Cyberpunk Meets Charles Babbage:  
*The Difference Engine* as Alternative Victorian History

**HERBERT SUSSMAN**

Taking responsibility for the social relations of science and technology means refusing an anti-science metaphysics, a demonology of technology, and so means embracing the skilful task of reconstructing the boundaries of daily life, in partial connection with others, in communication with all of our parts. It is not just that science and technology are possible means of great human satisfaction, as well as a matrix of complex dominations. Cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves.  
—Donna Haraway, "A Cyborg Manifesto" (181)

In *The Difference Engine* (1991), William Gibson and Bruce Sterling, two leading writers of cyberpunk, leave the imagined near future, the Boston-Atlanta “Sprawl” and “consensual hallucination” of cyberspace in Gibson’s *Neuromancer* as well as the global communications “net” of Sterling’s *Islands in the Net*, to create an imagined near past in the sooty streets of London where Victorian “savants” debate evolutionary theory and where Charles Babbage’s Analytical Engines, with their thousands of clockwork gears and yards of punched paper, have become the dominant technology of the time.

Whatever our meta-narrative of Victorian life and culture, contemporary reconstruction of the nineteenth century is bound by certain limitations external to language. We may suspend our disbelief so as to imagine a passionate relationship between Robert Browning and Christina Rossetti, but such fictive events are set within a world in which the well-to-do ride the streets of London in horse-drawn vehicles, and Disraeli is for a time Prime Minister. A fiction in which the upper classes travel in “steam-gurnies” and Disraeli makes his living as a writer of florid prose moves into a genre of science fiction, into alternative history. Alternative history occupies a cusp between contemporary notions of the constructed nature of history and the demands of historicity. The narrative of the past is altered, but in distinction to fantasy or Wells’s later alien invasion or time-travel plots, events within alternative
history remain in the realm of the historically possible, although, as in *The Difference Engine*, potential, unrealized. *The Difference Engine* contains historical figures—Babbage, Lord Byron, Byron’s daughter Ada—as well as existent technologies such as the Jacquard loom, the pianola. What is fictive are the paths that these lives, these technologies, as well as political events, social changes, and cultural discourses have taken. This form of fictive history is well described by Jorge Luis Borges in “The Garden of Forking Paths”: “In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others. . . . He creates in this way diverse futures, diverse times which themselves also proliferate and fork” (26). At its best, in, for example, Philip Dick’s *The Man in the High Castle*, set in the United States after Germany and Japan have won World War II, alternative history creates “a growing, dizzying net of divergent, convergent and parallel times . . . [a] network of times which approached one another, forked, broke off” (Borges 28).

The primary rhetorical effect of alternative history lies in the shock of defamiliarization. As much as contemporary theory has quite properly emphasized that we employ our own political agendas to organize the past, most readers, even theoretically-informed readers I would hazard, tend to naturalize past events, assuming that since events did happen they somehow had to happen, that social change and, given the emphasis of this novel, technological change are determined. One major effect of alternative history is to dramatize that what we accept as inevitable is only contingent, only one among an infinite number of possibilities, of forking paths. As Dick suggests, had Hitler decided to bomb the radar stations of England rather than concentrate on London, World War II might have turned out quite differently. To use the evolutionary metaphors of the novel, the destruction of the complex organisms of the Cambrian Shale, an incident that so appalls the evolutionist Mallory in the book that he collapses and dies, illustrates the absence of teleology, the power of contingency in the evolution of biological organisms and, by extension, the development of the fusion of the social, the organic, and the mechanical that Manuel De Landa calls the “machinic phylum.”

In *The Difference Engine* the forking paths are “dizzying,” as Borges’s term suggests, but the central movement lies in the imagining of a nineteenth-century Britain where the information technology inherent in Babbage’s Engines has been fully developed within a tech-
noculture in which engineers, intellectuals, and scientists have come to hold power. The novel’s action takes place after the “Industrial Radicals,” whose program based on the values of meritocracy and the importance of technology and science supplants the division of Tory and Whig, have gained power in the bloody revolution so feared during the age of Wellington.

It was only as a civil politician, and a reactionary Prime Minister, that Wellington had so thoroughly misjudged the revolutionary tenor of the coming age of industry and science. . . .

And the England that Wellington had known and misruled, the England of Mallory’s childhood, had slid through strikes, manifestos, and demonstrations, to riots, martial law, massacres, open class-warfare, and near-total anarchy. Only the Industrial Radical Party, with their boldly rational vision of a comprehensive new order, had saved England from the abyss. (153)

This imagined social change is represented as basically positive. The “Rad Lords” have chosen as Prime Minister the still-living Lord Byron, a Reaganesque figurehead, whose position provides his daughter Ada, the “Queen of Engines” (95), with needed protection to continue her mathematical work. The House of Lords, now based not on birth but on intellectual merit, is populated by Lord Darwin, Lord Huxley, Lord Brunel, and Lord Babbage. Employing scientific intellect and the new technologies, the “Rad Lords” have moved toward abolishing poverty within nineteenth-century England.

The revolutionary triumph of meritocracy and transfer of political power to “savants” is inextricably connected with the large-scale development of the Babbage Engine, for in keeping with contemporary theorists of technoculture, Gibson and Sterling see technological change not as an isolated phenomenon, but as occurring within the sudden emergence of a new nexus of man-machine, a new machinic phylum. Since the construction of Babbage’s Engines was well within the potential of Victorian engineering, the novel assumes this information technology could have been developed had the priorities of Victorian society been different. In 1822, Babbage drew plans for and built a small model for a machine of gears and levers, the Difference Engine, that would perform errorless mathematical calculations for tidal and astronomical tables by the process of addition “based on a mathematical principle known as the method of finite differences” (Swade 86). In spite of initial backing from the Government, which saw the advantage of errorless navigation tables, the Difference Engine remained unbuilt, in part because of Babbage’s
administrative shortcomings, but primarily because the Government lost its initial enthusiasm and finally withdrew support in 1842. One government official remarked that the first task assigned to the Difference Engine should be to calculate the date at which it would be completed.

