The Girl with No Eyes

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William Gibson may regret coining the term cyberspace in his 1984 novel *Neuromancer*. He received acclaim with the world of the Sprawl, which he created in the short story "Johnny Mnemonic." But it was one well-tuned phrase,

"jacked into a custom cyber-space deck that projected his disembodied consciousness into the consensual hallucination that was the matrix,"

that helped win him the science-fiction triple crown: the Hugo, the Nebula, and the Philip K. Dick awards. Now he can't get away from cyberspace, like an actor typecast by a too-successful performance in a role he may no longer love.

In this installment of Biblio Tech, we return to cyberpunk, which was very hot in the 1980s and retained considerable power throughout the 1990s. In the first decade of the 21st century, cyberpunk conjures much less, so this is an excellent time to give it a thoughtful look. Specifically, we'll explore a particular theme of Gibson's—namely, what distinguishes the human from the machine.

Human + machine = ?

In computer science, the fascination with using technology for augmentation, particularly of the human intellect, is one of the oldest drivers in the field. Doug Engelbart introduced the term in the 1960s, but he credits Vannevar Bush's seminal paper "As We May Think," which *The Atlantic Monthly* published in 1945, for the in-spiration. Englebart's vision has proved incredibly influential, producing the mouse, the graphical user interface, hyperlinks, and online collaboration, among other things. Bush's technological foresight may have been flawed in the details—our modern information systems still aren't based on microfilm, for example—but in the broadest sense, he got much of it right. He properly identified that information storage and retrieval would be one of the most important challenges facing those we now call knowledge workers.

Engelbart made his life's work the solution of the augmentation problem—namely, how to make it easier for people to actually use mechanical aids to increase their capabilities. In the introduction to his 1962 report to the US Air Force on his research in this area (www.bootstrap.org/augment/AUGMENT/133182-0.html), he wrote:

By "augmenting human intel-lect" we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to de-rive solutions to problems. In-creased capability in this re-spect is taken to mean a mixture of the following: more-rapid comprehension, better comprehension, the possibility of gaining a useful degree of comprehension in a situation that previously was too complex, speedier solutions, better solutions, and the possibility of finding solutions to problems that before seemed insoluble. And by "complex situations" we in-clude the professional problems of diplomats, executives, social scientists, life scientists, physical scientists, attorneys, designers—whether the problem situation exists for twenty minutes or twenty years. We do not speak of isolated clever tricks that help in particular situations. We refer to a way of life in an integrated domain where hunches, cut-and-try, intangibles, and the human "feel for a situation" usefully co-exist with powerful concepts, streamlined terminology and notation, sophisticated methods, and high-powered electronic aids.

In his work on augmentation, Engelbart invoked important examples to show that augmentation needn't be simple amplification—as, for instance, a hammer does for our fist or a megaphone does for our voice—but rather, it could be ab-straction and extension.

Threading through Gibson's "Sprawl" stories ("Johnny Mne-monic," *Neuromancer*, *Count Zero*, and *Mona Lisa Overdrive*) and later efforts (*Virtual Light*, *Idoru*, and *All Tomorrow's Parties*) is an exploration of the bound-

aries and distinctions between humans and machines. Like a child with a box of mixed Lego kits, Gibson experiments with different combinations of pieces, creating monsters and angels and then exploring the potential relationships among them from different directions. From the concept of a person, he probes the implications of using technology for augmentation and the threshold that divides humans from machine. From the idea of the machine, he speculates on what added characteristics could turn an artificial intelligence (AI) into a human.

In "Johnny Mnemonic," we encounter several boundary-testing experiments. In the story's gigantic megalopolis (resulting from the fusion of the cities between Boston and Atlanta into the Boston Atlanta Metropolitan Area, or BAMA), human beings augmented with surgical implants is the norm. The lowest level of augmentation is the jack, the electro-optical connector that lets people connect their nervous systems directly to computers or vice versa.

