by ricardo dominguez

Nano-fest Destiny 3.0:

Fragments from the Post-Biotech Era

"In the game of life and evolution there are three players at the table: human beings, nature, and machines. I am firmly on the side of nature. But nature, I suspect, is on the side of the machines."

-George Dyson, *Darwin Among the Machines*

MNT("Molecular Nanotechnology") device designs should incorporate provisions for built-in safety mechanisms, such as:
1) absolute dependence on a single artificial fuel source or artificial "vitamins" that don't exist in any natural environment;
2) making devices that are dependent on broadcast transmissions for replication or in some cases operation;
3) routing control signal paths throughout a device, so that subassemblies do not function independently;
4) programming termination dates into devices, and
5) other innovations in laboratory or device safety technology developed specifically to address the potential dangers of MNT.

- Foresight Guidelines on Molecular Nanotechnology, (Revised Draft Version 3.7: June 4, 2000).

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The term "Molecular Nanotechnology" (MNT) refers to the ability to program matter with molecular precision and, at some point in the future, scale it to three-dimensional products of arbitrary size. Nanotechnolgy is to inanimate matter what biotech is to animate matter.

Recombinant society falls quickly before nano-fest destiny. Biotechnology, like digital networks, becomes a side event before the next state of command-and-control society. Each of us will rapidly become the by-product of artificial Molecular Nanotechnology "vitamins," interdependent molecular subassembly engines, and inter-linked "termination dates."
We will become more than replicants and less than nothing. The cross-roads between the imaginary and all too real construction of MNT is perhaps already behind us.

Tactical media, bio-interventionist and critical theory sectors should have already been involved in disturbing nanotechnology by the late 1980s when it was first being defined for the engineering sectors as a sign moving from a speculative model to a sanctioned exploratory zone. At this point in time, not even Bill Joy's (cofounder and Chief Scientist of Sun Microsystems) rant -- "Why the Future Doesn't Need Us," which appeared in Wired in 2001 -- about the ramifications of molecular nanotechnology will do little more than alter a few micro-points of revised MNT Guidelines by the Foresight Institute.

Gone Nano

As the Biotech sectors gain command and control over 40 percent of the world economy in the next few years, the MNT or Nanotech sectors will seek to grab hold of the rest of the 60 percent of the material world during the next few decades. While Biotech is carbon-based, Nanotech is focusing on carbon atoms. Life is carbon-based. The atoms that make the molecules that structure DNA are carbon. Thus, Nanotech has the potential to encompass the entire Table of Elements. Biotech is just a backwater town compared to the command and control that Nanotech will be able to exploit for its own profit. Already several important connections between nano-biology and nano-engineering are being installed in the hybrid venture capital market. Nanotech development is now about where biotech was a quarter century ago. This does not mean it will take 25 years before it starts to attract the kind of capital investment enjoyed by the Genome market. Advances in other scientific fields, especially informatics, means that the acceleration of MNT will be rapid.

A Note About Post-Genomic Profits Today: The Empire's New Genes

"In, 1492, Christopher Columbus was blundering about the Caribbean in search of India - he wrote home to say that the ancient mariners had erred in thinking the earth was round. Rather, he said, it was shaped like a woman's breast, with a protuberance upon its summit in the unmistakable shape of a nipple - towards which he was slowly sailing."

- Anne McClintock, Imperial Leather

Objectivity, for the native is always against him.
-Frantz Fanon, "*A Dying* Colonialism"

The conquest of woman and reproduction is at the core of the old Empire -- the new land was to be taken, raped, and made to give birth to a new economy. The new Empire of bio-colonialism is replaying the same tale. Only this time Christopher Columbus has not planted his flag on the beach of the Indigenous lands he accidentally discovered but on their genes. Now the flag waves deep in the pleats of matter. The fast-forward future is now a rewinding of the past into the present of post-genomic profits. The Human Genome Project and genetic research in general "raises serious issues of concern to indigenous peoples," states Debra Harry, Executive Director of the Indigenous Peoples Council on Bio-colonialism. She says,

Another link between the Old Empire and the New Empire is the vision that the New World is full of animal people -- dark people who have been breeding with the native creatures since the time began. This belief allows the New Empire, as was the case with Old Empire, to rape and reconfigure the dark native as animals -- first in the name of God and now in the name of Genomics.

