

**ESSAY****Socialism and Technology: A Sectoral Overview\****Victor Wallis***Introduction**

The discussion of socialism as a historical project—that is, as a project for which it can be argued that the necessary practical conditions exist—has from the beginning been closely linked to issues of technology. Earlier advocates of social justice (before Marx’s day) had spoken in terms of timeless moral principles. Thus, leaders of millenarian movements would deliver apocalyptic religious pronouncements to peasant followers, while utopian writers, for their part, addressed all “men of good will” (though in practice this most often meant educated people who took for granted the continuation of their personal preeminence). Marx, on the other hand, linked communism—and therefore also socialism, which would be its precursor—to the rise and eventual political organization of the proletariat (wage workers), whose existence as a social class reflected the technology of what he called “large-scale industry.”

The shift from handicraft to large-scale industry entailed: 1) development of the labor market (i.e., of labor-power as a commodity); 2) reduction of the work process to regimented repetitive motions; and 3) the bringing together of large numbers of workers under a single roof. It was this combination of traits which gave capitalism—in the form it took during Marx's time—both its destructive character and, simultaneously, the potential to generate its positive replacement.

Jumping ahead to our own time, we see that capitalism, having beaten down its challengers almost everywhere for more than a century (longer, no doubt, than Marx and his immediate successors could have thought possible), confronts us with a daunting paradox. On the one hand, we see that capital, viewed globally, has acted out the whole rapacious script that Marx projected for it: it has concentrated wealth at one pole and misery at another; it has tightened more than ever the mechanisms of political control, including resort to military aggression backed by the “ultimate weapon”; it has created a largely hegemonic culture in its own (commercial) image; it has severely weakened public sector services; and, with its readiness to sacrifice both soil and worker to continued unlimited growth, it has brought on an ecological crisis which puts in doubt the continuation of our species-life. All this makes more urgent than ever the task of supplanting such a system. But—and here lies the paradox—the very factors that make the rule of capital so destructive also operate to shield it against any effective effort to go beyond it.

This represents something of a change since Marx's time. For him, the concentration of capitalist power had as its byproduct the bringing together of workers and their eventual consolidation into a class that could end the rule of capital. For us, capital's even further concentration (on a global scale), together with the concomitant technological changes, has had several consequences which make this outcome appear, at least initially, much more remote. First, big capital has radically dispersed its labor force, with the result that it can

undercut the potential power of the workers by shifting its operations at will. Second, mass media technology has been used to shrink the public sphere in favor of direct one-way communication from the centers of power (public or private) to the isolated household or individual. Third, so much environmental damage has already been done, and the infrastructure for ecologically harmful patterns of energy consumption has become so deeply entrenched, that any reversal is bound to be both slow and disruptive. (This effect is amplified with the rise of genetic engineering, which by its very nature—since no biological organism exists in isolation—introduces uncontrollable and irreversible changes into the environment.) Finally, in terms of political discourse, the notion that a radical alternative to capitalism has already been tried and found wanting may discourage many who might otherwise be receptive to socialism.

One possible conclusion to draw from all this, is that a transformation that was conceivable in Marx's time is no longer conceivable now. Within the dominant culture, this conclusion has already attained the status of an axiom. But human beings are not automatons, and obstacles that seem insuperable may bring defections in unexpected places, with the result that what first appeared as a reinforcement to the status quo may end up being a sign of its weakness. In terms of our present focus, it is the very extremity of the current situation that could provoke people to move much further, faster, and more purposefully than they had ever thought possible. There is, of course, nothing “inevitable” about such a response, and it is a lamentable fact that certain types of environmental damage (e.g., extinctions of particular species) cannot be undone. Nonetheless, what works in favor of a constructive response is the emerging recognition that doing nothing—letting current trends run their course—spells disaster.

The struggle to survive is indeed a powerful motivator, but it depends in turn on confidence that survival is possible. Such confidence draws partly on the solidarity that can be inspired by a vast social movement. If a movement of this kind is to grow, however, it must have theoretical underpinnings. People need to understand the potential alternative as being already implicit in conditions we can now see. Speaking of technology, it is not enough to advance a notion of “what might be.” Any such vision must flow in a recognizable way from “what is,” granting that this encompasses not just the physical and institutional reality but also people's subjective capacity to respond.