It should be noted, however, that although the book is titled *The Difference Engine*, its central information technology evolves from another unbuilt Babbage Engine, the Analytical Engine conceived in 1834. The Analytical Engine was intended as a "general-purpose programmable computing machine" that features a "separate 'store' and 'mill'" (Swade 88), the memory and processor of a modern computer. In Babbage's designs for the Difference Engine, pâpier-maché strips are used only to print the output; in the Analytical Engine punched cards are employed to program the machine. Quite directly Babbage drew upon an earlier nineteenth-century information technology, the Jacquard loom. In the Jacquard loom, introduced in 1805 and used throughout the textile mills of early-Victorian Britain, the pattern of the weaving was, to use our vocabulary, programmed into punched paper cards that guided the loom to weave a specific design. The Jacquard process was woven into the fabric of Victorian life as it is woven into the history of mechanical intelligence. This Jacquard technique marks a crucial historical moment in which the operation of a machine was transferred from the human operator to another machine, a critical moment in the erosion of the boundary between the human and the machinic. In De Landa's words, "Jacquard's idea of coding the direction of the weaving process into a series of holes punched in cards ... transferred control (and structure) from the human body to the machine in the form of a primitive program stored as punched holes in paper cards, the earliest form of software" (159).

To Gibson and Sterling, as to contemporary historians of nineteenth-century technology, what is seen as pivotal in the Victorian period is the emergence of the central process of the cyborg revolution, "the translation of the world into a problem of coding" (Haraway 164). To the authors, the Jacquard loom and the plans for the Difference Engine, the origins of our own information society, much like the arcades of Paris to Walter Benjamin (see Buck-Morss 58–77), are the crucial fossils in the paleontology of modernity or, in this case, of postmodernity. In its blend of the historical and the possible, of the Jacquard process and the imagined building of Babbage Engines, and in its thickly described Victorian context of existent if primitive intelligent machines, *The Dif-
ference Engine asks us to redefine the Victorian period as the age of emergent information technology, as the historical site of the dissolution of the boundary between the human and the machinic in the intelligent machine.

Centering this imagined Victorian world on information technology and inventing a nineteenth-century Britain run by the oiled gears and paper punch cards of steam-powered Analytical Engines, enable The Difference Engine, like cyberpunk fictions of the future, self-consciously to engage competing narratives of technology. By radically rewriting Disraeli's Sybil, Gibson and Sterling reject the Victorian story of industrialism that locates value in the hierarchical agrarian society and that looks to the tempering of the industrial by literary culture. Furthermore, the novel also rejects the Foucauldian model of a seamless, invincible panoptical power as necessarily imbricated with information technology. Instead, this liberatory narrative imagines the possibility of social intervention and the creation of areas of autonomy through the development of new technological forms. In its utopian aspect, the The Difference Engine imagines the sudden dissolution of a centralized information system as resulting in the emergence of a reconfigured subjectivity and a valorized cyborg art.

In imagining a Victorian age that did not, but very well might have existed, in presenting an alternative cultural evolution in which “a demonology of technology” (Haraway 181) does not come to dominate discourse, The Difference Engine deconstructs as merely contingent, merely vestigial, the Victorian cultural dualisms—culture/industry, human/mechanical, art/technology—that have made the period such an attractive subject for nostalgic recreation and that still govern our reconstructions of the age. Furthermore, the vividly realized alternative Victorian past of The Difference Engine where cyberpunk meets Charles Babbage becomes, in Ursula K. Le Guin's term, a rich “metaphor” for the potential dangers and delights of our own cyborg present.

I

The narrative of technology that has come to dominate academic Victorian studies emphasizes what Michel Foucault calls “biopolitics” or the control of the body in the factory, in the army, as well as in other social institutions and in private life. This narrative is well described by Andrew Ross:

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One of the stories told by the critical left about new cultural technologies is that of monolithic, panoptical social control, effortlessly achieved through a smooth, endlessly interlocking system of networks of surveillance. In this narrative, information technology is seen as the most despotic mode of domination yet, generating not just a revolution in capitalist production but also a revolution in living... that touches all cultural and social spheres in the home and in the workplace. (126)

It should be noted that this anti-technological story was developed by the Victorians themselves, specifically in the formation of “culture” as a realm of individual freedom defined as the opposite of the industrial, so that Foucauldian histories reproduce the ideology of the period they seem to demystify. It is noteworthy, too, that as much as this panoptical model of universal policing informs academic Victorian studies, it seems to have little appeal to contemporary readers of popular fictional recreations of the time. The police and their wives in such Victorian pastiche detective fiction as that of Anne Perry are fallible individuals within a bumbling organization, rather than agents of a totalizing disciplinary system.

