seen as contingent options, undesirable alternatives within an array of social options. What is not confronted is the possibility identified by neo-Luddite analysts, namely that these destructive outcomes might not be subsidiary to capital's logic, but rather

central to it --that post-Fordist restructuring might be a project predicated on discipline through austerity as a prerequisite for future profit. In this view, the weakening of resistance, on the shopfloor and in society at large, is a *central* purpose in the corporate deployment of new technologies, and the chances of negotiating a "new deal" around their use are thus probably illusory.

This tendency to downplay the darker side of capitalist restructuring is even more apparent when post-Fordism has entered discussions on media and popular culture. Just as in the the labour process debate the post-Fordist cachet often marked a shift away from pessimism about the degradation of work toward post-Taylorist optimism, so in the field of culture it has been associated with a rejection of sombre theories of mind-management in favour of an effervescent enthusiasm for 'popular culture.' A salient example is the concept of 'New Times' proposed in the British journal Marxism Today by a cluster of authors including Stuart Hall, Dick Hebdige, Robin Murray and John Urry.[92] In the New Times analysis the switch from standardized mass consumption to flexible specialization is seen as bringing with it an intensified attention to advertising, design, fashion, media and market information. This generates a postmodern ambience of sliding signifiers, simulacra and spectacle, a culture whose volatility and recombinancy both reflects and contributes to the fluidity of post-Fordist production systems.[93]

However, in marked contrast to theorists such as Schiller, New Times analysts do not view this explosion of media and imagery with suspicion or alarm. Rather, the new scope of consumer choice--including the proliferation of media channels--and the energetic experimentation of post-Fordist commercial culture, with its gender-bending advertisements, socially conscious products, global eclecticism and self conscious embrace of feminism and multiculturalism, are seen as opening an exciting space replete with possibilities for the forms of life championed in various identity politics. Hall speaks of the disintegration of Fordism catalyzing a "revolution of the subject," and creating an "expansion in the positionalities and identities available to ordinary people."[94] Exhorting the left to adapt to the pluralizing, decentralizing and variegating aspect of the new cultural regime he cites Marx's famous lines about the dynamic effects of "the constant revolutionizing of production" in which "all fixed, fast frozen relationships . . . are swept away . . . All that is solid melts away."

In the eyes of critics such as A. Sivanandan, however, what has melted away in the enthusiasm for post-Fordism is the solidity of Marxist commitments.[95] Even more moderate critics voiced concerns that the "designer socialism" of Hall and his colleagues expressed the limited perspectives of a fraction of left intelligentsia favoured by the growth of new cultural industries, and that their enthusiasm for "new times" was achieved only at

the expense of forgetting about "old enemies."[96] And indeed, the New Times celebrations of post-Fordism's cultural vivacity seem remarkably indifferent to the appearance in Thatcherite Britain of new exclusions and stratification at least as pernicious as the massified divisions of Fordism. Eloquent about the improved choices post-Fordism brings to consumers, it was very silent on the street-level bricolage left for those destituted by the degradation of the welfare state. When this is taken together with an evident distaste for the militancies of miners' strikes or anti-poll tax riots, a politics hovering vaguely on the left of a Labour Party marching rapidly to the right, and a theoretical rapprochement with specifically 'post-Marxist ' theorists, it is difficult not to think that the New Times analysis made the title of Marxism Today into a very postmodern irony.

Distaste for such positions has led many Marxists to entirely reject the categories of Fordism and post-Fordist as a mystification of capital's perennial, and ugly, features. This may be to throw the baby out with the bathwater. The argument that capital entered a phase of drastic restructuring in the early 1970s is a compelling one. In recognizing this shift, theorists who use the category of post-Fordism have often been more alert to important changes in work, culture, and politics than their more orthodox Marxist critics. They could even be said to have rediscovered a sense of the dynamic, tumultuous and experimental nature of capitalist development that was salient in Marx's own writings, but is often forgotten by those who insist that capital is always 'the same old thing.'[97]

However, to agree with the post-Fordists that capitalism is undergoing a period of rapid change is not to assent to their analysis of the cause, course or consequence of this transformation. As Julie Graham has pointed out, embedded within the theoretical apparatus of the Regulation School is a deep tendency to downplay the conflict at the heart of capitalist society.[98] For their analysis takes as its focus and "point of entry" the requirements for capital's successful organization of society, not the contestation of its rule.[99] Its research agenda is built around capitalist growth, not class struggle. Once such study is divorced from scientific socialists' teleology of inevitable breakdown, it tacitly enters onto the same ground as non- or anti-Marxist theories of economic development, so that "Marxism becomes another theory of capitalist growth, focusing primarily on those social processes that promote capital accumulation and excluding those that do not."[100] The result, as Graham notes, is a vision that is premised on the "vitality and uncontested hegemony" of capital's reproduction, but "obscures the weaknesses and instabilities of that process (and) hides the failures and unevenness that make non-capitalist alternatives an existing and future option."[101]

This emphasis on the historical adaptability of capital, taken in conjunction the general demoralization of the left in the 1980s, has led to a very rapid acceptance that what

will emerge from the crisis of Fordism can *only* be another capitalist regime of accumulation. The assumption that restructuring will succeed--an inverse reflection of scientific socialism's faith in inevitable collapse--leads, by gradual but inexorable stages, to a circumscription of left action. Even in the work of Lipietz, shrewdest and most persuasive of post-Fordist reformists, it is impossible not to be struck by how emphatically socialism is ruled off the agenda for the foreseeable future, how complete is the acceptance of the hegemony of the market, or how large the concessions to the corporate agenda for the reorganization of work. The only issue becomes what *sort* of capitalist regime will emerge, and how good a "deal" workers and social movements can cut within it.

This effects what Les Levidow has termed a "foreclosure of the future."[102] By implicitly accepting the success of capital's restructuring it directs attention away from forms of action which might challenge that completion. It shuts the door on strategies where workers' knowledge of new production systems yield, not partnership with management, but new ways to challenge managerial command, and new ways in which emergent media networks are made to circulate struggles rather than commodities. In doing so, it represses radical potentialities in favour of reformist hopes.[103] This is done in the name of realism. But given the enormous offensive capacity the new technologies allow global business, the expectation that capital will negotiate any reformist compromise *unless* faced with a serious challenge to its overall control of society is itself utterly utopian. For Lipietz, the task is "to find a way out of the crisis." But the Marxist project has never been to help capitalism find a way out of crisis. It has been to find a way of capitalism. This is precisely the possibility that much post-Fordist writing abdicates.

Conclusion: Condition Terminal?

In this chapter we have seen how various schools of Marxism have responded in radically contrasting ways to the 'information revolution.' This diversity of response arises from the complexity of Marx's own writings on technology. The amplification and extension of different aspects of these texts has given rise to very different perspectives on the relation of machines to social change. Scientific socialism has conceived of a teleological interaction of forces and relations of production, leading to the eventual collapse of capital; technology-as-domination theorists, on the other hand, see machinery as consolidating and deepening capitalist power; and post-Fordists have often found in new technologies the promise of a humanization of work which would transcend the traditional patterns of exploitation.

All these accounts suffer major defects as a reply to the anti-Marxist challenge of the information revolutionaries. In a way that uncannily mirrors the logic of their opponents, scientific socialism effectively liquidates human agency, and substitutes for it an inexorable, and ultimately sinister, technological automatism. Technology-as-domination theorists restore to view the question of the subjectivity constituted by a machine saturated society-- but can conceive of it only as a process of victimized exploitation, to which the best response is a reactive, heroic, but probably hopeless neo-Luddism. Many post-Fordist accounts, on the other hand have embraced so much of the information revolutionaries own euphoria about the new subject of technology as to essentially abdicate the negative moment of critique and subscribe to capital's own logic of technological development.

Indeed, all three perspectives lead, although by different routes, to potential disintegrations of or exits from Marxism: scientific socialism shattered by the confounding of teleological optimism marked by the events of 1989; neo-Luddism descending into a dystopian, radical pessimism; and several versions of post-Fordism converging with a post-Marxist politics that claims to go 'beyond' issues of capital and class. Surveying these dead-ends, it would appear that the information age has put Marxism into a terminal condition.

NOTES

1 Karl Marx, The Poverty of Philosophy (New York: International Publishers, 1971) 109.

2 For a valuable discussion, see Donald.McKenzie, "Marx and the Machine," Technology and Culture 25.3 (1984): 473-502.

3 Karl Marx, Preface to the Contribution to a Critique of Political Economy (London: International Publishers, 1971) 20-21.

4 Marx, Preface 21.

5 On this debate see Laurence Harris, "Forces and Relations of Production," Dictionary of Marxist Thought, ed. Tom Bottomore, Laurence Harris, V.G. Kiernan, Ralph Miliband (Cambridge: Harvard University Press, 1983) 178-180.

6 Frederick Engels, Socialism: Utopian and Scientific (Peking: Foreign Languages Press, 1975) 88.

7 Nikolai Bukharin, Historical Materialism: A System of Sociology (New York International Publishers, 1925);. J.D. Bernal, The Social Function of Science (Cambridge: MIT Press, 1939); Gerald Cohen, Karl Marx's Theory of History: A Defence (Oxford: Clarendon, 1978).

8 Karl Marx, Capital: A Critique of Political Economy vol. 1 (New York: Vintage Books, 1977) 1026-1040

9 Marx, Capital vol. 1 1037.

10 Georg Lukacs, "Technology and Social Relations," New Left Review 39 (1966) 27-34; Harry Braverman, Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century (New York: Monthly Review, 1974); David Noble, Forces of Production (New York: Knopf, 1984).

11 Marx, Capital vol 1 590-614.

12 Marx, "Speech at the Anniversary of the *People's Paper*" (Apr. 14, 1856), Karl Marx: Selected Works, ed. V. Adoratsky and C.P. Dutt, vol. 1 (London, 1942), 428, cited in Simon Schaffer, "Babbage's Intelligence: Calculating Engines and the Factory System." Critical Inquiry 21 (1994): 206.

13 Marx, Capital vol. 1 618.

14 Marx, Capital vol. 1 618.

15 Marx, Capital vol. 1 618. "'*Ne sutor ultra crepidam*' ('let the cobbler stick to his last', a phrase which was the absolute summit of handicraft wisdom, became sheer nonsense from the moment the watchmaker Watt invented the steam-engine, the barber Arkwright the throstle and the jeweller Fulton the steamship."

16 Marx, Capital vol. 1 618.

17 Marx. Capital vol. 1 618.

18 For such an account see Paul S. Adler "Marx, Machines, and Skill," Technology and Culture 3.4 (1990): 780-812.

19 An excellent collection of Marx's writings in this sphere is Yves de la Haye, Marx and Engels on the Means of Communication: The Movement of Commodities, People, Information and Capital. (NY: International General, 1979). See also Armand Mattelart and Seth Siegelaub, eds., Communication and Class Struggle: I. Capitalism and Imperialism (New York: International General, 1979).

20 Karl Marx and Frederick Engels, The Communist Manifesto (New York: Washington Square, 1969) n.p.

21 Karl Marx, Wage Labour and Capital: Value, Price and Profit (New York: International Publishers, 1976), cited De La Haye 52.

22 Marx, Grundrisse, cited De La Haye, 10-103.

23 Marx and Engels, The Communist Manifesto n.p.

24 Marx and Engels, The Communist Manifesto.n.p.

25 James Billington, Fire In the Minds of Men: Origins of the Revolutionary Faith (New York: Basic, 1980) 309.

26 Peter Waterman, "International Labour Communication by Computer: The Fifth International?" Working Paper Series 129, (The Hague: Institute of Social Studies, 1992) 9.

27 On these definitions see James O'Connor, The Meaning of Crisis (Oxford: Blackwell, 1987) 49-108.

28 Ernest Mandel, Late Capitalism (London: New Left Review).

29 Mandel, Late Capitalism 195-197.

30 Mandel, Late Capitalism 191.

31 Mandel, Late Capitalism 501.

32 The following summary draws on Mandel's own account in his An Introduction to Marxist Economic Theory (New York: Pathfinder, 1969).

33 Mandel, Late Capitalism 111.

34 Karl Marx, Capital: A Critique of Political Economy. vol. 3 (New York: Vintage Books, 1981), 339-349. For the immensely complex debate on this topic see Michael A. Lebowitz,"Marx's falling Rate of Profit: A Dialectical View," Canadian Journal of Economics 9.2 (1976): 233-254; Harry Cleaver, "Karl Marx: Economist or Revolutionary?" Marx, Schumpter and Keynes: A Centenary Celebration of Dissent, ed. Suzanne W.Helburn and David F (New York: M.E. Sharpe, 1986) 121-148, and O'Connor.

35 O'Connor 76.

36 Mandel, Introduction 50.

37 Mandel, Late Capitalism 207.

38 Mandel, Late Capitalism 110.

39 Mandel, Late Capitalism 405-407.

40 Mandel, Late Capitalism 208.

41 The phrase is from Russell Jacoby, "Towards a Critique of Automatic Marxism: The Politics of Philosophy From Lukacs to the Frankfurt School" Telos 10 (1971): 119-146, and "The Politics of Crisis Theory: Toward a Critique of Automatic Marxism II," Telos 23 (1975): 3-52.

42' This resemblance is tellingly revealed by the facility with which Mandel's theories, stripped of political implication, have been reabsorbed by postindustrial long-wave theorists, with their visions of ineffable economic cycles pulsing tidally across the centuries. 'Long wave theorists' such as Christopher. Freeman and Carletta Perez Technology, Policy and Economic Performance (London: Frances Pinter,1987)) and Hall, Peter Hall and Paschal Preston, The Carrier Wave: New Information Technology and the Geography of Innovation, 1846-2003 (London: Unwin Hyman, 1988) base their work on Kondratieff's theory of inexorable--albeit mysterious--economic cycles linked to clusters of technological innovation and situate the emergence of computers and communications as part of the new "techno-economic" paradigm marking the onset of "fifth Kondratieff." or "carrier wave" about to unfold at the turn of the century (Hall and Preston 1988) While this construction moderates claims of the scope of epochal change made by postindustrialists--situating the microchip and fibre optic cable within a sequence of technological revolutions where their predecessors include steam, steel processing, electricity --it retains the idea of momentous technological change overtaking the contemporary world with inhuman irresistibility.

43 See note 27 above.

44 Ernest Mandel and George Novak, The Revolutionary Potential of the Working Class (New York: Pathfinder, 1974) 6.

45 For discussion of the "STR" see Frederic J. Fleron Jr., ed., Technology and Communist Culture: The Socio-Cultural Impact of Technology Under Socialism (New York: Praeger, 1977); Krishan Kumar, "Futurology: The View From Eastern Europe," Futures 4.1 (1972); and Dallas Smythe Dependency Road: Communications, Capitalism, Consciousness and Canada (Norwood: Ablex, 1981).

46 See, for example, Bell's comments on Trotsky's concepts of economic planning in "The Social Framework of the Information Society," The Computer Age: A Twenty Year View., ed. Michael L. Dertouzous and Joel Moses (Cambridge: MIT Press, 1979) Bell in part derives his model of "technocracy" from Soviet practice, and scientific socialists model the "scientific technological revolution" from American futurists.

47 Theodor Adorno and Max Horkheimer, Dialectic of Enlightenment (New York: Herder and Herder, 1972: orig 1947).

48 Herbert Marcuse, One Dimensional Man (London: Routledge Kegan Paul, 1964).

49 Harry Braverman, Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century (New York: Monthly Review, 1974).

50 Braverman, Labour and Monopoly Capital 114.

51 Braverman, Labour and Monopoly Capital 193.

52 See the essays in Andrew Zimbalist, ed., Case Studies in the Labor Process (New York: Monthly Review, 1979).

53 David Noble, Forces of Production (New York: Knopf, 1984).

54 David Noble, Progress Without People: New Technology, Unemployment, and the Message of Resistance (Toronto: Between The Lines, 1995).

55 Adorno and Horkheimer, Dialectic of the Enlightenment n.p.

56 Representative works include Vincent Mosco, Pushbutton Fantasies: Critical Perspectives on Videotex and Information Technology (Norwood: Ablex, 1982) and The Pay-Per Society: Computers and Communication in the Information Age: Essays in Critical Theory and Public Policy (Toronto: Garamond, 1989); Nicholas Garnham, Capitalism and Communication: Global Culture and the Economics of Information (London: Sage, 1990); Dallas Smythe Dependency Road: Communications, Capitalism, Consciousness and Canada (Norwood: Ablex, 1981). For works by Schiller see the following note.

57 Schiller's impressive body of work includes The Mind Managers (Boston: Beacon, 1973); Communication and Cultural Domination (New York: International Arts and Sciences Press, 1976); Who Knows: Information in the Age of the Fortune 500 (Norwood: Ablex, 1981); Information in the Crisis Economy (Norwood: Ablex, 1986); Culture, Inc: The Corporate Takeover of Public Expression (Oxford: Oxford University Press, 1989).

58 Schiller, Who Knows xi-xiii.

59 Schiller, Culture, Inc 165.

60 Schiller, Culture, Inc 45.

61 Schiller, Information in the Crisis Economy 22.

62 Schiller, The Mind Managers.n.p.

63 Kevin Robins and Frank Webster, "Cybernetic Capitalism: Information Technology, Everyday Life," The Political Economy of Information, ed. Vincent Mosco and Janet Wasko (Madison: University of Wisconsin, 1988) 44-75.

64 Frank Webster and Kevin Robins, Information Technology: A Luddite Analysis (Norwood: Ablex, 1986) 311.

65 Webster & Robins, Information Technology: A Luddite Analysis 329.

66 Webster & Robins, Information Technology: A Luddite Analysis 347.

67 David Noble, "Social Choice in Machine Design: The Case of Automatically Controlled Machine Tools," Case Studies in the Labor Process , ed. Andrew Zimbalist (New York: Monthly Review, 1979) 19.

68 For statements on the pathological nature of capitalist technology, see Schiller, Information in the Crisis Economy, 25; Kevin Robins and Frank Webster, "Athens Without Slaves . . . Or Slaves Without Athens? The Neurosis of Technology." Science as Culture 3 (1988): 7-53; and Noble, Forces of Production.

69 For classic statements of this position see see Kevin Robins and Frank Webster, "Luddism: New Technology and the Critique of Political Economy," Science, Technology and the Labour Process, vol. 2, ed. Les Levidow and B. Young (Atlantic Highlands: Humanities, 1983) 9-48, and the series of articles by David Noble, "Present Tense Technology," Democracy, 1983, "Part 1," Spring: 8-24; "Part 2," Summer 70-82; "Part 3," Fall 71-93. These articles are reprinted in Progress Without People. Although Schiller does not adopt the Luddite label, in Who Knows, 149, he concurs with Noble's call to halt the rapid diffusion of IT, urging "a maximum effort directed at slowing down, and postponing wherever possible, the rush to computerization."

70 Noble, "Present Tense Technology: Part 1" 8.

71 Noble, "Present Tense Technology: Part 3" 87.

72 Stuart Ewen, rev. of The Mind Managers, by Herbert Schiller, Telos 17 (1973): 186.

73 See the articles mentioned in note 69.

74 Marx, Capital vol. 1 554-555.

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76 Two foundational works of Regulation School analysis are Michel Aglietta, A Theory of Capitalist Regulation (London: New Left Books, 1979), and Alain Lipietz, Mirages and Miracles: The Crisis of Global Fordism (London: Verso, 1987).

77 Lipietz, Mirages and Miracles 32-33.

78 Alain Lipietz and and D. Leborgne, "New Technologies, New Modes of Regulation: Some Spatial Implications," Environment and Planning D: Society and Space 6 (1988): 41.

79 Antonio Gramsci, Selections From the Prison Notebooks, ed. Q. Hoare and G. Nowell-Smith (London: Lawrence and Wishart, 1973) 217-316.

80 Aglietta 123-124.

81 Aglietta 124, 385.

82 Michael J.Piore and Charles Sabel, The Second Industrial Divide: Possibilities for Prosperity (New York: Basic, 1984).

83 See the passage where they discuss workplaces based on "flexible specialisation" as places where "Proudhon might have taken Marx to show him where cooperation and competition meet " Piore and Sabel 287.

84 Piore and Sabel 258-280.

85 Piore and Sabel 305.

86 Representative works include Martin Kenney and Richard Florida, "Beyond Mass Production: Production and the Labor Process in Japan," Politics and Society.16.1 (1988) 121-158; John Mathews, Age of Democracy: The Politics of Post-Fordism.(Melbourne: Oxford University Press, 1989), and Tools of Change: New Technology and the Democratization of Work (Sydney: Pluto, 1989); Robin Murray, "Fordism and Post-Fordism," New Times, ed. Stuart Hall and Martin Jacques (London: Lawrence & Wishart, 1989) 38-54. Although it does not use the 'post-Fordist' terminology, the work of Larry Hirschorn is very similar in themes, and in its trajectory away from Marxism. See his "New Productive Forces and the Contradictions of Contemporary Capitalism: A Post-Industrial Perspective," Theory and Society 7 (1979); "The Post-Industrial Labor Process," New Political Science 2.3 (1981): 11-32; Beyond Mechanization: Work and Technology in a Post-Industrial Age (Cambridge: MIT,1984).

87 On this point see Chris Smith, "From the 1960s Automation to Flexible Specialization: A Deja Vu of Technological Panaceas," Farewell to Flexibility, ed. A. Pollert (Oxford: Blackwell, 1991) and Stephen Wood, "The Transformation of Work?" The Transformation of Work?: Skill, Flexibility and the Labour Process, ed. Stephen Wood (London: Unwin Hyman, 1989) 1-43.

88 Eloina Pelaez and John Holloway, "Learning to Bow: Post-Fordism and Technological Determinism," Science as Culture 8 (1990): 15-27.

89 Leborgne and Lipietz 263, 272.

90 Les Levidow, "Foreclosing the Future," Science and Society 8 (1990): 59-79.

91 Mike Parker and Jane Slaughter, "Management By Stress," Science and Society 8 (1990): 27-58.

92 Many of these articles are collected in Stuart Hall and Martin Jacques, eds., New Times (London: Lawrence & Wishart, 1989).

93 See Dick Hebdige, "After the Masses," Hall and Jacques,.76-93.

94 Stuart Hall, "The Meaning of New Times," Hall and Jacques, 121,129.

95 A. Sivanandan, 'All that melts into air is solid: the hokum of New Times', Race and Class 31.3 (1989) 1-23.

96 See Michael Rustin, "The Trouble with 'New Times," Hall and Jacques, 303-320, and John Clarke, New Times and Old Enemies: Essays on Cultural Studies and America (London: Harper Collins, 1991).

97 See Nick Witheford and Richard Gruneau, "Between the Politics of Production and the Politics of the Sign: Post-Marxism, Postmodernism, and New Times,"Current Perspectives in Social Theory 13 (1993) 69-92.

98 Julie Graham, "Fordism/Post-Fordism, Marxism-Post-Marxism." Rethinking Marxism 4.1 (1991).39-58.

99 Graham 48.

100 Graham 48.

101 Graham 49.

102 Levidow, "Foreclosing the Future."

103 Interestingly enough, this tendency appears even where supporters of the Regulation School believe they are arguing most strongly for the 'radicalism' of their outlook. Thus Mark Ellam, "Puzzling Out the Post-Fordist Debate: Technology, Markets and Institutions," Post-Fordism: A Reader, ed. Ash Amin (Blackwell: Oxford, 1994) 66, contrasts the Regulation School with "neo-Schumpeterean" and "neo-Smithian" approaches, and approves it because it "sees the new rulebook of capitalist life as only partially written with room for many more coauthors." In support of this, he asserts the insight that "In fact, *strategic resistance against new technology and the Market may well be essential if a new period of stable capitalist growth is to be secured.*" (orginal emphasis). This strikes us as the apogee of functionalist recuperation: "strategic resistance" is defined by its role in consolidating accumulation. We say burn the book.

Chapter 4
CYCLES

Introduction

There is, however, another perspective on technology and power within the Marxist tradition--one that can be referred to as "autonomist Marxism."[1] The prefix signifies a Marxism that takes as its premise not the dominative power of capital, but the potential freedom of people from that domination. Clearly no one group could or should claim monopoly over such a perspective. And indeed, the genealogy of autonomist Marxism, as described by its main English language archivist and chronicler, Harry Cleaver, is deep and wide, reaching back to council communism and even anarcho-communism, and stretching out to connect with the work of C.L.R. James, the French "Socialisme ou Barbarie" group, and E.P. Thompson and his students.[2] But of particular importance in this network is a cluster of theorists associated with the "*autonomia*" movement of Italian workers, students and feminists of the 1960s and 70s, including Raniero Panzieri, Mario Tronti, Sergio Bologna, Romano Alquati, Mariarosa Dalla Costa, Francois Berardi, and Antonio Negri.[3]

In the late 1970s, *autonomia* was destroyed in one of the fiercest yet least-known episodes of political repression in the recent history of metropolitan capital, and the work of this group of intellectual-activists violently interrupted by exile and imprisonment. Their brand of Marxism, anathema to neoliberals, Soviet-style *nomenklatura* and social democrats alike, came to constitute a largely subterranean tradition.[4] Yet over the political winter of the 1980s and 90s it has continued to develop, undergoing new mutations and making fresh international connections.[5] Transgressing the conventional limits of Marxist thought, but built on the foundations of Marx's work and extending it into the contemporary world, autonomist Marxism proposes not an 'ex-Marxism' or a 'post-Marxism' but a "Marx beyond Marx."[6]

Moreover, to pit autonomist Marxism against information revolutionaries is no arbitrary juxtaposition. Groups within the orbit of *autonomia* were among the first to analyze the postindustrial restructuring of capital as a weapon aimed against social upheaval. Since that time certain autonomist theorists, most notably Negri, have devoted increasing attention to the vast new informational apparatus of contemporary capitalism. What makes their perspective peculiarly notable is that it grasps the new forms of knowledge and communication not only as instruments of capitalist domination, but also as potential resources of anti-capitalist struggle. While autonomists have by no means been alone in raising such possibilities, the theoretical inventiveness and scope with which they

explore these issues is perhaps exceptional, and certainly under-acknowledged. We therefore read autonomist Marxism (and it is worth emphasizing that this is indeed a *reading* of the autonomists' work, just as theirs is an active, inventive reading of Marx) as a subversive counter-interpretation of the information revolution, contributing to the reconstruction of a twenty-first century communism capable of confronting computerized capitalism with a radically alternative vision of community and communication.

In this chapter we will suggest how autonomist analysis opens a way to understand the widespread introduction of information technologies as a moment in an ongoing 'cycle of struggles,' and to assess the current state of 'class composition' within electronic capitalism. But first it may be useful to outline some of the basic theoretical concepts of autonomist Marxism, and, in particular, its understanding of the interweaving of technology and power.

The Perspective of Autonomy

At the heart of autonomist analysis lies Marx's familiar analysis of the relation between labour and capital: a relation of exploitation in which workers, separated from the means of production, are compelled to sell the living labour power from which the capitalist extracts surplus value. In elaborating this account, however, most Western Marxisms have tended to emphasize only the dominant and inexorable logic of capital, to a degree such that its accumulative logic, unfolding according to ineluctable (even if finally self-destructive) laws, figures as the unilateral force shaping the contemporary world.[7] The autonomists' re-discovery--startling enough that Yves Moulier terms it a "Copernican inversion" in post-war Marxism--was that Marx's analysis affirms the power, not of capital, but of the creative human energy Marx called "labour"--"the living, form-giving flame" constitutive of society[8]

As Tronti put it:

> We too have worked with a concept that puts capitalist development first, and workers second. This is a mistake. And now we have to turn the problem on its head, reverse the polarity, and start again from the beginning: and that beginning is the class struggle of the working class.[9]

Far from being a passive object of capitalist designs, it is in fact the worker who is the *active* subject of production, the well-spring of the skills, innovation and cooperation on which capital depends.[10] Capital attempts to incorporate labour as an object, a component in its cycle of value extraction, so much *labour power*. But this inclusion is always partial, never fully achieved. Labouring subjects resist capital's reduction. Labour is for capital always a problematic 'other' which must constantly be controlled and subdued, and which

as persistently, circumvents or challenges this command. Insofar as workers, rather than being organized by capital, struggle against it, they constitute the *working class*.

This distinction between labour power and working class was originally Marx's.[11] But by reviving it, the autonomists opened a way beyond the sterility of much subsequent Marxist class analysis. For by saying that "the working class is defined by its struggle against capital," they shrugged off elaborate taxonomies circumscribing the 'real workers' as some (usually diminishing) fraction of collective labour--manual, industrial, or 'blue collar.'[12] Rather, they opened a perspective which could see tendencies to incorporation within capital (as labour power) and independence from capital (as working class) as opposite polarities or contending potentialities that permeate the entirety of capital's labour force, understood in its broadest scope. In this view, working class struggles are the paradoxical insurgencies of subjects capital 'classes' only as human resources against that limitation--what Cleaver has recently termed "struggles to cease being defined as either *a* class or as a *working* class."[13]

To analyze such struggles autonomists use the concept of *class composition*.[14] As Cleaver points out, this is a striking instance of their "inversion" of classical Marxist categories.[15] Marx had referred to the way technological change results in a change in the "composition of the collective labourer."[16] But his original account of the "organic composition" of capital focused on the power of capital to direct production through the accumulation of machines. In autonomist theory, however, this emphasis is reversed: the analysis of class composition is aimed at assessing the capacity of living labour to wrest control away from capital.[17] It starts from workers' struggles: how they arise, how they are connected or divided, their relation or lack of relation to 'official' workers' organizations, and their capacity to subvert capitalist command.[18] It measures the "level of needs and desires"--expressed in political, cultural and social organization--which constitute the working class as what Negri terms a "dynamic subject, an antagonistic force tending toward its own independent identity."[19]

Class composition is in constant change. If workers resisting capital *compose* themselves as a collectivity, capital must strive to *decompose* or break up this threatening cohesion. It does this by constant revolutionizing of the means of production--by recurrent *restructurings*, involving organizational changes and technological innovation that divide, deskill or eliminate dangerous groups of workers. But since capital is a system which depends on its power to organize labour through the wage, it cannot entirely destroy its antagonist. Each capitalist restructuring must recruit new and different types of labour, and thus yield the possibility of working class *recomposition* involving different strata of workers with fresh capacities of resistance and counter-initiative.

The process of composition/ decomposition/ recomposition constitutes a *cycle of struggle*.[20] This concept is important because it permits recognition that from one cycle to another the leading role of certain sectors of labour (say, the industrial proletariat), of particular organizational strategies (say, the vanguard party), or specific cultural forms (say, singing the Internationale) may decline, become archaic and be surpassed, without equating such changes, as is so fashionable today, with the disappearance of class conflict. Rather than being 'made' once-over, the working class is, as Negri puts it, perpetually "remaking" itself again and again in a movement of constant transformation.[21]

Indeed in a crucial autonomist formulation,Tronti suggested that it is actually *workers' struggles which provide the dynamic of capitalist development*. In Capital Marx had observed that the initial impetus for capital's intensifying use of industrial machinery came from proletarian movements demanding the shortening of the working day. Building on this, the autonomists argued that capital does not unfold according to a self-contained logic, spinning new technologies and organizations out of its own body, but rather is driven by the need to forestall, coopt and defeat the incorporated 'other' simultaneously indispensable and inimical to its existence, fleeing forward into the future in what Tronti termed "successive attempts of the capitalist class to emancipate itself from the working class."[22]

In this process capital is driven to successively wider and deeper dimensions of control--toward the creation of a *social factory*. Marx had written of capital's tendency to "subsume" not only the workplace but society as a whole into its processes.[23] Extending this analysis Tronti, writing in the 1960s, argued that capital's growing resort to state intervention and technocratic control had created a situation where "the entire society now functions as a moment of production."[24] To understand these conditions required moving away from the traditional Marxist focus on the immediate point of production (usually the factory) towards the wider perspective suggested by Marx when he wrote of capital as a circuit comprising not only the moment of production but also of distribution and consumption.

This concept was then elaborated by the feminist wing of autonomist Marxism. Mariarosa Dalla Costa and Selma James, anticipating themes now popular in feminist political economy, argued that within the social factory, the *reproduction* of labour power occupied a crucial but unacknowledged role.[25] Without the--to male theorists--invisible labour process of child-bearing, child-raising, cooking, shopping, education, cleaning, caring for the sick, emotional sustenance, in short, 'housework,' labour power would not be ready for work each morning. This vital reproductive labour, traditionally female and "unwaged," was subordinated to the traditionally male bread-winner.[26] Thus the wage,

mediated by patriarchal authority, commanded and disguised unpaid labour time not only in the workplace but outside it. Other autonomist theorists applied broadly analogous analysis to the situation of other unwaged groups--e.g. students, or, in an international context, peasants--within the social factory.

In developing this analysis, Dalla Costa, James and other autonomists emphasized that the potential unification of workers produced by the universalizing logic of capital has to be understood as cross-cut by a contrary tendency, which Marx recognized, but did not analyze so deeply--namely capital's drive to divide workers along lines of nationality, gender and race. As James puts it "In capital's hands, *the division of labour is first and foremost the division of labourers, on an international scale*."[27] This systemic organization of "difference as division" was imperative for capital, precisely in order to forestall the unified class movement Marx predicted.[28] Therefore anti-capitalist movements, rather than simply mobilizing a unity pre-given by the structure of production, faced the far more complex task of organizing across difference in order to challenge a capitalist totality founded on fragmentation and division.

By extending the analysis of class composition to include reproductive as well as productive labour, and unwaged as well as waged work, autonomists opened up Marxism to radically new theoretical and organizational horizons. For, unlike the Frankfurt School theorists, they did not find the scope of the social factory grounds for despair. If capitalist production now requires an entire network of social relations, these constitute so many more points where its operations can be ruptured. However, autonomists recognized that all of these involved different subjects (factory workers, students, housewives) with specific demands and organizational forms. No longer was the undermining of capitalism the operation of Marx's singular "mole" --the industrial proletariat--but rather of what Sergio Bologna termed a "tribe of moles."[29] The 'autonomy' of autonomist Marxism thus came to affirm *both* labour's fundamental otherness from capital, and *also* the recognition of variety within labour. This in turn leads away from vanguardist, centralized organization, directed from above, toward lateral, polycentric concept of anti-capitalist alliances-in-diversity, connecting a plurality of agencies in a *circulation of struggles*.

Autonomist Marxism thus sees class conflict moving in what Tronti termed a spiralling "double helix."[30] Working class composition and capitalist restructuring chase each other over ever widening and more complex expanses of social territory. As long as capital retains the initiative, it can actually harness the momentum of struggle as a motor of development, using workers' revolts to propel its growth and drive it to successively more sophisticated technical and organizational levels. The revolutionary counter project, however, is to rupture this recuperative movement, unspring the dialectical spiral, and

speed the circulation of struggles until they attain an escape velocity in which labour tears itself away from incorporation within capital--in a process which autonomists refer to as *autovalorization* or *self valorization*.[31] For behind the perennially renewed conflict of capital and labour lies an asymmetry of enormous consequence. Capital, a relation of general commodification predicated on the wage relation, needs labour. But labour does not need capital. Labour can dispense with the wage, and with capitalism, and find different ways to organize its own creative energies: it is potentially *autonomous*.

The autonomist tradition has more often been stigmatized and ignored than given rigorous theoretical examination. But some significant criticisms have been made. Werner Bonefeld, while praising autonomists for breaking with the rigid stasis of structuralist Marxism, suggests that their emphasis on the potential independence of labour from capital can result in a tendency to present workers' as entirely external to capital--a sort of pure,uncontaminated revolutionary force.[32] Although this is not the case with the best of autonomist analysis, which clearly depicts such struggles as occurring both *in* and *against* capital, it undoubtedly can manifest in a certain romanticism that underestimates the depths and pervasiveness of hierarchical divisions and ideological assimilation within the working class, and sees every rebellious swallow as a spring of revolution.

Other critics have suggested that the autonomists' focus on the capital/labour contradiction ignores the competitive conflicts and fractures within capital itself.[33] Within autonomist writing one certainly finds relatively little discussion of the rivalries between different sectors of the ruling class, or of the divergence in immediate aims that can occur between sectors such as, say, financial and industrial capital. Indeed sometimes reading autonomist accounts of capital's 'strategies' one might get the sense that corporate power operates with a single, master-minded battle-plan.

This emphasis on capital as a totality with certain over-riding systemic imperatives is, however, consonant with the approach of Marx himself, who always emphasized the importance of understanding "capital as a whole" before analyzing the activity of "individual capitals." More importantly, it is, in our view, the only way to perceive what is really at stake in the war against class--namely, the attempt by human agents to assert their freedom against a structure of alienated and ultimately quite inhuman power, a process-without-a-subject-but-with-a-purpose to whose relentless accumulative drive individual capitalists, with all their smart manoeuvres and internecine squabbles, are merely functionaries. However, we agree that some autonomist analysis speaks an overly 'intentionalist' language. While the high levels of planning by today's transnational organizations such as the IMF and G7 can often make it *very* appropriate to speak of a capitalist 'strategy,' at other times the anonymous nature of the world-market's operations

make the term "the logic of capital"--as used, for example by Michael Lebowitz--preferable.[34]

However, having duly acknowledged these problems, we have to say that we find the autonomist perspective both illuminating and inspiring--particularly compared with the current welter of Marxist defeatism and post-Marxist apostasy. At a moment when all the accepted verities of the left are in confusion, heresy can make a regenerative contribution. So, having established an overall theoretical orientation, let us turn to look at autonomist Marxism's analysis of technology.

The Interweaving of Technology and Power

As we have seen, autonomist analysis stresses that the capital relation is a collision between two opposed vectors--capital's exploitation of labour and worker's resistance to that exploitation. All the so-called laws of capital are the outcome of this violent intersection. Its perspective on technology, correspondingly, has two aspects. The first is an analysis of technoscience as an instrument of capitalist domination--a rereading aimed at shattering scientific socialism's myth of automatic scientific progress. The second, however, looks at the situation from the other side, and analyzes the ways in which struggles against class can overcome capital's technological control.

In an early essay that established the direction for later autonomist critique, Panzieri broke decisively with left views of technoscientific development as 'progress.'[35] Rather, returning to the pages in Capital on the early introduction of machinery, he re-proposed that capitalism resorts to incessant technological renovation as a "weapon" against the working class: its tendency to increase the proportion of dead or 'constant' capital as against living or 'variable' capital involved in the production process arises precisely from the fact that the latter is a potentially insurgent element with which management is locked in battle and which must at every turn be controlled, fragmented, reduced or ultimately eliminated.[36]

Faced with "capital's interweaving of technology and power," simply to ratify technological rationalization as a linear, universal advance--as the dominant forms of official, Soviet -influenced Marxism did--was to ignore that what it consolidated was a specifically *capitalist* rationality aiming at the domination of labour.[37] To believe that the relations of production (property relations) were simply a "sheathing" which would fall away once the the forces of production had been sufficiently expanded was an illusion.[38] There could, Panzieri concluded,be no question of assuming that socialism would arrive as a by-product of scientific advance: emancipatory uses of machines were possible, but only to the degree that working class revolt assumed a "wholly subversive character."[39]

Panzieri's perspective was formed in the industrial factory, witnessing the way the Taylorist division of labour and Fordist automation were used to break down worker solidarity. But his analysis of technology as capitalist weaponry has subsequently been applied to situations not only of waged but unwaged labour. Thus, for example, Harry Cleaver has analyzed the so-called Green Revolution as capitalist counter-revolutionary strategy.[40] In the context of widespread communist insurgency in Asia, Cleaver argues, the sponsorship by U.S. development agencies of new plant stocks and agricultural techniques was aimed primarily at breaking down the traditional village structures. This had a two fold aim--to eliminate the communities within which guerrillas moved,'like fish in the sea,' and to allow the creation of an industrial proletariat, fed off the countryside, a prerequisite for capitalist modernization. Agricultural technology served as the civil side to counter-insurgency warfare.

However, autonomists also emphasize that waged and unwaged workers are not just passive victims of technological change, but active agents who persistently contest capital's attempts at control. This contestation can take two forms.[41] The first is sheer refusal. This is the theme of the most famous, and most reviled, of autonomist texts, Negri's Domination and Sabotage.[42] Writing in the context of the Italian industrial struggles of 70s in the giant Fiat plants and elsewhere, Negri proposes that, confronting the introduction of huge systems of semi-automated technological control, there could be no question of accepting the necessity of modernization, as official trades unions insisted. Instead, workers should stop the innovations used against them--if necessary, by sabotage.[43] This emphasis on the possibilities of sabotage is an important part of the autonomist tradition, and puts them close to the neo-Luddite authors discussed in the last chapter, some of whom in fact draw on their work.[44]

However, there is another side to the autonomist analysis which gives it a greater dynamism than outright neo-Luddism. This aspect, (which, as we will see, Negri develops in his later work) affirms the the possibility for workers to use their "invention power"--the creative capacity on which capital in fact depends for its incessant innovation--in order to reappropriate technology.This possibility arises because, in its attempt to technologically control labour, capital cannot avoiding creating new types of technologically capable, scientifically literate workers. As Cleaver observes, "The struggles of these workers vis-a-vis their own working conditions as well as vis-a-vis larger social issues can . . . constitute a serious obstacle to successful capitalist planning."[45]

An early instance of this line of thought can be found in the work of Francois Berardi--an activist in the network of politicized 'pirate' radio stations which played a crucial role in the Italian *autonomia* movement.[46] Berardi argued that in the course of

developing the "technoscientific intelligence" it needed for for the control of living labour, capital was unavoidably creating an increasingly "intellectual" workforce.[47] With the appearance of this new, scientific form of labour power also emerged the possibility of a "worker's use of science" that would transform machinery from an "instrument of control and intensification of exploitation into an instrument of liberation from work."[48] This manifested in two ways: in workers' insistence on claiming as their own the surplus time created by automation, and in the increasing popular capacity to reappropriate communication technologies, "subverting the instruments of information" and "reversing the cycle of information into a collective organization of knowledge and language."[49]

Both resistance and reappropriation, sabotage and invention power, are, in autonomist analysis, parts of the repertoire of struggle--although different authors, at different times and contexts, may put more emphasis on one than another. Unlike scientific socialists, autonomists find no inherently progressive logic in technological development. But unlike neo-Luddites they do not perceive only a monolithic capitalist control over scientific innovation. Rather, their insistence on the perpetually contested nature of the labour-capital relation and the basic independence of human creativity tends away from attribution of fixed political valencies to machinery and towards a focus on possibilities for counter-appropriation, refunctioning, and "detournement."[50] If machinery is a "weapon" then it can, as Cleaver says, be stolen or captured, "used against us or by us."[51] Or--to use Panzieri's perhaps richer, and less instrumental, metaphor--if capital "interweaves" technology and power, then this weaving can be undone, and redone in different patterns.

This need not imply a crude 'use and abuse' concept of technology of the sort that neo-Luddites have rightly criticized. We can accept that machines are stamped with social purposes without accepting the idea that all of them are so deeply implanted with the dominative logic of capital as to be rejected. For if the capital relation is to its very core one of conflict and contradiction, with managerial control constantly being challenged by counter-movements to which it must respond, then this conflictual logic may enter into the very creation of technologies.

Thus, for example, automating machinery can be understood as imprinted *both* with the capitalist's drive to deskill and control workers, and *also* with labour's desire for freedom from work--to which capital must respond by technological advance. Similarly, communication technologies have often--as in the case of radio and computer networks--evolved in the course of very complex interaction between business's drive to extend commodification and democratic aspirations for free and universal of communication. Along the way communication technologies have been shaped by both forces. This is not to say that technologies are neutral, but rather that they are often constituted by contending

pressures that implant in them contradictory potentialities: which of these are realized is something that will only be determined in further struggle and conflict.[52]

In the very course of class conflict, workers will not only, repeatedly, halt and sabotage machines, but also challenge capital's unilateral ability to implant *its* logic in technology--and instead bend, twist and even detach part of the process of technological development to move it in quite different directions. Instead of understanding Marx's 'negative' and 'positive' visions of machine-use in a linear, before-and-after progression--with the same machines that were repressive before communism becoming magically emancipatory afterward--autonomist analysis allows us to reconceive the process of deconstructing and reconstructing technologies as itself part of the movement of the struggle against capital.

Cycles of Struggle: From The Professional Worker to the Crisis of the Social Factory

To understand these ideas more concretely, however, we need to look at the three major cycles of struggle which autonomists identify in the twentieth century: those of the *professional worker*, the *mass worker* and--at least by some accounts--the *socialized worker*. Such a sweeping account will necessarily be highly schematic. As Moulier has emphasized, sensitive use of the cycles of struggle concept demands allowance for unevenness, overlap, regional and national variation, and so on.[53] Nonetheless, the very broad-brush version offered here does provide the framework for an analysis of the information revolution which situates it not as the product of ineluctable scientific progress, but of social conflict. In order to clarify this overall dynamic we will proceed through all three of the cycles, moving swiftly at first, but then deepening the analysis as we approach the more recent periods where the focus of our interests lie.

The era of the professional worker--or what might more generally be recognized as the craft worker--is regarded by autonomists as running from the mid-19th century to World War I. It is so termed because of the strategic position occupied by skilled workers, now absorbed within a mechanized factory system but still in possession of craft knowledges and technical competencies. Such workers are the main protagonists in struggles focused on control of the production process and the preservation of the dignity and value of work. Outside of the factory, capital's subsumption of society remains relatively rudimentary. The state's activity, other than in projects of imperial expansion, is generally limited to policing the the operation of the 'free' market, which is characterized by disastrous economic cycles of 'boom and bust' arising from the difficulties of coordinating production and consumption.

Socialist programs in this period are built around the concept of worker's management of industrial production. The role of productive factory labour as the agent of emancipation is unquestioned. Left parties tend to reflect the technical composition of the professional worker insofar as they have a mass membership but an avant-garde leadership--trained cadres of political 'experts.' Revolutionary organizations constructed on this basis include not only the Leninist parties but also council communist movements based largely amongst skilled technical workers--such as those of the German metal industries.[54] In the first quarter of the 20th century such organizations present a mounting threat to capital. With the victory in 1917 of the Bolshevik vanguard party, this threat seems about to attain catastrophic dimensions.

To save itself, capital undertakes a drastic organizational and technological restructuring. This is aimed at decomposing working class power, by destroying the technical base of the professional workers' power and cutting them off from the growing mass of industrial labour. On the shopfloor the chronometer and the clipboard of Taylorist scientific management are deployed to break craft worker's control of production. This deskilling, at first attempted primarily through organizational innovation, is subsequently mechanically embedded in the Fordist assembly line. At the same time, in the face of the socialist threat, the first tentative steps are taken toward a more interventionist role for government in social and economic affairs, aimed at stabilising business cycles and pacifying unrest.

However, this restructuring unintentionally forges the matrix for the emergence of a new working class subject--the mass worker. The Fordist factory--typified by the huge auto plants which come to form the hub of the advanced economies--spatially concentrates huge bodies of dequalified labour subjected to the brutality of continuous automated machine pacing. In doing so, it creates the conditions for an unprecedented form of class solidarity. With craft skills increasingly eroded by Taylorism, the mass worker fights not to to uphold the dignity of a trade, but to make capital pay for lives vanishing meaninglessly down the assembly line. No longer able to control production, he can still stop it. The vulnerability of the assembly line to interruption and sabotage, and the cost to management of idling the increasingly expensive accumulation of fixed capital provide the points of attack. In a cycle of struggle which finds its paradigmatic North American moments in the 1937 Flint sit-down strikes in the US auto industry, the mass worker finds increasingly effective ways of converting the mechanized factory into a bastion of resistance.

To contain this new working class strength, capital is forced to further innovation. Here the productivity deal, in which management maintains shopfloor control by negotiating with trades unions regular pay raises tied to increases in output, becomes a

crucial factor. Although initially only grudgingly concede, this arrangement was eventually assimilated by business as a way of harnessing working class strength to accumulation. The link between productivity and pay served to both propell technological innovation and pacify worker resistance. Alongside this institutionalization of 'industrial relations' emerge ever more comprehensive plans of social management. Again as a result of working class struggle, the *factory wage* is increasingly supplemented by a *social wage* of state controlled payments and amenities--welfare, unemployment, pensions, health insurance, and medical, educational, and recreational facilities. And again capital recuperates these concessions within a new structure of accumulation, as a means to forestall social discontent and guarantee the markets for the volume of commodities pouring off the mechanized lines.[55]Out of this complex interaction of opposition and incorporation there gradually comes into being what the autonomists know as the *Planner State* , in which government supports capitalist activity through Keynesian economics and welfare programs.[56]

As John Merrington has noted, autonomists never understood the era of the mass worker as simply a 'factory' phenomena.[57] Rather, they saw it as the moment of emergence of the social factory. Capitalist organization now requires the synchronization of the factory, where surplus value is pumped out on the assembly line, with the household, where the punishing force of such work is repaired, displaced and hidden, and the pay packet translated into purchases of standardized domestic goods. The gendered division of labour and the pairing the male mass worker--whose life is to be slowly obliterated on the assembly line--with the female housewife, whose lot is to tend the wounds, take the abuse, do the shopping and raise the next generation of labour power in the isolation of the home--becomes a conscious concern of capital's social managers.[58] The labour of the female housewife, whose 'consumerist' schedule is organized largely through new organs of mass communication, such as radio and television, starts to become as much the object of a corporate planning as the productivity of her male partner on the shopfloor--for it is through her activity that the pay increases won by the mass worker are translated into the consumption necessary for a virtuous cycle of continual capitalist growth and stability.

At the end of the Second World War, it seems as if capital in North America and Europe has successfully stabilized itself. The threatening presence of the mass worker is contained in management-union 'deals,' subjected to an increasing weight of mechanical control, and kept ready for work by female reproductive labour in the home. Ethnic minorities and immigrants provide a reserve army available for jobs outside the large scale industry or in its most antiquated, dangerous sectors. Young people are processed through an expanding educational system that sorts and trains personnel for the increasingly elaborate techno-administrative apparatus required by the Planner State and ever more

mechanized production. The threat of the Soviet Union, now turned under Stalin into a ghastly caricature of revolution, is cordoned off with nuclear weapons and a perpetual state of war-readiness. On the basis of this carefully segmented but society-wide mobilization, capital secures its 'Golden Age' of uninterrupted growth.

But then things start to come apart. In the inhuman conditions of the assembly-line factory, the productivity deal always rested on a razor-thin balancing of capitalist profits and worker anger. In the mid-60s the tight-rope trembles. Mass workers increasingly refuse to restrain wage demands within limits functional to capitalist growth or to tolerate conditions accepted by their unions. Management responds to wage pressures with attempts to intensify the pace and intensity of work, thereby precipitating further resistance. A wave of wildcat strikes, slowdowns, sabotage, and absenteeism--which the autonomists christen "the refusal of work"--sweeps across Europe and North America, concentrated initially in the crucial automobile plants, but spreading to other sectors, rendering factories from Detroit to Turin to Dagenham virtually unmanageable.[59]

Even more alarming for capital, these industrial conflicts start to reverberate with problems elsewhere in the social factory. Students who have flooded the universities to escape a destiny as line workers or housewives refuse to confine their intellectual activities within the limits of the 'knowledge factory' and burst into campus revolt. Black and immigrant communities explode against their situation as ghettoized reservoirs of cheap labour. Women, who had in increasing numbers already been abandoning their designated household role to seek paid work, begin a new wave of feminist rebellion against domestic subordination. All these outbreaks are in turn coloured by the unexpected challenges in Vietnam and Cuba to advanced capital's global dominance which generate powerful anti-war and international solidarity movements.

Understood in the light of autonomist analysis, these diverse eruptions, while distinct, are not disconnected. Rather, they appear as a broad revolt by different sectors of labour against their allotted place in the social factory. The new social movements of the era can be understood not as a negation of working class struggle, but as its blossoming: an enormous exfoliation, diversification and multiplication of demands, created by the revolt of previously subordinated and super-exploited sectors of labour. The swirling social ferment which results certainly involve struggles within and amongst labour, as those sectors at the bottom of the wage hierarchy--unpaid women, unemployed minorities--assert their equality with those above them--usually white, male, unionized labour. But they also involves a destabilization of the entire capitalist organization of society as a mechanism of surplus extraction.

Complex ricochet effects come into play as demands for improvement in the social wage threaten corporations with higher tax levels and diminished profits, thereby intensifying conflicts over the factory wage. Even more alarming for capital, the multiple outbreaks of dissent begin to be consciously linked with or inspired by one another--as in the interaction of students and workers that occurs briefly in Paris in 1968 and over a longer period of time in Italy; the meeting of labour and anti-racist struggles in Detroit and elsewhere; or the rekindling of feminism out of the civil rights and student movements. The result is a circulation of struggles which starts, at multiple points, to threaten the whole intricate balance of the social factory.

The Imposition of Cybernetic Command

The response can only be counterattack. In a shift which is usually identified with Reaganism and Thatcherism but whose origins the autonomists date back to the early 1970s, capital begin another drastic restructuring.[60] In the realm of government, the "Planner State" is replaced by the "Crisis State"--a regime of control by trauma induction in which "it is the state that plans the crisis."[61] Keynesian guarantees are dismantled in favour of discipline by restraint; unions hamstrung by changes in labour law; monetary policies exercised to drive real wages down and unemployment up; and welfare programs brought under attack. At the same time, corporate managers take aim at the industrial centres of turbulence, decimating the factory base of the mass worker by the automation and globalization of manufacturing. Dismantling the Fordist organization of the social factory, capital launches into its post-Fordist phase--a project, which however, must be understood as a technological and political offensive aimed at decomposing social insubordination

It is in the context of this offensive restructuring that the work of the 'information revolutionaries' can be situated As we have seen, the first formulations of postindustrial theory by Bell, Drucker, Brzezinski and Kahn--intellectuals closely affiliated to the nexus of state and corporate power in the most powerful capitalist centres--corresponds precisely to this moment. At that time, George Caffentzis, writing of the apocalyptic calls for a "complete change in the mode of production" issuing from such theorists, observed :

> They are "revolutionaries" because they fear something in the present mode that disintegrates capital's touch: a demand, an activity and a refusal that has not been encompassed.[62]

The postindustrialists' futurological reports thus fall into place alongside other documents of the era, such as the infamous report by Samuel Huntington and others on the "excess of democracy," in which capital takes stock of a deteriorating situation, and projects what it will take to reassert command.[63] In the name of irresistible progress and objective

prediction, the information theorists propose a program and a legitimation for a great technological deployment whose glittering sheen disguises old and cold objectives: annihilation of the bases of working class power, reduction of wages and social wages, restoration of social discipline.

For *Collettivo Strategie*, a group within the orbit of *autonomia*, what the new informational doctrines demonstrated was "a militant and revolutionary behavior on the part of capitalism."[64] Analyzing the projection by Zbgniew Brzezinski--President Carter's US National Security Advisor and a founding member of the Trilateral Commission--of an imminent "technetronic revolution" based on "new technologies, new sciences, microelectronic computers and new means of communication" it noted:

> This process is nothing other than a confirmation of the power of capital, as Marx asserted, to impose itself as a force which changes technology or which strikes it down and destroys it violently, thus revealing itself as the least conservative force possible. . .[65]

In fact, *Collettivo* suggested, the emergence of eminent state officials such as Brzezinski from the culture of think tanks and futurological research institutes indicated that capital had gone "Leninist."[66] Just as the socialist vanguard party was the "organized and theoretical form for seizing power" so

> . . . in the same way capital tries to organize its vanguards into institutions which take the form of a party oriented not toward the destruction but rather the maintenance of power.[67]

The project of these informational "vanguards" of capital was a reorganization of production based on "new models of universal communication," launching a new phase of development characterized by the "creation of *uomini merce* (humans who have become commodities)" subject to manipulation through " control over the flows of information"--a project *Collettivo* referred to as the imposition of "cybernetic command."[68]

The military metaphor should not be taken lightly. For what occurs from the mid 1970s onward is that computer and telecommunications devices, developed since the end of World War II primarily as military instruments for the containment of international communism, are transfered for internal application as the 'command, control, communications and intelligence' system for the reestablishment of capitalist discipline and productivity. In a classic instance of what Paul Virilio terms "endocolonization," the security apparatus, nominally facing outward to defeat external foes, is turned against the 'enemy within.'[69] In the United States, a boosting in Pentagon funding, which eventually culminates in the gargantuan 'Star Wars' project, is central to generally speeding the rate of informatic research and development, and, in some cases, to highly specific injections of new technology into the war against labour. The US Air Force, for example, plays a central

role in fostering the computerized automation systems aimed at achieving a 'workerless factory.'[70]

Electronic networking, originally developed as part of nuclear war fighting preparation, receives its first large-scale civilian application in the emergency management systems used by the Nixon administration to monitor its wage-price freeze and picket line violence in a truckers strike.[71] More generally, there is an accelerated adoption by both the corporate sector and the apparatus of government of technologies previously nurtured by the military in its quest for battlefield control--microelectronics, computer mediated communications, video recording, expert systems, artificial intelligence, robotics--now adapted and diffused to provide a similar scope of overview and precision intervention in the workplace and civil society.[72]

Thus the neoliberal transition from "welfare state to warfare state"--or what the autonomists dub the shift from the Planner to the Crisis state--is supported by a whole new level of intensity and sophistication in the governmental use of information technologies.[73] Mass media and new communications techniques are deployed in depth to measure, massage, poll and propagandize public opinion preparatory to policy change. Computerization automates and disperses state sector jobs, providing crucial leverage in attacks on public service unions--such as the Reaganite assault on US air-traffic controllers--and creating 'lean' institutions attractive to privatization. The same technologies are applied to streamline social programs shaved to levels which monitor, rather than support, and to scan scapegoatable perpetrators of welfare fraud. Last, but by no means least, informatics equips paramilitarized security forces with a full arsenal of surveillance devices, electronic intrusion measures, cross-referenced data banks and field communications for a series of domestic 'wars'--on terrorism, on crime, on drugs--which beat down on civil disorders.

The aggressive use of informatics is even more pronounced in the corporate restructuring of work. If the chronometer and the assembly line were the weapons of managerial assault on the professional worker, the robot and the computer network play an equivalent role in the attack on the mass worker. In manufacturing plants, factory wide systems of computerized flow control--Flexible Manufacturing Cells (FMC), Flexible Manufacturing System (FMS), Management Resource Planning (MRP), Computer Aided Process Planning (CAPP) and Just-in-Time (JIT) systems--permit management to sever the solidarity of the assembly line by cutting it into competing 'work teams' supplied by robot servers, shrinking the labour force, and in some cases approaching the 'lights out' scenario of fully automated factory production. The strategic advantage afforded capital by this disaggregation and downsizing is then reinforced by telecommunications systems which permit the centralized coordination of dispersed operations, making feasible the transfer of

work from 'hot spots' of instability either to domestic 'greenfield' sites uncontaminated by militancy or to offshore locations--the first steps toward what would soon be known as 'globalization.'

On all these fronts the deployments of new information technologies and the restructuring of capital converge so closely that neither is practically distinguishable from the other.[74] The effects on class composition are devastating. In a series of critical industrial confrontations, informational innovations give capital a winning card, as Italian car workers find their industrial strength destroyed by the total-automation systems of Robogate and Digitron, British miners are undercut by the Minos robot drill, remnants of craft work strength in London's printers unions are annihilated by computerized type setting, and the striking clerical workers in the US health insurance industry find their pickets lines overleaped by telematics.[75] Such defeats set the scene for an overall neoliberal attack not only on the wage but also on the social wage, realised through the dismantling of the welfare state.

In the face of this attack, the other movements that had shaken the social factory in the 60s and 70s are themselves increasingly thrown onto the defensive. The most militant--like the Panthers in the US or *autonomia* in Italy--are destroyed by assassination, imprisonment and direct repression. But others--such as the student movement--are sapped by insecurity, lack of resources and time and confronted at every turn by the ideological claims of restraint, globalization and deficit reduction. In the face of cybernetic command, the incipient circulation of struggles disintegrates into a series of atomized rearguard actions.

The effects of this convulsion on Marxist thinking have, as we have seen, been quite devastating. For, as Caffentzis remarks "The very *image* of the worker seems to disintegrate before this recomposition of capital.[76] As Fergus Murray argues, in an analysis drawing on autonomist categories, extensive computerization in the factory seems to mark a decisive "decline in the mass collective worker."[77] By permitting centrally controlled, comprehensive factory automation and the splitting-up of the production cycle, management can now reduce and disperse workers once concentrated together so they are "scattered territorially, socially and culturally, in different conditions of work and often invisible from one another."[78] In such a situation, Murray observes, "the problem of uniting a single workforce, let alone the class, is daunting."[79] Indeed, as we have seen in earlier chapters, there is now widespread acceptance even on the left that aspirations for proletarian autonomy have met a technological nemesis--that capital may indeed have succeeded in achieving its age-old goal of emancipation from the working class.

To stop here, however, would be to omit the most provocative proposal in recent autonomist theory--namely, that out of capital's informational restructuring is emerging the subject of a new cycle of revolutionary struggles, the "socialized worker." This term, first used by Romano Alquati in his analysis of student revolt in the 1970s, has subsequently been primarily associated with the work of Negri. He describes the concept as "an innovation in the vocabulary of class concepts" attempting to express the transition from,

> that working class massified in direct production in the factory, to the social labour-power, representing the potentiality of a new working class, now extended through the entire span of production and reproduction--a conception more adequate to the wider and more searching dimensions of capitalist control over society and social labour as a whole.[80]

Over two and a half decades, from the time of Negri's involvement in the Italian struggles to his exile in France, he has progressively deepened and amplified this idea.[81]

The socialized worker is, according to Negri, the subject of a productive process which has become coextensive with society itself. In the era of the professional worker, capital concentrates itself in the factory. In the era of the mass worker, the factory is made the centre around which society revolves. But in the epoch of the socialized worker, the factory is, with the indispensable aid of information technologies, disseminated out into society, deterritorializing, dispersing and decentralizing its operations to constitute what some autonomists term the "diffuse factory" or the "factory without walls."[82] "Work," says Negri "abandons the factory in order to find in the social, a place adequate to the functions of concentrating productive activity and transforming it into value.[83]

This diffusion of work unfolds through what he terms "flexibilization, tertiarization and socialization."[84] As the traditional centres of production are automated, enterprises reorganize around flexible models based upon a small core of permanent employees surrounded by a periphery of contingent workers: part-time, temporary and casual work, dependent subcontracting operations, 'black' work, informal work, outwork and teleworking proliferate. Wage labour is deconcentrated, spatially and temporally dispersed throughout society, and interleaved with unpaid time in new and irregular rhythms.[85]

Simultaneously, as capital reduces its industrial workforce, it seeks out new sources of labour in the so-called service or tertiary sector. This process embraces the large-scale conversion of female domestic labour into fast food, homemaking, day-care, health care, and surrogate motherhood businesses; an extraordinary diversification of cultural industries, turning knowledge, aesthetics, and communications into materials for an explosion of media, music, entertainment, advertising, and fashion industries; and an

array of other experiments from massage parlours to management consultancies. This expansion of waged work marks a new order of magnitude in the commodification of human activity.

However, the most radical aspect of this socialization of labour is the blurring of waged and non-waged time. The activities of people not just as workers but as students, consumers, shoppers and viewers are now directly integrated into the production process. During the era of the mass worker, the consumption of commodities and the reproduction of labour had been organized as spheres of activity adjunct to, yet distinct from, production. Now these borders fray. In education, schooling is explicitly reconstituted as job training, life-long learning as requalification for technological change, and universities as corporate research facilities. In consumption, the integration of advertising, market research, point-of-sale devices, just-in-time inventory control and flexible specialization systems makes the monitoring of the consumer as integral to the production cycle as that of the worker.Work, school, and domesticity are re-formed into a single, integrated constellation

The world of the socialized worker is thus one where capital suffuses the entire form of life. To be socialized is to be made productive, and to become a subject is to be made subject to value--not only as an employee but as a parent, shopper and student, as a flexibilized 'home' worker, as an audience in communicative networks, indeed even as a transmitter of genetic information. The demarcation between the production, circulation and reproduction of capital is impeached in a "network of various, highly differentiated, yet confluent mechanisms" which "mixes, in new and indefinite labour, all that is potentially productive" so that "the whole of society is placed at the disposal of profit."[86] "Productive labour," says Negri, "is now that which produces society."[87]

In this situation, where the spatial location of exploitation is no longer the factory but the network and its temporal measure not the working day but the *life-span*, Negri observes that we have indeed "gone beyond Marx."[88] Marx's original concept of "real subsumption," the swallowing of society by capital, has been realized and exceeded. Indeed, says Negri, it is this apparent co-extensivity of capital with the social which obscures the "contours of the totality," allowing business to "disguise its hegemony . . . and its interest in exploitation, and thus pass its conquest off as being in the general interest."[89] Facing such an expansion of capital's calculus beyond the point of production we might, he says, now choose to speak of socialized labour power not as a *worker* but as an *operator* or *agent*. Yet, by retaining the traditional Marxist epithet, he emphasizes "an antagonism which has never ceased to exist"--a conflict between the imperatives of capital and the needs and desires of the subjects on whose activity it depends.[90]

For, Negri argues, this intensifying fusion of capital and society has unexpected consequences. Capital 'socializes' itself in order to escape the factory-centred conflicts with the mass worker. But the exploitative relation from which that conflict arose--the extraction of unpaid activity from labour--persists. Now, however, it radiates out to inform the extended networks of social activity. Capital persists in paying only for a tiny segment of the life activity it expropriates. But this logic manifests not only in roll-backs and speed-ups on the shop floor, but in cut backs to the social wage, the erosion of the welfare state, and the off-loading of the costs of environmental damage. These practices are of course not new. But the intensified integration of capital's circuit sharply highlights the inadequacy of the wage to acknowledge the web of relationships which sustain social production.