The higher levels of augmentation we see in Gibson's work seem to stem from an extrapolation of trends and visions in human prostheses. Although we take baby steps today toward mechanical ears and artificial eyes to help the deaf and the blind, consider a future in which we have perfected the ability to connect manmade devices to our nervous systems. How many people, given the opportunity, would choose to replace some imperfect pieces of their anatomies, not because they failed but just to achieve superior performance?

Some augmentation might not be visible or even operationally valuable, as in the case of Eddie Bax, the Johnny Mnemonic of Gibson's title. Eddie has a memory device implanted in his head that lets him store data on his clients' behalf, whether for safekeeping or for smuggling. The Lo Teks, whom we meet in "Johnny Mnemonic," tend toward less functional augmentation—essentially, punk modifications like an-

imal teeth, ears, and other changes made for shock value rather than performance enhancement. Gibson's interest in tattooing and body piercing, also aspects of punk culture, are in evidence in various works, notably *Virtual Light*. It's a small conceptual step from a grotesque tattoo to a dog's ears grafted on a character's head.

She seems to be staring …

Other augmentation in Gibson's work is deliberately, even shockingly, visible and extravagantly useful to the augmented person. Molly Millions is one such. She's invested a fortune in surgical implants to turn herself into a lethal fighting machine, a fortune that she earned by practicing several unsavory professions, including the oldest one. In the tip of each finger is a retractable knife blade, implanted by one of the best of Chiba City's "black clinics." Her nervous system is enhanced, rendering her perceptions and reactions lightning fast. Finally, and most strikingly, the prosthetics replacing her eyes combine vision, see-in-the-dark sensors, and computer interfaces, all covered by

chrome covers that look at first glance like high-tech reflective sunglasses. Gibson exploits the shock value of this self-mutilation: Molly has superior eyesight and looks incredibly cool with her mirrored eye covers, but wow!

In 1995, Robert Longo made "Johnny Mnemonic" into movie starring Keanu Reeves. The movie wasn't particularly successful, although it does have a very attractive star and several engaging elements. My personal beef with it is the rebalancing of the Molly / Eddie dynamic. In the short story Molly is tough and lethal whereas Eddie is a self-described "technical boy" whose one foray into crudeness flops until Molly rescues him. The Molly character that Gibson creates in the Sprawl novels has a lot of potential, and I earnestly hope that the rumored *Neuromancer* project doesn't make the same mistake by submerging the killer queen again.

Gibson's fascination with Molly is evidenced by the fact that unique among the characters he creates for the Sprawl stories, she spans all of them. She's young and ambitious and serves as the love interest of several
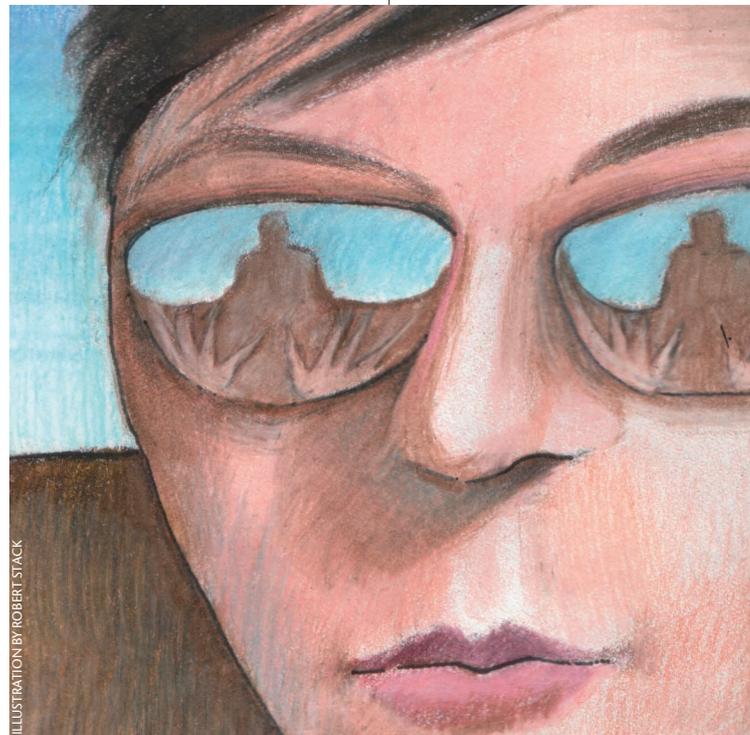