"Now that the sequencing project is complete, more scientists will turn their attention to human genetic diversity, which includes the collection and study of the DNA of indigenous peoples. This is likely to result in patents on the genetic inheritance of indigenous peoples, and possible manipulations of their DNA, which violate the natural genetic integrity of their ancestry."

The Indigenous are the first markers of the complex territories of what will become the growing question of bio-rights for all. Bio-colonialism breaks down the walls between the outside and inside, blood and soil, micro-ecologies and global economies - but, the flag of the recombinant Empire still waves between the two worlds established by Columbus. The value of the New World is still bound by the same dream of the Old World -- to carve out spaces for profit for the Old World by mining the dark bodies and lands for that new genetic gold. The difference -- between the old flag with its prayer to God and the new flag of Genomics -- is that this new flag is being planted on the bio-beach with a prayer to the Therapeutic State and its call for "Health for All."

Dr. Jonathan King, Professor of Biology at MIT and a member of the board of directors of the Council for Responsible Genetics in Cambridge, MA, states "We are concerned that the emphasis on gene sequences will be used to imply that genes are at the basis of a variety of human disease and conditions, when in fact the great body of evidence, establishes that the majority of human ill health is not inherited but is due to external insult including pollution, infection, inadequate or inappropriate diet, physical accident, or excess stress or social disruption such as wars." King further adds, "We note that preventing damage to human genes from carcinogens is a far more effective public health strategy than allowing the disease to develop and then attempting gene therapy."

Both colonialism and bio-colonialism pray for the poor dark ones. One prayed for their souls and that the power of the Empire would be able to save them from themselves. The other prays that they will be able to save the natives from the poor genes they have been born with and that the power of the Empire will be able to save them from themselves.

Dr. Stuart Newman, Professor of Cell Biology and Anatomy at New York Medical College notes, "Although there are potentially beneficial uses for the information gathered in the Human Genome Project, there is also the great threat that this information will be used to persuade people that they are not good enough, biologically. This will be justified by promised improvements to human health, but unless carefully monitored and regulated, this emphasis on genetics will have a divisive effect, whereby those categories and groups of people that have traditionally been marginalized will now learn that their genes are inferior and need to be improved." In each instance, those who have crossed the unknown seas dreaming of new lands for the Empire fall back on the "genomic space" of the dark Other as the reason for life itself as conquest.

As it was the case in the days after Columbus, so it unfolds in the days after the Human Genome Project -- the slave ships and their gold are now beginning to cross back into the treasuries of the New Empire. Each day, the genetic wealth of the New World is being added to the coffers as new biological "truths" to be patented in the name of Empire's historically given rights to scientific research. As we all know, the human Genome can be privatized, not to benefit people's health for corporate profits. Already, patents have been filed, and then later abandoned, on the DNA of indigenous peoples from the Solomon Islands and Panama. The U.S. Patent and Trademarks Office (PTO) actually approved a patent on the cell lines of a Hagahai man from Papua, New Guinea. The patent was granted to the U.S. Department of Health and Human Services and the National Institutes of Health in March 1994. In late 1996, the NIH abandoned the patent. However, the Hagahai cell line is now available to the public at the American Type Culture Collection as ATCC Number: CRL-10528 Organism: Homo Sapiens (human) for $216 per sample. This trend is likely to continue as new potentially profitable genes are identified in indigenous populations.

Another link between the Old Empire and the New Empire is the vision that the New World is full of animal people -- dark people who have been breeding with the native creatures since the time began. This belief allows the New Empire, as was the case with Old Empire, to rape and reconfigure the dark native as animals -- first in the name of God and now in the name of Genomics. Maori activists have already had to take a very active stance on this concern. Donna Gardiner, a Maori researcher, has written extensively on the movement of Selbourne Biological Services and PPL Therapeutics in the Tauranga area of Aotearoa, New Zealand. Selbourne Biological Services imported human DNA for insertion into sheep -- those sheep are bred in Tauranga. Donna outlines the manipulative practices of the company to gain access to Tauranga. Her research found that the company asserted by letter to the Ministry of Environment that five members of the Ngati He/Ngai Te Ahi tribes had formalized approval of the company's application. Four of the five tribal members identified in the letter stated that they had not given any such approval. After some probing, they realized that one of their members had indeed signed a letter composed by the company, after being convinced the research was for the "greater good of mankind." Gardiner states that "The thought of human and animal genes being mixed was totally abhorrent and offensive both culturally and morally." The issue is not that we, as humans, are part of the same Genome as all the rest of the species on the genetic beach -- because we are and have always been -- but that profits are now being extracted from the links between human cells and those of animals. The New Empire wears genes as a sign of wealth and objective "truth," and as a re-play of its historical destiny. As Hegel decreed, progress in the realm of history was possible because it has always already been accomplished in the realm of "truth." The New Empire is now on the genetic beach planting its flag. The symbol on this flag is "TM." The trademark is now the only "truth" of this Empire. This time, the local natives won't be silent and will slowly surround Columbus as he prays and send him back naked, wearing only his own genes.