The result, Negri says, is that class struggle, transmuted but not eliminated, reappears, refracted into a multiplicity of points of conflict. In a world where capital has insinuated itself everywhere, there is now no central front of struggle, which instead snakes through homes, schools, universities, hospitals, and media, and takes the form not only of workplace strikes and confrontations, but also of resistance to the dismantling of the welfare state, demands over pay equity, child care, parenting, and health care benefits, and opposition to ecological despoliation. In the newly socialized space of capital, a fractal logic obtains, such that each apparently independent location replicates the fundamental antagonism that informs the entire structure--capital's insistence that life-time be subordinated to profit.

The crucial issue therefore becomes whether the scope of socialized labour will manifest as division or alliance, segmentation or linkage. Negri observes that struggles by multifarious subjects at the many sites of the factory without walls--factory workers, welfare mothers, students--each manifest their own specificity, their own "concrete autonomy."[91] Yet all encounter a barrier in capitalism's subordination of every use value to the universal logic of the market. Consequently,

> It's either/or: either we accentuate the antagonisms and competitions in the concrete cases or we construct a political and subjective totality dialectical of these segmentations . . . All this finds its material base if, escaping the myth of factory production you enter the truth of the process of social production and reproduction, where the functions, the consumption, the elements, the differentiation of the process are fundamental for its own operation, that is for the operation of producing and circulating wealth.[92]

For Negri, the experimentation with coalitions, 'coordinations,' 'rainbows,' 'rhizomes,' 'networks,' 'hammocks,' and 'webs 'which has been a salient feature of anti-capitalist movements in the last decade denotes the search for a politics adequate to "the specific form of existence of the socialized worker," which " "is not something unitary, but something

manifold, not solitary, but polyvalent" and where "the productive nucleus of the antagonism consists in multiplicity.[93]

The concept of the socialized worker is in fact a conjugation or synthesis of 'old' working class theory and analysis of 'new' social movements.[94] Negri argues that the new subject arises at the intersection of "two fundamental axes."[95] One of these runs "from society toward the world of labour" and transmits into the workplace the concerns "of feminism, of ecology, of young people, of anti-racist struggle, of social activism, and, in general, a radical cultural modification and a perspective of irreducible grassroots autonomy."[96] The other runs "from the world of work to society" and carries with it not only a critique of capitalist restructuring, of "exploitation aggravated and distributed throughout the most diverse strata of society," but also a demand for increased power in the shaping of the economic order.[97] Out of the fusion of these currents appears the possibility of a "reunification of the traditional components of the class struggle against exploitation with the new liberation movements."[98]

Indeed, Negri argues that from the 1980s there have appeared the first signs of a *new* cycle of struggles.Focusing mainly on the European context, he and his colleagues look at a series of movements--amongst nurses, media workers, students--which have challenged neoliberal restructuring. In particular, they have been inspired by the successive waves of social revolt which have shaken French society, from the student protests of 1986 to the interlinked revolts of students, workers and immigrants in 1994 against proposals to cut the minimum wage to young job entrants, to the massive three week strike wave of 1996 against the neoliberal Juppe plan. These movements of the socialized worker, Negri says, take forms completely different from the factory struggles of the mass worker, and although historically linked to the first appearance of the new social movements in the 1960s, they are now entering an entirely new phase. This is characterized by:

> . . . the radically democratic form of organization, the transformed relation with the trades unions (which become more and more just transmission lines for impulses arising from below), the social dimension of objectives, the rediscovery of a social perspective by the old sectors of the class struggle, the emergence of the feminist component, of workers from the tertiary sector and of 'intellectual' labour (above all labour power in training).[99]

Such movements,"break with the purely defensive attitude to restructuring."[100] They challenge the Crisis State's managerial control of society, are informed by an ethic that "emphasizes the connections of social labour and highlights the importance of social cooperation," and express, in a diffuse but unmistakable form an aspiration that "cooperative production can be lead from the base, the globality of the postindustrial economy can be assumed by social subjects."[101]

What is of particular interest to us is Negri's analysis of the role of communication and information in these struggles. For he emphasizes that the "factory without walls" is also the "information factory," a system whose operation depends on "the growing identity between productive processes and forms of communication."[102] The conflicts of the Fordist era drove capital to interlink computers, telecommunications and media in ever more extensive networks the more effectively to subordinate society. While the mass worker laboured on a factory assembly-line, the socialized worker's productivity emerges at the terminal of fibre optic lines, as a nurse monitoring cardiograms, a bank clerk handling on-line transactions, a teacher in a computer lab, a programmer or a video technician, or, indeed, as the audience of interactive television channel or the respondent to a telemarketing survey. Her productivity depends on an elaborated network of informatic systems.

However, this technological envelopment does not, Negri claims, necessarily result in a subjugation of social labour. As the system of machines becomes all-encompassing and familiar, he argues, the socialized worker enjoys an increasingly "organic" relation to technoscience.[103] Although initiated by capital for purposes of control and command, as the system grows it becomes for the socialized worker something else entirely, an "ecology of machines."[104] The "system of social machines" increasingly constitutes an everyday ambience of potentials to be tapped and explored.[105] The elaboration and alteration of this techno-habitat becomes so pervasively socialized that it can no longer be exclusively dictated by capital.

In the era of the mass worker, Negri says, the conditions of mechanized labour, concentrated in the factory under the hand of management, led many militants to a "rejection of science." In the age of the socialized worker, however, this situation is "surpassed" as capital is obliged to both devolve and diffuse technological knowledge amongst its workforce. The increasingly social nature of the technological apparatus now makes the tactic of sabotage, which was crucial to the professional and mass worker, and which, as we have seen, Negri himself espoused, less central. Rather, expanded possibilities for refunctioning and recuperation appear. Technoscience now becomes a site--perhaps, Negri suggests, the principle site--for the reappropriation of power.[106]

This might seem reminiscent of Serge Mallet's earlier concept of a "new working class" based in the skilled cadres of advanced industry.[107] But Negri's theory differs in positing the emergence not of a select intelligentsia of technical workers but of a generalized form of labour power needed by a system now suffused in every pore with technoscience. He claims that the new communicative capacities and technological competencies

manifesting in the contemporary workforce, while most explicit among qualified workers, are *not* the exclusive attributes of this group, but rather exist in "virtual" form among the contingent and unemployed labour force.[108] They are not so much the products of a particular training or specific work environment but rather the premises and prerequisites of everyday life in a highly integrated technoscientific system permeated by machines and media.

Negri suggests that the complexity and scope of the factory without walls creates for capital "a specific social constitution--that of cooperation, or, rather, of *intellectual cooperation* i.e. communication--a basis without which society is no longer conceivable."[109]

> Advanced capitalism directly expropriates labouring cooperation. Capital has penetrated the entire society by means of technological and political instruments(the weapons of its daily pillage of value) in order, not only to follow and to be kept informed about, but to anticipate, organize and subsume each of the forms of labouring cooperation which are established in society in order to generate a higher level of productivity. Capital has insinuated itself everywhere, and everywhere attempts to acquire the power to coordinate, commandeer and recuperate value. But the raw material on which the very high level of productivity is based--the only raw material we know of which is suitable for an intellectual and inventive labour force--is *science, communication and the communication of knowledge*.[110]

To secure this cooperation, capital must appropriate the communicative capacity of the labour force, making it flow within the stipulated technological and administrative channels:

> Capital must . . . appropriate communication. It must expropriate the community and superimpose itself on the autonomous capability of manufacturing knowledge, reducing such knowledge to a mere means of every undertaking of the socialized worker. This is *the form which expropriation takes in advanced capitalism*--or rather, in the world economy of the socialized worker.[111]

However, to accomplish this expropriation, capital has to surround the socialized worker with a dense web of communicative channels and devices.

Indeed in a rich, if cryptic, passage Negri claims that "communication is to the socialized worker what the wage relationship was to the mass worker."[112] This does not mean that TV programs replace pay. Rather, Negri is suggesting that communicational resources now constitute part of the bundle of goods and services capital must deliver to workers to ensure its own continuing development. Just as in the era of the mass worker Keynesian capital institutionalized wage increases as the motor of economic growth and generalized the norms of mass consumption, so today, post-Keynesian capital institutionalizes the information infrastructure by which it hopes to rejuvenate itself, 'plugging in' its socialized workforce, multiplying points of contact with the networks,

furnishing and familiarizing labour with a 'wired' habitat through which instructions can be streamed and feedback channelled.

But the analogy suggests more. In the Keynesian era, attempts to domesticate pay demands as part of capitalist growth plans ultimately failed and became a focus for struggle. Similarly, Negri sees the control of communication resources as an emergent arena of tension. By informating production, capital seems to augment its powers of control. But it simultaneously stimulates capacities which threaten to escape its command and overspill into rivulets irrelevant to, or even subversive of, profit. Indeed, insofar as the increasingly 'communicative' texture of the modern economy discloses and intensifies the fundamentally 'socialized,' cooperative nature of labour, it comes into friction with capital's hegemony.

This antagonism can be schematically represented as a conflict between *communication* and *information*--an opposition roughly analogous to Marx's distinction between living and dead labour: communicative activity is "current," information its "imprisonment . . . within inert mechanisms of the reproduction of reality once communication has been expropriated from its protagonists."[113] Information is centralized, vertical, hierarchic; communication is distributed, transverse, dialogic. Capital tries to capture the communicative capacity of the labour force in its technological and organizational forms "like a flat, glass screen on which is projected, fixed in black and white, the mystified cooperative potentialities of social labour--deprived of life, just like in a replay of Metropolis," while the direct current of communication takes transverse "polychromatic forms."[114] Or, in a different formulation, "conflict, struggle and diversity are focussed on communication, with capital, by means of communication, trying to preconstitute the determinants of life," while, on the other hand, "the socialized worker has come to develop the *critique of exploitation* by means of the *critique of communication*."[115]

Negri's analysis of this conflict remains characteristically abstract. But one example undoubtedly in his mind is the use of the Minitel computer system by French student protestors. Minitel was originally designed as a one-way videotex service transmitting government and corporate messages--phone directories, advertisements, banking information, timetables--to French citizens.[116] It was only changed when hackers converted a small-in house mail system into an open, generalized exchange, an initiative that proved so popular that it was incorporated into the official system--thereby laying the basis for an email system perhaps most famous for its erotic "messagerie rose."

In 1986, however, Minitel attained more political dimensions when students erupted in protest against neoliberal university 'reforms,' and were met with a police violence that resulted in at least one death. Frustrated by the mainstream media's hostility or

indifference to their cause, the Student Coordinating Committee, through the daily newspaper *Liberation*, mounted a Minitel service for the revolt. This included information about the spreading university and school closures, demonstrations, reasons to oppose the proposed legislation changes, and a game service satirizing the government updated news bulletins, appeals.[117] Interactive "enter your reactions" section received 3000 calls from across France, including questions about reasons for action, the level of student support, the difficulties of governement /student negotiations, and the on-line fees charged by the telephone company. For Negri, the significance of the student revolt is that it represents the capacity of labour in training--the emergence of a type of worker who embodies "intellectual cooperation" and technoscientific literacy, and the capacity to use this knowledge in oppositional form.

In the next chapter we will try to further concretize Negri's analysis. For the moment, we can anticipate our argument by suggesting that the struggles between information and communication which he has in mind would embrace the conflicts over the collective organization of work--'team concept,' 'quality circles,' 'TQM'--in production; the expansion of alternative media activism contesting the corporate control of news and imagery; struggles in schools and universities between capital's demand for a functionally educated workforce and people's insistence in learning for their own purposes; the imposition and transgression of proprietorial control over vital medical and ecological knowledge; and the struggle in cyberspace between activists who have diverted global computer networking into an unprecedented form of collective intellect, and capital's attempt re-sieze it for commercial purposes.

While the tentative nature of these oppositional projects is evident, Negri would maintain that they constitute the prefigurations of an insubordinate anti-capitalist subject whose identity is rooted in the communicative interconnections of socialized production. While neoliberalism has launched a restructuring that has fatally decomposed the traditional bastions of working class strength and imposed a historic reverse on the left, "nothing," says Negri "tells us that the journey can be concluded according to the direction established by capital." On the contrary, restructuring has also released "uncontrollable effects . . . perverse from the capitalist point of view, but virtuous from the opposing point of view," creating the conditions for an emergence of new subjects who "even if they escape the historical continuity of the workers' movement, are nevertheless not easily reconciled with capitalist plans for the market."[118]

Socialized Worker . . . or Fragmented Worker?

To discern such a recompositional process amidst decades that most on the left reckon to be catastrophic is nothing if not audacious. Many consider it merely a theoretical whistling in the dark. By now, the resemblances between the autonomists' theory of "cycles of struggle" and the Regulation School's concept of successive "regimes of accumulation"--with the era of the mass worker corresponding to Fordism, and the socialized worker to post-Fordism--will be apparent. In fact, both groups have influenced each other, while taking very different orientations--the Regulation School theorists preoccupying themselves with the requirements for successful capitalist accumulation, the autonomists searching for possibilities to explode that process. Perhaps predictably, they arrive at different conclusions, with autonomists--or at least Negri--perceiving the onset of a new era of struggle, and Regulation School theorists settling for accommodation. Negri, although sometimes using the Fordist/post-Fordist terminology, has criticized the Regulationists as an "academic school" who have abandoned the "critique of political economy" in favour of a "functionalist and programmatic schema;"[119] Alain Lipietz--voicing what is probably a fairly widespread opinion--has accused Negri of a "headlong voluntarist flight into the future."[120]

Indeed even many of Negri's political allies dissent from his analysis, suspecting that enchantment with the 'cycle of struggles' theory leads him to find evidence of resurgence where little exists.[121] Several autonomists have been struck not so much by the unification and empowerment of labour in the information economy as by an intensified fragmentation and hierarchization. They have suggested that Negri's work suffers from the defect of some many attempts to periodise class struggle--namely, that an orientation toward what is perceived as the leading-edge of struggle leads to a neglect of capital's tendency to pull together into a unified production system very different kinds of labour--in other words to overlook its dependency on what Trotsky referred to an "uneven and combined development."[122]

Thus in an analysis which extends the work of James and Dalla Costa, George Caffentzis argues that capital's decomposition of the mass worker in the mid 1970s has been accompanied by a redistribution of work in two directions. One is the growth of a high-technology sector focussed on the "energy/information" field of oil, electricity, nuclear power, and microelectronics.[123] The other is the emergence of a low-technology 'service' sector, built around an influx of women into the work force, and partially transforming traditional, unwaged reproductive labour in the home into a zone for direct exploitation.

The "energy/information" and "service" sectors are functionally complementary for capital, the former providing the cutting edge of profit-taking, the latter the mass employment necessary to stabilize the wage relation. But they differ markedly in conditions of work. While workers in the "high" sector may be technologically skilled, relatively secure and perhaps even identify with their work as part of "the brains of the operation," the "low" end service sector worker is poorly paid, insecure, untrained, deskilled.[124] Moreover, the sectors are differentiated by the age, race, and especially gender of their labour power--the high sector being predominantly male and white, the low sector disproportionately composed of workers who are young and/or colored and/or female, often performing a double shift of paid and unpaid reproductive labour at work and in the home. The former gendered division between waged work and unwaged service is now displaced and recapitulated within the wage zone.

Such polarization raises serious questions about Negri's concept of the socialized worker. It obviously affects the "organic" relation to technology he posits for his emergent subject. The grand sweep of the socialized worker thesis often seems to minimize those tendencies which separate strata of relatively well-skilled, well-paid workers--who may indeed possess strategic technical and communicational capabilities--from the larger mass of a post-industrial service-sector--janitors, fast-food operatives, and data-entry clerks--subject to all the most deskilling and isolating effects of technological domination. Since this division of the workforce tends to fall along lines of gender and race, to ignore it is to risk universalizing experiences most readily available to labour insofar as it is white and male.

As numerous feminist analyses have made clear, the traditional masculinization of technology --formerly sedimented in the division between house and work--is to a considerable degree perpetuated within the new informational economy. While it is not unusual for women to have positions working with technology, men more often secure the jobs in which they control technology, rather than being controlled by it--while female workers experience classic deskilling effects.[125] This can be the case even in situations where workers of different genders use the 'same' technology: telework, which can for some--predominantly male--professionals offer significant convenience and control, reveals a very different face in regard to the usually female data processor -- poorly paid, outside legislative protection, closely monitored, isolated and unorganized within an an "electronic ghetto," Such patterns of segregation tend to be redoubled where the exclusions of race are compounded with those of gender.

If this is the case, the opportunities for technological reappropriation that Negri identifies may exist primarily for those who are most privileged--and therefore least likely

to use them subversively. In not explicitly addressing this issue, the socialized worker theory invites the accusations--which other autonomists have in fact levelled against Negri's work-- of generalizing the experiences of relatively privileged workers in contact with the most advanced sectors of capital and ignoring other strata.[126] Moreover, in his eagerness to identify the leading edge of working class development, Negri also sometimes seems to dismiss the continued resilience of some 'old' struggles-- one thinks, for example of the persistent, and, from capital's point of view, very untimely, militancy of coal miners in Britain, the USA, and Canada. All this suggests that the divisions within the post-Fordist workforce are more complex and significant than Negri allows. Although theorists such as Caffentzis undoubtedly share his hope for an eventual recomposition of the working class, it is with far less optimism about its immediate prospects. In the hands of non-autonomist theorists--including various Marxists and ex-Marxists--the segmentation of the informational labour force is widely adduced as evidence of a final end to class politics.[127]

However, Negri's writings contain an implicit response to this charge, albeit one which deserves amplification. He in fact emphasizes that in describing the recomposition of socialized labour power he not talking of "something definitive, concluded," but a "potentiality", "a political act "which has to be asserted against resistance.[128] Negri's socialized worker is conceived as an agency in process, a subject formed in a struggle which has at stake not only the relation between labour and capital, but also the relation of labour to itself. The counter-tendency against which this recompositional movement asserts itself is, precisely, capital's segmentation of the labour market along lines of gender, race, and age, which tends toward a "South Africanization" of society, splitting socialized labour into isolated segments, just as Caffentzis and others have described.[129]

However, Negri believes that this 'divide and conquer' strategy for decomposing the socialized worker has some serious limitations. Capital's tendencies to social apartheid, powerful as they are, are contradicted by a simultaneous tendency to subsume labour within a single, unified system dependent on a common infrastructure. Its simultaneous tendencies to 'smooth' and 'stratify' social space generate paradoxical results, unanticipated interstitialities, upward and downward mobilities and flux. The dissemination of technical knowledges and abilities cannot be limited to safe, reliable strata of employees--who in fact often themselves feel the chill breath of insecurity--but is made catholic by capital's own frenetic processes of circulation. The socialized worker's familiarization with and appropriation of their informational habitat is a process which squirms under and over attempts to strategically contain and stratify it. The system of segmentation leaks.

Although Negri does not elaborate on the point, it is easy to think of examples, some of which we will discuss later: the video counter-surveillance of police abuses in ghettoized sectors, the development of highly technical modes of politico-cultural expression, such as certain strains of rap music, the importance of community and 'guerrilla' radio amongst subordinated groups, the crucial role of film, video and media in feminist and anti-racist struggle, the increasing use of computer networks--including feminist networks--to publicize otherwise invisible labour struggles, and the remarkable exploration of cyberspace as a medium for the circulation of struggles by some of the most marginalized and dispossed sectors of the global workforce--such as the Zapatistas in Chiapas. Indeed, we can say that it is precisely as an instrument to overcome the fragmentation and segmentation of the workforce that the struggle of communication against information to which Negri gives so much emphasis assumes its full importance.

In our own view, realistic assessment of the current state of class composition requires taking into account *both* the recompositional possibilities on which Negri focuses, *and* the decompositional tendencies stressed by Caffentzis and other autonomists. Both are present tendencies, and their prominence in any given concrete instance varies. Negri's analysis is clearly rooted in some of the remarkable cross-sectoral linkages made in the French movements--although even there, sectoralism enormously impedes mobilisations against neoliberalism. Caffentzis' more sombre perspective reflects the near-disastrous working class atomization in the United States. Yet, as we will see, even in the North American context of fragmentation there are important countervailing tendencies. With both these potentialities present within it, electronic capitalism constitutes what Negri calls "an enormous node of strategic contradictions--like a boiling volcano"[130] In the next chapter we will descend a little deeper into the volcano, and start to more closely observe its fluxes and eruptions.

NOTES

1 In adopting this term we follow the usage of Harry Cleaver, Reading Capital Politically (Brighton: Harvester, 1979). This work constitutes the major English definition and mapping of the theoretical positions and historical unfolding of autonomist Marxism.

2 See Cleaver, Reading Capital Politically, and also The Texas Archives of Autonomist Marxism, ed. Harry Cleaver and Conrad Herold, available from the Economics department, University of Austin, Texas.

3 On the Italian autonomists see Cleaver, Reading Capital, and also Yves Moulier, Introduction, The Politics of Subversion: A Manifesto for the Twenty First Century, by Antonio Negri (Cambridge: Polity, 1989) 1-46, and Michael Ryan, Politics and Culture: Working Hypotheses for a Post-Revolutionary Society (London: MacMillan, 1989) The articles in Marie Blanche Tahon and Andre Corten, eds., Actes du Colloque de Montreal, L'Italie: le Philosophe et le Gendarme, (Montreal: VLB Editeur, 1986) provide a valuable retrospective assessment. Important anthologies of autonomist Marxist writings are Red Notes, Working Class Autonomy and the Crisis (London: Red Notes,1979) and Sylvere Lotringer and Christian Marazzi, eds., Italy: Autonomia--Post-Political Politics (New York: Semiotext(e), 1980). Robert Lumley, States of Emergency: Cultures of Revolt in Italy From 1968 to 1978 (London: Verso, 1990) gives a rather hostile account of *autonomia* in its historical context, while Nanni Balestrini, The Unseen,(London: Verso, 1989) gives a vivid novelistic description of its rise and fall. It should be emphasized that our synoptic account of Italian autonomist Marxism necessarily distorts its complex history: in particular it scants the relationship of the earlier Italian *operaismo* or 'workerism' focussed around factory struggles of the industrial proletariat to the later currents merged in the broad social movement of *autonomia*. Tronti and Panzieri belong to the former, not the latter. Indeed, Tronti split politically with theorists of *autonomia* such as Negri who built substantially on his work. Nonetheless, we find sufficient continuity in their line of thought to classify all as 'autonomist Marxists.' A key English language analysis of the Italian New Left is Steven Wright, Forcing the Lock: The Problem of Class Composition in Italian Workerism, unpub. Ph.D. Dissertation, (Monash University, Australia, 1988) which emphasizes the difference between *operaismo* and *autonomia* and gives a fascinating analysis of the debates and struggles within the movement.

4 Readers will look in vain for any mention of autonomist Marxism in either Perry Anderson's periodic reports on the state of Western Marxism, Considerations on Western Marxism (London: New Left, 1976) or In the Tracks of Historical Materialism (London: Verso, 1983) or in the Dictionary of Marxist Thought, ed. Tom Bottomore, Laurence Harris, V.G. Kiernan, Ralph Miliband (Cambridge: Harvard University Press, 1983).

5 The main vehicle for the current work of Negri and his colleagues is the French journal Futur Anterieur. Some indication of its direction can be found in Hardt and Negri, Labor of Dionysus, and in Chapter 9 of this dissertation. Other strands of autonomist Marxism include, in the United States, the work of Harry Cleaver, and of George Caffentzis and the Midnight Notes collective--a selection of whose work can be found in Midnight Notes Collective, Midnight Oil: Work, Energy, War 1973-1992. (Brooklyn NY: Autonomedia, 1992); in Britain, by the publications of the Red Notes Collective; in Italy, by a 'new generation' of autonomist activists, largely focussed around the formation of 'social centres,' and internationally by Selma James' organization of the "wages for housework" campaign.

6 Antonio Negri, Marx Beyond Marx: Lessons on the Grundrisse (Massachusetts: Bergin and Garvey, 1984).

7 Arguably this focus on the activity of capital, rather than workers began with Marx himself, who completed Capital, but never his projected book on wage labour: for a trenchant statement of this case, see Michael Lebowitz, Beyond Capital: Marx's Political Economy of the Working Class (New York: St Martin's Press, 1992). Certainly it is the direction in which his thought has been developed by the majority

of Marxists. The result is a perspective in which the worker appears primarily as as passive object ground between the wheels of capital's exploitative machine. This machine is, to be sure, a self destructive one--driven toward disaster by inexorable internal laws. But it runs toward breakdown on its own--until eventually, in a moment of massive reversal, the immiserated proletariat revolts. While the consequences of such a view have varied, they have been almost uniformly catastrophic, and indeed largely justify the many criticisms of Marx made by new social movement theorists. On the the one hand, it has generated a teleological--and fatally misplaced--confidence in the inevitability of revolution. On the other, when it is suspected that the 'laws' of economic collapse are not manifesting on schedule, it fosters the vision of capital as an invincible juggernaut capable of assimilating every opposition within its one-dimensional order. Further, insofar as such an account can see workers only, as it were, through the eyes of capital--as so much labour-power--it does, as so many anti-Marxist s have claimed, tend toward a reductionism in which people are regarded only as the bearers of economic categories, emptied of sexuality, culture, pleasure--everything, indeed, that makes life worth living. And finally, since the only historical project visible in such an account is that of capital, it makes it difficult to imagine revolution as anything but the extension or completion of capitalist development, albeit in either faster or fairer terms i.e. 'socialism.' For the argument that at a certain point in his project of immanent critique Marx "fell into a trap baited by political economy" see E.P. Thompson, The Poverty of Philosophy (New York: Monthly Review, 1978) 62.

8 Moulier, Introduction, The Politics of Subversion 19; Karl Marx, Grundrisse (Penguin: Harmondsworth, 1973) 361. This definition of "labour"is cited in the Preface to Michael Hardt and Antonio Negri, Labor of Dionysus: A Critique of the State Form (London: Minneapolis, 1994) 1.

9 Mario Tronti 1979, "Lenin in England," Working Class Autonomy and the Crisis , ed. Red Notes (London: Red Notes,1979) 1. Tronti's major work, Operai e Capitale (Turin: Einaudi, 1966), from which most of the essays cited here are extracts, has never been completely translated into English. It is available in French as Ouvriers et Capital (Paris: Christian Bourgeois, 1977).

10 See also Tronti, "The Strategy of Refusal," Working Class Autonomy and the Crisis 8-9: "The existence of a class of capitalists is based on the productive power of labour . . . it is productive labour that produces capital. . . . The worker is the *provider of capital*. In reality, he is the possessor of that unique, particular commodity which is the condition of all the other conditions of production. Because, as we have seen, all these other conditions of production are, from the start, capital in themselves--a dead capital which, in order to come to life and into play in the social relations of production, needs to subsume under itself labour power, as the subject and activity of capital."

11 Karl Marx. Capital: A Critique of Political Economy vol. 1 (New York: Vintage Books, 1977) 719. On this "theoretical juxtaposition of labour power to working class" see also Cleaver, Reading Capital 53.

12 Zerowork Collective, "Introduction," Zerowork: Political Materials 1 (1975): 3. This piece from a now unfortunately defunct journal, though perhaps somewhat dated, remains the best single, short, English language introduction to autonomist perspectives. It is reprinted in Midnight Notes Collective , Midnight Oil, 108-114. On defining the working class by struggle see also Marx, Selected Correspondence (Moscow: Progress Publishers 1965), 165 "The working class is revolutionary or it is nothing."

13 Harry Cleaver, "Secular Crisis in Capitalism: The Insurpassability of Class Antagonism," Rethinking Marxism Conference, Amherst, 1993.

14 For the concept of 'class composition,' see Cleaver, Reading Capital, 112, and "The Inversion of Class Perspective in Marxian Theory: From Valorisation to Self Valorisation," Open Marxism, vol. 2, ed. Werner Bonefeld, Richard Gunn and Kosmas Psychopedis (London: Pluto 1992) 106-144; Moulier "L'Operaisme Italien: Organisation/Representation/ Ideologie: Ou la Composition de Classe Revisitee," and Bruno Ramirez, "Notes Sur la Recomposition de Classes en Amerique du Nord," both in Tahon and Corten, and Zerowork Collective.

15 Cleaver, "The Inversion of Class Perspective" 113.

16 Marx, Capital, vol. 1, 461.

17 As Cleaver puts it, both the organic composition of capital and class composition refer to the organization of the production process, but where Marx's original concept focuses on on the "aggregate domination of variable by constant capital,""class composition" involves a "disaggregated picture of the structure of class power existing within the division of labor associated with a particular organization of constant and variable capital." ("The Inversion of Class Perspective," 113). Note that such a perspective does not dismiss the interminably-debated falling-rate-of-profit.tendency. But it sees it as defining a line of combat. In this view, capital's drive to increase constant over variable capital derives not primarily from the exigencies of competition, but in the first instance from its need to control with automation the threat of class conflict. Equally, its ability to avoid being choked by the weight of technological innovation depends on how inventively and on what terms it can impose counter-tendencies to offset this self-asphyxiation--perhaps most importantly through manufacturing new work to replace that being eliminated by machines. In each case, what is critical to the organic composition of capital is the class composition of the labour it confronts—the degree of resistance or compliance which capital encounters in its attempts to exercise command.

18 Zerowork Collective, "Introduction, 3-4.

19 Antonio Negri, Revolution Retrieved: Selected Writings on Marx, Keynes, Capitalist Crisis and New Social Subjects (London: Red Notes, 1988) 209.

20 As Cleaver notes, in using the concept "cycle of struggles" it is important to avoid suggesting a foreordained, quasi-Spenglarian natural 'law' of history which determines that workers' struggles spring up, die down and are renewed ("The Inversion of Class Perspective," 6.) If these conflicts do indeed recur, even after the most crushing defeats, it is because i) capital has not, to date, freed itself from the need for workers and ii) its logic imposes on the lives of these workers constraints and limitations against which they rebel. This view does not preclude the possibility either of 'false starts'—workers' initiatives which are suppressed within the existing structures of capital without compelling it to restructure, or, equally, worker's victories--in which capital fails to reattain control.

21 Negri, Revolution Retrieved 209.

22 Tronti, "The Strategy of Refusal"10.

23 "Subsumption" designates the degree to which labour is absorbed into capital's processes of value extraction. In the 'Unpublished Sixth Chapter' of Capital, Marx described this process in terms of successive stages. In "formal subsumption"--roughly the early stages of the industrial revolution--capital simply imposes the form of wage labour on pre-existing modes of artisanal production. But in the subsequent phase, "real subsumption," it undertakes a wholesale reorganization of work. Science is systematically applied to industry; technological innovation becomes perpetual; exploitation focuses on 'relative' intensification of productivity rather than 'absolute' extension of hours; economies of scale and cooperation are systematically sought out; and consumption is organized by the cultivation of new needs which beckon on new industries in an orgy of "productions for production's sake." In this phase, Marx observes, the agent of production ceases to be the individual labourer and becomes the "collective worker, made up of labour power "socially combined" in all the manifold differentiated yet interdependent tasks "which together form the entire production machine." The "limbs" of this collective subject encompass both physical and intellectual activity:"Some work better with their hands, others with their heads, one as a manager, engineer, technologist, etc., the other as overseer, the third as manual labourer or even drudge. . . And here it is quite immaterial whether the job of a particular worker, who is merely a limb of this aggregate worker, is at a greater or smaller distance from the actual manual labour." See Capital, vol 1. 1026-1040. Autonomist Marxism's concept of the "social factory" is the theory of this "collective worker"

grown beyond a point even Marx could anticipate.

24 Mario Tronti "Social Capital," Telos 17 (1973): 105.

25 Mariarosa Dalla Costa and Selma James, The Power of Women and the Subversion of the Community. Bristol: Falling Wall Press, 1972.

26T he concept of "unwaged" labour is particularly associated with Selma James, and has been developed by her in a series of writings from Sex, Race and Class (Bristol: Falling Wall, 1975) to."Women's Unwaged Work-The Heart of the Informal Sector." Women: A Cultural Review 2.3 (1991)267-271. Other works drawing on this analysis include Nicole Cox and Silvia Federici, Counterplanning From the Kitchen -- Wages for Housework: A Perspective on Capital and the Left (Bristol: Falling Wall, 1975), and, more recently, Leopoldina Fortunati, The Arcane of Reproduction: Housework, Prostitution, Labor and Capital (New York: Autonomedia, 1995).

27 Selma James, "Marx and Feminism," Third World Book Review 1:6.(1986) 2, original italics.

28 James, "Marx and Feminism," 2.

29 Sergio Bologna, "The Tribe of Moles," Italy: Autonomia--Post-Political Politics, ed. Sylvere Lotringer and Christian Marazzi. (New York: Semiotext(e), 1980) 36-61.

30 Tronti, Ouvriers et Capital 305.

31 On self valorization see Cleaver, "The Inversion of Class Perspective."

32 Werner Bonefeld, "Human Practice and Perversion: Beyond Autonomy and Structure," Common Sense 15 (1994) 43-42.

33 Thus in a review of Midnight Notes Collective, Midnight Oil, the journal Aufheben criticises the book for an tendency to see "capital as an undifferentiated unity imposing an agreed structure on the working class" which verges on conspiracy theory (Review of Midnight Oil by Midnight Notes Collective, Aufheben 3 (1994); 35-41). For other interesting critical analysis of the autonomist tradition see "Decadence: The Theory of decline or the Decline of Theory--Part II, Aufheben 3 (1994); 24-34" and "'Autonomist' & 'Trotskyist' Views: Harry Cleaver Debates Hillel Ticktin," Radical Chains 4 (1994) 9-17.

34 Michael Lebowitz, Beyond Capital: Marx's Political Economy of the Working Class (New York: St Martin's Press, 1992).

35 Raniero Panzieri, "Surplus Value and Planning: Notes on the Reading of Capital," The Labour Process & Class Strategies (London: Conference of Socialist Economists, 1976) 4-25, and "The Capitalist Use of Machinery: Marx Versus the Objectivists," Outlines of a Critique of Technology, ed. Phil Slater (Highlands: Humanities, 1980) 44-69.

36 Marx, Capital vol. 1 563.

37 Panzieri, "Surplus Value and Planning" 12.

38 Panzieri, "Surplus Value and Planning" 12.

39 Panzieri, "Surplus Value and Planning" 12. In "The Capitalist Use of Machinery," 57, Panzieri observed that "The relationship of revolutionary action to technological 'rationality' is to 'comprehend' it, but not in order to acknowledge and exalt it, rather in order to subject it to a new use: to the socialist use of machines."

40 Harry Cleaver, "Technology as Political Weaponry," Science, Politics and the Agricultural Revolution in Asia, ed. Robert Anderson (Boulder: Westview, 1981) 261-276.

41 My account here rewrites in terms familiar to English speaking audiences the distinction Negri makes in "Domination and Sabotage," Working Class Autonomy and the Crisis (London: Red Notes, 1979) 93-138, between "sabotage" and "invention power."

42 Extracts are reprinted in Red Notes, Working Class Autonomy and the Crisis (London: Red Notes, 1979).

43 By "sabotage" Negri was in fact designating a very broad concept of refusing and undermining capitalist development. But there is no doubt that this included its most concrete and pointed applications: strikes, 'direct action' and the destruction of machinery--tactics for which *autonomia* was to develop a formidable reputation.

44 See for example Frank Webster and Kevin Robins, Information Technology: A Luddite Analysis. (Norwood: Ablex, 1986).

45 Cleaver, "Technology as Political Weaponry" 264.

46 For an account of the most famous of these radio stations, which broadcast out of Bologna, see Collectif A/Traverso, Radio Alice, Radio Libre (Paris: J-P. Delarge, 1977). Other autonomist influenced radio stations included Radios Red Wave and City of the Future in Rome, and Radio City of the Future in Venice.

47 Berardi, Franco ("Bifo"), Le Ciel Est Enfin Tombe Sur La Terre (Paris: Seuil, 1978) 27, my trans.

48 Berardi, Le Ciel Est Enfin Tombe 27.

49 Berardi, cited in Radio Alice, Radio Libre 107.

50 "Detournement" is a term deriving from the Situationists, with whom the Italian autonomia had a distinct affinity. It describes the reassemblage of elements torn out of their original context in order to make a subversive political statement; see Ken Knabb, ed. Situationist International Anthology (Berkeley: Bureau of Public Secrets, 1981) 8-14, 55-56; Guy Debord, Society of the Spectacle (Detroit: Black and Red, 1977); and, for useful commentary Cleaver, "The Inversion of Class Perspective."

51 Cleaver, "Technology as Political Weaponry" 264.

52 On the fluidity of technology, see Cleaver, "Technology as Political Weaponry" 268: "A given technology is never the same when it is implemented in different historical and political contexts. As organization of social production, technology organizes the existing social relations, and those shift and change according to the changing composition of political power."

53 Moulier, "L'operaisme italien." He stresses that the periodization should not be taken to mean that the workers of one era vanish at the commencement of the next: professional workers persist into the era of the

mass worker, and mass workers into the epoch of the socialized worker: the point is that the innovative and strategic centre of struggle shifts. For a compact summary of the three cycles described here, see Antonio Negri, "Interpretation of the Class Situation Today: Methodological Aspects," Open Marxism, vol. 2, ed. Werner Bonefeld, Richard Gunn and Kosmas Psychopedis (London: Pluto 1992) 69-105.

54See SergioBologna, "Class composition and the theory of the party at the origin of the workers councils movement," The Labour Process & Class Strategies (London: Conference of Socialist Economists, 1976). 68-91.

55 On the social wage and the factory wage see Tronti, "Social Capital," and Negri, "The State and Public Spending" in Labor of Dionysus 179-216.

56 See Tronti, "Social Capital."

57 John Merrington, notes to Negri, Revolution Retrieved 200.

58 Witness Henry Ford's obsessive concern with worker's morality and marital status. An excellent account of these developments is Stuart Ewen, Captains of Consciousness (New York: McGraw Hill, 1976).

59 Tronti, "The Strategy of Refusal." For autonomist accounts of this crisis see Cleaver, Reading Capital, and many of the articles in Midnight Notes Colective, Midnight Oil. For a collection of non-autonomist articles on the same topic, see Colin Crouch and Alessandro Pizzorno, eds., The Resurgence of Class Conflict in Western Europe Since 1968, vols. 1 & 2, (London: MacMillan, 1978).

60:Negri, "Interpretation of the Class Situation Today," dates it specifically to the 1971 Nixon/Kissinger departure from the gold standard.

61 Negri "Interpretation of the Class Situation Today" 87.

62 George Caffentzis, "The Work/Energy Crisis and the Apocalypse," Midnight Notes Collective, Midnight Oil 221-222, orig. Midnight Notes 3 (1980).

63 Michael J. Crozier, Samuel P. Huntington and Joji Watanuki, The Crisis of Democracy (New York: New York University Press, 1975), 115.

64 Collettivo Strategie, "The 'Technetronic Society' According to Brzezinski," Compulsive Technology, ed. Solominides and Les Levidow (London: Free Association Books, 1985, orig. 1978) 128.

65 Collettivo Strategie 128.

66 Collettivo Strategie 128.

67 Collettivo Strategie 128.

68 Collettivo Strategie 129 It should be underlined that this analysis was no abstract exercise: Brzezinski, an originator of information revolution theory, was also, at the time of *Collettivo's* writing, advising the Italian government on how to dispose of *autonomia* and other dissident groups, a process which was to end in arrest and imprisonment for hundreds of activists. See Brzezinski 1983.Brzezinski, Zbigniew. 1983. Power and Principle: Memoirs of the National Security Adviser. New York: Farrar, Strauss, Giroux.

69 Paul Virilio, Popular Defense & Ecological Struggles (New York: Semiotext(e), 1990). Although

Virilio has now departed on a very different trajectory, he is a theorist at one time loosely connected to *autonomia*—see his "Popular Defense and Popular Assault," Italy: Autonomia--Post-Political Politics, ed. Sylvere Lotringer and Christian Marazzi. (New York: Semiotext(e), 1980) 266-272.

70 See David Noble, Forces of Production, (New York: Knopf, 1984), Les Levidow and Kevin Robins, "Towards a Military Information Society?" Cyborg Worlds: The Military Information Society, ed. Les Levidow and Kevin Robins (London: Free Association Books, 1989) 159-177.

71 See Starr Roxanne Hiltz and Maurice Turoff, The Network Nation: Human Communication Via Computer (Reading: Addison-Wesley, 1978).

72 On this process, see, in addition to the sources cited above, Manuel Castells, The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process (Oxford: Blackwell, 1989); Jim Pomeroy, "Black Box S-Thetix: Labor, Research, and Survival in the (Art) of the Beast," Technoculture, ed. Constance Penley & Andrew Ross (Minneapolis: University of Minnesota, 1991) 271-294; Manuel De Landa, War in the Age of Intelligent Machines (New York,1991).

73 Negri, Revolution Retrieved 181, borrows this phrase from Herbert Marcuse and applies it specifically to the transition from Planner State to Crisis State.

74 For ratification of this point from a non-autonomist source see Castells 29: ". . . while informationalism has by now been decisively shaped by the restructuring process, restructuring could never have been accomplished, even in a contradictory manner, without the unleashing of the technological and organizational potential of informationalism."

75 Dave Feikert, "Britain's Miners and New Technology," Issues in Radical Science, Radical Science 17 (Free Association Books: London, 1985) 22-30; G. Santilli, "Peau de Leopard: L'Automatisation Comme Forme de Controle Social." Travail 8 (1985): 20-28. Cynthia Cockburn, Machinery of Dominance: Women, Men and Technical Know How (London: Pluto, 1985).

76 Caffentzis 234.

77 Fergus Murray,"The Decentralisation of Production--the Decline of the Mass-Collective Worker?" Capital and Class 19 (1983): 74-99.

78 Murray 95.

79 Murray 95.

80 Negri, Revolution Retrieved 209.

81 Negri first uses the term in La Classe Ouvriere Contre L'Etat (Edition Galilee: Paris, 1978) and Del Obrero-Masa al Obrero Social (Barcelona: Editorial Anagrama, 1980.) His fullest English language statements of the position are "Archaeology and Project: The Mass Worker and the Social Worker," Revolution Retrieved 199-228; The Politics of Subversion: A Manifesto for the Twenty First Century (Cambridge: Polity, 1989); and "Interpretation of the Class Situation Today". For the context of the theory, and the controversy surrounding it, see Wright 287-339.

82 Negri, Politics of Subversion 89.

83 Negri, Politics of Subversion 89.

84 Negri, La Classe Ouvriere 254.

85 For an autonomist analysis of this in the context of Fiat, see Mariella Bierra and Marco Revelli,"Absenteisme et Conflictualite: L'Usine Reniee. Crise de la Centralite de L'Usine et Nouveaux Comportements Ouvriers," Usines et Ouvriers: Figures du Nouvel Ordre Productif, ed. Jean Paul de Gaudemar (Paris: Francois Maspero, 1980). 105-136.

86 Negri, Politics of Subversion 79.

87 Negri, "Interpretation of the Class Situation Today" 79.

88 Negri, Revolution Retrieved 219.

89 Negri, Politics of Subversion 204.

90 Negri, Politics of Subversion 84.

91 Negri, Politics of Subversion 94-95.

92 Negri , Del Obrero-Masa al Obrero Social 36-37, trans. Santiago Valles.

93 Negri, Politics of Subversion 87.

94 Negri, "Gauche et Coordinations Ouvrieres," Lignes 5: (1989) 94. my trans.

95 Negri, "Gauche et Coordinations Ouvrieres" 93.

96 Negri, "Gauche et Coordinations Ouvrieres" 94.

97 Negri, "Gauche et Coordinations Ouvrieres" 94.

98 Felix Guattari and Toni Negri, Communists Like Us (New York: Semiotext(e), 1990) 128.

99 Negri, "Luttes Sociales et Control Systemique," Futur Anterieur. 9 (1992): 15 my trans.

100 Negri, "Luttes Sociales" 15.

101 Negri, "Luttes Sociales" 18.

102 Negri, Revolution Retrieved 239.

103 Negri, Politics of Subversion 93.

104 Negri, Politics of Subversion 93.

105 Negri, Politics of Subversion 93.

106 Negri, Politics of Subversion 85-86. Referring specifically to computerization, Negri,"Interpretation of the Class Situation Today" 89, observes that the more "abstract" and "immaterial" the "instrumentation of

production" becomes, the more it is itself "implicated in the struggle that traverses the social" and reveals "sectors which are vulnerable, and ever more vulnerable to the autonomy of social cooperation and the auto-valorisation of proletarian subjects."

107 Serge Mallet, Essays on the New Working Class (St. Louis: Telos, 1975).

108 Maurizio Lazzarato and Toni Negri, "Travail Immaterial and Subjectivite," Futur Anterieur 6 (1991): 87.

109 Negri, Politics of Subversion 52.

110 Negri, Politics of Subversion 116 (original emphasis).

111 Negri, Politics of Subversion 116 (original emphasis).

112 Negri, Politics of Subversion 118.

113 Negri, Politics of Subversion 119. He notes that the distinction is "imprecise"; in practice information and communication are not easily separable: computerization represents an attempt by capital to enhance its informational powers, but may in practice allow communicational opportunities for workers. For this reason, "One must . . . be very careful in the use we make of the distinction, occasionally using it, if one wishes, as an abstract, definitional distinction, but bearing in mind that it is quite inadequate for analysis of the concrete."

114 Negri, Politics of Subversion 117-118.

115 Negri, Politics of Subversion 118, 58

116 For information on these events, see Marie Marchand, The Minitel Saga (Larousse: Paris, 1988).

117 "There was also detailed information on the demonstrations (starting points, routes, buttons to wear, slogans to shout) and statements rejecting any attempts by political parties and their allies to coopt the student movement. They were truly dead set on maintaining their independence and they said as much on display page after display page." ((Marchand, 153).

118 Negri, Politics of Subversion 137.

119 Negri, "Interpretation of the Class Situation Today" 104-105.

120 Alain Lipietz, The Enchanted World: Inflation, Credit and the World Crisis (London: Verso, 1985) 141.

121 For example Sergio Bologna was intensely critical of Negri's attempt to contain the complexities arising from the restructuring of labour power within a single grand theoretical construct. For an exciting and informative summary of the criticism of Negri's "socialized worker" thesis by Bologna and other of his Italian comrades see Wright, 287-339. It should, however, be noted that Negri's account of the "socialized worker" has developed over the course of time, and its most recent versions are more substantial than its initial enunciation.

122 Leon Trotsky, History of the Russian Revolution, vol 1, "Preface. (Anne Arbor: Michigan, 1967).

123 Caffentzis 235.

124 Caffentzis 235

125 For a selection from the large literature on this issue, see Cockburn; Margaret Lowe Benston, "For Women, The Chips Are Down," The Technological Woman: Interfacing With Tomorrow, ed. Jan Zimmerman (New York: Praeger, 1983) 44-54; Heather Menzies, Fast Forward and Out of Control: How Technology is Changing Your Life (Toronto: MacMillan, 1989); Sally Hacker, "Doing It the Hard Way:" Investigations of Gender and Technology (Boston: Unwin Hyman, 1990).

126 See the discussion between Guido Baldi, "Negri Beyond Marx," and Bartleby the Scrivener, "Marx Beyond Midnight" both in Midnight Notes 8 (1985): 32-36.

127 Thus in a recent analysis--The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process (Oxford: Blackwell, 1989)--which provides a striking contrast to Negri's account of the socialized worker Manuel Castells argues that a high technology economy--unlike smokestack industry with its massed blue collar workforce--tend to polarize employment.Computerization results in the elimination of jobs insufficiently skilled to escape automation but expensive enough to be worth replacement. Of the remainder a substantial number are 'upgraded' to provide 'intellective' tasks for a new echelon of technicians and programmers. A larger portion are downgraded, "recycled in low-skill, low-pay activities in the miscellaneous service sector, or integrated in the booming informal economy in both manufacturing and services" with lower wages and little or no social protection. This generates a dualized occupational pattern whose divisions follow predictable lines of gender and ethnicity, and are reinforced by self-perpetuating residential enclaves, educational chances, and differential exposure to media and information flows. What results is "a highly differentiated social structure, both polarized and fragmented."(205)Professional and managerial classes identify with capital, and the remainder of the working population, with their variegated positions in the new production systems reflected and amplified in their territorial differentiation in the city are divided into "socially discriminated communities that *cannot constitute a class*" "(228, emphasis added)

128 Negri, Politics of Subversion 145-146.

129 Negri, Politics of Subversion 133.

130 Negri, "Interpretation of the Class Situation Today" 87.

Chapter 5
CIRCUITS

Introduction

In the previous chapter, we sketched a history of the struggles which have led class war onto the terrain of the information revolution. We now take a more synchronic approach and survey the contemporary battleground, presenting reports from a front that passes through robotized factories, interactive media, virtual classrooms, biotechnological laboratories, *in vitro* fertilization clinics, hazardous waste sites and out into the global networks of cyberspace.

To organize this account we use a concept very important to Marx--that of the circuit of capital.[1] Put simply, this shows how capital depends for its operations not just on exploitation in the immediate workplace, but on the continuous integration of a whole series of social sites and activities. Marx's account described two moments in this circuit. In production, labour power and means of production (machinery and raw materials) are combined to create commodities. In circulation, commodities are bought and sold; capital must both sell the goods it has produced, realizing the surplus value extracted in production, and purchase the labour power and means of production necessary to restart the process over again.

Since Marx proposed this model, capital has prodigiously expanded the scope of its social organization. This expansion, and the resistances it has provoked, has made visible aspects of its circuit that he largely overlooked, but which are identified in the autonomist analysis of the social factory.[2] In the 1970s Mariarosa Dalla Costa and Selma James made a crucial revision when they insisted that a vital moment in capital's circuit was the *reproduction of labour power*---that is, the activities in which workers are prepared and repaired for work.[3] These are processes conducted not in the factory, but in the community at large, in schools, hospitals, and, above all, in households, where they have traditionally been the task of unwaged female labour.

More recently, another round of struggles have called attention to further aspects of capital's circuits, previously largely overlooked by Marxists--the reproduction of nature. Capital must not only constantly find the labour power to throw into production, but also the raw materials this labour power converts into commodities. As mounting ecological catastrophe catalyzes intensifying protests by green movements and aboriginal peoples, it has become apparent that faith in the limitlessness of such resources is profoundly mistaken. Whether raw materials are in fact available for accumulation depends on the

extent of capital's territorial and technological reach, on the degree to which ecosystems have been depleted and defiled, and on the level of resistance this devastation arouses. The *reproduction* (or non-reproduction)*of nature* increasingly becomes a problem for capital and a terrain of conflict for those who oppose it.[4]

Taking account of insights won not just by workers' struggles but also by feminist and environmental movements we posit an updated version of the circuit of capital. This is constituted by five moments--*production, consumption, the reproduction of labour power,the reproduction of nature*. and, finally, *circulation as a whole*, where capital attempts to achieve maximum mobility, flexibility and coordination between all its other sites. At each point we will see how capital uses high-technologies to enforce command by imposing increased levels of workplace exploitation, intensifying market relations, expanding subsumption of education, health care and maternity, deepening penetration of the environment, and establishing an overarching, panoptic system of measurement, surveillance and control through digital networks.

However, our model is a map not just of capital's strength but also of its weakness. In plotting the nodes and links necessary to capital's flow, it also charts the points where those continuities can be ruptured. At every moment we will see how people oppose capital's technological discipline by practices of refusal or reappropriation. We will see how these struggles multiply throughout capital's orbit; how conflicts at one point precipitate crises in another; and how activists are using the very machines with which capital integrates its operations to connect their diverse rebellions. The circuit of high technology capital thus also provide the pathways for the *circulation of struggles*. We draw our examples primarily from a North American context. This is perhaps one of the most inauspicious of current contexts for class struggle and, consequently, an acid test for our contention that such conflict has not vanished from the horizons of the information era.

Production: Workerless Factory

Let us start--though not stay--at the traditional heart of Marxist theory, the immediate point of production, where capital squeezes out surplus value from workers, either 'absolutely' (by extending the working day) or 'relatively' (by raising the intensity or productivity of labour). Here, the information revolution means an intensification of business' perennial drive to cut labour costs by transferring workers' knowledge into machines. Over the last twenty years management has invested massively in computerized tools, robots, automatic delivery devices, and just-in time inventory systems, and connected them in increasingly self-regulating complexes. With the advent of these 'new

production systems' we approach the the horizon foreseen by Marx where capital attains its "full development" with the creation of,

> . . . an *automatic system of machinery* . . . a moving power that moves itself . . . consisting of numerous mechanical and intellectual organs, so that the workers themselves are cast merely as its conscious linkages.[5]

In such a system living labour is not so much "included within the production process" but relates to it "more as watchman and regulator."[6]

Although the elements of these highly automated systems have been appearing since 1945, their introduction was clearly accelerated by the industrial revolts of the 60s and 70s. The advent of new production systems was initially concentrated in the car factories, chemical plants, and steel mills where mass worker militancy had been strongest.[7] Subsequently, however, such systems have been experimented with throughout all sectors of work, from nursing to pizza-making to lighthouse-keeping. Although their fully integrated versions are still futuristic islands in a sea of more traditional work methods, their discrete elements are widely disseminated, and the tendency toward integration evident.[8]

Since the dawn of such computerized automation, people have been concerned about the consequences for employment: as early as 1949, Norbert Weiner, the father of cybernetics, raised the spectre of a crisis of work resulting from robotization.[9] The classic reply was that labour displaced from the manufacturing sector would be reabsorbed in the service sector or in the information sector. Throughout the 1950s and 60s, this optimistic prediction seemed to be borne out by the course of events. But today there are signs that this logic may be exhausting itself. For the same type of technological systems which decimated manufacturing jobs are now being applied in the tertiary sectors meant to soak up the surplus labour displaced from industrial production. In the banking, insurance, wholesale and retail industries, companies are using seamless, end-to-end information processing systems to eliminate whole layers of employees. Moreover, the acceleration of this process is an unacknowledged aspect of the 'information highway.' Teleshopping, video on demand, and virtual services mean the mass liquidation of clerks, salespeople, and other supernumeraries.[10] As the spate of layoffs in telecommunications demonstrates, those who are building the highway are the first to go. Capital is automating not just the factory but the entire social factory.

Potentially, the extraordinary productivity increases created by such high levels of automation could be realized in terms of general increases in income and/or supported leisure time. But within a social order where income remains dependent upon the wage (and where this dependence is reinforced by cuts to welfare and social programs), they

result in an entirely opposite outcome: an intensified availability for work, enforced by the immiseration of unemployment.

In many advanced capitalist economies unemployment rates are now at levels unthinkable fifty years ago. Where this is not the case, as in the US, this is largely because of a huge expansion of part-time and temporary work, so-called 'McJobs,' which in effect institutionalize chronic underemployment. This situation certainly can't all be laid at the door of automation. The global relocation of labour (capital's other major weapon against workers) is a major factor, which we will discuss in the next chapter; and there are further cyclical, organizational and demographic elements in play. Nonetheless, attempts to deny the contribution of technological redundancy, along with all the negative multiplier effects of decreased consumer demand, seem increasingly obtuse. Even some mainstream economists now concede that a serious problem exists.[11]

This growth in unemployment restores what Marx identified as the central weapon of capitalist command over the working class--the maintenance of a permanent "reserve army" of the unemployed.[12] Fear of joblessness undermines labour's strike power, and allows management to coerce employees 'cooperation,' recruit desperate scab labour, and drive down wages and working conditions. As workers compete amongst themselves for employment, capital sifts them into different strata--the declining core of permanent employees needed to run the new production systems, the periphery of temporary and part-time workers called up according to the fluctuations of the economy or the production cycle, the absolute rejects destined for the welfare lines or starvation. Labour is segmented into an increasingly vicious hierarchy whose rungs tend to correspond and reinforce discriminations of gender, race and age. Those at the top must work ever harder, faster and more flexibly to save themselves from the immiseration below. Those at the bottom buy survival only at the price of super exploitation, pricing themselves into a job so cheaply it is not worth replacing them with machines.

However, capital has won this victory at the cost of creating a potentially explosive social situation. In North America, the most dramatic evidence of this was the Los Angeles rebellion of 1992, the single most violent urban insurrection since the mid-19th century. Framed by the mainstream media simply as an issue of 'race', the uprising was in fact, as commentators such as Mike Davis have pointed out, in fact a "multicultural bread riot."[13] It involved Latinos, blacks and whites in a community whose traditional sources of employment in the aerospace and automobile inustries had been gutted through automation and global relocation. The rioters came from the ranks of the un- and under-employed, dependent on the scanty welfare, casualized service work or criminalized industries which

constitute the underside of the high-tech economy. They thus represent precisely the potential fate faced by all labourers in the era of the workerless factory.

Moreover, although the conditions of South Central Los Angeles gave the rebellion its singularity, it would be wrong to see it simply as a 'one-off' event. From the late 1980s to today there have emerged an array of movements fighting to avoid the levels of immiseration that sparked the LA riot. The insurrection of 1992 should therefore be seen, not as an anomaly, but as an epicentre of turmoil, around which can be located less intense, but perhaps more persistent, shock-waves spreading out in time and space across North America.

These include a new series of mobilizations by workers fighting to preserve their livelihoods and dignity.[14] In Los Angeles itself, the same communities that rose up in the 1992 insurrection are now generating a surge of labour militancy sweeping the hotels, fast foods, restaurants and dry-walling firms. To the north, janitors and service workers have for the first time struck the computer mecca of Silicon Valley; to the east, similar struggles are being waged in the entertainment complexes of Las Vegas; to the south, female workers are organizing in a garment industry that migrates its operations across the US/Mexico border. Elsewhere, the same period saw major workplace battles waged by meatpackers at Hormel; miners in the Appalachians and in Northern Canada; vehicle, rubber and sugar workers whose simultaneous strikes and lockouts turned Illinois into a 'class war zone'; airline attendants from Alaska to Miami; telecommunications operators in New England; newspaper workers in San Francisco and Detroit; autoworkers in both the US and Canada ; and nurses and education workers resisting public spending cutbacks from New York to Vancouver.

These movements are, in terms of the types of workers involved, extraordinarily diverse--so much so that they at first seem to defy generalization. In fact this diversity is, in itself, an important defining feature. These struggles are clearly no longer predominantly "mass worker" actions. They are the actions of Negri's variegated "socialized worker," or of what Michael Lebowitz refers to as not an industrial but a "multifarious" proletariat.[15] This is not to deny that they include some very traditional working class battles. The militancy of mining communities at Pittston in the US or Yellowknife in Canada contradicts those who are quick to say *adieu* to 'old' terrains of class war. Moreover, industrial workers have sometimes found in the new automated factories unexpected points of vulnerability. In US and Canadian strikes in the 1990s, car workers have discovered the susceptibility of highly integrated 'just-in-time' production to strategic work stoppages. Nonetheless, industrial labour no longer provides the cutting edge of labour activism. In

major confrontations its classic strike tactics have often gone down to defeat. At least in the US, its major institutional organization, the AFL-CIO, seems in a state of disarray.[16]

In many cases the most militant and successful struggles are arising outside the industrial factory in the diffuse service sector, from organizations such as Justice for Janitors or the new groupings of female homeworkers. Often these movements involve workers at the bottom of the hierarchy of labour power, especially women and people of colour whose networks of support are founded as much in gender and ethnicity as in the traditions of the labour movement. While unions often provide the organizational form for these insurgencies, and in some cases give real support and leadership, such rebellions constantly bubble up at a local level below and sometimes in opposition to the upper levels of union bureaucracies, challenging established structures and strategies.

Not the least of these has been a tendency to expand the scope of struggles. Faced with capital's new technological abilities to outflank and overwhelm isolated revolts, workers have, with increasing urgency sought linkages between different points of resistance. They reply to the automation of work with a socialization of struggles. This tendency takes a variety of forms. It includes increased efforts to organize sectorially, rather than on a basis of single plants; cross-sectorial connections, such as linkages between striking workers in the telecommunications and garment industries, or the mutual support between airline attendants, construction workers and bus drivers; and increased resort to consumer boycotts and 'corporate campaigns' hitting at every aspect of an employer's investments.[17]

Even more importantly, workers' organizations have entered into experimental coalitions with other social movements also in collision with corporate order, such as welfare, anti-poverty, students, consumer and environmental groups. Silicon Valley workers fighting the toxic production practices of computer companies have linked their struggles with those of environmental and housing activists.[18] Striking telephone workers join seniors, minorities and consumer groups to beat back rate hike.[19] Unionizing drives in the ghettos of the fast food and clothing industries intertwine with campaigns against racism and the persecution of immigrants.[20] Although such alliances are fraught with difficulties, and sometimes end disastrously, they increasingly breach the boundaries of official 'labour' politics. Increasingly, the agency of countermobilization against capital becomes not so much the trades union as the "labour/community alliance."[21]

The objectives workers seek are diverse: resistance to lay-offs, roll-backs, speed-ups and contracting out; demands for redundancy compensation; support for retraining; better pay and conditions for contingent workers ; protection of health and other benefits. These goals are not, *per se*, new. But they are set in a new context--that of the vast

potential surpluses of labour time produced by automation. Underlying the new wave of struggles is a rejection of capital's prerogative to plan and manage these surpluses to its own advantage.

Often this orientation is expressed in a demand for 'more jobs.' For reasons we discuss in a later chapter, this seems to us an inadequate response. However, around this ameliorative pea for the perpetuation of the wage relation seethe more subversive ideas. One is an issue Marx saw as vital to the emancipation of labour, but which has since the end of World War II been largely abandoned by trades unions--the shortening of the working day.[22] Demands for the reduction of hours without loss of wage are now on the agenda of the most innovative sectors of labour revolt in North America, as in Europe, and even entertained by social democratic thinkers.[23] This strategy builds solidarity between the employed and the unemployed. Rather than dividing those impoverished by too little work and those exhausted by too much, it aims for a situation where "everyone works, but only a little."[24] Ultimately it points toward even more radical possibilities, such as the institution of a guaranteed income, which could dissolve the link between work and income. However, as we have suggested, these possibilities are no longer--and can no longer--be sought solely on a workerist basis. Contrary to postindustrial fantasy, workplace conflicts are not dissolved by the fluidity of the new technological environment; but they *are* decentred and recomposed with other arenas of activism, to whose examination we now turn.

Consumption: Interactive Media

If it is in the workplace that capital extracts surplus value, it is in the market that this value must be realized through the sale of commodities.[25] Marx repeatedly emphasized that capital had a tendency to integrate these two moments in its circuit, expanding the circle of consumption to match the growing volume of goods its produced, and decreasing the turnover time by accelerating the speed with which goods passed from production to consumption.[26] In the course of the twentieth century, these requirements have become the basis for a massive project of social engineering--the creation of a consumer society. Capital has discovered that as work requires a labouring subject, so the market needs a consuming subject, a subject that needs what capital produces and believes that these needs can and must be satisfied in commodity form. And as in production it develops technology--in the form of automatic machinery--to reduce and control subjects in their tasks as workers, so in the market it resorts to technology--in the form of ever more sophisticated

waves of media and communications devices--to target and direct subjects in their tasks as consumers.

