UC Santa Barbara
Recent Work

Title
Nano-Punk For Tomorrow's People

Permalink
https://escholarship.org/uc/item/5bg9n39z

Author
Newfield, Chris

Publication Date
2006-03-01

Nano-Punk for Tomorrow's People
By Christopher Newfield

Remarks on the Tomorrow's People Conference, James Martin Institute, Said Business School, Oxford University March 2006

Note: As of this writing, the conference program is on line and all presentations can be viewed via webcast at http://www.martininstitute.ox.ac.uk/JMI/Forum2006/Forum+2006+Webcast.htm. This availability helps correct my overemphasis on the first day's talks.

The core topic of this important and agenda-setting conference was human enhancement - new and imminent forms of enhancement of our physical and mental powers. The source of these enhancements was generally assumed to be new and future technology. Nanotechnology was not an explicit topic but it was a constant undertone, since breakthrough forms of enhancement were traced by speaker after speaker to the accelerating technological change enabled by the disciplinary "convergence" of formerly distinct fields. William Bainbridge and Mikhail Roco's NBIC (nano-bio-info-cognitive) convergence was the implicit baseline, and Bainbridge attended the conference and gave an interesting and optimistic paper about new potentialities and enhancements already in development. I very much liked this optimism and the enhancements. And yet the conference raised the question of whether our societies are willing to use the full range of our capacities - socio-cultural as well as technological - to make real enhancement possible over the long haul.

Steve Rayner (the Director of the Martin Institute) and his group did a great job of designing an event that addressed a host of crucial issues while offered a topic for everyone, from new scientific research to public policy analysis to speculation about human life spans of 2000 years. There were good crowds for all of the panels as the topics moved from Longer? Stronger? to Smarter? Happier? and finally to Fairer? and Governable? Social and cultural analyses was particularly well represented in the always slightly deflating last category, where two panels were organized by Dan Sarewitz at our counterpart Center for Nanotechnology in Society at Arizona State; I wound up giving a paper on one of these panels on the topic of creativity as a model for enhanced governance.

The Story We Know
Many of the conference papers offered a familiar plot, resolution, and cast of heroes. First, grave problems appeared, problems like climate change, pollution disasters, and the poverty, misery, and disease that threaten the survival of mankind. These problems were furthermore acknowledged to have behavioral, cultural, and social dimensions: how do you get consumers and corporations to switch to greener but more expensive energy sources, or governments to invest enough in research, or stressed societies to be creative, or billions of people to seek enhancement in the already available

form of avoiding tobacco? But then, as the given talk proceeded, the solutions were technological. When the talk ended, audience members rose up to say that grave socio-cultural issues were being left underdeveloped or ignored. One repeated example was the issue of unequal access to technology depending on whether one is rich or poor. The speaker usually replied that nothing in their technology favored one group over another or ruled out fair distribution. The critics would grumble, though usually elsewhere over coffee, for they sought concrete ways to rule it *in*. As this pattern continued, the commentators often offered negative examples of socio-cultural effects - problems, limits, obstacles, losses, zero-sums. They truly became critics, which made it harder to be, say, partners with technologists who could furnish our common problems with symbiotic social and cultural expertise.

This may sound like one problem, but it is actually three in one. First is the dissociation between technology and society. The anthropologist Mary Douglas pressed this issue mid-way through the conference when she said rather pointedly, "The human being is a social animal. Unless you can take that into account in the research you're doing on enhancement, one day you'll have to scrap it all." The second problem is the hierarchy this dissociation enables, in which technology is associated with terms like future-solution-enabler and society with past-present-problem-constraint.

The third problem is the related contrast between technology and government, in which technology makes up for the failure of government, meaning that the insights of a fairly small group of great minds (and their graduate students) must transcend the permanent disaster that is our collaborative life. This is where many people turn against transhumanism - not because they oppose enhancement of human capacity, but because they oppose sidestepping its social dimensions. In concrete terms, this tacit rejection of social life - casting it as constraint *rather than* enabler as well - rules out cooperative technological development in the form of, for example, either national or international industrial policy, even though that may be exactly what nanotechnology needs to develop. It also elevates business to the position of science's invisible hand.

