Tools of Their Tools

Tools of Their Tools: Communications Technologies and American Cultural Practice

Edited by

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We dedicate this book to the memory of Ewa Grzeszczyk, one of our contributors, who died tragically on May 22, 2009. She was an excellent scholar and a wonderful colleague, who will be greatly missed.

TABLE OF CONTENTS

PREFACE

All the essays collected in this book explore the role of communications technologies during the last 150 years in American cultural practice. By communication technologies we mean audio and visual reproduction technologies, analogue telecommunications such as traditional telephony, radio and television broadcasts, digital telecommunications, computer-mediated communications, telegraphy, and computer networks.

The study of the impact of telecommunication technologies is a way to explore the various flows and tensions of American culture. How has American society molded communication technologies? How have they, in turn, shaped American history? Are Americans still, in the words of Thoreau, "tools of their tools"? More so or less than during the philosopher's Walden days? How do America's cultural, ethical, and economic assumptions determine and limit the ways in which telecommunications function in American society?

Fascinating questions abound. How do contemporary telecommunications transform the sense of America's timespace? To what extent have mass media failed to breed cultural and political conformity? Have the newest digital technologies been more successful in producing diversity and difference? Our contributors have investigated the rise of electronic communities—how have the new media transformed the patterns of social interactions in terms of politics and sexuality? Does the Internet and the Web foster the heterogeneous character of the U.S.? We examine the forms and significance of many-to-many communication via e-mail, Internet forums, blogs and chat rooms. What are some of the new interventions in the social construction of emerging telecommunications and the innovative uses of the new and not-so-new, analogue and digital technologies? Last but not least, how are analogue and digital telecommunications represented in literature? What may be the import of digital reading and writing—digital re-reading of old literature, hypertexts, cybertexts and e-literature? These and other related issues are explored in this book.

Andrew Ross looks at the US national and social costs of cross-border technology transfers and web-related outsourcing of high-skill jobs. Offshore, especially to China, went not only much of assembly platform work but also, right in its wake, R&D sectors. PRC's rise to the position of

a superpower creates problems of its own for Americans. According to Ross, Americans have basically two weapons against processes which their multinationals have helped to unleash. One is their commitment to create another superpower on China's turf, i.e. India; another the tightening of legal regulations on the licensed use of technologies, which would assure that the technology transfers are accompanied by reverse flows of revenue. The latter efforts, Ross predicts, are likely to be frustrated by a broad Internet-networked coalition of hacker-minded professionals who gradually begin to understand they can make the blue-collars of the coming decades.

In their melancholy, kaleidoscopic essay on the history of American radio, David Jones and Joanna Waluk pay tribute to its nation-building role in the difficult decades from the 1930s to the 1960s, which were ridden with crises threatening to rip apart the fabric of American society. For balance, Raffaele Asquer outlines the limits of the airwaves' ideological impact by sampling the mixed public response to FDR's fireside chat of March 9, 1937 in defense of his rather insupportable Court-packing Bill. If not perfectly tight, the mainstream media's grip over Americans has never significantly slackened. Most of us have gotten used to the complaint that television-driven personality politics has made a mockery of real democratic debate. In his contribution, Maciej Turek turns his media critic's eye on American vice-presidency alone; he demonstrates that the marked neglect of this institution as well as of the televised "Veep" debates by the American public may be a symptom of national carelessness.

Małgorzata Gajda-Łaszewska draws our attention to a worrying alliance being forged between corporate media and PR officers. She shows how various business and government actors go out of their way to be sourced by the media by providing them with Video News Releases, news clips of their own making. This is not to say, however, that the mainstream media are only propagandistic and allow no dialogue: Aleksandra Różalska praises the popular miniseries *Sleeper Cell* as a noteworthy cultural intervention subverting the prevalent "Orientalist" bias. By creating Darwyn Al-Sayeed, an African American Muslim and an undercover FBI agent who infiltrates a terrorist outfit, the makers of *Sleeper Cell*—Różalska maintains—indicate a worthwhile direction for the American television, a step towards dismantling Western ethnocentrism as outlined by Edward W. Said.