In the era of the mass worker, mass production and mass consumption met in the virtuous circle of Fordism. Radio and television were indispensable components of this regime, deluging society with the advertising that trained populaces in the the widespread consumption of standardized commodity goods. However, the revolts of the 1960s and 1970s shattered the stability and homogeneity of this mass market. The rejection of the Fordist factory regime manifested in movements which, as well as demanding better standards of living, affirmed cultural diversity and self-expression. Capital reimposed social discipline through austerity, driving down wages and social wages. However, in doing so it undermined the purchasing power that supported mass-markets. This precipitated a classic realization crisis--inability to sell what is produced. Not only the workplace but also the marketplace therefore had to be restructured. This has proceeded by a variety of avenues including the expansion of credit, the reorganization of marketing, and 'globalization.' One crucial ingredient, however, has been a major restructuring of media.[27]

From the late 1970s to the present there have appeared on the market a profusion of new communications devices--cable and satellite TV, VCR's, camcorders, computers. Deployed beneath the mantle of increasingly concentrated, vertically and horizontally integrated media empires, these technologies have been announced as inaugurating a new era of choice, liberation, and personal fulfillment. As Frederic Jameson has observed, there is today a tendency to identify the alleged benefits of the new media and the supposed virtues of the free market, with each serving as a legitimating metaphor for the other.[28]

In practice, the new technologies have fulfilled two corporate purposes. First, they have provided the channels for an explosive growth of markets for entertainment and information. Here, as on the shopfloor, capital has advanced by harnessing the energy unleashed against it: the desire for cultural diversity, subversively expressed in the 1960s, has over the subsequent decades been subjected to an unrelenting commodification, converting rock music, fashion, style, personal growth and popular culture into highly variegated zones of vertiginous commercial development.[29] This skyrocketting commodification of culture has been vital as a compensation for a flagging growth in other sectors. In the polarized post-Fordist economy, even those who can no longer look forward to buy a house or car can still pay for a CD or cable, while those who already have more residences and vehicles than they need can be persuaded to spend on computers and electronic goods. Moreover, the high rates of obsolescence that obtain in these fields--almost instantaneous in cases of evanescent soft goods songs, films and video, scarcely

less so in the ever changing electronic equipments--means that there is little risk of saturating markets.

Second, the new media not only create fresh cultural commodities, but also permit extraordinary refinements in marketing other products. Here, a central element in the restructuring of capital has been a huge increase in expenditures on advertising, sales promotions and direct marketing.[30] As the Fordist mass market was fragmented by falling wages and social polarizations, corporations sought both to internationalize sales, and to segment them, stimulating hyper-consumption amongst the relatively thin strata of well-paid workers to compensate for the limited consumption capacity of the poor and unemployed. New media systems, such as cable and satellite television channels are eminently suited to this purpose.They both enlarge audiences (sometimes on a potentially global basis) and make possible this ever more precise targeting of consumers differentiated by taste and income.

This prospect is enhanced by the promise of various kinds of 'interactivity'--roughly speaking, media systems which unlike unidirectional broadcasting permit a dialogic exchange between receiver and transmitter--for example, computerized video-on-demand or teleshopping. One common but underpublicised feature of such systems is their capacity to transmit back to the corporate provider detailed information about consumers' identities, location, consumption habits, and daily schedule.[31] Integrated with other electronic traces left by point-of-sale devices, credit card scanning, billing and subscription records and direct polling, this allows the compilation of comprehensive profiles of consumer behavior. Such data then forms the basis for the highly targeted, demo- and psycho-graphic micro-marketing required by the increasingly stratified and hierarchical organization of consumption. Furthermore, this data can be fed back into systems of 'flexibly-specialized' production and just-in-time inventory control designed for rapid response to shifting market conditions. Interactive media thus hold out the promise of what Kevin Wilson terms "a truly cybernetic cycle of production and consumption."[32]

The implications of this situation were perhaps best recognized two decades ago when Dallas Smythe suggested that the watchers of TV, in "learning to buy," effectively "worked" for advertisers.[33] Electronic capital's expanding media reach meant it exploited not just labour power in the factory but also "audience power" in the home.[34] As the home entertainment centre becomes the conduit not only for an incoming flow of corporate propaganda but also for an outgoing stream of information about its viewers, this analysis grows in credibility. The level of surveillance in the home tends toward that already experienced in the workplace, and the activity of the waged "watchman" in the automatic factory, described by Marx, becomes integrally linked with the unpaid "watching time"

which s/he passes in front of the television.[35] The rate of surplus value extraction, dependent on the exploitation of labour power, and the velocity of circulation, dependent on the carefully targeted consumption capacity of the media audience, merely measure different moments in a continuous, overarching, internally differentiated but increasingly unified process of valorisation.

However, analyses such as Smythe's often assume capital's intended exploitation of audience-power is fully successful. From our perspective, the more interesting question is how it *fails*. If audience power is today analogous to labour power, then it too is a disobedient subjectivity which evades, resists, and reshapes technological controls. There is now extensive evidence that viewers, listeners and readers are not passive receptacles awaiting hypodermic injection with narcotic messages, but rather active agents who engage in thousands of little lines of flight and fight--from turning off advertisements to the oppositional reinterpretation of programs and the creation of micro-networks of decommodified cultural activity.[36] Just as capital's introduction of new technologies, by potentially freeing huge surpluses of time, have unintentionally opened up prospects of liberation from work, so its expansion of new communication technologies inadvertently opens up a world of counter-usage.

To understand why, we can elaborate on a hint of Marx's. As we have noted, he argued that a crucial motive behind the capitalist development of communications was its drive to shorten the circulation time of commodities--to speed the passage from commodity-form to money-form and back again. But Marx also observed that there was a limit to this acceleration. If a product passes instantly, without barrier or impediment, from producer to consumer, it destroys the moment of exchange. A commodity must remain in the owner's hands long enough to be sold. Capital might wish to maintain the continuity of circulation by passing through its different phases "as it does in the mind, where one concept turns into the next at the speed of thought."[37] But this dream cannot be realized.For the commodity to retain it essential attribute--that of being bought and sold--its passage must be interrupted: "it must spend some time as a cocoon before it can take off as a butterfly."[38]

Today, electronic technologies are making a whole range of commodities central to the 'information economy'--computer software, films, video, television programmes, electronic music and games and a proliferation of digital goods--into instant butterflies. Disseminated at virtually "the speed of thought" through electronic and digital channels, they take on aireal and evanescent forms difficult to contain within the commodity-form. We have seen that computerized automation, by moving the requirement for labour in production towards zero, opens up ambivalent possibilities--either for an intensification of work or a fundamental erosion of the the wage form. Similarly, electronic communication

so diminishes the circulation time of electronic goods as to simultaneously permit two diametrically opposed options: a radical intensification of commodification, through pay-per services and consumer surveillance, or a fundamental attenuation of the commodity form.

At the very time when innovations in communication are becoming the basis for vast commercial empires, there is apparent an opposite tendency that flouts the logic of the market. People are using the new technologies to get or give out information for free: reproducing, transmitting, sampling and reconfiguring without respect for commercial property rights. This is known as 'piracy.' And it is prevalent. As access to the new communication machines becomes more and more thoroughly socialized, we see photocopying; home taping; bootlegged videos; copied software; zapping; surfing; descrambling, and culture jamming. These practices constitute a clandestine shadow-world which obstinately follows the attempt to enclose information in commodity form.[39]To give only one example, in the United States, where 'theft ' of satellite television signals was to be prevented by scrambling, it is estimated that half the descramblers are now used illegally.[40] Of course, much of this illicit activity is folded back into commodity form through black market industries. However, what is remarkable is that so much corporate effort --both in terms of technological design and legal activity--is today being exercised to restrict what the media corporations ostensibly promote, that is the, literally, 'free' flow of information.[41]

Moreover, an increasingly wide variety of groups and movements are using this generalized availability of communication technologies not simply for individual but for collective purposes. This manifests in the development of 'alternative' or 'autonomous' media.[42] Such experiments first blossomed during the 1960s and 1970s in a wave of radio-activism, guerrilla video, and public access cable movements.[43] Despite enormous difficulties they have persisted. Radio-activism has continued and spread, reinvigorating itself in North America by the proliferation of inexpensive, low power, and usually illegal microwatt FM broadcasting by ghetto communities, squatters and the homeless.[44] Oppositional video-making has passed from the avant-garde to common practice amongst social movements.[45] New areas of activism have opened around television, with the attempts in the US and Canada to create and sustain public access cable--a medium whose political potential has been developed by the Paper Tiger Television collective and its satellite broadcasting Deep Dish project.[46] These initiatives have been complemented by others which ingeniously critique and challenge mainstream media: the Vancouver-based 'Adbusters'attempt to infiltrate commercial channels with "subvertisments"--and then use their refusal as grounds for legal action.[47] Computer networks are adding a whole new

dimension to this autonomous media activity, one which we will examine in a separate section of this paper.

Lack of resources mean that in many--or most--cases the reach of such experiments is limited, and their aspirations only very partially realized. Nonetheless, alternative media, offer something different from, and often explicitly opposed to, capital's mobilization of "audience power." Corporate 'interactivity' is ratificatory: it posits dialogue only within the preset limits of profitability. The logic of autonomous media, on the other hand, tends to be what Rafael Roncaglio calls "alterative"--probing the limits of established order.[48] It often includes projects of self-representation, involving subjects in the definition and documentation of their own social experience. It attempts to overcome the restrictions of technical expertise characteristic of capital's division of labour. It experiments with forms of collective ownership. Above all, alternative media often give a voice to precisely those who are excluded or silenced by the commercial logic of market-driven information industries--either because they are not demographically desirable or because they are politically suspect.

This proliferation of individual and collective counter-usages means that on occasion capital's communicational control can be interrupted. Let us look briefly at just one example--the events around the Los Angeles rebellion. As Mike Davis notes, Southcentral LA is a "data and media black hole, without local cable programming or links to major data systems."[49] A "housing/jobs ghetto in the early twentieth century industrial city," it is now also "an electronic ghetto within the emerging information city "[50] Yet when the streets exploded in 1992 in a vast outburst of 'proletarian shopping,' the insurgency in multiple ways made the communication apparatuses of contemporary capital operate to its advantage.[51] The uprising was, of course, ignited precisely by an instance of this capacity-George Halliday's video of Rodney King's beating. This was not the first example of politically significant counter-surveillance in the city: only shortly before, in an episode sometimes referred to as "the riot that didn't happen," unionized Latino and Chicano janitors and maids fighting for a first contract with the Los Angeles hotel industry had won, partly as a result of threatening to circulate videoed evidence of abysmal working conditions to potential convention guests.[52]

Even before the rebellion, its idiom of despair and anger had already been disseminated in advance by the cultural inventions of the ghettoized community--hip hop and rap--music whose characteristic sampling and mixing techniques are a quintessential example of ingenious technological reappropriation by disenfranchised.[53] The political importance of such music was neatly demonstrated when, after the uprising, President Clinton chose to publicly reprimand rap artist Sister Souljah for her justification of the

rebellion. Meanwhile, on the actual days of the riot, the Los Angeles Police Department failed to control the streets not only because of fear of the street gangs' firepower, but also because of the skillful walkie-talkie coordination of looting. The omnipresence of the corporate media, covering the most televised urban uprising in history, had an ambiguous effect. For although its representations generally demonized and distorted the insurrectionaries, it could not entirely avoid giving voice to their outrage. Television thus contributed to the circulation of supporting riots and demonstrations in Atlanta, Cleveland, Newark, San Francisco, Seattle, St Louis, Toronto.[54] Simultaneously, a variety of autonomous media, ranging from microwatt radio stations in ghettoized neighborhoods--such as the famous Zoom Black Magic Liberation Radio--to computer networks connecting activists in North America to others in Europe, spread a wider range of news, analysis and debate.[55] These included the reports of writers and journalists sympathetic to the rioters, such as Mike Davis. They also included the extraordinary "Bloods/Crips Proposal for LA's Face Lift," a comprehensive plan for the reconstruction of LA produced by the notorious street gangs, with provisions for the remaking of the urban environment, education, health services and employment--a document largely ignored by mainstream media.[56]

As so very many commentators have pointed out, the monopolization of media by commercial interests has momentous consequences for freedom of speech.[57] Whether through explicit editorial intervention, the demographic imperatives of advertising, internalized censorship by journalists or the conventions embedded in their professional training, it tends to filter out news or analysis subversive of capitalism. Frictions and competition within media capital itself, and the occasional refusal of individual journalists or artists to submit to managerial control, means that this filtration is not as absolute as is often suggested. Something usually escapes. But the corporate ownership of the major organs of societal communication *tends* towards a situation in which, in Marx's classic formulation, "the ruling ideas are nothing more than the ideal expression of the dominant material relationships"--in this case, the idealized expression of capitalism's dominance over society.[58]

However, there is a countervailing factor. Capital, in developing its media apparatus, has let the genie out of the bottle. In its drive to extend the scope of the market, it has so thoroughly disseminated and made familar the technical means of communication as to open the door to a series of individual and collective reappropriations. Out of these efforts emerge possibilities to use new technologies, not for the circulation of commodities, but for the circulation of struggles, connecting and making visible to each other a multiplicity of social movements which in different ways contest the relations of the market. To the example of events around the LA revolt can be added others: the efforts of

alternative media during the Persian Gulf War; the mobilization of support for political-activist prisoner Mumia Abu Jamal, accomplished almost entirely through alternative radio, press, video and computer links; the international networking associated with events such as NAFTA and the Zapatista revolution, which we discuss in the next chapter. But to understand the multiplicity of groups using the new communication channels we must go beyond production and consumption and into the realm of reproduction.

Reproduction of Labour Power: The High--Technology State

Labour power is reproduced in the households and institutions where people are socialized, schooled, trained, prepared and repaired for work. Marx noted that "the maintenance and reproduction of the working class remains a necessary condition for the reproduction of capital"--but, betraying blindspots characteristic of his gender and era, he omitted this activity from his account of capital's circuits, declaring that "the capitalist may safely leave this to the worker's drives for self-preservation and propagation."[59] Autonomists, however, have argued that this reproductive activity--so often the unpaid activity of women--cannot be taken for granted. Moreover, they have pointed out that over the course of its historical development, capital has increasingly extended its organization to shape, sort, maintain and renew the supply of minds and bodies it requires for work--an activity usually mediated through the increasingly Leviathan-like structures of the state.[60]

Thus the first half of the twentieth century saw all advanced capitalist societies, to varying degrees, move from the "Rights State"--where the activity of government was restricted to securing the conditions for 'free-market'--to the "Planner State"--in which the state managed the reproduction of labour power through a vast array of schools, hospitals, welfare offices,and other institutions. Initiated as a concessionary response to the threat of working class movements, the Planner State also became a motor for capitalist growth. The welfare state simultaneously represented a real victory for workers and, for business, cultivated the increasingly healthy, educated and stratified forms of 'human capital' necessary for intensive technoscientific development. In the 1960s and 70s, however, movements of workers, the unemployed, welfare recipients, students and minority groups won increases in social expenditures, and in some cases control over their administration that conflicted with the priorities of capitalist development.[61]

Capital's response was to dismantle the Planner State in favour of the "Crisis State." This new regime has a double face. On the one hand, privatization, deregulation and cutbacks systematically erode the welfare state, slash the social wage and attack any protections from the disciplinary force of the market. On the other, those aspects of the

state necessary to the protection of accumulation--such as the security apparatus or subsidization of high technology investment--are strengthened. There thus appears the paradoxical combination of "the free market and the strong state."[62] The governmental apparatus, in so far as it serves social purposes, is dissolved, but maintained or enlarged insofar as it assists accumulation. The result is a fusion of state and capital in which the former is increasingly absorbed into the latter and acts solely as its coercive and administrative arm.

The Crisis State is a high-technology state. The costs of reproducing labour power, once supported through the social wage, are now, as in more primitive eras, substantially devolved back onto the population. However, this process, ripe with potentiality for disorder, is now policed, monitored and administered through increasingly precise and omnipresent technological networks, devoted to the regulation of subjects considered as dangerously deviant or unproductive. The computerized monitoring of claimants for various forms of "social wage"; the electronic or biometric fingerprinting of welfare recipients; the technologically-intensive policing applied against the poor, indigent or ghettoized; the drive to reduce the costs of a growing prison population--through electronic braceleting, or telework in privatized jails--all show the increasingly panoptic face of the neoliberal state.

An important part of this regime of criminalization and surveillance is brought to bear on the most fundamental form of reproductive activity--motherhood. The reconsolidation of the 'family values' supposedly ruptured by the feminist revolt of the 1960s and 70s has been a significant part in the neoliberal agenda. For as welfare services are degraded, the resumption of the traditional female role as a 'voluntary' care-giver for the young, sick, and elderly becomes critical to prevent social disintegration. This reconsolidation of female domesticity has been associated with a variety of state interventions: limitations on and recriminalizations of abortion services; legal regulation of the pre-natal conduct of 'unfit' mothers; and experiments in the sterilization of welfare mothers by mandatory Norplant implants.[63] Many of these measures are enabled or supported by high technologies--from the fetal iconography made available by advanced monitoring techniques to under-the skin fertility drugs.[64]Although they include both 'pro' and 'anti-natalist' tendencies, the common theme of these interventions is enhanced state control over maternity--control exercised to ensure the 'proper' management of procreation and to reconstruct the household as a costless, reliable site for the reproduction of labour power.

This monitoring of maternity is in turn a part of a larger disciplining and rationing of medical costs. In the 1960s and 1970s, health care had been a site of rapidly escalating

expense and demands by social activists. The 1980s and 90s saw a counterattack on public health care costs, freezing or rolling back the wages and working conditions of nurses and service workers, closing hospitals and clinics, lengthening waiting lists, imposing user fees and eroding free coverage. The consequence has been a regression in basic health care services, marked in North America by the reappearance of tuberculosis and other anachronistic epidemics. Yet at the same time, scientific innovation is generating an array of futuristic techniques--biotechnology, organ transplants, new super drugs. These are heralded as transforming the very limits of mortality. However, access to these technologies is increasingly limited by the imperative of the market. Their development becomes a point of intersection for a series of powerful agencies--pharmaceutical companies, manufacturers of hospital equipment, insurance corporations, and enterprise-oriented doctors, research institutes, and hospitals--focussed on making health care a source of profit rather than a public service.[65]

While neoliberalism displaces social costs back to the individual and family level, public institutions are increasingly shaped to turning out the precise forms of labour power wanted by capital. Even as its insists on the reduction of social expenditures, business still--indeed more than ever--demands literate workers, drug and disease free technicians, and world class molecular biologists and computer scientists. The disintegration of general social welfare thus proceeds simultaneously with increasingly direct public financing of corporate research and training, by direct subsidization, university collaboration, military contract, or privatization. A vital aspect of this process is the heightened orientation of schools, universities, and medical institutes to the training, sorting and selection of aptitudes and competencies functional for high technology industry.

Thus, in the universities the neoliberal response to the student revolt of the 1960s (after the tear gas, shootings and academic purges) was radical restructuring.[66] Over the late 1970s and 1980s the rate of funding for university education in most capitalist economies were cut, tuition fees and student debt sharply raised, and programs seen as radical or simply inutile to industry cut. With campus unrest apparently quashed, conditions were set for a new, deeper integration of universities and business, one vital to the development of high tech 'knowledge industries.' Moneys subtracted from base operating budgets were partially reinjected back into programs of applied science, schools of communication, engineering and business administration, and special institutes for computer, biotechnology and space research.

The reshaped education apparatus in many ways epitomizes the seamless technological logic of the neoliberal state.[67] Targeted and sponsored research programs, industrial parks, private sector liaisons, consultancies and cross-appointments provide

business with the facilities to socialize the costs and risks of research and privatize the benefits. Students are trained and sorted for the new information economy by increasingly vocational and technically-oriented programs, both at the university or school level, while they or their parents bear an increasingly high proportion of the costs for this process. At the same time, universities and schools, as major users of computer and other information technologies, provide a market for the products of the same high-technology corporations whose future employees they train. Educational institutions in turn use these technologies to cut-costs and lay-off employees as their contribution to Crisis State austerity.

Information technologies are thus embedded at the very core of the crisis state, as both means and end. High-technology is used to cut social programs. Social programs are cut in order to assist corporations make huge investments in high technology, either directly through subsidization or indirectly through tax breaks. As the social wage is slashed, the costs of reproducing labour power are devolved onto individuals and households. Yet the state apparatus continues to serve as an agency for mobilizing, training and sorting the computer-literate, software-friendly, media-familiar labour power which knowledge-based capital requires. The net tendency is toward a return to the social conditions of the 19th century overseen by the technologies of the 21st.

However, this transformation of government has catalyzed opposition. The dissolution of the welfare state has mobilized a very broad array of resistances to what is widely understood as a corporate agenda of privatization and deregulation. Although these movements have a historical continuity with the revolts of the 1960s and 1970s, they have, through the 1980s and 1990s, involved new constituencies, with different themes and organizational styles. While the participants in such movements may often not consider themselves anti-capitalist, their activism almost inevitably leads to collision with the neoliberal restructuring. Increasingly these movements have begun to enter into networks of alliance with each other. Of particular significance from our point of view is that in some cases they have reappropriated segments of the enormous technoscientific apparatus that the Crisis State has helped bring into existence.

Thus the destruction of social safety nets has brought into being a variety of new "poor peoples organizations." These ranging from the squatters of Homes not Jails, to End Legislated Poverty in Vancouver, to the encampments of homeless in New York. Although these movements address the concerns of the most extremely dispossessed and excluded, some of them in fact display considerable technological sophistication. For example, Food Not Bombs is a group whose activities in San Francisco led to over seven hundred arrests from 1988 to 1994. In addition to running the on-street soup kitchens which have aroused the ire of municipal government, it operates its own radio network, based largely on low-

watt broadcasting, produces its own audio tapes and has a World Wide Web site. Through these channels it disseminates information excluded from the mainstream press about the police harassment of its programs and the stuctural causes of poverty.[68]

Similarly, the neoliberal return to family values has encountered widespread resistance. In North America there has been a revival of the abortion-rights movement. Largely as a result of the influence of poor women and women of colour, this has undergone a strategic reorientation, sometimes described as a shift "from abortion to reproductive freedom."[69] The emphasis on individual choice has been gradually replaced by an emphasis on collective control over the research and availability of medical technologies, including opposition to both compulsory fertility and eugenic sterilization. Women have also attempted to enlarge their own technological control over procreation, through campaigns such as that waged in the US for access to the abortion drug, RU 486.There is also more focus on the provision of adequate health services, housing, and wages and welfare as "social conditions necessary for autonomous choice."[70]

The nucleus for this new resistance is often the women's health centres and clinics, whose defence, both from the harassment, firebombings and assassinations of the right-to-life movement and from the cut-backs of neoliberal governments, has formed a focus of activism. These centres are in turn embedded within the dense web of alternative communications and cultural channels developed over several decades by the women's movement. They are also more and more frequently using new channels, such as the Internet, for discussion and mobilization. Indeed, it is interesting that perhaps the first major North American political crisis in cyberspace, precipitated by the US Telecommunications Decency Act, pivoted around the attempt to curtail discussion of abortion issues on the networks.

These struggles in turn overlap with a broader array of movements over health care. In Canada, various coalitions of hospital workers and community groups have mobilized to defend public health care system against cuts, or actually attempted to extend the socialization of health care, as in the struggle over health insurance in the US. At the same time there have appeared what Patrick Novotny, writing of the environmental justice activism, calls movements of "popular epidemiology."[71] These movements often involve groups marginalized by the industrial-medical complex--people of colour, women, gays and lesbians. They challenge established expertise, demand additional allocations of funding, question the priority of profits over people, reappropriate popular capacities for research, and often seek systemic rather than palliative answers to the causes of ill-health.

A striking example is the extraordinary self-organization of medical knowledge associated with anti-AIDS activism. Organizations such as ACT UP and Project Inform

have attacked governmental underfunding of research and its subordination to corporate profit; reshaped research agendas; amassed and circulated immunological and virological information, both by computer networks and other means; investigated 'alternative' treatments; set up guerrilla clinics, smuggling rings and buyers clubs; clandestinely manufactured commercially-patented drugs; and shown enormous sophistication in video-activism and other forms of cultural agitation[72] Moreover, these forms of activism have gradually become central to the agendas not just of the white, male gay community but also of people of colour and women. In the process, AIDS has been recognized as a disease of poverty, primarily afflicting those whom the disintegration of social infrastructures, community networks, health-care and education render vulnerable. Anti-AIDS struggles have thus often been connected to campaigns for improved public health funding, comprehensive medical insurance, and the reallocation of military spending.[73]As Steven Epstein points out, anti-AIDS activism is part of a wider current of popular mobilizations over the control of medical technoscience.[74] It draws on the earlier example of the women's health movement and, in turn, has inspired groups seeking to establish causal links between breast cancer and industrial pollution or win access to RU-486. All of these efforts run athwart neoliberal piorities.

Meanwhile, the belief that campuses were pacified now appears premature. The late 1980s and 1990s have seen the emergence of a new cycle of university struggles.[75] Robert Ovetz notes that this stems from numerous different but interanimating sources.These include protests against tuition increases, program closures, student aid cuts, and skyrocketing debt loads; movements against the commercial development of university lands ; campaigns opposing involvement with corporate investment in South Africa or East Timor; and demands by minorities and women for campus centres, daycares and programs of multicultural and feminist studies.[76]This web of protests further overlaps with the fights of university workers against rollbacks and casualization. The net result has been a slowly mounting campus turbulence, involving picket lines, demonstrations, occupations, national student strikes in Canada and major confrontations between police and students on several US campuses.

These student movements have sometimes involved blocking the high-tech colonization of education, as in the case of the Unplug youth activists who have ejected the Whittle corporation's commercial Channel One from several high schools in the US.[77] In other cases, it entails reclaiming info-tech for alternative purposes. In North America, students not only played a major part in the unauthorized creation of the Internet, but have used it to link protests at geographically dispersed campuses. In spring of 1994 Latino and Chicano students at the Universities of Michigan, Colorado, Nebraska and numerous sites

in California erupted in hunger strikes and occupations. They demanded new programs, anti-racist initiatives, grape boycotts in support of farmworkers, and the naming of buildings in memory of Caesar Chavez. Their protests were extensively connected and coordinated by computer-communications facilitated by sympathetic librarians, faculty and union organizers.[78] Similarly, 1995 and 1996 saw the email-coordination of multi-campus protests against reductions in student aid and rising tutition fees both in Canada and the US.[79]

Surveying this range of resistances, it is clear that while neoliberalism has been largely successful in its restructuring of the state, this process displays increasingly paradoxical aspects. As Negri puts it,

> extreme liberalization of the economy reveals its opposite, namely that the social and productive environment is not made up of atomized individuals . . . <but> of collective individuals . . . new technology . . . increase the importance of this collective basis of production[80]

Most simply, this manifests in the fact that the project of cutting the social wage has mobilized a range of social movements arrayed outside and against the privatized state. While neoliberalism has found in computers and other forms of informatics the instrumentation to attack social programs, the creation and operation of such technologies depends on a widespread socialization of scientific competencies. Indeed, it presumes the very educational and medical infrastructures, the very development of human capital, which neoliberalism now aims to erode. This introduces into the project of austerity a fundamental instability. One symptom of this is that the technologically-armed Crisis State increasingly finds itself opposed by the anti-poverty activist with a micro-watt transmitter; the reproductive rights worker versed in medical science; the anti-Aids organizer with camcorder and pharmaceutical expertise; the student plugged into the Internet.

The Reproduction of Nature: Genetic Engineering

However, to grasp the full scope of such opposition, we have to look at struggles not only over the state and social reproduction, but also around the reproduction of nature. Capital mobilizes technology to control not only labour in the workplace, nor society as a whole, but nature itself. It needs not just workers but also raw materials. As it reduces people to labour power, so it reduces nature to a resource: both exist to be used up. The development of a technoscience aimed at the domination of labour has, as the Frankfort School theorists point out, been inseparable from an unprecedented intensification in the domination of nature. For all that Marx often participated in the scientific triumphalism of his century, he nonetheless clearly recognized the dangers of this trajectory when,

describing capitalist agriculture, he spoke of it "simultaneously undermining the original sources of all wealth--the soil and the worker."[81]

During the industrial phase of capital this exhaustive tendency became established as business's standard operating procedure. Ever-intensifying applications of machinery and chemicals were applied to 'mine' ecosystems without regard to sustainability. The costs of such damage were 'externalized' by dumping them on the surrounding community or deferring them forward onto future generations. As capital avoided paying for the reproduction of labour power, assuming the unpaid human activity of households and communities, so it minimized expenditures for the restoration of the natural world, assuming an inexhaustible regenerative power.

However, during the post-war period the enormous social costs of this process became increasingly apparent. Nuclear emissions, industrial pollutants and pesticide poisoning created ever deepening and broadening zones of toxification--and new points of conflict. Indeed, an eruption of 'green' struggles was one aspect of the general crisis of the social factory. At sites from Diablo Canyon to Love Canal, activists storming fences and blockading gates disrupted industrial mega-projects as effectively as labour unrest on the assembly line.[82] Not less than sheer depletion of natural resources, this growing resistance to corporate despoliation constituted a menace to accumulation.

The post-industrial leap into the world of computers, telecommunications and biotechnologies was in part a response to this threat. As the arrival of high-tech on the shop floor was accompanied by promises of liberation from work, so too was the advent of clean technologies celebrated as the answer to the evils of pollution.[83] Such announcements have to be understood as largely just mystification and deception. In practice, capitalism frequently uses new technologies not to halt destruction of the environment but to circumvent opposition--as with the use of advanced telecommunication and transport to coordinate the shipping of toxic residues away from affluent neighborhoods to urban ghettoes, native reservations or the Third World. Moreover, in many cases, capital has developed so-called clean technologies in ways that replicate the very patterns of pollution they purportedly eliminate. The computer industry's use of toxic substances in microchip assembly, for example, has made Silicon Valley home to the highest concentration of hazardous-waste sites in the United States.[84] Consequently, the wave of ecological struggles has not subsided over the last three decades but intensified, spreading from its initial bases amongst relatively privileged sections of labour to other strata, such as the black, Chicano, Latino and Native Indian constituencies involved in the environmental justice movement.[85]

However, it would be wrong to altogether dismiss the ecological novelty of information technologies. What they enable is a partial move from the mining to remodeling--a shift from stripping of nature to synthesizing it, recreating a world of artificially-generated resources to substitute for the gutted planet left in the aftermath of industrialism. This shift follows a path, which, as Harry Cleaver points out, Marx appears to have foreseen. In volume1 of Capital 'nature' appears as an object outside of and opposed to humans. But in its later volumes, Marx suggests that as capital increases the scope of its organization, nature is englobed by technology to a degree that that its original features become largely unidentifiable.[86]

This tendency culminates in biotechnology--the splicing, cutting and recombination of the genetic code. After a gradual postwar development, founded in North America upon heavy state investment in basic research, these technologies have since the 1970s undergone an extraordinary acceleration in commercial development. Historians of the industry, such as Edward Yoxen and Herbert Gottweis agree that the impetus for this came in the crisis of Fordism and the search for new 'post-industrial' sources of investment.[87] Over the last thirty years, biotechnologies, facilitated by the computer systems now indispensable to the monitoring, sequencing and analysis of complex gene codes, have become the basis of a multi-billion dollar 'life-industry' complex. This involves transnational medical, pharmaceutical, agricultural, insurance and computer corporations; dizzying sums of venture capital; a bacterial proliferation of academic entrepreneurs; and a frenzy for genetic property rights.

The capacity to rewrite the 'code of life ' has been applied to agricultural, food production and plant breeding to produce new strains of plants, new forms of food and new types of fertilizer. As in other areas of capitalist technological development, these innovations have to be understood not simply as means to increase productivity, but as tools to change social relations. For example, many of the developments in biotechnology have been central to the extension of large scale capitalist techniques to farming--agribusiness. Cleaver has described how the 'Green Revolution' was used to break down forms of rural community resistant to capitalist modernization.[88] The same process is now enacted on a multitude of fronts: through the establishment of patent-rights over food sources cultivated in the wild by peasant and indigenous communities; the creation of herbicide-resistant plant strains tied to the products of particular chemical companies; the ability to bypass rural and Third World producers by artificial synthesis of naturally occurring substances; and the institution of methods--such as pharmological augmentation of cows by the use of bovine growth hormone--which favour large scale enterprises.[89]

Increasingly, however, genetic engineering has in its sights not merely indirect, but direct, control over human behavior. As Gottweiss argues, the burst of state and corporate interest in biotechnologies during the crisis of the social factory arose because in addition to yielding traditional economic benefits, it was conceptualized as "a potential contribution to a broader social stabilization, mainly by its expanded capacity to control behavior and bodies."[90] The ambition is now dramatically manifest in the Human Genome Project, the US state sponsored attempt to map and sequence all the DNA of a 'normal' human prototype--a project comparable in cost and scope to the space programme of earlier decades.[91]

Currently, genetic engineering's main achievements are neither therapeutic nor even diagnostic but predictive.[92] However, the capacity to identify 'hyper-susceptible' workers with supposed genetic sensitivity towards toxic chemicals or radiation has already become a significant source of employment discrimination in the US. It allows business to redefine pollution not as a social hazard, but as a problem of individual predisposition, capable of being handled by genetically 'subsensitive' labour.[93] Eventually, however, genetic engineers may indeed be able not merely to predict but to repair or modify an individual's genetic constitution. When they can, the biotechnology industry anticipates lavish profits from the creation of new ways to improve health, longevity and pleasure--for those who can afford them. This potential is already apparent in the burgeoning market for synthesized human growth hormones, silicon breast implants, cosmetic surgeries, performance enhancing drugs and transplantable hearts, livers, kidneys and corneas.[94] It is expected to explode as the Human Genome Project generates the raw data necessary for new 'breakthroughs' to enhance the human body.

At this point, genetic engineering promises a spectacular convergence with other reproductive technologies. Already, *in vitro* fertilization, amniocentesis, embryo selection, and artificial insemination are becoming the instruments for an extraordinary experiment--the conversion of motherhood into a domain for the direct extraction of surplus value. As feminists such as Maria Meis and Kathryn Russell have argued, the commercial application of such techniques drives female 'labour power'--in the procreative sense-- towards the condition of abstraction, divisibility and alienation traditionally experienced in industrial work.[95] Reproductive engineering applies a technological deskilling strategy, classic in form but unprecedented in intensity, comprehending both conscious knowledge and corporeal capacity, detaching, permutating and recombining the various moments of pregnancy until the unifying factor governing the conception, gestation and delivery of a child is no longer maternal but managerial--a logic most apparent in the so-called surrogate motherhood business.[96]

Anti-abortion crusades and reproductive technology businesses seem antithetical, one resting on a sacralization of procreation, the other on its utilitarian industrialization. And there are indeed real contradictions between them. But they are also intimately connected. Both counter the reproductive autonomy fought for by women. The 'family values' campaign cancels 'choice' in an outrightly reactionary manner. But the corporate biotechnologists coopt 'choice' as the watchword for the commodification of procreation. And just as in production capital combines sweated labour and robotics, so 'family values' and genetic engineering are poles in a single overarching regime of reproductive control, with biotechnological options commercially available to the rich, and surrogate mothers drawn from the ranks of poor women deprived of welfare support and circumscribed by restrictions on abortion. Both extremes depend on technology to remove control of pregnancy and birth from women--whether through the right-to-lifers use of the fetal iconography made available by advanced monitoring techniques to legitimize their campaigns of harassment, bombing, and assassination, or in the hygienic setting of the corporate laboratory.

Ultimately, the combination of genetic screening and enhancement with reproductive technologies offers the prospect of a eugenic agenda once thought to have been discredited with the fall of fascism. However, the commercial thrust behind the biorevolution means that a contemporary, high-tech eugenics would probably have a different 'feel' from its historical predecessors. As employment possibilities become increasingly dependent on a clean genetic profile, or even on possession of certain bioengineered enhancements, positive and negative selection will be left to the survival instincts and pocket book of individuals. People may bio-technologically reproduce the labour power of themselves and their children in the most saleable form affordable, in acontext of an increasingly stratified, privatized and expensive medical system. Capital will thus move towards establishing a hierarchy of labour powers in which the various class-ificatory grades are distinguished not simply by education and training, or according to traditional discriminations of gender and race, but according to fundamental bodily modifications.[97]

However, the further this technological corporatization of life proceeds, the more varied become the constituencies taking issue with it. There is now resistance from unions opposed to genetic screening in the workplace; green activists concerned about the preservation of biodiversity; farmers suspicious of agents like bovine growth hormone; and consumer groups anxious about the implications of artificially mutated foodstuffs. Women's groups have played a central role. The Feminist International Network of Resistance to Reproductive & Genetic Engineering has opposed the *in vitro* fertilization

industry, pointing to its exploitation of experimental subjects, the damaging effects of its fertility drugs, the misogyny of sex selection, and the dangers of eugenic logic.[98] FINRAGE activists have fought both for a moratorium on the development of new technologies and alternative research to discover different remedies for the problems of infertility. In Canada the attempt by the Royal Commission on New Reproductive Technologies to suppress such critique exploded into public scandal.[99] Other points of struggle have involved indigenous people, both in North and South America, concerned with the ramifications of Human Genome Diversity Project (known as the 'vampire project') which has sampled and patented human cell lines from 'endangered' aboriginal communities.[100]

Taken in conjunction with the continuing and expanding range of 'old' but very current ecological struggles, against hazardous waste sites, deforestation, ground water pollution, radiation poisoning, and so on, these new movements against genetic commodification introduce an extraordinary dimension to struggles against information capital, one which we anticipate will become increasingly important. For what is a stake is nothing less than what Marx termed humanity's "species being"--its capacity to direct its own development.[101] The issue today is whether this shaping--at a primordial, biological level--will be determined by capitalist command and market forces, or by a broader social logics. As Peter Linebaugh has pointed out, in origin, the term "proletarian" designated someone who has no function but to reproduce themselves.[102] In Marxist usage, this has conventionally been understood as a person who has nothing to sell but their labour power. Soon, however, it may be applied to someone whose only economic asset is their gestational capacity and their genetic heritage. In this sense, proletarian struggles--struggles of people to collectively assert a self-determining power over the development of the human species--resume all the universalistic significance which Marx once attributed to them.

Circulation: Struggles in Cyberspace

To this point we have examined information-age capital in the workplace, the market, the state and the environment. But perhaps its most the distinctive feature is its tendency to integrate these different points into a social system which as one vast apparatus for the extraction and realization of surplus value. This tendency was glimpsed by Marx a century ago.In discussing it that he made some of his most interesting observations on communication.Writing of the the roads, railways, and canals of his age he described "the production of the means of communication, of the physical conditions of circulation" as part of "*communal, general conditions of social production* as distinct from the conditions

of *particular capital* and *particular production* process."[103] As capital expands in scope and scale, such systems become increasingly necessary for individuals to reproduce themselves as members of a social collectivity and "and hence to reproduce the community, which is itself a general condition of productive activity."[104] Marx noted that the enormous cost of investment in such infrastructures usually resulted in capital leaving their initial development to the state: only subsequently does business reclaim them from the realm of "public works" as sources of private profit.[105] Indeed, he says, this takeover of the means of communication represents "the highest development of capital" and "indicates the degree to which the real community has constituted itself in the form of capital."[106]

Today, the most advanced means of communication are the networks created by the linking of computers and telecommunications. Cyberspace--that notional dimension constituted by flows of electronic data--appears as the domain within which the various nodes of the social factory can be almostly instantaneously interlinked. The latest arena in which capital asserts its dominance over society at large is that of the "virtual community."[107] In this world of computer networking, the pattern of public development and private appropriation, already so manifest in the world-wide neoliberal privatization of telecommunications and public broadcasting systems, is clearly repeated.

Computer mediated communications were originally designed under public auspices, first as part of the Pentagon's nuclear war fighting preparations, later to connect the supercomputing centres vital to military research. Only subsequently did they migrate to the corporate sector, as a means of linking automated machines, connecting dispersed production sites, and creating interfaces between previously distinct industries. But in the process of capital's post-Fordist restructuring, digital flows have been increasingly used to give it a comprehensive command, control and communications capacity. They came to provide a medium through which all aspects of its operations can be synchronized with extraordinary speed and scope, allowing "virtual corporations" to rapidly coordinate labour power, raw materials, finances and marketing strategies on a global scale--and as rapidly disperse them.[108]

Today, these developments are culminating in the the US government's National Information Infrastructure initiative, with its plan for a publicly subsidized, corporately owned and operated information 'superhighway.' Such a system would rationalize the already existing web of fibre optic, cooper wires, cable radio waves and satellites that provide the basis for telecommunications and cable television into a comprehensive, integrated information network. Many companies are interested in the highway for internal purposes: to connect customers with suppliers, improve monitoring of employees, eliminate jobs, cut travel costs and gather competitive data. The giants of the information

and entertainments sector, however, see unprecedented market opportunities. Telephone, cable, video and software companies look to colonize cyberspace with their four 'killer' applications--video-on-demand, tele-gambling, pay-per-computer games and info-mercials. These prospects have excited a feeding-frenzy of corporate mergers and manoeuvres, and aroused CEO's wet-dreams of "a single box on top of every television set in America, a box attached to one wire directing the flow of every conceivable form of information." providing "television programs, telephone conversations, old movies, sexual fantasies, bank statements, interactive games, doctors prescriptions and merchandising orders."[109] Through such a medium, community would indeed be "constituted in the form of capital."

However, there is another side to this process. For the story of cyberspace is not a unilateral saga of capitalist expansion. It is a far more complex one, in which capital's development has been opposed by, and indeed largely spurred by, alternative and subversive intitiatives. To create and operate computer systems, commerce has had to summon up whole new strata of labour power. These range from computer scientists and software engineers, through programmers and technicians, to computer-literate line and office workers, and ultimately to whole populations relegated to tedious and mundane jobs yet required to be sufficiently 'computer-literate' to function in a system of on-line services and electronic goods. As this virtual proletariat emerges, there also appears a tension between the potential interest and abundance it sees in its technological environment, and the actual banality of cybernetic control and commodification.

As so often before, the new forms of conflict appear first under the guise of criminality and delinquency--as 'hacking.' If, following Andrew Ross, we define hacking simply as the "unauthorized use of computers," we can embrace under this term computerized sabotage; the reappropriation of work time to play games or write novels, or exchange unauthorized email; so-called crimes of data copying, electronic trespass and information dissemination; and unofficial experimentation with and alteration of systems up to and including the invention of new machines and the self-organization of alternative electronic institutions.[110] These activities are now giving capital's managers multiple headaches over loss of productivity, theft of trade secrets, cybernetic revenge by terminated workers and intrusions into its security apparatus.[111]

Indeed, at moments, hacking has diverted the whole course of technological development. One example is the invention of the Internet, the world wide network of networks. As we have mentioned, computer networking had its origins in the Pentagon's search for highly decentralized communication systems sufficiently flexible to survive nuclear war, a distributed architecture later applied to increase the productivity of research within the major centres of the military-industrial-academic complex. However, in an

entirely unforeseen development, the technoscientific labour employed in these sites-- especially graduate students- extended the network far beyond its original scope, using it for non-military research, designing successive layers of alternative systems which connected into the main backbone.This accretion of self-organized services proceeded, with the complicity of systems managers enchanted by the technological 'sweetness' of the results, until, as Peter Childers and Paul Delany put it "the parasites had all but taken over the host."[112]

Thus in the era of marketization and privatization, the most technologically advanced medium for planet-wide communication was in fact created on the basis of open usage and cooperative self-organization- in short, by a huge explosion of autonomous activity. The result was the transformation of a military-industrial network into a system that in many respects realizes radical dreams of a democratic communication system: omni-purpose, multi-centred, with participants transmitting as well as receiving, near real-time dialogue, a highly devolved management structure, and-- since universities and other big institutions have (so far) paid a flat rate for connection--offering relatively large numbers of people access for little or no cost. On this basis, there emerged the unplanned explosion of popular interest in the Internet which in the early 1990s catapulted it on a trajectory of exponential growth.

There are at least two aspects of this phenomenon of serious concern to capital. One is that the Internet makes available a voluminous amount of information in uncommodified form. Vast banks of data are available for free. Large amounts of software have been dropped into the Net *gratis* by creators who prefer to see their work used rather than sold. Others have been electronically 'liberated' from commercial owners and given instantaneous world wide distribution.[113] The famous hacker slogan "information wants to be free" displays a naive technological determinism, but it does tell a certain truth. Electronic data flows are so fast, extensive and elusive as to pose enormous problems for those attempting to commodify them. Information society theorists have long pointed out that "ethereal goods" have qualities anomalous in a market economy: they can be used simultaneously by many people, be duplicated and transmitted cheaply and instantaneously, are not 'consumed' or exhausted by use and may grow in use-value the more widely they are shared. These features have become increasingly problematic to those concerned with policing digital commodity transactions. For what has emerged in cyberspace are collectivities of users who, rather than being subordinated to the laws of commodification, are rather characterized by their persistent, indeed often gleefully overt, transgression of these rules. The massive confusion that now reigns over copyright and patent law in the

electronic domain suggests that the enforcement of property rights in this arena will be extraordinarily vexed.[114]

The other challenge for capital is that the networks are being used by social movements in conflict with its agenda.While the activities of Chinese and Russian dissidents in mobilizing communications against state socialism have been well reported in the mainstream press, similar oppositional activities within capitalist societies have been, until recently, less publicized. But in North America, Internet mailing lists such as ACTIV-L, LEFT-L, PEN-L (the Progressive Economists Network), news groups such as P-NEWS, and gopher sites such that of the Economic Democracy Project have become increasingly important medium for a variety of social movements. This cyber-organizing has extended to the construction of independent networks which interface with the Internet but are entirely devoted to social activism, such as the Association for Progressive Communications. This originated in the mid-1980s from the coalition of Peace-Net, Eco-Net and Conflict-Net and now constitutes a global computer system dedicated to peace, human rights and environmental preservation. Such networks mark the latest phase in the emergence of the autonomous media that we described earlier.

Views on the significance of this oppositional Internet use vary widely. In some quarters, there is enormous optimism. Enthusiasts speak glowingly of the capacities of computer-communication to by-pass the filters of the information industries, speed internal communication, send out 'action alerts,' distribute documents and connect with potential allies. Indeed, amongst both left-liberals and cyber-anarchists these prospects sometimes breed a euphoria that is essentially a populist, grassroots version of information revolution theory.[115]

In response to this, Marxian political economists feel obliged to sternly underline the limitations of the medium. They stress the Internet's military-industrial roots, a sure taint of original sin. Pointing to the real demographic limitations on access to personal computers, modems and technical expertise, they forecast increasing stratification of information rich and information poor. They warn of the probabilities of state surveillance and grimly anticipate the imminent closing of the new space by commercial developments.[116] Feminists, noting the serious obstacles of time, money, socialization, education and harassment that discourage the involvement of women with the Internet, have also often been sceptical about its emancipatory potential.[117]

In our view, both these contending evaluations have a partial truth. It is certainly the case that, contrary to the universalist rhetoric of information society theorists, access to the tools and skills necessary for networking is sharply segregated, partly by gender, race, and age, but most sharply by income.[118] In North America the most frequent owner of a

personal computer and modem is male, white, middle aged and affluent. If he is not necessarily a member of the managerial strata, he is likely to be situated within the more privileged sectors of the wage hierarchy. This seems to seriously limit the likelihood of subversive uses.

However, there are some countervailing factors. Capital's own omnipresent deployment of computers as work-tools and consumer-goods, and the extraordinary pace of planned obsolescence in this field, is making some of the basic equipment for networking easily affordable, sometimes virtually free. Significant numbers of people have free or cheap access via universities, schools and businesses. Moreover, in a political context organizational capacities--the ability of a particular movement or group to access networked information which can then be further distributed via more traditional methods--may be a more critical factor than individual ownership of computers.

It is only by balancing these contending factors that one can make sense of the puzzling patterns of network activism. The Internet *is* used by a wide variety of oppositional groups. Some have been far swifter to establish a presence than others. Environmental movements, perhaps because of the high numbers of professionals involved in many green organizations, and student campaigns, because of the information-intense nature of universities, have been early and frequent users. Much of the left activity on the Net is conducted from academic centres by students and teachers. How far they are acting as relays to wider constituencies it is difficult to tell. Women remain underrepresented; even the left Net is largely a 'boy toy.' But there are neverthless numerous feminist lists and newsletters. Left lists regularly post messages mobilizing support for the protection of abortion clinics, the defence of lesbian activists threatened by right wing violence, the prevention of domestic violence, and the struggles of women workers. There are active initiatives from organizations such as the APC to increase the involvement of women engaged in political organization.[119]

So called 'organized' labour has been slow to enter cyberspace, perhaps because of an abiding view of technology as a managerial domain. Nonetheless the 1980s and 1990s have seen major 'Labortech' conferences; the initiation of lists such as LABOR-L and networks such as Labour Net; and a burgeoning of North American union-affiliated bulletin boards, run by teachers, firefighters, plumbers, communication and public service workers, musicians, and journalists.[120]Some, such as the Canadian Union of Public Employee's Solinet, are now well established. Several have connection to similar networks outside North America --Glasnet in Russia, WorkNet in South Africa, Geonet in Germany, and Poptel in the United Kingdom.[121]

The relation of these networks to the internal organization of trades unions varies. In many cases, computer communications are used simply to speed and make more efficient traditional trades union industrial relations practices. Sometimes, access to networked information has clearly been structured to reinforce internal bureaucracy and hierarchies. But on occasion, debates in the networks have in fact become forums for unexpected debate, dissent or rank and file initiatives. For example, Solinet exploded with contending views about the appropriate response to a social democratic provincial government in Ontario which launched a major assault on public service workers.

In some recent struggles net-workers have taken the offensive on-line in highly original ways.One example concerns the newspaper industry. This is a business that has felt the full weight of capital's drive to deskill, automate and shed labour. In 1994, some 2,600 workers from eight unions struck San Francisco's two daily papers. During the strike they produced their own paper --the San Francisco Free Press. This was not only distributed within the city, but was also made electronically accessible via World Wide Web, thus making it probably the most widely circulated strike bulletin in the history of civilization. At the same time, the strikers intiated a boycott of companies which continued advertising with newspapers behind picket lines.A computer list, Left-L, posted daily lists of "scab advertisers," and encouraged subscribers to call these corporations' 1-800 phone numbers with complaints. This boycott call appears to have been successful, with many companies discontinuing advertising, and others having their advertisements run for free as the newspaper proprietor's desperately attempted to save face. The eventual settlement was widely seen as a victory for the strikers - an unusual moment in recent US labour history. Similar Internet organized boycotts have been used by striking janitors in Silicon Valley and internationally by unions representing laid off workers of the Bridgestone rubber company.[122]

In our view, cyberspace is important as a political arena, not, as some postmodern theorists suggest, as a sphere where virtual conflicts replace struggles 'on the ground,' but as a medium within which terrestrial struggles can be made visible to and linked with one another.[123] This is of particular importance when such struggles occur within the enormously expanded framework of the social factory. As we have seen, there is within this setting no shortage of actual or potential anti-capitalist initiatives. The great difficulty facing these struggles is, however, their fragmentation and separation. In this situation the power of capital to divide and conquer, isolating points of opposition and turning them one against another is truly formidable.

Computer networking is one--although only one--possible countervailing force against this fragmentation. Lists that carry messages from labour, environmental, feminist,

indigenous groups implicitly assert these movements; interconnections even while participants may still be searching for the explicit formulation of such links. In combination with other autonomous media, such networks provide a channel within which a multiplicity of oppositional forces, diverse in goals, varied in constituency, specific in organization, can, through dialogue, criticism and debate, discover a new language of autonomy and alliance. In this sense, cyberspace is a potentially recompositional space in which the atomization that information capital inflicts on socialized labour can be counteracted.

The European Counter-Network, an autonomist network circulating news of struggles by workers, refugees, and anti-fascists within the EEC notes the potential hazards of such computer activism: technical fetishism, new hierarchies of expertise, health risks, and the "ultimate nightmare,"

> . . . a simulated international radical network in which all communication is mediated by modems and in which information circulates endlessly between computers without being put back into a human context.[124]

As Dorothy Kidd has written,

> Attempts to use computers . . . in the struggle require constant, collective reevaluation, to determine which strategies are effective, and which dangerously compromised.[125]

But given such ongoing reassessment, there is plausible hope that computer networking can help constitute new forms of anti-capitalist combination that do not rest on the directives of a vanguard party, but rather arise out of the transverse, transnational connections of oppositional groupings.[126]

The question now confronting capital is whether it can reabsorb the unruliness of the networks. This is undoubtedly the aim of the the information highway. It is also the objective of various flanking initiatives. These include the privatization and commercialization of the Internet; the various 'Clipper chips' rendering digital communication transparent to national security agencies; the electronic 'law and order' crackdown that climaxed in armed raids on supposed hackers; and the enormous moral panic over pornography, terrorsm and other evils on the Net.[127] All these work to make cyberspace safe for business as usual. The possibility--perhaps probability--that the brief blossoming of the Internet will be swiftly "paved over" by the corporate highway builders, as has largely occurred with radio, television and earlier generations of communication technologies, is very high.[128]

However, the attempt to commercially constrain computer communications has evoked opposition. This often comes from groups outside the traditional orbit of the left, such as the activists in Computer Professionals for Social Responsibility, or the "cyberpunk librarians" on the front lines of the fight for public access to the nets.[129]

Indeed, just as digitalization, by creating a common medium for capitalist transactions drives toward the merging of once distinct industries, so it creates a momentum for what Jim Davis terms a "popular digital convergence" amongst different sectors of social labour.[130] Organizations that fought separately for community access to cable television or the employment conditions of phone workers or the artistic rights of musicians and writers now find in their common concern around the "highway" a "new, practical basis for working together."[131]

Coalitions such as the US Telecommunications Round Table have called for the construction of universal public access, two-way communications, no censorship, the preservation of common carrier status, protection of workers, privacy protection, and democratic policy making. These demands, though framed within a reformist perspective, actually imply a radical challenge to corporate intentions. At the same time a variety of community computing initiatives, such as the Freenet movement, are springing up, attempting to overcome the exclusion from the networks of the poor, elderly, and ghettoized, and linking control of information services to wider issues of social infrastructure.[132]

The familiar pattern of capitalist recuperation may encounter unexpected problems in the case of computer communication. Preventing hackers' circumvention of commodified networks will be difficult. Furthermore, there are real questions as to whether there is actually sufficient popular demand for the commercial applications of the highway to warrant the enormous investments corporate development demands. Every indication is that what people want from the on-line environment is global, communal conversation rather than teleshopping and video on demand--in Negri's terms, "communication" rather than "information."[133] To the degree that capital stifles or excludes this possibility, it risks killing the digital goose whose golden eggs it is already counting.

The most adventurous sections of information age business--such the libertarian cyber-entrepreneurs of the Electronic Frontier Foundation--gamble that they can avoid this impasse by entering into a symbiotic relation with Internet culture to perfect a new round of cybernetically based accumulation. They even anticipate benefiting from the probes and challenges of hackers in order to spur technological development. This type of compromise would preserve a degree of openness within the networks. However, such a strategy entails capital accepting that the relative liberty it permits will provide the platform for a plethora of alternate digital institutions and subversive experiments. In this case, the networks will continue to serve as a medium not simply for the circulation of commodities, but also for the circulation of struggles.

We will conclude with an admittedly optimistic yet not totally implausible historical analogy. It is well known that in the aftermath of the 1848 proletarian uprisings in Paris, the Emperor Napoleon III ordered Baron von Haussmann to redesign the city--and that a centerpiece of this urban planning exercise was the widening of streets to allow the passage of artillery for the suppression of any future insurrections. What is not generally known is that the workers employed on this highway development project, impoverished masons and builders housed in squalid Parisian slums, were amongst the most important participants in the next revolutionary outbreak--the 1871 Paris Commune that seized the city in its entirety, rocked the stability of capitalist Europe, and gave Marx a blazing, prefigurative glimpse of communist society.[134]

Today, in the era of the information highway, capital is constructing its cyberspatial thoroughfares in order to circumvent or overwhelm the industrial conflicts which once brought it to crisis. Proceeding through its circuit we have seen how it is deploying high technologies in an attempt to crush all traces of opposition-- enforcing availability for work, commodifying ever larger areas of experience, deepening social controls and intensifying the depletion of ecosystems. In doing so, however, it is both reinforcing old exploitations and creating new ones. It is bringing into being fresh forms of proletarianization, ranging from the growing ranks of the technologically-trained but unemployed workers to genetically-sampled women and aboriginal peoples. The great contemporary question is whether this new informational labour power can discover ways of creating, not so much a virtual community, as a politicized and oppositional 'Virtual Commune.'

Our travels along capital's data highways have discovered rebellions at every point: people fighting for freedom from dependence on the wage, creating a "communication commons," experimenting with new forms of self-organization, and new relations to the natural world.[135] Such movements are incipient and embattled, yet undeniable. Capital has not succeeded in technologically terminating the cycle of struggles. Indeed, without in any way diminishing the magnitude of the defeats and disarrays suffered by counter-movements over the last twenty years, we would suggest that there are now visible across the siliconized, bioengineered, post-Fordist landscape the signs of a strange new class recomposition. This is proceeding on a much wider basis than that traditionally conceived by Marxism. In the integrated circuit of virtual capitalism, the immediate point of production cannot be considered the 'privileged' site of struggle. Rather, the whole of society becomes a wired workplace--but also potential sites for the interruption of capital's logic.

There is no need to emphasize the present fragility and uncertainty of the various reappropriations, counter-plans and alternative logics whose sinuous course we have traced. In their isolation, each provides only a minor problem to corporate power. But in their proliferation and interconnection they constitute a challenge to its dominion. It is precisely the breadth and variety of such subversions that makes the fields of information and communication so crucial today. For it is by a process of mutual discovery, recognition and reinforcement --by an accelerating circulation of struggles--that such insurgencies could attain a strength capable of prising apart the coils with which capital now encircles society. However, an assessment of such possibilities cannot limit itself to the most 'advanced' sectors of development, but must rather take a perspective embracing the truly global scope of information capital--an optic we open in our next chapter.

NOTES

1 This concept of the circuit of capital recurrs throughout Marx's work, but perhaps finds its most systematic exposition in vol. 2 of Capital (London: Vintage, 1978) and, in a somewhat different form, in the Introduction to Grundrisse (Harmondsworth: Penguin, 1973) 81-114.

2 The autonomist development of the concept can be found in Mario Tronti "Social Capital," Telos 17 (1973): 105. Tronti elsewhere writes: "The more capitalist development advances, that is to say the more the production of relative surplus value penetrates everywhere, the more the circuit production-distribution-exchange-consumption inevitably develops; that is to say that the relationship between capitalists production and bourgeois society, between the factory and society, between society and the state, become more and more organic. At the highest level of capitalist development social relations become moments of the relations of production, and the whole society becomes an articulation of production. In short, all of society lives as a function of the factory and the factory extends its exclusive domination over all of society." (Tronti, Operai e Capitale, cited & trans Cleaver, "The Inversion of Class Perspective" 137).See also Panzieri, "The factory is becoming generalized. The factory is tending to pervade, to permeate the entire arena of civil society ("Lotte Operaie Nello Sviluppo Capitalistico," Quaderni Piacentini (1967), cited James O'Connor, Accumulation Crisis (Blackwell: Oxford, 1984) 151.). For a very clear exposition of the concept iof the social factory see Harry Cleaver, "Malaria, the Politics of Public Health and the International Crisis," Review of Radical Political Economics 9.1 (1977): 81-103, and Peter F. Bell and Harry Cleaver, "Marx's Crisis Theory as a Theory of Class Struggle" Research in Political Economy 5 (1982): 189-261, to which this chapter owes a considerable debt.

3 Mariarosa Dalla Costa and Selma James, The Power of Women and the Subversion of the Community, (Bristol: Falling Wall Press, 1972).

4 For important recent Marxist theoretical perspectives on ecological issues see the journal Capitalism, Nature, Socialism.

5 Marx , Grundrisse 692.

6 Marx , Grundrisse 705.

7 On new production systems see Stanley Aronowitz and William DiFazio, The Jobless Future: Sci-Tech and the Dogma of Work (Minneapolis: University of Minnesota Press, 1994); Benjamin Coriat, L'Atelier et Le Robot (Paris: Christian Bourgeois, 1990); Jean Paul de Gaudemar, ed., Usines et Ouvriers: Figures du Nouvel Ordre Productif (Paris; Francois Maspero, 1980); David Noble, Forces of Production (New York: Knopf, 1984); Stephen Wood, ed., The Transformation of Work?: Skill, Flexibility and the Labour Process (London: Unwin Hyman, 1989).

8 Jim Davis and Michael Stack, "Knowledge in Production." Race & Class, 34.3 (1992): 8, report that the Next computer factory in Fremont California requires only five manual-assembly workers and fewer than one-hundred other workers, mostly engineers, for a line capable of producing $1 billion of computers a year.

9 See Norbert Weiner, "A Letter to Walther Reuther, UAW President," 13 Aug. 1949, in David Noble, Progress Without People (Toronto: Between the Lines, 1995): 161-163.

10 David Noble, "TheTruth About the Information Highway," CPU: Working in the Computer Industry 13, online, Internet, ACTIVE-L, 15 Feb.1995.

11 See for example Ethan. B Kaplan, "Workers and the World Economy," Foreign Affairs 75.3 (1996) 16-

63, and Barrie Sherman and Phil Judkins, Licensed to Work (London: Cassell, 1995).

12 Marx, Capital vol. 1 (New York: Vintage Books, 1977) 781-802.

13 Mike Davis, "Los Angeles Was Just the Beginning: Urban Revolt in the United States: A Thousand Points of Light," Open Magazine Pamphlet Series (New York: New Press, 1993), and Cindi Katz and Neil Smith,"L.A. Intifada: Interview with Mike Davis," Social Text 33 (1992): 19-33.

14 The best single source for reporting the unfolding of these movements is the US dissident trades union journal Labor Notes. Other interesting discussion can be found in Pamela Chiang, "501 Blues," Breakthrough 18:2 (1994): 3-7; David Bacon, "L.A. Labor--A New Militancy," Nation 27 Feb. 1995: 273-276; Jeremy Brecher and Tim Costello, eds. Building Bridges: The Emerging Grassroots Coalition of Labour and Community (NewYork: Monthly Review, 1990); Collective Action Notes, "The U.SA. A Transitional Period-But to Where?" Collective Action Notes 9 (1996) 1-4; Mike Davis, "Armaggedon at the Emerald City: Local 226 vs MGM Grand." Nation 11 July 1994: 46-49; Peter Downs, "Striking Against Overtime: The Example of Flint," Against the Current 54 (1995): 7-8; Peter Rachleef, Hard Pressed in the Heartland: The Hormel Strike and the Future of Labour (Boston: South End 1992) and "Seeds of a Labor Resurgency," Nation 21 Feb. 1994: 226-229; Jane Slaughter, "Addicted to Overtime," The Progressive 31 April (1995): 31-33.

15 Antonio Negri, The Politics of Subversion: A Manifesto for the Twenty First Century (Cambridge: Polity, 1989); Michael Lebowitz, Beyond Capital: Marx's Political Economy of the Working Class (New York: St Martin's Press, 1992).

16 On recent developments in the AFL-CIO, see Jeremy Brecher and Tim Costello, "A New Labor Movement in the Shell of the Old," Z Magazine April (1996) 45-49.

17 See Chiang, and Andrew Banks, "Jobs With Justice: Florida's Fight Against Worker Abuse," Building Bridges: The Emerging Grassroots Coalition of Labour and Community, ed. Jeremy Brecher and Tim Costello (NewYork: Monthly Review, 1990) 25-37.

18 Labour Resource Center, Holding the Line in '89: Lessons of the NYNEX Strike (Somerville: Labour Resource Center, 1990.

19Lisa Hoyos and Mai Hoang, "Workers at the Centre: Silicon Valley Campaign for Justice," CrossRoads. 43 (1994): 24-27.

20 David Kallick, "Toward a New Unionism," Social Policy 25.2 (1994): 2-6.

21 Brecher and Costello.

22 See Juliet Schor, The Overworked American: The Unexpected Decline of Leisure (USA: Harper,1991) and Benjamin Hunnicutt, Work Without End: Abandoning Shorter Hours for the Right to Work (Philadelphia: Temple University Press, 1988).

23 For example, a shortened work week is a proposal of the Labor Notes group--see the pamphlet by Kim Moody and Simone Sagovac, "Time Out: The Case for a Shorter Work Week" (Detroit: Labor Notes, 1995)

24 Berardi, Franco ("Bifo"), Le Ciel Est Enfin Tombe Sur La Terre (Paris: Seuil, 1978) 27, my trans.

25 The treatment of the sphere of consumption offered in this section is truncated, in that it deals only with struggles surrounding capital's attempt to sell commodities, and not with its activities as a purchaser of the labour power and raw materials required for "productive consumption.". This issue is, however, later picked up, in regard to raw materials in the section on the "The Reproduction of Nature," and in the next chapter, which discusses capital's global cheap-labour strategy. Although Marx distinguished the extraction of surplus value in the workplace from its realization in the market, he also noted that the faster capital circulates, the more often in a given period it can flow through the production process and be augmented by the addition of surplus value. Increasing the speed with which commodities are brought and sold can thus have the same consequence as increasing the productivity of labour: more profits. See Marx, Grundrisse 539.