Science and society are too important to have our answers to its dilemmas be predetermined by these three false dichotomies, though they often have been so predetermined during the past fifty years.

In anatomizing the conference like this, I am not doing justice to the excellence of the presentations or to the persistence and quality of the conversations among panelists and audiences. Virtually everyone was *aware* of both technological and socio-cultural sides of the story and was concerned about both; no one advocated or openly desired the polarities that I've just described. That's exactly why I think the conference plot is so interesting: it is actively sought by no one, opposed by most, and yet it endures

nonetheless. The conference raised the question of what we, the physical *and* the socio-cultural scientists, are going to do about this.

Civilizations Unborn
It may help to clarify matters if I say more about the opening papers, for they framed much of the discussion that ensued. The first lecture was delivered by the Institute's founder and funder, the businessman James Martin, who led the audience through a forty-five minute preview of his forthcoming book about environmental, population, energy, and related crises. He argued that the world needs a new "civilization" to deal with these enormous problems. The story of intertwined crises was vividly told, and at the same time, the content and sources of their solution, this new civilization, remained less than clear. Would it include major changes in cultural relations among various peoples, improved international governance, a more equitable distribution of resources than the "Planet of Slums" version we have now? It was hard to say: the powerpoint slides labeled culture were the ones Martin skipped, and my impression was that the new civilization consisted largely of higher literacy levels leading to lower poor-country birthrates and a work ethic strong enough to achieve faster and bigger technological breakthroughs. The solutions to the problems of the physical world have clear behavioral dimensions, and culture (or civilization) is vitally important to transforming behavior. But how would culture do this? Was it really an independent variable, or something to be controlled by science?

Next up, the journalist Joel Garreau, author of *Radical Evolution*, continued this line of thought.   He rejected both the "heaven" and "hell" scenarios in which technology's exponential growth either saves or destroys the planet. He offered a third scenario as the only plausible one. Called "prevail," it was a tangled arrow in which humanity goes up and down, backwards and forwards, around and around, but winds up moving ahead in the end. Garreau said what I take to be true and lovely things about people's capacity to figure things out, to cooperate when they have to, to do the right thing, to be surprising, to be "unpredictably clever." And yet his discussion of "inventing new social forms" was vastly less developed than his discussion of new technology, being largely limited to the improvisation among the passengers who crashed the fourth 9/11 plane before it could hit anything. Culture was folded into human nature, and Garreau's final lines were not about "co-evolution" of social and technological forms but about "new definitions of what it means to be human."

Garreau also coupled this description of network-based cultures, relatively non-hierarchical and self-organizing, with data taken largely from his recent contact with American military research. His most memorable image, at least for me, was of a pilotless "predator" plane which he described as having killed alleged Al-Qaeda operatives who were driving a four-wheel drive vehicle on the ground. However one feels about that particular deed, Garreau was perhaps inadvertently reminding us that half of federally-funded

R&D in the United States has military sources and missions, and that the percentage for nanoscale research may be still higher. Certainly the imagination of nanocapabilities is being shaped by national security thinking, and we need to consider the possibility that at some point nanotechnology may become intertwined with the pursuit of overwhelming military force in the same way that nuclear power has never escaped the shadow of the bomb.

But my main concern again involved the role of socio-culture in this tale. The problem was not just that the *social* organization of effective science was missing from Garreau's presentation: this was presumed in the form of the US DARPA and related agency apparatus. It was that thinking about drone predator planes made me at least temporarily unable to imagine how network-based innovation or self-organizing could exist. Predators arise from and create fear; fear insists on hierarchy, fear calls for control. Fear is thus a major enemy of both civilization and science. Even positing that all this defense research is legitimate or desirable - a controversial claim - its framework is not obviously compatible with the culture-based forms of flexible, often informal, self-governed collaboration behind "prevail."

Colonial Shadows
Martin and Garreau are no doubt aware of these issues. So why is it difficult to bring this awareness to life? A similar fate befell the final keynote, by the scenario planner Peter Schwartz of the Global Business Network. Partly for reasons of time, it is easy for half-hour descriptions of the science of the future to fall into the crack between fact and fiction. They often lack the scientific detail that would make them plausible, and the social detail that would show utopia and dystopia as inevitably intertwined. When dystopian elements - starting with the sheer complexity of human societies - are left out or suppressed, the scenario is no longer convincing.