We have witnessed too much bashing of the mainstream media not to transfer our hopes to the Internet. Collapsing space and time more successfully than any other communication technology thus far, the Web

has brought together the most remote areas and the most isolated social or ethnic groups. It remains to be seen, however, whether it will deliver the long-awaited "global village," a perfectly open, fully participatory environment which Marshall McLuhan saw incipient in the success of radio and television. Mirosław Miernik assesses the accuracy of McLuhan's predictions against the media landscape some 40 years after the publication of *The Gutenberg Galaxy* and gauges the usefulness of the Canadian's notorious interpretive instrumentarium. Richard Profozich offers a comprehensive, and on the whole laudatory, review of new developments in online citizen journalism. Today from many quarters come alarmed voices that the "need to know" of responsible citizenry is being replaced by yahoo junkies' infosnacking. Without explicitly denying the validity of this argument, Profozich is not unhappy to see the media priests and punditocrats cut down to size by bloggers who, with the help of broadband and WiFi connections, can pool expertise more efficiently than any of the traditional think tanks.

In her sociologically disciplined analysis "Fan Culture in the Internet," Ewa Grzeszczyk takes notice of the rising power of online fan communities, the so-called Generation C, which has its new ways of actively influencing the media content. On a more skeptical note, Anna Krawczyk-Łaskarzewska expresses a mixed opinion of citizen film reviewing. In his well-known August 2006 *New Yorker* piece, Nicholas Lemann, a professor of the Graduate School of Journalism at Columbia, poured cold water on the enthusiasts of "journalism without journalists." Although Krawczyk-Łaskarzewska is no less questioning in her estimation of the quality of online film reviewing without professional film reviewers, she cautiously admits that online amateur journalism "offers the potential for creating a multilayered critical space."

Notwithstanding the excellence of her essay, Krawczyk-Łaskarzewska's difficulty to come to terms with an Internet-driven change in the public realm is common. Her tendency to see citizen film reviewers as mere impostors and her reluctance to embrace the newly emergent rhizomic space in which films are being assessed today may be just part of a much wider resistance against hitching human subjectivity up to the technological other. Such breakthrough has long been awaited, and called for, by Gilles Deleuze and Felix Guattari, whose enthusiasm for technological immanence is explicated in this book by Marek Wojtaszek. Wojtaszek reads *The Matrix* as an illustration of Deleuzian concepts, and as offering a radical reconceptualization of human experience into a virtual sensibility—cubistic, dynamically evolving, and always ready to make

itself comfortable in ever newer realms offered by autonomously evolving technologies.

Paradoxically, it is not "techno-logic" alone that rules even cutting-edge labs and design shops. In fact, new technologies are driven by certain age-old myths as well, questioned today not only by philosophers but also by novelists and film directors. Dorota Golańska, for instance, examines two relatively recent SF movies, Steven Spielberg's *Minority Report* (2002) and *AI* (2001), to argue that they effectively challenge many of the long-established neo-positivist paradigms such as the privileging of the natural over the artificial, or the dominance of seeing in epistemological enquiry, perpetuated by the most recent developments in science and medicine (such as imaging technologies of deep body structures). They do so, even though American SF movies seem ill-suited to dispute values that, after all, lie at the foundation of the genre and national mythology.

Our contributors have also mapped a range of literary responses to the impact of communication technologies. Invoking Edward Balcerzan's concept of multimedial genres, Alicja Piechucka reinvestigates T. S. Eliot's interest in incorporating a variety of genres and techniques within one work. Piechucka goes so far as to argue that the language of T. S. Eliot and the French symbolists anticipates the media-saturated experience of our time and reminds us that some critics (notably Richard Schusterman) have described the author of *The Waste Land* as a postmodernist. Interested in more active responses, Julia Fiedorczuk looks at the fortunes of today's avant-garde poets. Wishing to avoid sterile aestheticism and engage in social praxis, they can do so only from a certain remove, safe from "the means-ends rationality of the bourgeois everyday," a position that —when all is said and done—has many features of the rejected "ivory tower." Communication technologies can hardly help escape the predicament. To begin with, they are part of the problem: nothing is more formulaic than downloadable e-motional greeting cards or media-ized political discourse. But fighting them, L=A=N=G=U=A=G=E poets discovered, is like squeezing the balloon. Charles Bernstein's innovative orthography may be subverting the ideal of transparent meaning, but involuntarily it also risks being co-opted into the mass enthusiasm for spelling glitches, acronyms and related instances of accelerating the already speedy text messages and emails. Fiedorczuk sees more hope for "virtual communities" that one day may churn out collective poems, no longer adhering to the myth of the autonomous authorial subject.