26 For just one of many possible examples see Marx, Grundrisse 516-544.

27 This section draws on Robert McChesney, "The Global Struggle for Democratic Communication," Monthly Review. 48.3 (1996): 1-20; Nicholas Garnham, Capitalism and Communication: Global Culture and the Economics of Information (London: Sage, 1990); Vincent Mosco, Computers and Communication in the Information Age: Essays in Critical Theory and Public Policy (Toronto: Garamond, 1989).

28 Frederic Jameson, "Postmodernism and the Market," Socialist Register, ed. R. Miliband, L. Panitch and J. Saville (London: Merlin, 1990) 95-110.

29 On this point see Giuseppe Cocco and Carlo Vercellone, "Les Paradigmes Sociaux du Post-Fordisme," Futur Anterieur 4 (1990): 71-94.

30 According to Michael Dawson and John Bellamy Foster, "Virtual Capitalism: The Political Economy of the Information Society." Monthly Review, 48.3 (1995): 47, in 1992 US business spent $1 trillion dollars--one-sixth of the Gross Domestic Product--on marketing.

31 See Eileen Meehan, "Technical Capability vs. Corporate Imperatives: Towards a Political Economy of Cable Television and Information Diversity," The Political Economy of Information, ed. Vincent Mosco and Janet Wasko (Madison: University of Wisconsin Press, 1988)

32 Kevin Wilson, Technologies of Control: The New Interactive Media for the Home (Madison: University of Wisconsin, 1988) 36. See also Oscar Gandy, The Panoptic Sort: Towards a Political Economy of Information (Boulder: Westview, 1993), and David Lyon, The Electronic Eye: The Rise of Surveillance Society (Cambridge: Polity, 1994).

33 Dallas Smythe, "Communications: Blindspot of Western Marxism," Canadian Journal of Political and Social Theory 1.3 (1977): 6; see also his Dependency Road: Communications, Capitalism, Consciousness and Canada (Norwood: Ablex, 1981). This line of thought has subsequently been developed by Sut Jhally, The Codes of Advertising: Fetishism and the Political Economy of Meaning in the Consumer Society (New York: St. Martin's Press, 1987). In a personal conversation shortly before his death Smythe agreed that his perspective converged with the autonomist's "social factory" analysis.

34 Smythe, "Communications: Blindspot of Western Marxism" 4.

35 Smythe, "Communications: Blindspot of Western Marxism" 4.

36 Such 'active audience' analysis has been particularly developed in 'cultural studies' perspectives from such as John Fiske, Understanding Popular Culture (London: Unwin Hyman, 1989).

37 Marx, Grundrisse 548.

38 Marx, Grundrisse 548-549.

39 For a handy sketch of this spectrum of activity see John Chesterman and Andy Lipman, The Electronic Pirates (London: Comedia, 1988).

40 John Keane, Media and Democracy (Oxford: Blackwell, 1990) 159.

41 As Nicholas Garnham observes in Capitalism and Communication, there is a contradiction at the heart of the communication commodity, arising from media business's need to simultaneously maximise and restrict istribution. On the one hand, they want to sell as *much* as they can. Therfore they increase the speed and efficiency of communication methods to reach more people, more of the time, in more and more various ways. But on the other hand, media corporations want to *sell* as much they can; they are interested not just in getting out messages, but in getting back money. So they confront a paradoxical requirement to expand and restrict comunication at the same time--simultaneously creating plenty and imposing scarcity.

42 For discussion of these terms see John Downing, Radical Media: The Political Experience of Alternative Communication (Boston: South End Press, 1984).

43 The seminal essay on alternative media in this period is Hans Magnus Enzensberger, "Consituents of a Theory of the Media," The Consciousness Industry. New York Seabury Press, 95-128. For a contemprary survey see Jesse Drews "Media Activism and Radical Democracy," Resisting the Virtual Life: The Culture and Politics of Information., ed. James Brook and Iain A. Boal.(San Francisco: City Lights, 1995) 71-84, and David Trend, "Rethinking Media Activism: Why the Left is Losing the Culture War," Socialist Review 93/2 (1993): 5-34.

44 See Bruce Girard,.ed., A Passion for Radio (Montreal: Black Rose, 1992); Greg Boozell, "The Revolution Will Be Microwaved: The FCC, Microwatt Radio, and Telecommunication Networks," Afterimage 22.1 (1994): 12-14; Wes Thomas, "Hyperwebs: Pirate Radio," Mondo 2000 11 (1993): 26-39.

45 See the excellent discusions in Nancy Thede and Alain Ambrosi, eds., Video the Changing World. (Montreal: Black Rose, 1991) and Dee Dee Halleck,"Watch Out, Dick Tracy! Popular Video in the Wake of the Exxon Valdez," Technoculture, ed. Constance Penley & Andrew Ross (Minneapolis: University of Minnesota, 1991).

46 See Patricia Aufderheide, "Underground Cable: A Survey of Public Acess Programming," Afterimage. 22:1 (1994) 5-7; Douglas Kahn, "Satellite Skirmishes: An Interview With Paper Tiger West's Jesse Drew," Afterimage 20.10 (1993): 9-11; Douglas Kellner, Television and the Crisis of Democracy (Boulder: Westview.1990); Martin Lucas and Martha Wallner, "Resistance by Satellite: The Gulf Crisis and Deep Dish Satellite TV Network," Channels of Resistance, ed. Tony Dowmunt (London: British Film Institute 1993) 176-194; Dot Tuer, "All in the Family: An Examination of Community Access Cable in Canada." Fuse. 17. 3 (1994): 23-29.

47 Adbusters: Journal of the Mental Environment is published by the Media Foundation, Vancouver, Canada, email adbusters@adbusters.org.

48 Rafael Roncaglio, "Notes On the Alternative," Video: The Changing World. Montreal, ed.Nancy Thede and Alain Ambrosi (Montreal: Black Rose, 1991) 207.

49 Katz and Smith 16.

50 Katz and Smith 16.

51 For some fascinating analysis of media politics surrounding the LA rebellion see John Fiske, Media Matters:Everyday Culture and Political Change (Minneapolis: University of Minnesota, 1994).

52 Jason Frank, "Television That Works: Labor Video in the 1990s," Socialist Review 93/2 (1993): 37-78.

53 As Clarence Lusane, "Rap, Race, and Rebellion," Z Magazine Sep. (1992) 36, comments, "On the one hand, rap is the voice of alienated, frustrated, and rebellious black youth who recognize their marginality and vulnerability in post-industrial America. On the other hand, rap is the packaging and marketing of discontent by some of the best ad agencies and largest record poducers in the wold. It's this duality that . . . made rap and rappers an explosive issue in the 1992 elections."

54 Wilmette Brown, "No Justice, No Peace: the 1992 Los Angeles Rebellion from a Black/women's Perspective" (London: Wages for Housework Campaign., 1993) 5-8.

55 See Ron Sakolsky, "Zoom Black Magic Liberation Radio: The Birth of thr Micro-Radio Movement in the USA," A Passion For Radio, ed. Bruce Girard (Montreal: Black Rose, 1993) 106-113.

56 Reprinted in Haki R. Madhubuti, ed., Why L.A. Happened: Implications of the '92 Los Angeles Rebellion. (Chicago: Third World, 1993).

57 See for example Noam Chomsky and Edward S. Herman, ManufacturingConsent: The Political Economy of the Mass Media (Media.New York: Pantheon, 1988); Ben Bagdikian, The Media Monopoly. (Boston: Beacon, 1990) and the discussion of the work of Herbert Schiller in Chapter 3 of this dissertation.

58 Karl Marx and Frederick Engels, The German Ideology (London: Lawrence &Wishart, 1963) 3.

59 Karl Marx, Capital: A Critique of Political Economy vol. I (New York: Vintage Books, 1977) 718.

60.See Michael Hardt and Antonio Negri, Labor of Dionysus: A Critique of the State Form (London: Minneapolis, 1994).

61 James O'Connor, The Fiscal Crisis of the State (New York: St Martins, 1973). This crisis is then exacerbated as the corporate response to workplace unrest --downsizing and automation--ejects more and more workers from production, thereby swelling the ranks of the unemployed and impoverished, increasing welfare roles and diminishing tax revenues.

62 Andrew Gamble, The Free Market and the Strong State.

63 On this point see Rosalind Petchesky, Abortion and Woman's Choice: The State, Sexuality and Reproductive Freedom (Northeastern University Press: Boston, 1990) 241-252.

64 On high-tech imaging and abortion activist responses see Patricia Zimmerman,"The Female Bodywars: Rethinking Feminist Media Politics," Socialist Review 93/2 (1993): 35-56.

65 See Donald Lowe, The Body in Late Capitalist USA.(Duke University Press, 1995), and Vicente Navarro, Crisis, Health and Medicine: A Social Critique (New York: Tavistock, 1986) and Dangerous To Your Health (New York: Monthly Review, 1993).

66 On this process see Martin Kenney, Biotechnology: The University Industrial Complex (New Haven: Yale University Press, 1986); Janice Newson and Howard Buchbinder, The University Means Business: Universities, Corporations and Academic Work (Toronto: Garamond, 1988); Sheldon Krimsky, "The New Corporate Identity of the American University," Alternatives.14.2 (1987) 20-29; David Noble, "Insider Trading: University Style," Our Schools/Our Selves 4: 3 (1993): 45-52.

67 On the points in this paragraph see Frank Webster and Kevin Robins, The Technical Fix: Education, Computers and Industry (London: Macmillan, 1989); Monty Neill. "Computers, Thinking, and Schools in 'the New World Economic Order," Resisting the Virtual Life, ed. James Brook and Iain A. Boal (San Francisco: City Lights, 1995) 181-195; Douglas Noble, "Mental Materiel: The Militarization of Learning and Intelligence in US Education," Cyborg Worlds, ed. Les Levidow and Kevin Robins (London: Free Association, 1989).

68 Alex Vitale and Keith McHenry, "Food Not Bombs," Z Magazine, Sep. (1994)19-21.

69 Marlene Fried, ed., From Abortion to Reproductive Freedom: Transforming a Movement (Boston: South End Press, 1990)

70 Rosalind Copelon, "From Privacy to Autonomy: The Conditions for Sexual and Reproductive Freedom," Marlene Fried, ed., From Abortion to Reproductive Freedom: Transforming a Movement (Boston: South End Press, 1990), 39. In the same anthology see also the essay by Angela Davis, "Racism, Birth Control, and Reproductive Rights," 15-26.

71 Patrick Novotny, "Popular Epidemiology and the Struggle for Community Health: Alternative Perspectives from the Environmental Justice Movement," Capital, Nature, Socialism 5.2 (1994): 29-50.

72 See Peter Arno and Karyn Feiden, Against the Odds: The Story of AIDS Drug Development, Politics and Profits (NY: Harper Collins, 1992); Steven Epstein, "Democratic Science? AIDS Activism and the Contested Construction of Knowledge," Socialist Review 21.2 (1991): 35-61.Paula A Treichler, "How to Have Theory in an Epidemic: The Evolution of AIDS Treatment Activism," Technoculture, ed. Constance Penley & Andrew Ross (Minneapolis: University of Minnesota, 1991) 57-156. These points have been underlined by dramatic demonstrations and occupations against companies such as Hoffman Larouche, Boroughs Welcome, Kowa Pharmacuticals, and Astra. Epstein describes the most famous of these, the ACT-UP invasion the New York Stock Exchange protesting AZT price gouging:"Seconds before the 9:30 am opening bell, the activists began to blare portable foghorns . . . Fake $100 bills imprinted with the words 'Fuck your profiteering. We die while you play business' were tossed to the traders below."

73 See George Carter, "ACT UP, the AIDS War, and Activism," Open Fire: The Open Magazine Pamphlet Series Anthology, ed. Greg Ruggiero and Stuart Sahulka (New York: New Press, 1993) 123-150.

74 Epstein 37.

75 See TonyVellela, New Voices: Student Activism in the 80s and 90s (Boston: South End Press, 1988); Paul Loeb, Generation At The Crossroads: Apathy and Action on the American Campus (New Jersey: Westview, 1994).

76 Robert Ovetz, "Assailing the Ivory Tower: Student Struggles and the Entrepreneurialization of the University," Our Generation 24.1 (1993): 70-95.

77 Margaret Spillane, "Unplug It!" Nation 21 Nov.(1994) 600; Robin Templeton, "Not For Sale-Unplug Channel One," Crossroads 34 (1993) 19-20.

78 Roberto.Rodriguez, "Information Highway: Latino Student Protesters Create Nationwide Link Up." Black Issues in Higher Education 16 June(1994), online, Internet, ACTIVE-L, 5 Aug. 1994.

79 "Students Fight the Contract," Progressive.16 May 1995, n.p.

80 Antonio Negri, The Politics of Subversion: A Manifesto for the Twenty First Century (Cambridge: Polity, 1989) 206.

81 Marx, Capital vol. 1 638.

82 See Robert Gottlieb, Forcing the Spring: The Transformation of the American Environmental Movement. (Washington: Island, 1993).

83 See Joseph Boland, "Ecological Modernization," Capital, Nature, Socialism 52 (1994): 135-141, and Tim Luke, "Informationalism and Ecology," Telos 56 (1983): 59-73.

84 See Dennis Hayes, Behind the Silicon Curtain: The Seductions of Work in a Lonely Era (Boston: South End, 1989) and Robert Howard, Brave New Workplace (New York: Viking, 1985).

85 See Richard Hofrichter, ed., Toxic Struggles: The Theory and Practice of Environmental Justice. (Philadelphia: New Society, 1993).

86 Harry Cleaver, Reading Capital Politically (Brighton: Harvester 1979) 134.

87 Edward Yoxen, "Life as a Productive Force: Capitalising the Science and Technology of Molecular Biology,"Science, Technology and the Labour Process: Marxist Studies, vol. 1, ed. Les Levidow and Bob Young. (New Jersey: Humanities, 1981) 66-123; Herbert Gottweis, "Genetic Engineering, Democracy, and the Politics of Identity." Social Text 42 (1995): 127-152.

88 Harry Cleaver, "Technology as Political Weaponry," Science, Politics and the Agricultural Revolution in Asia, ed. Robert Anderson (Boulder: Westview, 1981) 261-276.

89 See Tom Athanasiou, "Greenwashing Agricultural Biotechnology," Processed World 28 (1991/2) 16-21; Cary Fowler and Pat Mooney Shattering: Food, Politic and the Loss of Genetic Diversity (Tucson: University of Arizona, 1990); Vandana Shiva, The Violence of the Green Revolution: Third World Agriculture, Ecologyand Politics (London: Zed Books, 1991); Jeremy Seabrook, "Biotechnology an Genetic Diversity," Race & Class 34.3 (1993) 15-30; Brian Tokar, "The False Promise of Biotechnology," Z Magazine Feb. 1992, 27-32.; Susan Wright, "Down on the Animal Pharm: Splicing Away Regulations," Nation 11 Mar. 1996.

90 Gottweis 137.

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93 Henry Greely, "Health Insurance, Employment Discrimination, and the Genetics Revolution," The Code of Codes, ed. Daniel Kevles and Leroy Hood (Cambridge: Harvard University Press, 1992) 264-280.

94 See Andrew Kimbrell, The Human Body Shop (Harper: San Francisco, 1993), and Giovanni Berlinguer, "The Body as Commodity and Value," Capital, Nature & Socialism 5.3 (1994): 35-49.

95 Maria Mies, "Why do we Need all this? A Call Against Genetic Engineering & Reproductive Technology," Made to Order: The Myth of Reproductive and Genetic Progrss, ed. Patricia Spallone and Deborah Steinberg (Oxford: Pergamon, 1987) 34-47, and Kathryn Russell, "A Value-Theoretic Approach to Childbirth and Reproductive Engineering," Science and Society 58.3 (1994): 287-314.

96 This is the ultimate in female service sector labour. Poor women are, through an entrepreneurial intermediary, paid by rich clients to undergo either artificial insemination or *in vitro* fertilization and carry and bear children. According to Kemble (110) such agreements,"routinely require that the prospective mother submit to massive doses of fertility drugs, hormone injections, amniocentesis and an array of genetic probes and tests at the discretion of the client; require that the mother agrees to abort the fetus on demand, and is liable for all 'risks' associated with conception, pregnancy and childbirth." Payment is in the region of $10,000--$1,000 if the child is still-born. But such obviously exploitative repro-tech arrangements only represent the extreme of tendencies evident even in more seemingly benign uses. For example, women who voluntarily attempt *in vitro* fertilization not only pay for the service, but also, in a complex and painful process of self-surveillance and constant testing often knowingly or unknowingly providing the surplus material --'excess eggs'-- required for further commercial experimentation.

97 For speculations along this line by a member of the European ruling class see JacquesAttali, Millennium: Winners and Losers in the Coming World Order (New York: Random House, 1991).

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99 On the Canadian events see Gwynne Basen, Margaret Eichler, and Abby Lippman. eds., Misconceptions: The Social Construction of Choice and the New Reproductive and Genetic Technologies (Quebec: Voyageur, 1993).

100 Debra Harry, "The Human Genome Diversity Project and Its Implications For Indigenous Peoples," InformationAbout Intellectual Property Rights No. 6, Jan. 1995, Institute for Agriculture and Trade Policy, Minneapolis: Minnesota, avaolable by email from iatp@iatp.org.; Pat Mooney, The Conservation and development of Indigenous Knowledge in the Context of Intellectual Property Systems (Ottawa: Rural Advancement Foundation International, 1993). The Ottawa-based Rural Advancement Foundation International has served as a clearinghouse and information source both for these efforts and for for First and Third world farmers fighting agribusinesses biotechnological enclosures.

101 Karl Marx, Economic and Philosophical Manuscripts (new York: International Publishers, 1964) 112.

102 Peter Linebaugh, The London Hanged (London: Penguin, 1991) 121-122.

103 Marx, Grundrisse 533.

104 Marx, Grundrisse 526.

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107 Howard Rheingold, The Virtual Community (Reading: Addison-Wesley, 1993).

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Chapter 6
PLANETS

Introduction: The Net of the World Market

Whoever today says 'capital' says 'globalization.' Nothing has been more central to the current restructuring of corporate power than nomadic range of manoeuvre, deterritorialization from old centres, systematic subversion of national sovereignty, and planetary political planning. And whoever today says 'globalization' says also 'communication,' for the emergence of this new world order would be unthinkable without the telecommunications and computer networks which now form the electronic pathways for the circulation of money, commodities and power.

Despite the breathlessness that characterizes so much contemporary commentary on these developments, they represent the culmination of an old logic. Marx in his time saw clearly how capitalism's compulsion to expand production and circulation drove it to successive geographic enlargements of a circuit whose circumference would eventually encircle the whole earth, leading to "the entanglement of all peoples in the net of the world market."[1] Observing the telegraphs, railways and steamships of his age, he observed how capital "by its nature drives beyond every spatial barrier" so that "the creation of the physical conditions of exchange--of the means of communication and transport--the annihilation of space by time--becomes an extraordinary necessity for it."[2]

Marx believed these developments had a double aspect, containing both exploitative and emancipatory potentialities. For example, in Grundrisse he describes how institutions of information, such as the mails and telegraph, are established by capital in an attempt to overcome the "crises, etc." that arise from the contradiction between increasing global "interdependence" and the "indifference" of privatized production.[3] In this respect, the new means of communication are instruments in the "autonomization of the world market"--the alienation of human powers to a vast transpersonal apparatus of monetary exchange.[4] Yet at the same time, they open"relations and connections" with the potential to overcome this alienation. They introduce the possibility of "suspending the old standpoint" and replacing it with a "real communality and generality" that affirmed the "general bond" of planetary humanity[5]

Today the net of the world market is made of fibre optic cables and satellite links. But the possibility of "suspending" capital's standpoint seems remote indeed. While there have been many recent analyses of globalization from a broadly Marxian perspective, nearly all see the recent intensifications in the transnational organization of production,

exchange and finance, and the accompanying developments in new media and communications technologies, only as massively enhancing the power of transnational corporations.[6]

We follow a different tack, and propose that globalization, rather than simply representing an inexorable deepening of capitalist control, constitutes a defensive corporate response to series of interweaving challenges which in the 1960s and 70s plunged the international structure of accumulation into crisis. Moreover, while the immediate impact of this riposte was to profoundly disarray oppositional forces, it has also opened unforeseen opportunities for their new cooperation and alliance. Not the least of these is the use of globalizing capital's own means of communication and transport to connect a proliferating array of counter-movements whose own world-encircling activities of resistance and reconstruction we term the 'other globalization.'[7]

"Crises, etc:" Three Worlds Into One

In our analysis, the most important of the "crises, etc." that global capital seeks to escape are those arising from the rebellions of its labouring subjects. Historically, these struggles have spiralled across a succession of expanding territorial spaces: the *national* space, where capital was first challenged by emergent proletarian movements; the *imperial* space, where these challenges were partly defused by capital's capacity to raise domestic living standards on the basis of colonial super-exploitation; the *socialist* space, where Bolshevism, in the midst of inter-imperial war seized a terrain within which it was then fatally contained. By the mid-point of the twentieth century, however, the catastrophes of inter-imperial war, the threat of state socialism and the mounting pressures of anti-colonial liberation propelled capital towards its first exercises in truly international planning.

These took shape at the end of World War II. Under the leadership of a newly preeminent US industry, whose most advanced corporations were rapidly transcending the limits of the domestic market to acquire multinational form, the management of the capitalist world economy began for the first time to be directed and orchestrated by an array of consciously global institutions. Trading arrangements were codified in the Bretton Woods treaties; significant financial controls were delegated to the World Bank and IMF; monetary stability was assured by the dollar's role in regulating exchange rates; and the whole system was held in place militarily by the Pentagon's nuclear might, relayed through various local authorities and regional alliances. The Fordist 'golden age of capital' thus rested not only on the domestic planning of national economies, but also on an unprecedented level of international organization.

The famous tripartite division of First, Second and Third World describes the success of this international order in segregating the global proletariat into zones of differential control. For the inhabitants of the First World, there was an historic experiment in welfare state reformism. For the populace of the socialist bloc, the Second World, there was Cold War encirclement and forced industrialization. And for the Third World, there was a transition from colonial subordination to European capital to neocolonial penetration by US based multinationals, with modernization programs courtesy of the Rockefeller Foundation, counter-insurgency from the CIA, and ongoing mass immiseration. The workers of the world were in effect segregated and exiled to three separate planets with drastically different levels of 'development' or 'underdevelopment,' and radically incommensurable experiences of work, exploitation, and struggle.

Over the next twenty-five years, however, the stability of this international order was shaken by rebellions converging from different directions. In the Third World, the arrangement was in trouble from the start, as successive revolutionary movements--in China, Algeria, Cuba, Vietnam --fought and won against the sentence of dependency. Ironically, at the same time as Third World movements were establishing state socialist regimes, in the Soviet-bloc Second World the initial rapid growth produced by forced labour stagnated, leading to bread riots and rebellion against police control. Finally, in the First World metropolis, the Keynesian deal started to come apart in the 1960s and 70s. Supposedly 'affluent' workers, instead of being pacified by higher living standards, used these as resources to pursue new levels of struggle, which rolled from inner city ghettoes to industrial shop floors to university campuses setting off a sequence of mutually reinforcing reverberations.[8]

As Harry Cleaver points out, struggles arising in the different zones of the world system started to circulate.[9] Metropolitan capital had relied on cheap resources from colonial and neocolonial dominions to finance its deals with the mass worker. As anti-colonial wars ruptured this control, this domestic latitude of manoeuvre was diminished. The inflationary effects of the Vietnam conflict, in particular, set in chain a whole series of wage and social wage struggles. Moreover, struggles across the planet began to support one another. Third World revolutions inspired social activists in the metropolis, and were supported in turn by international solidarity movements.[10] In the US, and to a lesser degree in Europe, opposition to the Vietnam war movement brought on massive internal turmoil.

By the early 1970s, it became clear that, from capital's point of view, the old 'triplanetary' division of the world wasn't working.[11] With profit rates in the old centres of accumulation tumbling, the search for a reorganization of capital's global circuits that would allow it to escape world-wide pressures of social unrest was on, both in the probes

and experiments of individual corporations and banks, and in the consultations of high-level capitalist planning agencies such as the Trilateral Commission. The US government's abrogation of the Bretton Woods currency agreement in 1971 was a first signal of the abandonment of the post-war international settlement, a departure deepened a few years later with the dramatic redirection of finances and investment occasioned by the first 'oil shock.'[12]

In 1975, Mario Montano argued that what was taking shape was a restructuring which would render previous theories of 'development' and 'underdevelopment' obsolete. As general capitalist strategies, both underdevelopment and development had failed. For multinational capital, the question now was,

> . . . how to directly oppose development and underdevelopment against each other, how to make underdevelopment work completely inside development.[13]

What was unfolding, Montano suggested, was an undoing of the traditional demarcations by "two opposing dynamics": on the one hand, the "underdevelopment of development "--with the "Latin Americanization" of the US and Europe--and, on the other a "development of underdevelopment," with the industrialization of portions of the former Third World.[14] The aim of this restructuring was to pit "the starvation of underdevelopment . . . against the living standards of the working class of the metropolis."[15]

While Montano's analysis was necessarily preliminary, it accurately defines the main thrust of the process that is today known as 'globalization.' To destroy the multiplying threats to its international command, capital has broken out from its old entrenchments, overrun the previous divisions of its world system, and, empowered by its new digital technologies, opened up the whole planet as a field for manoeuvre. In doing so, it has imploded the Three Worlds into one another. Corporate flight from the demands of the mass worker in Europe and North America has led to the partially Third-Worlding of the First World--deindustrializing manufacturing centres, cancelling the Keynesian deal, inaugurating mass unemployment, lowering wages, intensifying work. This has introduced into the metropolis levels of insecurity and destitution previously thought of as relegated to the peripheries of capitalist world economy.

The other side of this coin, the selective First-Worlding of the Third World, has equally taken its impetus from the urgent need--mediated through a variety of authoritarian local regimes--to 'modernize' out of existence the threat of revolutionary insurgency. Thus the turbulent energies of immiserated labour of the periphery have been harnessed to the creation of various growth sites--the Newly Industrializing Countries and other development zones--whose appearance controverts cruder models of perpetual dependency.

The drive to eliminate the twin nemesis of the industrial wildcatter and the peasant guerrilla links the deindustrialized rustbelts of the North and the new shanty towns of the South in a complementary logic.

At the same time the one supposed alternative to capitalist development and underdevelopment --the Second World of state socialism--has blown apart and its residues been allocated between the two poles. Retrospectively, it is clear that the capitalist restructuring of the 1970s sounded a death knell for the command economies of the Soviet bloc. The rigidities of their internal controls proved altogether unable to adapt the flexibilities requisite for microelectronic, post-Fordist production. When these converging pressures exploded in a series of popular uprisings across Eastern Europe and the USSR in 1989, neoliberalism's market managers rode the wave, channelling movements characterized by an immense diversity of aspirations into marketization and economic shock therapy. Where state socialist regimes have survived, as in China, it is only by bringing to bloom their already present tendencies to act simply as versions of authoritarian capitalism.

The result is the creation of an increasingly smooth and planar world-space of accumulation. The polarities of 'development' and 'underdevelopment' of course still exist --indeed are massively intensified. And, it is important to emphasize, their distribution continues to fall preponderently on either side of a North/South axis. But at the same time these poles increasingly designate possibilities of ascendant affluence or abysmal misery that can be visited on *any* point in the planet according to the movement of corporate investment. Inner city ghettoes in North America attain 'Third World' infant mortality rates, while cities such as Sao Paulo, Seoul or Taipei begin to burgeon with a cosmopolitan affluence matching the one time 'First World.' It is beyond the scope of this thesis to analyze the full unwinding of this transformation, especially since many of its aspects have been very adequately addressed elsewhere. What we want to indicate here is the way in which it has been dependent on a massive expansion of the means of communication, and in particular on the development of computers and telecommunications.

Re- Dividing the International Labourer

At the basis of capitalist globalization is the "new international division of labour."[16] We understand this as a process in which capital both flees from and undermines strongly organized, and consequently costly, strata of working class power--metropolitan, male, industrial--by gaining access to more vulnerable sectors--peripheral, female, domestic, cheapened by destitution and authoritarian discipline.

US employers have repeatedly responded to cycles of working class struggle with waves of investment abroad.[17] From the mid 1960s on, this pattern was repeated, not only by US companies, but also by European and Japanese corporations, on an extraordinary scale and across an unprecedented range of industries. From the relocation of car production to sites in Warsaw, Tehran and Brazil, through the shift of light assembly industries to the 'free trade zones' of Hong Kong, Singapore, Taiwan and South Korea, to the emergence of Mexican and Latin American maquiladoras and the creation of industrial enclaves in post-socialist China and Eastern Europe, this process has proceeded at an accelerating rate. It involves not only 'smokestack' industries but also 'sunrise' microelectronics enterprises. Already it has rendered traditional divisions between metropolitan industry and peripheral hinterland largely obsolete.[18]

This geographical reorganization of labour power has also involved a radical reworking of the gendered division of labour. For the corporate search for inexpensive and reliable labour has largely entailed a switch from male 'factory hands' to the supposedly docile and disposable female 'nimble fingers' employed in, say, the garment industries of the Mexican maquiladoras or the microchip assembly of the Malaysian enterprise zones. Much of this female labour is organized so as to labour at home, in isolation, while still performing unpaid domestic work in support of male labour power. The global assembly line of many industries--electronics, textiles, light engineering--is thus to a remarkable extent a homework economy, linking transnational contractors and subcontractors in long, shifting chains whose complexity hides responsibility for the abysmal conditions of the new home/factories.

This global spread of female "shadow work" has even darker aspects. Silvia Federici, Mariarosa Dalla Costa and Maria Mies and others argue that globalization takes its impetus not only from business's attempts to escape the militancy of the industrial mass workers, but also from its flight from, and capitalization on, the First World feminist revolt against reproductive labour work. The transnational explosion of the sex trade, pornography industry, mail order bride business and baby adoption market all represent "enormous quotas of reproduction work which capital has exported in the same way that there has been a strategy of exporting part of the manufacturing process with the free enterprise zones."[19]

All these strategic relocations depend on highly developed systems of transportation and communication. Electronic information systems in particular allow transnational corporations to decentralize operations while centralizing control; executives in Toronto offices open on-screen windows displaying the performance of machine operators in Seoul factories.[20] Manufacturing strategies for products such as Ford's 'world car' rely on

telecommunications to coordinate production flows at plants on different continents, perfect standardization of modularized parts, fast, cheap transportation, and computerized automation carried to a point where elementary units and simple routines can be performed by unskilled workers. Global homework industries, such as those of Benetton, network computers to tie suppliers to sellers, match production to inventories, monitor dispersed workers, and check quality and speed of supply through every rung of their hierarchy. The same logic, to greater or lesser degree, is in play in the processes which allow Canadian supermarkets to sell fresh-cut flowers from Africa, or travel agencies in Bonn and Tokyo to book sex tours in Thailand and the Philippines. In all areas, even though production remains dependent on the most arduous, protracted physical labour--in Mexican car plants, Kenyan agribusiness plantations or Bangkok brothels--coordination and control is effected through communication flows moving over distances and at speeds which surpass corporeal horizons.

Winning Global Hearts and Minds

The global restructuring of production is complemented by an equally global reorganization of consumption. As we saw in the last chapter, this is necessitated by capital's very success in driving down the wage and social benefits of metropolitan mass workers--for this undermined mass consumption within the domestic markets of the First World. Increasingly, therefore, business has turned its eyes to export markets and, increasingly toward the population masses of the South. These are so great in numbers that if even a relatively small proportion--the managerial and professional strata benefiting most directly from industrialization--can be brought into the orbit of luxury consumer capitalism, it will more than counter-balance the eroded spending power of Northern workers.[21] And for industries whose goods can be sold cheaply enough to penetrate the youthful economies of South African townships and Latin American barrios--cigarettes, soft drinks, cassettes--the potential profits are prodigious.

However, such a global projection of consumerism into zones previously entirely relegated to economic marginality demands a reconstruction of needs and desires--of cultural traditions, religious prohibitions, dietary habits, sexual mores, traditions of self-sufficiency --similar to that experienced by the Euro-American proletariat in the first part of the twentieth century, but exceeding it in scale. In this process the vanguard organizations are the great media corporations--characterized by concentrated ownership, vertical and horizontal integration, and mastery of world-spanning arrays of convergent technologies. These "lords of the global village" are no longer--as in the classic formulations of the

'cultural imperialism' thesis--exclusively North American.[22] Although US entertainment and information corporations still generally enjoy a preeminent position, these industries have themselves, to a degree, become globalized, and also include European, Japanese and even Latin American interests; newly-marketized Moscow's most popular soap opera, "Even the Rich Cry," was made in Brazil.

But, whatever their ownership, these corporations--Adorno and Horkheimer's "culture industry" gone planetary--have become the vital agents for a reconstruction of global subjectivities carried out in the interests not of national, but transnational capital. Their products--films, programs, music, videos--are quintessentially global commodities, instantaneously broadcastable, evanescent, and demanding vast, world-wide audiences in order to recoup the costs and risks of production. Globalization means that everywhere, all the time, it is "video night in Kathmandu," as the habits of media spectatorship are stimulated and implanted world wide.[23]

These media commodities in turn provide the vehicle for the global marketing campaigns. During the 1960s and 1970s, the penetration of television to households all over the world had provided multinational corporations with the necessary communication infrastructure to carry out coordinated advertising in Europe, Canada, Latin America and Asia.[24] In the 1980s such global marketing strategies, promoted by business management gurus such as Theodore Levitt, became the creed of major advertising agencies.[25] These strategies are supported both by powerful campaigns to compel developing countries to lift restrictions on advertising and by the deployment of technologies which can effectively overleap any such barriers. Carried by satellite beam and VCR to the villages of Indonesia, Zaire and Colombia, Arnold Schwartzeneger and Pamela Lee perform as the simulacral storm troopers of consumer revolutions dedicated to the attractions of soft drinks, hard bodies, high-tech weapons and high-cut swim suits.

However, this universalization of advertising also goes hand in hand with intensifying segmentation and stratification of markets. Assuming that consumer elites in New York, Rio de Janeiro, Paris and Bombay will have more in common with each other than with the homeless who in each city swarm on the adjacent blocks, the agencies deploy ever more sophisticated technological resources for surveillance of the world's consumption zones. They also carefully modulate centrally planned campaigns in the light of detailed anthropological, ethnographic and market research. Arif Dirlik reports a paean from an advocate of this "guerrilla marketing" who declares that "just as the guerrilla fighter must know the terrain of struggle in order to control it, so it is with the multinational corporation of today. Our terrain is the world." This business-administration "guerilla" goes onto claim that the "world market is now being computer micromapped" into 304

geographical consumption zones cross-referenced with the "unconscious" needs 507 microconsumption types:

> Through an extension of this mapping, even the most autonomous and unconventional desires may be reconstructed for the benefit of market extension and control . . . we must win hearts and minds. This task can be accomplished by constructing and reconstructing them all the way down in what can only be viewed as an endless process.[26]

While the cutting edge of this "hearts and minds" campaign remains the standardized Hollywood style of infotainment, media conglomerates also collect themes from all over planet--world music, ethnic arts, Third World cinema--for conversion into commodities and marketing instruments. The relentless monoculture of Disney and MTV is leavened with multicultural traces of Taiwanese rice farming chants and Indian bhangra dancing. This eclecticism has led some observers of popular culture to enthusiastic celebrations of the diversity and hybridization of the newly cosmopolitan global bazaar.[27]

It is true that, as Marx observed, the world market brings with it a variegation and elaboration of needs and appetites. In a way it does open up new horizons and subjective possibilities. But what too many contemporary panegyrics to this process overlook is the relentless uniformity of the logic underlying this process, the enormous systematicity that precedes all the apparent differentiation. The order of this system is unequivocal. Every human aspiration, desire and creative impulse shall find their place within the commodity-form: those that refuse are condemned to oblivion.

Money in Command, World Wide

With globalization, capital cracks the shell of the nation state. In its Fordist era, national governments had been indispensable for planning and securing the social conditions of accumulation--by Keynesianism in the First World, by neocolonial modernization in the Third. However, the struggles of the 1960s and 70s threatened these arrangements. To varying degrees, ranging from revolutionary power-seizures in the Third World to First World "fiscal crises," social movements undermined business's control of public spending.[28] Capital's reply was to relocate social control outside the national sphere. Over the last decade, a round of regional and global trade agreements--NAFTA, Maastricht, GATT, the establishment of the World Trade Organization--have subordinated national policy to supranational agreements favouring unrestricted mobility of capital, deregulation, privatization and unfettered markets. But such agreements in many ways merely formalize and consolidate a level of a transnational discipline which capital had already won earlier in

the globalization process, through another mechanism--that of the international financial markets.

Since the 1960s, these markets have undergone an explosive expansion. This is the result of a number of factors: the collapse of the Bretton Woods agreement and the establishment of floating exchange; the growing importance of offshore or stateless money, such as Eurodollars; the deregulation and restructuring of banking, stock exchanges and financial institutions; the invention of ever-more arcane methods of speculation; and the increasing role allocated to world level financial institutions such as the IMF and the World Bank. As Arthur MacEwan points out, what is new in this situation is not the importance and interdependence of financial flows for capital, but their degree of integration, speed of transaction and capacity to escape state control.[29]

Again, these developments are inseparable from the expansion of information technology, which has "probably changed banking and finance more than any other sector of the capitalist economy."[30] Computers and telecommunications accelerate financial flows phenomenally, permitting round-the-clock planet-wide investment activity, reducing the costs of transfers, creating a common digital medium for transactions and spurring mergers and consolidations amongst monetary institutions. In a sector where a few seconds advance knowledge over competitors can translate into billion-dollar profits, information systems are hardly less sophisticated than those governing nuclear weaponry. Indeed, as one observer of electronic trading says, "Its almost like modern warfare, where people sit in bunkers and . . . push buttons and things happen."[31]

This world of virtual finance has become both increasingly detached from and superordinate over material production. As the struggles of the 60s and 70s unfolded, financial trading became very important to capital as an escape from crisis. Faced with loss of control in the shop floor and the paddy fields, many commercial interests simply evacuated the corporeal world, with its mud, blood and recalcitrant labour power, taking flight not merely by seeking new sites for production but by dematerializing themselves entirely into speculative activity. This migration of money into cyberspace left behind a mundane spoor of abandoned factories and ruined communities and was a major factor in the mounting toll of job loss which undermined labour 's capacity to oppose capital.

In other ways, too, the money markets became crucial in driving down social expenses to a level where investment in tangible production would be profitable again. Previously, the financial levers of domestic economies had rested predominantly in the hands of national governments. But when governments failed to discipline their workers, global money bypassed such arrangements. With the valuation of national currencies, interest rates and credit worthiness determined by international investors and speculators,

economic control became immanent within the entire planetary finance system. Governments--national, regional and municipal--that had previously squared the demands of business and worker's movements by running up deficits now found the continuation of their credit and the stability of their currencies conditional on the implementation of austerity programs. As Christian Marazzi puts it,

> the need to preserve credit ratings and currency stability has narrowed in an unprecedented way the margins of maneuver--the "relative autonomy"--of national states, to the extent of dramatically reducing the area of choice within which national policies has to operate. All governments and their oppositions have in this sense been pulled into the narrow area of choice imposed by the logic of international monetary austerity.[32]

More and more vital areas of domestic policy are subjected to what Cleaver terms "international adjustment mechanisms virtually invisible to the average worker."[33]

The full enormity of this monetary discipline is of course seen in the "structural adjustment programmes" (SAPs) inflicted by the World Bank and IMF on Third and Second World states unable to pay for the large scale national development programs of the 1970s.[34] However, the 'debt crisis' is not restricted to economies formally placed under the protectorate of the IMF. Indeed, what is remarkable about globalization is the way in which the pressure of the money markets has resulted in the spontaneous adoption of SAP-style measures within the very heart of the former First World. From the New York deficit crisis of 1975-76, through the rampage of Reaganite and Thatcherite monetarist policy in the US and Britain, to the retreat of Mitterand's socialism in France in 1982 in the face of financial pressure, to the gutting of the New Zealand and Canadian welfare states in the name of deficit reduction, the imperatives of world money have dictated policies of deregulation, privatization, wage cutting and welfare reduction adopted regardless of parliamentary regimes' ostensible political coloration. By lifting financial control out of the hands of domestic governments and diffusing it through the electronic nodes of global exchanges, capital has effectively placed economic power in a stratospheric orbit where it cannot be reached by electoral choices taken within the confines of the nation state. It thus raises to a new level the negation of democracy inherent in the private expropriation of the means of production.

The Resurrection of War

However, the ultimate disciplinary instrument of the world market is, as it has always been, force. War is always critical to capitalist control, as a means for extending its circuits over new domains, dividing opposition, and destroying any threat to the operations of the market. It is therefore hard to overestimate the significance of the series of military

reverses inflicted on capital by revolutionary movements from 1945 on--in Korea, China, Algeria, Cuba, Mozambique, Rhodesia, Angola, and, most seriously, Vietnam, where the preeminent imperial power went down to defeat, partly due to the disaffection of its own populace.

An important part of capital's restructuring has thus been the resurrection of military power as a viable instrument of global command. Amidst privatization and deregulation, one of the few aspects of the capitalist state generally reinforced is the security apparatus. In the US, which retains its position as the principle 'enforcer' for the world market, the Pentagon has carefully investigated ways to circumvent the unwillingness of citizens to sacrifice themselves in foreign wars. This experimentation has followed two routes: on the one hand, the development of high-tech weaponry--Cruise Missiles, Star Wars systems, first strike nuclear missiles, Stealth bombers--capable of fighting highly automated, remote-control wars; on the other, the resort to the low-intensity, covert, proxy or mercenary strategies practiced in Afghanistan, Cambodia, Namibia, El Salvador, Guatemala, and Nicaragua.[35]

In both strategies, command, control, communication and intelligence capacities are vital. Whether in the 'black' satellite systems beaming CIA messages from Virginia to the rain forests of Costa Rica and Cambodia, or the artificial intelligences unwinkingly monitoring the earth via the orbital platforms of the Strategic Defence Initiative, the new forms of warfare demand omnipresent surveillance, near-instantaneous transmission and precision-targeting. The search for global battlefield supremacy brings to bloom some of the most exotically deadly technological orchids of the information age. At the same time, control of information has also assumed a new prominence on the domestic front. Haunted by the belief that the Vietnam War was lost to the television viewers of America, the Pentagon and its allies have devoted increasing thought to the control of public opinion in time of crisis. The fruit of these deliberations appeared in the Malvinas war, the bombing of Libya, and the invasions of Grenada and Panama. Here it was demonstrated that regimes of commercial-style image-management, military-marketing, press-pool control, censorship, black-out and propaganda, combined with the extreme swiftness of operations permitted by massive technological advantage, could largely stifle domestic dissent.

The real flowering of these developments, had, however, to await the Persian Gulf War. Here, as Hamid Mowlana says, "the propaganda and communication strategy surrounding the conduct of war entered a new dimension not seen in previous conflicts."[36] Acting as the mercenary agent of multinational capital, the US terminated the disturbance its former Iraqi client threatened to inflict on the world oil supply by an overwhelming application of information power. Smart weaponry, superior intelligence gathering, radar

jamming, stealth technologies, the infiltration of computer viruses and the annihilation of enemy radar systems gave the Allied forces total battlefield superiority. Meanwhile, a massive media campaign, including fabricated 'incubator babies' stories, round-the-clock press conferences and bulletins, in-field interviews and orchestrated displays of patriotic fervor aimed to win domestic and international support for the war. This was complemented by the targeting of Iraq's civilian telecommunications and other information utilities, depriving its government of equivalent weapons in the propaganda war. In short, front and home lines were interconnected in a near-seamless regime of information control.

Indeed in a sense, the whole war, with its spectacularly excessive violence, can be understood as an act of communication. For the message sent to the world by way of bomb-sight videos was that any interference in the finely-tuned balances and flows of the world market would be crushed with lightning force. It is no coincidence that President Bush's announcement of a 'new world order,' widely understood as signalling not merely a diplomatic, but also a politico-economic dispensation, should follow on the heels of the Persian Gulf War. For the underlying logic of globalization is that of war--a war waged by capital to annihilate all points of opposition and permit the relaunching of a new cycle of accumulation.

Globalization as Class Decomposition

The creed of capital in this globalized era is clearly enunciated by Robert Reich, economic advisor and Labor Secretary to the Clinton administration, in his The Work of Nations: Preparing Ourselves For 21st Century Capitalism.[37] Today, Reich argues, wealth generation is entirely dependent on "nomadic corporations" which, having fully transcended any national base exist only as "global enterprise webs" held together by the threads of computers, fax, phone and video networks.[38] Nation states' capacities to control their own destiny is restricted to the creation of infrastructures--such as information highways--attractive to the investment by these mobile corporations. The result is to replace capital's previous territorial divisions of the workforce with an increasingly transnational hierarchy of labour power. Those countries, or regions, or cities that can render themselves hospitable in this way will attract well paying "symbolic analytic" jobs--the knowledge-based work associated with the design and development of new technologies. Those that don't will become the dumping grounds for the unfortunate industrial and routine service workers destined to be devalued by automation and global cheap labour.

Reich, to his credit, expresses considerable anxieties about how this divisive logic will effect the social fabric of the US, as privileged "symbolic analysts" retreat into fortified

enclaves to escape the deepening misery of unemployed service and industrial classes. The rest of the world, however, hardly figures in his optic. But his overall perspective on globalization is is both inevitablistic and optimistic. The accumulation of wealth permitted by enhanced trade and specialization, although unevenly divided, will eventually raise global living standards by an inexorable trickle down process. Even those areas fated to receive the industrial work cast off by the most advanced sectors of capital will be better off than in their previous agrarian situation. Globalization is, Reich insists, not a zero-sum game but rather an "infinitely expanding terrain of human skills and knowledge."[39]

He is quite correct about the astounding wealth-generating effects of contemporary technology and trade. But his analysis omits the dimension of power--the strategic logic inherent in capitalist globalization. By expanding the division of labour, the capitalist enlargement of the world market allows huge increases in productivity. But it also expands the division of labourers--the degree to which capital can set workers in competition with each other and thereby seize for itself an ever increasing proportion of this global wealth. The social surplus grows--but so, and probably to an ever greater extent, does capital's capacity to expropriate that surplus. The "infinite terrain" over which capitalist globalization expands is thus not one of "human skills and knowledge" but of inhuman profit and exploitation.

By seeking out and putting in competition with one another pools of labour power previously inaccessible or isolated because of geographical distance, state regulation or communal self-sufficiency, capital can repeat a classic strategy--creation of a reserve army of the unemployed, now realized on a world scale. In this context, the nomadism afforded corporations by the "global webs" means that demands for the maintenance, let alone improvement, of wages and social conditions, can be circumvented and outflanked. Workers are faced with the choice of acceding to corporate requirements, or seeing the now lighter-than-air means of production--software programs and communication nodes--relocated elsewhere. There is set in train what Jeremy Brecher and Tim Costello term a "race to the bottom" whereby workers across the world are compelled to cheapen themselves into a job by competitively lowering their wages and conditions.[40]

Thus, although the new mobility of investment shuffles and reshuffles relative positions in the hierarchy of labour with extraordinary rapidity, its overall drive is toward increased power for capital vis a vis the global proletariat as a whole. Reich is right that globalization has given some knowledge workers, largely male, largely white, associated with high tech, finance, communication and information an exceptional importance. Concentrated in the technopoles that form the hubs of "global webs," these constitute a layer of privileged labour on whose loyalty capital can largely rely. But analysis which sees

"symbolic analysts" as the crucial actors in globalization does not grasp the speed with which capital turfs yuppies from the lifeboat when cheaper replacements can be found.[41] Even symbolic analysts feel the blast of globalization, as North American computer programmers are undercut by Lithuanian or Indian competition, and architects, engineers and professors discover that those who can telecommute can always be teleterminated by cheaper services uploaded from anywhere on the planet.[42] The ultimate benefactors of globalization are not even the symbolic analysts, but the power which Reich hardly mentions--that of transnational capital itself.

Beneath the symbolic analysts are the mass of industrial and service workers exposed to increasing insecurity by a mobility of investment that can send jobs catapulting from Oregon to Lima to Jakarta in a matter of weeks. This logic has, so far, primarily been applied against industrial workers in the North--to the temporary benefit of labour in selected growth areas such as East Asia. However this undercutting is a process that can be repeated universally. Workers in Mexico or South Korea who have unionized find their jobs shifted to Bangladesh or Indonesia or China--and when labour there organizes, the work moves on to Vietnam.[43] Latin Americans see investment prospects vanish towards Eastern Europe. Indeed, at points the deindustrializing process comes full circle, by creating in the old metropolitan areas zones of immiseration so deep that they then become low wage areas which lure capital back from its flight to the one-time periphery: Scotland and Ireland are now attracting Japanese and Korean investment with industrial wage levels comparable to those in parts of Asia.

At the bottom of the new global hierarchy, in regions and cultures that do not match capital's requirements in terms of wages, work habits, or possession of desirable natural resources, lie the hapless surplus reservoirs of labour power, labelled 'not wanted on voyage' in capital's round-the-world restructuring.[44]These populations, still predominantly but not exclusively in the South, uprooted from the land by agribusiness and IMF agricultural rationalization, but by-passed by the electronic paths through which the world market circulates wealth, survive through the networks of the drug trade, prostitution, body parts sales, exotic animal trade, arms smuggling and other informal economies. To the degree these desperate measures fail, they fall through the holes of the network into an abyss of impoverishment and debasement that is a breeding ground for ethnic, nationalist and religious wars, in Somalia, Liberia, Chechnya, Afghanistan, or Bosnia. From these catastrophe zones the victims will only be rescued by international 'peace-keeping' interventions when the level of chaos threatens to become uncontainable or interfere with serious investment opportunities.

Their fate--relayed by real time satellite broadcasts of famine and street fighting--serve as an admonishment to others in more fortunate places not to demand too much, to buckle down, work harder, be grateful for what they have. Such scenes, whether from Mogadishu, Sarajevo, Kabul, Monrovia, Grozny or South Central Los Angeles, are not, in our view, incidental to capitalist globalization. They are essential to it. For they represent the ultimate outcome of a strategy of decomposition which empowers capital by intensifying the world wide competition between workers--dividing labour from itself in a process whose culmination is an internecine violence.

Globalization as Recomposition:

We do not minimize the terrible efficiency of this disintegrative strategy. Yet analysis that understands globalization *only* as capitalist triumph is incomplete. For one of the remarkable features of the last decade is the way in which unexpected currents of opposition have started to emerge from the transformed conditions created by transnationalization. Often these new vortices of subversion have started to spin precisely where the victory of the market forces was thought most complete, as in Mexico, where the Zapatista's challenge to the showcase of neoliberal development has caught the imagination of the world.

As we discussed in the previous chapter, the scope of contemporary capitalist subsumption means that such movements of opposition will no longer be found concentrated at the immediate point of production but spill across society as a whole. Battles against corporate globalization involve waged workers, but also unwaged labour: women's organizations resisting the deconstruction of welfare services, students opposing the slashing of public spending, movements of indigenous and peasant people fighting eviction from the land, rural and urban communities refusing the ecological devastation of hazardous waste dumps and hydro-electric development projects. The very diversity of these resistances, and the real nature of the contradictions which often divide them, makes the problems of their cooperation and coordination between them enormous, even on the scale of a neighborhood, city or region; when viewed internationally, these obstacles might appear insuperable.

And yet the new counter-movements are making trans-sectoral and transnational interconnections. In part, this is happening because capital's very success in creating for itself a world-wide latitude of action is dissolving some of the barriers which previously separated oppositional movements geographically. In collapsing the Three Worlds into a single plane of accumulation, capital has introduced from one to the other forms of work, dispossession and struggle which were previously segregated. Thus the spread of large-

scale manufacturing into Korea, Brazil or South Africa results in the emergence of mass-worker struggles of a sort that were once distinctively metropolitan, while the deindustrialization of the United States and Europe is in turn accompanied by social movements resembling those of the 'underdeveloped' world: many authors have noted the similarities between the 1992 Los Angeles riots and Latin American urban insurrections.[45] More generally, the global imposition of neoliberal policies has created commonalities of experience for waged and unwaged labour from Warsaw to Cairo, as the destruction of public services and the subjugation of government to supranational financial flows, increasingly come to constitute a shared lexicon of proletarian existence.[46]

This exchange of experience is intensified by the vast flows of migrants and refugees set in motion by Third World industrialization, war and environmental catastrophes. Moving legally and illegally, this huge movement of peoples has converted world cities into crucibles of cosmopolitan experimentation, confounding, confusing and confronting long-held ethnocentric and colonialist perspectives. Capital everywhere tries to harness these exiles as yet another source of cheapened labour, making them the "new helots" of globalization.[47] Yet migrant workers--Turkish autoworkers in Germany, Filipino nannys and Punjabi farmworkers in Canada, Mexican drywallers and janitors in California--also carry with them traditions of struggle, and often stand at the heart of new militancies, challenging the racism of established trades unions and social movements, and establishing new lines of international connection.[48]

Moreover--and this is the point to which the remainder of our analysis will be devoted--capital's own diffusion of the means of communication has inadvertently assisted this connective process. In creating the pathways for its own transnational circuit, it has unintentionally opened the routes for a global contraflow of news, dialogue, controversy and support between movements in different parts of the planet. To a degree, the very communication channels which circulate commodities also circulate struggles. Despite all the well-known filtering and censorship mechanisms, corporate and state media do carry abbreviated scenes and news of class conflicts across the world. Sometimes--as in the case of the Israeli invasion of Beirut, or the Indonesian genocide in East Timor--shots of a riot, bombing, or a massacre have been crucial in mobilizing transnational support for resistances which, in a purely national context, face overwhelming odds. However, to a large extent connections and dialogue between globally distant resistant movements depends on the construction of counter-networks, which while drawing on the technologies and expertise diffused by the world market, reconstruct them into radically new configurations.

Thus, while the effect of globalization has often been to more intensely divide workers within a given city, region or nation, it has, paradoxically, also created the possibility of building alliances across city, regional and national boundaries. Writing of the transnational linkages established by the indigenous peoples movements, Mariarosa Dalla Costa has spoken of how,

> Workers and non-natives, ecological movement militants, women's groups, and human rights activists have been attracted into complex support actions, helping and monitoring from various parts of the world.

In this process, she says, a "hinterland of communication and liaison has been constructed . . . across the Americas and in the world":

> Relations of analysis and information have been more clearly and more strongly interwoven. And all this has become the primary tissue for communication between and action by different sectors in the working social body.[49]

Dalla Costa speaks of a growing "tissue for communication between and action by different sectors in the working social body." This tissue creates connections which run counter to the decompositional logic of capitalist globalisation. Somewhere between the ethereal activism of radio and computer networks, and the weary odysseys of proletarians trekking from San Salvador to Vancouver or from Manila to Kuwait City, a new global class composition is being born.

Radiating the Information of Struggle

More than twenty years ago, the autonomist Romano Alquati suggested that the movements of working class struggles could be analyzed as constituting a network, not just regionally or nationally, but on the international level. This network, he proposed, possessed both vertical and horizontal articulations:

> . . . *vertical* according to the organization of the class at points within and against the capitalist circuit of production and reproduction; *horizontal* according to the geographical-terretorial distribution and linkage of these movements within and against capitalist accumulation.[50]

In one sense, the structure of the network was given by the capitalist organization of production against which it fought, but,

> the information passing from the apex to the base of the hierarchy . . . does not correspond to that passing in the opposite direction. In other words, the network of the class struggle, like capital, has its own operational information, its own mechanisms for checking and controlling, but the process based on hierarchical command of capitalist accumulation is turned upside down.[51]

This combined vertical-horizontal network of struggles pivot around "nodal points" of interconnection; "points of maximum accumulation of information and greatest direct combination of different moments of the anticapitalist struggle." From these poles "the operational information of struggle is radiated."Such communication about "forms, goals, content, organization of struggle" was, Alquati said,

> . . . an indirect, mediated and complex process, operating through a whole series of mechanisms . . . a form of telecommunication which transcends physical spatial contacts between the nodes that are in communication.[52]

Today, of course, these connections are often not just metaphorically but literally telecommunicational. And amongst the many mechanisms by which it proceeds, a crucial one has been the creation of various networks of autonomous media. We discussed the emergence of these networks in North America in the last chapter. But a crucial ingredient of 'the other globalization' has been the eruption of similar experiments across the planet. Indeed, a feature of contemporary struggle is the degree to which many of the crucial "nodal points" from which the "operational information of struggle is radiated " are to be found in the former Second and Third Worlds.

In the Third World, the creation of autonomous communication networks were, of course integral to anti-colonial struggle; one has only to think of Frantz Fanon's observations on the role of radio in the Algerian civil war.[53] The residual impetus of these revolutionary experiments propelled the New World Information and Communications Order, the Third World challenge to US global media dominance. But this complex movement was partly harnessed to the interests of post-colonial state and media elites. Its critique of media imperialism was thus compromised by a certain willingness to overlook internal repressions and exclusions. However, over the last two decades, as national governments submit to privatization and deregulation, the focus of information activism in the South has largely shifted from such a state-centred media base towards a proliferation of independent, grassroots, initiatives, arising from sectors in struggle with both local and global rulers: Brazilian street television, video training for Korean trades unionists, township-based South African community radio stations. These media often provide the vital channels for movements opposing capitalist globalization within neighborhood, regional and national boundaries.

The political potential of these forms of activism was strikingly, though ambiguously revealed, in the fall of state socialism in the ex-Second World. Here the radio activism of Solidarnosc, the rivulets of *samizdat*, underground music and media permeating Eastern Europe, the role of computer networks and radio stations media relaying news of the Stalinist Moscow coup, all played an important part in undermining the rule of the

commissars. A similar, but more complex dynamic emerged in the deadly dance of subversion and surveillance surrounding satellite-borne images of events at Tienanman Square. The relative friendliness of the Western media (not to mention the CIA) toward these revolts makes their success a special case. Yet some would argue that they demonstrate a vernacular familiarity with technology and a popular capacity for the self-organization of communications technology potentially inimical to either state or corporate management, and which can be as effectively turned against neoliberal globalism as Stalinist isolation.

Others are more sceptical. Against hopeful prognoses about international democratic empowerment through information, they identify the formidable global limitations to and inequalities in access to the means of communication in a world where forty per cent of the population are without electricity and and sixty-five per cent have never used a telephone. In an essay tellingly entitled, "World Wide Wedge," Peter Golding notes that "the terrain occupied by communication goods and facilities is a hilly one, marked by soaring peaks of advantage and dismal valleys of privation."[54] He points out that all information industries are very heavily concentrated in the developed world. This holds from newspaper publishing, where half the world's production is in the industrialized West,to telecommunications, with more phone lines in Tokyo or New York than in the whole of sub-Saharan Africa. These inequities are even more marked in computer-mediated communications, which are, as Golding notes, "not so world wide after all," since large portions of Africa, Asia and Latin America currently lack all but minimal connections to the Internet.[55] These problems are compounded with inequities in the availability of technical training, and with problems around translation for digital media, in which English remains the *lingua franca*. The implication of such analysis is that the potential for information activism remains limited to a few relatively privileged zones.

These objections are substantial enough to damn any naive political optimism. But they are not sufficient to dismiss the possibilities for a significant enlargement in the "network of struggles." Capital is, for its own reasons, diffusing and cheapening access to many information technologies. The inevitably socialized aspects of communications--its broadcast and network aspects, which increase in value according to the number of recipients and participants--means that in many areas business is working very fast to extend the reach of its circulatory apparatus: AT & T Submarine systems aims to complete Africa One, the fibre optic undersea cable that will create a communications ring around the continent by the year 2000. Televisions, transistors and walkmans are already available in areas without schools, running water or medical care.[56] We expect more of this distorted information age universalism.

More importantly, extreme pessimism about global access to communication resources underestimates the ingenuity of the various communities appropriating these technologies for their own purposes. Movements which would seem at the furthest remove from 'high-tech,' such as those of the Mayan peasants in Chiapas, or Indian farmers fighting multinational seed patenting, or the Kayapo and other indigenous peoples in the Amazon opposing World Bank development, are interfacing advanced communication networks and highly traditional forms of mobilization.[57] They are constructing hybrids of pre- and post-industrial communication forms. We have seen film of the village-by-village oral education used by the campaigns of Indian farmers and peasants against GATT. These films were brought to North America by Canadians, themselves involved in opposition to agribusinesses, who in turn cull and relay information about these companies via the Internet to university-based members of the Indian movement.[58] This sort of interaction constructs patterns of activism that defy prediction.

Further, the transfer of technical expertise and experiences in the establishment of counter-communications is itself becoming a focus of political organizing. The transfer of old computers from North to South, for example, has become a commonplace of international solidarity activities. These global connections, both on a North/South and South/South axis are taking organizational form. Alternative radio activists have formed the World Association of Community Broadcasters (AMARC).[59] International associations of video activists and producers such as Video Tierre Monde and Videazimut are experimenting with circulation of videos via broadcast and cable networks, independent distribution circuits and formal and informal networks.[60] While the largest computer of the Association for Progressive Communications is located in Silicon Valley, it has partner networks in Nicaragua, Brazil, Ecuador, Uruguay, Russia, Australia, the United Kingdom, Canada, Sweden and Germany, affiliates from Vanuata to Zimbabwe, subscribers in ninety-five countries, and runs projects aimed specifically at facilitating the computer networking of peace, human rights, ecological and labour organizations in underdeveloped countries.[61]

Out of these activities horizontal linkages between various "nodes of struggle" are now being made on a very global basis. They include both the transfer of technical know-how and equipment and the relay of political analysis, discussion and support. Microwatt broadcasters from California assist Haitian activists set up radio stations in Port au Prince; video activists in Vancouver draw on the lessons of popular education from Nicaragua; British motorway protesters at Newbury receive faxes of support from Ogoniland in Nigeria, while environmental activists in Europe deluge Shell offices with email protesting

the execution of Ken Saro Wiwa. This is the communicational weave of recomposition. Let us look at some of its patterns.

Modem Solidarity

Through globalization, capital attempts to directly pit First against Second and Third World workers, undermining the wages and conditions of the former via the immiseration of the latter. However, this paradoxically opens the way to a reverse logic in which workers of the one-time metropolis, losing the position of relative privilege which gave them a partial stake in capitalism's international system, acquire an interest in raising the living standards of those in previously peripheral zones. Northern workers might--and often do--attempt to insulate themselves from globalization by traditional forms of protectionism. But this strategy depends upon business support, at the very time when multinational capital has decisively rejected such an option. An alternative is for (ex) First World workers to seek alliances with their counterparts elsewhere in the world. Over the period of capitalist global restructuring the slogan,"When they win, we win," has begun to be heard within the most progressive sectors of US and European trades unionism, and there has appeared a tentative web of connections between metropolitan and peripheral labour.[62]

Instances include the ten-year solidarity campaign by US trades union and church groups supporting the occupation of a Coca Cola plant in Guatemala city; networks of international sugar workers formed around issues of land reform and crop diversification; autoworkers' conferences involving US, European, Malaysian, Brazilian, Japanese, and South African delegates; US-Japan worker-to-worker meetings in the computer industry; South African unionists painting murals for striking Minnesota meatpackers fighting an apartheid-implicated employer; West Virginia steelworkers forging links with Swiss, Dutch and Eastern European unions and green movements to beat their multinational employer; the international connections spun amongst maritime labour around a Liverpool dockers strike; and the burgeoning networks of transnational support amongst female homeworkers, discussed in the next section.[63]

Reviewing such initiatives amongst US labour in the late 1980s, Kim Moody suggested that their strengths included an activist orientation and the bypassing of bureaucracies in favour of direct communication among militants. Their corresponding weaknesses were lack of resources and frequent suspect status of participants within their own unions.[64] A decade or so later, these obstacles are far from dissolved. But such projects of international solidarity have--largely under the impact of free trade agreements

such as NAFTA--become increasingly common.They turn not only on person-to-person contact, but also on communication via film, video, fax, and computer networks.