The sphere of technology is crucial to this process, for at least two reasons. On the one hand, the capitalistic cult of innovation promises to overcome all obstacles, including those posed by the absolute exhaustion of the world's resource base. On the other hand, we know that long-term species-survival is contingent upon a reduction on the order of 70 percent in the burning of fossil fuels, and that the conditions for carrying out such a reduction are to a large extent already present. These conditions, consisting partly of *devices*, partly of *scientific knowledge*, and partly of *organizational experience*, are what I propose to remind us of here. As we examine them, it will become evident that the framework required for directing them toward ecological restoration is one which breaks sharply with capitalist priorities and which therefore will link up in the short run with demands reflecting working-class (or, more broadly, non-capitalist) interests, and in the long run with socialism.

Both for the economy as a whole and for each of its sectors, it is possible to outline the main features of current capitalist practice, the implicit requirements for a socialist

alternative, and the degree to which the conditions for satisfying these requirements are already present. Whatever the specificities of the various sectors, a socialist approach will be understood to rest on the underlying principles of (a) social ownership and control of large-scale property, with the option of reconfiguration (including subdivision and dispersion) of production units; (b) economic decisions beyond the household seen as matters of public policy (at whatever level), to be based on criteria of physical health and social well-being rather than of profit and the market; and (c) a revised concept of efficiency which takes into account *all* inputs and outputs of a particular productive activity (and not just those that are measured in the profit margins of particular enterprises).

We may now consider the application of these principles to the major sectors of economic activity. The discussion here will be purely illustrative; actual implementation would require organized debate and planning on the part of all those affected.

### **Agriculture/Forests/Fisheries**

The traditional practices of agriculture, forestry, and fishing—clearly the sectors most vital to our physical survival—are increasingly giving way to agribusiness, industrial tree plantations, factory fishing, and aquaculture. Agribusiness, with its vast acres of single crops and with its factory-like regimentation of landless (often migrant) laborers, is heavily committed to fuel-intensive cultivation based on chemical fertilizer and highly toxic pesticides. Scorning age-old practices of mixed growth, it depletes both the topsoil and, through over-irrigation, the aquifers. Livestock raising, in its industrial form, is marked by even more wasteful and increasingly toxic practices. Beef production, in particular, uses up ten times as much acreage as does grain to feed a given number of humans, and the water pollution from stockyards is prodigious. Animals bred for meat and dairy products are typically subjected to extreme crowding and highly unhealthy conditions, including the use of growth hormones and antibiotics, which help create antibiotic-resistant strains of microbes that then threaten human health. Despite these damaging ecological and public health consequences, all such practices are carried out for the sake of guaranteeing the owners of these operations the highest possible output at the lowest possible cost.

The same precepts are applied to forests and fisheries. Forests are viewed not for their roles in producing oxygen, protecting against soil erosion and floods, or sheltering many species of wildlife (including pest-predators), but exclusively as either sources of lumber or impediments to cash crops and grazing. The destructiveness of this approach is incalculable, perhaps most dramatically shown in the mudslides that beset clear-cut hillsides (frequently taking, in poor countries, hundreds of lives at a time). In terms of the capitalist bottom line, however, all this is simply disregarded. So it is with fishing, where natural stocks are relentlessly depleted. Farm-raised fish are then bred under conditions comparable to livestock, with excessive crowding and consequent adverse health effects, which again are passed on to humans.