A glimpse into fictional strategies of dealing with the ascendancy of the digital is offered by Marta Koval in her analysis of John Barth's 2001 novel *Coming Soon!!!*—a characteristically autotelic dramatization of the

aesthetic antagonism between printed and electronic literature ("p-fiction" and "e-fiction," respectively). Examining the ontology of the written word at the turn of the millennium, Barth's inter- and intratextual work playfully mimics hypertext and tantalizes the reader with false promises of navigational freedom. Although the writer declares his interest in hypertextuality mainly as a metaphor for language, Koval argues that various deployments of the idea of "mingling of essences" throughout *Coming Soon!!!* encourage a reading of the work as a narrative mediation between the two modes.

A broader antagonism is sketched by Kate Delaney, who invokes C. P. Snow's legendary pronouncement on the "two cultures" in her discussion of two relatively recent novels which imagine a rewarding confrontation between science and the humanities in a university setting. The novels in question are Richard Powers's *Galatea 2.2*, in many ways a reenactment of the Pygmalion myth, and *Thinks…* by David Lodge, which revisits some of the novelist's pet themes and situations. Delaney argues that both works envision a veritable symbiosis between a frustrated writer and a confident scientist: the former, forced to defend and thus to reconsider the relevance of literature, is reinvigorated in the process and finally able to deal with his or her writer's block.

Some of our contributors are also interested in the impact of virtuality on a writer's public image. Focusing on the celebrated American literary recluse Cormac McCarthy, Hanna Boguta-Marchel examines the virtual persona constructed by net-savvy readers and enthusiasts through Web sites such as cormacmccarthy.com. Boguta-Marchel also comments on the irony between the fans' reliance on technological progress and its function in McCarthy's novels: conspicuously absent from the narrative, or present only in the form of its dire consequences, technology often looms as a grave threat to the very existence of mankind.

Beata Zawadka's essay demonstrates that reflection on contemporary communication technologies may illuminate literary works which predate their arrival. In her unorthodox reading of Octavia Butler's 1979 novel *Kindred*, Zawadka sees the notion of time travel as an integrative strategy, a prescient metaphor of the World Wide Web. Apart from commenting on current cultural practice—Zawadka argues—Butler's metaphor appears to point towards an imagined, idealized future, in which empathy becomes a key to healing the trauma of slavery and tightening the bonds of the American society.

Literary approaches to traditional means of communication are also featured in the volume. Noel Polk focuses on a few mechanical devices which appear in Eudora Welty's memoir, *One Writer's Beginnings*. A

prototypical Victrola and a couple of telephones are invoked in the essay to suggest that underneath the enthusiasm for the modern era, embodied by Welty's father, there lurks what the writer herself experiences as a discernible "growl," an unsettling, discordant quality. What is ultimately channeled through these mechanisms, Polk believes, is not so much human communication—a clear focal point of Welty's writing—as a variety of "one-way communiqués"; far from ascribing all the blame to technology, however, the author of the essay entertains the thought that this mechanical "noise" may in fact highlight a difficulty inherent in any contact between people.

Tomasz Basiuk traces the distortive influence of telephony on amorous relationships in two gay plays, Mart Crowley's *The Boys in the Band* and Robert Chesley's *Jerker, or The Helping Hand*. Basiuk invokes the Derridian revision of the assumed primacy of speech, applied by Lee Edelman to reveal an implicit coding of reproductive and non-reproductive sexuality, to describe ways in which the spoken word, when transmitted through the telephone, becomes distant to itself and thus approximates writing as understood by the French theoretician. The act of telephoning becomes a deconstructive procedure, subjecting the seemingly direct meaning to unforeseen, circumstantial alterations, and compounding spatial distance by emotional detachment.

An alluring intersection between technology, diasporic realities and gender is offered by Izabella Kimak, who analyzes the role of telephony in selected works by two South Asian American woman writers, Chitra Banerjee Divakaruni and Amulya Malladi. In their fiction, the telephone emerges as a double-edged, ambivalent instrument of power: used by the family in the homeland as a tool of surveillance and a means to guarantee the female émigrés' obedience to tradition, it also becomes a potentially subversive medium of sororal succor across the Pacific.

Analyzing the depictions of African Americans in the era of the "graphic revolution," Matthew Wilson argues that the invention of halftone photoengraving may have fostered the objectification of those portrayed on account of the supposed veracity associated with the new technique. Wilson cites examples from elite magazines such as *Harper's* and *Scribner's*, as well as an instance of self-depiction in the narrowly circulated *Colored American Magazine*, intended as counterbalance to the prevailing imaginary. Paradoxically—and tragically—regardless of the intent with which the illustrations were published, they seemed automatically to become incorporated into the discourse of the dominant ideology.