In a series of important articles, Peter Waterman has analyzed the role of communications in forging the new labour internationalism, focusing particularly on labour's growing involvement in computer mediated communications.[65] By the mid 1990s this had produced two major networks, the US based Labornet and the European Geonet devoted to union matters, and a number of activist conferences, in locations from Manchester to Moscow. This labour interest in computerization, Waterman says, arises largely from the obvious need of trades unions facing multinational corporations to possess communication capacities matching those of their managerial antagonist. Increasingly, such unions use large-scale data bases to track information on companies' financial status, health and safety regulations, and collective bargaining practices; email for internal communications and solidarity appeals; and bulletin boards for membership orientation and discussion. But while such networks facilitate the conduct of traditional trades union activities on a larger scale, with greater speed, Waterman observes that their operation also often replicates the classic limitations of business unionism; centralized control, a purely corporate basis of organization, and narrow or non-existent political aims

However, he goes on to suggest that in Europe, over the 1980s, a new, more expansive approach to modem solidarity began to emerge. This resulted from the interaction of international trade union organizations and a loose ensemble of radical activists, NGOs, communication specialists and researchers, whose base lay not so much in the European unions as in a variety of Third World collectivities. While the perspective of on-line unionists from the core tended to be pragmatic and utilitarian, those from the periphery were more innovative and experimental, opening up "alternative visions and utopian prospects."[66]

These wider visions included the use of networks in alliance building between unions and other social movements, recognizing differences in needs and skills amongst the various potential participants, and emphasizing improved communication as a component of inter- and intra-organizational democracy. As representative of this broader style of on-line solidarity, Waterman cites examples such as South Africa's WorkNet, developed by the alternative press in the anti-apartheid struggle and subsequently used by trades union, church, media, and housing movements; the Asia Labour Monitor Resource Centre, started by radical church activists in Hong Kong on the basis of "US computer familiarity and ever cheaper East-Asian computers," to circulate information about worker struggles in China, Taiwan, South Korea and Hong Kong; Mujer a Mujer, a collective of Mexican, US, Canadian and Caribbean women's groups representing waged and unwaged

female labour who use on-line communication in their transcontinental opposition to neoliberal restructuring.[67]

One particularly telling example involves Glasnet, the Moscow affiliate of the Association of Progressive Communication. In the second Moscow coup of October 1993, where Yeltsinite forces of free market capitalism re-repressed democracy, three members of the independent Russian Party of Labour, including author Boris Kargilatsky, were arrested by police, charged with planning to attack a radio station, systematically beaten, and threatened with death. A criminal released from jail told the wife of one of the prisoners, who contacted an Australian correspondent for the Green Left Weekly, who in turn reached a Russian union officer with access to Glasnet, who sent an international email alert on a series of computer conferences."Within hours the police station was inundated with calls" Kargarlitsky writes:

> We were watching from the cell . . . One of the the first was from Japan. The police didn't seem able to believe it. After that the calls seemed to be coming from everywhere--there were quite a few from the Bay Area in the United States.[68]

Email attention was reinforced by the arrival of a Moscow TV crew from the program "The individual and the law." Within hours the detainees were released and the charges dropped. Waterman comments that "through the concrete and steel" of state socialism and "out of the shit and blood of an increasingly globalized information capitalism", there "appears to bloom one flower of global solidarity--an electronic one."[69]

As he admits, labour's electronic networking is barely nascent, directly involving only a relatively low number of specialists. While it has had some manifest successes--in pressuring states to free imprisoned militants, in providing negotiators timely access to strategic information--it is far from matching, let alone beating, the power that business has discovered in cyberspace. Nonetheless, he argues that its potential for reorienting workers' organizations is significant. Drawing on the formulations of media theorist Fred Stangelaar, he suggests that the realization of these possibilities depends on labour computer networks becoming a relay in "spiral flows" of alternative communication that both laterally connect a wide range of oppositional groups, and vertically heighten their degree of coordination and support.[70] Given this condition, Waterman suggests computer networking could become a vital element in the constitution of what he calls a "fifth international"--a transnational connection of oppositional groupings which does not, like the four previous socialist 'internationals' rest on the hierarchical directives of a centralized vanguard party, but rather arises from the transverse communications of multiplicitous movements. Waterman's account corresponds closely to our concept of the circulation of struggles. Let us examine some further turns of the spiral.

Movements contesting global capitalization extend beyond the immediate workplace, and engage corporate power in the sphere not just of production, but of consumption. This manifests in a number of ways--adbusting, cultural jamming, media piracy--but is perhaps best exemplified in the growing number of transnational boycott campaigns.[71] Ground-breaking instances of this tactic include the boycotts against Nestle's infant formulae, South African wines and Chilean grapes. Recently, these examples have been widely emulated by human rights, feminist, environmental and labour groups. Targets include clear-cutting by forest companies from British Columbia to Sarawak; Indian carpets made by child labour; US coffee-bars supplied by super-exploited Guatemalan plantation-workers; toys made in the super-hazardous factories of China, Hong Kong and Thailand; and North American clothing chains selling garments manufactured in Taiwanese-owned sweatshops located in El Salvador.

In many ways, capital's own globalizing momentum opens the door to such counter-attacks. By making the effects of sweated labour and intensified environmental destruction reverberate world-wide, planetary corporations unintentionally prompt the making of connections between conditions at the point of production and decisions at the point of sale. The heightened combativeness of the international market, the consequent corporate dependence on image and public relations, and, above all, the very communication networks vital to global production and global advertising, have made business vulnerable to challenges in the world marketplace. Thus, for example, a campaign waged by labor, religious and other groups across North America against the exploitation of sweated labour by the sportswear giant Nike could focus on the fact that in 1992 the company paid basketball superstar Michael Jordan more for his promotional efforts than the combined yearly income of 30,000 young Indonesian women who toiled to piece together the sneakers he advertised. The same campaign could also use the Internet to coordinate international global 'phone zaps' of Nike headquarters.[72]

An even more striking example is that of the British 'McLibel 2.' Two British activists were sued by McDonald's hamburger chain for distributing leaflets denouncing the corporation's low-wage labour practices, child-targeted advertising, involvement in rainforest destruction, animal welfare record, and promotion of unhealthy diet. By assembling a volunteer defence of international experts that substantiated their accusations they turned the five-year civil trial--the longest in British history--into a public relations fiasco for the company. World-wide 'McLibel' support groups have distributed over 1.5

million copies of the original leaflets, as well as sponsoring numerous demonstrations and disruptions at McDonald's across the world.

They have also created McSpotlight, a World Wide Web site combining text, graphics, video and audio materials in a thoroughgoing critique of the corporation. The Guardian newspaper reported that this site "claimed to be the most comprehensive source of information on a multinational corporation ever assembled--and that doesn't sound like an exaggeration."[73] McSpotlight, in addition to documenting the McLibel trial and the claims of the original leaflet, contains news of other anti-corporate campaigns and discussions of alternatives to food production by multinational corporations. It reported 190,000 'hits' in its first week, email responses at a rate of forty a day, and was widely reported by the mainstream press, further discomforting its corporate adversary.

The use of new information channels has also been important in throwing the light of public attention on the shadow-work of domestic labour. This has been particularly telling in the highly image-conscious fashion industries, where contracting and subcontracting allow major corporations to distance themselves from slave-like conditions of production. Here feminist organizations have built alliances both among the internationally dispersed home workers and between these labourers and the shoppers--themselves predominantly women--who purchase the products they make.

In doing so they have availed themselves of the most up-to-date means of communication. Thus on the World Wide Web one can find the well-appointed home pages of organizations such as the Clean Clothes Campaign, a movement started in 1990 by Dutch women supporting striking Filipino garment workers in the Bataan Free Trade Zone. Its web site carries information about homeworkers unions and support organizations, strikes in Lesotho, Nicaragua, Vietnam, Egypt, Jamaica, Sri Lanka and California, discussions of the strengths and weaknesses of corporate 'codes of conduct' and 'social clauses' in free trade agreements, news of boycotts and information about other ways shoppers can support workers, for example through the use of "clean clothes scorecards."[74]

Such sites sometimes contain self-reflection on the means of communication. For example, the "North South Dignity of Labor Web Site," run by Centre Nuovo Modello di Silvuppo in Italy, at once affirms the use of computer networks in coordinating and distributing information of world wide scope and recognizes the limitations of access to such technology. It affirms the continued importance of more traditional means such as mail and face-to face-meeting, and ends by asserting a strategy of parallel channels:

> Each of these means is, in its own way, irreplaceable, because it makes possible something that all the others do not . Therefore we shall go on using them all.

We do not here pretend to analyze all the strengths and pitfalls of boycott tactics. They can, without careful agreement amongst the different parties involved, lead to disastrous contradictions.[75] But the experiments we have described seem significant. They show electronic communications deployed to link labour, ecological and feminist perspectives, connecting oppositions to capital across the fields of production, consumption and reproduction. Aimed at specific products, they nevertheless inevitably prompt questioning of the consumerism that is the complement to capital's doctrine of endless work. And they do so by mobilizing withdrawals of consumption power over the same global terrain on which capital attempts to stimulate it, taking the same technological means corporations deploy to coordinate exploitation and depredation in lonely and underreported places and turning them into instruments of exposure and contestation.

Cross-Line, On-Line

The scope of oppositional networking exceeds resistance to specific corporations. Capitalist globalization entails the subordination of state policy and public spending to international financial flows and treaty obligations. Consequently, opposition to it, whether insurrections against structural adjustment programs or mobilizations against free trade agreements, tend to catalyze the formation of broad movements involving diverse sectors of the working class with interests in resisting privatization, deregulation and austerity. Further, the transnational logic of capital gives a powerful impetus to the connection of these revolts in regional and multinational organizations. However, such coalitions require the resolution amongst potential participants of real contradictions and conflicts of interest resulting from capital's international division of labour. They thus depend on communicational channels for information, discussion, and debate.

This was very apparent in struggles around the North American Free Trade Agreement (NAFTA). When the final draft of this treaty was announced by the governments of the USA, Mexico and Canada in August 1992, it was rapidly apparent that an agreement which gave capital unlimited mobility across borders, pitted labour forces in direct competition with one another, and dismantled a wide range of public services would encounter resistance in all three countries.[76] However, coordination of a trilateral opposition faced serious obstacles. In the US and Canada the anti free-trade movement often tended toward a national-chauvinist protectionism. Development of an alternative direction partly depended on contact with and understanding of Mexican social movements.

Such efforts would, however, run contrary to both the corporate media's pro-NAFTA predisposition and neglect of issues in the South, and the Salinas' regime's state control over the Mexican news flows.

In fact the NAFTA debate spawned a wide variety of alternative communications across the Canadian, US and Mexican border. Visits, personal contacts, conferences, tours, and transborder exchanges, particularly visits to maquiladoras by US and Canadian workers, became frequent amongst activists. While there were important organizational nodes for these transfers, they proceeded from a multiplicity of points in complex and interweaving paths. This circulation of struggles and perspectives was not only carried by 'on the ground' contacts but was also made through newsletters and journals, videos, alternative radio and television broadcasts, and computer networks. These provided the media for the discussion of strategy and tactics, reports on conferences, announcement of cross-border exchanges, organizing efforts and human rights appeals.

Focussing again on computer networks, John Brenner and Fredrick Howard have both made inventories of the anti-NAFTA organizations using online communication.[77] These include the North American Worker-To-Worker Network, supporting the connections, within and without official union frameworks, between US and Mexican workers in the automobile, telecommunications and electronics sectors. They also number feminist organizations, such as El Paso's La Mujer Obrera, fighting to improve the conditions of women workers in the border regions, and Mexico City-based Mujer a Mujer; green organizations, tracking pollutant flows across three borders, or funnelling information from North American sources to Mexican opponents of medfly spraying in Chiapas; and a variety of US and Mexican-based services which specialized in disseminating critical analysis of the free trade negotiations.[78]

The anti-NAFTA coalitions, while mobilizing a depth of opposition entirely unexpected by capital, failed in their immediate objectives. But the transcontinental dialogues which emerged checked--though by no means eliminated--the chauvinist element in North American opposition to free trade. The movement created a powerful pedagogical crucible for cross-sectoral and cross-border organizing. And it opened pathways for future connections, including electronic ones, which were later effectively mobilized by the Zapatista uprising and in continuing initiatives against maquilladora exploitation.

While the intensity of transborder networking catalyzed by NAFTA was perhaps exceptional, both because the treaty so sharply posed issues of capital mobility and because of North America's situation as a centre of communications technologies, the phenomena is by no means unique. Thus, if we turn from the Americas to Asia, we can see a similar process unfolding, albeit in a more diffuse way. Over the last five years, India has been

systematically opened up to the world market under a New Economic Policy, adopted under pressure from the IMF and World Bank.[79] In 1992, an estimated 15 million workers participated in a one-day nationwide industrial strike to protest this process.[80] Resistance has taken a number of forms--some fundamentalist and fascist, such as the Bharatiya Janata Party, others of a broadly 'left' nature.[81] Amongst these latter there has emerged a variety of transnational alliances, solidarities and contacts with oppositional movements both in other Asian countries and in the North. These connections flow through multiplicitous channels of oral, written, film, video, and computer communication.

Thus we find world-spanning alliances between Northern environmentalists and Indian 'tribals' and urban intellectuals opposing the World Bank's Narmada dam project--fed by a circulation of films, videos and email; Indian peasant movements fighting GATT's intellectual-property clauses visited by Canadian organic farmers, who carry with them books analyzing the activities of multinational seed corporations, return with films and videos of these same corporation's offices sacked by million-strong demonstrations, and keep in touch by e-mail; Internet solidarity appeals from Indian workers occupying jute factories; Northern NGOs electronically-scanning data banks for details of commercial plans to patent plant and animal species and transmitting the news back to the resistance organizations of Indian, Thai and Sri Lankan farmers; and Indian labour and human rights organizations sending delegates and films to North American trades unions supporting boycotts of Walmart megastores selling carpets made by child labour.[82]

These initiatives proceed without central focus. They constitute a diffuse coalescence of micro-activisms contesting the macro-logic of capitalist globalization. We would suggest that similar constellations could probably be found forming at virtually any point on the planet. They exist as a sort of fine mist of international activism, composed of innumerable droplets of contact and communication, condensing in greater or lesser densities and accumulations, dispersing again, swirling into unexpected formations and filaments, blowing over and around the segregative barriers dividing global workers. In the next section we will consider some of the thunder and lightning that accompanies these clouds.

Netwars and Anti-Wars

At its cutting edge, capitalist globalization means war--not only the immediate violence of military attack, whether in the form of imperial invasion or low-intensity conflicts, but also the sustained social and environmental violence of starvation, social disintegration, and deprivation which in turn sets the scene for ethnic rivalries and internal

conflict. Consequently, the circulation of struggles between a multiplicity of movements--trades unionists, feminists, ecologists, indigenous people--has increasingly taken the form of a front arrayed in the name of peace: life against death, a refusal to accept the sentence that says what is not profitable must be erased. The great international mobilization of the anti-nuclear movement of the 1980s, which was coloured by the particular interest of the inhabitants of the North in avoiding the punctual holocaust of nuclear armageddon, has in a sense broadened and deepened to become a demand, enunciated from a wide variety of sites, for the end of the everyday holocausts proliferating all over the planet. This perspective is not strictly pacifist, since it usually entails recognition of the right of resistance against exploitation and degradation. But it seeks to block the infinitely greater exterminatory violence brought to bear on such revolts, in order to defend a space for the creation of alternative social options. The new counter-networks transmit an old slogan: "Bread and Peace."

Communication is, again, vital--for exposing the actual or potential atrocities that capital prefers to have executed in secret. The most striking example is of course the uprising of the Zapatista Army of National Liberation against the Mexican government in 1994--a revolt which specifically denounced capitalist globalization as the culmination of a centuries-long dispossession of the people of Chiapas. In an important analysis, Harry Cleaver has suggested that the success of the EZLN in avoiding the normal fate of peasant revolts in Mexico--outright massacre--was partly due to their weaving of an "electronic fabric of struggle."[83] Despite the Zedillo regime's control of Mexico's mainstream media, the EZLN was able to rapidly disseminate its own communiques not only within Mexico but globally. This was accomplished largely through the network of electronic contacts established via the Internet during the NAFTA campaigns. EZLN documents and news reports flashed into conferences and lists on networks such as Peacenet and Usenet, and were then rediffused, accompanied by additional information, analysis and discussion from those familiar with the situation in Chiapas into other parts of the Internet, into left-wing newspapers, magazines and radio stations, and into the mainstream press.

This "communicative action" then passed into "physical action," not only in a world-wide series of protests at Mexican embassies and government offices, but in an influx of Zapatista supporters--journalists, human rights observers, delegations--into Chiapas.[84] This occured in a context where NAFTA had made Mexico an exemplar of capitalist development and an object of intense scrutiny by international investors. Cleaver suggests that, together with the many protests within Mexico, it was this focusing of global attention which made it impossible for the Zedillo government to impose a purely military solution, and compelled it to switch to cease-fire and mediated negotiations.

After the initial moments of the revolt, the "electronic fabric of struggle" was strengthened with new threads. Videos made in Chiapas have gone North: microwatt broadcasting has gone South, as radioactivists from Free Radio Berkeley assist Zapatistas and local autonomists set up their own micro-watt transmitters. The translation of entire books of EZLN documents has been coordinated in cyberspace, and the Zapatistas have established there own "Ya Basta" World Wide Web site.[85] And these electronic flows have in turn attracted interest in the *encuentros* organized by the EZLN with the explicit aim of stimulating global opposition to neoliberalism--international meetings whose discussions have then in turn been relayed out across airwaves and networks.

For capital and its advisors, such activity is a threat. This was acknowledged by some of its own analysts. In the aftermath of the Gulf War slaughter, two RAND corporation analysts, John Arquilla and David Ronfeldt, had written a paper suggesting that the conflicts of the future would take the form of "cyberwars" and "netwars."[86] Cyberwar, waged at a purely military level might "be to the twenty first century what blitzkrieg was to the twentieth."[87] It would be a type of conflict "in which neither mass nor mobility will decide outcomes; instead, the side that knows more, that can disperse the fog of war yet enshroud an adversary in it, will enjoy decisive advantages."[88] Netwar is a broader concept of "societal-level ideational conflicts waged in part through internetted modes of communication" and entails" trying to disrupt, damage, or modify what a target population knows or thinks it knows about itself and the world around it":

> it may focus on public or elite opinion, or both . . . involve public diplomacy measures, propaganda and psychological campaigns, political and cultural subversion, deception of or interference with local media, infiltration of computer networks and databases, and efforts to promote dissident or opposition movements across computer networks[89]

Cyberwar and netwar are "forms of war about 'knowledge,' about who knows what, when, where, and why."[90] Both "revolve around information and communications" and imply that that in future conflicts "whoever masters the network form will gain major advantages.[91]

Shortly after the outbreak of the Zapatista revolt, Ronfeldt was interviewed on the situation in Mexico. Although in his earlier writings he had focussed on information technologies as instruments of inter-state conflict, he had also noted that netwar applies to "low intensity conflict " by "non-state actors, such as terrorists, drug cartels, or black market proliferators of weapons of mass destruction. " By "making it possible for diverse, dispersed actors to communicate, consult, coordinate, and operate together across greater distances, and on the basis of more and better information than ever" netwar might create a terrain favorable to what would otherwise be small and conventionally weak organizations.

Ronfeldt now emphasized that social activists were on the cutting edge of the new "network" system of organizing. Noting the use by Zapatista's and other opponents of Zedillo of internet, fax and video, he suggested that;

> At a time when the political and economic crisis has created widespread disaffection . . . network style organizing will enable the opposition to overcome its traditional factionalism. The greatest threat to the government could be hundreds or thousands of independent groups united in their opposition but 'accepting of each other's autonomy.[92]

Although the"decentralization" of this oppositional force meant it could not "take national power," Ronfeldt suggested its activities could make Mexico "ungovernable;"

> The risk for Mexico is not an old-fashioned civil war or another social revolution . . . The risk is social netwar. The country that produced the prototype social revolution of the 20th century may now be giving rise to the prototype social netwar of the 21st century.[93]

What Ronefldt calls "netwars" we would rather call "anti-wars"--the mobilization of world wide communications to hold open spaces within which experiments in autonomy can escape extermination.

Three Examples

Subcommandante Marcos, inputting communiques to a laptop plugged into the lighter socket of an old pickup truck, has by now become something of a mythical figure both for the left and its enemies. But the communicational logic demonstrated by the Zapatista's is not limited to Chiapas. We will point briefly to some other examples, from Asia, Africa, Europe and the South Pacific.

One is East Timor. Here, until a very few years ago, the Indonesian government's invasion and genocide could proceed in quiet obscurity thanks to the huge interests of multinational capital in the development of one of Asia's most populous and resource-rich markets. In the early 1990s this changed, largely due to three events: the filming by British television journalists of the massacre of student demonstrators in Dilli; the circulation of the independently-produced film, "Manufacturing Consent," giving central place to Noam Chomsky's analysis of mainstream media silences about Timor; and the establishment of several computer news groups, email lists and web sites giving information about the situation on the island.[94]

This dissemination of news and analysis has encouraged a proliferation of international actions in support of the Timorese resistance, including civil disobedience and sabotage in England against an aerospace company supplying fighter jets to Indonesia; North American student protests against university cooperation with the Suharto regime;

and contacts between Timorese resistance leaders and US workers in Charleston, Illinois, striking against a company with commercial links to the Indonesian government.[95] Furthermore, the illumination of the Timorese situation has spilled over to shed light on other human rights abuses in Indonesia, including the repression of trades unions and students, and the implication of mining corporations such as Freeman McMoRyan in the ravaging of Irian Jaya.[96]

The second case is that of Nigeria. Here again, there is a long history of struggle against the military regime whose self-styled "wasting operations" have swept across pollution drenched landscapes, protecting the operations of Shell Oil from a population whose living standards have dropped twenty-five per cent in the last twenty-five years.[97] And again, this struggle was shrouded in a handy--from the point of Shell and General Abacha--oblivion. Until the execution of Ken Saro Wiwa and nine other activists. For Saro Wiwa's role as an author and television playwright placed him at the centre of a web of cultural and communicational networks. As these transmitted the news of his death, they stimulated an unprecedented volume of mainstream analysis of the Nigerian situation. This provided the opportunity for international solidarity groups to set underway major demonstrations and boycotts against Shell, actions which were publicized and organized through alternative networks of computer, print, and film.[98] This activity in turn built pressure for other campaigns driving for trade sanctions, and all rolled together to create an unprecedented attention to the cost in Nigerian blood of corporate oil.

In Timor and Nigeria, unlike Chiapas, this flow of information has brought no immediate lessening of horrors. But it has resulted in an intensified circulation of struggles. It is, we would emphasize, resistance on the ground, in the streets--the willingness of people to fight and die--that lies at the base of these situations. But when the cries of the wounded, the crackle of machine gun fire, and the pop of tear gas enter into global communication networks, they can create a series of feedback effects and noise very unpleasant to capital. For business went global to find stability and predictability. In search of these goals it will turn a blind eye to, and pay for, unspeakable atrocities. But when such atrocities become visible, capital's very mobility can destabilize its own operations. Facing imponderable risks--the costs of public relations,the consequences of international protests, the rising morale of the local resistors--money sometimes finds it easier to migrate than fight, relocating production elsewhere or evaporating into financial speculation.

And this volatility can create difficulties for the local authorities whose task it is to maintain the conditions of accumulation at gun-point. On some recent occasions, the flight of private funds from 'hot spots' has created the need for massive intervention by the highest levels of capitalist organization. In Mexico, partly as a result of the war in Chiapas,

and in Russia, partly as a result of war in Chechnya, global financial institutions have had to syphon in billions of dollars to uphold the regimes they are depending on to secure the open market. The funds available for such rescue operations are vast, but not limitless; this is a game that that can be repeated once or twice simultaneously, but perhaps not five or ten times.

Let us give one other example of oppositional networking. In 1995, France's government announced an austerity plan aimed at meeting the Maastricht treaty's requirements for European financial union. The response was a four-week strike-wave that put millions of French workers, students and citizens into the streets in what has been termed --a tad Eurocentrically--"the first revolt against globalization."[99] These domestic actions coincided with an international outcry against French nuclear testing in the Pacific, which included mass rioting in Tahiti and other islands in the region, world-wide demonstrations outside embassies and airline offices, and a boycott call against French wines. A few months later, the shipment of French nuclear wastes across European borders precipitated three days of pitched battle between German protestors and police.

The link between these apparently disparate events was made in a novel way on the computer list "counter@francenet.fr" which circulated news of the strike. Here an Italian group, Strano Network, proposed a "net' strike" ("*greve en reseau*") against French government internet sites, to be conducted by inundating them with 'hits' to the point of paralysis. The proposal read:

> The French government shows a total contempt for its people, for the international community and for ordinary people who want to see their children grow up in a better world. It carries out nuclear tests in the Pacific. It continues to use "civilian nuclear power." It maintains its projects of "social reconstruction" despite demonstrations of massive opposition. For these reasons we intend to take away (although partially, and for a limited period) from the institutions of the French government the privilege which all the powerful--the lords of war, famine and social injustice--seek: access to the ever more powerful means of communication and the channels of information, those same privileges which are denied to the vast majority of the global population.[100]

The proposal stirred some online debate about its utility or desirability as a tactic, but Strano Network persisted with its initiative, and later issued a report claiming the participation of "several thousands of strikers" and success in shutting down numerous French government sites.[101]

In our mind, the significance of the strike does not lie so much in its immediate effectiveness--a point on which we share the reservations of Strano Networks critics--as in the linkages it made, tying together in a world-wide electronic forum the austerity inflicted on French workers and the nuclear fallout imposed on Pacific islanders, pointing to the

value placed by neoliberalism on military as against civilian expenditures, and to its disregard for popular opinion, global or domestic. Connecting the marchers in the streets of Rouen, the rioters in Papeete, and, prefiguratively, the German anti-nuclear protestors, it thus created an optic within which the French government's partial retreat from its domestic cutbacks and its abandonment of nuclear testing could be grasped as twin victories against a common enemy. The logic of France's Juppe government and its business and financial backers is that of capitalist globalization. The logic of Strano network, of the French strikers, and the German and Pacific Island rioters, is that of the other globalization.

Conclusions: The Globalization of Others & the Other Globalization

In an earlier era, prospects of breaking through the net of the world market were often thought to lie in the piecemeal withdrawal or disassociation of liberated zones, which were believed to most likely succeed first in peripheral zones, and gradually surround and destabilize the capitalist centre. This concept was given classic expression in Samir Amin's theory of "delinking"-often interpreted, and in some cases implemented, as a program of nationalist autarky.[102] In today's situation, where the integration of economic activity has reached an entirely new level and the positions of metropolis and periphery become profoundly intermingled, such concepts become increasingly problematic. At the very least, it is paradoxically apparent that any localized *delinking* can only succeed as a moment in a series of highly *linked*, mutually supportive regional and transnational projects of withdrawal.

In the current context a more promising line of initiative is what Jeremy Brecher and Tim Costello call "globalization from below."[103] This refers to the activities of "peoples transnational coalitions," formed across national boundaries by social movements aiming to fulfil mutually complementary supportive objectives for workers in different parts of the world.[104]Brecher and Costello suggest that such movements will come to oppose the 'downward harmonization' of wages, social wages, human rights and environmental standards effected by free trade agreements and financial discipline with demands for 'harmonization upward'; they will have as a priority the democratization of economic institutions, and be oriented toward the creation of "a multilevel one-world economy (with) regulation above and below the level of the nation state, and powers devolved downward and upward."[105] Such proposals are often presented within a reformist perspective that obscures the depth of confrontation with capital that their realization would require. Nevertheless, "globalization from below" seems to roughly correspond to many of the tendencies in transnational struggles identified in this chapter.

We have suggested that the increasing circulation of struggles during the crisis of the 1960s and 70s compelled capital to a fundamental reorganization, one which broke down the previous 'triplanetary' segregation of the globe into First, Second and Third Worlds. The objective of this manoeuvre was to unify and integrate the circuits of profit while severing and destroying connections amongst the working class, decomposing points of opposition and unrest from the industrial factory to the jungle paddy-field. This process has, however, unintentionally created the terrain for a new recomposition of oppositional forces--not least by its fabrication of a world-wide net of communications, a net formed to facilitate the operations of the market, but increasingly expropriated by oppositional forces for very different purposes. The result has been to produce not *one*, but *two* globalization processes --simultaneous, superimposed, interdependent and antagonistic.

The first is capitalist globalization. Its tendency is to create incredible wealth and power for the few controlling the flows of international investment and finance; improvements in living conditions within a persisting context of exploitation for some ; and, for very many, a chaos of immiseration. Celebrated, with partial truth, as the unification of the planet, this globalization also carries within itself a lethal acceleration of divisions and antagonisms. For its mechanism is an intensification of competition within a planetary market, an intensification of polarities and hierarchies in a 'one world' economy, a relentless setting of labour against itself--a globalization of 'others.'

The alternative, opposing tendency is that of the world wide counter- movements confronting transnational capital. As Waterman points out, these movements appear to have "no international headquarters, no organization, . . . no obvious terrain of battle"; but "alternatively, one could say that they have many headquarters, many organizations--and many terrains, forms and levels of struggle."[106] Appearing first as a series of sporadic and localized neighborhoods of survival and communities of resistance, these struggles are generating a series of connections, contacts, coalitions and networks of cooperation. They aim at the creation of a world space which, rather than being subject to the monologic of capital, contains within it the conditions for the interaction of diverse ways of living and organizing. This is the other globalization.

NOTES

1 Karl Marx, Capital: A Critique of Political Economy vol. 1 (New York: Vintage Books, 1977), 929.

2 Marx, Grundrisse (Harmondsworth: Penguin, 1973) 524-525.

3 Marx, Grundrisse 161.

4 Marx, Grundrisse 160.

5 Marx, Grundrisse 161.

6 See Manuel Castells, The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process (Oxford: Blackwell, 1989); David Harvey, The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change (Oxford: Blackwell, 1989); Joyce Kolko, Restructuring the World Economy (New York: Pantheon, 1988); Robert Ross and Kent Trachte, Global Capitalism: The New Leviathan (New York: University of New York 1990); Gary Teeple, Globalization and the Decline of Social Reform (Toronto: Garamond, 1995).

7 This approach is strongly influenced by Harry Cleaver's observation that most Marxist analyses of the expanding planetary scope of capitalism--e.g. the Hobson-Bukharin-Leninist theory of imperialism, dependency theory, and world-systems theory-- focus on the totalizing, world-wide imposition of commodity relationships to the neglect of the resistances and alternatives that challenge this process, Cleaver, "Secular Crisis in Capitalism: The Insurpassability of Class Antagonism," Rethinking Marxism Conference, Amherst, 1993, says "Because of the top-down orientation of these projects, nowhere has there been an attempt to grasp the logic of capitalist development in terms of the autonomous self-activity of the people struggling against it."

8 See Zerowork Collective, "Introduction," Zerowork: Political Materials 1 (1975):reprinted in Midnight Notes Collective , Midnight Oil (New York: Autonomedia, 1992) 108-114 and Cleaver, Reading Capital Politically (Brighton: Harvester, 1979).

9 Cleaver, Reading Capital 43.

10 In addition, the appearance in the Second World of dissident movements experimenting in alternative forms of socialism and self-management, such as the Prague Spring, undermined the stability not only of the Stalinist regime, but of the Cold War polarization on which so much capitalist control rested, and breathed new life into the European left.

11 To focus on the role of this wave of international unrest in precipitating the economic crisis is not to discount other factors--for example, the intensified international competition resulting from the post-war recovery of European and Japanese industry. It is, however, to place such issues of intercapitalist rivalry in the context of the greater issue that faced capital as a whole--namely, the control of socialized labour. If Japanese capital constituted a challenge to North American capital this is precisely because the former, having, with US help, inflicted a significant defeat on their own working class in the immediate post-war period, were in a position to squeeze more cooperation and creativity out of 'their' workers for less money, while social militancy confronted U.S. business with rigid or rising wages and social costs (see Joe Moore, Japanese Workers and the Struggles for Power 1945-1947 (Madison: University of Wisconsin, 1983).

12 On the place of the 'oil shock' in restructuring see Midnight Notes, Midnight Oil (New York: Autonomedia, 1992).

13 Mario Montano, "Notes on the International Crisis," Zerowork 1 (1975) 52-53. Repr. Midnight Notes, Midnight Oil.115-143.

14 Montano, 52-53

15 Montano, 52-53

16 Folker Frobel, Jurgen Heinrichs and Otto Krege, The New International Division of Labour: Structural Unemployment in Industrialized Countries and Industrialization in Developing Countries (New York: Cambridge, 1988).

17 Monsanto, 31.

18 On these points see, in addition to the sources already cited, Arthur MacEwan, "What's "New " About the "New International Economy"?" Socialist Review 21. 3/4 (1991) 111-131.

19 Caffentzis, George, and Silva Federici "Modern Land Wars and the Myth of the High-Tech Economy," The World Transformed: Gender, Labour and International Solidarity in the Era of Free Trade, Structural Adjustment and GATT, ed. Cindy Duffy and Craig Benjamin (Guelph, Ontario: RhiZone, 1994) 144; See also Maria Mies, Patriarchy and Accumulation on a World Scale: Women in the International Division of Labour (London: Zed Books, 1986); Maria Mies, Veronika Bennholdt-Thomsen and Claudia von Werlhof; Women: The Last Colony (London: Zed Books, 1988); and various essays in Mariarosa Dalla Costa and Giovanna Dalla Costsa, eds, Paying the Price: Women and the Politics of International Economic Strategy (London: Zed Books, 1995).

20 Heather Menzies, Fast Forward and Out of Control (Toronto: MacMillan, 1989) 96, observes that through its global information network, the giant US firm, Bechtel Corp can "take advantages of differential labour costs by employing lower salaried architects in India to draft construction plans, which become instantaneously available via satellite to supervisors in one corner of the world and project managers in another. Bechtel can use up to the minute financial information to get the best financing rates from New York banks and insurance from a London company. It can then manage the construction of the project in the middle of Saudi Arabia by using Korean workers, Indian architects, American managers and European material managers. Computer communications makes it all possible."

21 See Kim Moody, "When High Wage Jobs Are Gone, Who Will Buy What We Make?" Labor Notes, June 1994, 8.

22 Ben Bagdikian, "Cornering Hearts and Minds: The Lords of the Global Village," 12 June, 1989 Nation, 805-820. For recent discussion of the degree of US domination in global media see David Morely and Kevin Robins, Spaces of Identity: Global Media, Electronic Landscapes and Cultural Boundaries (London: Routledge, 1995) and Benamin Barber, Jihad vs McWorld (New York: Times, 1995).

23 Pico Iyer, Video Night in Kathmandu: And Other Reports From the Not So Far East (New York: Knopf, 1988).

24 On these tendencies see Armand Mattelart, Advertising International: The Privatisation of Public Space (New York: Routledge, 1991)

25 Theodore Levitt, "The Globalization of Markets." Harvard Business Review 6.1 (1983): 92-102.

26 Cited in Arif Dirlik, "Post Socialism/Flexible Production: Marxism in Contemporary Radicalism,"

Polygraph.6/7 (1993): 156-157.

27 An egregious example is the radio series by Gwnn Dyer, "Millenium," CBC Radio, Jan. 1996.

28 James.O'Connor, The Fiscal Crisis of the State (New York: St Martins, 1973). On this point see also Harry Cleaver, "The Subversion of Money-As-Command Within the Current Crisis," Conference on Money and the State, Mexico City, Mexico, 14-17 July,.1992.

29 MacEwan, 123. See also Howard Wachtel, The Money Mandarins: The Making of a Supranational Economic Order (London: Pluto, 1991).

30 Richard Barnet and John Cavanagh, Global Dreams: Imperial Corporations and the New World Order. (New York: Simon Schuster, 1994) 399.

31 Barnet and Cavanagh, 399..

32 Christian Marazzi, "Money in the World Crisis: The New Basis of Capitalist Power." Zerowork 2 (1977): 107

33 Cleaver, "The Subversion of Money as Command."

34 On the debt crisis see Cleaver,"Close the IMF, Abolish Debt and End Development." Capital and Class. 39: (1990) 17-50, and Dalla Costa and Dalla Costa.

35 As George Caffentzis observes, "Rambo on the Barbary Shore," , Midnight Oil, ed. Midnight Notes Collective (New York: Autonomedia, 1992) 299-300, this dual military strategy has mirrored economic development: "It is premised on the Vietnam era revolt against mass military service between 1965-73, just as recent economic strategy premises the revolt of the mass factory worker in the late 1960 and early 1970s. . . .(T)he military's "solution"--a combination of buying automated death machines and hiring out the "dirty jobs" to low wage mercenaries abroad --is identical to the economic "solution"--automation and computerization of domestic production and the exportation of "dirty work" to the "dirt wages" of the "free trade zones" of the Philippines, Singapore, South Korea, Mexico and so on."

36 Hamid Mowlana, "Roots of War: The Long Road to Intevention," Triumph of the Image: The Media's War in the Persian Gulf – A Global Perspective ed. Hamid Mowlana, George Gerbner, and Herbert Schiller (Boulder: Westview, 1992) 35. This collection contains many other excellent papers of the issues discussed in this section. See also Haim Bresheeth and Nira Yuval-Davis, eds., The Gulf War and the New World Order (London: Zed Books, 1992) and John MacArthur, Second Front: Censorship and Propaganda in the Gulf War, New York (Hill and Wang, 1992).

37 Robert Reich, The Work of Nations: Preparing Ourselves For 21st Century Capitalism (New York: Knopf, 1991).

38 Reich 111.

39 Reich 312.

40 Jeremy Brecher and Tim Costello, Global Village or Global Pillage: Economic Reconstruction From the Bottom Up (Boston: South End, 1994).12.

41 On this point see Butch Lee and Red Rover,.Night-Vision: Illuminating War & Class on the Neo-

Colonial Terrain (New York: Vagabond Press), 1993.

42 On these tendencies in the computer industry see Eric Auchard, "Discount Programming: The Global Labour Market,". CPU: Working in the Computer Industry 001. (1993): 13-24. online, Internet.

43 This is the route followed by Nike as its footwear plants flee across the world. See John Cavanagh and Robin Broad note, "Global Reach: Workers Fight the Multinationals," Nation, 18 Mar., 21-24.

44 See the important analysis in Midnight Notes Collective, "The New Enclosures," Midnight Oil, (New York: Autonomedia 1992) 317-333. On tendencies to global immiseration, Michel Chossudovsky, "The Globalisation of Poverty and the New World Economic Order," Working Paper #9114E, Department of Economics, Faculty of Social Sciences, University of Ottawa, 1991, and Riccardo Petrella, "World City States of the Future." New Perspectives Quarterly 8.4 (1991) 59-63.

45 See for example Cynthia Hamilton, "Urban Insurrection and the Global Crisis of Industrial Society," The World Transformed, ed. Cindy Duffy and Craig Benjamin, (Guelph, Ontario: RhiZone, 1994) 169-179.

46 On this point see Midnight Notes."The New Enclosures."

47 Robin Cohen, The New Helots: Migrants in the International Division of Labour (Vermont: Gower, 1987).

48 See Caffentzis and Federici, 140.

49 Mariarosa Dalla Costa, "Development & Reproduction," Common Sense 17 (1995): 29.

50 Romano Alquati, "The Network of Struggles in Italy," unpublished paper, Red Notes Archive, 1974.

51 Romano Alquati, "The Network of Struggles in Italy," unpublished paper, Red Notes Archive, 1974.

52 Romano Alquati, "The Network of Struggles in Italy," unpublished paper, Red Notes Archive, 1974.

53 Frantz Fanon, "This is the Voice of Algeria," in A Dying Colonialism (New York: Monthly Review, 1965) 69-98.

54 Peter Golding, "World Wide Wedge: Division and Contradiction in the Global Information Infrastructure," Monthly Review 48.3 (1996) 82.

55 Golding, 81.

56 Lee and Rover, 129.

57 On the Kayapo see Ella Shohat and Robert Stam, Unthinking Eurocentricism: Multiculturalism and the Media (London:Routledge, 1994).

58 Seeds of Struggle, presented by Brewster Kneen at Simon Fraser University, 4 Nov., 1996. Kneen, editor of The Ram's Horn magazine and author of Trading Up: How Cargill, the World's Largest Grain Company is Changing Canadian Agriculture (Toronto: NC Press, 1990) was invited to India to assist in the "seed satyagraha" whose demonstrations culminated in the destruction of Cargill's India offices. This account of the circulation of struggles drives from personal conversations with him.

59 See Bruce Girard, ed., A Passion for Radio (Montreal: Black Rose, 1992).

60 See Nancy Thede and Alain Ambrosi, eds., Video the Changing World. (Montreal: Black Rose, 1991).

61 See Howard Frederick "Electronic Democracy," Edges 5.1 (1992) 13-18.

62 See MacEwan.

63 These examples are drawn from Brecher and Costello, Global Village or Global Pillage, and Kim Moody An Injury to One (London: Verso, 1988). Information on the Merseyside dock strike can be found at http://www.gn.apc.org/lbournet/docks/

64 Moody 297-301.

65 Peter Waterman, "International Labour Communication by Computer: The Fifth International?" Working Paper Series 129 (The Hague: Institute of Social Studies, 1992). See also his "Communicating Labour Internationalism: A Review of Relevant Literature and Resources," Communications: European Journal of Communications 15. 1/2 (1990): 85-103, and "Reconceptualising the Democratisation of International Communication," International Social Science Journal 123 (1990): 78-91.

66 Waterman, "International Labour Communication by Computer" 38.

67 Waterman, "International Labour Communication by Computer" 35.

68 Cited Waterman, "From Moscow With Electronics: A Communication Internationalism For an Information Capitalism," The Democratic Communique 11:2/3 (1994) 11.

69 Waterman, "From Moscow With Electronics" 15.

70 Waterman, "International Labour Communication by Computer," 67, citing Fred Stanglaar, "An Outline of Basic Principles of Alternative Communication," Workshop on International Communication by Computer, Institute of Social Studies, The Hague, 27 Oct. 1985.

71 The periodical Boycott Quarterly is entirely devoted to this strategy.

72 Cavanagh and Broad, 22.

73 The Guardian, 22 Feb., 1996. McSpotlight can be found at http://www.mcspotlight.org.

74 The Clean Clothes site can be found at http://www.xs$all.nl/~ccc.

75 Moreover, as Cavanagh and Broad note, corporations often evade boycotts by implementing tokenist 'codes of conduct' or greenwashing campaigns. Boycotts tend to be effective against products with strong brand loyalties, but less so in industries where this is not so important, or where the consumers are other companies. And there are scores of boycott attempts which fail because, in a context where they can expect little or no attention from mainstream media, they lack the resources to command public attention.

76 In the US & Canada, the threat to incomes, social programs and environmental conditions posed by direct exposure to the low wage Mexican economy was obvious. In Mexico, although the government was able to muster significant support for the agreement through lavish promises of development and modernization, there was opposition from peasants and small farmers threatened by the influx of

agribusiness, workers in telecommunications and other public sector industries confronting privatization, and those who feared the generalization of 'maquilla' conditions. See Cindy Duffy and Craig Benjamin, "Women and the World Transformed," The World Transformed, ed. Cindy Duffy and Craig Benjamin, (Guelph, Ontario: RhiZone, 1994) 83.

77 Joseph Brenner.. "Internationalist Labor Communication by Computer Network: The United States, Mexico and Nafta," School of International Service. American University, Washington D.C..,1994; Howard Frederick, "North American NGO Networking Against NAFTA: The Use of Computer Communications in Cross-Border Coalition Building," XVII International Congress of the Latin American Studies Association, Los Angeles, 24-27 Sep. 1994.

78 See also Mujer a Mujer Collective, "Communicating Electronically: Computer Networking and Feminist Organizing," RFR/DRF 20.1/2: (1991) 10.

79 See Praful.Bidwai, "Making India Work--For the Rich," Multinational Monitor 16.7/8 (1995): 9-13. and Michel Chussudovsky, "India Under IMF Rule," The Ecologist 22.6 (1992), 270-274.

80 Brecher and Costello, 86.

81 See Salim Lakha, "Resisting Globalization: The Alternative Discourse in India," Arena Journal 4 (1994/95) 41-50.

82 On the Narmada damn struggle see the film Narmada: A Valley Rises, dir. Ali Kazimi, Colour Canada, 1994; on the anti-GATT uprisings, see footnote 57 and Vandana. Shiva, "Seeds of Struggle," The World Transformed, ed. Cindy Duffy and Craig Benjamin, (Guelph, Ontario: RhiZone, 1994) 57-70; on biopiracy activism see Yuli Ismartono,and Teena Gill, "Asian Farmers Struggle Against Transnationals," online, Internet, ACTIVE-L, Third World Network, 17 Jan. 1996; Martin Kohr, "Global Fight Against 'Bio-Piracy.," online, Internet, ACTIVE-L, Third World Network 6 Nov. 1995; the Third World Network can be contacted at twn@igc.apc.org. Also, visit the World Wide Web site of Rural Advancement Foundation International at http://www.charm.net/~rafi/rafihome.html; on child labour activism see Broad and Cavanagh.

83 Cleaver, "The Chiapas Uprising," Studies in Political Economy 44 (1994): 15.

84 Cleaver, "The Chiapas Uprising," 16.

85:Cleaver, "Zapatistas in Cyberspace," Simon Fraser University, Vancouver, 15 Nov. 1994. The text whose translation was coordinated via email is Zapatistas: Document of the New Mexican Revolution (New York: Autonomedia, 1994). A communique from Subcommandante Marcos of 17 Mar., 1995, (cited by Jason Wehling, "Netwars' and Activists Power on the Internet," online, Internet, ACTIV-L, 25 Mar.,1995) refers to the importance of international support for the the revolt in the following terms: ". . .we learned that there were marches and songs and movies and other things that were not war in Chiapas, which is the part of Mexico where we live and die. And we learned that these things happened, and that "NO TO WAR!" was said in Spain and in France and in Italy and in Germany and in Russia and in England and in Japan and in Korea and in Canada and in the United States and in Argentina and in Uruguay and in Chile and in Venezuela and in Brazil and in other parts where it wasn't said but it was thought. And so we saw that there are good people in many parts of the world... when they are old, then they can talk with the children and young people of their country that, 'I struggled for Mexico at the end of the 20th century, and from over here I was there with them . . . and I did not know their faces but I did know their hearts and it was the same as ours.'

86 John Arquilla and David Ronfeldt, "Cyberwar Is Coming!" Comparative Strategy. 12.2 (1993): 141-165. Citations are from an electronic copy.

87 Arquilla & Ronfeldt.

88 Arquilla & Ronfeldt.

89 Arquilla & Ronfeldt.

90 Arquilla & Ronfeldt.

91 Arquilla & Ronfeldt.

92 Cited in Joel Simon, "Netwar Could Make Mexico Ungovernable." Pacific News Service,.online. Internet, ACTIVE-L, 20 Mar. 1995.

93 Simon.

94 Manufacturing Consent, dir. Mark Achbar. On networked information about the Timorese resistance movement, see Charles Scheiner, "Electronic Resources on East Timor," online, Internet, ACTIVE-L, 25 Oct. 1996, availabe from timor_info@igc.apc.org.

95 See "US Labor Dispute Raises East Timor," online, Internet, ACTIVE-L, 25 April 1996, and "Ramos Horta to Speak in Charleston," online, Internet, ACTIVE-L, 25 April 1996: the latter describes how Timorese resistance leader Ramos Horta, and Allan Nairn, one of the journalists who reported the Dilli massacre, spoke to members of the United Paperworkers International Union on strike against Trailmobile Corporation "before a backdrop of banners demandingIndonesia end its occupation of East Timor and calling for justice for locked-out Trailmobile workers."

96 "Trailer Workers Meet Timor Resistance Leader," online, Internet,ACIVE-L, 15 Aug. 1996.

97 Joshua Hammer, "Nigeria Crude," Harper's Magazine June 1996, 58--71.

98 See film Delta Force, CARNA Films, 1995.

99 Raghu Krishnan, "December 1995: "The First Revolt Against Globalization," Monthly Review 48.1 (1996) 1-22..

100" Net'Strike--Greve En Reseau," online, Internet, counter@francenet.fr, 19 Dec. 1995, my trans. Valuable archives of computer messages at the time of the strikes can be found at http://www.lglobal.com/TAO/A-Infos 95-2/0.117.html and http://www.anet.fr/~ans.

101 One dissenter argued that the Internet was not an appropriate site for such sabotage, that the "net'strike" would simply exasperate webmasters of the particular sites, but not be understood as a form of social protest. Moreover, if generalized, this type of sabotage would set in motion a destructive logic: "anti-fascists paralyze the sites of fascists, fascists paralyze the sites of anti-fascists, Christians paralyze the sites of Muslims, Muslims paralyze the sites of Hindus, Hindus paralyze the sites of Christians, Christians paralyze the sites of gays and lesbians, Macintoshiennes paralyze sites dedicated to Windows . . . ." This would be damaging because "The Net is the best tool of counter power (because it is the best means of diffusion of information and knowledge is power) which we have been given. It is out greatest treasure, for us militants, too--don't count on me to engage in an action that would damage it." Another said "To see the net as a means of direct action seems to me an error for two reasons: one is its inefficiency, the other is that it can very well be turned against sites and means of diffusion such as this one here." On Boxing Day, 1995, Strano issued an email bulletin, "Echoes of the Net'Strike," presenting a preliminary assessment of the action. They observed that while it was not possible to precisely quantify the number of participants,

the count of hits on French government sites led them to suppose that there had been "several thousand of strikers." While there had been rapid access to the sites before the strike hour, it had declined rapidly thereafter, so that within 15 minutes several sites--that of the Ministry of Education first--were jammed. Strano network also reported many online messages of support for the action, including one from US cyberpunk celebrity Bruce Sterling--and several news items about the "net'strike in the press and radio. They concluded that the action showed a "widespread desire to take actions against the French government," "the potential effectiveness of the online strike as an instrument of action, and the willingness of cybernauts to use it, and "the extreme speed and spontaneity of organization of such a movement."

102 Samir Amin, Accumulation on a World Scale: A Critique of the Theory of Underdevelopment.(new york: Monthly Review, 1974)..

103 Brecher and Costello, Global Village or Global Pillage 96-97 For a collection of articles--very mixed in both perspective and quality--which shares ths general orientation see Jeremy Brecher,, John Brown Childs, and Jill Cutler, eds., Global Visions: Beyond the New World Order (Boston: South End, 1993)..

104 Brecher and Costello, Global Village or Global Pillage 96-97

105 Brecher and Costello, Global Village or Global Pillage 174

106 Waterman, "InternationLabour Communication by Computer," 47. See also Dirlik.

Chapter 7
POSTMODERNISTS

Introduction

The idea of the 'information revolution' is inextricably involved with that most shimmering of contemporary concepts--'postmodernity.' Theorists of a "postmodern condition," such as Jean Francois Lyotard, Jean Baudrillard and Gianni Vattimo, explicitly or implicitly base their claims about radical changes in today's society on the analysis of postindustrialism previously posited by Daniel Bell and other futurologists.[1] Indeed, so deeply embedded in postmodern theory is the belief that computers, telecommunication and other high technologies are a vital element distinguishing our epoch from the fading modern age that it can be seen as offering a new inflection of the earlier distinction between 'postindustrial' and 'industrial' eras, now reworked to stress the epistemological, philosophical and aesthetic consequences of this transformation.[2]

Given this, it is hardly surprising that Marxists' encounter with postmodern theorists has largely followed the trajectory of their earlier meeting with the postindustrialists--hostile collision. This is unfortunate. For although postmodern theory often accepts too easily the idea that high-technology inaugurates an historically unprecedented era, it does not usually look on this prospect with naive enthusiasm. Indeed, it includes highly critical perspectives. Moreover, postmodern theory is a plural beast with several heads, some venomously anti-Marxist, but others much more conversational. Thus while there are very substantial issues at stake in Marxist /postmodernist polemics, such arguments can also sometimes constitute a disabling fracture of intellectual forces antagonistic toward high-technology capitalism.

Recently, certain lines of theory, emerging from both the Marxist and postmodernist camps, seem to reach across this divide toward new dialogues, *rapprochement* or even synthesis. Such efforts have concentrated on identifying certain aspects of postmodern culture as manifestations of capitalist restructuring. However, they have had relatively little to say about what we regard as the *sine qua non* of Marxist analysis--the possibility of opposition and subversion. In this chapter we suggest that certain lines of what can be broadly designated as autonomist Marxism, developed by theorists such as Antonio Negri, Gilles Deleuze and Felix Guattari, can supply this deficiency. They offer a sort of recombinant postmodern/Marxism which, without sacrificing the Marxist emphasis on class struggle, admits important postmodern insights into the variegated and technologically-mediated aspects such conflict assumes today. In

doing so, they open important perspectives on the postmodern proletarian condition--a disturbing and exciting scene of simulacra, cyborgs, net-nazis and rhizomatic alliances.

Hostilities: Postmodernity versus Marxism?

The hostilities between postmodern theory and Marxism have important historical roots. Many of the Parisian progenitors of postmodern theory--Jean Francois Lyotard, Michel Foucault, Jean Baudrillard, Juliet Kristeva--were one-time Marxists for whom the defeat of the student-worker uprisings of 1968, and particularly the total failure of the French Communist Party to comprehend or respond to these revolts, were a watershed of disillusionment.[3] The theories they subsequently developed can in part be seen as an attempt to understand the nature of conflicts apparently beyond the ken of orthodox Marxism--conflicts in which, for example, the leaders of dissent were not factory workers but university students--and also to comprehend why these new movements failed in their revolutionary aspirations. There was thus implanted at the root of postmodern theory an anti-Marxist tendency, which, although it in many cases turned in outrightly reactionary directions, also contained strong radical impulses.

In their attempt to grasp the problems Marxism had apparently failed to address, the dissident Parisian intellectuals turned, somewhat incongruously, to conservative American sociology, and concepts of postindustrialism. Just as, according to postindustrial theory, contemporary societies are passing beyond industrialism to informationalism, so, according to the prophets of postmodernity, we are now speeding past the limits of modernity, with its confidence in reason, progress, and universalist political projects, into unknown territory. Amongst the most important features of this postmodern world is its highly 'communicational' texture. Signifiers are supreme over referents, images more powerful than substance, symbols trump things. The real is constituted by a play of texts, discourses, language-games, or codes. While this inseparability of world from word may perhaps always have been the case, what now intensifies and renders it apparent is the growing prominence of information technologies, which saturate society with messages and images and break down the the solidity of the material world into an immaterial flow of digits and data subjected to infinite processings and reprocessings.[4]

This result is an ambience mobile, multiplicitous and elusive in the extreme. The proliferation of media channels throws all stable and authoritative accounts of the world into crisis. This collapse of what Lyotard calls "metanarratives" may be seen either as potentially liberatory diversification or as profoundly atomizing and disintegrative cacophony, but it is in either case inescapable.[5] Indeed, its force is such as to explode the

possibility of any unitary or totalizing perspective on society as a whole, leaving only a contingent juxtaposition of incommensurable perspectival shards and fragments: "playing with pieces, that is postmodernism."[6] Lamentation for lost unities and stabilities is beside the point: all that is possible is clear-eyed acceptance of a transformation that has shattered pretensions to theoretical mastery of society and, with it, all grand projects of political emancipation.

In such postmodern theorizations, Marxism is depicted as fatally anachronistic--usually elected as the exemplary case of 'modern' thought only to be immediately consigned to the dustbin of post-history. Lyotard catches the prevalent tone:

> The mere recall of the(se) well-known guidelines of Marxist criticism has something obsolete, even tedious, about it . . . the ghost has now vanished, dragging the last grand historical narrative with it off the historical stage.[7]

The decisive influence of the "mode of production" is superseded by that of what Mark Poster terms the "mode of information."[8] Marxist claims that the economic sphere constitutes a ground-level 'base' of which other cultural 'superstructures' are mere epiphenomena expire as it becomes apparent that the real is made, not in the material transformation of the world, but in the immaterial play of signification. Consequently, the importance attributed by Marxists to class--that is, location within relationships of production--is dissolved in favour of concepts of social identity as de-centred, transitory and heterogeneous. Furthermore, in a world now revealed as containing innumerable and incommensurable accounts of the real, the Marxist ambition to 'grasp the totality'--that is, gain a comprehensive overview of the societal whole--is seen as not merely unattainable, but intensely suspect: a manifestation of a dominative will-to-power deeply related to 'totalitarian' schemes of social control, a megalomanic theoretical dream that leads straight to the Gulag.

It is hardly surprising, then, that the first--and often last--response of many Marxists to postmodernism is withering hostility. Postmodernist tendencies has been denounced by Marxian scholars as a "mystique . . . which strives to cultivate ignorance of modern history and culture" and serves to "echo the ruling-class self delusions that it has conquered the troubles and perils of the past";[9] as a linguistic idealism that has "strafed meaning, over-run truth, outflanked ethics and politics and wiped out meaning";[10] as an irrationalism that "challenges the very notion of emancipation" and "produces an anxiety-ridden sense of chaos and isolation";[11] or as just "the smoked-out butt-end of . . . theory."[12]

Counter-attacking, Marxists have pointed to the many self-contradictions into which postmodern theory falls as it dismisses totalizing theories while itself indulging in the most

airily grandiose gestures of historical speculation. They have challenged the credibility of the information-society theory whose accuracy so much postmodernist thought simply assumes, with its implausible claims that capitalism has quietly succumbed to ineffable postindustrial evaporation. They have pointed out the lack of self-reflexivity postmodern theorists often display about their own class-situation: Alex Callincos, for example has tellingly suggested that the popularity of postmodernism owes much to the fact that it elevates to the level of general theory experiences and habits specific to particular strata of intelligentsia immersed in cultural production and anxious to arrive at an accommodation with an apparently triumphant capitalism.[13] And they have effectively demonstrated how destructive is the belief--which some postmodernists certainly flirt with, and which Marxists tend to believe is promiscuously entertained by them--that it is impossible to know anything beyond the images dominating contemporary life.[14]

We tally this passage of critical arms as a bloody draw. Marxists have effectively ridiculed postmodern theory's hyperboles and inconsistencies. This, however, cannot cancel out the fact that such theories identify, often in intentionally ironic and provocative style, aspects of life in an information-intense, technologically-enveloped society that have previously escaped Marxist analysis: Foucault's concept of "panopticism," Baudrillard's discussion of "simulation" or Lyotard's account of "immateriality" all speak to phenomenon that are neither immediately dismissable, nor already defined in the standard dictionaries of historical materialism. At the very least, they touch on crucial aspects of what Raymond William's called the "structure of feeling" of contemporary life in advanced capitalism.[15]

Moreover, while Marxists are right that the postmodern rejection of "metanarratives" is untenable (so that, as Jameson notes, the refusal of 'totalizing' theory simply results in its surreptitious and unacknowledged reappearance via the back door) this does not answer the postmodernists' point that something is seriously amiss with the *specific* metanarrative of classical Marxism--namely, that its central protagonist, the industrial proletariat, seems to have gone absent, missing in action in a field of robots, computers, and telecommunications.[16] Postmodern theory's undeniable insights into new mechanisms of power and new social subjectivities has thus been thrown up against Marxism's equally unanswerable arguments about the persistence of capitalism and the implacable consequences of commodification, generating a profound theoretical impasse.

Recently, however, certain attempts to surpass this impasse have emerged, proceeding from both sides of the postmodern/Marxist divide. From the Marxist camp, the pioneering example is Frederic Jameson's now-canonical essay, "Postmodernism: The Cultural Logic of Late Capitalism."[17] In this essay, Jameson argues that the emergence of a distinctively postmodern culture, rather than marking a break with capitalism into a new era, corresponds to the 'late' or 'multinational' stage of capitalism analyzed by Ernest Mandel.[18] In this phase, previously untouched domains of social activity are penetrated by the forces of a technologically-integrated world-market. One aspect of this process is a surge in the commodification of cultural and communicational forms. Advertising, design, marketing, fashion, and entertainment become a primary focus of commercial activity. Consequently, the distinction--valid for earlier stages of capitalist development--between an economic base and cultural superstructure collapses. Capitalized culture envelops all aspects of the social in an omnipresent wrap of imagery whose multiple surfaces extinguish material reference or sense of history. Subjectivity becomes, as postmodern theory suggests, increasingly decentered and unstable--experiencing a condition not so much of alienation as fragmentation, induced by the fluctuating stimuli of electronic media and the malleable spaces of commercial architecture and urban design.

This analysis--whose boldness is indicated by the fire it drew from partisans of both Marxism and postmodern theory--has subsequently been elaborated in a variety of ways, most notably by connecting postmodernity to the concept of a post-Fordist regime of accumulation.[19] The most impressive of these efforts is that of David Harvey's, who relates postmodern culture to post-Fordist "time-space compression."[20] Capitalism, says Harvey, is periodically compelled to flee the risk of overproduction by both expanding the geographical horizons of the market and accelerating the circulation-time of commodities. At such moments, society undergoes a massive speed-up in the pace of daily life and a dramatic expansion in spatial horizons. Since 1972, the passage from Fordist mass-production to a post-Fordist regime of flexible accumulation has precipitated such a convulsion in North American and European culture, such that "spaces of very different worlds seem to collapse upon each other, . . . and all manner of sub-cultures get juxtaposed."[21] Postmodern culture--with its cosmopolitanism, eclecticism and volatility--is both reflective and constitutive of this shift: its emphasis upon "ephemerality, collage, fragmentation, and dispersal . . . mimics the conditions of flexible accumulation," and also stimulates the new images, fashions and styles of thought which are so central to the restructuring of production.[22] Although Harvey is fiercely sceptical towards postmodern

theory, which he believes fails to critically distance itself from the transformations it records, he does allow that it recognizes, albeit in mystified form, important alterations in the structuring of subjectivity and perception. Postmodernism registers a "sea-change" in culture caused by a "shift in the way in which capitalism is working these days."[23]

These lines of Marxist analysis have in a way been met from 'the other side of the hill' in recent statements by the Jacques Derrida, the leading poststructuralist philosopher. To the infinite dismay of many of his disciples, Derrida broke his decade-long silence on the topic of Marxism, not to issue one more declaration of its obsolescence, but, on the contrary, to affirm its unsurpassability of a horizon of contemporary thought. In fact, Derrida suggests, it is precisely the immaterial or "spectral" conditions of contemporary production, on which so many postmodern theorists have dwelt so extensively, that throws into new salience certain features of Marxist analysis.[24] In particular, the internationalization of production through telecommunication has made the issue of the world market, and with it issues of exploitation and inequity in the distribution of global surplus, inescapable. Rather than agreeing with Lyotard that "the (Marxist) ghost has now vanished," Derrida argues that the "spectral" conditions of the new global economy, an economy predicated on mediatization and tele-work, in fact summons up the continuance of Marxism as a "spectral" presence, a certain spirit of resistance against injustice which obdurately refuses to vanish from the world stage.

These various postmodern/Marxist conversations seem to us of considerable importance. Yet they lack a crucial dimension. While all in various ways identify aspects of what we might call 'postmodern capitalism,' all are virtually silent on the question of opposition to such an order. Derrida calls for a New International, but does not specify how or where this might emerge. Indeed, as Adrian Wilding points out, Derrida's reasserted Marxism is undermined by his insistence that the spectre of revolution can never be conjured in full presence, that communism is an ever-deferred futural project, "urgency, imminence, but, irreducible paradox, a waiting without horizon of expectation."[25] Jameson suggests that postmodern culture has to be seen dialectically as *both* a mystificatory veil over the realities of contemporary exploitation *and* a field of emancipatory potential, but says almost nothing about how this latter potential might manifest .[26] Similarly, Harvey evokes a revival of historical materialism but gives no indication of where this regenerated Marxism might find its protagonist or translate into political practice.[27]

These silences signify a major problem. For, if Marxism cannot under contemporary conditions locate agents of contestation and practices of opposition, its analysis of postmodern capital amounts only to a reiteration (albeit on a more 'political economic' basis) of the chief point of anti-Marxist postmodern theory: that under

postmodern conditions, the game is over, the struggle does *not* continue. What is therefore required is not just analysis of postmodern capital, but also of the subject (s) potentially antagonistic to it : an analysis of the postmodern proletarian condition. For at least some hints in this direction we can look to autonomist Marxism, and in particular to the work of Negri and his collaborators, Gilles Deleuze and Felix Guattari.

Recombinancy: Postmodern Class Struggle?

To situate the autonomists within the Marxist /postmodernist debate, some historical perspective is again useful. As we have mentioned elsewhere, the *autonomia* movement emerged from the wave of struggles that swept Italy during the 1960s and 1970s, starting in industrial plants but rapidly involving universities, schools, homes, urban squats, radio stations, transportation networks, cultural organizations and every facet of their society--struggles similar to, but more protracted than, the French student-worker revolts that provided the seedbed of postmodern theory. However, unlike both the official French and Italian communist parties, the Marxists of *autonomia* did not reject the widespread uprisings outside the factory as marginal and incorrect, but rather embraced them and tried to adapt their theoretical perspective to encompass these new points of conflict. Many 'postmodern' theorists--such as Michel Foucault, Paul Virilio, and, most especially Felix Guattari, who was actively involved with dissident radio in Italy--had sympathies with *autonomia*, and, when the movement was repressed and its leaders were put on trial, joined in the international campaign to free them: when Negri fled Italy after a period of incarceration, he found refuge in France through the assistance of Guattari, with whom he has subsequently worked collaboratively.