Cutting across all forms of food production is the use of genetic engineering (GE). In the midst of all the controversy on this topic, a few points deserve emphasis: 1. The impetus for GE comes entirely from big corporations. 2. The initial motivation for genetically modifying crops was to create captive markets for certain herbicides, to which the crops in question would be immune. 3. GE is by no means guaranteed to increase

productivity; in some instances it has the opposite effect. Productivity, however, is not the goal; the goal is to replace independent community-based agriculture with a form of production that maximizes dependence on commercial inputs. 4. It is impossible to guarantee that genetically modified plants (or fish) will not interbreed with their wild counterparts, with unknown consequences. 5. GE was introduced into U.S. food supplies by stealth (companies blocked efforts to require labeling of GE produce); in countries where there was open discussion, GE technology has been severely restricted. 6. The attempt to impose GE has also entailed high-pressure tactics on the part of the U.S. government, including blocking worldwide adoption of the precautionary principle (under which products have to be proven safe before they are marketed) and most recently winning a World Trade Organization ruling that declares the European Union's six-year ban on GE foods an unfair trade barrier.

In envisaging a socialist response to all these practices, it is important in the first instance to see the practices themselves as aberrational. Far from building on the accumulated experience of food producers who understand and respect the natural setting in which they operate, capitalist agriculture—of which GE is only the most extreme expression—fixates on reaching its narrowly defined targets “by any means necessary,” in total disregard of impact on the eco-system. The most urgent priority for socialism, then, is to rescue agricultural practice from the imbalances and the ravages perpetrated by capital. This implies a comprehensive approach, not limited to intervening at any single level. Above all, nature's infrastructure (land, water, trees, wildlife) must no longer be treated as a vast heap of potential commodities ready to be seized and put on the market. The challenge is not so much one of innovation as one of retrieval. Precisely how the production process will be organized—in particular, the exact mix of different scales of operations—must be determined in accordance with both the natural and the cultural traits of each locality. Specific decisions on matters such as water use, pest management, crop combinations, and working conditions can then be taken on the basis of public discussion, with free flow of essential knowledge and a common commitment to long-term viability.

Nature does not recognize property boundaries. What is done in one space affects other terrains as well. Long-term viability means, on the one hand, avoiding toxins, and on the other, protecting soil quality, water availability, and species diversity. All these objectives require a degree of mixing and complexity of plant life. This might in turn entail, on the one hand, higher levels of labor input, and on the other, smaller outputs of any single product within a given region. Such changes can be seen as positive, however, from several angles. 1. The severe rural unemployment that exists in most of the world's poor countries could be absorbed. 2. Although the output of a region's leading product might decline, this could be offset by the output of secondary products, some of which could be locally consumed. 3. Agricultural work would become—as it often used to be—more varied, more creative, more dignified, and healthier.

Steps in the direction of such an outcome can be discerned in a number of settings around the globe. Cuba, with what is left of its socialist framework, in some respects leads the way, as it responded to the cutoff of its external inputs (following the Soviet breakup) by carrying out an exemplary switch to organic agriculture, including large-scale promotion of urban food gardens. India has been the setting for major organizing efforts within farming communities as they have sought to defend their livelihoods against the incursion of dam

building projects and water-guzzling softdrink manufacturers. And in the advanced capitalist countries, consumer groups have established food coops and mounted educational campaigns while farmers' markets have reestablished direct links between city dwellers and nearby small-scale food producers. However limited might be the immediate scope of such developments, they offer substantial networks on which more ambitious projects can build.

### **Industry/Transport/Energy**

In industry, unlike agriculture, the capitalist organization of production appears at first glance not as a possibly arbitrary superimposition upon age-old practices but rather as a structure inherent in the tasks to be performed. Large-scale industry originated under capitalist sponsorship; no earlier epoch offers an alternative model for it. Twentieth-century socialist regimes may have strengthened rather than weakened the perceived link between industrial success and the rule of capital. The reason for this is straightforward. Socialist revolutions occurred in relatively backward countries. In terms of industrial competition, therefore, the resulting regimes always appeared as laggards. It became impossible for them to shake off a fixation on overcoming this circumstance, whether the concern was to showcase what they proclaimed to be a new social order or whether it was to build up, in a more practical sense, the means to defend themselves against the real and continuous threat of hostile intervention. Ironically, then (as Lenin was the first to insist), they were able to contend with the capitalist powers only by largely succumbing to the rules of the capitalist game. Once this pattern had become routinized, it suffused the ambitions of the Soviet ruling strata, making them easy prey for cooptation.