Also present in the volume are illuminating evaluations of technology as experienced in the performing arts. In his essay, Radosław Rybkowski examines the impact of nineteenth century technological innovation on the American theater and its audience. Rybkowski engagingly explains how such devices as the gas table, the lime lamp, the hydraulic stage elevator or the folding chair gradually eliminated or lessened problems encountered both by the purveyors and recipients of the theatrical experience, ultimately leading to changes in the patterns of artistic communication.

In her appraisal of the art of John Cassavetes, a pioneer auteur of American cinema, Elżbieta Durys maintains that the initial rejection of his work in the sixties and seventies was caused, among others, by the director's highly innovative approach to the film medium. Rejecting both the "zero degree" poetics championed by Hollywood and the achievements of foreign and domestic art film—Durys argues—Cassavetes found inspiration in the documentary style of direct cinema. A maverick filmmaker, he did not receive appropriate recognition until the nineteen-eighties, by which time audiences had learned to appreciate the technical innovation which made his works unique.

If the book begins by describing ways in which the new technologies have exacerbated nationalist anxieties in the U.S. and transmogrified the media, it closes with an inquiry into their impact on American arts. Like other cultural practices, the arts are as much on top of communications technologies today as they are under them. We hope that this book has adequately identified the dangers and opportunities involved in the untrammeled development of communications; we also believe that it demonstrates a very effective approach in American studies.

Grzegorz Kość and Krzysztof Majer

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HOARDING THE GOLD: US TECHNOLOGY AND INTERNATIONAL TRADE

ANDREW ROSS

It has been said that technology is a civil religion in the US. When other belief systems are exhausted, or else confounded by realities on the ground that betray their ideals, we can always rely on the next generation of technology to deliver the dream of perfection to a fallen people, yearning for completion of things they have been promised. This kind of narrative is standard fare for American Studies, and it has enjoyed a straight line of continuity from Leo Marx's *The Machine in the Garden* (1964), which analyses the struggle between the Enlightenment legacies of pastoralism and technological progress, to David Noble's *The Religion of Technology* (1997), which records how successive generations of evangelists found redemption in the technological sublime. This is a field of literature that takes a nationalist frame for granted, and it is shamelessly exceptionalist, finding in American pragmatism a unique, homegrown response to the ideologies of progress associated with technical invention.

In recent years, however, this narrative has altered somewhat, and not just because scholarship in ASA has entered a post-nationalist phase. This narrative has fallen victim to the quickening forces of globalization, the influence and pace of which causes the ground to continually shift under our feet. Today, there is no easy congruence between the national interest and the technology-driven industries that were national champions, at home and abroad, during the heyday of the Cold War. The internationalization of production, which began in the 1960s with the offshore manufacture of radio and TV component parts, primarily in Japan and Taiwan, is now a properly global phenomenon—its subcontracting chains snake their way all over regions like East Asia, Eastern Europe, and Central America. Technology-driven corporations are hot to transfer overseas as many operations as they can as soon as possible. These are no longer limited to labor-intensive operations; they include R&D units

which lie at the very top of the skills hierarchy, and which we have long been told would never leave American shores.[1]

The collapse of this last myth has been the hardest to swallow, since it goes to the heart of national pride about native innovation. Yet there are few obstacles that lie in the path of this kind of offshore knowledge and technology transfer—a temporary shortage of skilled labor in select regions of the world where such labor is conveniently cheap, or an immature legal regime for intellectual property in others. And then, of course, there is domestic public opinion, which is relatively easy to work up into a chauvinist lather, and indeed there has been much of that in recent years around the prospect of high-skill jobs going offshore.[2] Politicians take note of such sentiment, but Washington has little appetite for stemming the flow. For sure, there has been the spectacle of some senators from vulnerable states grandstanding on Capitol Hill, and on the campaign trail, and no elected official will resist the invitation, when called upon, to voice support for some sort of economic nationalism. But there has been no effective political will to overturn neoliberal trade policies which encourage the export of the nation's technological patrimony.[3]

Protectionist measures are generally only successful when nations are net importers—America's wall of high tariffs in the nineteenth century is one of the best examples of that during the era when the US was still the world's number one pirate nation. Today, even the national security hawks, so powerful in other aspects of foreign policy, are losing the battle to keep militarily sensitive technologies out of the hands of potential enemies.