*The Difference Engine* vividly presents this deterministic historical narrative of information technology as the necessary instrument of panoptical discipline and surveillance in order to challenge this paradigm. This alternative Victorian world appears, in part, as a 1984 run by steam. All citizens carry a “citizen-card” with an “Engine-stippled” portrait. All buying and selling utilizes these proto-credit cards and all transactions are registered by the gears of the central Government Engine. The *sanctum sanctorum* of the new age of control through information is the “Central Statistics Bureau,” a fortress reminiscent of the virtual reality of “ice” that hides information secrets within the cyberspace of *Neuromancer*. With enormous virtuosity, the book fuses existent Victorian style and technology with the historically possible:

The Central Statistics Bureau, vaguely pyramidal in form and excessively Egyptianate in its ornamental detail, squatted solidly in the governmental heart of Westminster. . . . Its walls, pierced by towering smokestacks, supported a scattered forest of spinning ventilators, their vanes annoyingly hawk-winged. The whole vast pile was riddled top to bottom with thick black telegraph-lines, as though individual streams of the Empire’s information had bored through solid stone. A dense growth of wiring swooped down, from conduits and brackets, to telegraph-poles crowded thick as the rigging in a busy harbor. . . .

The Bureau’s fortress-doors framed by lotus-topped columns and Briticized bronze sphinxes, loomed some twenty feet in height. . . . Mallory, scowling, strode into...
cool dimness and the faint but pervasive odors of lye and linseed oil. The simmering
London stew was behind him now, but the damned place had no windows.

He showed his citizen-card at the visitor’s desk. The clerk—or perhaps he was
some sort of policeman, for he wore a new-fangled Bureau uniform with an oddly
military look... took an Engine-printed floor-plan of the building from beneath
his counter, and marked out Mallory’s twisting route in red ink. (127-28)

This account of the Central Statistics Bureau vividly suggests the histor-
ical application of new information technology as instrument of surveil-
lance in the nineteenth century. The long records of personal data the
Engines print out, the “Engine-stippled” portraits, are only a slight
technological shift from the filing systems that made possible police
dossiers and the photographic portraits that categorized and controlled
the population. Furthermore, the deft appropriation of the Victorian
architectural treatment of industrial buildings suggests the ways that
Victorian culture, like our own, mystified the deployment of up-to-date
technologies within a system of domination. Disguised in an historicist
style—the Egyptian facade here alludes to those of Victorian railway
stations—the building denies its very modern function. The windowless
work-space, the darkness lit only by torches, evokes the common Victor-
ian equation of the factory with Hell, a dark underground of the
workers, here of “clackers,” that in the novel’s continuing homage to
Wells also resonates with the devolution of workers into Morlocks. The
“military look” also evokes the disciplinary narrative, the imbrication
of information systems with the militarization of society. The evolution
of the modern computer in the twentieth century was hastened by the
demands of the military for accurate firing information for artillery.

But Gibson and Sterling’s strategy in their alternative history
of technology is to contest this deterministic disciplinary narrative of
technoculture in several ways—by subverting one narrative, the anti-
technological Victorian story of industry, and by substituting another,
a liberationist, even utopian, story of technological revolution. These
narrative and techno-political transformations are achieved through the
radical rewriting of *Sybil*.

By recasting the plot of this exemplary Victorian industrial
novel, Gibson and Sterling deconstruct the dualisms of the Victorian
narrative of technology that still govern our representation of the pe-
riod. Egremont is now an MP who secretly foments insurrection by the
“Luddites,” the novel’s pejorative term for the party that still opposes
technological change. Spurned by Egremont, Sybil is now a prostitute,
who numbers among her regular clients the Reverend Charles Kingsley. Crucially, within this anti-\textit{Sybil} the marriage of Sybil and Egremont does not take place. For the Victorians such marriage represents the dream of mediating the oppositions of industry/culture and industry/pastoral by bringing the factory under the control of a beneficent landed aristocracy, redeeming the machine by absorbing it into pre-industrial pastoralism and a hierarchical social order, a dream grounded in the same nostalgic "love of a lord" that makes so many presentations of the nineteenth century on "Masterpiece Theater" attractive to Americans. In erasing such closure through marriage, \textit{The Difference Engine} suggests not only the impossibility of such mediation, but the error of such oppositional categories in thinking about the machine.

The ideological force of refashioning Victorian narratives of technoculture appears if we contrast this strategy of revision to that of applying the plot of the Victorian industrial novel basically unchanged to the present moment. In \textit{Nice Work}, David Lodge shifts the story of Gaskell's \textit{North and South} to contemporary England by imagining a romance in present-day Manchester between a female academic whose special area is the industrial novel and the "master" of a small industrial firm. Without in any way derogating Lodge's quite delightful book, I would only note that in transferring the form of the Victorian industrial novel to contemporary Britain, Lodge is also carrying into the present the dualistic positions of the past, primarily the binary of literary humanism and industry. Closure in marriage in Lodge's novel, as in the marriage of Thornton and Margaret Hale, signifies that the intellectual class and the managerial class—literary culture and industrialism—may each temper the other to form an organic society. Perhaps it is the continuing power of this dream that accounts for the pleasure of Lodge's novel.

But the strategy of Gibson and Sterling is radically different, as different as the language of cyberpunk is from the nineteenth-century realism appropriated by Lodge. The radical divergence of the technopolitics of \textit{The Difference Engine} from that of the Victorian industrial novel lies not only in the rejection of the industry/culture, industry/pastoral dualisms, but in the repudiation of the model of class conflict that structures the Victorian narrative of technology. By implication, the novel also rejects a Marxist analysis of contemporary technoculture.\textsuperscript{10} This effort to move the issue of information technology beyond the issue of class is inscribed in the novel's appropriation and
political transformation of that crucial event of the Victorian industrial novel, the uprising and the quelling of the “mob.” In *North and South* the erupting passion of the working-class mob proves the inability of the workers to govern themselves and thus justifies bourgeois control. In *Sybil* the mob threatens the rule of the newly regenerated aristocracy of birth that alone can lead what Disraeli calls “the People” (237). In *The Difference Engine* the populace of the East End becomes an uncontrollable mob whose rage is directed at the government of “savants” and “clackers.” In its anarchy and lawlessness, its animalistic qualities, the mob scene appropriates the rising of the “Hell-cats” from Wodgate under the drunken leadership of Bishop Hatton in *Sybil*. This mass eruption of passion leading to temporary social chaos is headed by a mysterious figure, Captain Swing, self-named after the mythological leader of rural uprisings in the early nineteenth century, but who is unmasked as a member of the now deposed aristocracy of birth, another dig at the Victorian faith in the control of technology by the pre-industrial hierarchy.