But the mere fact that large-scale industry was founded and propagated by capital does not in itself make capitalism the only possible framework for its existence. For reasons put forward initially by Marx, the historical evolution of the rule of capital brings problems of a new kind which capital is incapable of addressing. Capitalism's core anomaly, in comparison with earlier systems, has always been the phenomenon of overproduction. In Marx's time, overproduction came into play essentially with reference to the size of the market (in any given region) relative to the quantity of available commodities: if more was produced than could be sold, the market would collapse and the economy would go into recession. Nowadays, however, the limiting factor is not just the size of any regional market; it is also the total quantity of available resources, on a global scale. The classic capitalist desideratum of perpetual growth is thus no longer viable even in the short run, let alone as the basic measure of economic success. Both *what* is produced and *how much* is produced must be decided upon in terms of an entirely new set of considerations—and hence also through a largely new set of institutions and processes.

We should note immediately that although this is formulated as a prescriptive statement, it derives its impetus from the economy's clash with objective limits, whether in the form of a peak in oil production, a catastrophic increase in atmospheric carbon, a shortage of clean water, or (as now in the case of China) an absolute shrinkage of agricultural terrain in the face of expanded reliance on private motor vehicles. What these trends imply is that an alternative set of production-parameters is a matter not just of taste or preference, but of survival.

The response of capital to this crisis is ambivalent. On the one hand, it cannot fail to recognize the threats to “business as usual,” and so devotes a certain portion of its capacity to exploring, in particular, new sources of energy, most notably, the promise of “hydrogen power.” On the other hand, however, both in its direct corporate practices and through its political clout, it aggressively clings to an agenda of controlling and exploiting oil reserves down to the last profitable drop. While the sponsored research into devices like hydrogen cells is there to be picked up and carried further, the will to organize a timely conversion away from hazardous and unsustainable technologies is lacking. The proliferation of toxic practices continues unabated, under the assumption that the residues can always be dumped on “expendable” populations, while the implementation of cleaner approaches awaits the moment—put off for as long as possible—when the market for existing practices dries up.

A socialist approach would not limit itself to inserting new energy sources into established patterns of consumption. It would seek to change those patterns both by putting an end to the power of a privileged class—with the opportunity for massive reorganization of priorities that such a power-shift would bring—and by making use of those already available approaches to production and transport that entail less human and environmental cost than do the ones favored by capital.

More specifically, socialism can first of all limit the pressure on energy resources by reducing, in an organized way, the total production of goods and services. In order to minimize adverse effects, such reduction will require (a) reconfiguring economic space (taking more advantage of geographic proximity), (b) promoting collective consumption (e.g., mass transit), (c) relying less on possible new inventions and more on making fuller use of existing devices (e.g., bicycles), (d) encouraging society-wide redefinition of what constitutes a “good life” (esp., reducing emphasis on possessions and discrediting exploitative lifestyles), (e) bringing immediate improvements to those who are least well off, and (f) most generally (building upon d), identifying the many currently accepted social practices (e.g., commercial, financial, bureaucratic, repressive, profligate, destructive) that can be curtailed and establishing the necessary coordination to help move people from within the affected sectors into more socially useful and fulfilling activities.

Second, the production process itself will need to be redesigned, with top priority given to its effects on those whom it directly engages. This means not only protecting workers from accidents and illnesses but also enhancing their opportunities for social interaction, diffusing control over the work process, democratizing decisions about common goals (including *what* is produced as well as how it is produced), and generally considering the mental health of the workforce (in particular, the level of well-being felt by each worker at day’s end) to be as important an output of the enterprise as whatever products it sells.

It is within the context of these kinds of changes that a society-wide shift to cleaner and more sustainable technologies becomes immediately conceivable. Until large numbers of people are well organized and thoroughly aware of their long-term interests, the idea of reducing carbon emissions by 70 percent will appear totally unreal. Only with the social transformation well underway will everyone be able to see through the false dilemma—“either” protect “the economy,” “or” preserve the environment—propounded by those who resist even the most minimal international accords on global warming.