Negri has in fact referred to his own work as a theory of "class antagonism in the postmodern world."[28] From what we have already seen of his work, it is perhaps not hard to understand why. For while Negri reaffirms the Marxist analysis of the war between capital and labour, he reinterprets this antagonism within a horizon which emphasizes both the diverse sites over which this conflict is fought, and the importance to it of communicational practices.

It will be remembered that Negri, like other autonomists, traces class conflict through a series of cycles of struggle--from the "professional" or craft worker at the end of the 19th century to the mid-20th century "mass," industrial factory worker. Each of these cycles of conflict has driven capital to adopt successively more highly-organized and technologically-intense forms. This trajectory has today led to a situation where "the factory spreads throughout the whole of society . . . production is social and all activities are

productive."[29] However, according to Negri, such a development only inaugurates a new cycle of struggle--that of the "socialized worker."

For, says Negri , capital's self-enlarging subsumption of society also multiplies the potential points of resistance. When the locus of production shifts from the factory to society as a whole, anti-capitalist antagonism is no longer concentrated in the mass factory, but radiates out to manifest in households, schools, hospitals, universities, media, and so on. Struggles at each site manifest their own specificity, yet all encounter a barrier in capitalism's subordination of every use value to the universal logic of exchange. Thus, unlike the relatively homogenized, factory-based "mass worker," the "socialized worker" arises from a pluralistic, variegated form of labour power, whose ranks include not only highly varied forms of wage worker (in the service as well as industrial sector) but also the unwaged workers (homemakers, students) whose activities are indispensable for the operations of the social factory. As Negri puts it, in a formulation that clearly shows his convergence with characteristically postmodern themes of heterogeneity and diversity,

> The specific form of existence of the socialized worker is not something unitary, but something manifold. The paradigm is not solitary, but polyvalent. The productive nucleus of the antagonism consists in multiplicity."[30]

Moreover, Negri argues, the social expansion of capital gives both its operations and the struggles against them an increasingly communicational nature. Avoiding the 'base/superstructure' metaphor, whose baggage of mechanical materialism has so plagued Marxism, Negri's rests instead on Marx's observations about the importance of "labouring cooperation." For Marx, a central feature of capital's enlarging organization was its attempt to impose despotic managerial control over a workforce whose activities depended on "collective unity in cooperation, combination in the division of labour."[31] Developing this theme, Negri says that the advent of the "social factory" produces

> a specific social constitution--that of cooperation, or, rather, of *intellectual cooperation* i.e. communication--a basis without which society is no longer conceivable.[32]

To coordinate its diffused operation, business must interlink computers, telecommunications and media in ever-more convergent systems, automating labour, monitoring production cycles, streamlining turnover times, tracking financial exchanges, scanning and stimulating consumption in the attempt to synchronize and smooth the flow of value through its expanded circuits. It is only through the elaboration of this vast information-system that "advanced capitalism directly expropriates labouring cooperation;"

> Capital has penetrated the entire society by means of technological and political instruments (the weapons of its daily pillage of value) in order, not

> only to follow and to be kept informed about, but to anticipate, organize and subsume each of the forms of labouring cooperation which are established in society in order to generate a higher level of productivity. Capital has insinuated itself everywhere, and everywhere attempts to acquire the power to coordinate, commandeer and recuperate value. But the raw material on which the very high level of productivity is based--the only raw material we know of which is suitable for an intellectual and inventive labour force--is *science, communication and the communication of knowledge*.[33]

The preeminence of "communication " as a category in postmodern theory, Negri claims, registers this process. In the Grundrisse Marx explains that the discovery of "labour" was an historical event: although the category "labour in general" represents an "immeasurably ancient relation valid in all forms of society," nevertheless it had to await formulation until capital's forcible "abstraction" of labour power--technologically reducing craft skills, homogenizing the workforce, stripping workers of all attributes other than as a factory 'hands'--gave it "practical truth."[34] Today, Negri suggests, the incorporation of a variety of informational flows and interaction into production is imposing a similar "abstraction" on the concrete variety of communicative practice. This is perhaps most readily recognized in the creation of a universal digitalized idiom into which all forms of communication can be coded and transcoded as 'information'--a quantifiable flow of bits and bytes which can be measured and monitored as the stuff of workplace productivity and pay-per services.

However, Negri says, this development has a double face, each side of which is recognized by a different branch of postmodern thought. One side is the harnessing of all sorts of communication to ever-expanding commodification, the reduction of social relations to a series of exchange relations, and the consequent hollowing out of meanings and relations;

> In the circulation of values, every commodity has become money, every reference appears in a circuit of equivalents . . . every singularity has lost all significance and the sense of being has become pure paranoia.[35]

This is caught by what Negri calls the more "banal and pessimistic" version of postmodernism, in which the novel features of the age lie in "the total disintegration of received language, of its meanings and expressions . . . the tectonic slippage of all foundations."[36] This negative moment of postmodernism arises from the sense of immersion in capitalist subsumption--a vast apparatus whose sole purpose is, in Marx's terms, "production for productions sake," a situation which, Negri suggests, produces "a painful . . . perception of the total insignificance of the being in which we are immersed; a being whose framework and directions we no longer perceive."[37]

However, Negri suggests, there is another aspect to capital's extraordinary development of its informational apparatus--namely, that its channels can potentially be

used for purposes quite other than those for which it was intended. It is these creative openings that are glimpsed by what he regards as the more "sophisticated and positive" versions of postmodernism, attuned to the"plurality of languages, the uncertain role of judgements, and the becoming-ever-more absolute of the horizon of communication."[38] At its best, Negri says, such postmodern theory:

> presupposes not merely an enormous, fluent universe of communication, but throughout every stretch of this mass of communicative threads it identifies contradiction, conflict, and, above all, new power.[39]

In this version, postmodernism constitutes "a primitive but effective allusion to the . . . new subjects which appear in the Marxian phase of general circulation and communication."[40]

In Negri's view, the negative and positive moments of postmodern theory between them present a portrait of the contradictions that run through a capitalism predicated on a vast communicational infrastructure--"simultaneously the ruin and the new potential of all meanings."[41] Both offer important insights, yet each provides only a partial perspective. The first responds to the deepening reach of computerized commodification, but nihilistically denies the possibility of resistance; the other recognizes the "socialized worker's" potential for experiments in diversified and democratic communications but occludes issues of exploitation and capitalist control. Only when the two tendencies are seen counterpoised in ongoing conflict does an adequate perspective emerge. Thus in Negri's view postmodern thought is "ambiguous"; although "eclectic," it does identify "certain conditions on which it is possible to construct the concept of new subjectivities."[42]

Negri's Marxism thus enters into a tentative rapport with postmodern theory. Yet his insistence on the universal and progressive goals of struggle is also reminiscent of the postmodernists' major modernist opponent, Jurgen Habermas. Negri's contrast between dominative information and insurgent communication owes an acknowledged debt to Habermas's theory of communicative action, which upholds an "ideal speech situation" of democratic, symmetrical dialogue unobstructed by inequities of power and skill as a yardstick against which to measure emancipatory social change.[43] However, for Habermas economy and workplace lie outside the orbit of such judgement, and are subject to an instrumental logic which finds inexorable embodiment in capitalist rationalization. The consequence is a purely defensive social democratic politics which aims to protect select areas of the "life-world" from the encroachments of the "system", but abandons any fundamental challenge to capital's dominance of productive activity.[44]

For Negri, in contrast, the advent of the "factory without walls" makes it impossible to split work from life. The increasing prominence of communicative action is

precisely a result of the socialization of production. Conflict between instrumental and communicative logic crystallizes around the contradiction between capitalist command and collective labour; and the horizon of the "ideal speech situation" can only be reached by way of full-blown revolutionary project whose ultimate objective remains the demise of capital. In the next two sections we will elaborate this point by looking briefly at examples of what Negri would consider "negative" and "positive" moments of postmodern analysis, and their relation to autonomist theory.

Simulacra: The Reality Gulf

What Negri terms the "banal and pessimistic" school of postmodernism is undoubtedly best represented by the school of Jean Baudrillard and his followers. Baudrillard, after starting from a brilliant critique of orthodox Marxism's base/superstructure dualism, and developing an incisive analysis of cultural commodification, has since gone on to develop ian ever-more nihilatory analysis of the power of media.[45] In an age of advanced information technologies he claims, signs, which once pointed to reality, then served to mystify it through advertising and propaganda, have now come to entirely substitute dor it. We enter a world of simulacra, where models come before originals. In this hyper-reality,

> The territory no longer precedes the map, nor survives it. Henceforth, it is the map that precedes the territory . . . The real is produced from miniaturized units, from matrices, memory banks and command models-- and with these it can be reproduced an indefinite number of times.

Subjectivity is no more than an effect of an omnipresent "code," produced by a shadowy "neo-capitalist cybernetic order."[46] A "cyberblitz" of advertisement, propaganda, television shows and polling techniques produce the very needs, desires, opinions and identities to which they ostensibly respond. Every antagonism is annulled by a media apparatus that effortlessly recuperates opposition as spectacle. With reality itself constituted by wall-to wall -media images, the epistemological ground for distinction between actuality and imaginary, truth and lies, fabrication and authenticity evaporates. Social existence undergoes an "implosion," becoming a "black hole," a spongy, infinitely absorbant mass that soaks up media images from Bobbits to Bosnia, indifferent to veracity but hungry for ever more intense waves of sensation.[47]

The recent culmination of this line of thought comes in Baudrillard's articles on the Persian Gulf War.[48] Written at the time of the conflict, these focussed on the role of the media in a war where "our strategic site is the television screen, from which we are daily bombarded."[49] Baudrillard claims that propaganda and disinformation make it impossible to

know what is actually going on in the sands around Kuwait: epistemological certainty, including even the the confidence that what is occurring constitutes a "war," has been swallowed up in an abysall "reality gulf."[50] While he admits that large numbers of people have been been killed and cities bombed, the "virtual" nature of the electronically-mediated hostilities makes any "practical knowledge of this war . . . out of the question."[51] All that sceptical intelligence can do is "reject the probability of all information, of all images whatever their source."[52] The aim of this is not to "seek to reestablish the truth"--for which, Baudrillard insists, "we do not have the means"--but rather to "avoid being dupes."[53]

Despite the denunciations that these and other of Baudrillard's writings have rightly attracted, they should not be lightly dismissed. His account of the simulacra has, as Negri puts it, "a very high degree of descriptive power."[54] Indeed, in many ways it more fully acknowledges the enormous challenges facing oppositional movements today than many more conventional Marxist accounts of 'ideology'. For it registers a situation in which control of the media often (if not as uniformly as he suggests) gives established power the capacity not just to promulgate specific beliefs and values, but to set the very parameters of perception.

Negri himself uses Baudrillardian language to describe this capitalist "duplication" of reality. Discussing the neoliberal state (which they also term "the postmodern state") he and Michael Hardt suggest that one of its central roles in capitalist restructuring has been to disintegrate the institutions of civil society (trades unions, political parties) so as to effectively annul political debate. However "this void must be covered over by the construction of an artificial world that substitutes for the dynamics of civil society." Thus "Even while the real elements of civil society wither . . . its image is proposed at a higher level."[55] Here, they remark, "The new communicational processes of the so-called information society" play a vital role, with a move "from the democratic representation of the masses to the representative's production of their own voters";

> Through the mediatic manipulation of society, conducted through enhanced polling techniques, social mechanisms of surveillance and control, and so forth, power tries to prefigure its social base . . .[56]

Moreover, Baudrillard's account recognizes--even as it reinforces--one of the most problematic aspect of the postmodern proletarian condition, namely that awareness of such manipulation may take the form of a deep-seated cynicism and relativism, inimical to activism. Indeed, from our point of view, Baudrillard's account of "social implosion" is a quite percipient account of an advanced state of class decomposition in which solidarity and agency have broken down in favour of atomization and spectatorship.[57]

Where autonomist analysis parts company from Baudrillard, is, of course, on the possibilities of challenging and subverting the reign of the simulacra.[58] Underlying Baudrillard's fatalistic cynicism is in fact a highly structuralist view of the subject as simply an effect of the dominant "neo-capitalist" cultural code. An autonomist perspective would understand the operations of this dominant code not so much as constructive as reductive--something that selects, limits and constricts the possibilities of a more expansive field of social practices that always includes at least some elements 'other' than capital. If the self is always fabricated, some fabrications promote a subjectivity of passivity, dependency and indifference, while others foster agency, autonomy and inquiry.

In a rather cryptic phrase, Negri has suggested that in the face of the "duplicatory" power of capital, the task of opposition is nothing less than "a Socratic task--that of reimposing the principle of reality."[59] We do not understand this phrase in the sense of any naive objectivism, or uncomplicated faith that situations can be reduced to a single truth. But we would nevertheless affirm the possibility of distinguishing between 'truer' and 'falser' depictions of reality--in the sense of identifying more or less coherent and comprehensive accounts, and more or less manifestly self-interested narratives.

Even advanced capital does not so completely or efficiently monopolize the channels of communication as to make this activity impossible. As Christopher Norris has argued, even in the midst of the Gulf War propaganda blitz, the activities of a few reporters of integrity did occasionally make it possible to discern the discrepancies and omissions of official accounts.[60] And Europe and North America also saw some remarkable uses of video, 'alternative television' and computer networks to transmit news and analysis marginalized or excluded from mainstream accounts.[61] Although these efforts were, in Robert Hackett's phrase, "engulfed" by the US state's military-marketing campaign, they nevertheless point to potentialities which in other circumstances could be more effective.[62] Indeed, Negri would argue that one of the characteristics of the socialized worker --or postmodern proletarian--is his/her increasing ability to reappropriate capital's communicational machines in order to contest its simulations. But to consider this possibility we should turn to a more optimistic version of postmodern analysis.

Cyborgs: Living/Dead Labour

For such an example, we can do no better than to look at the notion of the "cyborg" presented by Donna Haraway in her "Manifesto for Cyborgs: Science, Technology and Socialist Feminism in 1980s."[63] For Haraway, the figure of the cyborg--a cybernetic organism--provides an "ironic myth" expressing contemporary possibilities for political

activism in an era when capitalism operates through a high-technology "informatics of domination."[64] To refer to the inhabitants of this global system as "cyborgs" is to suggest that in a society permeated by media, computers and genetic engineering, subjectivity has in a profound and irreversible way become technologized--formed at the interface between human and machines. Drawing on postmodern theory, Haraway argues that in such a technological world, identities cannot be predicated on some 'essential' nature, but are instead relentlessly artefactual and constructed. However, in a spirit diametrically opposite to the anti-technologism of much left and feminist thought, she does not find this prospect defeating or despiriting. As she puts it,

> cyborgs . . . are the illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins.[65]

At its most literal level, cyborg politics means refusing a "demonology of technology" and embracing the possibilities of reappropriating the instruments of information capitalism for alternative purposes, reconstituting the boundaries of daily life by "both building and destroying machines."[66] More broadly, the border-transgressing figure of the cyborg is for Haraway a metaphor for the hybrid identities emerging in a situation where the "elementary units" of "race, gender and class . . . themselves suffer protean transformations" within a global high-technology capitalism.[67] Cyborg politics thus also means discovering new forms of organization adequate for an era when a "new industrial revolution" is "producing a new worldwide working class."[68] This project, Haraway suggests, involves rejecting vanguard parties but fostering affinities and alliances." Oppositional, utopian and completely without innocence," she writes, cyborgs are "wary of holism, but needy for connection--they seem to have a natural feel for united front politics."[69]

Haraway's concept of the cyborg has a distinct affinity with Negri's theory of the socialized worker. For Negri, the socialized worker is a figure operating at variegated sites throughout the circuits of capital, immersed in a technoscientific environment where computers and communications have become so commonplace as to constitute a second nature. S/he (Negri specifies the feminization of the workforce as a feature of the socialized worker) inhabits an "ecology of machines."[70] Computers, videos, faxes and other media become so quotidien that workers have"organic" familiarity with them.[71] Capital is thus unable to stop socialized workers using these technologies for their own purposes--of which the most politically significant is the establishment of communication across the divisions that segregate sections of the workforce. Indeed, Hardt and Negri specifically declare this parallelism with Haraway's line of thought, saying that the increasing interface

of the labouring body with technological appendages means that "the cyborg is now the only model for theorizing subjectivity."[72]

We have already mentioned several cases which would serve as examples of such "cyborg" activism: Subcommandante Marcos plugging in his laptop; French students appropriating Minitel; video counter-surveillance in Los Angeles or East Timor; the feminist computer and radio networking surrounding the United Nations conferences in Egypt and Bejing; the mobilization of biomedical knowledge in struggles around AIDS, abortion and environmental health. Andrew Ross, in an article inspired by Haraway's line of thought, cites a case which would also well serve as an instance of the "organic" connection to technoscience that Negri sees in the socialized worker.[73] This involves a group of Michigan autoworkers who had been promised courses in computer programming as part of their on-the-job training by General Motors. When the company abruptly terminated these courses, declaring that such depth of technical knowledge was excess to functional workplace requirements, the workers--who included veterans of the Flint sit-down strikes--launched a law suit, hinging around the corporation's use of state-provided public education funds for private purposes. But they also formed their own USE net news group and email bulletin--the Amateur Computerist. This bulletin was devoted simultaneously to practical self-instruction in computer lore, criticisms of the corporate use of technology, arguments for the reduction of the work week, support of autoworkers' strikes and "netizens" arguments for the democratic, rather than commercial, organization of cyberspace. It eventually came to command a relatively wide following--a prime example of cyborg struggle.

Although there are strong similarities between the lines of thought of Negri and Haraway's, there is a difference in emphasis. Haraway's work is characteristically postmodern in its refusal to nominate any central axis of conflict along which activism might be arrayed-- a refusal which, particularly in elaborations by later authors, results in the discovery of 'cyborg resistance' in every aspect of contemporary technoculture, with little attempt to make strategic or tactical differentiations about its political significance. Negri's appropriation of the cyborg concept reinscribes it within a Marxist horizon of capital/labour conflict, but to heretical effect.

Marxists have always emphasized that capital is a system which tends to supplant living labour with dead labour, replacing the variable capital of human workers with the fixed capital of machinery. This tendency now appears to be reaching a culmination in genetic and computerized technologies, where machines are infiltrated deep into organic life itself while artificial intelligences promise to assume many of the attributes of consciousness. One interpretation of this situation is to see in it a necrotic apogee of capitalist control--a near total subjugation of living to dead labour, the ultimate victory of

fixed over variable capital, a nightmare of technological exploitation extended to the point where the very biological integrity of the species is subordinated to the imperatives of accumulation. This indeed is the theme of some Baudrillardian strains of postmodernism, such as the brilliantly graphic, but ultimately voyeuristic, accounts of technocapital's virtual "harvesting" of human flesh offered by Arthur Kroker and his colleagues.[74]

But from Negri's perspective this is only half the story. Against it must be set countervailing tendencies, in which the increasing interface and infiltration of living by the dead labour opens towards a quite different outcome: a prosthesis of labour and machine which loosens capital's unilateral control of technology. Expanding his point, we could say that capital, in its drive to automate every function of the work place--mental as well as manual--has been compelled to develop machines of extraordinary versatility, technologies which in their potential universality emulate the very flexibility and plasticity of living labour itself. In this respect, information society theorists are right to emphasize the difference between mechanized and information systems. However, this protean quality of computers and communication systems--their reprogrammability, their interactivity--is often taken as simply marking a new, intensified level in capitalist development. What such analysis omits is the possibility that this flexibility might be used, not to augment capital, but to subvert it. For the malleability of the new technologies means that their design and application becomes a potential site of conflict, and holds unprecedented potential for the recapture of machines. These are the possibilities recognized by Haraway and Negri, possibilities of which any Marxism confronting postmodern culture must take account.

Rhizomes and War Machines

Although we can find elements of a postmodern/ Marxist recombinancy in Negri's work, to see a sustained exploration of this possibility we should turn to the *oeuvre* of his allies and collaborators, Felix Guattari and Gilles Deleuze. Of course, despite the explicit insistence of these authors that they are indeed Marxists, many would feel that the chaotic playfulness, exotic vocabulary and celebrations of 'desire' and 'schizophrenia' found in their writings are far removed from the sober business of historical materialism.[75] And, on the other hand, Guattari has specifically divorced his work from postmodernism -- denouncing the ideas of a "postmodern condition" promoted by Lyotard and Baudrillard as "the very paradigm of every sort of submission, every sort of compromise with the existing status quo"--yet is regularly included in anthologies of postmodern thought![76] However, we think this confusion if anything confirms the accuracy of our hybrid designation--postmodern Marxists.

Deleuze and Guattari's work is now the topic of a growing number of excellent analyses. We will therefore restrict ourselves to a brief overview of their position before looking more specifically at how it bears on our discussion of information capitalism.[77] In the universe of Deleuze and Guattari, all social reality is constituted by desire. Desire is not good or bad; just productive and dynamic. Indeed, we think it is fair to say that Deleuze and Guattari's desire is the principle of transformative, constitutive action which Marx called 'labour'--prior to its appropriation within a structure of surplus value extraction.[78] Desire is heterogeneous and mobile. Social order is built on its homogenization and stabilization--the organization of the small, fluid, multiplicitous "molecular" forms of desire into big, institutional "molar" macrostructures: "To code desire is the business of the socius."[79] This binding of desire is a "territorialization"-- a fixing in place, setting of boundaries.[80] But desire is "nomadic," always seeking lines of fight or flight, pursuing more objects, connections and relations than any society can allow.[81] Consequently "there is no social system that does not leak in all directions."[82]

Capitalism "deterritorializes" more stable archaic social orders based on landed property or tribal community, but "reterritorializes" everything in terms of exchange value.[83] Constantly adding or subtracting organizational "axioms" and altering its combinations of labour process, political organization and cultural apparatus, it is more flexible than any of the social systems it supplants.[84] Its most recent form is "integrated world capitalism," in which "the single external world market (is) . . . the deciding factor."[85] The global economy emerges as a "universal cosmopolitan energy which overflows every restriction and bond":

> Today we can depict an enormous, so-called stateless, monetary mass that circulates through foreign exchange and across borders, eluding control by the states, forming a multinational ecumenical organization, constituting a de facto supranational power untouched by governmental decisions . . .[86]

Characteristics of "integrated world capitalism" are a reshaping of the international division of labour, with the appearance of areas of under-development appearing within the developed world and limited development within the underdeveloped world; a declining number of jobs; intensified integration of the upper, privileged strata of the working class and the appearance of new strata of great insecurity--"immigrants, hyper-exploited women, casual workers, the unemployed, students without prospects, all those living on social security"; and a "constant reinforcement of control by the mass media."[87]

However, over the same period that capitalism has consolidated this global, "molar" structure, there also appears what Guattari terms a "molecular revolution"--"a proliferation of *fringe groups, minorities and autonomist movements* leading to a flowering of particular desires (individual and/or collective) and the appearance of new forms of social

grouping."[88] These are movements appearing beyond the ranks of the industrial working class amongst the unemployed, women, ecologists, homosexuals, the old, the young . . . These, Guattari says," constitute 'fighting fronts' of a quite different sort from those that have always marked the traditional workers' movement.[89] For these movements, it "is not just a matter of struggling against material enslavement and the visible forms of repression, but also, and above all, of creating a whole lot of alternative ways of doing things, of functioning."[90] The undecidable factor today is whether these micro-revolutions "remain contained within restricted areas of the socius" or establish " a new inter-connectedness that links one with another" and end by producing "a real revolution . . . capable of taking on board not only specific local problems but the management of the great economic units."[91]

Deleuze and Guattari speak of revolutionary organization as the creation of "machines of struggle."[92] This has to be understood carefully. For Deleuze and Guattari, any assemblage of desire--at a subjective or social level--is a "machine." The term is aimed to break with humanist concepts of natural identities, to emphasize (as Haraway does with her concept of "cyborgs") the constructed, produced, and collectively fabricated nature of psyche and society. Thus when they speak of radical political organization as the creation of nomadic "war machines," while they certainly do not preclude armed struggle, the phrase has a far wider dimension. They are thinking in terms of aggressive, mobile, decentred organizations, capable of being built or dismantled as needed, that can harry and erode the structures of established order--"state machines." At the same time, given their affirmative attitude toward the subversive use of technology, which we will examine in a minute, there is also a certain literal embrace of the machine as an instrument of struggle.

The characteristic form of a contemporary "machine of struggle" is a "rhizome."[93] By this name Guattari and Deleuze designate decentred, divergent, transverse, non-hierarchical, lateral or transverse modes of organization--contrasted with "aborescent" or rigid, linear, vertical and hierarchical patterns."[94] Deleuze and Guattari apply the term "rhizomatics" to modes of philosophy and psychoanalysis, but the phrase also has clear political implications. The experimentation with coalitions, rainbows, networks, and webs which has been a salient feature of anti-capitalist movements in the last decade are all experiments with rhizomatic forms of organization. Guattari speaks of the needs for the "molecular revolution" to find forms of organization in which "the different components will in no way be required to agree on everything or to speak the same stereotypical language."[95] In doing so he reiterates a persistent theme of autonomist Marxism: Sergio Bologna has similarly spoken of the search for "a set of recompositional mechanisms that start, precisely from a base of dishomogeneity,"while Sylvere Lottringer and Christian

Marazzi emphasize "multi-centred" forms of struggle which "stress similar attitudes without imposing a 'general line.'"[96]

One characteristic of "rhizomatic" organizations is that the distributed nature of their decisions and actions makes rapid and efficient communication very important. Thus the possibility of their using information technologies becomes very significant. Guattari, himself involved in politicized 'pirate' radio, was particularly aware of this possibility and he repeatedly emphasizes the liberatory possibilities of new machines. On the one hand, high technology offers "integrated world capitalism" the opportunities of extending "a generalized machinic enslavement" in which humans operate as input-output relays within elaborated information systems dedicated to speeding the circulation of exchange values. However, this situation also abounds in "undecidable propositions."[97] There is a "shared line of flight of the weapon and the tool: a pure possibility, a mutation";

> There arise subterranean, ariel, submarine technicians, who belong more or less to the world order, but who involuntarily invent and amass virtual charges of knowledge and action that are usable by others, minute but easily acquired for new assemblages.[98]

Guattari specifically rejects "media fatalism" arguing that as a result of declining costs, and continued technological advancement, continuous labour market retraining there is a growing "potential use of . . . media technology for non-capitalist ends."[99] Media, he says, can be tied to different types of "group formation"--one based on "standard identifications and imitations, the father, the leader, the mass media star," the other more open and creative, leading to dialogues which can break down received stereotypes and encourage diverse collectivities to form their own discourses and self-representations. The first, Guattari claims, is encouraged by the uni-directional broadcast technologies of the "mass media," the latter by the new capacities of a "post-media age " in which the communication technologies can be "reappropriated by a multitude of subject-groups"; computerization in particular, he says, has "unleashed the potential for new forms of . . . collective negotiations, whose ultimate product will be more individual, more singular, more dissensual forms of social action.[100]

Harry Cleaver has made an interesting application of the "rhizome" concept to the Zapatista networking we discussed in the previous chapter.[101] For another example of the "rhizomatic," "post-media" movements of the sort Guattari envisages, one might think of the anti-roads struggles which have snaked their way through post-Thatcherite Britain across sites like Twyford Down, the M11 Extension and Newbury.[102] These campaigns, aimed at blocking the new motorways built largely to facilitate integration with the European Economic Community, involve highly diverse groups--Earth Firster's, 'middle class' conservationists, local property owners, Marxist militants, Greenpeacers, the Donga

Tribe, and so on. They also interweave loosely with other movements, such as the very 'nomadic' struggles by Gypsies, 'travellers,' anti-hunt saboteurs against the draconian restrictions on civil liberties and personal mobility imposed by the Tory government's Criminal Justice Bill, or various 'New Digger' groups such as "The Land is Ours" attempting to reappropriate the one-time 'commons' from corporate ownership.

One feature of these anti-roads struggles has been their pervasive use of various forms of high-tech communication: personal computers to coordinate rapidly assembled blockades and demonstrations; video to record and publicize protests and for counter-surveillance against police and security guards; the dissemination of such film through alternative television producers, such as the celebrated "Undercurrents" programs; and, more loosely, the construction of a cultural ambience of protest closely associated with various forms of techno-music. One reporter on the "postmodern tendencies" of this "media-friendly, technologically-literate" movement comments:

> Anti-roads activists phone up the media to give interviews from the top of cranes while videoing the behaviour of police and security guards swarming beneath them. The action footage is replayed at clubs and festivals or broadcast on the Internet across the world. As the electronic icons . . . are appropriated for protest, the information technology revolution is being pressed into service in the name of further widening the scope of political communication and participation.[103]

This, we suggest, is exactly what Guattari thought "the molecular revolution" would look like.

Cyber-Nazis and Nizkor Projects

However, it is important to recognize that the potentialities recognized by Deleuze, and Guattari also have a malignant side. One of the salutary aspects of these authors' work is that they take seriously the possibility of a postmodern fascism, in which the very communicational and nomadic capacities so rich in anti-capitalist possibilities are recuperated in appallingly destructive form. Guattari and Deleuze have always emphasized that molecular rebellions can turn negative, becoming paranoid or suicidal, and they have taken conventional Marxisms to task for their failure to recognize the unconscious and preconscious paths in which longings for emancipation and freedom become twisted into racist, sexist and homophobic hatreds and authoritarian dependencies.[104] Like Baudrillard, they speak of "black holes"--in this case, meaning the turning inwards of revolutionary aspirations toward internecine hostility.[105] In this perverted form, they become available to capitalism as a weapon against movements of autonomy, providing the basis for fascism --

"without doubt capitalism's most fantastic attempt at economic and political reterritorialization."[106]

Today, it is very evident that desires for autonomy from "integrated world capitalism" can take 'right' and well as 'left' forms. The proliferation in North America and Europe of neo-Nazis, Klan, Aryan Nations, Patriot Militias, holocaust denyers and fundamentalist churches, mobilized both in official forms, such as the movements headed by J. M. Le Pen in France and Pat Buchanan in the USA, and in clandestine, underground networks of the sort responsible for the Oklahoma City bombing or the burnings of immigrant hostels in Germany, represents a significant popular response to the social and economic costs of neoliberal restructuring. Recruiting their membership from sectors of the working class dramatically devastated by the advent of the information economy--the unskilled, rural white males at the base of the US militias, the masses of European unemployed--these movements present an analysis that often mixes percipient analysis of globalization with extremes of pathological fantasy. Unemployment is attributed to aliens and immigrants; disintegrations in family security and social infrastructures to the activities of feminists and homosexuals; capital's overunning of national sovereignty is deciphered as the result of Jewish banking cabals; real intensifications in security-state activity appear as fantasies of 'black helicopters' commanding takeovers engineered by the United Nations; and desires for release from deepening immiseration translates into programs of vengeance against every form of social 'other.'

These movements have proved at least as adept as the left, probably more so, in availing themselves of the widely socialized capacities of information age capitalism. "You may ask 'why the computer technology?" wrote one Aryan Nations leader as early in 1984:

> The answer is simple, because it is our Aryan technology just as the printing press, radio, airplane, auto, etc. etc. We must use our own God-given technology in calling back our race to our Father's Organic Law.[107]

Such uses extended from the sophisticated BBS computer networking linking the armed cells of various North American white supremacist groups and militias; the Usenet newsgroups such as alt.skinheads, alt.politics.white_power, or alt.politics.nationalism.white; holocaust -denial World Wide Web sites, such as the trilingual "Stormfront"; the distribution by German and Austrian neo-Nazi groups of children's computer games based on genocidal scenarios; and the extraordinary success of the far-right in colonizing talk radio in the United States.[108] Indeed, the considerable communication power of proto-fascist groups has meant that combatting their high technology propaganda itself become an important focus of information activism--one thinks of the Nizkor Project (from the Hebrew word for "we will remember") operated by a

Ken McVay, a fifty-four year old Vancouver Island store-clerk and self-described "modem junkie" who has over years compiled a vast electronic archive (or what has been described as "the information equivalent of a gigantic weapons dump") devoted to refuting holocaust revisionism on the Internet.[109]

The relations of these far right groups to the central institutions of capital are complex. On the one hand, the threat to order posed by their armed wings has meant that such movements are indeed targeted by the state security apparatus, which often brings to bear on them the most violent forms of repression (Waco, Ruby Ridge), while at the same time making their activities a pretext for a more generalized repression (censorship of the Internet). At the same time, there are undoubtedly sectors of capital--for example the corporate backers of the Republican right in the US--which look to either tolerate or actively harness the energies of such movements to the project of paralyzing and destroying working class unity. Out of such complicity emerges the real possibility of a fascist "reterritorialization" of capital.

Deleuze and Guattari note that "What makes fascism dangerous is its molecular or micropolitical power, for it is a mass movement: a cancerous body rather than a totalitarian organism."[110] As they observe, the success of Nazism in Germany lay in its creation of microorganizations capable of penetrating every cell of society, organizations which both predated its assumption of state power, and, persisting afterwards, gave this power an insidious and omnipresent grip on society:

> . . .fascism is inseparable from a proliferation of molecular focuses in interaction, which skip from point to point, before beginning to resonate together . . . Rural fascism and city or neighborhood fascism, youth fascism and war veteran's fascism, fascism of the Left and fascism of the Right, fascism of the couple, family, school and office: every fascism is defined by a micro-black hole that stands on its own and communicates with the others, before resonating in a great, generalized central black hole.[111]

As Douglas Kellner and Steve Best point out, it is not hard today to perceive the potential for such a North American fascism, which would surely combine racists, 'pro-family' groups, fundamentalist Christians, skinheads, anti-environmentalists, MIA groups, and gun lobbies in a deadly resonance.[112]

The condition of the postmodern proletariat thus includes what Negri calls "alternative subjectivities."[113] One powerful tendency is for the destructive effects of capital's offensive to translate into intensified competition between different groups of workers. To the degree that this tendency prevails, the various limbs of the collective labourer will be turned against each other in the mutual dismemberment of neo-fascist populism, religious fundamentalism, ethno-nationalism, gay bashing and sexist backlash.

In this situation of extreme decomposition, the absorption and appropriation of new technologies could serve only to provide fresh instruments for internecine self-destruction--nazi hate lines, homophobic computer bulletin boards, fibre-optic evangelism and right-wing grassroots radio. Above this wreckage of class politics, the multinationals will glide through the global networks, swooping down to gut and abandon successive sites for profitable exploitation. No one witnessing recent events in Europe and North America can doubt the plausibility of this outcome.

The other possibility is for the different segments of social labour to connect and interanimate their struggles against capital. In this context the reappropriation of informational technology has a special significance, not only as an inroad upon capital's control over what is now a vital force of production, but also, simultaneously and inseparably, as a means to open the channels through which the "socialized worker" can overcome segmentation and constitute itself as a subject of radical cooperation. Communication--through contestation and infiltration of established channels, alternative media, autonomous radio, tactical television, culture jamming and computer counter-networks--spins the life thread of awareness, negotiation, dialogue, criticism, self criticism and solidarity by which the variegated agencies of the collective worker develop their basis for alliance, create a recombinant politics and recognize each other as members of a compound subject capable of reclaiming the direction of society from capital .

Post-Marxists . . . or Communists Like Us?

In 1985 Negri and Guattari coauthored a work published in France as New Spaces of Liberty, New Lines of Alliance, and in North America (in 1990) as Communists Like Us.[114] Their declared objective was "to rescue 'communism' from its own disrepute," and to challenge a situation where "the 'ethic' of social revolution has become instead a nightmare of liberation betrayed, and the vision of the future is freighted with a terrible inertia."[115] Against the devastating effects of "integrated world capitalism" they urged "reunification of the traditional components of the class struggle against exploitation with the new liberation movements."[116] Rejecting both Leninism and anarchism, Negri and Guattari propose the creation of multi-centric "machines of struggle.[117] This would require discarding the Marxist habit of nominating some agents as central to anti-capitalist struggle and others as marginal. Instead, it would involve constructing a system of "multivalent engagement" between movements, "each of which shows itself to be capable of unleashing irreversible molecular revolutions and of linking itself to either limited or unlimited molar struggles."[118] In this process, the development of communicational links amongst

movements, using the advanced technologies which capital is unavoidably disseminating, would be of crucial importance:

> All the current catchwords of capitalist production invoke this same strategy: the revolutionary diffusion of information technologies among a new collective subjectivity. This is the new terrain of struggle . . .[119]

Negri and Guattari offered a number of "diagrammatic propositions" about the issues around which the new rhizomes might cohere. These include struggles on the welfare front, for the establishment of a guaranteed equalitarian income, and against poverty in all its forms; shortening and reorganizing the time of the work day; "a permanent struggle against the repressive functions of the State"; campaigns against war, particularly anti-nuclear movements; and the construction of North-South alliances amongst movements.[120] These, they say, would all be steps toward the rediscovery of communism not as "a blind, reductionist collectivism dependent on repression" but as a "process of singularization."[121]

> Real communism consists in creating the conditions for human renewal: activities in which people can develop themselves as they produce, organizations in which the individual is valuable rather than functional.[122]

The struggle for communism could regain the universality Marx attributed to it if "Truth 'with a universal meaning' is constituted by the discovery of the friend in its singularity, of the other in its irreducible heterogeneity . . ."[123]

This postmodern Marxism can usefully be contrasted with the very influential "post-Marxism" advocated by Ernesto Laclau and Chantall Mouffe in their Hegemony and Socialist Strategy ,also published in 1985.[124] In post-Marxism, the importance Marxists traditionally attribute to struggle against capital is dismissed as crudely economistic. Instead, the social is seen as an open, fluid, "unsutured" field, constituted by a plurality of power relations and struggles--over class, gender, race, homophobia, the environment--none of which can be said to have any priority over, or intrinsic connection with each other, although they may be contingently linked together. Socialism is redefined in such a way as to diminish the importance of reorganizing the relations of production, which simply becomes one part of a programme of "radical democracy" that seeks to promote equalitarian relations across the whole social spectrum. From this point of view, eliminating capitalism no longer claims any centrality amongst emancipatory projects.

Laclau and Mouffe believe that in moving the focus of social analysis outside the factory to embrace this wider field of conflicts they have decisively gone beyond Marxism. And indeed, in acknowledging the importance of struggles around issues of gender, race, and a multitude of other oppressions they have transcended the 'workerist' logic of the

Second International, their constant, if perhaps slightly outdated, target. In this respect their project does constitute an important break with sclerotic Marxisms.

However, to make this move they adopt an extraordinarily abstract and ahistorical vision of the contemporary world. The density and intransigence of historical determinations are eclipsed, and there appears instead a concept of the social domain as "discourse," constantly available for deletion and recombination in ever-alterable "articulations," as fluid and malleable as words on a page. It is this ahistorical abstraction which makes it so easy for Laclau and Mouffe to sidestep the Marxist insistence on the dominative centrality of capital. Once one returns from the abstraction of discourse in general to the concrete specificities of the late twentieth century, the degree to which the logic of capital is in fact busily "suturing" society --sewing up the planet in the net of the world market--becomes much more striking. To a greater extent than ever before, control over planetary resources, including the vital communicational and informational resource of "discourse" itself, are concentrated in the hands of a corporate order which now possesses truly global capacities of command and coordination, and whose organization increasingly subsumes and mediates other social hierarchies formed on the basis of gender and ethnicity. To skip over this point is to return--under the guise of postmodern sophistication--to a liberal, pluralistic view of an 'open' society based on a multitude of freely competing interest groups. It is to evade, rather than surpass, the crucial point of Marx's analysis of "real subsumption"--the tendency of capital to impose its logic not just over the workplace, but over all areas of life.

This is the line of analysis that Negri and Guattari develop. In their analysis, capitalist totalization is a force which invades, permeates and refracts every domain of social activity, and every other social antagonism. The market asserts its priorities over issues of gender equity or ecological preservation to a degree that it becomes impossible for feminist or green movements to succeed without coming into conflict with it. And it is the necessity of this challenge that provides the potential connecting point between the varied movements seeking to pursue other societal logics. From this point of view, there is no evading the issue of control over production--defined in its broadest social aspect:

> Instead of new political alliances, we could say just as well: new productive cooperation. One always returns to the same point, that of production -- production of useful goods, production of communication and of social solidarity, production of aesthetic universes, production of freedom . . .[125]

Although Laclau and Mouffe's ideas have commanded an enormous academic interest, post Marxism seems, a decade after its first enunication, strangely dated. This is surely because analysis that has almost nothing to say about the international division of labour, new technologies of communication and exploitation, and changing conditions of

labour misses some of the most dynamic aspects of contemporary social transformation.[126] In a massive failure of theoretical nerve, post-Marxism has shut its eyes to the approaching 'big story' of the early 21st century--the consolidation of the world market. Moreover, in practice, "radical democratic" politics have proven peculiarly lacklustre. It has been associated with a rejection of some of the most important actually-occurring forms of militant struggle (such as the British miners strikes and anti-poll tax riots); with a fixation with electoral politics and reformist constitutional schemes; and with a recycling of that most exhausted shibboleth of social democracy--the mixed economy--at the very time when international capital has decisively signalled its lack of interest in such a settlement.[127]

Negri and Guattari's collaborative work lacks the enormous theoretical sophistication with which Laclau and Mouffe invest their proposals, and its sense of urgency sometimes translates into a purple, overblown rhetoric, and certain traces of slapdash assembly. But in the decade since they wrote, their analysis of "integrated global capitalism" grows in pertinence. Their discussion of new, technologically-facilitated "machines of struggle" resonates with the actual paths being taken a variety of coalitions and networks world-wide. And while their sketch of a revitalized communism is only rudimentary, it does at least begin to raise the pressing questions about the reorganization of work, income and the allocation of social time that the general collapse of both state socialism and social democratic compromises necessitates. For these reasons, their postmodern/Marxism seems today a far more germane project than the eminently fashionable "post-Marxism."

Conclusion

As Harry Cleaver has observed, autonomist Marxism has "evolved in such a way as to answer the post-modern demand for the recognition of difference and the Marxist insistence on the totalizing character of capital."[128] Its project can be defined as a paradoxical 'detotalizing totalization' that seeks to analyze the overarching social command of capital the better to dissolve it it into a more multiplicitous and varied order. As Cleaver observes

> . . . in spite of justifiable post-modern objections to master narratives, simple self-defense requires that for any social theory to be useful in the struggle for liberation, it must recognize and comprehend not only different forms of domination but the world-wide and totalizing character of the capitalist form . . . what is required is an ability to grasp simultaneously: the nature of the totality/globality that capital has sought to impose, the diversity of self-activity which has resisted that totality and the evolution of each in terms of the other.[129]

Capital, in order to maintain its totalizing system, strives to prevent its variegated opponents from combining forces: dividing, splitting, and fracturing in order to maintain the systemic integrity of its world system. For the diverse anti-capitalist movements, the problem is that in order to break out of capital's totalization they have to link their diversity, to ally across difference to circulate struggles.

We have suggested how, within this framework, we can recontextualize some of the important postmodern insights into contemporary conditions of communication. In introducing high technologies, a central aim of capital has been to reinforce its own circuits while paralyzing those of opposition movements through an increasingly intense regime of informational control. This decompositional, disintegrative, immobilizing tendency is recognized in the Baudrillardian school of postmodernism--which, however, completely fails to recognize the countervailing tendencies of oppositional groups. These groups have to some extent been able to reappropriate these same technologies capital has deployed, and make them channels for new solidarities and alliances. This is the tendency partially recognized by Haraway and other 'optimistic' postmodernists. In the work of Negri, Guattari and Deleuze these two tendencies appear pitted against each other, as the collision of different "machines of struggle"--a conflict that might be characterized as 'cyborgs versus the simulacrum.'

However, while Negri, Deleuze and Guattari envisage these struggles moving toward the constitution of a non capitalist society, they offer only limited hints as to what this alternative might be. They clearly see it not as a state-socialist imposition of centralized uniformity, but as an explosion of difference--a dissolution of the global command of profit which opens the way to alternatives that, like a volcanic "magma," spreads out in a "network of streams of enjoyments, of propositions, of inventions."[130] However it has to be said that these theorists have very little concrete to say about how such a self-organized society might operate--how the buses would arrive on time, the bread be on the shelf, or the AIDS vaccine be researched.

There are some good reasons for this reticence. Blueprints for a 'post-revolutionary society' have had authoritarian implications. The stipulation of a pre-conceived set of ideal relations has resulted in 'transitional programmes' that repress anything deviating from their model. Postmodern/Marxists emphasize that any project truly believing in the self-determining capacities of people should avoid theoretical foreclosure of the paths this energy might take. Furthermore, if the aim of revolutionary activity is to break the 'totalizing' logic of capital and shatter its homogenizing and systematizing tendencies, as Negri and Guattari suggest, any stipulation of a singular form of post-revolutionary society

can be seen as self-contradictory; rather, the aim should be to create a space where a diversity of social, cultural and economic ways of being can coexist.[131]

These are important points that nevertheless leave difficult problems unresolved.While a post-capitalist society definitely should encourage diversity of social organization, and be open to evolving and unforeseen directions, this does not eliminate the need to think carefully about what arrangements, on a planet effectively unified by trade, transport and communication, might enable such a coexistence, or of considering which within a plethora of possibly emergent non-capitalist ways of life are desirable and worth fighting for. So it is to these points that we turn in our next chapter.

NOTES

1 See for example Jean Francois Lyotard's acknowledgement of his debt to American sociology in the opening pages of The Postmodern Condition: A Report on Knowledge (Minneapolis: University of Minnesota, 1984). Early uses of the term 'postmodern' from this quarter can be found in Peter Drucker, Landmarks of Tomorrow (New York: Harper Row, 1957), and Amitai Etzioni, The Active Society:A Theory of Societal and Political Processes (New York: Free Press, 1968).

2 For useful studies of this relationship, see Krishan Kumar, From Post-Industrial to Post-Modern Society: New Theories of the Contemporary World (Oxford: Blackwell, 1995); David Lyon, Postmodernity (Minneapolis: University of Minnesota, 1994); Margaret Rose, The Post-Modern and the Post-Industrial: A Critical Analysis (Cambridge: Cambridge University, 1991); Frank Webster, Theories of the Information Society (London: Routledge, 1995).

The 'postmodern' is of course a bewildering category: distinctions can be made between *postmodernism*, an artistic movement, *post-structuralism* , a philosophic (or anti-philosophic) tendency, and concepts of *postmodernity* as a particular social formation. We use the term 'postmodern theory' to designate those thinkers who believe that a distinctively postmodern moment can be recognized in any or all of these fields, particularly the last.

3 For an interesting account of this context see Mark Poster Existential Marxism in Postwar France: From Sartre to Althusser (Princeton: Princeton University Press,1975).

4 For a very economical statement of this position, see Gianni Vattimo, The Transparent Society (Baltimore: John Hopkins, 1992) 1-11. On the relation between post-structuralism and informatics, see Mark Poster, The Mode of Information: Poststructuralism and Social Context (Chicago: University of Chicago, 1990).

5 Lyotard, The Postmodern Condition xxxiv.

6 Jean Baudrillard, "Interview: Game With Vestiges," On the Beach 6 (1984): 19-25, cited in Steven Best and Douglas Kellner, Postmodern Theory: Critical Interrogations (London: MacMillan, 1992).

7 Jean Francois Lyotard, Political Writings.(University of Minnesota: Minneapolis, 1993).115.

8 Mark Poster, Foucault, Marxism and History: Mode of Production versus Mode of Information (Cambridge: Polity 1984).

9 Marshall Berman, All That Is Solid Melts Into Air: The Experience of Modernity (New York: Simon and Schuster, 1982) 33, 348.

10 Perry Anderson, In The Tracks of Historical Materialism (London: Verso, 1983).

11 Stephen Bronner, Socialism Unbound (New York: Routledge,.1990) 171.

12 Andrew Britton, "The Myth of Postmodernism: The Bourgeois Intelligentsia in the Age of Reagan," Cineaction 13/14 (1988): 17.

13 Alex Callincos, "Postmodernism, Post-Structuralism, Post-Marxism?" Theory, Culture and Society 2.3 (1985): 85-101.

14 Todd Gitlin, "Images Wild," Tikkun 4 (4), 112.

15 Raymond Williams, Marxism and Literature. (Oxford: Oxford University Press, 1977) 128.

16 Frederic Jameson, "Foreword," The Postmodern Condition by Jean Francois Lyotard (Minneapolis: University of Minnesota, 1984) xii.

17 Frederic Jameson, "Postmodernism: or the Cultural Logic of Late Capitalism," New Left Review 146(1984): 55-92.

18 For analysis of Mandel's work, see Chapter 3.

19 For the debate around Jameson's work see the essays in Douglas Kellner, ed., Postmodernism/Jameson/Critique (Washington DC: Maisonneuve Press, 1989).

20 David Harvey, The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change (Oxford: Blackwell, 1989)

21 Harvey 302.

22 Harvey 302.

23 Harvey 112.

24 Jacques Derrida, Specters Of Marx: The State of the Debt, the Work of Mourning, and the New International, (London: Routledge, 1994).

25 Derrida 168. Adrian Wilding, Rev. of Specters Of Marx by Jacques Derrida, Common Sense 17 (1995): 92-95.

26 At different points in his *oeuvre* Jameson oscillates between suggesting an eventual return to more 'normal' conditions of class struggle, development of vaguely described "cognitive mapping" practices (1984; 1988) and "homeopathic" adoptions of postmodernism (1987). See his "Periodizing the 60's,"The Ideologies of Theory: Essays 1971-1986. v. 2. (Minneapolis: University of Minnesota, 1988) 178-210; "Cognitive Mapping,"Marxism and the Interpretation of Culture, ed. Lawrence Grossberg and Cary Nelson (Urbana: University of Illinois, 1988) 347-358"Reading without interpretation: post-modernism and the video-text," The Linguistics of Writing: Arguments Between Language and Literature, ed. Nigel Fabb, Derk Attridge, Alan Durant and Colin McCabe (Manchester: Manchester University Press, 1987) 199-224.

27 Harvey 353-356.

28 Antonio Negri, Marx Beyond Marx: Lessons on the Grundrisse (Massachusetts: Bergin and Garvey, 1984), xvi.

29 Negri, "Interpretation of the Class Situation Today: Methodological Aspects," Open Marxism, vol. 2, ed. Werner Bonefeld, Richard Gunn and Kosmas Psychopedis (London: Pluto 1992),85.

30 Negri, The Politics of Subversion: A Manifesto for the Twenty First Century (Cambridge: Polity, 1989) 87.

31 Karl Marx, Capital: A Critique of Political Economy vol. 1 (New York: Vintage Books, 1977) 1054. Marx wrote that "When the worker cooperates in a planned way with others, he strips off the fetters of his individuality, and develops the capabilities of his species" (447) For his extended reflections on the topic of cooperation see Chapter 13 of Capital vol. 1. "Co-Operation," 439–454.

32 Negri, The Politics of Subversion 52. (original emphasis).

33 Negri, The Politics of Subversion 116.

34 "It was an immense step forward for Adam Smith to throw out every limiting specification of wealth creating activity--not only manufacturing, or commercial, or agricultural labor, but one as well as the others, labor in general. With the abstract generality of wealth-creating activity we now have the universality of the object defined as wealth, the product as such or again labor as such, but labor as past objectified labor. How difficult and great this transition was may be seen from how Adam Smith himself from time to time still falls back into the Physiocratic system. Now it might seem that all that had been achieved thereby was to discover the abstract expression for the simplest and most ancient relation in which human beings–in whatever form of society–play the role of producers. This is correct in one respect. Nor in another . . . Indifference towards specific labors correspond to a society in which individuals can with ease transfer from one labor to another, and where the specific kind is a matter of chance for them, hence of indifference. Not only the category 'labor,' but labor in reality has here become the means of creating wealth in general, and has ceased to be organically linked with individuals in any specific form. Such a state of affairs is at its most developed in the modern form of existence of bourgeois society–in the United States. Here, then, for the first time, the point of departure of the category 'labor,' 'labor as such,' labor pure and simple, becomes true in practice . . . Thus the simplest abstraction which modern economics places at the head of its discussions and which expresses an immeasurably ancient relation valid in all forms of society, nevertheless achieves practical truth as an abstraction only as a category of the most modern society " Marx, Grundrisse (Harmondsworth: Penguin, 1973), 104–105.

35 Negri, The Politics of Subversion 201.

36 Negri, The Politics of Subversion 200

37 Negri, The Politics of Subversion 202.

38 Negri, The Politics of Subversion, 200

39 Negri, The Politics of Subversion 203.

40 Negri, The Politics of Subversion 206.

41 Negri, The Politics of Subversion 203.

42 Negri, The Politics of Subversion 202

43 See Jurgen Habermas, The Theory of Communicative Action: Vol. 1. Reason and the Rationalization of Society (Boston: Beacon, 1984) and The Theory of Communicative Action: Vol. 2. A Critique of Functionalist Reason (Boston: Beacon, 1987). Negri writes that "in the productive community of advanced capitalism we find ourselves confronted by a primary phenomenon which, following Habermas, we will call 'communicative action.' It is on the basis of the interaction of communicative acts that the horizon of reality comes to be constituted . . . Above all, communicative action gives rise to the extraordinary possibility of activating dead socialized labour. Communication is the Direct Current of these

relationships." The Politics of Subversion, 117

44 Habermas in an interview with Peter Dews upholds this segregation as follows: "Marxists . . . have to ask themselves whether socialism today, under present conditions, can still really mean a *total* democratic restructuration from top to bottom, and visa versa, of the economic system: that is a transformation of the capitalist economy according to models of self-management and council-based administration. I myself do not believe so . . . I wonder-this is an empirical question which cannot be answered abstractly, but only through experimental practice--if we should not preserve part of the today's complexity within the economic system, limiting the discursive formation of the collective will precisely to the decisive and central structures of political power: that is, apart from the labor process as such . . . We must start from the fact that social systems as complex as highly developed capitalist societies would founder in chaos under any attempt to transform their fundamental structures overnight . . . Such a path would . . . accomplish a prudent and long-term process of transformation. The task is a very difficult one, for which an extraordinarily intelligent party is necessary." Cited in Peter Dews,ed., Autonomy and Solidarity: Interview with Jurgen Habermas (London:Verso, 1985). .Critics sympathetic to autonomist Marxism such as Michael Ryan have strongly attacked this scaling-down of leftist ambitions for thoroughgoing social transformation as "managerial social democracy"--see his "The Joker's Not Wild: Critical Theory and Social Policing," in Politics and Culture: Working Hypotheses for a Post-Revolutionary Society (London: MacMillan, 1989) 27-45.

45 For a valuable account of Baudrillard's trajectory see Douglas Kellner, Jean Baudrillard: From Marxism to Postmodernism and Beyond (Stanford: Stanford University Press, 1989).

46 Jean Baudrillard, Simulations (New York: Semiotext(e), 1983) 3.

47 Baudrillard, "The Implosion of Meaning in the Media and the Implosion of the Social in the Masses," The Myths of Information: Technology and Postindustrial Culture, ed. Kathleen Woodward (Wisconsin: Coda, 1980. 137-150. At some points in his writings Baudrillard suggests that this indifference, the extreme inertia of the "silent majorities," might constitute the only possible resistance to a regime which incessantly solicits the participation of the subjectivities it has itself created. But in his later works, even this possibility evaporates, in increasingly 'fatal' scenarios. All natural functions have become artificial, the senses are technologized, automation has liquidated labour and images supplanted things. Wired at all points to walkmans, cellular phones and media,we float through a vertiginous world devoid of truth or foundation, which increasingly tends towards the dimensions of a technologically created hallucination, a virtual reality in which it becomes impossible to tell the difference between actual and imaginary, someone and something . . .

48 Jean Baudrillard, The Gulf War Did Not Take Place (Bloomington: Indiana University Press, 1995).

49 Baudrillard, The Gulf War Did Not Take Place.

50 Baudrillard, The Gulf War Did Not Take Place.

51 Baudrillard, The Gulf War Did Not Take Place.

52 Baudrillard, The Gulf War Did Not Take Place.

53 Baudrillard, The Gulf War Did Not Take Place.

54 Negri, The Politics of Subversion 203.

55 Michael Hardt and Antonio Negri, Labor of Dionysus: A Critique of the State Form (London:

Minneapolis, 1994) 268.

56 Hardt & Negri 271.

57 Indeed, Baudrillard's idea that in such a condition oppositional impulses can only express themselves negatively, in terms of extreme passivity, indifference and non-participation were also mooted by the autonomist Mario Tronti in his discussion of labour during periods of defeat--see his Ouvriers et Capital (Paris: Christian Bourgeois, 1977).

58 In regard to Baudrillard, Negri's critique of the French *nouveaux philosophe* is relevant. He observes that while their vision of totalized capitalist power displays "hatred for the despotic powers that dead labour tries increasingly to exercise over living labour," the problem with their position is that "This pessimism aborts into a philosophy which simply reflects the destructured power of capital, inasmuch as it uses the categories within an absoluteness which is neither dialectical nor revolutionary. It is not dialectical because it looks at power in unqualified terms, 'without adjectives'; it is not revolutionary because, consequently, it cannot develop a logic of separation." "Domination and Sabotage," Working Class Autonomy and the Crisis, ed. Red Notes (London: Red Notes, 1979) 166.

59 Negri, Revolution Retrieved (London: Red Notes, 1988), 192.

60 Christopher Norris, Uncritical Theory: Postmodernism, Intellectuals and the Gulf War (London: Lawrence & Wishart, 1992).

61 For accounts of this activity see Douglas Kahn , "Satellite Skirmishes: An Interview With Paper Tiger West's Jesse Drew," Afterimage 20.10 (1993): 9-11, and Martin Lucas and Martha Wallner, "Resistance by Satellite: The Gulf Crisis and Deep Dish Satellite TV Network," Channels of Resistance, ed. Tony Dowmunt (London: British Film Institute 1993) 176-194.

62 Robert Hackett, Engulfed: Peace Protest and America's Press During the Gulf War (New York: New York University, Center for War and Peace and the New Media, 1993).

63 Donna Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980's," Socialist Review 80 (1985): 65-107.

64 Haraway 65, 66.

65 Haraway 68.

66 Haraway 68.

67 Haraway 91.

68 Haraway 91.

69 Haraway 101.

70 Negri, Politics of Subversion 93.

71 Negri, Politics of Subversion 85-86

72 Hardt and Negri 10.

73 Andrew Ross, "Hacking Away at the Counterculture," Technoculture, ed. Constance Penley and Andrew Ross (Minneapolis: University of Minnesota, 1991). We supplement Ross's account with information from the Amateur Computerist, online, Internet.

74 See for example Arthur Kroker and Michael Weinstein, Data Trash: The Theory of the Virtual Class (Montreal: New World Perspectives, 1994).

75 See, for example, the sardonic dismissal of these thinkers by Harvey, 352, or the more measured critique in Best and Kellner. For Deleuze's affirmation of Marxism see his Negotiations (New: York: Columbia University Press, 1995), and for Guattari's, "Institutional Practices and Politics," The Guattari Reader, ed. Gary Genosko (Oxford: Blackwell, 1996) 123.

76 Guattari, "The Postmodern Impasse," The Guattari Reader, 110. See also his "Postmodernism and Ethical Abdication," in the same collection, 114-117.

77 We are particularly indebted to Kenneth Surin,"Reinventing a Physiology of Collective Liberation: Going 'Beyond Marx' in the Marxism (s) of Toni Negri, Felix Guattari, and Gilles Deleuze," paper presented at the Rethinking Marxism Conference. Amerst, Mass. 1992, Michael Hardt, "The Art of Organization: Foundations of a Political Ontology in Gilles Deleuze and Antonio Negri," diss., U. of Washington, 1990, and the chapter on Deleuze and Guattari in Best and Kellner 76-110.

78 Gilles Deleuze and Felix Guattari, Anti-Oedipus: Capitalism and Schizophrenia. (New York: Viking,1983) 116. On "molecular" and "molar" formations, see 183.

79 Deleuze and Guattari 1983, 139.

80 On "territorialization" and "deterritorialization" see Deleuze and Guattari, Anti-Oedipus 222-240.

81 On "nomadism" see Deleuze and Guattari, A Thousand Plateaus: Capitalism and Schizophrenia (London: Athlone, 1987) 380-385.

82 Deleuze and Guattari, A Thousand Plateaus 204.

83 Deleuze and Guattari, Anti-Oedipus 222-240.

84 Deleuze and Guattari, A Thousand Plateaus 454-73.

85 Deleuze and Guattari, A Thousand Plateaus 465.

86 Deleuze and Guattari, A Thousand Plateaus 454.

87 Guattari, Molecular Revolution: Psychiatry and Politics (Harmondsworth: Penguin, 1984) 260.

88Guattari, Molecular Revolution 263.

89 Guattari Molecular Revolution 263. For Deleuze and Guattari "minorities" are not defined by numbers put by distinction from concept of majority as"the national worker, qualified, male and over thirty-five." Minority struggles are characterized by connectability. In all the struggles, around votes, abortions, jobs, Third World --"there is also always a sign to indicate that these struggles are the index of another, coexistent combat." A Thousand Plateaus 471.

90 Guattari, Molecular Revolution 263.

91 Guattari, Molecular Revolution 263.

92 Deleuze and Guattari, A Thousand Plateaus 351-423.

93 Deleuze and Guattari, A Thousand Plateaus 3-25.

94 Deleuze and Guattari, A Thousand Plateaus 6-7.

95 Guattari, Molecular Revolution 110

96 Sergio Bologna, "The Tribe of Moles," 51, and Sylvere Lotringer and Christian Mazarri, "The Return of Politics," 8, both in Italy: Autonomia--Post-Political Politics, ed. Sylvere Lotringer and Christian Marazzi. (New York: Semiotext(e), 1980).

97 Deleuze and Guattari, A Thousand Plateaus 473.

98 Deleuze and Guattari, A Thousand Plateaus 473.

99 Guattari, "The Three Ecologies," New Formations 8 (1989): 146

100 Guattari, "The Three Ecologies," 146.

101 Cleaver, "The Chiapas Uprising," Studies in Political Economy 44 (1994)

102 Our analysis in this section draws on the following articles Conor Foley, "Virtual Protest," New Statesman & Society, 18 Nov. 1994, 47-49; Neil Goodwin and Julia Guest,"By-Pass Operation," New Statesman & Society, 19 Jan. 1996, 14-15; Tim Maylon, "Killing the Bill," New Statesman & Society, 8 July 1994, 12-13; Camilla Berens, "Folk Law," New Statesman & Society, 5 May 1995, 34-36, and on Aufheben Collective, "Auto-Struggles: The Developing War Against the Road Monster," Aufheben 3 (1994): 3-23, and on our own research amongst activists in Britain.

103 Foley 47.

104 Deleuze and Guattari, Anti-Oedipus 105.

105 Deleuze and Guattari, A Thousand Plateaus 224.

106 Deleuze & Guattari Anti-Oedipus, 258.

107 Richard Butler, cited in Hannah Nordhaus, "Underground By Modem," Terminal City, 11 Aug. 1993, 7.

108 On these developments see Crawford Killian, "Nazis on the Net," The Georgia Straight 11-18 April 1996, 13-17, and Martin Spence, "Young Boy Network," New Statesman & Society, n.d., n.p.

109 Kim Goldberg, "Battling Cyber-Nazis," Progressive , 13; Killian, 15.

110 Deleuze and Guattari. A Thousand Plateaus 215.

111(Deleuze and Guattari. A Thousand Plateaus 214.

112 Best and Kellner. n.p.

113 Negri, The Politics of Subversion 145-146.

114 Felix Guattari and Toni Negri. Communists Like Us (New York: Autonomedia).

115 Guattari and Negri 7, 8.

116 Guattari and Negri 128.

117 Guattari and Negri 103.

118 Guattari and Negri, 123.

119 Guattari and Negri. 16.

120 Guattari and Negri 146.

121 Guattari and Negri 13.

122 Guattari and Negri 13.

123 Guattari and Negri 42.

124 Ernesto Laclau and Chantall Mouffe. Hegemony and Socialist Strategy: Towards a Radical Democratic Politics. (London: Verso, 1985). In making this contrast between Negri and Guattari and Laclau and Mouffe, we are considerably indebted to Richard Hutchinson, "Machines of Desire: Class, Identity and the Potential of the New Social Movements," New Directions In Critical Theory Conference, University of Arizona, 17 April 1993.