But the conflict between the mob and the established social order is not, as in *North and South* and *Sybil*, employed to display the danger of inverting class hierarchy, but rather the peril of opposing technological change. For Gibson and Sterling, the crucial social conflict, in the nineteenth century as now, is not between workers and aristocracy, nor between workers and capitalists, but between the “Luddites” and the technologists. It is the “Luddite” consciousness seeking to reform society by restraining technological evolution, rather than the class consciousness of an anarchic working class that is here marked as socially insane: “BROTHERS, SISTERS! Kneel no more before the vampire capitalist and the idiot savantry. Let the slaves of crowned brigands grovel at the feet of Newton. WE shall destroy the Moloch Steam and shatter his rocking iron!” (273). The “Luddite” underclass is given no ideological position beyond the overthrow of the establishment, but the establishment is valorized as the meritocracy of Lord Babbage, Lord Brunel, Lord Darwin.

As in *Sybil* and *North and South*, this civil disturbance as mob anarchy is put down by the military. In Victorian industrial novels, the militia or the regular army merely appear, like the U. S. Cavalry, to save the beleaguered bourgeois mill-owners and aristocrats, but this military power, the dirty little secret of Victorian bourgeois hegemony, is not celebrated. The industrial novels do not enter the consciousness of the
soldiers, do not represent their pleasure in riding down the Chartists. By contrast, *The Difference Engine* dwells at length on the macho derring-do of Mallory and his band of male-bonded heroes, in using the new military technologies to vanquish the "Luddites." Riding in their "line-streamed steam-gurnies" and using the new repeating weaponry tested in the successful British military operation in the Crimea, these soldier-males valiantly overcome the leaders of the rebellion. The army, with artillery now made devastatingly accurate by the use of Analytical Engines, carries out the final destruction. There is throughout this novel a delight in the application of intelligent machines to war:

"They love the Artillery, your military Rads . . . Special military savantry! Dreamy little fellers with specs on their noses, and figures in their heads. Never seen a sword drawn, or a bayonet. Don't need to see such things to win a modern war. 'Tis all trajectories and fuse-timings . . . You should have seen Odessa burning, Ned. Like a flaming hurricane it was! A giant hurricane. . . ."

"Yes—I read about that," Mallory nodded. "There was a 'storm fire' in the siege of Philadelphia. Very similar business, very remarkable principle." (268-69)

Here it must also be acknowledged that despite its attempt to dismiss the Victorian model of class conflict by discarding the marriage plot, *The Difference Engine* does not move beyond the Victorian practice of resolving social discord through the masculine plot, a narrative central to the formation of the science fiction tradition in the Victorian period.

Threatened by the seeming erosion of bourgeois and aristocratic class hegemony, the increasing power of women, and the decline of England itself, men found in the late-nineteenth century a source of stable value in an aggressive masculinity authenticated by homosocial bonds. In *The Difference Engine*, as in the paranoid imperialist fantasy of Bram Stoker, the imperialist romances of Rider Haggard, and the scientific romances of Wells, an orgasmic pleasure in violence affirms masculine bonds as the only refuge in an anarchic world. Furthermore, this cyberpunk alternative history continues a nineteenth-century formation of masculinity in which fusion with the machine provides a hard external shell or carapace to protect against both the repellent softness of the male interior, exemplified in the image of the pulpy bodies of Wells's Martians within their metal fighting machines, and against the threat of a feminized softness without, typified in the effeminate bodies of the Eloi. In *Neuromancer* the prototypical cyberpunk hero is named Case. In *The Difference Engine* the heroic soldier males
become armored bodies, Victorian Robo-Cops, fighting the “Luddites” from within their “line-streamed steam-gurnies.”

But if *The Difference Engine* fails to move beyond the Victorian pre-occupation with a hard masculinity generated by fusion with the hard machine, this masculine plot remains subordinated to the novel’s primary turn from the Victorian narrative of technology. In a nineteenth century where “nature,” the “pastoral,” the “human” have ceased to exist as the organic and the machinic have been fused into the cyborg, techno-politics shifts from questions about the role of the agrarian and humanistic—and even from the issues of which class is worthy to control the machine—to the question of whether information technology will be employed for totalizing disciplinary control or for satisfaction and enhancement. And in keeping with the utopian strain of cyberpunk evident in Sterling’s ecological or “green” visions of advanced technology and in contrast to the more dystopian edge in Gibson’s imagining of the near future, *The Difference Engine* suggests that a panoptical system of information technology can be wholly transformed, not through “Luddism” or “culture,” not by class warfare or heroic personal action, but only through the transformation of information technology itself. As much as the novel dramatizes the disciplinary potential of information technology, it also suggests that only subversive use of the cyborg itself can destabilize disciplinary control by the state and bring about positive alteration within the machinic phylum.