## Information/Communication/Education

Information technology and its offshoots need to be considered from two angles. On the one hand, all the talk about a presumed shift to a “weightless economy” needs to be brought up short against recognition of the physical or material underpinnings to the supposedly “non-material” transactions that are carried out. On the other hand, we must consider how the new technologies in question affect the substance of what is communicated and how this substantive dimension in turn inserts itself into either a capitalist or a socialist framework.

The common application of the adjective “virtual” to computer transmitted images and exchanges feeds the illusion that in switching into this relatively new medium, we are somehow leaving behind the messy world of tangible objects and factory labor. This is a further extension of the rhetoric of mid-20<sup>th</sup>-century sociologists and economists who, noting the swelling of service sector employment, popularized the term “post-industrial society” as a descriptor for contemporary capitalism. In so doing, they celebrated a supposed improvement in status of a large portion of the workforce, when in fact most of the new service workers were economically weaker than their earlier factory-employed counterparts, while the latter then saw their situation undercut by the transfer of much production work to Third World countries. The point is that the grimy/repetitive manual operations were not eliminated but were only shifted to less favorable settings and conditions—and to more vulnerable populations.

A similar process has occurred with computerization. Both the manufacture and operation of computers and also the uses to which they are put have heightened, rather than easing, the assault on the environment. The toxic toll of computer manufacture is itself prodigious. As Wolfgang Sachs reports, “no less than 15-19 tons of energy and materials—calculated over the entire life-cycle—are consumed by the fabrication of one computer.” Eight hundred kilograms of fossil fuels and toxic chemicals are required to manufacture just a single kilogram of computer chips. As if these basic costs were not enough, there is the further phenomenon of perpetually accelerating obsolescence. With the intense competition over the speed, capacity, and versatility of computers, ever-new refinements are devised, and big institutions scrap and replace entire functioning systems almost without warning. Whatever the calculations that might be embodied in the first such step, the ultimate effect is to multiply real pressures to “upgrade” upon every other system that interacts with the original one. Similarly, a perfectly serviceable component of an office complex may be rendered useless by upgrades in some other component to which it is linked.

Over and above such self-generated pressures from within the computer industry, we must take note of the frequent resort to high-tech “solutions” for problems that in themselves could be addressed more directly and effectively (and at less environmental cost) by rethinking either the infrastructure or the habits that give rise to them. The need for such rethinking tends to be overwhelmed by the mentality of the technological “quick fix,” which resists disruption of existing personal habits and is positively averse to collective or structural approaches. Thus, confronted by the at-least twice-daily traffic tie-ups of major cities, instead of reducing the number of vehicles (and thereby saving not only energy but also space, materials, clean air, and sociality), one devises a computer program to detect where, at

a given moment, there might be a slightly smoother flow—forgetting, of course, that if everyone does the same thing, the problem will be back at square one.

A similar sort of irrationality is manifested in the educational and cultural applications of computer technology. This is not to dispute the impressive advantages conferred by such technology in matters of research and in the diffusion and filing of information. There are, however, serious concerns in terms of proportion. These have to do not only with the question of the costs of computer systems (compared with other possible allocations, such as hiring more teachers or providing more public support for the arts), but also with the degree to which *what can be done via the computer becomes a determinant of whatever tasks might be undertaken*. This latter consideration is so pervasive that its limits are hard to identify. Especially when one thinks of the addictive behavior that has developed around certain types of computer pastimes, it becomes apparent that the technology can affect human experience in a way that may shut out more than it opens up (if not quantitatively, then at least qualitatively).

The addictive dimension takes two principal forms, both of which provide a kind of shortcut to gratification. The first is computer video games, many of which involve maneuvers dangerously akin to military targeting, in which the reward is an exploding screen image (typically, a human body). Such games isolate the direct mouse-guided act both from the human surroundings of the player and from any meaningful sense of what the image signifies. The second—and more likely long-term—form of addiction is the Internet phenomenon of Multi-User Domains (MUDs), which “provide worlds for anonymous social interaction in which you can play a role as close to or as far away from your real self as you choose.” Individuals readily take on multiple personae, spending up to twelve hours a day at the screen and losing any sense of their actual place in the world. As Sherry Turkle puts it, “the self spins off in all directions.” The alienation that Marx first recognized in capitalist production relations has thus taken on an added dimension, as the individual now seeks escape not (or not only) from the workplace but from the whole sphere of face-to-face interactions.