125 Guattari and Negri 125.

126 This general deficit is particularly marked by contrast with one brief, surprising, and indeed anomalous section in the final chapter of Hegemony and Socialist Strategy (161-175). For in these pages, Laclau and Mouffe offer an all-too-swift outline of the historical and material conditions which, they say, provide the grounds for the emergence of post-Marxist theory and radical democratic politics.It is--strange to say--an analysis of changes within the mode of production. Since the end of the Second World War, Laclau and Mouffe argue, there has been in the advanced industrial nations a significant shift in the organization of capitalism, involving transformations in the labor process, state structure and popular culture. Commodification and bureaucratization have reached into previously untouched areas of social life: at the same time, there has been a growth in the complexity and density of civil society. Taken together, these tendencies have resulted in a multiplicity of new--and not necessarily class based--points of social antagonism. It is these conditions which make necessary and possible the emergence of new forms of social struggle--and of theories such as their own, which attempt to account for these fresh forms of praxis. Many readers of the book have pointed out that this section is inconsistent with the main thrust of their book. For while the bulk of Hegemony and Socialist Strategy is devoted to repudiating Marxism's insistence on the correspondence between economics and politics, its conclusion suddenly chooses to explain the necessity of

a new politics by shifts in the pattern of capital accumulation! On this point see Michael Rustin, "Absolute Voluntarism: Critique of a Post-Marxist Concept of Hegemony," New German Critique, 43 (1988): 146-171; A. Belden Fields, "In Defence of Political Economy and Systemic Analysis: A Critique of Prevailing Theoretical Approaches to the New Social Movements," Marxism and the Interpretation of Culture, ed. L. Grossberg and C. Nelson (Urbana: University of Illinois, 1988) 141-156; and Michelle Barratt, The Politics of Truth: From Marx to Foucault (Cambridge: Polity, 1991).

127 See in Chapter 2 the discussion of the British "New Times" initiative, which was heavily influenced by Laclau and Mouffe's post-Marxism.

128 Harry Cleaver, "Secular Crisis in Capitalism: The Insurpassability of Class Antagonism," Rethinking Marxism Conference, Amherst, 1993.

129 Cleaver, "Secular Crisis in Capitalism."

130 Antonio Negri, Marx Beyond Marx: Lessons on the Grundrisse (Massachusetts: Bergin and Garvey, 1984), 150.

131 See for example Harry Cleaver, "Socialism," The Development Dictionary: A Guide to Knowledge as Power., ed. Wolfgang Sachs.(London: Zed Books, 1992) 233-249.

Chapter 8
ALTERNATIVES

Introduction: The Great Leviathan versus Utopia

Defining the features of a society alternative to capitalism has always been a vexed issue for Marxism. Although Marx's early writings contain some of the most lyrical evocations of a post-capitalist order ever penned, he and Engels were highly critical of "utopian socialisms"--many of them technocratic ancestors of today's information society theory--that drew-up elaborate pictures of ideal societies without recognizing the need for struggle and conflict to attain them.[1] Rejecting these "Comtist cookbooks about the future," they held that communism is "not a state of affairs which is to be established, an ideal to which reality [will] have to adjust itself" but rather "the real movement which abolishes the present state of things."[2]

Today, however, invocation of the "real movement " is not immediately encouraging. The catastrophe of state socialism has left millions convinced that, however appalling the trajectory of capitalism may be, there is simply no alternative. Social democracy is evidently unable to sustain even its reformist project in the face of capital's new-found global mobility. A vast psychic block of despair and cynicism consolidates the dominance of the world market . This resignation is then reinforced by information capital's managers--those whom Pierre Bourdieu, in a statement supporting striking workers and students, recently called the "kings of technocracy." For in the discourse of these contemporary autocrats, any attempt to think beyond the 'realities' of global competition and automating technology is instantly dismissed as tantamount to delirium.[3]

As Massimo De Angelis observes, such "technicism" serves as the "ultimate legitimation" for capitalism, making its economic order into

> . . . a great Leviathan, the unchangeable and unquestionable constraint facing all political and cultural subjectivity, a constraint that subsumes everything.[4]

In the face of this conceptual closure, De Angelis says, we need to "recover a utopian discourse, in thought as well as in antagonistic and constitutive practice."[5] He observes that:

> Through an interesting play on words, the word utopia is defined in English as *no*where - no place. But this could also be read as *now*here - here and now.[6]

De Angelis distinguishes between "realizable" futures, that "presuppose a pre-conceived plan which must be realized (by subordinating to the plan all the people who don't like it)," and "actualizable" futures, where "whatever is actualizable is already existing in a virtual way, where virtuality is a dimension of reality."[7] He urges utopian invention, "not as the alternative model, not as a party program or a plan in search of subjects to subordinate" but as "an open and inclusive horizon of thought, antagonistic practice and communication" that can "show different possible horizons and contrast them to the poverty of the mainstream one."[8]

It is in this spirit that we offer our sketch of an alternative future. We propose a series of measures--the institution of a guaranteed annual income, the creation of universal communications networks, the use of these networks in decentralized, participatory counter-planning, and the democratic control of decisions about technoscientific development. These elements would, in their full implementation and synergistic interaction, go a long way towards constituting a viable alternative to capitalism. Moreover, each of the separate elements proposed here, and each of the various gradients and steps in their realization, can be seen as delineating fronts of struggle, invading beachheads that can be established on the shoreline of capital and advanced, up to the point where their combined effect overwhelms the logic of the entire system. At the end of the chapter, we briefly reflect on some conditions under which this might occur.

The ideas we propose have not fallen from the sky, but spring up from the ground of contemporary movements. They extrapolate from what is really being done, now, in what autonomists would term the "self-valorizing" practices of a multitude of activists.[9] The example of these struggles provides our most important sources of inspiration. But we have also been influenced by a variety of speculative proposals. Indeed, one of the subsidiary points we want to make is that what might be considered an 'ultra-left' future can be constituted by the interweaving of elements and possibilities that are now in fact commanding wide attention, on a quite non-sectarian basis.[10]

This thought-experiment has some important limitations. It focuses only on those issues that relate to our major theme--the social uses of the new information technologies. Our basic orientation comes from Marx's observation in Grundrisse, that while machinery may be the "most appropriate form" of capital, capital is not necessarily the most appropriate social form for machines.[11] To illustrate this point, we assume a society in which high-technologies are fairly readily available. Since currently these conditions obtain most strongly in a handful of advanced capitalist economies, our sketch is Eurocentric. There is a missing dimension, whose importance we acknowledge but do not address, one that involves issues such as the release of the South from an exterminatory debt burden, the

reversal of the flows of value from South to North, the payment by the North for the preservation of the ecological resource vital to planetary survival, and the support of spaces for what is sometimes termed "autonomous development" freed from the economic and cultural constraints of neo-colonialism.[12]

What we propose figures in our mind as 'communism--a continuation of the red thread which Marx and so many others have spun across centuries. But we know that this term has become so heavy, so sodden with blood and weighted with nightmarish history, and carries with it such a burden of explanation, repudiation and qualification, that many regard it as unspeakable, at least for this generation and probably several more.[13] What word might be used instead? We have no desire whatsoever to talk of 'socialism,' a concept profoundly tainted--in its authoritarian forms, by terror; and in its social democratic variants, by failed compromise.[14] We might follow the lead of Cornelius Castioradis, who now speaks of an "autonomous society"--but this phrase also is freighted with its author's changing allegiances, and too rhetorically ponderous to be attractive.[15]

Therefore, after much reflection, we have decided to occasionally use another word: 'commonwealth.' Some of the connotations of this term, too, are not particularly appealing, but others are very appropriate. It designates quite exactly what we have in mind-a 'common-wealth' of collectively shared resources. It derives from a root around which clusters other concepts important to us --like 'communism,' 'communication,' 'commons,"community.' 'Common-wealth' also reminds us of the energy of 17th century revolutionary republicanism; if what we propose seems like a technoscientific version of the project of the Diggers and Ranters who, in combat with monarchical authority and bourgeoisie power, were willing to see the "world turned upside down," that is as we would have it.[16]

Zerowork: Guaranteed Income

Marx wrote that:

> . . . the realm of freedom actually begins only where labour which is determined by necessity and mundane considerations ceases: thus in the very nature of things it lies beyond the sphere of actual material production . . . Beyond it begins that development of human energy which is an end in itself, the true realm of freedom, which, however, can blossom forth only with this realm of necessity as its basis. The shortening of the working day is its basic prerequisite.[17]

This is the prospect that the' information revolution' seems to bring in sight. Capital's drive to automation reaches a level such that, in more and more branches of industry, necessary labour time approaches zero. There emerges the potential for what Paolo Virno terms;

> The reduction of obligatory labour time to a virtually negligible part of life, the possibility of conceiving employment as one of the moments of existence and not as forced labour nor as the source of a permanent identity.[18]

However, because capital continues to impose the linkage of income to work (for all except the owners of the means of production) a diametrically opposite situation is produced. Technological ultra-sophistication results, via the renewal of the reserve army of the unemployed, in immiseration, insecurity, the revival of archaic forms of sweated labour and the intensification of exploitation. Thus, "the time of non-work, which is a potential richness, presents itself within the established system as a lack, as poverty."[19]

So serious is the consequent crisis of social disintegration that within the last few years several social theorists from a very wide variety of perspectives--Stanley Aronowitz and William De Fazio in The Jobless Future, Jeremy Rifkin in The End of Work, Barrie Sherman and Phil Judkins in Licensed to Work--have acknowledged that we may be in view of the point foreseen by Marx, where the replacement of living labour by machines fatally undermines the wage relation.[20]

Faced with this convulsion, the usual response of the socialist left has been to call for the creation of 'more jobs,' engineered by a renewal of Keynesianism or an adjustment of interest rates. Not only does this response run in the face of the actual capacities of technological innovation, but it forgets that, in origin, socialism was not a project for the extension or renewal of wage labour, but for the ending of what was understood as an exploitative and dominative institution: 'wage slavery.' The reduction of this aspiration to a call for 'full employment'--a call, moreover, made more implausible by every advance in computer science--dramatically reveals the attachment of social democratic and trades union leaders to the basic structures of capitalist society, at the very moment when these walls are being breached. Putting the wage-form on an elaborate life-support system is a strategy of "making some people toil unnecessarily so that they can be paid without others complaining that they are hanging around with nothing to do."[21]

The alternative is to delink income from jobs. The case for this step is quite simple: capitalism has created a productive capacity so great that there is no necessity for anyone to suffer want because they cannot sell their labour time. Moreover, this productive capacity arises from an economic system so socialized--so much the product of 'combined effort' occurring not just in workplaces but households, schools and general social intercourse--that the allocation of income only to those who exert themselves at the immediate point of production is neither just nor even efficient. The social risks of people 'freeloading' on a system of generalized income are now infinitely less than the problems created by consigning increasing masses to an income-less, because work-less, future.[22]

As Steve Wright notes, the institution of a universal guaranteed income "has long held an honored place within . . . autonomist discourse."[23] In the 1960s and 70s, theorists such as Negri were already suggesting that the automation and socialization of production had rendered 'labour theories of value' anachronistic--a fact which they understood as marking a crisis, not for Marxism, which has always seen wage labour as an historically transitory form of social organization, but for capital, which depends on upholding the necessity and rationality of the wage relation. Groups in the midst of militant shop floor struggle argued that both rising technological productivity and the increasingly evident social nature of production should be recognized by the creation of a social wage, equal for all, tied to needs rather than performance, and available to those outside the traditional realms of paid work, such as houseworks and students. This is sometimes known as the "zerowork" position.[24]

Such ideas were subsequently elaborated, popularized and watered-down by Andre Gorz, whose provocative writings are informed by a considerable familiarity with autonomist thought.[25] One of the few left optimists about computerization, Gorz in the mid 1980s suggested that the reductions in labour-time made possible by microelectronics were opening "paths to paradise."[26] The realization of these prospects was, however, impeded by a "living dead" or "impossible" capitalism that preserved the wage and the market beyond the moment of their historical validity, retaining them merely as techniques of domination.[27] Rejecting the traditional left focus on 'dignity in work,' a goal which he believed the rationalized and deskilled nature of technological production made unattainable, Gorz argued that the cutting edge of social activism rather lay in the demand for freedom from work.

To this end, he proposed a programme for a social income, distributed through life, based on the requirement to perform a (low) minimum amount of socially necessary labour; twenty thousand hours in a lifetime, or about ten years full-time, twenty years part-time, or forty-years of intermittent work).[28] If this was implemented, Gorz suggested, work would no longer be a full time occupation or the centre of social existence. Life would become multi-centred with a wide variety of rhythms and styles of activity coexisting, creating rich opportunities for citizens to exercise their creative powers "autonomously," freed from the "heteronomous" constraints of work; "let us work less," he said, "so that we all may work and do more things by ourselves in our free time."[29]

Gorz's work has had an ambiguous legacy. By developing the autonomists' rather sketchy hints about a universal income, he pushed the frontiers of left imagination beyond the boundaries of 'a fair day's wage for a fair day's work.' But he also partially discredited the idea of liberation of work by associating it with a sort of apolitical voluntarism.

Whereas autonomists had always emphasized that freedom from work was something that had to be fought for against capital's tendency to reimpose the commodification of human activity, Gorz often seems to suggest that a general reduction of labour time could be realized simply by dropping-out from the wage economy. In his most notorious statement he suggested that we must say "farewell to the proletariat," as post-industrial socialism is quietly invented in do-it-yourself, back-yard experiments of the new "non-class of non - workers."[30] Because of this his work has been widely criticized from the left as simply a recipe for what Wright calls "self-managed poverty."[31]

An insistence on the *contestatory* nature of the guaranteed income project is critical because versions of the idea have in fact also been proposed from the right. Indeed, its advocates include such free-market champions as Milton Friedman.[32] During the Nixon administration, a legislative proposal in the US Senate for a form of Guaranteed Annual Income (GAI) was only narrowly defeated; in Canada in the 1980s a version of the idea was proposed by the Liberal MacDonald Commission.[33] As De Angelis points out, these plans "to separate access to income from the labour market" are in fact designed only "to make the latter function effectively."[34] In such proposals, GAI is set low (well below the 'poverty line) and delivered in terms of negative income tax; the minimum wage is also low; and other social wage programs (unemployment insurance, welfare, family allowance) are abolished. The aim is to use the GAI to rationalize state expenses, to eliminate their universality, and to allow capital to pay inadequate wages, with the effect "not of eradicating poverty and unemployment, but of making them socially acceptable."[35] In the light of this "big business version" of a guaranteed annual income, some anti-poverty activists are now intensely sceptical of the entire concept, believing it has been fatally coopted.[36]

However, at the same time, the intensifying crisis of unemployment and social disintegration precipitated by computerization and globalization has made others on the left increasingly interested in the concept. A new generation of autonomists have taken up the the task of going, as Wright puts it, "beyond Gorz," developing schemes for a guaranteed income that "do not just coexist with capital, but can be used as a means to challenge it."[37] Their line of thought intersects with work on the same topic from a very wide variety of left and liberal orientations. We think of the sustained theoretical arguments for a universal income offered by Philippe Van Parijs in the Netherlands, of the campaigns waged by the 'Basic Income' group in the United Kingdom, and of proposals from political economists such as Diane Elson in England, Adam Przeworski in France and Eric Shragge in Canada.[38]

Drawing on these sources, we can suggest some of the features of a guaranteed income scheme as it might figure in our commonwealth. Its level should be set 'high'--very well above the official poverty-line. To the degree that such an income coexists with wage labour, as it might in the early stages of its introduction, it should be adequate to free people from the necessity of selling their labour power, even if the possibility of supplementation by this means continues. Its level should expand as and if the productivity of society grows, and accompany a generalized and egalitarian reduction in waged work time, to a point where guaranteed income eventually supersedes the wage as the main source of livelihood. Although receipt of such an income might initially be tied to some obligation to perform socially useful labour, this would not be construed in terms of participation in traditional paid productive employment (making it a 'workfare') but of fulfilling responsibilities such as care for children, the sick and elderly. And it should be seen as an integral part of an expanding package of freely distributed services and use values, from housing and schooling to health, associated with the development of cooperative and collective forms of administration, discussed later in this chapter, that would encourage forms of social solidarity going beyond the cash nexus.

Such an innovation would have multiple ramifications; we will comment on only three. First, the guaranteed income concept, while partly flowing from the technological crisis of paid jobs, also converges with feminist demands for the economic recognition of domestic labour. In the 1970s, Mariarosa Dalla Costa and Selma James integrated Marx's observations on the socialization of labour with the the direct experience of millions of women, and pointed out the vast amount of monetarily unacknowledged, invisible but economically essential household labour done for free. Their proposal--immensely controversial within the women's movement--was "wages for housework."[39] Although this has been criticized as an attempt to commodify domestic work, it is in fact clear that Dalla Costa and James intended "wages for housework" as a strategy to explode the wage form completely, undermining the attachment of income to a (male) job. Today, the drive to compensate domestic work is attracting widespread attention through the work of feminist economists such as Marilyn Waring.[40] A guaranteed annual income of the sort we describe--perhaps tied to a requirement for men and women alike to participate in activities such as raising children, caring for the sick and elderly--would effectively annihilate the hierarchical division of waged and non-waged labour which has so closely entwined capitalism and patriarchy.

Second, although the "zerowork" perspective focuses on reducing the overall amount of socially necessary labour, it should not be understood as precluding efforts to make what remains more enjoyable. Even in a society with a high level of technoscientific

development, there will be tasks which, because of their inherent complexity, or their intrinsically satisfying nature, cannot or should not be automated. Although our commonwealth will abolish 'work' as we know it--'work' as synonymous with 'job,' 'boss' and 'wage'--there will still be labour to be performed. Contrary to Gorz's gloomier statements, we do not believe that even highly-technologized tasks have to be alienating. There is now a vast literature on the enrichment and the qualitative improvement of such labour. To give only a couple of examples, Mike Cooley, from a trades unionist perspective, has written on ways in which computer systems can be designed to re-skill, rather than de-skill workers, while more recently, Shoshona Zuboff, from a more managerial position, has discussed the ways in which high -technologies can be used to 'informate' workplaces rather than 'automate' them, expanding workers knowledge and control over operations rather than reducing and eliminating it.[41] From our point of view, the only (albeit very serious) problem with such analysis is that it usually represses the degree to which such 'humanizing' innovations contradict capitalist imperatives of labour control and cost-reduction. Outside of this context--in a situation where, in ways we detail later, trade-offs between productivity and gratification could become a matter of social choice rather than profit-driven imperative, and where a guaranteed income frees people from the necessity of enduring degrading, monotonous jobs--there is every prospect for a creative remaking of labour. Thus, as Van Parijs suggests, the abolition of work should be seen as unfolding "along two converging routes: by giving work an ever-smaller place in life and by making it less and less like work."[42]

Third, freeing people from the compulsion to perform wage labour creates opportunities for more profound and creative involvement in other aspects of social life. One common and important objection to schemes for post-capitalist, self-organized societies is that they assume onerously high levels of 'political' participation: Oscar Wilde's quip that "socialism is a good idea, but it requires too many evenings" springs to mind.[43] If one assumes a world like the present one, where most people are exhausted after eight, ten or twelve-hour days of waged labour--plus the longer hours of unwaged domestic duties and 'double shifts' which are the indispensable accompaniments of the current job system--this is a telling point. However, not the least important aspect of a society with a guaranteed annual income and a drastically shortened and flexiblized work schedule is that it leaves people with time and energy, some (though by no means all) of which can be devoted to collective discussion and decisions about production, education, health care, environment --and in ways that might even be rewarding and enjoyable. In other words, zerowork creates the communicative preconditions for other aspects of commonwealth. This potentiality can be enhanced by ensuring accessibility to the extraordinary communication

systems which are, along with automation, the other major technological creation of information revolution--a prospect we turn to in our next section.

Zero Commodity: Communication Commons

Under capital's direction, the successive waves of electronic communication technologies--the radio, television, telecommunications and computer networks whose networks now girdle the planet--have served mainly as the basis of vast, vertically and horizontally integrated commercial media empires. The consequences barely need rehearsal: an envelopment of society in corporate speech; market censorship of news and artistic expression; increasing privatization and stratification of access to information; and a relentless interpellation of audiences in the name, not of citizenship, but of consumerism.

These tendencies are exacerbated by the erosion of publicly-owned media. Insofar as such institutions exist within advanced capital economies--and here conditions vary from the rudimentary services in the US to the more developed institutions of Canada and Europe--the idea of public ownership of media has largely centred around state-financed public broadcasting organizations. Always existing, like the other institutions of the welfare state, in an uneasy relationship to the market society that surrounds them, these organizations are now subjected to intensifying corporate encroachment. This process proceeds under the watchwords of deregulation, the reduction of governmental limits on free enterprise activity, and privatization, the conversion of state institutions into corporate property. It is associated both with the use of new technologies to outflank and fragment the 'universal' audiences of public broadcast systems, and, even more importantly, with the ideological claim that the potential of new communicative technologies can only be realized under the auspices of capital. The net result is to deepen the communicative subsumption of society by capital.[44]

And yet, at the same time, electronic media display quite contrary tendencies which radically subvert the logic of the market. Because advanced communications networks can circulate information goods very fast and very widely, goods that are by their very nature dependent on extensive availability of appropriate machines, skills and knowledge, imposing commodity exchange in this area has proven extraordinarily difficult. A wave of everyday media 'piracy,' including photocopying, home taping, bootlegged videos, unpaid reception of satellite signals, copying of computer software and hacking is informally decommodifying information flows. In its more organized forms, this reappropriative tendency takes the form of ' alternative' media networks, from microwatt radio to community cable to the creation of the Internet. As computerized automation, by reducing

socially-necessary labour time, opens up possibilities either for intensified exploitation or for subversion of the the wage form, so electronic communication, by reducing the necessary circulation time for information goods, opens onto two diametrically opposed options: either, a radical intensification of commodification--through pay-per services and consumer surveillance--or a fundamental attenuation of the commodity form, through the normalization of piracy and hacking and the generalized transgression of electronic property rights.

Our commonwealth would build on and amplify this latter decommodifying tendency. Dorothy Kidd and others have referred to this process as the creation of a "communications commons"--a counter-project against capital's attempts to "enclose" the immaterial territories of airwaves, bandwidths and cyberspaces in the same way it once, in the era of primitive accumulations, enclosed the collective lands of the rural commons.[45] However, we envisage this process of renewed public ownership advancing along lines rather different from those tried before--by a fusion or amalgam of the public-service model of state-financed communication utilities and the more decentralized and diffuse practices of autonomous media.

Advocates of state-financed public media often find it difficult to marshall support against privatization, in part because of the frequent elitism, remoteness, over - professionalization, and under-accountablity of the institutions they defend. On the other hand, while the networks of autonomous media--the alternative press, community radio, public access TV, microwatt broadcasting and grassroots computer networking--have been the site of fertile experimentation in popular participation and public access, they have been stunted by the lack of resources which accompanies social and economic marginalization. Recently, however, analysts from a variety of backgrounds have begun to rethink the democratization of communication in terms which blend elements of the public-service and alternative mode--proposing the public financing of a multiplicity of decentralized but collectively or cooperatively operated media outlets, licensed on the basis of commitment to encouraging participatory involvement in all levels of their activity.

Thus for example John Keane, writing from a liberal position, has argued that the undermining of "both arcane state power and market power,"

> requires the development of a dense network or "heterarchy" of communications media which are controlled neither by the state nor by commercial markets.[46]

Noting that "the new technologies strengthen the tendency whereby the element of rights to dispose of property privately becomes obsolete in the communications field," Keane argues for policies which would encourage the tendency for communication "to be seen as flows

among publics rather than as an exchange among discrete commodities which can be owned and controlled privately as things."[47] This would involve a democratization of public broadcasting institutions, aimed at introducing greater accountability to and greater involvement of their various constituencies; creation of networks of leased-back broadcasting facilities made available for use by a wide variety of groups and collectivities ; the support of cooperatively run publishers, community radio and public access television; publicly funded faxes, videotex systems and electronic mail facilities; and networks of media training and research institutions.

Somewhat similar suggestions have been made by Douglas Kellner. Drawing on his experience working with Paper Tiger television and the Deep Dish distribution network, Kellner suggests that the technological capacity for the multiplication of satellite and cable channels, often seen as a threat to public broadcasting, should be embraced as a offering the potential for a more diversified and decentralized version of such a service. He has urged the creation of a publicly funded satellite system, which, along with appropriate training and production facilities, would permit communities and movements from a wide variety of political and cultural orientations to broadcast their own programs.[48]

Popular support for decentralized and distributed public communications systems has been particularly strong in the field of computer networking. The development of the Internet arose, as we have seen, from a certain bizarre conjunction between publicly-funded institutions--the original military-research ARPA Net--and the autonomous activity of a host of hackers, techno-hobbyists and computer dissidents. In North America, the attempt to defend this unique experiment from commercial recolonization by the 'information highway' has evoked a wealth of proposals for more fully releasing the democratic and participatory potential of digital technologies. Many of these come not from the usual centres of the left but rather from technoscientific workers most familiar with the radical potentialities of the new technologies. Couched in idioms that combine liberalism, libertarianism and undeniably communist impulses in an uncategorizable amalgam, the challenge of such initiatives to the prerogatives of corporate media empires is nevertheless unmistakable.

Thus, for example, a critique of the 'information highway' put forward by Computer Professionals for Social Responsibility (CPSR) is predicated on "freedom to communicate," which it defines as having two essential features: first, freedom from censorship, and, second, "the opportunity to be heard in the first place."[49] This later is explicitly defined in terms of overcoming the condition so pithily defined by A.J. Leibling where "the freedom of the press belongs to those who own one," CPSR suggests that the availability of increasingly cheap computer technology presents the possibility of breaking

the corporate monopolies of communication established in print and broadcasting.[50] Recognizing the importance of the Internet in establishing a model of open, participatory computer communication, CPSR also notes its disadvantages--difficulties of navigation, technological complexities, and limitations of access.

It then makes the following proposals for a public network. There should be universality of access, defined not only in terms of availability of connections (with full service to homes, workplaces and community centres), but also of low pricing, and the provision of subsidized hardware, software, and training. A basic feature of the network should be to enable all users to act as both producers and consumers; "every user . .. must have the option to generate new information as well as publish that information through the network." While CPSR concedes commercial interests a major role in the construction of the networks, it insists on preservation of "diversity of content."[51] Common carrier status--preventing the control of content by the owners of the channels--is crucial. A central aspect of any information infrastructure must , CPSR says, be the development of a "vital civic sector," constituting "public spaces" for discussion, governmental interaction, distribution of free software, and "the spontaneous development of communities of all kinds " amongst "groups . . . of people who want to discuss issues concerning their neighborhood, worksite, nation or planet."[52]

Other local branches of CPSR have gone further. The Berkeley chapter calls for a national computer network infrastructure to be publicly built and maintained; for the creation of a "public information treasury" specifically aimed to "ensure that the widest possible kinds of social information are collected; and for the abolition of intellectual property laws."[53] On this last point, it notes that the ostensible, and traditional rationale for such property rights is to promote progress and creativity. However, current patent and copyright systems do not perform this function but rather lead to secrecy, duplication and litigation. As the CPSR activists observe, other models exist for organizing and rewarding intellectual work in ways that do not require proprietary title to the results--such as grants, peer or public recognition. They therefore call for a moratorium on computer software patents, accompanied by social funding of research and development, and the implementation of new systems, such as public competitions, to spur development of "socially needed technology."[54]

Even partial implementation of these ideas would represent a significant collective inroad on the capitalist information economy. But the significance of such a socialization of media goes well beyond the immediate reappropriation of resources from corporate conglomerates. Every communicational node and link established outside the control of capital diminishes its ability to naturalize commodification, to impose its 'class-ifying' grids

of surveillance, to suppress news of struggles, to censor, mystify and deceive. Conversely, each instance of such counter-communication increases the possibility to explore variegated images of decommodified human identity, circulating struggles, and to discussing the reorganization of society outside the parameters of the market. Because today's cultural industries take as their productive material forces basic to the constitution of individual and collective subjectivity, their liberation from capitalist control in turn enhances every other escape attempt.

Establishing a "communication commons" would both reinforce, and be reinforced by, the abolition of work proposed in the previous section. Diminishing the role of wage labour in society involves not just economic but cultural metamorphosis, with dimensions such as lifting the cultural opprobrium attached to the sheer enjoyment of free time; validating the skill, difficulty and worth of undervalued or non-market activities--such as collective decision-making or domestic labour; and constructing forms of subjectivity other than those revolving around the image of the 'consumer.' A diverse communication commons provides the matrix for such cultural experimentation, while the free time made available by the reduction of work creates the condition for the widespread involvement in cultural production necessary to give the new networks vivacity. Moreover, the establishment of such a commons creates unprecedented opportunities for cooperative organization--not least in the sphere of social governance. This is the issue we take up in the next section.

Zero State: Computerized Counter-Planning and Electronic Anti-Markets

To pose an alternative to advanced capital is, necessarily and centrally, to raise the issue of of "governmentality."[55] We use this term of Michel Foucault's to designate the operations of public administration, without necessarily identifying such activities with the functions of the centralized state. The distinction is important because the years of the high technology revolution have also, and not coincidentally, been a period during which both the necessity and viability of the nation state as a central unit of social organization has been seriously challenged. This challenge has, however, appeared simultaneously in two different and antagonistic forms: privatization and socialization.

The privatizing tendency is of course represented by the neoliberal program of marketization and deregulation. Its essence is the reversion of the apparatus of government, which the era of the welfare state had (as a result of pressures from labour and other social movements) attained a certain 'relative autonomy' from the immediate imperatives of business, back into direct instruments of capital accumulation. In some respects this

involves a diminution in state functions: the erosion of welfare expenditures, reduction in social services, sale of public industries. In others, it expands these functions--most notably in the intensification of the state's security, surveillance and coercive role. Privatization abolishes the state only insofar as it presses the interdependence of capital and state to the point of identity, making the latter, in effect, the direct administrative and coercive arm of the former. As Gilles Deleuze and Felix Guattari put it "Never before has a State lost so much of its power in order to enter with so much force into the service of the signs of economic power."[56]

This fusion of capital and state relates to the issue of information technology in several ways. It is increasingly through the state, by means of government-industry consortia, university-business partnerships, training and education schemes, military contracts, and business subsidies that capital mobilizes the range of cooperative social activities necessary to generate the technological innovations on which it depends. Moreover, much of the drive to privatization is aimed at expropriating technoscientific systems first developed as public utilities and now sufficiently advanced to become profitable for private operation; hence the selling off of telephone-systems, research institutes, library resources and so on. At the same time, high technologies allow corporate power to exercise both the carrot and the stick in compelling privatization and deregulation. The stick is the threat of capital-flight into the global webs of investment and speculation. The carrot is the promise (to compliant regimes) of instrumentation for reducing costs--automating public service jobs, intensifying surveillance of welfare 'cheats', deploying 'robocop' security forces to mop up social disintegration, and so on. And this technologically-aided reduction in social expenditures is itself one of several avenues to reduce the so-called 'tax burden' on corporations, thus freeing funds for the gigantic investments required by new high technology systems. The emergent conditions of technoscientific production are thus profoundly connected--both as end and means--to the dynamic of privatization.

Confronted by this onslaught, the usual response of social democratic parties and trades unions has been a defensive cry for the maintenance of the welfare state. But calls for a return to the era of Keynesian 'big government' strike us as inadequate as the demand that unemployment be solved by 'more jobs.' They forget the important critique of the welfare state mounted by workers, feminists and anti-poverty movements during the 1960s and 1970s, which addressed not only the quantitative limits of social expenditures and programs but also the qualitative problems arising from their frequently demeaning and invasive administration.[57] It is important to recognize that neoliberal success in deregulation and privatization rests in part on mobilizing these real popular resentments against remote,

bureaucratic and hierarchical forms of governmentality. Moreover, a purely defensive response to privatization neglects the real possibilities for more responsive and participatory practice of governmentality than those permitted by the old 'Planner State.'

We remember that "the withering away of the state" was once viewed on the left as as an occasion for jubilation rather than dismay. This perspective can be maintained without lapsing in to any sort of anarchist romanticism.[58] The response to neoliberal privatization should not simply be a plea for return to the welfare state, but rather a project for destatification of a different kind--one which restores and increases social expenditures, but devolves administrative power towards a multiplicity of collective, democratic projects and agencies.[59] This project of "destatification downward" or "socializing without statifying," a long-standing element in the autonomist tradition, has recently been voiced from many other sections of the European left.[60] Broadly speaking, such proposals aim to relay financial and administrative control over publicly-funded governmental services away from the state apparatus towards a variety of other social locii--housing and medical cooperatives, social and cultural centres, research and innovation centres. The role of government is redefined as supporting collective initiatives rather than substituting for them, diffusing rather than concentrating control, nurturing social transformation from the bottom up rather than engineering it from the top down.

The potentiality for this diffusion arises from the proliferation of ecological, feminist, labour, educational, housing and public transport activism which has been such a marked feature of capitalist societies over the last twenty five years. Such activism constitutes an already-existing tissue of agencies and organizations, many operating at sophisticated levels of administrative, technological and communicative practice. This can be seen as an arena of "counterplanning"-- a term which autonomists have used to designate the ability of socialized labour to run things according to priorities different from those of capital, either on shop floor, or in the social factory as a whole.[61] Destatification downward rests on reinforcing and amplifying this nascent network of counterplanning agencies and institutions, so that they play an increasing role in the conception and administration of governmental regulation and spending in the workplace, welfare, education, health, and environment. Where privatization dissolves the state into capital with the aim of better subordinating society to corporate will, "socializing without statifying" reabsorbs the functions of the state within myriad non-commercial collectivities with the aim of surrounding and encroaching on capital from a variety of directions.

The products of the information revolution can be put to serve this alternative at least as effectively as they are now being marshalled in the service of privatization. Within the context of "communication commons" of the sort outlined in the previous section,

computerization and telecommunication could provide the channels for access to data and analysis, cooperative assistance, and easy-to-use accounting and administrative systems necessary for complex and decentralized systems of social self-organization. Indeed, we are now witnessing, in embryonic form, the emergence of such capacities.

For example, in the US, agitation by green groups has resulted in the establishment of Right-to-Know Computer Network (RTK Net). This offers free, online access to the U.S. government's Toxics Release Inventory (TRI), with information on industrial releases of toxic chemicals from some 24,000 U.S. industrial facilities. Grassroots groups around the country have used TRI information to produce dozens of reports on pollution, garnering public attention and compelling industry cleanup efforts in a number of states.[62] In Canada, the Ottawa-based Rural Advancement Foundation International , which serves as a clearing-house and information source for movements of indigenous people and First and Third world farmers fighting biotechnological enclosures, uses electronic data-base searches to identify pending corporate patent claims. It disseminates its analysis via World Wide Web.[63] Such initiatives, and many others--feminists coordinating proposals for international conferences by email ; unions establishing in-house electronic data-bases on health and safety practice; community networkers making available public information on health or recreational activities on free-nets--are in various ways using the networks to accumulate and distribute knowledge and coordinate activities on a scope and scale that was previously the prerogative of state and business organizations.[64] Limited as these instances are, one can extrapolate from them to envisage the potential role of computers in providing the fibres for destatification from below.

Indeed, here it is possible that information technologies may help resolve a major dilemma of the left--that of large-scale economic coordination. It is widely held today that on this issue there exist only two options--the free market, or the command state--and that the latter of these has been decisively discredited.[65] Neither, in our view, offers a desirable prospect, the former because it drives inexorably toward the commodification of human life-time, the latter because of its tendencies--tragically demonstrated in 'already existing socialism' --to official despotism. Reformist combinations of state and market, such as the 'mixed economy' have revealed their extreme instability.[66] In this situation, attempts to envisage an emancipatory social order seem stymied between two unacceptable choices--command by money or bureaucracy: *non tertium datur*.

There *is*, however, a third way, periodically proposed by the anti-authoritarian left: decentralized democratic planning, sometimes known as participatory economics. The classic riposte to this suggestion is that the volume and complexity of information required to coordinate a modern economy could never be processed in time to allow any exercise of

democracy or participation. However, the emergence of highly distributed, very fast information systems throws this rebuttal into question. Some radical economists are now asking whether the extreme sophistication of contemporary communications technologies does not make feasible highly decentralized forms of planning previously considered unwieldy, eliminating the need to chose between the "single brain" of the centralized state or the blind exchanges of the market.[67]

Proposals along these lines encompass varied, perhaps contradictory, possibilities. For example, the socialist-feminist Diane Elson envisages a crucial role for communication systems in her vision of a "socialized market."[68] Elson's economy assumes a guaranteed income--along the lines discussed earlier--and a situation where production is predominantly in the hands not of corporations, but co-operatives, the self-employed, or publicly-owned but worker-managed companies. Centralized economic planning would be limited to the setting of a guiding strategy by means of fiscal and monetary policy, with the daily coordination of supply and demand left to the market. However, the market would be "socialized" by rendering it *transparent*. Enterprises would be obliged to divulge information about the design, production processes, price formation, wage conditions, and environmental consequences of the goods they make. This would be analyzed by publicly supported collectives--"consumers unions"--who would propose norms governing various aspects of these practices. Information about actual production processes and proposed norms would then be disseminated via universal communication networks--something like the Internet or the information highway--publically supported so that every individual,or at least every household, had easy access to telephones, photocopiers, fax machines, computers, and modems.

In this way, Elson says, people could know what enterprises offered, not merely in terms of price but of social and environmental costs of what was consumed. In a situation where it would be immediately apparent what goods had been produced in low-wage or environmentally dubious conditions, shopping would, she suggests, become a series of decisions about the collective, as well as individual, costs and benefits of goods selected. Collective control over information is thus interpreted in terms of democratization rather than centralization.[69] Arguing that "open access to information is the key to conscious control of the economy," Elson concludes by arguing for a strategy that aims to "attack capital's prerogatives over information, and to begin to develop networks which prefigure those a socialist economy would need."[70] Issues range through market regulation, restrictive practices, environmental issues, consumer protection, industrial democracy, and national industrial strategies to open government should be woven into a coherent campaign around open access to information which has the potential for "appealing to a wide range of

non-socialists as well as to socialists, while going to the heart of capital's ability to exploit labour."[71]

An even more comprehensive model of decentralized planning is proposed by Michael Albert and Robin Hahnel.[72] They conceive a society in which production and consumption are entirely organized by decisions of workers' and consumers' cooperatives. Initial statements of needs, in the case of consumer councils, and capacities, in the case of workers councils, are matched, and then adjusted one to another according to what emerges about the overall situation. This process proceeds by several rounds of discussion or "iterations," ascending and descending through various levels of neighborhood, regional, national, and international organization. Now, this is of course precisely the sort of scheme that might be suspected of taking so long nothing would ever get produced or consumed. However, Albert and Hahnel argue strongly that the rapidity of information-processing, speed and scope of communication and relative ease-of-use of contemporary computer technology would make involvement in the process no more complex or time consuming than the daily processes we take for granted in a a market economy

We do not ratify or predict the realization of either of these models, which, as their authors would admit, are necessarily very abstract, and schematic. But the possibilities they raise of linking electronic communications to non-statist planning models are important. They suggest ways in which information technologies, rather than being used as instruments of privatization, could help to create what we might, appropriating a phrase from Manuel De Landes, term "anti-markets"--mechanisms for allocating resources that go beyond commodity exchange.[73] And they envisage this unfolding in a way that does not depend on massive, centralized state bureaucracies. The actualizable nature of such potentials become more visible if we consider the incredible sophistication of the electronic networks now used to process the operations of global stock exchanges, or to integrate just-in-time production systems, or military Star Wars systems. Set against these present uses, the prospects that these same technologies might be used to facilitate highly decentralized forms of collective negotiation, decision-making and management of resources does not seem far-flung.[74]

Zero Technology? The Reconstitution of Machines

Writing of technology, Marx observed that

> Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry: natural material transformed into organs of the human will over nature, or of human participation in nature.[75]

How far their author recognized the significance of this apparently casual distinction must remain unsure.[76] What is certain is that today the issue of whether technology is be conceived as an organ of "will over" or "participation in" nature marks a momentous line of struggle.

For capitalism, the use of machines as organs of "will over nature" is an imperative The great insight of the Frankfurt School--an insight subsequently improved and amplified by feminists and ecologists--was that capital's twin project of dominating both humanity and nature was intimately tied to the cultivation of "instrumental reason," a rationality which systematically objectifies, reduces, quantifies and fragments the world for the purposes of technological control.[77] Business's systemic need to cheapen labour, to cut the costs of raw materials, and expand consumer markets gives it an inherent bias toward the piling-up of technological power. This priority--enshrined in phrases such as 'progress,' 'efficiency,' 'productivity "modernization,' and 'growth'--assumes an automatism which is used to override any objection or alternative, regardless of the environmental and social consequences. Today, we witness global vistas of toxification, deforestation, desertification, dying oceans, disappearing ozone layers and disintegrating immune systems, all interacting in ways which perhaps threaten the very existence of humanity and are undeniably inflicting social collapse, disease and immiseration across the planet. The degree to which this project of mastery has backfired is all too obvious.

Confronting this catastrophic scene, one understandable response is an outright refusal of technoscience. This, for example, is the position of the eco-feminist Maria Mies. Writing primarily in the context of a discussion of biotechnologies, but referring also to computerization, Mies argues that high-technology is so implacably stamped with a capitalist/patriarchal logic of domination that it can only be met by an act of absolute refusal. Marxism, because of its attachment to technological development, is rejected. Any leftist who uses a computer is "schizophrenic."[78] The project of oppositional politics is defined as the construction of a society based on "subsistence production" which largely repudiates machine production, and happily accepts voluntary frugality.[79] This type of perspective is now widespread in ecological, feminist and anarchist movements.

Contrary to these celebrations of pre-industrial conditions, we believe a return to such relative impoverishment sets the likely conditions for the reimposition of all the most unpleasant forms of parochial and patriarchal tyranny. Notwithstanding the enormous problems of environmental degradation that have accompanied their development, machines are a prerequisite for creating the surpluses that support human freedom. Moreover, we agree with those thinkers who have pointed out that the technological changes that have already been wrought on the natural and social habitat are, too a degree, irreversible. Short

of accepting the need for mass 'die offs' of surplus peoples (as some misanthropic sections of the ecology movement do) the sustainability of human society can no longer be predicated on reversion to a supposedly natural, pre-industrial condition. Rather, it will require continuous levels of intervention and management even in order to contain or undo the dangers already set in motion by damage to the planetary ecology.[80]

This interpenetration of 'first 'and 'second' natures is not *necessarily* terrible. As capital has been compelled by labour struggles to develop technologies which could *potentially* end the need for wage work, so it has been spurred by green activism to create machines that *potentially* diminish the depletion of the natural world. Computer and communications networks could (if used in conjunction with electricity sources other than catastrophic megaprojects) be elements in a benign and careful planetary metabolism which, rather than pillaging and defiling ecological systems, repaired and protected them. Indeed, the experiments of many ecological movements--for example, in the satellite mapping of endangered resources--demonstrate this capacity. However, just as capital makes of automation a means to increase people's availability for work, so it deforms resource-saving technologies into means to extend and intensify the reduction of nature to raw materials. The undoing of this vicious paradox requires a governance of technology free from capital's compulsion to endlessly converting the world into commodities.

Thus, rather than rejecting technological development *tout court* it seems more useful to reconsider whether there is some possibility of breaking with the capitalist project of technology as "will over nature" and of developing Marx's hint that machines might instead be developed as organs of "participation in nature." This of course was the issue raised by Herbert Marcuse nearly fifty years ago when he called for the possibility of an alternative technology based on active partnership with nature rather than Promethean conquest.[81] His suggestion was stingingly attacked by Jurgen Habermas, who, in a highly influential article, accused Marcuse of a romanticism that confused the proper domains of "communicative" and "instrumental" reason.[82] The natural world was mute and never could become a a co-participant and interlocutor in the development of technology, but must always remain an object of human control.

In our view, however, Habermas's refutation is not definitive. Marcuse does not have to be understood as proposing a conversation with dolphins, owls and rain-forests, but a dialogue among humans who perceive a more reflexive and participant relationship with such creatures than instrumental rationality acknowledges. For us, the development of machines as "organs of participation in nature" means recognizing that the human wielders of technology are embedded-in and dependent-on the world they transform, and

intervening with an awareness of the limits and uncertainties that flow from this recursive situation.[83]

Moreover, as Andrew Feenberg has argued, since the time Marcuse issued his call, the project of developing a new science and technology has taken concrete social form. Social movements in conflict with the technoscientific agenda of capital ---feminists, ecologists, community health, and worker movements--have, at both theoretical and practical levels, challenged the characteristic methods, preoccupations, and institutional structures of corporate technoscience.[84]Such movements have attempted to develop modes of investigation and experimentation that do not align themselves with the assumptions of capitalist progress. In a field of workplace, medical and environmental settings they have challenged the rigid instrumental division between subjects and objects of knowledge, and investigated research practices emphasizing holism, interaction, complexity and self-reflexivity. They have questioned the privileging of certain forms of theoretical inquiry over others--for example, the adoption of physics rather than biology as model of scientific inquiry--and disputed the automatic dismissal of alternative knowledge-systems, such of those of indigenous people. They have experimented both with using the machines capital designed in ways differently from what was intended, and in intentionally designing machines in ways different from capitalism.[85]

Technoscientific innovation is a collective, social process.Its processes are manifold rather than monolithic. Scientific research and technological invention are not so much something that capital creates as appropriates--activities it must forcibly shape and twist to its purposes, by acts of exclusion, repression, and marginalization. Thus, although reductionism, fragmentation and "will over nature" are elements in technoscientific endeavor to which the path of capitalist development have given precedence and emphasis, they are not the whole story. As Evelyn Fox Keller has argued from a feminist perspective, they are only part of a more complex and variegated bundle of impulses and approaches associated with scientific activity, which also includes very different tendencies toward holistic perspectives, reverence, curiosity etc.[86] If these aspects have been devalued in capital's expropriation of social knowledge, they have never been completely extinguished, and can be revived.

Our commonwealth would create space for these emergent counter-knowledges and alternative ways of doing. It would not reject technological development, but broaden its scope, opening and creating institutions to allow the emergence of experiments, innovations and logics other than those which have hitherto been admitted, and assessing them not according to the needs and priorities of capital, but by far more widely-determined

criteria. We agree with the many movements and theorists now arguing for a"democratization of technology,"

> . . . a democracy deep enough to function even at the level at which the machines are shaped--from the uses to which those machines are applied to their design and construction and use."[87]

Drawing on the experience and examples of the movements we mention above, thinkers such as Andrew Feenberg, Richard Sclove, Michael Goldhaber and Hilary Wainwright have done interesting work in suggesting non-capitalist criteria which might be applied in evaluating technologies for collective adoption--for example, the degree to which they support ecological sustainability, local economic self reliance, satisfying work experiences, flexible life scheduling, and equalitarian and diverse social relations.[88]

They have also suggested the array of new institutions necessary to make application of these criteria feasible. These include the creation of extensive opportunities for citizen involvement in technological research, development, design and strategic planning within universities, laboratories, enterprises and government agencies; publicly funded organizations to assist various communities of locality or interest research and develop technologies shaped to their needs; public programmes to overcome traditional patterns of marginalization and exclusion in the institutions of science and technology; and a wide array of collective bodies to monitor, test, evaluate and debate the consequences of specific lines of research and to determine the level of funding for their development, possible redirections, or termination. As Douglas Schuller points out, while these approaches could not and should not *control* technoscientific innovation, which indeed depends on the surprising and unpredictable, it could *shape* its trajectory--just as capitalist control today channels it, but in very different directions.[89]

The only shortfall of this approach is the apparent reluctance of many of its advocates to recognize that the adoption of such arrangements, on any large scale, is incompatible with capitalism. For the liberal-sounding slogan "democratization of technology" is, if taken seriously, tantamount to a call for the reappropriation of the means of production, and will be resisted by established power accordingly. Such a "democratization" would, however, be consistent with our own suggestion for a commonwealth characterized by decentralized, networked collective planning and an abundance of free time. Moreover, the advance of such initiatives for the collective control of machine-development is itself a way of setting in motion vectors of struggle moving towards the institution of such a commonwealth.

Although ours is not a primitivist position that looks to the abolition of machines, we do believe that our commonwealth implies a very different relation between machines

and people from that which exists under capital--to a degree that perhaps subverts commonly accepted notions of 'technology.' Historically, machines have incarnated expropriation from the means of production. In their fixity of design, industrial technologies embodied --or metallised--the alien will of their owner, so much so that sayings like a 'cog in the machine' summon up a world of dispossession and powerlessness. Indeed--as Marx often pointed out--in a certain sense this association with dominative power became definitive of what a machine *is*.

We have already suggested that there are in play today, in social struggles and grassroots experimentations such as 'hacking,' certain tendencies to erode this situation. The institutions of commonwealth we envisage would aim to accelerate this dissolution. In particular, they would undo the 'autonomous' nature of a certain line of machine advance (dynamic in some respects, narrow and constrained in others) which in the name of 'progress,' and 'efficiency' assumes the status of a natural law, repressing question or deviation and thereby cancelling the autonomy of the humans it ostensibly serves--in which 'technology' is predicated as an autonomous force. Thus, the selection or refusal of particular paths of machine or non-machine development would be the outcome of collective reflection and discussion which would contradict the imperative tone that has become synonymous with 'technology.'

This collective decision-making might well lead to the phasing out of certain machines which the capitalist structuring of everyday life has made indispensable (such as the private automobile) or the rapid development of others (such as the universal provision of adequate cooking and clean drinking-water facilities on a global scale) to which it has paid little or no attention. In the absence of capital's compulsion to accumulate, any number of more, less or differently technologized futures, currently ruled out of play as inefficient or non-economic, become available--not because of magical translation to some realm of infinite abundance,but because a self-organized society is empowered to make the difficult decisions as to how to allocate its resources.

If our commonwealth itself has a technological imperative, it is a paradoxical and self-reflexive one--namely, that there shall be enough machines to permit choice about whether to develop more machines. Sufficient automation to free ample time from work, a communications infrastructure capable of acting as an organ of democratic debate and planning enable collective decision and reflection. The aim of the process is, we might say, is to subordinate the instrumental aspects of technology to the collective, communicative determination of societal directions.

We have pointed to various constituents for the creation of a social order different from capital. The elements for this alternative are to hand, but not combined. They exist, here-and-now, but only here-and-there, just as at certain point in the pre-history of capital its various ingredients--wage labour, market exchange, new machinery--all existed in scattered form but had not cohered--or been violently welded--into a new order.

Under what conditions, and through what pressures, the new ensemble might come into being is uncertain. We do not believe such an emergence is inevitable. It is, however, obvious that capitalism is experiencing serious problems in managing the world-transforming technologies it has itself bought into being. The manifest inability of business to sustain employment in the face of blisteringly-fast automation; the consequent contrast between restricted consumption power and endlessly expanding production; the tendencies of social spending cuts to erode the the very public infrastructures on which technological development depends; the repeated failures to restrain the depredation of the ecological fabric of the planet, all mean that the maintenance of the existing order is a project no less 'utopian,' in the negative sense of inviting incredulity, than the creation of an alternative.

The actualization of such an alternative is a matter of contestation. What we have offered here is not so much a blueprint as a battlefield map. It does not identify an agenda to be implemented 'after the revolution,' but a series of initiatives whose advancement can be pursued and interrelated. At a certain point their implementation would contaminate and overload the circuitry of capital with demands and requirements contradictory to the imperatives of profit, snapping the logic that binds people's various activities into a market-society, and so permitting the reassembly of these activities in a new configuration.

This snapping could be violent. While the recent disintegration of Soviet state-socialism presents the historically unusual case of a social system so demoralized and undermined that it collapsed without major exercise of force, a repetition of this pattern should not be assumed: "present policies are not accidental: capital will put up a fight."[90] Insurrectionary concepts of revolution--the storming of the Winter Palace--are today a dead letter, but the capacity of capital to release violence against any serious challenge are undimmed. Social movements which ignore this act in bad faith. We can imagine a commonwealth born in extreme tumult: perhaps out of the mounting civil disorder arising from intensifying unemployment and social disintegration, increased activity by proto-fascist militias and extreme-right parties, and resistance to these programs: perhaps in an Allende-style situation in which a government democratically elected to implement part of the commonwealth program--say, a guaranteed annual income--faces a reactive coup;

perhaps in a situation where some region or nation attempting to secede from the world-market by debt-repudiation faces invasion or intervention; perhaps in the wreckage of ecological catastrophe or the devastation of inter-capitalist war. In all these circumstances the technological forms of struggle on which this work has focussed could become recontextualized and converge around a collision of physical force, as the ability to acquire and use weaponry; circulate and coordinate military actions; disrupt similar efforts by opponents; and disaffect their combatants. If we do not discuss these eventualities, it is not because we believe they cannot occur.

Whatever path their actualizatiom might take,, the measures suggested here, combined in some concerted society-wide ensemble, would make up a world very different from that which we today accept as normal. It would be a world where wage-work would have a steadily decreasing importance or vanish entirely; where, although there would be labour to be done, livelihood would not be dependent on a job; where, consequently, people would have more time to think about and participate in decisions about organizing life in association with others; where they would have access to a very wide variety of communication channels, with a very wide diversity of representations and images about different possibilities of being; where these channels served also as routes for a flow of participatory decision making about the production and distribution of goods--and also about the directions taken and not taken in technological development. Although these prospects may seem distant today, they nevertheless represent potentialities which numbers of people are currently attempting to activate. The revolution "takes its poetry from the future," but it also knows that the seeds of the future are in the present.[91]

NOTES

1 Frederick Engels, Socialism: Utopian and Scientific.(Peking: Foreign Languages Press,1975) 88.

2 Karl Marx and Frederick Engels, The German Ideology (London: Lawrence &Wishart, 1963) n.p. There is of course an enormous literature on the relation of Marxism to utopian thought: two of the sources we have found most stimulating are Krishan Kumar, Utopia and Anti-Utopia in Modern Times (Oxford: Blackwell, 1987) 48-65, and E.P. Thompson, William Morris: Romantic to Revolutionary (London: Merlin, 1977).

3 Pierre Bordieu, Liberation, 14 December 1995, cited in Massimo De Angelis, "The Autonomy of the Economy and Globalization," Vis-A-Vis,Winter 1996, online, available from http:// jefferson.village.Virginia.EDU/~spoons/aut_html/glob.html

4 De Angelis, ""The Autonomy of the Economy."

5 De Angelis, ""The Autonomy of the Economy."

6 De Angelis, ""The Autonomy of the Economy."

7 De Angelis, email, online, autop_sys discussion group.

8 De Angelis, email, online, autop_sys discussion group.

9 The most accessible English-language discussion of 'self-valorization' is Harry Cleaver, The Inversion of Class Perspective in Marxian Theory: From Valorisation to Self Valorisation," Open Marxism, vol. 2, ed. Werner Bonefeld, Richard Gunn and Kosmas Psychopedis (London: Pluto 1992) 106-144. See also "An Interview With Harry Cleaver," Vis-A-Vis 1 (1993) online, available from http://www.eco.utexas.edu.80/Homepages/aculty/Cleaver/index2.html.

10 Amongst works which have influenced us but are not mentioned in the body of the text are Tessa-Morris Suzuki's sketch of "information democracy" in her Tessa Morris-Suzuki, Beyond Computopia: Information, Automation and Democracy in Japan, (London: Kegan Paul, 1988), Rudolf Bahro, The Alternative in Eastern Europe. (London: New Left, 1978); and Raymond Williams, Towards 2000 (London: Chatto and Windus, 1983).

11 Karl Marx, Grundrisse (Harmondsworth: Penguin, 1973) 699-700.

12 For a collection of essays from diverse perspectives but within this broad orientation, see Wolfgang Sachs, The Development Dictionary: A Guide to Knowledge as Power. (London: Zed Books, 1992)ed.

13 For discussion of this type of problem see Maurizio Viano and Vincenzo Binnetti, "What Is toBe Done?: Marxism and the Academy," Marxism Beyond Marxism, ed. Saree Makdisi, Cesare Casarino, & Rebecca E. Karl (London: Routledge, 1996) 243-254.

14 See for example Harry Cleaver, "Socialism," The Development Dictionary: A Guide to Knowledge as Power, ed. Wolfgang Sachs.(London: Zed Books, 1992) 233-249.

15 Cornelius Castoriadis, Political and Social Writings, Volume 3, 1961-1979: Recommencing the Revolution: From Socialism to the Autonomous Society (Minneapolis: University of Minnesota, 1993)..

16 Christopher Hill, The World Turned Upside Down: Radical Ideas During the English Revolution.(New York: Viking, 1973).

17 Karl Marx, Capital: A Critique of Political Economy. vol. 3 (New York: Vintage Books. 1981) 958.

18 Paolo Virno, "Quelques notes a propos du 'General Intellect,'" Futur Anterieur. 10. (1992): 47..

19 Virno, 47.

20 Stanley Aronowitz and William DiFazio, The Jobless Future: Sci-Tech and the Dogma of Work (Minneapolis: University of Minnesota Press, 1994); Barrie Sherman and Phil Judkins, Licensed to Work (London: Cassell, 1995); Jeremy Rifkin, The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era (New York: Putnam, 1995).

21 Adam.Przeworski, "Less is More: In France the Future of Unemployment Lies in Leisure." Dollars & Sense. July/August.1995 12,15.

22 For exposition and discussion of these arguments, see the collection Arguing for Basic Income: Ethical Foundations for a Radical Reform, ed. Phillipe Van Parijs (London: Verso, 1992).

23 Steve Wright, "Confronting the crisis of Fordism: Italian Debates Around Guaranteed Income," manuscript 1995, forthcoming in Capital & Class.

24 Zerowork Collective, "Introduction," Zerowork: Political Materials 1 (1975): 3.

25 Gorz, as editor of "Les Tempes Moderne," ran a special issue on the Italian New left, and approvingly cites Negri in several of his works.

26 Andre Gorz, Paths to Paradise: On the Liberation From Work (London: Pluto, 1985). For a more recent statement of Gorz's position, see his Critique of Economic Reason (London: Verso, 1989), and Capitalism, Socialism, Ecology (London: Verso, 1994).

27 Gorz, Paths to Paradise n.p.

28 Gorz, Paths to Paradise 41.

29 Gorz, Paths to Paradise n.p

30 Gorz 1982. Farewell to the Working Class (London: Pluto, 1982).

31 Wright, "Confronting the crisis of Fordism." For a scathing critique of Gorz by some North American autonomists, see Midnight Notes Collective. "The Working Class Waves Bye-Bye," Midnight Notes 7 (1984): 12-18. David Byrne, "Just haad on a minute there: a rejection of Andre Gorz's 'Farewell to the Working Class'." Capital and Class 24 (1985): 74-98, and R. Hyman, "Andre Gorz and His Disappearing Proletariat," Socialist Register, ed. Ralph Miliband and John Saville.(London: Merlin, 1983) 272-295.

32 Milton Friedman, "The Case For the Negative Income Tax: A View From the Right," Issues in American Public Policy, ed. J.H. Bunzel (Englewood: New Jersy, 1968) 111-120.

33 Jean Swanson, "GAI: Guaranteed Disaster," Canadian Dimension. December/January 1994/95, 24.

34 De Angelis, "'Crisi dell'occupazione', strategie del capitale e ipotesi strategiche per l'autonomia," Vis-A-Vis 2 (1994), cited in Wright.

35 De Angelis, "'Crisi dell'occupazione.'"

36 See Swanson, "GAI: Guaranteed Disaster." and her debate with Eric Shraggein the same issue of Canadian Dimension.

37 Wright, "Confronting the crisis of Fordism."

38 In addition to works already cited see Philippe Van Parijs, Marxism Recycled (Cambridge: Cambridge University Press, 1993) and Real Freedom For All, (Oxford: Clarendon, 1995); Dianne Elson, "Market Socialism or Socializing the Market?" New Left Review 172 (1987): 3-44; David Purdy, "Citizenship, Basic Income and the State," New Left Review 208 (1994) 30-48.

39 Mariarosa Dalla Costa and Selma James, The Power of Women and the Subversion of the Community. Bristol: Falling Wall Press, 1972.

40 Marilyn Waring, If Women Counted: A New Feminist Economics (San Francisco: Harper & Row, 1988).

41 Mike.Cooley Architect or Bee? The Human Price of Technology (London: Hogarth, 1987);.Shosana Zuboff, In the Age of the Smart Machine: The Future of Work and Power (New York: Basic, 1988).

42 Van Parjis, Marxism Recycled 236.

43 Oscar Wilde, The Portrait of Dorian Grey (?)

44 On these developments see Vincent Mosco The Pay-Per Society: Computers and Communication in the Information Age: Essays in Critical Theory and Public Policy. (Toronto: Garamond, 1989); Nicholas Garnham, Capitalism and Communication: Global Culture and the Economics of Information (London: Sage, 1990); W.D. Rowland Jr. and M. Tracey, "Worldwide Challenges to Public Service Broadcasting," Journal of Communication 40.2 (1990) 8-27; Marc Raboy, Ivan Bernier, Florian Sauvageau, Dave Atkinson. "Cultural Development and the Open Economy: A Democratic Issue and a Challenge to Public Policy," Canadian Journal of Communication 19 (1994): 291-315; and Edward Comor, ed., The Global Political Economy of Communications: Hegemony, Telecommunications and the Information Economy (New York: St Martins, 1994).

45 Dorothy Kidd and Nick Witheford, "Counterplanning from Cyberspace and Videoland: or Luddites on Monday and Friday, Cyberpunks the Rest of the Week," paper presented at "Monopolies of Knowledge: A Conference Honoring the Work of Harold Innis," Vancouver, November 12, 1994, 1.

46 John Keane, Media and Democracy (Oxford: Blackwell, 1990. 159.

47 Keane 161.

48 Douglas.Kellner, Television and the Crisis of Democracy (Boulder: Westview, 1990).

49 Computer Professionals for Social Responsiility, "A Public Interest Vision of the National Information Infrastructure," online, Internet, ACTIVE-L, 11 Mar. 1994.

50 Computer Professionals for Social Responsiility, "A Public Interest Vision."

51 Computer Professionals for Social Responsiility, "A Public Interest Vision."

52 Computer Professionals for Social Responsiility, "A Public Interest Vision."

53 Computer Professionals for Social Responsibility, Berkeley Chapter Peace and Justice Working Group. "A Computer and Information Technologies Platform." Online, Internet, ACTIVE-L, 19 Sep. 1992.

54 This suggestion is also made by Tessa Morris Suzuki, Beyond Computopia. We are aware that this call for the elimination of property rights will seem problematic for many artists, researchers and cultural workers. For people in these areas the propensity to piracy inherent in electronic technologies threatens their livelihood. While they would like to see intellectual property rights in this area revised to strengthen the rights of the immediate producers against the large enterprises publishing houses, music businesses, software giants who purchase and dispose of their work, they might well be aghast at the prospect of forgoing royalties and other revenues on which their activities depend.We agree that within the current, capitalist, context, legal protection for these producers is appropriate: the direction of dismantling intellectual property rights should start from an assault on the legal fortifications of the corporations who are the beneficiaries of the current system, not of individuals and small organizations. Its full realization should be to be understood as part of the overall constititution of our commonwealth aimed to break fundamentally with market logic, as part of an entire 'package' which includes measures such as a guaranteed income which fundamentally undercut the need for people to worry about selling their intellectual or physical labour power.

55 Michel Foucault, "Governmentality," The Foucault Effect, Graham Burchell, Colin Gordon, Peter Miller (London: Harvester 1991) 87-104.

56 Gilles Deleuze and Felix Guattari, Anti-Oedipus: Capitalism and Schizophrenia. (New York: Viking,1983), 252.

57 See, for example, the London Edinburgh Weekend Return Group, In And Against the State (London: Pluto, 1980).

58 See Kenneth Surin, "Marxism(s) and "The Withering Away of the State." Social Text 27(1990): 35-54.

59 We agree with Joachim Hirsch, who in "The New Leviathan & The Struggle for Democratic Rights." Telos 48.(1981) 79-89, argues that what is necessary is "reduction of the role of the state" in the sense of "a collective reappropriation of responsibilities, self-management, autonomous interest organization, debureaucratization and decentralization;" this program is valid even though it will necessarily conflcit with attempts "to exploit anti-state and and anti-bureaucratic resentments for quasi-populist, reactionary mobilization and social-political austerity strategies."