ILLUSTRATION BY ROBERT STACK

other characters in the early stories. In later ones, though, she's old and cynical, but just as deadly. Why is Molly so important to cyberpunk? Certainly her sexuality is important to the success of Gibson's early writing, but is that all? I think not. Her integration of technological (albeit not intellectual) augmentation is total and permanent. Her partner in *Neuromancer* is Case, the console cowboy. His augmentation is intermittent; he's only augmented when he's jacked into the matrix. Other times, he's merely human.

One of the most fascinating experiments of Gibson's work with Molly and Case comes when he outfits Molly with a sim/stim rig that transmits all her sensory inputs to Case. Suddenly the partnership has Case's integration with the matrix and Molly's integration with the physical world.

Machine + augmentation = ?

In *Neuromancer* Gibson's focus is on the quest by a machine, an AI, to augment itself. Throughout the novel, we encounter the efforts of one AI to merge with another, something that the Turing Police are systematically, though incompetently, constituted to prevent. Woven through this is a hardboiled adventure yarn whose plot twists and confusions would do credit to Raymond Chandler or Dashiell Hammett.

Gibson raises some interesting questions. In *Neuromancer*, we encounter an AI with Swiss citizenship:

"It owns itself?"

"Swiss citizen, but T-A own the basic software and the mainframe."

"That's a good one," the construct said. "Like, I own your brain and what you know, but your thoughts have Swiss citizenship. Sure. Lotsa luck, AI."

This is the crux of the question. When a true AI actually comes to be, whether by accident or design, what rights should it have? Who will protect these rights? What will be its attitudes toward the human race? Gibson is not the first to ponder this topic, of course, as we discussed in the first Biblio Tech, but he does seem to have articulated and explored many more different aspects of the question in fictional scenarios.

Machine + human = ?

In *Count Zero* we meet another augmented person in the form of Josef Virek. He's a man whose body's failure has been arrested but not stopped by the continuous addition of machinery. The novel hints that the augmentation's primary purpose is preserving Virek's life, but it is also clear that Virek has gained a certain level of multitasking and has lost some control over some of the manifestations of his persona in the process. This raises an interesting question: Is he still human? What does it mean to be human? Do we have to be a biological entity residing in a body? How much machinery can we add without sacrificing our humanity? Must these functions be provided biologically?

Eddie Flatline, whom we meet in *Neuromancer*, is a ROM construct—a recording of a dead console cowboy's personality and memories. At one point, Flatline asks Case, a natural human, to destroy the ROM containing his personality, meaning the ROM construct has enough self-awareness to request death. This is a notion we encountered much earlier in Vernor Vinge's *True Names*, when at the end, Erythrina records herself in a computer network's data space. Explaining herself to her erstwhile but now uncertain ally, Mr. Slippery, she says,

When Bertrand Russell was very old, and probably as dotty as I am now, he talked of spreading his interests and

attention out to the greater world and away from his own body, so that when the body died he would scarcely notice it, his whole consciousness would be so diluted through the outside world.

Lawyers have the term natural person to distinguish between corporations and people, because in a certain sense we have created corporations for the purpose of investing them with some of the rights and privileges of people. Perhaps we will be able to persuade an attorney with a theoretical bent to write about this for a future installment of Biblio Tech.

The ultimate reunion of the star-crossed lovers Bobby Newmark and Angela Mitchell in *Mona Lisa Overdrive* comes only after the deaths of their bodies and the transfer of their personalities into AIs destined to live in the Aleph's context. In fact, it's Virek's quest to acquire the technology to permit that same transfer for himself that precipitates the entire sequence of events in *Count Zero* and *Mona Lisa Overdrive*, although Virek himself doesn't survive the first episode.

As we've observed earlier, Gibson isn't the first to have speculated on the use of AI as a framework for the preservation of the human (the soul?) after death, but he's certainly the first to render it a casual assumption.