[F a s t F o r w a r d]

What Are Nanos Good For

Not much difference between a banana and a human. Same Atoms, just arranged differently.
-K. Eric Drexler, *Engines of Creation: The Coming Era of Nanotechnology (1986)*

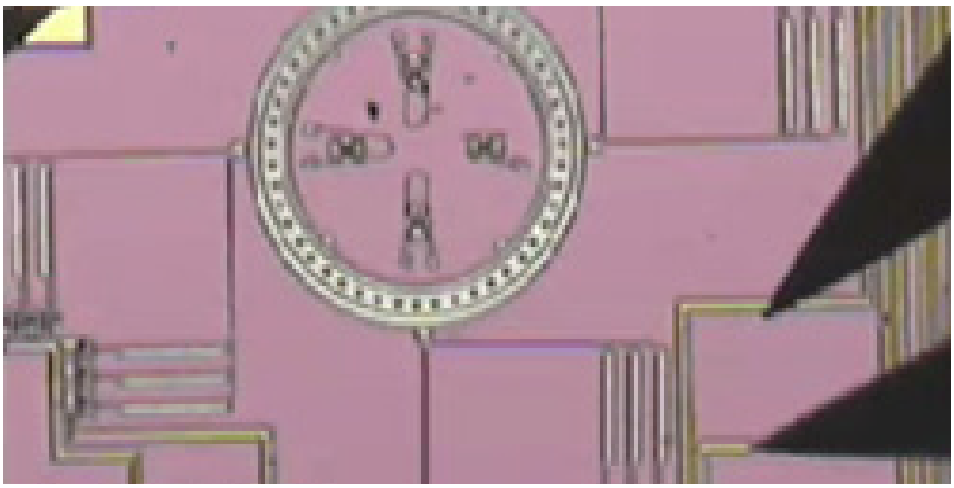
Nanotechnology is said to offer us an unprecedented new set of technical and economic opportunities. The opportunities include: the development of inexpensive and abundant diamond-like building materials with a strength-to-weight ratio 50 times greater than titanium; the possibility of widespread material abundance for all the Earth's people; the development of revolutionary new techniques in medicine; and the opening of the space frontier for development. Nanotechnologists also admit that along with these new capabilities come new risks, and new responsibilities. Drexler states that those working with nanotechnology must accept that, "…the future capabilities of MNT also raise an unprecedented set of military, security and environmental issues. Dealing with these issues proactively will be critical to the positive development of the field." That's what scientists said when talk of splitting the atom was contemplated as possibility. It did not help the outcome.

Gray Gooing the Universe

Do not adjust your mind - there is a fault in reality.
-Easy Rider (The Movie, 1971)

On the other side, objective scientific speculations from exploratory engineers have a number of 'End of History' scenarios available. One, primary assemblers will achieve A.I. level rapidly and displace humanity as the dominant species. The MNT guidelines call for the containment of the primary assemblers with specific types of command and control spaces, like the Double Security Sphere Protocols (DSSP). The DSSP call for the building of double spheres that will enclose all primary assemblers within an imploding event horizon both within and without: if the containment sphere senses external rupture, it automatically implodes; if the internal sphere senses a disturbance, it automatically implodes.

Two, History as Assembler, could end as a gray goo syndrome (GGS) -- the reverse-engineering of secondary assemblers towards the negation of all molecular programs and into an endless gray biomass sea consuming everything -- and would finally encompass the moon after a few months of replication. This would occur if secondary assemblers or stage-two self-replicating nanobots are built to function autonomously in the natural environment. They could quickly convert that natural environment (e.g., "biomass") into replicas of themselves



(e.g., "nanomass") on a global basis, a scenario usually referred to as the "gray goo syndrome" but perhaps more properly termed "global ecophagy."