More generally, the instant accessibility of a vast universe of facts and ideas, combined with the awareness of this accessibility, carries the danger of obscuring the painstaking creative process that underlies authentic mastery, in whatever domain. The further phenomenon of incessant updating diminishes the apparent worth of any intellectual product whose physical form (e.g., that of a book) can be seen as fixing it at a moment that has already been superseded. In relating to bodies of knowledge that are cumulative, it becomes difficult to recognize the underpinnings of whatever stage has currently been reached. The extreme though not uncommon expression of this difficulty is the practice of plagiarism. This is of course physically facilitated by word processing technology, but more importantly, it is made to appear ethically unproblematic by its congruence with the awareness that one can “access” any desired item of information at a moment’s notice. The official condemnations of plagiarism ring hollow in view of the enormous pressures and inducements which make it attractive, and which are not called into question. But this is a familiar contradiction of capitalist culture, much like the promotion of an “abstinence only” approach to sex education in the context of commercial media that trumpet sexual conquest at every turn. In all such examples, the supposedly “moral” stance has long ago lost whatever



grounding it might once have had in a genuine regard for the quality of human interaction—the latter having been scornfully displaced in favor of market priorities.

The all-purpose target of market appeal is the demand for instant gratification. Nowhere does this appear more sharply than in the technology of the cell phone. Leaving aside the applications for which the mobile dimension is totally unnecessary (i.e., long conversations that could be held anytime and from anywhere), we are left with a number of distinctive applications whose desirability or necessity has to be seen in the context of alternative approaches and then weighed against the possible adverse public health consequences of blanketing the globe with the microwave fields that are required in order for cell phones to function. It is emblematic of capitalist hegemony (especially in its U.S. guise) that, as with the imposition of the automobile-centered transportation system or of genetically modified food, the question of whether or not to build the global infrastructure for cell phone use has never been viewed as a public policy issue—let alone as a question meriting society-wide debate grounded in full disclosure of the relevant scientific information. The purpose of such debate would be not only to bring out the risks of the proposed technology, but also to work out in great detail the alternative possible ways of meeting whatever legitimate needs the technology in question might be thought to address.

Underlying all such questions is the issue of control. Should technology be democratically controlled, or can its development be safely left in the hands of capital (and/or of governments constituted by capital)? In view of the costs and dangers of the new technologies (as well as their complexity), choices on their adoption have implications far beyond what can be perceived or contemplated by the prospective individual consumer. If this is true of already known technologies, it will apply with even greater force to the new nanotechnology, which involves particles so tiny and capable of so many permutations that the means to contain them have not yet been devised. The protection of human beings, not just as “consumers” (i.e., buyers) but as involuntary recipients of particles with unknown properties, has become very much a collective responsibility. Hence the need for social control over production. Only within such a framework can public debate be made a precondition for major production decisions. In the case of information technologies, the task will be to avoid harmful or wasteful applications while at the same time exploring what positive role these technologies can play in democratizing all aspects of society and politics. Here their contributions could range from breaking down knowledge barriers to addressing the more intractable problems of coordination that arise in any society-wide planning process.

### **Surveillance/Repression/Military**

The non-neutrality of technology deserves particular emphasis when we look at technologies of repression. In the sectors we have examined so far, the task has been to identify and preserve the components that can serve human needs (consistent with ecological concerns), while at the same time recognizing and curbing the components that are wasteful and/or dangerous. With the technologies of repression, however, and in particular with those of military destruction, we confront a set of applications that is inherently negative and whose adoption can at best claim only the most transient and circumscribed justification, in contexts of territorial self-defense.