For several postwar decades, there was a moratorium on exporting dual-use technologies to proscribed or suspect countries, whose militaries could absorb them to create mischief, or worse. With the ending of the Cold War, this moratorium was replaced with the more informal Wassenaar Arrangement, whose 33 member countries enjoyed considerably more individual discretion to control sensitive exports. This much looser agreement, combined with the loss of the U.S.'s commercial high-tech monopoly, meant that Washington could no longer effectively control technology denial to countries on its enemy list. In the meantime, the commercial trade in licensed exports shot up, and, by 2003, the export of general purpose microprocessors was entirely de-controlled.

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[1] Walsh, *Foreign High-Tech R&D*; Saxenian, *New Argonauts*.
[2] Tonelson, *Race to the Bottom*.
[3] Bronfenbrenner, *Impact of U.S.-China Trade Relations*; Bronfenbrenner and Luce, *Changing Nature*.

Hardliners continued to insist that countries like China should be kept two generations behind in its access to advanced technology. On the other side, the powerful business wings of both political parties were acutely aware that China was already using its access to international technology and knowledge transfers to jumpstart its own high-tech industries, and that U.S. firms would lose vital opportunities if the more stringent controls were not relaxed. Most U.S. firms, and foreign investors in general, have come to accept that technology transfer, even the illegal appropriation of their own intellectual property, is part of the price of doing business in China. Indeed, the offer of technology transfer is a routine deal-maker for U.S. firms seeking better investment terms or market access. Most recently, the cost of access has been the establishment of a joint training or R&D center with a Chinese university or research institute. By dangling the promise of its vast domestic market, China has been able to attract the kind of technology and resources that it needs to upgrade its economy. By the end of 2004, Washington had bowed to the clamor from U.S. firms by softening its controls. An agreement on "end-use visits" was negotiated, and controls on the export of advanced semiconductor manufacturing equipment were eased.

What is the upshot of this relaxation of export controls? It is only a matter of years, perhaps months really, before we see a new generation of technologies whose American brand names will be their only effective relationship to the U.S. They will have been conceived, developed, tested, engineered, manufactured, and assembled in other parts of the world. So how does this fit with the vision of homegrown American know-how and innovation that has been one of the core elements of nationalist ideology for at least two centuries? Not very well. Will the result occasion any more significant public outcry, or government action, or will it be accepted as just one of the many contradictions that globalization has thrown our way? How much does it matter if no one in America knows any more how to make bicycles, let alone computers?

However you answer those questions, American Studies scholars should hardly be confounded by such developments. Historically speaking, literature in the field shows that the development of new industrial technologies has aroused more skepticism, anger and opposition among users than it has generated gratification among owners. The use of such technologies to deskill artisans, to speed up work tempos, and to enforce new divisions of labor designed to disempower operators is well understood and well-documented.[4] Overall, the argument that new

[4] Braverman, *Labor and Monopoly Capital*.

technologies promote efficiency in the workplace has generated much less evidence than the counter-claim that they are introduced to tighten control and surveillance over a workforce. This applies even in the age of Information Technology, where, among economists, the theory called the "productivity paradox" is still intact. No economist has yet come forward with statistical evidence that the introduction of IT into workplaces has boosted productivity appreciably (there are many in the economics profession who would be all too happy to deliver such evidence to the business leaders whose aspirations and belief-systems they do so much to embellish).

Adding to the longstanding anxieties about deskilling and surveillance have been even more sharply pronounced anxieties about technological disemployment—the fear that machines will displace our livelihoods entirely. A mainstay of the 1930s and 1960s, this fear was slightly revived in the 1990s during the dot.com boom. One of the buzzwords of that era was disintermediation. This term implied that digitization would cut out all the middle men who were necessary to distribute product in the brick-and-mortar world but who would be rendered redundant in the world of online business. Though it was overhyped, like everything else in the heady New Economy climate of that era, its consequences have nonetheless been felt in all areas of commerce as the practice of doing business online has spread. Ironically, one of the deepest impacts has been in the technology industries themselves, among employees who pioneered the new media technologies of that period.

One of the companies where I did ethnography for my book *No-Collar* had a rather famous slogan: "Everything that can be digital will be digital." The dotcommers who lived by that slogan were among those whose livelihoods suffered when the slogan morphed, over the next few years, into "Everything that can be outsourced will be outsourced." They had pioneered the technologies that made it technically possible to send their jobs offshore—web-based work-flow platforms that can break down jobs into discrete operations, allocate the work to different parts of the globe, and recombine the disparate portions into a meaningful whole that is serviceable to a project manager. They preached a business revolution in which they were the evangelical first movers but had little warning that the process would have such a huge impact on their own workplaces.