60 Wright, "Confronting the crisis of Fordism," describes how some Italian autonomists now argue a guaranteed income based upon the free distribution of selected social services could provide a starting point from which to build for the further extension of a self-managed sector where need takes priority over profit and provide a "motor of a process of reappropriation of the welfare state's institutions and services, based upon the expansion of self-managed social labour and cooperation.'He also shows how the idea of reappropriation of the welfare state 'from below' has been expounded by Marco Revelli, a member of the more traditional left with autonomist affinities, who believes that "the welfare state has finally run its course:" " Since it is now both 'useless to the bosses [and] alienating to workers', a political strategy based

upon an unconditional defence of the welfare state would be 'suicidal'. Its current crisis can only lead to two outcomes: either towards a social 'free-for-all' such as can be found in the United States, where each must fend as best they can, or else 'a more mature "sociality"' based upon mutual aid. Many examples of the latter, he points out, already exist in Italy: above all, the thousands of cooperatives and mutual societies which provide health care and other social benefits to their members." The left's aim, Revelli suggests, should be to expand this area of welfare from below, and "to reconstruct those autonomies that the inevitably bureaucratic apparatuses of the parties, unions and state have dispersed."

For an example of such thinking from an Anglo-Saxon perpective, see Hilary Wainwright, Arguments For a New Left: Answering the Free Market Right (London: Blackwell, 1994).

61 See Nicole Cox and Silvia Federici, Counterplanning From the Kitchen -- Wages for Housework: A Perspective on Capital and the Left (Bristol: Falling Wall, 1975); Craig Benjamin and Teresa Turner "Counterplanning from the Commons: Labour, Capital and the `New Social Movements'. Labour, Capital and Society 25:2 (1992): 218-248; and Kidd and Witheford, "Counterplanning from Cyberspace and Videoland."

62 Douglas Schuler, New Community Networks: Wired for Change (Reading: Addison Wesley, 1996); Benjamin Goldman, "The Environment and Community Right to Know: Information for Participation," Computers in Human Services 8.1 (1991) 19-40.

63 RAFI can be reached at http://www.charm.net/~rafi/rafihome.html

64 For an extensive discussion of this activity see Schuler, and Jay Weston,."Old Freedoms and New Technologies:The Evolution of Community Networking," Free Speech and Privacy in The Information Age Symposium," U. of Waterloo, Canada, 26 Nov. 1994, online, Internet, Red Rock Eater news group.

65 The classic statement of this view remains F.A.Hayek, "The Use of Knowledge in Society." American Economic Review 35 (1945): 519-30. For a fascination discussion of and rebuttal of Hayek, see Wainwright.

66 For discussion of these issues see the debate between Alex Nove, the champion and of "market socialism" and Ernest Mandel, an advocate of state planning. Alec Nove, The Economics of Feasible Socialism, (London: Allen and Unwin, 1985), and "Markets and Socialism," New Left Review 161 (1987): 98-104. Ernest Mandel, "In Defence of Socialist Planning," New Left Review 159 (1986): 5-39, "The Myth of Market Socialism," New Left Review 169: (1988) 108-121. See also Boris Frankel, Beyond the State?: Dominant Theories and Socialist Strategies, (London: Macmillan, 1983) and "The Historical Obsolescence of Market Socialism--A Reply to Alec Nove," Radical Philosophy, 39 (1985): 28-33; Hans Breitenbach, Tom Burden, and David Coates, Features of a Viable Socialism.(New York, Harvester 1990); Pat Devine, Democracy and Economic Planning.(Cambridge: Polity, 1988).

67 Hayek.n.p.

68 Elson, "Market Socialism or Socializing the Market?"

69 Elson writes,"There has been a tendency among Marxists (beginning with Marx) to interpret conscious control in terms of gathering all relevant information at one decision-making point and of taking decisions with full knowledge of all inter-connections and ramifications. That is an impossible, and an undesirable, goal. Conscious control is better interpreted as open access to all available information concerning the product and its price, so that any decision-maker has access to the same information as any other . . . Such a system of coordination does not require simultaneous processing of large amounts of information, of the kind necessary for effective central planning (which, even with the latest computer technology is argued to

be unfeasible). Rather it requires the gathering and processing, at discrete intervals, in separate bundles, of information already generated by enterprises for their own use, such as unit costs and levels of inventories, and process and product specifications. The barrier to this is not technical: current levels of micro-processor technology can certainly handle this kind of information processing very rapidly . . . The barrier is not technical: it is social and political" (1988, 43)

70 Elson, "Market Socialism or Socializing the Market?" 43.

71 Elson, "Market Socialism or Socializing the Market?" 44.

72 Michael Albertand Robin Hahnel, The Political Economy of Participatory Economics Princeton: (Princeton University Press, 1991) and Looking Forward: Participatory Economics for the Twenty First Century (Boston: South End Press, 1991).

73 Manuel De Landa, "Markets and Antimarkets in the World Economy," Technoscience and Cyberculture ed. Stanley Aronowitz, Barbara Marhnsons, and Michael Merser (New York: Routledge, 1996) 181--94.While De Landa uses the term negatively, to denote impediments to some supposedly attainable prefect capitalist competition, we use it positively, to suggest democratic antidotes to market distribution.

74 Without claiming scriptural authority, we will note that this development would be one that Marx's would recognize He noted that while the world market operated according to "independent and indifferent" logic of monetary exchanges, in which cooperation is sacrificed to the law of supply and demand, the crises this produced meant that "together with the development of this alienation, and on the same basis,efforts are made to overcome it:"--attempts expressed in the development of institutions and technologiesof information." institutions emerge whereby each individual can acquire information about the activity of all others and attempt to adjust his own accordingly, e.g. list of current prices, rates of exchange, interconnections between those active in commerce through the mails, telegraphs etc. (the means of communication of course grow at the same time). (This means that, although the total supply and demand are independent of the actions of each individual, everyone attempts to inform himself about them, and this knowledge then reacts back in practice on the total supply and demand." The result is an increase in "the general bond and all round interdependence." While "alienation is not overcome by these means, nevertheless relations and connections are introduced thereby which include the possibility of suspending the old standpoint" and make possible a movement away from the blind comparison of exchange relations towards "real communality and generality." Grundrisse 160-61.

75 Marx, Grundrisse 706.

76 Marx's other writings contain elements both of the frank scientific triumphalism common to his age (elements later amplified in scientific socialism) and also insights into the metabolic interconnection of humanity and nature which prefigure contemporary ecological thought.For discussions of the 'green' Marx seesee the journal Capitalism, Nature, Socialism, edited by James O'Connor, and David Pepper, Eco-Socialism: From Deep Ecology To Social Justice (London: Routledge, 1993).

77 Theodor,Adorno and Max Horkheimer,. Dialectic of Enlightenment (New York: Herder and Herder, 1972).

78 Maria Mies, "Why do we Need all this? A Call Against Genetic Engineering & Reproductive Technology," Patricia Spallone and Deborah Lynn Steinberg, Made to Order: The Myth of Reproductive and Genetic Progrss (Oxford: Pergamon, 1987) 46. Despite the title of the paper, Mies addresses issues across the span of high-technology development, including what she terms "indundation with 'technical means of communication.'" See also her Patriarchy and Accumulation on a World Scale: Women in the International Division of Labour (London: Zed Books, 1986).

79 Mies, "Why Do We Need All This?" 46.

80 On this point see Felix Guattari, "The Three Ecologies," New Formations 8 (1989) 146-147: "Increasingly in the future, the maintenance of natural equilibrium will be dependent upon human intervention; the time will come, for example, when massive programs will have to be set in train to regulate the relationship between oxygen, ozone, and carbon dioxide in the earth's atmosphere .. . What is required for the future is more than the mere defence of nature. If the Amazonian 'lung' is to be regenerated, the Sahara desert made fertile again, we need, immediately, to go on the offensive. Even the human creation of new plant and animal species looms unavoidably on the horizon; the urgent task we face is, then, to fashion an ethics appropriate to a scenario that is both terrifying and fascinating, and, more importantly, a politics appropriate to the general destiny of humanity."

81 Herbert Marcuse, One Dimensional Man (Boston: Beacon, 1964), 156-169.

82 Jurgen Habermas, Towards a Rational Society (Boston: Beacon, 1977).

83 For discussions of the debate which tend toward this view point see Steven Vogel, "New Science, New Nature: The Habermas-Marcuse Debate Revisited," Research in Philosophy and Technology 11 (1991): 157-78, and Andrew Feenberg Critical Theory of Technology (Oxford: Oxford University Press, 1991).

84 Andrew Feenberg, "Marcuse and the Critique of Technology," in his Alternative Modernity: The Technical Turn in Philosophy and Social Theory (Berkeley: University of California, 1995). 19-40.

85 On these tendencies see Richard Levins, "Toward the Renewal of Science," Rethinking Marxism 3: 3/4 (1990): 102-125; David Dickson, The New Politics of Science (Chicago: University of Chicago, 1988); Cooley, Architect or Bee?; Sandra Harding,ed., The "Racial" Economy of Science: Toward a Democratic Future (Bloomington: Indiana University Press, 1993): Richard Hofrichter, ed., Toxic Struggles: The Theory and Practice of Environmental Justice (Philadelphia: new Society, 1993).

86 Evelyn Fox Keller, Reflections on Gender and Science (London: New Haven, 1985).

87 Tom.Athanasiou,. "Greenwashing Agricultural Biotechnology." Processed World 28 (1991/2): 21.

88 Feenberg, Critical Theory of Technology; Wainright,Arguments for a New Left; Richard Sclove Democracy and Technology (New York: Gilford, 1995); Michael Goldhaber, Reinventing Technology: Policies for Democratic Values (New York: Routledge and Kegan Paul, 1986).

89 Schuller 383.

90 From a wall poster seen on the streets of Vancouver..

91 Karl Marx, The Eighteenth Brumaire of Louis Napoleaon, n.p. The phrase "the future in the present" is from C.L.R. James.

Chapter 9
INTELLECTS

General Intellect

At the beginning of this work we described struggles within high-technology capitalism as a "contest for general intellect." This final chapter returns to that phrase. It starts by examining Marx's original account of "general intellect." Then it examines how this category has been reworked and amplified by a group of theorists clustered around the journal Futur Anterieur, and discuss the strengths and limitations of their analysis. We then offer two short case studies of what we understand as "the contest for general intellect," and conclude with some observations about the implications of this analysis for those who teach and study in universities.

Marx introduces the concept of "general intellect" in a passage of the Grundrisse known as the "Fragment on Machines."[1] In these pages he departs from his customary emphasis on the centrality of exploitation to the extraction of surplus value. Rather, he suggests that at a certain point in the development of capital, the the creation of real wealth will come to depend not on the direct expenditure of labour time in production, but on two interrelated factors: technological expertise--"scientific labour"--and organization--"social combination."[2] The crucial factor in production will become the "development of the general powers of the human head"; "general social knowledge";"social intellect"; or, in a striking metaphor, "the general productive forces of the social brain."[3]

The main expression of the power of "general intellect" is the increasing importance of machinery --"fixed capital"--in social organization:

> Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry: natural material transformed into organs of the human will over nature, or of human participation in nature. They are organs of the human brain, created by the human hand: the power of knowledge, objectified. The development of fixed capital indicates to what degree general social knowledge has become a direct force of production, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it.[4]

There are two forms of technology Marx particularly notes as signalling capitalism's mobilization of "general intellect." One is the development of production systems based on "an *automatic system of machinery* . . . consisting of numerous mechanical and intellectual organs, so that the workers themselves are cast merely as its conscious linkages."[5] The other, to which his allusions are more scattered but equally persistent, are the networks of

transport and communication integrating "the world market." The development of these human-eliminating, globe-spanning machines indicates the degree to which "general intellect" has been successfully mobilized and mastered by business, and "the accumulation of knowledge and skill, of the general productive forces of the social brain . . . absorbed into capital."[6]

However--and this is the whole point of Marx's analysis--such a level of technological advance, which seems at first a capitalist utopia , contains within itself the seeds of a capitalist nightmare. By setting in motion the powers of scientific knowledge and social cooperation, capital ultimately undermines itself. This occurs for two reasons. First, as advances in machinery and organization reduce the requirement for direct labour in production, the need for people to sell their labour power--the very basis of capitalism's social order--is systematically eroded. There arises a "monstrous disproportion" between individual labour time and the forces set in motion by organized science.

This is reinforced by a second tendency, the increasingly *social* nature of activity required for technoscientific development, which unfolds not on the basis of individual effort but as a vast cooperative endeavor. As this becomes more and more apparent, highlighted by the diffusion and integration of communication and transport networks, both private ownership and payment for isolated quanta of work-time appear increasingly as irrelevant impediments to the full use of social resources. Automation and socialization together create the possibility of--and necessity for--dispensing with wage labour and private ownership. In the era of general intellect "Capital thus works towards its own dissolution as the form dominating production."[7]

Today, "The Fragment on Machines" seem simultaneously astoundingly prescient and sadly anachronistic. In its extrapolation of capital's technoscientific trajectory it is surely prophetic. What Marx describes is eminently recognizable as a portrait of what is now commonly termed an 'information society' or 'knowledge economy,' in which the entire intellectual resources of society, from shopfloor production teams, to university-industry partnerships, to the regional 'innovation milieux' of microelectronic and biotechnology companies, is mobilized to produce the technological wonders of robotic factories, gene splicing and global computer networks. Yet any suggestion that this development of the productive forces leads automatically to the advent of socialism appears definitively refuted. Instead, we seem to be witnessing a triumphant reorganization of capitalism that is deploying the new technological innovations to solidify an unprecedented level of global domination. What --if anything--can now be made of the revolutionary optimism of Marx's account of "general intellect"?

It is this question that is addressed by the recent work of a group of theorists associated with the French journal, Futur Anterieur--a group that includes veterans of the Italian *autonomia* movement, such as Toni Negri and Paolo Virno, younger scholars, such as Michael Hardt and Maurizio Lazzarato, and others with roots in different lines of Marxism, such as Jean-Marie Vincent. The central points of their analysis can be summarized as follows.

The "mass worker" struggles of the 1960s and 1970s and the consequent crisis of Fordism compelled capital towards extraordinary levels of high-technology automation and global mobility. These post-Fordist experiments have now brought capital to a point corresponding to Marx's account of "general intellect." However, rather than generating the ordained demise of capitalism, these developments are resulting in something much more ambiguous. Paradoxically, the very 'revolutionary' tendencies Marx identified--the erosion of wage labour, the increasingly 'social' nature of production--are occurring, but in forms prescribed by an order that continues to organize itself on the basis of the wage and private ownership. As Virno remarks, these processes remind one of what Marx wrote about joint-stock companies; that in such institutions "one witnesses the disappearance of private property *on the very ground of private property*."[8] Today post-Fordist capital, displays a similar transformation of communist potentialities into capitalist actualities. As Virno puts it,

> . . . the displacement is real, but the ground on which it is accomplished is no less real. To think these two aspects jointly, without reducing the first to a mere virtuality and the second to an external "rind": such is the difficulty which cannot be avoided.[9]

In this situation it is not enough to focus, as Marx did, on the objectification of social knowledge in new technologies. Rather, the critical issue is that of the nature of the human activity required to create, support and enable this technoscientific apparatus. Here, Futur Anterieur suggests we encounter another paradox. While capital has developed machines to subordinate and reduce labour at the point of production, this development itself demands the emergence a new range of social competencies and cooperations--the cultivation of "general social knowledge." This subjective component of general intellect Futur Anterieur group explore under the label of "mass intellectuality" ("*intellectualite de masse*").

"Mass intellectuality" is the ensemble of 'know-hows' which supports the operation of the high-tech economy. It is "the social body" as a "repository of knowledges indivisible from living subjects and from their linguistic cooperation.[10]" It comprises a "whole gamut

of qualifications, modes of communication, local knowledges, informal "language games" and even certain ethical preoccupations"[11] Negri says that "mass intellectuality" is the activity of a "post-Fordist proletariat,"

> . . . increasingly directly involved in computer-related, communicative and formative work . . . shot through and constituted by the continuous interweaving of technoscientific activity and the hard work of production of commodities, by the territoriality of the networks within which this interweaving is distributed, by the increasingly intimate combination of the recomposition of times of labour and of forms of life.[12]

Mass intellect appears not just in production but throughout a whole network of educational and cultural relations. It is present in industrial and service workers, labouring at the data-face: in students keeping pace with technological innovation through 'life-long learning'; and in the various techno-cultural literacies on which new markets for electronic and entertainment goods depend. Mass intellectuality is intimately bound up with the new prominence of what Negri and Lazzarato term "immaterial labour"-- the "distinctive quality and mark" of work in "the epoch in which information and communication play an essential role in each stage of the process of production."[13] Overflowing and surpassing previous Marxist distinctions between base and superstructure, economics and culture, mass intellectuality is "difficult to describe in economic terms" but is "for that very reason (and not despite it) the fundamental ingredient of today's capitalist production."[14]

The crucial question thus becomes how far capital can contain what Vincente terms "this plural, multiform constantly mutating intelligence" of mass intellect within its structures.[15] As he observes, it "appears to domesticate general intellect without too much difficulty."[16] But this absorption in fact demands an extraordinary exercise of "supervision and surveillance," involving "complex procedures of attributing rights to know and/or rights of access to knowledge which are at the same time procedures of exclusion":

> Good 'management' of the processes of knowledge consists of polarizing them, of producing success and failure, of integrating legitimating knowledges and disqualifying illegitimate knowledges, that is, ones contrary to the reproduction of capital. It needs individuals who know what they are doing, but only up to a certain point. Capitalist 'management' and a whole series of institutions (particularly of education) are trying to limit the usage of knowledges produced and transmitted. In the name of profitability and immediate results, they are prohibiting connections and relationships which could profoundly modify the structure of the field of knowledge.[17]

The Futur Anterieur group suggest that these structures of exclusion and limitation can become the occasion for new forms of social conflict.

Perhaps their most detailed analysis of these new antagonisms is Negri and Lazzarato's discussion of "participative management."[18] As they point out, in many post-Fordist industries the quantitative elimination of labour by computerized automation has paradoxically been accompanied with increasing managerial concern about the quality of the remaining workers. To prevent or fix the many breakdowns of new production systems, to run them at peak capacity, requires operators who are creative, cooperative and alert (or at the very least not inclined to sabotage). This requirement has resulted in innumerable post-Taylorist experiments in work organization "--'quality circles,' 'team concept,' 'Japanese management techniques,' 'Total Quality Management'--in which the intellectual and intersubjective aspects of labour previously suppressed by Taylorism are mobilized for problem solving and participation. Such systems demand that workers,

> . . . become 'active subjects' in the coordination of the different functions of production, instead of being subjected to it as simple command. As the new management prescribes, today it is "the soul of the worker" which must come down into the factory.[19]

If new production systems are the objective side of capitalized "general intellect," the work team represents its subjective side, in cellular form.

Such participative management schemes are, Negri and Lazzarato say, "techniques of power."[20] Capital grants its labour power a certain fusion of conception and execution, and to some extent retreats from the the shop floor. But it continues to dominate the overall process from the heights of the enterprise, retaining control of finance, investment , marketing, and, of course, profit. Problem-solving is predicated on accepting these pre-determined parameters.[21] Although management exhorts dialogue and interaction, communication is actually reduced to "a simple relay of codification and decodification, within the context . . . that has been completely normalized by the firm. [22] In this context, the exhortation to participate is, as Lazzarato observes, authoritarian : "one must express oneself, one must speak, one must communicate, one must cooperate."[23] Indeed, the new team organization is even more totalitarian than the old assembly line, precisely because it seeks to involve the very subjectivity and will of workers, making them "self control" themselves so that command "arises from the subject itself, and from the communicative process."[24]

However, Negri and Lazzarato suggests there is another side to this process. In delegating-even nominally--certain managerial responsibilities to workers, capital is partially relinquishing its claim to act as the mediator and coordinator of production. There is a potential tension between capital's control of enterprises and the increasingly self-

directed nature of work. Drawing on Negri and Lazzarato's work in the context of the South African auto-industry, Franco Barcheisi observes

> . . . a massive contradiction arises for capital: it has to stimulate and harness subjectivity by encouraging increasing worker responsibilization, even creativity, in order to grasp a social and communicational surplus value in the workplace. This . . . comes to constitute a competitive edge in the global fight for shrinking and specialized markets. But in doing so, capital has to be careful in depriving worker subjectivity of any implication in terms of power and control . . . In this way, capital silences subjectivity just at the same time it calls it into life. Capital has not found, yet, the ways to deal with this contradiction.[25]

Such tension becomes increasingly pronounced as business uses the knowledge squeezed from team production to intensify automation, speed up work and increase lay-offs. In this sense, Negri and Lazzarato suggest, post-Fordist production methods, although devised as a means of circumventing and coopting workers organizations, contain the seeds of an aggravated conflict.

Lazzarato has examined some of these dynamics in strikes at Peugeot car factories in France in 1989.[26] These strikes were significant because they broke a relatively long period of industrial peace in the French automobile industry. They involved a new generation of employees, supposedly distanced from the militancy of the older "mass" assembly-line workers, including many immigrants, and trained for work in a highly automated environment. Lazzarato argues that the company's rhetoric about 'involvement,' 'participation,' and 'dignity', although at first quite attractive to workers, gradually became more and more mired in contradiction. There emerged an increasing discrepancy between the company's supposed willingness to entertain all and any 'suggestions' and its evident determination to implement only those that enhanced productivity. The alleged ethic of cooperation was riddled with actual grievances about pay and pace of work. This led to mounting tension on the shop floor, which eventually exploded. In the strikes, one of the workers' demands was for the company to live up to its own rhetoric about 'respect 'and 'cooperation.' Moreover, in this strike, Lazzarato argues, new forms of shop floor and community organization could be seen emerging, in some ways supplanting the more conventional and rigid forms of trades union hierarchy. This, he suggests, shows that the cooperative' aspects of the new work organization were being mobilized, but in the form of counter-power.

The other field where the Futur Anterieur group have investigated the contradictions of "general intellect," albeit in a less worked-through manner, is in the field of media and communication. As Vincente puts it, "general intellect" is in fact a labour of networks and communicative discourse";

> In effect, it is not possible to have a "general intellect" without a great variety of polymorphous communications, sequences of communication in the teams and collectivities work, communications to use in a creative fashion the knowledges already accumulated, communications to elaborate and record new knowledges.[27]

Capital has developed technologies of information--mass media, telecommunications, and computer networks--to consolidate markets and ideological control. But here too it has been unable to develop the objective, fixed, machine side of "general intellect" without also involving the subjective, variable, human aspect.

Negri specifically rejects critiques of this process framed only in terms of "manipulation."[28] Although we now inhabit a world where corporate media seem to constitute a vast "machine" which dominates society, there are, he says, on the inside of this "machine" spaces within which new individual and collective subjectivities can emerge.[29] The Futur Anterieur authors have studied a number of movements in France where groups opposing neoliberal policies have shown great dexterity in using media and information technologies to publicize their cause. These include strikes by cultural workers--filmcrews and audio-visual technicians--fighting for improvements in the conditions of contingent work; the movements of nurses opposing cut-backs and privatization of health care; and the student revolts of 1986, which we discussed in Chapter 4.[30]

Lazzarato has done a detailed analysis of the media practices of the "Panther" student movement, which in the late 1990s closed some one hundred and fifty Italian colleges and universities in protests against privatization.[31]These movements, Lazzarato says, were characterized by their extreme sophistication in counter-management of the media. The students exercised careful control of how,and under what conditions journalists covered their actions. They refused to subscribe to conventions damaging to the political integrity of the movement (e.g. focus on leaders). And they made constant use of information technologies--particularly fax--to generate their own coverage and bulletins. Lazzarato argues that the Panther's careful orchestration of refusals and reappropriations displayed the characteristics of a movement which, having literally come-of-age in a media environment, was capable of using it, rather than be used by it.

On the basis of these and other examples, the Futur Anterieur group argues that "mass intellect " is in fact potentially explosive for capital. This volatility arises not only from a dynamic of immiseration--with more and more people being expelled from production by automation--but also from a reappropriative process in which "mass intellect" begins to fold back into itself the organizational and technological knowledges necessary for the running of society. Negri now calls this capacity "constituent power," and describes the task of radical politics as the creation of a "republic" that dissolves both

capitalist command and state authority.[32] Virno speaks of an "exodus" from the "society of work" made possible by a radical re-disposal of the surplus time arising from automation.[33] It is these potentialities of "mass intellect" which Futur Anterieur now sees pulsing through a wave of social protest in advanced capitalist societies of the 1990s--in France, but also in the large scale strikes and protests in Italy, Germany and Belgium, and to a more limited degree in the North America.

How General is General Intellect?

The argument that subversive potentialities exist at the very heart of the technological armature which seems to make contemporary capital so impregnable is certainly an attractive one. Although only starting to be translated and discussed in North America, Futur Anterieur's revival and reworking of the category of "general intellect" has already sparked some debate in Europe. This has, however, included some substantial criticisms.[34]

Perhaps the most serious of these objections is that, in its capitalist form, "general intellect" is not "general" at all, but rather structured by an intensely hierarchical division of labour. This restricts crucial knowledges to a narrow stratum of privileged, and hence loyal, employers, while leaving the rest out in the cold to suffer the effects of technological deskilling. The edifice of scientific-technological power depends not just on scientists, engineers, programmers and various "symbolic analysts" but on a mass of janitors, homeworkers, fast-food cooks and other service workers. But the crucial point, the critics say, is that these latter are excluded from the 'intellectual' functions of the capitalist economy. The whole capitalist organization of work is in fact, predicated on dividing the 'head' of the collective worker from the 'arms,' 'feet,' 'digestive,' 'excretory,' and 'reproductive' organs. Given this, the capacities Futur Anterieur focuses on would seem to be very unevenly distributed.

Associated with this criticism is a suspicion about some of Futur Anterieur' s terminology--particularly its references to "immaterial labour." For this can easily be read as obscuring the continued importance of a vast mass of all-too physical and material work in the post-Fordist economy--domestically, in the service sector, and internationally, in everything from labour on coffee plantations to the trade in body organs. We would also note that "immaterial labour" occludes some very corporeal components of high-tech work, such as the epidemic of repetitive strain injuries associated with computer use.

These problems are clearly related to the relatively cursory analysis of the gendered or international dimensions of "general intellect" offered by Futur Anterieur. Such

omissions can be rather pointedly related to the fact that most of its authors are men, located in Europe or North America. It could be argued that the new circuits of capital look a lot less "immaterial," "intellectual," and full of emancipatory potentials, to the female and Southern workers who do the 'shit- work' for a capitalist "general intellect" whose headquarters remain preponderantly male and Northern. Indeed, the Futur Anterieur analysis has been accused of an all-too-familiar sort of Marxist vanguardism, whose protagonist is now not the 'industrial' but the 'intellectual' proletariat--a vanguardism which is, however, made peculiarly implausible by the relatively privileged conditions which its chosen protagonist enjoys.

Futur Anterieur authors have made some reply to these objections. Discussing the category of "immaterial" work, Hardt and Negri underline that "however immaterial this labor might be it still involves both brains and bodies."[35] They say that "mass intellectuality" has to be understood as including the affective, emotional work performed inside and outside the home by women--for example, the labour of nurses which is both "both highly technical and affective."[36] Hardt and Negri in fact go to some pains to designate "mass intellectuality" as a general propensity of the post-Fordist proletariat. Technoscientific labour is a "massified quality of labouring intelligentsia, of cyborgs and hackers."[37] But this "intelligentsia' is not some "recomposed vanguard or leading sector"; rather it is " a quality of subjectivity that extends through the various sectors of production."[38] The Futur Anterieur focus on advanced, post-Fordist production methods is not, they say, meant to deny the existence of other Fordist or even more archaic techniques, particularly in the South, but only to suggest that high-technology practices furnish the command, control and communication capacity through which the whole system operates--and which in some ways bathes the whole arena of struggle.

This debate has at the very least identified issues that deserve further investigation. Although the Futur Anterieur group has supported its analysis by several concrete studies, these evidently need to be vastly expanded in scope to test the usefulness of their categories. As Ed Emory has recently suggested, such an examination really calls for a project on the lines of what Marx called "a workers' inquiry," involving a network of researchers engaged in participatory study of emergent forms of struggle.[39]

Our own view is that, while the Futur Anterieur analysis has to be very seriously qualified, it is also 'onto' something important.The concept of "general intellect" clearly needs to be tempered by analysis of the hierarchy of labour, and to take far fuller account of capital's tendency to polarize the allocation of skills and competencies along lines of gender and race. Some of their categories--such as "immaterial labour"--should probably be rejected. However, this does not invalidate the concept of "mass intellect." Although capital

clearly attempts to limit and divide access to the social knowledges vital to technoscientific power, it should not be assumed that this division and fragmentation always succeeds. In an era when the World Wide Web carries the messages of Zapatistas and the resistance movements of East Timorese women, it is clear that the wretched of the earth are neither entirely 'outside' the mechanisms high-technology production, or (more importantly) completely powerless to reappropriate them.[40] The question of whether capital will successfully segment post-Fordist labour power, or, on the contrary, its rebellious subjects will break down these barriers to establish new alliances lies at the core of what we have termed "the contest for general intellect." In this contest the contemporary proletariat fights to actualize "general intellect" in ways that are truly "general."

Innovation From Below: Watchdogs, Green Works and Autonomous Production

We want now to offer two final instances of this "contest for general intellect." Though drawn from a North American context, they do, we think, indicate that capacities to reclaim and reorganize technoscientific knowledge are widespread. Consequently, they erupt in what might be considered unlikely places. Our first example concerns some 'shop floor' struggles around the control of high-technology.

In a North American context, Futur Anterieur's claim that forms of "participative management" are generating new flash-points of tension received some confirmation from a survey of 1500 workers and managers on the topic of 'team organization,' conducted by the US consultant firm Kepner-Tregoe So shocking were the findings that Kepner-Tregoe had them checked again by another group of consultants. The final results clearly showed that every aspect of 'team work' elicited disenchanted cynicism amongst workers. Kepner-Tregoe's President, T. Quinn Spitzer, had this to say:

> The vitriolic response was amazing . . . Workers don't like their companies, and there is a fundamental social change going on in this country regarding workplace relations. The workers hear the verbiage about how 'our people are the most important asset we have' and they want to throw up.[41]

In at least one industry where the drive for 'participative management' has been very intense, the automobile industry, the mid-1990s have seen a series of strikes in which workers have made demands which encroach on traditional managerial prerogatives. In Flint, Michigan, car workers struck to compel hiring new workers rather than increasing overtime. Canadian autoworkers responded to 'outsourcing' by General Motors by striking in support of 'job ownership.'[42] In both cases, workers fought for a real, rather than tokenistic, voice in decisions over the conduct of production. These demands were,

moreover, linked to an overall analysis of the effects of technological change and organizational restructuring on unemployment and social fragmentation.

On some occasions, such demands for real control have been pushed further. In 1982 General Motors, as part of a programme of rationalization aimed at consolidating production around new, highly automated, just-in -time centres, announced the shut-down of its car plant in the Van Nuys neighborhood of Los Angeles.[43] A coalition of predominantly black and Latino workers, in alliance with community groups, opposed this move. They fought to keep the factory open by threatening to start a boycott in the lucrative LA auto market. This "Save GM Van Nuys" movement was opposed not only by management, but also by the main bureaucracy of the United Auto Workers union, which was aghast at its infringement of 'management rights.' Nonetheless, the campaign forced GM to keep the plant open for *ten years*. During this time workers repeatedly rejected management attempts to introduce company sponsored 'worker participation' schemes.

In 1992, following the firing of its leaders, "Save GM Van Nuys" was finally defeated. It did not die, however, but metamorphosed. In a shift that defies stereotypes about working-class politics, former auto-workers became the nucleus for the WATCHDOG Organizing Committee. This group engaged in participatory community planning aimed to "rebuild Los Angeles from the bottom up."[44] It monitors air pollution in and combats corporate pollution of working-class neighborhoods. It is also seeking the conversion of the auto industry to clean, ecologically viable forms of production, including planning for the production of electric cars.

This group has become part of an international network of similar worker-based 'conversion' schemes. Amongst these is the "Green Works" coalition in Toronto.[45] This originated in the attempts of workers to prevent the closure of the Caterpillar factory at Brampton. Canadian Auto Workers members occupied the plant in spring of 1991. During this action, they demanded that the government reopen the plant to manufacture goods required for environmental enhancement. The occupation was unsuccessful, but it resulted in a dialogue between car-workers and environmental and anti-poverty groups. From this emerged a coalition focussed on reorganizing production to meet unfulfilled demand for goods and services in the clean energy sector and elsewhere--solar water heaters, energy efficient light bulbs, natural gas co-generation, recycling facilities. Although this alliance subsequently ran into serious internal problems over the labour practices of one its participant organizations, it did put forward a generalized program focussing on the redirection of federal and provincial government subsidies away from toxic industries like asbestos or nuclear power and towards forms of green production.

Green Works and Watchdog were subsequently in contact with perhaps the most remarkable of these recent worker-control initiatives--one by men and women at a joint Toshiba -Amplex enterprise in Japan.[46] After a protracted conflict during which they rejected the imposition of a 'company union'--the conventional Japanese form of labour control--Toshiba determined to close the factory. The workers occupied the plant. Because of some peculiar features of Japanese labour-law, they were able to successfully resist eviction. During the occupation, they continued production. Innovating on the technology and product-line of their former employer, they made monitors, TV conference systems, computer-aided educational systems, medical equipment, plant operation control systems, ITV monitoring systems, surveying instruments, mechatronic instruments, precision tools and plastic dies--"all developed, designed, manufactured and marketed by us workers."[47]

The decision to embark on what the Toshiba workers term "autonomous production" was initially made as a matter of financial necessity. But it led onto broader perspectives. As one worker put it,

> . . . in receiving an order for and in designing a computer aided process control system, we could not but ask ourselves whether or not the system as ordered would really promote the interests of the workers of the client company, and if not how the design concept could be improved.[48]

The plant-occupiers developed links with labor, environmental, consumer and other popular movements. Indeed, they came to sees these connections as something that differentiated them from other 'workers production' experiments which often "reopened with former union leaders as new executives, turned into firms not too different from ordinary ones"[49] Amongst the products which emerged from this interaction were a portable loudspeaker system "for use in demonstrations, rallies and other outdoor activities"; a cheap, handy Geiger counter suitable for popular use, sponsored by the Japanese anti-nuclear movement; and a special radiation monitor, funded by by union and citizen contribution, for residents of the Chernobyl disaster area , donated at about half the cost of commercial systems.[50]

The struggle with Toshiba Amplex went on for eight years. It involved resistance to the removal of plant machinery, legal challenges, and sustained picketing and demonstration outside Toshiba offices. In the end, the workers won a settlement which included not only a compensation package but the donation to them by Toshiba of a factory site to be operated as a worker-run cooperative. This cooperative now forms part of the Tokyo-based Workers Collective Coordination Center, formed by unionists from worker run plants and businesses, labour organizations, academics and researchers and social movement activists.[51]

These strike us as instances in which workers have mobilized the same intellectual and cooperative capacities that capital tries to harness through 'team work,' but in a completely different direction. In North America there are other, albeit less dramatic, instances where workers faced with automation and relocation have challenged capital's right to shut down. [52] Facing the withdrawal of waged work, labour has deployed its invention power not so much to stop production (as in classic strike strategies), but to keep it going--and to transform it. Plant closures have been met with plant occupations and picket lines aimed not only at stopping scabs getting in but at preventing machines being taken out. Sometimes symbolic, sometimes sustained, these actions have occasionally either forced capital to continue operations contrary to its intentions or transferred management entirely into the hands of the workers. Repeatedly they have involved the creation of alliances with wider community groups negatively affected by capital flight. Such movements represent a capacity for counter-planning from below aimed at preserving workers' livelihoods. Initially defensive and local, usually limited in their aims, most are painlessly reabsorbed within the logic of capital. In their isolation, such experiments are minor; but in their proliferation, they constitute a multiplicity of subversive question marks. They establish networks of counter-research and pools of shared experience, new connections and alliances. In short, they represent the counter-organization of "general intellect."

Windows of Opportunity: Cyber-Janitors and Software Gypsies

Our second example deals with computer-mediated communication. As we have seen, in the development of this extraordinarily powerful technology capital has in fact depended on a mass of informal innovatory, intellectual activity--'hacking'--on whose creativity commerce constantly draws even as it criminalizes it. It was precisely out of capital's inability to contain such activity that there emerged the astounding growth of the Internet. This is surely the quintessential institution of "general intellect." For, despite all the admitted banalities and exclusivities of Internet practice, one can in its various exchanges sometimes glimpse what seems like the formation a gigantic, communicatively-connected, polycentred, dialogic global intelligence. Today, of course capital is trying to recuperate this intelligence in the form of the information highway, making its channels the pathways of solely commercial flows--vide-on-demand, teleshopping, tele-gambling, personalized advertising. It is funnelling network interactions into a commercial "interactivity" which, as Chris Carlsonn says

> mimics the false control offered by workers participation schemes, wherein workers decide how to accomplish the business' mission, but , crucially, not *what the mission is*..[53]

However, the success of this recontainment is far from assured: subversive experiments continue, sometimes in strange quarters.

One of these is the heart of the US computer industry itself--Silicon Valley. Stimulated by nearby Stanford University's research park, and fuelled by immense Defence Department contracts, this location just outside San Francisco is the home to major computer companies such as Apple, Intel, Hewlitt Packard, Oracle and IBM. Although the Valley has itself recently seen significant restructuring, with a partial move away from chip manufacture and assembly (increasingly contracted out to off shore enterprises) and greater concentration on software development, it remains a vital centre of the US information economy and is considered one of the biggest high-technology centres in the world.[54]

As such, it presents a paradigmatic study in the organization of the postindustrial workforce. One much-publicized and glamorized aspect of this is the emergence of new cadres of highly skilled technical workers--engineers, software designers and programmers. Silicon Valley boasts the largest concentration of Ph.D.'s and engineers in the world. Most of these are male and white. They are the educated, technoscientific labour power needed for an industry whose profit depends on a constant stream of technological innovation.

However, there is another side to Silicon Valley--that of the janitors, landscapers, cafeteria staff, and microchip assemblers who provide the indispensable support for this technological creativity. These labourers are often immigrants or from ethnic minorities. Many of are female. They generally work at low or minimum pay, outside union organization, without health insurance, maternity benefits or recourse against sexual harassment. The big computer companies could not function without these workers, but distance themselves from their plight by a system of contracting-out, which allows disavowal of responsibility for working conditions and wages. This workplace segregation is reinforced by residential patterns which divide the Valley into racially sorted zones. The result is that, although Silicon Valley is situated in the most prosperous county in the US, this aggregate picture of wealth decomposes into a scene where "the First World meets the Third in a weird melange of high technology and misery."[55] It is an extreme example of postindustrial segmentation, with white men at the top and non-white women at the bottom.

For many years, the dispersed nature of the service workforce, its high turnover, and ethnic composition, meant that it was considered 'unorganizable' by the US labour movement. In the early 1990s, however, this changed. Justice for Janitors, an organization of Services Employees International Union, began a series of campaigns fighting for union

recognition, pay raises, and settlement of sexual harassment grievances.[56] These campaigns connected workplace organization to issues of race and gender discrimination. Additionally, because support workers are often directly or indirectly exposed to the highly toxic chemicals used in microchip manufacture, their work conditions became part of a broader community struggle about the poisoning of Silicon Valley's environment through ground, air and water pollution.

Justice for Janitors used a wide variety of tactics: strikes, picket lines, demonstrations, advertisements, leafleting campaigns outside consumer outlets, hunger strikes and the interruption of managerial press conferences. It also used the Internet. Organizers disseminated news about the super-exploitation of contract workers through the networks. This was severely embarrassing to companies such as Apple whose profitability depends on maintaining a benign public image amongst computer-users. In some cases the workers pressed their cyber-activism further. With the help of a small number of sympathizers amongst the core 'professional' staff, they found the email addresses of employees at Oracle corporation, and encouraged supporters Internet access at campuses around the country to post complaints.

One participant in this email campaign describes it as follows;

> They had no idea how many people we were sending to . . . They started answering, "We are not beating our janitors" and it turned out they were beating them, really. Once they started with those answers then people started to ask questions and it created a climate of heightened awareness of what the janitors were doing, though it was not easily visible . . . The costs of bad publicity, of morale being influenced by email are major . . for people like us who live in that world to sense the communications opportunity that exists right now--that email can be used to penetrate barriers that exist for more conventional communications--was rather exciting. Maybe after a while they'll set up filters and they'll get to keep all of our messages out, but we'll be engaged in a lot of measures and counter measures to keep communicating in that fashion . . . I think it's a creative way to use the technology of the industry to undermine the social relationships that have been built into it .[57]

Several of the Justice for Janitor campaigns in Silicon Valley made significant gains for service workers. It is hard to tell how much effect Internet activity had on these outcomes. Certainly other factors were in play. The turning point in the campaign at Apple, for example, came when workers threatened to take their campaign into the classrooms of California schools and universities--a major market for Macintosh computers. But both the email activism and the education campaign can be seen as targeting corporate vulnerabilities very specific to the era of "general intellect."

Subsequently other labour struggles, both inside and outside Silicon Valley, have pursued similar tactics against computer companies. The Hotel and Restaurant Employees

International used the Internet in its campaign to organize a chain of luxury hotels known as the Western Lodging Group. According to Nathan Newman, when mass firings of workers took place at the Lafayette Park Hotel, the publicizing of these news on the Internet generated hundreds of letters, calls and emails to management.[58] As the campaign evolved, the union targeted corporate customers of the hotel who regularly use it to house employees or visiting clients. One of these was a software corporation, PeopleSoft. The HREI highlighted negative facts from this company's own financial reports and posted them to a series of computer oriented newsgroups. PeopleSoft claims that within a week the value of their stock dropped by $63 million dollars because of reactions by investors. Soon after, it announced it was moving customers and other visitors to a different hotel.

Meanwhile, in Silicon Valley labor councils are now speaking in terms of more extensive campaigns: "The janitors were just the first among the contingent workforce," says one organizer,

> This is going to involve everybody from janitors to technical writers to software gypsies and testers to quality assurance engineers. When we talk about doing windows in this valley, we're not just talking about the janitors who clean them, but the software engineers who write them.[59]

At a time of widespread layoffs of 'professional' staff by computer corporations,due to new automated programming tools and low-wage, off-shore programming in countries such as Ireland or India, there may indeed be prospects for disaffection even at the 'upper' end of the Silicon Valley labour force. Indeed, for some time some activists involved with the electronic bulletin CPU: Working in the Computer Industry have been emailing to programmers, software engineers and other computer 'professionals' materials aimed at fostering a critical perspective on working conditions and encouraging various forms of collective organization.

The battle for organization of the computer industry has also spread to other areas in the US. The Southwest Network for Environmental Economic Justice, founded in 1990, involves over fifty grassroots organizations from Texas, Oklahoma, New Mexico, Colorado, Arizona, Nevada and California. Many of these are based in minority communities. The Network runs campaigns about public health crises on the Mexico-US border, a Native Lands campaign--and also a High Tech Campaign. This, according to a participant,

> . . . directly confronts both the microelectronics industry and its backers within the US government to cease the poisoning of high -tech chip production workers and surrounding communities, and to put a rein on the incessant capital flight and accompanying community disruption associated with the industry.[60]

Groupings affiliated with the Network allied with other organizations, such as the Silicon Valley Toxic Coalition, to create the Campaign for Responsible Technology. This succeeded in forcing the diversion of $10 million of Defense Department appropriations toward research for developing safe, non-toxic technologies for microelectronics production.[61]

If the computer industry is at the very heart of the information society, there are now signs of a heart-attack.This attack is the revolt of the disenfranchised and super-exploited labour on which the industry has for so long, so silently, relied. In some ways their movements represent a very old form of struggle. Their campaigns have dimensions that would be familiar to those who fought against the appalling conditions of migrant farm labour in the 1930s. But at the same time they have some very new features. For in this struggle, the technological marvels which have been made into the basis for the vast hardware and software empires are being turned around as weapons of contestation. What is appearing is The Grapes of Wrath gone digital. This is the face of militancy in the age of "general intellect."

Ivory Towers and Virtual Universities: Academia in the Era of General Intellect

If indeed we are in the epoch of "general intellect," this, as the Futur Anterieur authors have pointed out, has implications for those traditionally considered *particularly and especially* intellectual--such as teachers and students at universities.[62] In the era of the 'ivory-tower,' when universities were only partially integrated into capitalism, or marginal to its central functions, academics appeared (however much this actually mystified real interconnections) to be removed from 'industrial activity' and its attendant class-conflicts. It was from this position of apparent exteriority that the intellectual could commit or engage himself with political movements. From the end of the Second World War, however, this distance began to rapidly diminish. Today, it has sunk to zero. As industry becomes more intellectual (Microsoft refers to its central production facilities as a 'campus), universities become more industrial, acting as ancillary research and training facilities for capital's overall project of high-technology development.

There are different ways in which this changed situation can be construed. One is as a fall, a loss of autonomy, a corruption. And certainly, as the process of 'academic-business partnership' unfolds, sacrificing basic to applied research, critical to technological studies, humanities to sciences, and making the notion of 'conflict of interest 'between scholarship and corporate affiliation a quaint anachronism, there is plenty to be cynical about. It would be naive to pretend amazement at the speed with which not only individuals

but entire departments, once famous for radical perspectives, have tacked with the wind, trimming research agendas, theoretical positions and teaching priorities to align themselves with the new funding sources. The most vulgar of Marxisms could predict that. But the sheer agility of intellectual gymnastics accompanying the process--the strenuous affirmations of independence, integrity, humanism and uncompromised critical dissidence--may evoke a certain wonderment.

However, there is another side to this. To the degree that capital now insists to its workforce that 'life long learning' is an imperative of survival on the labour market, it opens itself to a series of contradictions. For one, it is unable to live-up to the promises it makes. Rates of unemployment for college and university graduates show that education, rather than guaranteeing personal success, constitutes a standing reserve army of intellectual labour, from whom capital can cull the relatively small number of full-time employees required by the 'knowledge economy.' For many, years of education ensure only the prodigious debt loads incurred as an increasing proportion of the costs of higher education are shifted back onto individuals and families. Students confronting this situation may develop critical perspectives on capital, independent of the compromises of their teachers.

Moreover, when universities are subjected to the same cost-cutting, productivist rationalization as other capitalist operations, this has consequences for the academic labour process. In the 'downsizing' logic of post-Fordist capital, academia must do more with less. Teaching and support staff experience increases in the pace and volume of work. A classic strategy of casualization means that the lower echelons of instructors form a characteristically contingent post Fordist work force--subjected to chronic insecurity, lack of benefits, and required to exercise mind-bending flexibility in pedagogic preparation. In short, the one-time ivory tower witnesses an intensification in the rate of exploitation.

These developments are often imposed under the guise of technological advance. Plans for the 'virtual university,' based on large-scale, tele-learning are transparently designed to cut labour costs. They also have enormous potential for both the centralized managerial control of knowledge, and increasing corporate sponsorship of instruction. 'Virtual universities' also work toward a technologically-compelled increase in the productivity of those living instructors that remain, enveloping them in email, Web site downloads and uploads, and multiple teaching requirements--the academic equivalent of speeding-up the assembly line.

Such changes produce tensions. As we suggested in Chapter 4, the late 1980s and 1990s have in fact seen an upsurge in dissent by students and instructors. Teaching assistants' strikes have spread across North American campuses; graduate students are now

an important constituency for labour organizing. Strikes by college instructors are no rarity. Indeed, on certain university campuses, including some of the most 'traditionalist,' regular university faculty are now unionised--something that would have been largely unthinkable even a decade ago. There have been a wave of student protests--demonstrations, strikes, occupations-- against rising tuition fees and debt loads. It is possible that there are in Canada actually more students 'on the streets' participating in such actions than in the famed revolts of the 1960s and 70s--revolts which for many of the participants in today's rebellions seem part of a remote and faintly mythic past.[63]

Today's campus activism certainly has a very different flavour from that of twenty-five years ago. For while the revolts of the 60s recognized and resisted the movement towards integration of the university "knowledge factory" into the capitalist economy (the military-industrial complex), the fact that this process was only partially advanced (combined with the relative affluence of the period) gave the student revolt of this era certain removal from the world of the labour market. If it allowed campuses, or parts of them, to become temporary 'red ghettoes' or 'autonomous zones,' it also meant a fundamental divorce between what was experienced in these spheres and the more general conditions of work and exploitation.

Today, the absolute fusion of academia with business, and its subordination to the job-market , removes such relative freedom. But it opens the way for connections between both students and instructors and other waged and unwaged workers. It makes their conditions far closer to that of the rest of the labour force. If they consequently lose the latitudes of action relative privilege once afforded, they also become potentially participant in and connected to movements formerly outside the university, movements for whom academia can therefore also become a node within the circulation of struggles. The conventional distinction so often made between 'university' and the 'real' world, a distinction at once self-deprecating and self-protective, becomes less and less relevant.

Writing in a European context, Negri and Lazzarato suggest that these tendencies may create the grounds for a new different relation between dissenting academics and oppositional social movements. Rather than descending from the heights of the university to commit themselves to a cause largely external to their daily experience, possibilities emerge for academics to make more "transverse" connections.[64] Academics perhaps lose the pretensions to be the bearer of great truths and grand analysis, but become the carriers of particular skills, knowledges and accesses useful to movements in which they participate on the basis of certain commonalities with other members of the post-Fordist proletariat[65]

This process of "transverse" connection is, in truth, difficult. Corporatization weeds-out the programs and centres that provide points of connection. Speed-ups in the

university labour process reduce time for such activities. Nevertheless, the possibilities do exist. They include the conduct of research on topics, and by methods, of value to labour, ecological, feminist and other social movements; the construction of curricula that address the concerns of these constituencies; the invitation of activists and analysts from these movements onto campuses and into lectures and seminars; and--by no means least important--use of the university's connection to the great communication networks of the era in order to relay news and analysis that are marginalized by the mainstream media.

On Optimism and Pessimism

Underlying the corporate invasion of the university is one fundamental contradiction. In academia, as elsewhere, labour power is never completely controllable. Capital may harness people's desire for knowledge to its own ends, but it cannot eliminate the possibility they will learn and teach differently. One crucial aspect of teaching differently is to address critically the utopian promises of the 'information revolution.'

It is both very important, and relatively easy, to demonstrate how hollow these promises have proven over the last three decades: how they have brought the majority of people in Europe and North America not new technologically-generated wealth, but declining or stagnant real wages; how the mirage of increased, enriched leisure has evaporated into rates of unemployment and poverty unimaginable twenty years ago; how the 'knowledge class' that was to humanize capital has found itself pink-slipped by its corporate masters, sharing the welfare line with millions of others; how the high-skill, high-tech service jobs are fractional compared to the burgeoning mass of poorly paid and precarious 'McJobs'; how the 'cooperative' workplace is terrorized by downsizing, closures and concessionary roll-backs; how the heralded multiplication of media channels masks an intensifying concentration of ownership; how promises of 'all information everywhere' translates into a vast extension of property rights and corporate power. From this point of view, the utopianism of the information revolutionaries is mere fraud.

However, this approach, unalloyed, can simply reinforce despair and cynicism. Demystification, practiced alone, leads to a dead end. The more difficult task is to identify the possibilities of things being other than they are. As Raymond Williams wrote, the crucial challenge is "making hope practical, rather than despair convincing."[66] For this purpose, we have found the perspective of autonomist Marxism particularly useful. For it shows how the information revolution came into being as a result of social struggles--as part of a vast restructuring capital intended to evade and suppress international opposition. More importantly, it suggests that this informational restructuring, rather than pacifying

conflict has only displaced it--so that the lines of struggle now run along the inside of the very technological systems deployed to overcome them.

To contain crisis, capital has been compelled to set in motion agents and subjects whose implications outrun its control. As Marx observed, by it incessant revolutionizing of industry, bourgeois society has "conjured up such gigantic means of production and of exchange" that it becomes like "a sorcerer, who is no longer able to control the powers of the nether world which he has called up by his spells."[67] If workers' refusal of work has resulted in extraordinary levels of automation, it is by no means certain that the wage-form can survive this innovation. If local militancies have provoked capital to seek global mobility, the very communications networks on which such flight depends become the threads of new, transnational solidarities. If people's desires for education and self-development have been made the stuff of a knowledge-for-profit economy, this new collective intelligence turns to criticize the human and environmental costs of its development--and to devise alternatives.

At the very high level of technoscientific development which the 'information revolution' represents, capital finds itself dependent on levels of cooperative activity, unimpeded communication, and free circulation of knowledge, which, rather than being easily integrated within its logic, stand in tension with its command. Thus the 'utopian' possibilities adumbrated in the discourse of information revolution cannot *just* be written off as false promises. Rather, they *also* represent real potentialities, openings onto new horizons, latencies that push against the ceilings capital must impose. They are a refracted and distorted index of something that threatens to escape enclosure, signs of a world autonomous from capital, uprising within it at the very moment it seems to have swallowed the entire planet.

We invite the charge of being too optimistic. But our optimism is methodological. The slogan Gramsci adopted from his idealist mentors, "Pessimism of the intellect, optimism of the will," is insufficient, for it can suggest commitment to a struggle perceived at some level as futile. The dissolution of capitalism by a better, communist, society deserves to be inscribed within the horizon of the possible. Therefore, without denying great obstacles, we have sought to identify the agencies that move toward this end. Our hypothesis is that the recognition, analysis and discussion of such struggles fosters their development, accelerates their circulation, and assists in the liberation of "general intellect."

NOTES

1 Karl Marx, Grundrisse (Penguin: Harmondsworth, 1973) 699-743

2 Marx, Grundrisse 705.

3 Marx, Grundrisse 694, 705, 706, 709.

4 Marx, Grundrisse 706.

5 Marx, Grundrisse 692.

6 Marx, Grundrisse 694.

7 Marx, Grundrisse 700.

8 Paolo Virno, "Notes on the General Intellect," Marxism Beyond Marxism, ed. Saree Makdisi, Cesare Casarino, & Rebecca E. Karl (London: Routledge, 1996) 268.

9 Virno,"Notes on the General Intellect" 268.

10 Virno "Notes on the General Intellect" 270.

11 Virno "Notes on the General Intellect" 270.

12 Antoni Negri "Constituent Power," Common Sense. 16 (1994): 89.

13 Negri and Lazzarato, "Travail immaterial and subjectivite" 86.

14 Virno "Notes on the General Intellect" 270.

15 Jean-Marie Vincent, "Les automatismes sociaux et le 'general intellect.' Futur Anterieur 16 (1993):121.

16 Vincent 121.

17 Vincent 123.

18 Maurizio Lazzarato,"General Intellect: Towards an Inquiry into Immaterial Labour," Immaterial Labour, Mass Intellectuality, New Constitution, Post Fordism and All That . . . . (Red Notes: London, 1994) 1-14.: 156-164; Maurizio Lazzarato and Toni Negri, "Travail immaterial and subjectivite," Futur Anterieur 6: (1994) 86-99.

19 Lazzarato, "General Intellect" 4.

20 Negri and Lazzarato, "Travail immaterial and subjectivite" 86.

21 Harland Prechel describes such a situation in his "Transformations in Hierarchy and Control of the Labor Process in the Post-Fordist Era: The Case of the U.S. Steel Industry," The Labor Process and Control of

Labor: The Changing Nature of Work Relations in the Late Twentieth Century, Berch Berberoglu (Westport: Praeger, 1993) .In the steel plants he examines workers are required to communicate, interact and participate, but only within certain predetermined paramaters is embodied in the various forms"premise" or "alogorithmic.control" associated with informatic production systems.In "premise control," top management calculates cost-efficient ways to conduct each step in the operation: these are then transmitted as rules through the computer system. Parameters within which choices can be made are already embedded within the programs directing production They thus take the form of adjustments within a pre-set process, rather than control over it. Command resides at the level of the total system, so that the autonomy bestowed on the parts is strictly limited. As Prechel puts it in his study of the post-Fordist US steel industry, management can thus "centralize command, while decentralizing responsibility for the decision,".pushing responsibility down the organizational hiearchy, while maintaining control at the top. It is this sort of "premise ontrol" which allows some companies to devolve responsibilities from middle level and line-management to the shop floor, while still maintaining ultimate authority firmly within the control of upper level management. This creates a paradoxical position where, while the worker may indeed by 'skilled' this skill is divorced from any individual or group 'control' over the production process. On this point see also Steven Vallas, Power in the Workplace: The Politics of Production at AT & T (New York: State University of New York, 1993).

22 Lazzarato "General Intellect," 6.

23 Lazzarato "General Intellect" 5-6..

24 Lazzarato "General Intellect" 6-7.

25.Franco Barchiesi, online, Internet, autop-sys, 5 Apr 1996.

26Maurizio. Lazzarato,"<<Pas de sous pas de totos!>>: La greve des ouvriers Peugeot." Futur Anterieur 1 (1990): 63-76.; "Les caprices du flux--les mutations technologiques du point de vue de ceux qui les vivent," Futur Anterieur 4 (1992) 156-165.

27 Vincent, 127. Author's trans.

28 Negri, "Infinite de la communication/finitude du desir," Futur Anterieur 11 (1992/93): 5-8.

29 Negri, "Infinite de la communication," 7.

30 Maurrizio Lazzarato and Antionio Negri, Le Bassin de Travail Immateriel (B.T.I.) Dans La Metropole Parisienne: Definition, Recherches, Perspectives (Paris: Tekne-Logos, 1993).

31 Maurizio Lazzarato," "La <<Panthere>> et la communication." Futur Anterieur 2 (1990): 54-67, my trans.

32 Negri "Constituent Republic."

33 Negri "Constituent Republic" 88, 93-94: Virno,"Notes on the General Intellect."

34 This discussion is so far largely unpublished, at least in English. My account of it here draws on discussions on the autop-sys email group, and amongst the "Infra-Reds" collective in Vancouver.

35 Michael Hardt and Antonio Negri, Labor of Dionysus: A Critique of the State Form (London: Minneapolis, 1994) 280.

36 Hardt and Negri 280.

37 Hardt and Negri 280.

38 Hardt and Negri 280.

39 Ed Emery, "No Politics Without Inquiry: A Proposal for a Class Composition Inquiry 1996-7," Common Sense 18 (1995): 1-11.

40 One friend of Futur Anteriur living in the East End of London remarked to us that unemployed black youths in theneighbourhood were, through involvement in rap, reggae and other music immersed in highly technological and "immaterial" networks of production, taping, mixing, sampling pirating, in a field which constituted one of the most dynamic sectors of the contemporary cultural industry, and were doing so sometimes in a politicized and oppositional way.

41 Cited in Massimo De Angelis, "The Autonomy of the Economy and Globalization," Vis-A-Vis,Winter 1996, online, available from http:// jefferson.village.Virginia.EDU/~spoons/aut_html/glob.html

42 Peter Downs, "Striking Against Overtime: The Example of Flint." Against the Current 54 (1995):7-8; Jane Slaughter, "Addicted to Overtime," The Progressive. April. 31-33 (1995).

43 This section is based on the following publications by Eric Mann; Taking On General Motors: A Case Study of the UAW Campaign to Keep GM Van Nuys Open.(University of California: Ceneter for Labor Research, 1987); "Labor-Community Coalitions as a Tactic for Labour Insurgency," Building Bridges: The Emerging Grassroots Coalition of Labour and Community, ed. Jeremy Brecher and Tim Costello (NewYork: Monthly Review, 1990) 113-134; "Labor's Environmental Agenda in the New Corporate Climate," Toxic Struggles: The Theory and Practice of Environmental Justice, ed. Richard Hofrichter.(Philadelphia: New Society, 1993) 179-185; with the WATCHDOG Organzing Committee, L.A.'s Lethal Air: New Strategies for Policy, Organzing and Action (Los Angeles: Labour/Community Strategy Center, 1991); and on R. Bloch and R. Keil,"Planning for a Fragrant Future: Air Pollution Control, Restructuring and Popular Alternatives in Los Angeles." Capitalism, Nature, Socialism 2.1 (1991).

44 Mann and WATCHDOG, "L.A.'s Lethal Air."

45 Analysis here draws on Roger Keil, "Green Work Alliances: The Political Economy of Social Ecology." Studies in Political Economy 44 (1994) 7-38 and on Steven Gray,."Ontario's'Green Work Alliance' Hopes Environmentally-Friendly Projects Can Reopen Plants," Labor Notes Nov. 1992, 15-17.

46 Ken Tsuzuku, "Presentation at the 1991 Labor Notes Conference," "A Conference on Labour & Team Concepts,".proceedings of conference by Vancouver and District Labour Council & Labour Studies Programme, Capilano College,.Vancouver Oct 18-19, 1991, 261-270.

47 Tsuzuku 266

48 Tsuzuku 266.

49 Tsuzuku 267.

50 Tsuzuku 268.

51 Tsuzuku 268. An important focus of this centre has been its work with discharged workers of the National Railway Union, fired under privatization schemes, who are fighting for reemplyment by launching worker run projects in the service and retail sectors

52 See Thomas Greven, "Can We Convert Defense Jobs to Peacetime Uses," Labor Notes Nov. 1992. 7; Carl. Boggs, "Economic Conversion as a Radical Strategy: Where Social Movements and Labour Meet," Building Bridges: The Emerging Grassroots Coalition of Labour and Community, ed. Jeremy Brecher and Tim Costello (NewYork: Monthly Review, 1990) 302-310.

53.Chris Carlsonn "The Shape of Truth to Come," Processed World 32 (1994): 32.

54 Dennis Hayes, Behind the Silicon Curtain: The Seductions of Work in a Lonely Era (Boston: South End, 1989); Michael Hardesty and Nina Wurgaft, "Silicon Valley: A Tale of Two Classes," Z Magazine. Sept. 1992, 63-65; Navid Mohseni, "The Labor Process and Control of Labor in the U.S. Computer Industry," The Labor Process and Control of Labor: The Changing Nature of Work Relations in the Late Twentieth Century, Berch Berberoglu (Westport: Praeger, 1993) 59-77; Andrew Gorry, "Silicon Valley: A Divided Workforce." CPU: Working in the Computer Industry 3 (1993) online, Internet.

55(Hardesty and Wurgaft, 62.

56 Lenny Siegel, "New Chips in Old Skins: Work, Labor and Silicon Valley." CPU: Working in the Computer Industry. 6 (1993), online, Internet; Lisa Hoyos and Mai Hoang, "Workers at the Centre: Silicon Valley Campaign for Justice," CrossRoads. 43 (1994): 24-27; David Bacon, "Silicon Valley on Strike," CPU: Working in the Computer Industry 3 (1993) online, Internet.

57 Siegel in "New Chips in Old Skins."

58 Nathan Newman, "Third Wave Unionism' Takes to the Net," online, Internet, Red Rock Eater news Service, 22 Aug. 1996.

59 Cited in Newman.

60 Richard Moore and Louis Head, "Acknowledging the Past, Confronting the Present," Toxic Struggles: The Theory and Practice of Environmental Justice, ed. Richard Hofrichter.(Philadelphia: New Society, 1993) 121. See also Paul Almeida, "The Network for Environmental and Economic Justice for the Southwest: Interview with Richard Moore," Capital, Nature and Socialism 5.1 (1994): 21-54.

61 Morre and Head 1993, 123.

62 Negri and Lazzarato, "Travail immaterial and subjectivite" 88

63 James Laxer, speech at the Annual General meeting, Council of Canadians, 17 Oct. 1996, Vancouver.

64 Negri and Lazzarato, "Travail immaterial and subjectivite."

65 The change Michel Foucault describes as the shift from the "universal" ito the "specific" intellectual catches something of this transition. See his Power/Knowledge (New York: Pantheon, 1980)

66 Raymond Williams, "The Politics of Nuclear Disarmament," Exterminism and Cold War (London: New Left Review, 1982), 85.

67Karl Marx and Frederick Engels, The Communist Manifesto (New York: Washington Square, 1969) 34..

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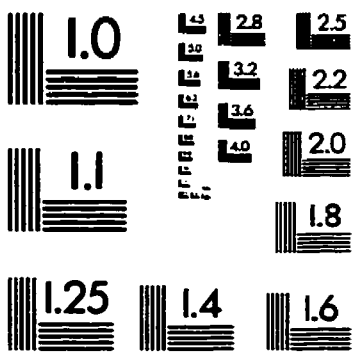
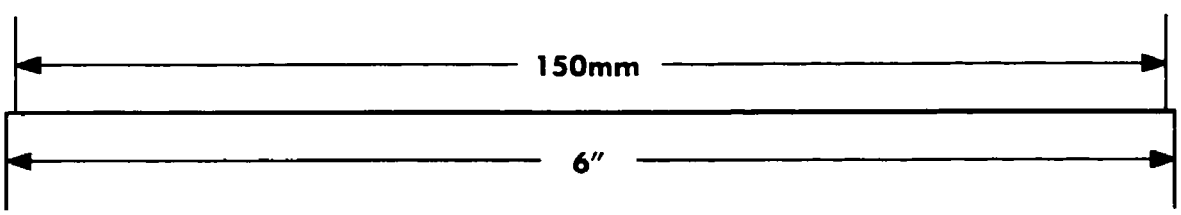
TEST TARGET (QA-3)





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