Love not human

Idoru's thesis is that a human and an AI fall in love and decide to marry. The novel spends its time and energy keeping us engaged in an attempt to grasp this point. The other characters in the story are engaged in various efforts to understand, thwart, or encourage the match.

Gibson is not the first to explore notions of emotional attachment between humans and AIs. Robert A. Heinlein established several close friendships between Mike and the humans most involved in setting up the Lunar revolution in his book,

Table 1. Influential Works

MEDIUM	AUTHOR	TITLE	ORIGINAL APPEARANCE
Article	Vannevar Bush	"As We May Think"	1945
Book	Philip K. Dick	*Do Androids Dream of Electric Sheep?*	1968
Short story	Vernor Vinge	"True Names"	1981
Short story	William Gibson	"Johnny Mnemonic"	1981
Film	Ridley Scott	*Blade Runner*	1982
Book	William Gibson	*Neuromancer*	1984
Book	William Gibson	*Count Zero*	1986
Book	William Gibson	*Mona Lisa Overdrive*	1988
Book	William Gibson	*Virtual Light*	1993
Film	Robert Longo	*Johnny Mnemonic*	1995
Book	William Gibson	*Idoru*	1996
Film	Andy and Larry Wachowski	*The Matrix*	1999
Book	William Gibson	*All Tomorrow's Parties*	1999

The Moon Is a Harsh Mistress. Mr. Slippery clearly maintains a personal loyalty to Erythrina even after her persona migrates permanently to cyberspace and she ceases to have a physical presence.

In these earlier stories, however, the authors maintained a clear distinction between the personalities living in the machines, whether they originated there or not, and natural humans. In *Idoru*, however, Gibson deliberately invokes aspects of love that we associate with bodies. Rei Toei, the artificial person, was originally constructed to be a performer. She is manifested as a holograph and appears as an attractive young woman. Rez, the human who wants to marry her, is a successful pop music performer with fan clubs on all continents, so his sudden obsession—his sudden crazy obsession—causes consternation among his friends, managers, and fans. His fascination with Rei Toei has an implicit carnal aspect that makes everyone squirm.

What precisely is marriage between a natural person and a virtual one? Gibson takes pains to make it clear that this is not the Platonic love between man and machine explored by Asimov, Heinlein, and others. This is the real thing. Unfortunately, Gibson walks to the brink but doesn't jump. He leaves the consummation of the union unexamined at the end of *Idoru*, as is his right. But in the next installment of the story, *All Tomorrow's Parties*, he cheats—when that scene opens, the two have parted company. Worse yet, by the end of that novel, he permanently eliminates the question by means of a deus-ex-machina maneuver that would be irritating if it weren't such a sublime pun.

Why cyberpunk?

What's fascinating about Gibson's writing is the focus on him as a literary stylist rather than as a speculator on the relationships between humans and their creations. Is this because the critics are largely littérateurs, primarily concerned with the world of words and uncomfortable with attempts to analyze the technological dimensions of Gibson's work? Or is it because many of the ideas explored in his writing aren't terribly new, as we've discussed in earlier articles?

Gibson's success to date has been driven more by the punk than the cyber in his world. His artful creation of a jarring, dissonant dystopia is compelling; the technology is more of a veneer. Nonetheless, he has managed to touch and speculate on a collection of important questions that we as technologists should think about. Gradually, we will develop the ability to integrate machine and man; in fact, we're doing it already with work in prosthetics and artificial intelligence. Because the process will be gradual, we are in danger of letting it happen unexamined. Each incremental step will benefit someone somewhere, and we will manage to avoid thinking about the systemic implications until suddenly we're in an alien world that might well resemble one of Gibson's nightmares.

That said, it's important to recognize part of Gibson's power as a writer is the power of the professional prestidigitator. His art is in misdirection, not magic. The worlds of Gibson's writing are dystopic, with many foundations of our present world absent or disturbingly warped. Security comes from powerful allies, never from neutral institutions dedicated to maintaining the public good. Relationships that last are built on raw power, while balanced relationships are evanescent. This isn't to say that comfortable homey things don't exist in the Sprawl or in the *Virtual Light* world, but Gibson definitely makes sure we don't see much of them.