In *Neuromancer*, the world is controlled by transnational corporations whose primary resource is information. These are opposed not by “Luddites” but by computer cowboys who, using these same information technologies with a certain power and even certain joy, roam cyberspace disrupting, if not overturning, the controlling power of the corporations and creating limited areas of autonomy within their own cyborgian lives.

In this recast *Sybil*, it is the equivalent of the computer cowboys of cyberpunk—“savants” like Mallory, “clackers” like Mick, or cyborg visionaries such as Ada Byron—who become the heroes by employing the Analytical Engine itself to subvert panoptical control. Egremont, who becomes the hero of Disraeli’s novel by mediating between the workers and the pre-industrial order, has become the villain of this anti-*Sybil* since as an MP he opposes technological change and works to restore the power of the landed aristocracy. Sybil is here valued not for her class origins, her aristocratic lineage, but for her verve and courage in assisting Mallory and the subversive “clacker” Mick to preserve the “Modus,” a new form of coding for the Analytical Engine developed by
Ada Byron, the shadowy shaman of this novel. In this alternative history, the set of punch cards is crucial since it can disrupt the centralized government Engines of both Britain and France and thereby transfer power to individuals using small steam-powered Analytical Engines. This alternative nineteenth century, then, allegorizes what the authors see as the potentially liberatory replacement in our own time of a centralized authoritarian information technology, the punch card processing with its inherent centralization of access to information (De Landa 219) that is figured here in the fictive Central Statistics Bureau, by the personal computer, a machine that within this utopian plot offers potentially unlimited access to information and information transfer in what Ross calls a “decentralized technology” (116). This alternative Victorian novel, then, does not turn on the discovery of “high” birth or closure in marriage, but on the possession of a computer program, for only an alternative information technology can revolutionize the disciplinary social order, that transform the machinic phylum.

II

In this model of revolution through the transformation of information technology itself, rather than through a dualistic tempering of industry by literary culture and a melioration of class conflict, this alternative industrial novel highlights the Victorian refusal, still present in our time, to acknowledge that the emergence of new technologies and new social forms creates wholly unprecedented configurations of machinic phyla.

Characteristically, Gibson and Sterling represent the Victorian so as to foreground that such systemic ecological thought was present in the nineteenth century, particularly in evolutionary theory, but that such a model was not applied to human/machine systems. Certainly technological change does enter the early-Victorian industrial novels and later novels of historical development such as Middlemarch, but, to speak rather generally, Victorian fiction is informed by a division of spheres that sees human life as occupying a realm wholly different from that of the machine. Even Middlemarch, which is controlled by systemic evolutionary thinking, presents the change created by the railway as a background against which is foregrounded multiple marriage plots. In Sybil, the new industrial system presents a form of social instability, but again as a field against which is played out a sexual plot. The union of
Sybil and Egremont, so crucially excluded from The Difference Engine, registers the supreme value of domestic satisfaction situated in a pastoral stately home far removed from the factory town.

As alternative Victorian novel, The Difference Engine deconstructs these dualisms of personal/public, domestic/industrial as well as the discourse of sexuality such dualisms generate. Gibson and Sterling self-consciously rewrite the Victorian novel and thus nineteenth-century ideas of technoculture by foregrounding not the individual insulated from technological power within the erotically charged sanctum of the domestic, but rather the individual as operating within the human/machine system or, in cyberpunk terms, the "net." Here, the "Engine" or motor of the plot is not sexual desire, but intellectual passion. Erotic relationships are set in the background. The foregrounded action is delight in systemic thinking engaged in the fusion of the organic and the machinic. The center of the plotting is not the courtship of Mick, the outlaw "clacker," and Sybil, but rather the development, the possession, and the application of the Modus, the object of desire for all the characters. The important point, here, is that value is located not in those matters central to the Victorian novel—material wealth, class position, the restorative power of the pastoral, sexual satisfaction either within or outside marriage—but rather in the delights of and the revolutionary potential of the intellect engaging the machine, a realm of nineteenth-century experience generally excluded from Victorian fiction. I might note in passing that the subordination, even erasure of erotic relationships in much science fiction has made it appear less "human" to the critical tradition and thus outside the "mainstream," another legacy of Victorian literary humanism challenged by this rewriting of the Victorian in the genre of science fiction, a genre that paradoxically develops in the nineteenth century.

Furthermore, this recasting of the Victorian industrial novel also asks the reader to recognize that we are still inhibited by the Victorian discourse that develops a technological gradualism to defend against acknowledging abrupt reorganizations of the connection of human beings and the machine. Grounded in a postmodern reading of technoculture and informed by chaos theory, The Difference Engine replaces the Victorian sense that technological change can be absorbed over time into existing social and cultural structures with a model of rapid organization and equally rapid dissolution of technological/social systems. Quite skillfully, Gibson and Sterling set this opposition between Victorian and postmodern models of technoculture as continuous with
nineteenth-century evolutionary debates about uniformitarianism and catastrophism. Indeed, the novel provides an alternative history for the Victorian novel by showing the path nineteenth-century fiction might have taken had it developed according to the model of catastrophism rather than a uniformitarianism grounded in a denial of the acute changes created by technology. Here again *Middlemarch* is exemplary. As Gillian Beer notes, “In the uniformitarian ordering of *Middlemarch* events, however seemingly catastrophic, are prepared for by the slight incipient movements, crumblings, pressures, erosions, siltages observable to an immeasurably patient eye” (181). Similarly, in *Sybil* for all the civil disruption, the outrage of the People is absorbed into the existent social system, the agrarian order restored, and the industrial returned to the periphery in an implicit denial of the systemic transformation brought by machine production.