It's a little odd that journalistic or scenario-oriented descriptions are at such a disadvantage when we compare them to the best science fiction. One prominent example of the latter is Neal Stephenson's remarkable novel *The Diamond Age* (1995), set in a Victorian-style nano era. Why Victorian? Perhaps not because technology advances while society does not, but because the advancement of society is not tied to technology. In any case, the novel's first line reads: "the bells of St. Mark's were ringing changes up on the mountain when Bud skated over to the mod parlor to update his skull-gun." Heaven and hell are found *together,* and Prevail emerges (or fails to emerge) from the social fabric.

Throughout its history, science fiction has refused to separate the utopian and dystopian power of technology, or to separate technology from the social and cultural world which doesn't simply *spoil* it but also gives it life. This was true even of cyberpunk, the fictional framework of the future implications of 1980s digital cultural. From *Bladerunner*'s (1982) vision of robotics turned to the creation of slave labor for all-white off-world colonies, through William

4

Gibson's celebrated *Neuromancer* (1984) and then Stephenson's own virtual reality-centered *Snow Crash* (1992), SF claims that only the full interweaving of cultural and technology will allow us to tell the true story of either. From Heinlein and Bradbury down through Kim Stanley Robinson, that true story has always included the specter of colonialism, technology used to settle, control, and dominate "alien" life forms which lead to epochal and disastrous struggles. Bradbury's *Martian Chronicles* (1940s) locates the drama of exploration not in rockets and other advanced technology, which he somewhat lazily takes for granted, but in the disastrous clash of cultures between humans and Martians. The humans, even before they are attacked, come as colonizers.

In science fiction, the avoidance of a colonial futurism requires cultural as much as it requires technological enhancement. Put another way, we need nano-punk to describe the meaning of nanotechnology. What kind of nano-punk might emerge the social sciences?

Three Worlds, Two Cosmologies
The opening lectures were followed by a panel about new life technologies. First up, William Bainbridge of the U.S. National Science Foundation offered a compelling overview of the technologies in development in some of the grants he administers, which were generally cognitive and emotional mapping projects that seek massive improvements in the quality of life for disabled people.[i] Bainbridge's own work includes an interest in "personality capture" for the purpose of human extension and enhancement - he described himself as the first person to have answered 100,000 personality questions, and as cheerfully on his way to completing the second 100,000. Some of the audience many have had qualms about such attempts to quantify personality so that it can be expressed through electro-mechanical and communicative systems, even when these systems serve a greater good like the manifestly humane and even libratory purpose of expressing thoughts and personalities trapped inside of impaired bodies (which, as later speakers such as Rachel Hurst and Greg Wolbring pointed out, refers to all of us in various ways). There was indeed something wonderfully defiant toward the unknown, and yet also strangely reductive, when Bainbridge remarked that he asks what is the actual information content of the human mind, and concludes that it may be much less than we think. He best represented one major current of the conference in his last line - "I believe that if we really go down the road of human enhancement, combining all of the technologies, . . we'll be able to live in and experience any environment, live anywhere, and build any kind of society we wish."

Since I too am a child of Sputnik, Mercury, Gemini, and Apollo, I too want us to be able to build any society we wish. But the main elements were for me always as cultural as they were technological. At the same time, it did feel like technology is our most *obvious* power, and it was clear that technological thinking needs to be protected from all sorts of hasty criticism or scorn. In its infancy, breakthrough science often looks dangerous and wrong. New

ideas and strange methods must be able to play themselves out, including ones that involve capturing personality through 100,000 questions.