Whenever we encounter children, as we do in several places, they are either street urchins living by their wits or sheltered flowers of the wealthy, as in the case of 13-year-old Kumiko Yanaka. We meet Kumiko in *Mona Lisa Overdrive* as she is being

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sent by private jet for safekeeping in London while her father, some sort of big shot in the Yakuza, sorts out some pending unpleasantness. Nothing about her life is what we would think of as normal. We see no school, we hear of no friends, but we do learn about her mother—albeit only her suicide—and Kumiko's ambiguous feelings toward her father, whom she blames. Even when we encounter middle-class children, for instance the Tokyo Lo/Rez fanclubs in *Idoru*, we don't see the prosaic day-to-day material of school and home that establishes context.

Developmental psychologists tell us that a child's growth is characterized by an increasing ability to distinguish the self from others and from the world. Gibson's writing, particularly in the Sprawl stories, explores breaking down that distinction between the self and the other. The console cowboy jacks into and merges with the matrix, being augmented and augmenting in turn. Sim/stim lets couch potatoes share the experiences of the stars, but it also lets Molly and Case achieve a new level of partnership. Wintermute seeks to merge with Neuromancer to create a new level of personality. Virek seeks to migrate his persona from his failing physical body to the immortal realm of the aleph. As quantum mechanics (via uncertainty) made hard little electrons into vague fuzzy presences, Gibson makes his people into fuzzy personas—not by making them vague and indistinct, but by blurring their boundaries. We keep coming back to the gist of his question: Just what is a person?

The people who occupy Gibson's worlds are adrenaline junkies, criminals, mercenaries, and super celebrities, always living on the very edge. More than that, they are people who are completely foreign and, consequently, fatally fascinating, to the vast bulk of his readers. I'm indebted to Paul Brians of Washington State University, who notes that, "it is not surprising that he gained more of a following among academics than among the sort of people he depicted."

One of the most fascinating speculations in both philosophy and computer science is over whether the human brain is a machine. If it is, then ultimately we can build a machine with equivalent complexity and capability and duplicate its every capacity, including creativity, imagination, vision, and boredom. If it is not, then some functional process in the brain, as yet not clearly demonstrated, must distinguish it from a computer. Nothing we know about the brain's physical machinery so far suggests that it has any capability that can't be duplicated with mechanisms. If so, what prevents us from being able to create an AI equivalent to a person? There conceivably might be some process in the brain that transcends mechanisms, some mystical facility that operates by means we don't yet know or perhaps cannot ever understand. Or there might be some complexity threshold that we haven't yet passed with our machines.

In *All Tomorrow's Parties*, Gibson gives his personal answer to this question when the artificial person Rei Toei says to Rydell:

"This is human, I think," she'd said when pressed. "This is the result of what you are, biochemically, being stressed in a particular way. This is wonderful. This is closed to me."

Here we see Gibson's failure as a theoretician. Nothing that the idoru claims underpins the distinction between AI and human is plausible to computer scientists and engineers who have considered the topic. There are no biochemical processes that cannot be modeled or simulated using computers. This damp squib leaves us with the unsettling feeling that Gibson has dropped the ball. It's at times like these that you realize Gibson belongs to the literary world, not the concept-mad world of science fiction, unlike his brethren Heinlein and Vinge.

This installment of Biblio Tech has been dedicated to the work of one person, William Gibson. More than that, however, the articles in this department to date have all been building toward this examination of Gibson's work. This is fitting; given the influence that his work has exerted on the field of science fiction and the entertainment he has given so many of us. I hope these articles inspire you to read some of the important works we've examined and, more importantly, to think about some of the issues discussed. As engineers, computer scientists, and general technologists we are among the best prepared to consider these topics and anticipate the implications of the technologies we are developing. We have an obligation to do so and to engage non-technical people in discussion. ☐

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