In contrast, *The Difference Engine* employs a catastrophist plot that fuses the technological with the biological, social, and environmental. Within this vision of technoculture as a network, a potential but undeveloped perspective within the nineteenth century, Gibson and Sterling imagine the totalizing disciplinary system suddenly collapsing under internal stress, an existent machinic phylum becoming extinct in a cataclysmic moment, and, within their utopian assumptions, a fresh human/machine system emerging. Within this vision of the fusion rather than the separation of human and machinic life, the uprising of the workers becomes transformed into more than an eruption of sexualized desire that must be controlled by the hegemonic power. Here, the civil disorder is precipitated by the combination of a heat wave, coal-smoke pollution, and gas escaping from excavations for the Underground as the ecological system of London collapses in the “Big Stink” or what we more politely call an “air quality emergency.” (I might note that this same phenomenon happens to be taking place as I write this essay in New York City at my electronic “Typing Engine.”) In imbricating civil disturbance with environmental crisis created by technological expansion, the book represents, again not class warfare, but the sudden collapse of a technoculture of iron, coal, steam, and centralized surveillance in an historicized allegory for our own times. The mob is represented not in moralized terms of unregulated human energy, but as the human component in the dissolution of an integrated mechanical/organic/social network. This very contemporary vision of machinic phyla is nicely presented as explicable to the consciousness of Mallory the evolutionist, a firm believer in catastrophism:
Bennett & Harper’s produced ... great volumes of effluent from half-a-dozen stacks, which clearly the city would temporarily be better off without. ... The police had immediately shut down the stacks, fine work and a credit to the Government’s good intentions, but the manufactory’s workers were still on the premises, idle and very restive ....

Worst of all, there seemed to be dire problems with the police telegraph-service—routed, presumably, through the Westminster pyramid of the Central Statistics Bureau. There must be trouble there from the Stink, Mallory surmised. ...

“Bureaucrats!” Mallory scoffed cheerily. “They might have known this would happen, if they’d properly studied Catastrophist theory. It is a concatenation of synergistic interactions; the whole system is on the period-doubling route to Chaos!”

In this recasting of Sybil, of Victorian fiction, and of the Victorian discourse of technoculture, this catastrophe is represented as a systemic breakdown. The disciplinary system fractures, police control breaks down, the Central Analytical Engine crashes because of internal strains generated within the network itself. But this chaos is not presented as a peril, but rather as the enabling act for the emergence of a new technoculture, as the originary moment of a new human/machine system, a new machinic phylum. The “Luddite” views of his unwritten Sybil refashioned, but his prose style intact, a fictive Disreali says to Mallory,

There are tumults of the mind, when, like the great convulsions of Nature, all seems anarchy and returning chaos; yet often, in those moments of vast disturbance, as in the strife of Nature itself, some new principle of order, or some new impulse of conduct, develops itself, and controls, and regulates, and brings to an harmonious consequence, passions and elements which seem only to threaten despair and subversion. (192)

Within the evolutionary sensibilities of the Victorian characters, the collapse of the human/machine system grounded in coal-based industry and a centralized information technology is seen as analogous to the end of the dinosaurs as their ecological system, too, suddenly failed. During the “Big Stink”

the sky above the Hart was like nothing Mallory had ever seen, yet he knew it. He had seen such a sky with his mind’s-eye, a lowering dome abrim with explosive filth, awash with obliterating dust—a sky that was the very harbinger of Catastrophe.

... [T]he Land Leviathans had seen this very sky, he knew, after the earth-shaking shock of the Great Comet. ... Storms of Cataclysm lashed the

AUTUMN 1994
Cretaceous earth, vast fires raged, and cometary grit sifted through the roiling atmosphere, to blight and kill the wilting foliage, till the mighty Dinosauria, adapted to a world now shattered, fell in massed extinction, and the leaping machineries of Evolution were loosed in chaos, to re-populate the stricken Earth with strange new orders of being. (237-38)

“The leaping machineries of Evolution,” a phrase that nicely encapsulates the fusion of the organic and the machinic, make the steam-engines of the Victorian coal and iron economy and, by implication, the centralized information technology of our own age as extinct as dinosaurs, but within this utopian narrative of technology such sudden extinction of a machinic phylum is valorized as allowing the birth of “strange new orders of being,” cyborgs that in fusing the organic and the mechanical in unprecedented ways enhance human freedom and energy.

III

Like the political agenda, the cultural agenda of this alternative industrial novel is clear. High artistic discourse took a wrong turn in the Victorian period in striving to maintain the human-machine boundary through narratives such as Hard Times that shore up the binary of industry/imagination. Certainly, the current vogue for the Victorian in the face of an increasingly cyborg world continues the cultural politics of the Victorians, the defense of the industry/culture dualism, by setting technology in opposition to beauty, Eros, creativity, and art production, writing-out intellect and engineering in reconstructing the past, much as high Victorian poetry and fiction itself, except for the short, unhappy life of the industrial novel, erased direct representation of factory life and neglected the achievements of the great engineers.16 The fictive lives of Robert Browning and Christina Rossetti in A. S. Byatt’s Possession become attractive by drawing on our nostalgia for the lives of the poets before the word-processor. In Jane Campion’s The Piano both erotic life and musical expression become intensified within the primeval forest far from the mill towns of England. The French Lieutenant’s Woman, too, gains its power from evocations of a repressed Victorian sexuality and from primitive landscape. So too, the fine films of Hardy novels, Far from the Madding Crowd and Tess of the d’Urbervilles, linger upon the beauties of the pre-industrial landscape. And certainly, even though they are not literally Victorian,
the Merchant-Ivory films of E. M. Forster novels, most specifically Howards End, appeal to art-house filmgoers by continuing, like Masterpiece Theater, the myth created by the Victorians themselves of agrarian England as the authentic England, as opposed to the world of the mills and railways.