As Drexler first warned in *Engines of Creation: The Coming Era of Nanotechnology* (1986):

"Among the cognoscenti of nanotechnology, this threat has become known as the 'gray goo syndrome.' Though masses of uncontrolled replicators need not be gray or gooey, the term 'gray goo' emphasizes that replicators able to obliterate life might be less inspiring than a single species of crabgrass. They might be superior in an evolutionary sense, but this need not make them valuable. The gray goo threat makes one thing perfectly clear: We cannot afford certain kinds of accidents with replicating assemblers. Gray goo would surely be a depressing ending to our human adventure on Earth, far worse than mere fire or ice, and one that could stem from a simple laboratory accident."

Gray Gooing Capital with Anti-Market Science

Everything that can be invented has been invented.
-Charles H. Duell, Commissioner of the US Office of Patents (1899)

Economy as we know it will come to an end. No more scarcity.
-K. Eric Drexler, *Engines of Creation: The Coming Era of Nanotechnology (1986)*

In mid-1999, Business Week announced that Nanotech will turn "matter into software." Right now, both Japan and the European Union are on equal footing in government support of MNT growth. Britain has established a Nanotechnology Link Program and the French and Germans have created 'Nano-valley' on the upper Rhine. Japan is at this time the most developed MNT country. In the U.S., research expenditures on nanotechnology have soared from US$ 116 million (1998) to US$ 220 million in 2000 and US $460 million in 2001. The U.S. Navy is creating an Institute for Nanoscience, which will open in Washington D.C. in March

An Interruption: The New Luddite Challenge

First let us postulate that the computer scientists succeed in developing intelligent machines that can do all things better than human beings can do them. In that case presumably all work will be done by vast, highly organized systems of machines and no human effort will be necessary. Either of two cases might occur. The machines might be permitted to make all of their own decisions without human oversight, or else human control over the machines might be retained.

If the machines are permitted to make all their own decisions, we can't make any conjectures as to the results, because it is impossible to guess how such machines might behave. We only point out that the fate of the human race would be at the mercy of the machines. It might be argued that the human race would never be foolish enough to hand over all the power to the machines. But we are suggesting neither that the human race would voluntarily turn power over to the machines nor that the machines would willfully seize power. What we do suggest is that the human race might easily permit itself to drift into a position of such dependence on the machines that it would have no practical choice but to accept all of the machines' decisions. As society and the problems that face it become more and more complex and machines become more and more intelligent, people will let machines make more of their decisions for them, simply because machine-made decisions will bring better results than man-made ones. Eventually a stage may be reached at which the decisions necessary to keep the system running will be so complex that human beings will be incapable of making them intelligently. At that stage the machines will be in effective control. People won't be able to just turn the machines off, because they will be so dependent on them that turning them off would amount to suicide.

On the other hand it is possible that human control over the machines may be retained. In that case the average man may have control over certain private machines of his own, such as his car or his personal computer, but control over large systems of machines will be in the hands of a tiny elite -- just as it is today, but with two differences. Due to improved techniques, the elite will have greater control over the masses; and because human work will no longer be necessary, the masses will be superfluous, a useless burden on the system. If the elite is ruthless, they may simply decide to exterminate the mass of humanity. If they are humane, they may use propaganda or other psychological or biological techniques to reduce the birth rate until the mass of humanity becomes extinct, leaving the world to the elite. Or, if the elite consists of soft-hearted liberals, they may decide to play the role of good shepherds to the rest of the human race. They will see to it that everyone's physical needs are satisfied, that all children are raised under psychologically hygienic conditions, that everyone has a wholesome hobby to keep him busy, and that anyone who may become dissatisfied undergoes "treatment" to cure his "problem." Of course, life will be so purposeless that people will have to be biologically or psychologically engineered either to remove their need for the power process or make them "sublimate" their drive for power into some harmless hobby. These engineered human beings may be happy in such a society, but they will most certainly not be free. They will have been reduced to the status of domestic animals.