Something like an opposition to this path to new societies began to develop via the next speaker, Alfred Nordmann, of the Technical University at Darmstadt, Germany. He presented himself as a "reality check" on a central premise of enhancement-type research programs, and that premise is the exponential growth curve in which scientific progress accelerates to the point of radical transformation or even transcendence of most current limits on behavior and society. Nordmann suggested that exponential curves of continuous technological acceleration on the model of Moore's Law cannot be supported by either statistical analysis or the history of technology. He also criticized the consumerist and individualist aspect of these visions, saying that they ignore the social and collective development on which genuine progress depends. He claimed that the European Union's "Converging Technologies" report offers a vision of tomorrow's people that is better than that of the American NSF's Nano-Bio-Info-Cognitive (NBIC) report.[ii] We should not confuse transhumanism, he said, with "the tradition of first enhancing ourselves through education and ingenuity, and then, to develop technology that better adapts the world to our interests and needs." By identifying a split between NBIC and CTEKS approaches, then associating these with the US and Europe, Nordmann depicted tomorrow's technology being torn between today's ideologies. Though citizens do not have a vastly higher level of scientific expertise within the continent's social-democratic paradigm, that paradigm does not worsen gaps in scientific expertise by the American-style subordination of social interests to abstract economic or technical forces.

These perspectives were made to look like two sides of the same coin by the next speaker, Shiv Visvanathan of the Institute for Information and Communications Technology. It is as a storyteller, he said, that I would like to respond to what I have heard today. I worry very much, he said, about the story I have been hearing so far. I worry about the state of your imagination. You seem to have only two characters in your myth. They are Prometheus and Faust, and they are working overtime. You have science, yes, but what about other forms of knowledge? What we storytellers know, he continued, is that the truth needs two cosmologies to work out a full story. And I see no such conversation of cosmologies. How, Visvanathan asked, can science look at other imaginations? For example, why the word longevity? Suppose I were to replace it with the world hospitality?   To me, he continued, this debate reflects a deep failure of storytelling, and a deep failure of democracy.

Democracy then entered Visvanathan's conversation through the concept of communicative justice, which he described in several ways -- as a people's intellectual presence in discussions about their own future, as part of a system of tacit constitutions, and, perhaps most profoundly, as the recognition that democratic societies have the right to "different kinds of

time." Growth, development, progress, perfection: these are only one kind of story to tell, one cosmology, perhaps only a piece of one cosmology. You are articulating a dream without shadows, he said. You need a desperate case of doubling. You need a certain sense of shadows in your enlightenment model. You need an imagination to say things science hasn't said. So far, you describe a predicable future in which the third world plays no part in your imagination. You offer a sterile technological view of history. Can we, those of us outside the West, chose to have cognitive indifference to your scientific world? What you're talking about, Visvanathan concluded, is a society that has lost control, and is celebrating it in terms of acceleration and speed.

Undermining Engagement
This opening panel offered a vivid typography of dueling models; perhaps they are competing cosmologies as well. The first of them is familiar. In it, progress is driven primarily by technology. The most important forces shaping the world are physical, biological, and natural. Society and culture is seen as important but secondary, and usually negatively. Later in the conference, I wound up giving a talk on creativity as a model of governance and defined the first cosmology through a series of oppositions:

Market	Government
Enterprise	Regulation
Innovation	Redistribution
Useful products	Soviet auto industry
Wealth creation	Stagnation / waste
Lexus	Olive tree
Technology	culture

This list is overdrawn, but it gets at the dualism beneath a widespread common sense in Anglophone cultures. In this common sense, social and cultural behavior is more often than not a problem that professional and scientific knowledge is designed to solve. Collective behavior, embodied in governmental activity or cultural production or ethical argument or collaborative storytelling doesn't really move society forward. Socio-cultural behavior, in this view, is the site of religious hatred, ethnic cleansing, civil war, and all the disastrous and cruel stupidity of which humans are routinely capable. Equitable distribution is assigned to the lesser half of outmoded and unscientific practices, ones the market and science together must overcome. Given this binary common sense, the entire issue of extremes of wealth and poverty as they distort not just the use but the *development* of technology - the deep ethical issue of widespread curable suffering *and* the deep operational issue of the wasted ability of four or five billion people, the unfathomable lost human development (certainly a cultural and even a spiritual catastrophe) - this complex of profound issues is bracketed as at best secondary, or dependent on market success, or simply defunct, obstacles to forward thinking.