It is important to begin by noting the military dimension of capitalism itself. Like the growing of food, the fighting of wars pre-dated capitalism, but capitalism added its own distinctive stamp which, evolving through history, has created a whole new level of high-tech mass killing. In the military sphere, the concentration of capitalist power has reached a previously unimagined level, where the agenda of global domination has become an article of consensus within the ruling class of the world's most powerful country. The specific expression of this agenda is the self-proclaimed prerogative of the U.S. government to intervene militarily, at its own discretion, in any country at any time. A long record of such interventions makes clear that what motivates them has no necessary connection with any threat of physical attack against U.S. territory or, despite invocations about “expanding liberty,” with whether or not the targeted regimes or movements have the support of their people. What unites the interventions, rather, is a pair of preoccupations central to the rule of capital, namely, 1) maximizing the sphere of corporate economic operations (now focusing especially on oil) and 2) blocking, punishing, and ultimately destroying any attempt to chart an independent—especially if socialist—course of development.

The technology that has evolved in carrying out this agenda goes far beyond any device that could conceivably be needed for territorial protection. It now extends to the domination of space, as the U.S. claims exclusive sway over the shield from which one can exercise surveillance—backed by the threat of instant attack from above—anywhere on the planet. On the ground, the goal of intervening with impunity while minimizing the risk of U.S. casualties has prompted a major thrust toward replacing infantry soldiers with robots. It would be hard to imagine a more definitive acknowledgment than this, that one is sending one's forces where they are not welcome. In order for the shielding effect to be complete, however, the robots must acquire an increasing capacity to make life-and-death decisions on their own, without nearby humans to type in the computer-commands. The dominion of machines over humans, described by Marx as the control of living labor by dead labor, would thus reach a new level of impregnability.

On the domestic front, the mission of crime control blends almost seamlessly into that of political repression. Criminal activity can of course itself take on a high-tech character, especially in information-related matters that shade over into routine financial practices like currency trading. The targets of surveillance and of high-tech weaponry, however, are more likely to be officially marginalized populations of one kind or another, ranging from prisoners to radical activists. There are now monitoring mechanisms of every description, from barcode/credit card links to surgically implanted computer chips. Stun guns and other allegedly “non-lethal” weapons have been used by law enforcement personnel with reckless indifference to their effects. “Crowd control” at demonstrations has often become a pretext for police assaults, especially against people carrying video equipment. In the prison system, stun guns serve as backup to the increasingly vindictive official regimen that has been imposed under the pretext of fighting terrorism.

It is clear that the disposition to use these technologies—along with the more traditional “quick fix” of relying on bullets—will tend to increase as the policies of the sponsoring regime become more oblivious to mass needs, rendering it less capable of gaining acceptance on the basis of any real services it might provide. At a more mundane level, the same indifference to popular needs has fed into the elite's growing propensity to

circumvent the electoral process by, among other things, techniques that rely on the manipulability (and potential impenetrability) of computerized voting. Whether by violence or by subterfuge (along with quiet complicity on the part of those who are not the direct perpetrators), the ruling class thus routinely shields itself from any priorities but its own. Ultimately, this may heighten people's awareness of the need for radical change. At the same time, however, any such repudiation of the status quo will only magnify the insecurity and consequent repressiveness of the regime. This raises, among other things, severe tactical problems for advocates of an alternative order.

The issues go beyond anything that can be fully resolved here, but they have to be mentioned because the core issue for socialism is the extent to which it can dismantle the structures and practices that have discredited its predecessor. Nowhere do these appear more intractable than in the domain of repression. What gives the repressive machinery added tenacity—an added appearance of inevitability—is the fact that it is directly used (whether internally or internationally) against any socialist movement that even approaches the possibility of taking power. How then can a socialist movement break free of this kind of defining circumstance?

It should not be expected that such a break can be instantaneous. Capital has made, and will continue to make, war on any regime (or movement) that defies it, no matter how legal or democratic the challenger might be. Indeed, such grounds for legitimacy could make the defiance even more sharply felt (because ultimately more embarrassing) than would be the case with a regime lacking in these qualities. For defensive arms to become outdated, therefore (on the part of regimes moving toward socialism), an international popular movement of enormous scope, especially within the imperial center, will have to act as a restraining force against intervention. In that process, and as its outcome, a number of restraints on military technology will have to evolve. Given that the imperial power is the one that exercises military initiative (and also has the more advanced military technology), it is on *its* part that restraint will first need to be felt. Once such restraint has become manifest, then the leadership of a country in revolution will have the space to reduce its own military orientation—a step that it would welcome insofar as it is committed to making social improvements.