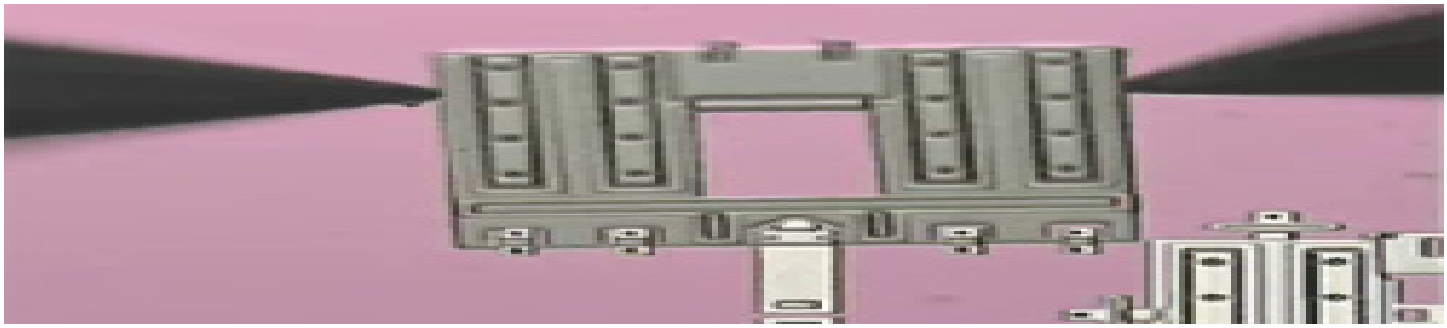
The Unabomber, 1994

2002.
The market containment of MNT is now under a double re-configuration: first, the economic enclosure of scientific speculation as a new market engine and, second, a technological displacement of economy as a historical drive. At the same moment where MNT is being embraced as part of the general economy, its internal objective trajectory aligns it with a vision of material scarcity -- scarcity as the governing doctrine of Capital finally ending. Capital under the sign of MNT enters slow eraser. The exploratory engineers working on Nanotech see the end of Capital. Indeed History as Capital will now be re-shifted into History as Assembler. The historical shift of an economic embrace of an anti-market science will expand into assembler networks -- exchange will become based on design values as distribution and not as Capital.

GNR: Genetics, Nanotechnology, and Robotics

We're in a war...We're going to bury this first wave of biotech. The first battle is labeling. The second battle is banning it.

- Activist at a protesters' gathering, November 1999 World Trade Organization meeting in Seattle.



Machine Meat

Biological species almost never survive encounters with superior competitors. Ten million years ago, South and North America were separated by a sunken Panama isthmus. South America, like Australia today, was populated by marsupial mammals, including pouched equivalents of rats, deers, and tigers. When the isthmus connecting North and South America rose, it took only a few thousand years for the northern placental species, with slightly more effective metabolisms and reproductive and nervous systems, to displace and eliminate almost all the southern marsupials.

In a completely free marketplace, superior robots would surely affect humans as North American placentals affected South American marsupials (and as humans have affected countless species). Robotic industries would compete vigorously among themselves for matter, energy, and space, incidentally driving their price beyond human reach. Unable to afford the necessities of life, biological humans would be squeezed out of existence.

The technologies underlying the weapons of mass destruction (WMD) -- nuclear, biological, and chemical (NBC) -- were powerful, and the weapons are an enormous threat. But building nuclear weapons required, at least for a time, access to both rare -- indeed, effectively unavailable -- raw materials and highly protected information; biological and chemical weapons programs also tended to require large-scale activities.

The 21st-century technologies -- genetics, nanotechnology, and robotics (GNR) -- are so powerful that they can spawn whole new classes of accidents and abuses. Most dangerously, for the first time, these accidents and abuses are widely within the reach of individuals or small groups. They will not require large facilities or rare raw materials. Knowledge alone will enable the use of them.

[Rewind to Clone Capitalism]

An Intervention: The End of the Gene or Artist as I-biology Tool

When the circuit learns your job, what are you going to do?
-Marshall McLuhan, *The Medium is the Massage* (1967)

The gene is a concept past its time.
-William Gelbart, molecular geneticist, *Science* (1998)

DNA as data is now staged as a "circuit" that performs you as gene. The question of performance as a function between software and wetware breaks down with the Human Genome Project. Data harvesting with I-biology tools displaces the performance of DNA as an invisible engine of wetware. The gene has now been spliced into data and distributed for profit. The gene has collapsed under the weight of data. We are now truly data bodies down to our genes.

The time between emergence of "the gene" and extinction of "the gene" was quick and efficient. Under the hyper-Darwinism of Clone Capitalism, the gene becomes a concept of the past before we can even understand it in the present. It will be important and necessary to trace the process of this disappearance, to document the moment when the circuit became the gene. The moment when our DNA became a distributed network for the market and no longer resides in our bodies.