And when we gaze over the devastated landscapes of human history, who wouldn't be tempted to look to science for salvation - analytical, rational, non-superstitious, impersonal, objective, seeking to sail around the vast shoals of human nature and devising methods to do this consistently? The problem is not the hope for science itself, which I find I share, but with the linking of science to once side of this falsely dualistic system, one in which science is tied to economic institutions *in contrast to* culture, governance, and collaborative life. This linkage produces Manichean visions like the columnist Thomas Friedman's metaphor of the Lexus - speed, forward motion, performance, refinement, perfection - vs. the Olive Tree, culture, religion, belief, tradition, routine, subsistence, tribalism, a vision of humans stuck to the wheel of Osiris, eating and being eaten by turns, history as the eternal return in a helpless circle. The humanities and social sciences and philosophies of norms and institutions of collective governance are placed around the tribal fire as well. "Upstream engagement" between the public and nanosciences, if left within this first cosmology, will mean the science Lexus being addressed by the public olive tree.

Elements of Another Model
Given the power of this first cosmology, what is the second cosmology? What does the second cosmology say back to the first? To ask about the third and the fourth and the fifth cosmologies from the full range of the world's cultures would take us well beyond the bounds of this particular conference. But the elements of a second model were very much in place.

A first element is implied by my critique of the disassociation of technology and markets from cultures and societies. For the moment I would call it by the unattractive name of a *post-dualist ELSI framework*. ELSI (Ethical, Legal, and Social Implications) has come a long way in recent years from its earliest conception as a kind of cow-catcher on the locomotive of new technology, warning of social fallout and trying to get it out of the way. The current idea is of a full-scale dialogue between science and its publics, a dialogue ideally between relative equals. It involves seeing technology as a product of human activity rather than other to it, as Steve Rayner put it at one point. It involves recognizing, as Dan Sarewitz put it, that "the most obvious attribute of any technology is that its creation and its use depend on human choice - on decisions made in institutional and cultural contexts." I would also add my own claim that group creativity offers a model of governance in which technology emerges from society defined not only as a constraint but as a generative collaborative process.

The post-dualist ELSI framework will also involve going beyond the current public, mediated as it is by science and technology studies, business schools, the investment community, and self-conscious technology buffs in the larger society. We need, for starters, to engage cultural academics in the upstream debate, most of whom see no place for themselves in the current discussion. And beyond this are not only the tech fans and educated professionals but

entire communities, the country, and, the most important audience of all, the unaddressed five billion. This is as amazing a challenge as interplanetary travel: human enhancement as the enhancement of humanity - *all* of humanity - through a massive, multinational dialogue unprecedented in history.

This work is certainly under way. At the conference it appeared in the thinking of Nordmann and Visvanathan, and also to Lord Richard Layard of the LSE, Baroness Susan Greenfield, Dame Suzi Leather, Arie Rip, and others. I would also mention the work of many who did not give papers at the conference - for example, Phil MacNaghten, Matthew B. Kearnes, and Brian Wynne's "Nanotechnology, Governance, and Public Deliberation: What Role for the Social Sciences?" offers a valuable overview of latter-day ELSI state-of-the-art, and David Guston's short essay "Forget Politicizing Science: Let's Democratize Science!" sketches the outlines of a democratic model of "participatory technology assessment," and is allied to CNS-ASU's trademark project of Real Time Technology Assessment. As post-dualist projects, they conceptualize the public as coming to the discussion with its own advanced and complementary knowledges. They further see these knowledges as co-evolved and indeed within science rather than as outside or other to it. Scientists speak as citizens, as members of an enormous national and international, and possess the plural knowledges required for that. Citizens, in turn, speak as scientists, particularly as "scientists" of society and culture and the complex lives the billions actually lead.

A second element is sustainable technological development - development sustainable, enabled, and enhanced by the cultures and societies in which it emerges. By this I don't mean slowing down technological development so that societies can catch up: this is the framework we inherit from the first cosmology. I mean something like full-functioning and balanced technologies, like medical technology as geared to public health as to rare fatalities, or a car that can renew most of its energy supply, or a space vehicle that can both take off and land, or broadband cable tied to a content delivery system that doesn't replace but interacts with the national educational system. Technology often outstrips society's capacity to absorb it: The Economic Strategy Institute recently reported that between 2000 and 2006 the US fell from 1st to 16th in broadband cable access, and this is in part because people's informational and communication needs do not fit with developments in routers, switches, and the capitalization of fiber optic. But it is crucial to recognize that this apparent social lag is a function of disproportionate investment. The first cosmology's belief that science will always be ahead of unenhanced humanity and its cultures is a self-fulfilling prophecy, and it steers funds away from full-service investment in all of a society's capabilities - foreign language skills as well as third-generation cell phones, for example.