In presenting a Victorian society fascinated with the potential for human enhancement provided by steam-powered Analytical Engines, Gibson and Sterling are not merely projecting a cyberpunk mentality anachronistically into the past, but rather recuperating an attitude of pleasure in the fusion of human and machine that has been contingently excised from our literary reconstruction of the age by the continued application of an Arnoldian discourse of "culture." If most contemporary representations of the Victorian age are informed by a nostalgia for a world less mechanized than ours, as alternative history The Difference Engine presents an alternative nostalgia—a nostalgia for the heroism of Brunel and Babbage, for the delight in invention, for the joy in working at the interface of the organic and mechanical to dissolve the boundaries of the human and machine, for the positivity of the cyborg erased from the high literary tradition we inherit from the Victorians and still use to reconstruct that age.

The words given in the novel to Ada Byron celebrating the erasure of the boundary between the living and the mechanical echo the actual words of Ada Byron Lovelace in her published Notes on the Babbage Engine. In The Difference Engine, the aging and alcoholic "Queen of Engines" prophesies:

If we envision the entire System of Mathematics as a great Engine for proving theorems, then we must say, through the agency of the Modus, that such an Engine lives, and could indeed prove its own life, should it develop the capacity to look upon itself. The Lens for such a self-examination is of a nature not yet known to us; yet we know that it exists, for we ourselves possess it. (422)

In 1843, the historical Ada Byron Lovelace wrote of the Analytical Engine:

In enabling mechanism to combine together general symbols, in succession of unlimited variety and extent, a uniting link is established between the operations of matter and the abstract mental processes of the most abstract branch of mathematical science. . . . Thus not only the mental and material, but the theoretical and the practical in the mathematical world, are brought into more intimate and effective connexion with each other. We are not aware of its being on record that anything
partaking of the nature of what is so well designated the Analytical Engine has been hitherto proposed, or even thought of, as a practical possibility, any more than the idea of a thinking or of a reasoning machine. (qtd. in Hodges 297)

In recovering the Victorian period as a moment in which many greeted with delight "the idea of a thinking or of a reasoning machine," Gibson and Sterling also see an age in which the art-machine was embraced by many with equal pleasure. In doing so, The Difference Engine again blends a number of issues, asking us to foreground the cyborg technology of the nineteenth century in our art historical narratives, to recognize that an unproductive turn was taken in the nineteenth century by defining art by its opposition to the technological, to imagine a discourse beyond the art/machine dualism that still inhibits the conceptualizing of nineteenth-century art as well as the art of the present. The novel not only evokes the valorization of the cyborg written out of high literary culture, but also the existent cyborgian art-machines that are now being recognized as central to the evolution of art in the nineteenth century."

The Difference Engine presents a Victorian age where the enhancement of the creative by the mechanical energizes both high and popular art. The existent and the potential are woven into thick description of the nineteenth century as the age of the emerging art-machine. Ada Byron Lovelace wrote that the Analytical Engine "weaves algebraical patterns just as the Jacquard loom weaves flowers and leaves" (Baum 71). Mallory displays his "waistcoat, which was woven in a dizzy mosaic of tiny blue-and-white squares. Ada Checkers, the tailors called them, the Lady having created the pattern by programming a Jacquard loom to weave pure algebra" (102). Similarly, Ada Byron Lovelace wrote of the Babbage Engine:

Supposing, for instance, that the fundamental relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adoptions, an engine might compose elaborate and scientific pieces of music of any degree of complexity or extent. (Baum 72)

Sybil listens as "a scowling organ-grinder cranked, two-handed at his symphony machine, filling the street with a fast springy racket of bells, piano-wire, and steel" (12). A "kinotrope" sign reads "CONVERT YOUR MANUAL PIANO . . . INTO A KASTNER'S PIANOLA" (11).

In the Victorian world of The Difference Engine it is the "kinotrope," a device of this pre-electronic era in which differently colored wooden pieces are set behind holes in a large wooden board, that has become the dominant art form. In the art of "kinotropy" these wooden forms, some-
thing like the LEDs of an electronic sign, form shifting patterns and the illusion of motion according to a program run on the punch cards of a small steam-powered Engine. As Sam Houston of the “Republic of Texas” tells a London audience of his adventures, “little kino cannons cracked gunpowder-white around the fort, and single-bit flickers of red cannon-shell arched rapidly across the screen. . . . A tiny figure dashed toward the fort, no more than a few black squares” (38).

Within the field of “kinotropy,” the “kinotropist” most in demand is John Keats, the exemplar to the historical Victorians of what seemed the inherent opposition of the beautiful to quotidian industrial reality, who has here turned his passion from literary culture to cyborg art. In one of the more delightful episodes of the novel, Sybil meets this alternative Keats:

“I was a student once,” he said, with a shrug. His cheeks were flushed, twin hot points of red. . . . "I wasted all my time versifying. . . . ”

“But you haven’t told me your profession, Mr. Keats,” she said.

“Kinotropy,” Keats said. “The techniques employed here tonight are of some special interest! While the screen’s resolution is quite modest, and the refresh-rate positively slow, remarkable effects have been secured, one presumes through algorithmic compression—but I fear that is all a bit technical.” (46-47)

This is a Victorian age obsessed with cyborg art. One young “clacker” says to Mallory:

“It’s art that I live for. Kinotropy! . . . ”

“Fascinating,” Mallory said. . . . “I hear that John Keats is quite good.”