Even so, we do not hear much about technological disemployment these days. All of the relevant anxiety has been displaced into fears about job loss from outsourcing, and the blame, for the most part, is placed on foreign governments, (Beijing, for example) rather than on corporate CEOs who order the overseas transfers of jobs and technologies. Among

these CEOs, there is a clear divide between larger companies that have been able to move offshore, and those who cannot, for reasons of their economy of scale, limited capital base, or the nature of the goods or services they provide. These smaller, domestically-focused producers have been losing business and profits to the China trade, primarily because they cannot compete with the so-called "China price" of imports. The National Association of Manufacturers was split down the middle on this issue for several years, with the small producers favoring self-interested alliances with the labor movement on China-bashing calls for protectionist measures, and the larger multinationals, who generally call the shots, favoring the free trade status quo. While this alliance generated a good deal of sound and fury on Capitol Hill, government agencies have followed the bidding of the multinationals, and are subject to the influence of the powerful China trade lobby that is controlled by the global firms.

In the US these days, we hear a lot of skepticism about the influence of the pro-Israel lobby, and deservedly so—cracks have begun to appear in the establishment consensus about unwavering support for Israeli policies.[5] The best evidence for this is that alternative views are now being so hysterically shouted down, even in the academy, where academic freedom has been trampled on, and appointments in Middle Eastern Studies roughly manhandled by the influence of pro-Israeli neo-conservatives. By contrast, not very much is heard about the China lobby. It is a different beast entirely, but arguably has a larger sphere of influence in trade policy than the Israel lobby does in foreign policy. The former exists for the purpose of increasing the scale and scope of US multinational operations in the PRC, and it is directed at home by the US-China Business Council, and by the American Chambers of Commerce in Shanghai and Beijing. The lobby's chief tool of political leverage is that the American business community in China is in a position to promote the liberalization of Chinese society and also to offer intelligence to diplomats to which they do not have access. On almost every aspect of trade and foreign policy in East Asia, the China lobby gets what it wants.[6]

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[5] Mearsheimer and Walt, *Israel Lobby*.

[6] I watched this process in the course of researching my last book *Fast Boat to China: Corporate Flight and the Consequences of Free Trade; Lessons from Shanghai*. One of my primary research sites in Shanghai was the American Chamber of Commerce, where I spent a lot of time interviewing, schmoozing, and attending meetings. I was able to see how the offshore arm of the lobby rode out each wave of China-bashing to sweep over Capitol Hill, or, should I say, managed to turn it to advantage, because China-bashing is one of the most reliable ethnic instincts of white America.

What, then, is the role of technology in all this? Rather crucial. China is leaping up the technology curve much faster than Japan, Korea, or Taiwan did during their era of industrialization by invitation. Besides, China was not invited to industrialize by the advanced powers. It did so on its own dime and on its own terms, beginning in the Maoist era, when, contrary to the dominant iconography of Mao as a committed pastoralist, his focus on technology-driven industrialization produced many homegrown successes (some of them, especially in the area of high-tech, are not well-known at all). In the 1950s, the new communist state established a science and technology R&D network, modeled after the Soviet system, and its electronics arm went on to produce several generations of computers, in many cases with little or no gap behind the capitalist powers. China's first computer was developed in 1958, only one year after Japan's, and its first integrated circuit was produced in 1964, only five years behind the first U.S. patent. A microcomputer was developed by 1977 (even before IBM unveiled its PC), a microprocessor by 1980, and a supercomputer, along with an IBM-compatible PC, by 1983.[7] As in the U.S. and European cases, advanced technology was developed initially with the military end-user in mind, and a large cadre of sophisticated engineers staffed the thousands of research institutes and labs (many of them in the west of China, outside of the spotlight) which fed initiatives like the atomic and hydrogen bomb projects, along with a succession of satellite technologies. After the Soviet pullout in 1960, the goal of self-reliance in technological achievement became a matter of vast national pride.[8]

In the U.S., federal funding accounted for between 40 and 45% of high-tech R&D from 1958 through the early 1970s. By the late 1970s, the private sector's pace of development and funding commitment for commercial R&D had outstripped that of the defense systems.[9] By contrast with the US, China had virtually zero civilian or commercial demand, and so the government's research elites, often isolated from one another in their labs, had no incentive to pass on the innovations to would-be industrial exploiters. Efforts to stimulate civilian industry fell far short of expectations, especially since successful manufacturing in sectors like integrated circuits is so dependent on international expertise. So eventually, China's policy-makers looked to foreign talent and investment—mostly the Taiwanese—to establish a fully competitive industry in high technology.[10] Even so, they have done it on their own

[7] Lu, *China's Leap*, 6–9.
[8] Simon and Rehn, *Technological Innovation in China*, 1–19.
[9] Flamm, *Mismanaged Trade*, 36–37.
[10] Hsing, *Making Capitalism in China*.

terms. The result today is a burgeoning semiconductor sector that is not very far behind the industry leaders, and the growth of a cheap skilled labor pool that makes the PRC all the more attractive to multinationals.