"i-Biology Patent Engine (i-BPE)" and "Memoryflesh: Harvesting the Net" by Diane Ludin stages the end of the gene. She behaves as the "circuit" that has learned "your job." She takes on the task of a search engine, a "reflective performance system," in order to trace the collapse of the gene. She becomes an information bot, she performs as a network spider, as an automated search engine harvesting the net for the last genetic traces and the first signs of the post-Genomic system. Her auto-organic parameters seek out points of market growth and intensification around "system-based biology," not only as they function within scientific testing and speculation, but from the spillage of economic hype surrounding the I-biology tools and software on Wall Street.

With the E-commerce market falling into the black hole of a present which could not meet the demands of the future, the market is looking at Clone Capitalism as the next hype-zone. "Memoryflesh" crawls and gathers the inflated discourse that is being manufactured by the Wall Street media networks for the promotion of Clone Capitalism: "Point-and-Click Genes, Genetic Landlords, Genetic Profits, Genetic Rents, Impulse Buy Genes, Selling Rights To Mine The Gene, and I Own You_Therefore I Am." Each one of these headlines are brought back by the artist as search engine into a counter database. The database is the staging area for the performance. Ludin becomes a primitive circuit learning its job and offering the harvest for access and distribution. She becomes her own I-biology tool, her own disappearance engine, and deposits the documentation for all to witness.

While it may not be possible to fully perform within the scientific networks that float in the inaccessible atmosphere of "scientific objectivity," one possible zone for intervention and re-reading by artists and activists is the space between "system-based biology" and the networks that Clone Capitalism is now interlocking into the old E-Capitalism database sharing tools in order to create new speculation bubbles. The intersection between the "gene" as data and the bio-tech market volatility may offer us an important circuit to shift the social teleology that is mining our bodies for profit. Ludin's "i-BPE" and "Memoryflesh" project traces the possibility of understanding this brief window of opportunity for network_art and tactical bio-media in the future.

i-BPE http://w3.thing.net/~diane/

Memoryflesh
http://memoryflesh.walkerart.org

[Fast Forwarding to the End of Nano History]

No Longer Science or Forget Mapping

Science aims to understand how things work; engineering aims to make things work. Sciencetakes the thing as given and studies its behavior; engineering takes a behavior as given and studies how to make something that will act that way.

-K. Eric Drexler,"Exploratory Engineering" (1988)

The diagram is highly unstable or fluid, continually churning up matter and functions in a way likely to create change...but, first one must fine visibilities and thresholds.

-Gilles Deleuze, *Foucault* (1988)

With MNT, we are no longer in the space of science, but in the space of engineering, two very different conditions and goals. Science is about mapping the process, the transmission, the in-between state between the message sent and the message received. Engineering, on the other hand, is about building diagrams. A diagram is a layered mapping, a transparent map floating between a number of maps. A Naval prison hospital is a diagram of multiple maps at work within one space. Engineering does not seek to map, but to build the mechanisms, or diagrams, necessary to send and receive, translate, and archive the input and the output defined by the maps.

While the force of scientific mapping is difficult to re-define or displace, the diagram function of "exploratory engineering" offers segmentations and visibilities to create counter-diagrams. Inside the diagram, knowledge is a practical assemblage, a mechanism of visibilities and thresholds for re-drawing the lines. The space of exploratory engineering creates a possible space for tactical assemblages for change and resistance to the Nanotech diagram. Critical interventionists need to develop community research initiatives for counter-diagram constructions and distribution of counter-top-down or bottom-up diagrams. Counter-MNT interventions cannot not stop the mapping process, but they can create limited tactical actions to re-shift the diagram of Nanotech. Tactical actions will have to be developed based on finding the points of visibilities and thresholds within the emerging Nanotech diagram.

Bad Nanos in the Genes

If it's new, they hate it.

-Ronald Bailey "Rebels Against the Future," *Reason Magazine (2001)*

Imagine if young Nanos (or Nannites) become nostalgic and desire body architectures for themselves. Using genomic transitivity, the Nannities can create the DNA of their desired representations. Perhaps the latest fads at the end of 3000 A.D. among young Nannites will be coagulating as Elvises and Madonnas. Conservative Nanos would be unable to stop the rage for gene replication of popular human icons. No longer would the small and invisible reign, the body Nannites gangs would call for a brave new world of big genes. Bad Nanos would become human, party all night, and forget to rearrange reality the next day.

[Video Fades to Black]