The ultimate goal would be a society in which the armed forces dissolve into a reserve of citizens whose primary orientation is no longer combat but rather social/ecological reconstruction projects of various kinds. As for the high-tech forms of surveillance that have developed under late capitalism, they would become increasingly superfluous as private financial transactions shrank in scope, as international economic polarization declined (reducing pressure at border crossings), and as secretive practices of accumulation (including criminal activity) gave way to a revival of face-to-face collaboration on a wide scale. The point of immediate concern, however, is that in the military/repressive sector more than in any other single domain, what can be done in a socialist framework is severely limited by the degree of external threat that is present.

### **Public Health and Healthcare Services**

Capitalist medical technology, like its counterparts in the communications and military spheres, can boast extraordinary achievements. At the same time, both the disorders

it has to address and the selection of its beneficiaries reflect a failure to achieve its purported objective—public health—in more direct, effective, and universal ways. It is widely accepted, except in mainstream U.S. political discourse, that the costs of healthcare can only be reasonably and universally met if they are averaged out over the entire population, as is done in many national health plans even in otherwise capitalist countries. What is less commonly recognized is the role of capitalist priorities in creating health problems which should never arise in the first place, and to which high-tech treatments are applied selectively and (often) only when it is too late. The greatest of these problems are those associated with *poverty*. Hunger, like war, is older than capitalism, but many of the present-day manifestations of poverty reflect market-based priorities. These include the disproportionate exposure of poor people to unhealthy working conditions, bad air, tobacco culture, and factory-processed food, combined with insufficient access to relaxation, exercise, and simply the knowledge of what is beneficial. More specific burdens on the healthcare system arise from various forms of *systemic violence*, ranging from car crashes (which, viewed in the aggregate, are predictable and therefore not accidental) to individual acts of violence and, beyond this, to war casualties. Finally, healthcare resources (including high-tech) are also diverted to *cosmetic surgery*, the demand for which arises from the quick-fix mentality applied either to physical problems (like obesity) or to psychological problems (reflecting internalization of degrading stereotypes associated with age, sex, or ethnicity).

A socialist approach would not do away with high-tech treatments but would reduce the need for them by raising the general level of public health (mental as well as physical). This approach—based on ending the poverty, violence, unhealthy habits, environmental toxins, and stereotyping culture that account for excess healthcare demands—would be both cheaper for the healthcare system and more beneficial for the people. It would signify, however, a radical reconfiguration of social priorities. All the sectors we have discussed would evolve along lines such as those here suggested. With regard to healthcare services in particular, we can go beyond sketching imaginary systems, because current Cuban arrangements already embody a thoroughgoing preventive approach—based on an ambitious level of training, an ethic of service, and routine housecalls by family doctors—resulting in public health indicators on a level with those of much richer countries. The mental or psychological dimension is of course more complicated, but there can be no doubt that a society in which everyone’s basic needs are acknowledged—both at the community level and in public policy—will free its people from the stresses associated with the pervasive capitalist stereotype of “the loser.”

### **A Socialist Technology?**

While some devices may be more compatible than others with socialist principles, the devices required for life under socialism pre-exist any socialist formation. The distinctive contribution of socialism lies not in any particular inventions that might emerge but rather in the reorganization of society in such a way that technological choices are no longer made (as we noted at the outset) on the basis of marketability and profit potential, but rather on the basis of compatibility with the overall requirements of humanity and the natural world. The process of identifying those requirements will of course be a matter for debate, but the guiding principles for any decisions will be, on the one hand, the concern for long-term species survival, and on the other, the assumption that no portion of the human race is entitled to deny any other portion of it, on any pretext, the conditions for a decent life.