China is unique in this regard because no modern industrializing country has been able to compete for top-end jobs at the same time as it effortlessly absorbs jobs much lower down in the production chain. To command this spread—from the lowest assembly platform work to the upper reaches of industry and services—is to be in a position to set the global norm for employee standards as no country has before. Given the chronic disregard for job security and workplace rights in China's foreign-invested private sector, such a norm is a clear threat to the stability of livelihoods everywhere. I refuse to accept that this is a threat hatched in Beijing. If China did not provide the most currently profitable mix of authoritarian governance, cheap, abundant labor, and investor-friendly policies, it would be sought out elsewhere. Though such conditions would not exist without government cooperation, the primary instigators and beneficiaries are global corporations. They stand to profit most from the normalization of an environment where jobs, capital, and technology can be transferred at a moment's notice and with complete impunity. If corporations cannot be held to consistent standards, responsibilities, or respect—and the working reality of offshore free trade does not demand any of these—then ordinary people in every corner of the globe will be at a loss to salvage any control over their futures and that of their communities.

Technology transfer is crucial to the US-China trade, and the mutual dependence of the US and the Chinese economies makes this transfer inevitable. The only real counterweight to this process from a US perspective lies in the realm of military technology, which Washington has made available in large quantities to Taiwan over the years. The more recent penetration of US military into Central Asia has resulted in the virtual encirclement of China, and Washington's cozying up to India has not helped to allay Beijing's fear of being encircled. When Secretary of State Condoleezza Rice declared, in a visit to Delhi in March 2005, that "the US policy was to help India become a major world power in the 21st century," the momentous implication was that one of the two emerging Asian mega-economies would be used to counterbalance the influence of the other. No major power in history has ever declared their intention to create another superpower. The subsequent India-US nuclear co-operation agreement sent a clear signal about how far Washington was prepared to go down the path of technology transfers to India in an effort to contain China and retain its ability to control the balance of power in the region.

The other weapon that Washington holds in its arsenal is not so much a technology per se as the legal regime which governs the licensed use of technology. I am referring to intellectual property, which is the number one tool available to US trade negotiators when they sally forth to promote the interests of US multinationals. In a globalized economy, there is little chance of stopping technology transfer, but a legal regime that regulates its licensed use, and which thereby guarantees a durable revenue stream, is the next best thing. This is why the drive to harmonize IP laws of all WTO members is so important to Washington. But does it correspond, in any way, to protecting the national interest? The case is even more dubious than with the technologies themselves. These days, many American universities hold patents and copyrights, and so one could argue that the revenue somehow benefits students. Nevertheless, this benefit has to be balanced against the social cost of commercializing the results of academic research, which are considerable, and which has generated a sharp debate in its own right. Most of the commercially valuable IP lies in the hands of large corporations, and in the US the stampede to secure more of it has seen the biggest property grab since the Treaty of Guadalupe.

The more common analogy used by campaigners against the IP monopolists is with the rapacious land enclosures of the 16th, 17th and 18th centuries in England, when land used as a commons was deeded exclusively to private owners. Resistance to the enclosure of the information commons is a rallying cry of the loose coalition of groups and organizations that have sprung up to contest the rush to propertize virtually everything under the sun.[11] (My favorite example is that Donald Trump is trying to trademark the expression "You're Fired" used on The Apprentice TV show, along with the hand gesture that accompanies it.) This coalition is packed with lawyers eager to take on monopolists in the courts, and artists unwilling to see their creative professions cede to full marketization. It includes high-skill engineers in the technology industries, whose professional labor ethos is opposed to any proprietary hold on information technologies, and who constitutionally lean toward the hacker ethic of shareware. And it includes overseas activists, many with advanced science degrees, fighting the efforts of multinationals like Syngenta, AstraZeneca, DuPont, Monsanto, Merck, and Dow to patent seeds, livestock, plant genes, and other biological raw materials that have been the basis of subsistence farming in the developing world for centuries.