“He’s old,” the boy said, with a ruthless shrug. “You should see Sandys. Or Hughes. Or Etty!” (142)

Of course, the “kinotrope” did not exist, but it is homologous (to use the evolutionary vocabulary of the nineteenth century adopted by the novel) with such actual Victorian devices as the phenakistiscope, zootope, and diorama (see Crary 97–136) that provided the sense of motion to the viewer, albeit without computer programs. And the turn of artists to the “kinotrope” provides a clear analogue to the channeling of creative energy into motion pictures in America and Europe in the earlier twentieth century, and of a similar turn to video, computer graphics, and the creation of virtual realities in our own time. By imagining without irony or any implication of degradation the creativity of Keats, of Victorian visual artists, and of the age manifested through a cyborg art, the novel
quite deftly deconstructs the Victorian binary of art/machine. The Difference Engine, then, situates the development of nineteenth-century art-technology in an evolutionary line that emerges as cinema in the modern period, and as virtual reality, the speculative subject of cyberpunk fiction, in postmodern times.

Finally, the utopian closure of this radical rewriting of the Victorian humanist narrative of technology looks beyond the art/machine dualism formulated, if not practiced, in the nineteenth century to a fusion of the organic and the machinic not only in an enhanced cyborgian creativity, but also in a reconfigured subjectivity. The description of Sybil Gerard in old age nicely indicates the continuity between the Victorian invention of intelligent machines and our contemporary sense of the body as programmed by DNA, while also suggesting an unprecedented form of beauty in the body perceived beyond the human/machine binary as a "vital machine." Sybil "rests her arthritic hands upon fabric woven by a Jacquard loom. These hands consist of tendons, tissue, jointed bone. Through quiet processes of time and information, threads within the human cells have woven themselves into a woman" (1).

At the close of her life this alternative Sybil exemplifies the new sensibility in which the distinction between the constructed and the natural, between aircraft and swooping birds dissolves. To this new consciousness, "metal, . . . having taught itself to fly" (2) becomes a source of beauty and delight:

In this historically displaced expression of the contemporary technopolitics powerfully expressed in Haraway’s “Cyborg Manifesto” that provides the epigraph for this essay, Gibson and Sterling represent the Victorian age as the analogue of our own time, as a moment of choice between a panoptical disciplinary use of the intelligent machine and the enhancement of intelligence and creativity through the fusion of the machine and the human. For them, such choice in our own time remains obscured by the vestigial dualisms of literary humanism passed
down from the Victorians, dualisms that find powerful contemporary reinforcement in our recreations of the Victorian age.

Northeastern University

NOTES


2 I have set the coined vocabulary of The Difference Engine in quotation marks.

3 Since in this alternative history Ada Byron does not marry, I use “Ada Byron” to refer to the figure in the novel, and “Ada Byron Lovelace” to refer to the historical person.

4 The contingent nature of evolution is wonderfully explained through these fossils in Gould.

5 I have in mind here the views of De Landa, Haraway, and Ross, critics whose thinking has influenced this essay.

6 In an activity reminiscent of cloning dinosaurs from fossil DNA, in 1991 the Science Museum in London completed its project of building a Babbage Difference Engine from Babbage’s original designs without violating the limits of nineteenth-century engineering. The curator in charge of the project concluded, “The success of our undertaking affirmed that Babbage’s failures [to build an Engine] were ones of practical accomplishment, not of design” (Swade 86).

7 My discussion of the Difference Engine and the Analytical Engine is indebted to Swade’s fascinating account of the contemporary building of the Difference Engine.

8 See the writings of Foucault, especially Discipline and Punish; Seltzer; and Miller.

9 The definitive account of the definition of “culture” by its difference from “industry” is that of Raymond Williams in Culture and Society.

10 See Jonathan Crary’s perceptive warning in “Critical Reflections” about the fallacy of forgetting national and global economic inequalities in our own giddy desire for an information highway to be travelled only by an economic elite.

11 I discuss the early Victorian masculine plot of homosocial bonding and the definition of masculinity as a soft interior protected by a carapace in my Victorian Masculinities: Manhood and Masculine Poetics in Early Victorian Literature and Art.

12 My analysis of this particular form of masculinity follows the work of Theweleit on male fantasies of German “soldier males” between the World Wars (See especially, I: 229–300, 429–35). See also the fine analysis of the turn to hypermasculinity for similar reasons during the Reagan era in Jeffords.

13 For the relation between the male body and the machine in the nineteenth century see Seltzer. The relation between cyberpunk and an aggressive masculinity is perceptively discussed by Scott Bukatman in “The Armored Body (and the Armored Arnold)” (301–11) and by Peter Fitting.

AUTUMN 1994
An exception is the writing of Samuel Butler on the machine/human relation, of which the best-known example is "The Book of the Machines" in Erewhon.

Intellectual passion does occasionally enter the Victorian novel, but is often overcome by sexual passion, notably in the case of Lydgate, or represented as dessicated in the absence of such erotic desire, as in Casaubon.

See the fine discussion in Gallagher of the displacement of value from the technological to personal life or Arnoldian "culture" as a reason for the demise of the Victorian industrial novel.

This revaluation of the history of art in terms of new technologies fusing the machine and the human is compellingly set forth in Bukatman, and Crary, Techniques of the Observer where he argues that such new optical devices as the stereoscope were crucial to the reshaping of vision in the period.

The term comes from The Vital Machine: A Study of Technology and Organic Life by David F. Channell, who deconstructs the organic/machinic binary (113–36).

WORKS CITED