Unlike learning a foreign language, a slow, erratic, and rarely completed process, broadband cellphones are a technology associated with the hockey-

stick growth curve associated exclusively with technological change and the 1990s growth-rates of their related start-up companies. At the conference, the economist Robin Hanson of George Mason University told this story particularly well. Since culture and society have never produced hockey stick curves at any time in history, it is certainly tempting to steer investment away from the flat curve (or worse, the eternal circle) of olive-tree struggles to develop. But this lopsided investment doesn't only retard society: it probably steers science off course. What if nuclear energy research had not revolved around the Manhattan Project and the atom bomb? Or what if, in 1945, the "Manhattan Project for the social sciences" demanded by some after Hiroshima and Nagasaki had actually gotten off the ground? Perhaps we would have avoided dirty nuclear and gone more quickly down the path of clean. What if we had sought "sustainable nuclear power"? The second cosmology sees these questions not as the "bolt-ons" that MacNaghten et al criticize but as intrinsic to scientific research design.   What would enhancement be like in a non-hockey stick world?

A third element in a post-dualist, second cosmology for enhancement is enhanced stories about enhancement's exciting, dramatic *social* stakes.   This means denser, more concrete, more imaginative storytelling. Again, the ingredients already exist in the best science fiction. Stephenson's *Diamond Age* is an example of this concrete speculation about the nanotechnology future. In Stephenson's version, nanotechnology fills the air with invisible particles performing tasks now relegated to obvious and intrusive equipment. They come to be called "mites," and they perform security and surveillance functions, create fogs and mists in certain areas under certain conditions, are deployed in "toner wars" because of the visible results of millions of disabled mites, and encourage elaborate filters, screens, lasers, and other countermeasures and engineering spillovers. In Stephenson's version, nanotechnology's economics will encourage the reconfiguration of world societies into economic zones that mingle multinational-corporate and ancient feudal elements, turning justice into a series of economic protocols where punishment is proportionate to economic effects. In Stephenson's version, the major social agents are not technology executives and their brainworkers but hackers, judges, detectives, gangs, and children. Finally, in Stephenson's version, the most advanced nanoproduct is a young girl's storybook, the one element in an indifferent and hierarchical society that addresses her individual identity and allows her to bring herself into the world. one which teaches her and allows her to save herself. In other cultures this would be called a Talking Book. And it is enhanced storytelling that in the novel allows people to move their society forward again.

By the end of the conference I was thinking as much of scenarios as of cosmologies - the term used by Garreau's opening and Schwartz's closing talks. I think of our first cosmology's as *Detour*: science evades the chronic stupidity of mankind, incarnated in politics, culture and society. What is the second cosmology's scenario. I'd like to call it Nano-punk, with science and

10

culture as equally radical powers of change. A more acceptable name would be something like *Integration*, in which enhancement comes from the way that diverse and non-overlapping knowledges learn how to enhance each other.

We have reached the point where the failure to resolve certain social questions is holding technology back, and where, at the same time, the protection of technology from social questions makes those questions less resolvable. Today's challenge for tomorrow's people is to see culture as a huge resource rather than a problem, justice (or Steve Rayner's "fairness") as central to innovation, governance as a form of creative collaboration, the public as an asset rather than a liability, and our doubts as springboards rather than quagmires.

NOTES

---

[i] Projects mentioned included Henry Kautz, U of Washington, Assistive CogTech, learning "that person's purposes, even that person's personality, certainly their habits"; Edmund Durfee, Martha Pollack, Cognitive Orthotics (enhancing interaction by "preserving their humanness"; Quentin Jones, Social Matching; Poz Picard, Affective Comupting; Gordon Bell - MyLifeBits; Self II (Bainbridge himself - "you rate yourself in terms of 2000 characteristics . . how little or much does this phrase describe me"; and a project called Anne, "the emotional rating of life episodes."

[ii] The European Union report is available on line at http://www.ntnu.no/2020/final_report_en.pdf. The NSF report can be found at http://www.wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf (both accessed March 2006).