[11] Lessig, *Future of Ideas*; Lessig, *Free Culture*; Litman, *Digital Copyright*; Perelman, *Steal This Idea*; Boyle, *Shamans, Software, and Spleens*; Bettig, *Copyrighting Culture*; Vaidhyanathan, *Copyrights and Copywrongs*; and von Lewinski, *Indigenous Heritage*.

What is distinctive about the disparate members of this loose coalition is the high degree of brainpower involved. They are drawn from sectors that are key to capital accumulation in the new knowledge economy, and collectively, they represent a significant, dissenting fraction of the cognitariat.

In this respect, they constitute what Marx himself referred to as "the general intellect," in an obscure "Fragment on Machines" in the *Grundrisse*, a passage which has attracted a good deal of attention from the post-*operaiste* Italian school of autonomists.[12] Marx, of course, was as ambivalent about technology as any of us, but in this passage, he predicts that capitalism's dependence on science would increase and that the generation of profit would depend less on direct labor time and more on the harnessing of mental powers and knowledge resources—"the general productive forces of the social brain."[13] Technology, in the form of fixed capital, would be the most efficient way for owners to coordinate and absorb mental labor. Yet to the degree to which the general intellect is a collective entity, production would become more and more social in nature. Ever alert to evidence of the bourgeoisie digging its own grave, Marx imagined that this latter development might lead to the dissolution of wage labor and private ownership along with capital itself.

That moment is not yet upon us, but it is plausible to conclude that the conflict over IP is, in large part, a consequence of the potential harbored within the general intellect. Efforts to administer an effective division of labor within the knowledge industries increasingly depend upon control over the IP inside employees' heads and the capacity to affect "knowledge transfers" without too much friction. Information monopolists have undertaken a massive property grab to prevent leaks in the system. But the leaks are being sprung nonetheless, and the Internet, which teems with unauthorized content, is the most porous of all public entities. Corporate managers, bent on disciplining rogue users through the use of electronic locks or other forms of Digital Rights Management (DRM) are now in a running battle with the ever-proficient hackers of the technocratic fraternity. Punitive policing of illegal downloaders among the general population runs the risk of adding to the record of case law that supports fair use and casts doubt on the legitimacy of all-out privatization. And, overseas, rent-seeking multinationals are running into significant resistance in their efforts to drive home global IPR harmonization.

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[12] Virno and Hardt, *Radical Thought in Italy*; Dyer-Witheford, *Cyber-Marx*.
[13] Marx, *Grundrisse*.

No one can doubt that these coercive efforts will continue apace. IP-driven industries—from microchips and biomedicine to multimedia entertainment—stand at the commanding heights of a rapidly globalizing economy, and their owners are bent on hammering out a property regime that will keep them there for decades to come. As always, their ability to shape and create their own opposition makes it easier to recruit their enemies. At least two generations of hackers have agonized over accepting lucrative offers of employment within corporate or government IP security. To cite another example, the Open Source movement in software is now integral to the business of multinationals, both as a source of free labor and a qualitatively superior source of technical competence.

These skirmishes are the result of intra-class conflict. The key to a more sustained challenge to knowledge capitalism lies in cross-class coalitions. For example, the march of insecurity into the upper reaches of industry and services has meant that skilled employees increasingly share the experience of contingency, if not disposability, with unskilled, low-wage or blue collar workers who felt the first brunt of corporate flight some time ago. In this development, some theoretical commentators from the Italian school see the formation of a multi-class *precariat*, linked by joint concerns and capable of developing a unity of consciousness and action on an international scale. Critics of this view dismiss as naive the assumption that highly trained aristocracy of labor will find common cause with the less skilled, simply on the basis of insecurity.

Yet we cannot afford to reject out of hand any evidence of, or potential for, these forms of identification. In my own research, for example, in IT and other technology-driven firms, I have found it common for employees to refer to their workplaces as "high-tech sweatshops," especially when they are pressured by long hours, deadline speed-ups, and divisions of labor that reduce employee autonomy. No doubt, these are throwaway comments, and are often simply expressions of the most cynical side of office humor, but they also contain real elements of self-recognition and identification with the plight of those toiling in workplaces customarily associated with sweatshop labor. "Wage slavery" once resonated as a slogan, in the 1840s, for skilled artisans facing down factory deskilling, and it also played a role in Abolitionist sentiment and action.[14] Today's anti-sweatshop movement has helped to revive public sympathy for the predicament of workers in labor-intensive jobs, but it has also provided a moral language and posture for those in value-added trades who see their

[14] Roediger, *Wages of Whiteness*.